## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating a new group definition</td>
<td>123</td>
</tr>
<tr>
<td>Defining a logical migration group</td>
<td>124</td>
</tr>
<tr>
<td>Defining a volume migration group</td>
<td>135</td>
</tr>
<tr>
<td>Defining a Volume Mirror group</td>
<td>139</td>
</tr>
<tr>
<td>Saving a group definition</td>
<td>140</td>
</tr>
<tr>
<td>Verifying a group definition</td>
<td>141</td>
</tr>
<tr>
<td>Promoting a group definition</td>
<td>143</td>
</tr>
<tr>
<td>Modifying a group definition</td>
<td>143</td>
</tr>
<tr>
<td>Deleting a group definition</td>
<td>145</td>
</tr>
<tr>
<td>Option 2 – Monitor Promoted Groups</td>
<td>146</td>
</tr>
<tr>
<td>Line commands for groups</td>
<td>147</td>
</tr>
<tr>
<td>Volume Mirror/Migrator volume configuration display</td>
<td>148</td>
</tr>
<tr>
<td>Logical migration dataset configuration display</td>
<td>149</td>
</tr>
<tr>
<td>Activating a group</td>
<td>150</td>
</tr>
<tr>
<td>Suspending a group</td>
<td>151</td>
</tr>
<tr>
<td>Resuming a suspended group</td>
<td>152</td>
</tr>
<tr>
<td>Diverting a logical migration group</td>
<td>152</td>
</tr>
<tr>
<td>Completing a logical migration group</td>
<td>153</td>
</tr>
<tr>
<td>Deactivating a group</td>
<td>154</td>
</tr>
<tr>
<td>Sample group display panels</td>
<td>154</td>
</tr>
<tr>
<td>Option 3 – Display Configuration Information</td>
<td>156</td>
</tr>
<tr>
<td>Option 4 – Operator Interface</td>
<td>157</td>
</tr>
<tr>
<td>Option 5 – Display Host Messages</td>
<td>157</td>
</tr>
<tr>
<td>Displaying messages for a host system</td>
<td>158</td>
</tr>
<tr>
<td>Option 6 – System Change Summary</td>
<td>159</td>
</tr>
<tr>
<td>Option 7 – Message Help</td>
<td>160</td>
</tr>
<tr>
<td>Option 8 – Monitor Command Line Help</td>
<td>162</td>
</tr>
<tr>
<td>Option 9 – Display installation Options</td>
<td>163</td>
</tr>
<tr>
<td>Option V – View or Browse Log dataset</td>
<td>164</td>
</tr>
</tbody>
</table>

### Chapter 7  z/OS Migrator Command Line Interface

#### Overview

- Submitting CLI commands                                       | 166  |
- General syntax                                               | 166  |
- Syntax conventions                                           | 167  |

#### Help facility

- HELP                                                      | 167  |
- HELP                                                      | 168  |

#### z/OS Migrator active commands

- ACTivate                                                  | 168  |
- COMPLETE                                                  | 169  |
- DEACTivate                                                 | 169  |
- DELete                                                     | 169  |
- DIVert                                                     | 170  |
- DROP                                                       | 171  |
- REFVTOC                                                    | 171  |
- RESume                                                     | 172  |
- SHUTDOWN                                                   | 172  |
- SPIN                                                       | 172  |
- SPLIT                                                      | 173  |
- SPLITMOUNT                                                 | 173  |
- STOP                                                       | 173  |
- SUSpend                                                    | 174  |
- SWAP                                                       | 174  |
- TERMinate                                                  | 174  |
Chapter 9  z/OS Migrator Examples

Overview................................................................................................ 226
Setting session options ........................................................................ 226
Migrating a single dataset, non-SMS ..................................................... 230
  Storage environment ................................................................. 230
  Migration objective ................................................................... 230
  Defining a logical migration group ............................................. 230
Migrating a single multi-volume dataset, non-SMS ............................... 233
  Storage environment ................................................................. 233
  Migration objective ................................................................... 233
  Defining a logical migration group ............................................. 233
Migrating multiple datasets, non-SMS................................................... 236
  Storage environment ................................................................. 236
  Migration objectives ................................................................... 236
  Defining logical migration groups ............................................. 236
Migrating multiple datasets, SMS volumes............................................. 241
  Storage environment ................................................................. 241
  Migration objectives ................................................................... 241
  Defining logical migration groups ............................................. 241
Volume Mirror example.......................................................................... 244
Volume Migrator examples..................................................................... 253
  Split offline example ................................................................... 253
  Consistent Migration example .................................................. 260
  Constant Copy example ................................................................ 269

Chapter 10  z/OS Migrator Batch Utility

Overview............................................................................................... 278
Execution parameters ............................................................................ 278
Group definition dataset......................................................................... 279
SYSIN commands .................................................................................. 279
  IF GROUP groupname [NOT] EXIST ........................................ 279
  IF GROUP groupname STATUS [NOT] groupstatus .................. 279
  IF RC operator value ................................................................ 280
  MAXWAIT nnnnn ................................................................. 280
  PROMOTE DLM=xx ............................................................. 280
  PROMOTE group-member-name .............................................. 280
  QUIT ....................................................................................... 280
  VERIFY group-member-name ................................................ 280
  WAIT GROUP groupname STATUS [NOT] groupstatus .......... 280
  WAIT nnnnn ................................................................. 280
Usage examples................................................................................ 281
Sample batch jobs for logical migration................................................ 281
  ZOSM5070 ............................................................................ 281
  ZOSM5071 ............................................................................ 285
Sample batch jobs for volume migration ............................................... 286
  Sample SYSPRINT output ...................................................... 286

Appendix A  Determining CPU Serial Number

Determining CPU serial number ......................................................... 290

Appendix B  Detailed Parameter Reference

Execution and global configuration parameters ................................... 292
<table>
<thead>
<tr>
<th>1</th>
<th>z/OS data components</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Determination of PAV status after a swap</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>EMC storage system requirements</td>
<td>36</td>
</tr>
<tr>
<td>4</td>
<td>Mainframe hardware and software requirements</td>
<td>37</td>
</tr>
<tr>
<td>5</td>
<td>RIMLIB contents</td>
<td>49</td>
</tr>
<tr>
<td>6</td>
<td>SYSOPTN defaults and options</td>
<td>55</td>
</tr>
<tr>
<td>7</td>
<td>z/OS Migrator JCL substitution variables</td>
<td>64</td>
</tr>
<tr>
<td>8</td>
<td>Pre-migration planning checklist</td>
<td>74</td>
</tr>
<tr>
<td>9</td>
<td>Migration action item checklist</td>
<td>75</td>
</tr>
<tr>
<td>10</td>
<td>DFDSS masking rules</td>
<td>79</td>
</tr>
<tr>
<td>11</td>
<td>z/OS Migrator data migration process</td>
<td>105</td>
</tr>
<tr>
<td>12</td>
<td>Configuration and control parameters</td>
<td>119</td>
</tr>
<tr>
<td>13</td>
<td>Define z/OS Migrator Group panel - Primary commands</td>
<td>121</td>
</tr>
<tr>
<td>14</td>
<td>Manage Group Members panel - Line commands</td>
<td>122</td>
</tr>
<tr>
<td>15</td>
<td>Kinds of build types</td>
<td>123</td>
</tr>
<tr>
<td>16</td>
<td>Group options</td>
<td>124</td>
</tr>
<tr>
<td>17</td>
<td>Source dataset options</td>
<td>126</td>
</tr>
<tr>
<td>18</td>
<td>Target parameters</td>
<td>132</td>
</tr>
<tr>
<td>19</td>
<td>Migrate Group parameters</td>
<td>135</td>
</tr>
<tr>
<td>20</td>
<td>Volume Mirror group parameters</td>
<td>139</td>
</tr>
<tr>
<td>21</td>
<td>Modes and group types</td>
<td>146</td>
</tr>
<tr>
<td>22</td>
<td>Monitor Promoted Groups - line commands for groups</td>
<td>147</td>
</tr>
<tr>
<td>23</td>
<td>z/OS Migrator Dataset List line commands</td>
<td>149</td>
</tr>
<tr>
<td>24</td>
<td>z/OS Migrator Dataset List filters</td>
<td>150</td>
</tr>
<tr>
<td>25</td>
<td>Logical migration group fields</td>
<td>154</td>
</tr>
<tr>
<td>26</td>
<td>Volume migration group fields</td>
<td>155</td>
</tr>
<tr>
<td>27</td>
<td>Subsystem Host messages panel fields</td>
<td>158</td>
</tr>
<tr>
<td>28</td>
<td>z/OS Migrator message severity table</td>
<td>161</td>
</tr>
<tr>
<td>29</td>
<td>Mirror Group parameter values</td>
<td>246</td>
</tr>
<tr>
<td>30</td>
<td>New Group parameter value examples</td>
<td>254</td>
</tr>
<tr>
<td>31</td>
<td>Create group parameter values</td>
<td>262</td>
</tr>
<tr>
<td>32</td>
<td>Group parameter value examples</td>
<td>270</td>
</tr>
<tr>
<td>33</td>
<td>Deciphering D M=CPU output</td>
<td>290</td>
</tr>
<tr>
<td>34</td>
<td>Execution and global configuration parameters</td>
<td>292</td>
</tr>
<tr>
<td>35</td>
<td>Suspend reason codes</td>
<td>320</td>
</tr>
<tr>
<td>36</td>
<td>Suspend physical volume state codes</td>
<td>323</td>
</tr>
<tr>
<td>37</td>
<td>Suspend logical extent state codes</td>
<td>324</td>
</tr>
<tr>
<td>38</td>
<td>z/OS Migrator group error reason codes</td>
<td>325</td>
</tr>
<tr>
<td>39</td>
<td>z/OS Migrator security record return codes</td>
<td>336</td>
</tr>
<tr>
<td>40</td>
<td>VMAX interface error code explanations</td>
<td>337</td>
</tr>
<tr>
<td>41</td>
<td>Dataset entries</td>
<td>340</td>
</tr>
</tbody>
</table>
PREFACE

As part of an effort to improve its product lines, EMC periodically releases revisions of its software and hardware. Therefore, some functions described in this document might not be supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information on product features.

Contact your EMC representative if a product does not function properly or does not function as described in this document.

Note: This document was accurate at publication time. New versions of this document might be released on the EMC online support website. Check the EMC online support website to ensure that you are using the latest version of this document.

Purpose

This document describes how to configure and use z/OS Migrator.

Audience

This document is intended for EMC customers to perform online migrations of their active mainframe datasets between logical volumes, and to perform online mirroring and migration of full volumes.

Related documentation

The following EMC publications provide additional information:

- z/OS Migrator Message Guide
- z/OS Migrator Release Notes
- ResourcePak Base for z/OS Product Guide
- TimeFinder Utility for z/OS Product Guide

The following documents provide additional information:

- EMC VMAX All Flash Product Guide — Documents the features and functions of the VMAX All Flash arrays.
- HYPERMAX OS for EMC VMAX All Flash and EMC VMAX3 Family Release Notes — Describe new features and any known limitations.
- EMC VMAX3 Family with HYPERMAX OS Product Guide— Documents the features and functions of the VMAX3 100K, 200K, and 400K arrays.
- E-Lab™ Interoperability Navigator (ELN) — Provides a web-based interoperability and solution search portal. You can find the ELN at https://elabnavigator.EMC.com.
Conventions used in this document

EMC uses the following conventions for special notices:

**CAUTION**

CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

**Note:** A note presents information that is important, but not hazard-related.

**IMPORTANT**

An important notice contains information essential to software or hardware operation.

**Typographical conventions**

EMC uses the following type style conventions in this document:

**Normal**

Used in running (nonprocedural) text for:
- Names of interface elements, such as names of windows, dialog boxes, buttons, fields, and menus
- Names of resources, attributes, pools, Boolean expressions, buttons, DQL statements, keywords, clauses, environment variables, functions, and utilities
- URLs, pathnames, filenames, directory names, computer names, links, groups, service keys, file systems, and notifications

**Bold**

Used in running (nonprocedural) text for names of commands, daemons, options, programs, processes, services, applications, utilities, kernels, notifications, system calls, and man pages

Used in procedures for:
- Names of interface elements, such as names of windows, dialog boxes, buttons, fields, and menus
- What the user specifically selects, clicks, presses, or types

**Italic**

Used in all text (including procedures) for:
- Full titles of publications referenced in text
- Emphasis, for example, a new term
- Variables

**Courier**

Used for:
- System output, such as an error message or script
- URLs, complete paths, filenames, prompts, and syntax when shown outside of running text

**Courier bold**

Used for specific user input, such as commands

**Courier italic**

Used in procedures for:
- Variables on the command line
- User input variables

< >

Angle brackets enclose parameter or variable values supplied by the user

[ ]

Square brackets enclose optional values

| |

Vertical bar indicates alternate selections — the bar means “or”

{} 

Braces enclose content that the user must specify, such as x or y or z

... 

Ellipses indicate nonessential information omitted from the example
Where to get help

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https://support.EMC.com

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EMC offers a variety of support options.

Support by Product — EMC offers consolidated, product-specific information on the Web at:

https://support.EMC.com/products

The Support by Product web pages offer quick links to Documentation, White Papers, Advisories (such as frequently used Knowledgebase articles), and Downloads, as well as more dynamic content, such as presentations, discussion, relevant Customer Support Forum entries, and a link to EMC Live Chat.

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- **North America, Latin America, APJK, Australia, New Zealand:** SVC4EMC (800-782-4362) and follow the voice prompts.
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Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications. Send your opinions of this document to:

VMAXContentFeedback@emc.com
CHAPTER 1
Overview

This chapter provides an overview of EMC z/OS Migrator, including functions and components. Topics include:

◆ Data migration challenge .............................................................. 20
◆ Introducing z/OS Migrator ............................................................ 20
◆ Volume Mirror and Volume Migrator .............................................. 23
◆ How z/OS Migrator fits into your environment ............................ 24
◆ Supported storage subsystems and dataset types ......................... 31
Data migration challenge

As data storage capacity requirements continue to grow, the demand for 24/7 data availability increases. At the same time, there is a strong need to control costs. Data centers face a dilemma: the introduction of new storage technology is traditionally disruptive. The need for upgrades and reconfigurations conflicts with the need to ensure maximum availability of the data and, in turn, application availability.

Traditionally, customers have required tools to support the events that drive data migrations, including such needs as:

- **Technology refreshes**, at which time new storage devices are brought in to replace existing storage devices.
- **Disk maintenance**, where storage devices must be off-loaded to allow maintenance activities to be performed on a storage device.
- **Performance related issues**, where data must be migrated to better balance activity within or across storage devices.

Introducing z/OS Migrator

EMC z/OS Migrator is a host-based data migration facility that migrates data from any vendor's storage array to a VMAX system without application downtime or disruption to business-continuity readiness. It can also be used to migrate data from one VMAX system to another. The migration can be done at either the volume or the dataset level.

EMC z/OS Migrator performs traditional volume migrations as well as host-based volume mirroring. Together, these capabilities are referred to as the Volume Mirror and Volume Migrator functions of z/OS Migrator. They are described in “Volume Mirror and Volume Migrator” on page 23.

In addition, z/OS Migrator can also migrate active mainframe datasets at the logical dataset (extent) level from one set of volumes to another, without any application downtime. This capability is referred to as logical migration, and z/OS Migrator can perform this migration in a non-disruptive manner to applications and business continuity. For an in-depth explanation of logical migration, its processing and requirements, refer to “z/OS Migrator migration process” on page 105.

Technical benefits of z/OS Migrator and logical migration

With z/OS Migrator, you can:

- Introduce new storage subsystem technologies with minimal disruption of service.
- Allow users to easily reclaim z/OS UCBs by simplifying the migration of datasets to larger volumes (combining volumes).
- Facilitate data migration while applications continue to run and fully access data being migrated, eliminating application downtime usually required when migrating data.
- Eliminate the need to coordinate application downtime across the business, and eliminate the costly impact of such downtime on the business.
Introducing z/OS Migrator 21

Overview

◆ Improve application performance by facilitating the relocation of poor performing datasets to lesser used volumes/storage arrays.
◆ Ensure all metadata always accurately reflects the location and status of datasets being migrated.

Business benefits of z/OS Migrator logical migration

Traditionally, when performing data migrations at the dataset level, users have been forced to deal with application downtime during the actual relocation process. Though excellent facilities exist for moving data, they require the exclusive usage of the dataset during the migration process.

z/OS Migrator differs from these other migration techniques in a major way: it does not require the exclusive usage of any dataset during the migration process.

Due to this, the following business benefits can be gained through the implementation of z/OS Migrator:
◆ Elimination of limited migration windows
    Migration windows typically take place on weekends. Time allotted is usually very small, possibly several hours in duration. During this time, applications are taken down, and then data can be moved. In contrast, z/OS Migrator allows you to move the data at leisure at any time of the day, turning a once-a-week migration window from 2 hours per week to the full week, or a 168-hour migration window.
◆ Eliminating downtime
    By eliminating the migration window, businesses no longer have to plan to have extended periods of time where their applications are down. When applications are down, business is not performed as normal. This can be costly to a business. z/OS Migrator eliminates the need to have business outages.
◆ Eliminating off-hour work
    Allowing migrations to be performed at any time allows storage administrators, operations staff, and business application support personnel the ability to work normal business hours. Additionally, this lowers the overall cost for the business by eliminating off-hours work.
◆ Reduced hardware expenditures
    Since data can be migrated much more efficiently and quickly with z/OS Migrator, storage resources are freed up much faster. Whether the source devices are coming off-lease, or being redeployed, this results in savings.

Figure 1 illustrates the business value of z/OS Migrator.

<table>
<thead>
<tr>
<th>Saturday, July 25</th>
<th>Sunday, July 26</th>
<th>Monday, July 27</th>
<th>Tuesday, July 28</th>
<th>Wednesday, July 29</th>
<th>Thursday, July 30</th>
<th>Friday, July 31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
</tr>
</tbody>
</table>

Figure 1 z/OS Migrator business value
Migration technology

Volume-level data migration facilities move logical volumes in their entirety. z/OS Migrator volume migration is performed on a track for track basis without regard to the logical contents of the volumes involved. Volume migrations end in a volume swap which is entirely non-disruptive to any applications using the data on the volumes.

Frequently, however, it is advantageous to relocate datasets at a more granular level. So, in addition to volume migration, z/OS Migrator provides for logical migration, that is, the migration of individual datasets. In contrast to volume migration functions, z/OS Migrator performs dataset migrations with full awareness of the contents of the volume, and the metadata in the z/OS system that describe the datasets on the logical volume.

Figure 2 illustrates the metadata that must be dealt with when dynamically relocating a dataset.

Figure 2 Metadata challenges
Table 1 describes the z/OS data components.

<table>
<thead>
<tr>
<th>z/OS data component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTOC</td>
<td>Contains information describing volume contents, including information about specific datasets (number of extents, size of extents, starting locations, and so forth).</td>
</tr>
<tr>
<td>VVDS</td>
<td>Introduced with ICF Catalogs, the VVDS contains similar dataset information as contained in the VTOC. Additional information, such as VSAM datasets RBA (relative block address) values, are kept in the VVDS.</td>
</tr>
<tr>
<td>Catalog</td>
<td>A typical z/OS system involves the use of many USER catalogs managed via the MASTER catalog. For cataloged datasets, where the datasets is located (volume or volumes) is maintained in the catalog. Catalog information is kept not only on the DASD volume holding the catalog, but also in memory as part of the CATALOG address space.</td>
</tr>
<tr>
<td>Coupling facility</td>
<td>If Enhanced Catalog Sharing is in use, then VVR entries from the VVDS may be cached in the Coupling Facility.</td>
</tr>
<tr>
<td>Application address spaces</td>
<td>When an application opens a dataset, control blocks are built in memory that describe the dataset. These control blocks describe the location of the dataset and its extents (physical location on disk). When the application issues a read or write request, the access method being used (such as QSAM or VSAM) will build a channel program, which refers to the device and the physical cylinder and track containing the application data to be accessed.</td>
</tr>
</tbody>
</table>

To facilitate data migration at the logical data level, the data migration facility must understand the z/OS metadata structures that describe the logical data being migrated, as well as be able to manipulate and update the metadata dynamically while applications and the system continue to access and modify the data.

z/OS Migrator dataset migration functions automatically manage all metadata during the migration process with the result that there is no disruption to active applications using the migrating datasets.

**Volume Mirror and Volume Migrator**

Volume Mirror and Volume Migrator are part of z/OS Migrator. You define a mirror or migrator member when you set up a new volume migration group. After that, the z/OS Migrator panels contain volume-specific selections.

**Volume Mirror**

Volume mirroring provides mainframe installations with volume-level mirroring from one VMAX device to another. It uses host resources (UCBs, CPU, and channels) to monitor channel programs scheduled to write to a specified primary volume and clones them to also write to a specified target volume (called a mirror volume).

After achieving a state of synchronization between the primary and mirror volumes, Volume Mirror maintains the volumes in a fully synchronized state indefinitely, unless interrupted by an operator command or by an I/O failure to a Volume Mirror device. Mirroring is controlled by the volume group. Mirroring may be suspended consistently for all volumes in the group.
Volume Migrator

Volume migration provides host-based services for data migration at the volume level on mainframe systems. It provides migration from third-party devices to VMAX devices as well as migration between VMAX devices. z/OS Migrator provides for a consistent swap across all group volumes if a Consistent Volume Migration type is selected when the group is built.

How z/OS Migrator fits into your environment

Figure 3 outlines how z/OS Migrator fits into your z/OS environment.

Figure 3  z/OS Migrator host-based data migration

Within your environment, z/OS Migrator offers the following benefits:

- Full target and source flexibility. All 3380 and 3390 Count Key Data/Extended (CKD/E) capable control units in the data center can participate in a migration.
- Full system sharing throughout the data center.
- Full access to the data at any point during a migration operation.
- Installs dynamically; no IPL is required.
- Works with pairs of datasets, including the original “source” dataset and the new “target” dataset.
How z/OS Migrator fits into your environment

Overview

- Uses both asynchronous and synchronous techniques to copy data from source locations to target locations, thus minimizing performance overhead.
- Applications continue to access and update the source dataset as normal while the logical migration group is active. z/OS Migrator ensures all updates are mirrored to the target dataset. Eventually, under user direction, z/OS Migrator can divert all I/O activity to the target dataset and simultaneously modify all metadata to reflect the new location of the dataset.
- Supports multiple system data-sharing environments.
- Guarantees physical data integrity with ongoing internal heartbeat monitoring, error detection, and recovery capability.

z/OS Migrator components

Figure 4 outlines the primary z/OS Migrator components and their functions.

![Figure 4 The z/OS Migrator components](image)
z/OS Migrator server

The z/OS Migrator server is the primary component of the z/OS Migrator product framework. The z/OS Migrator server is a z/OS started task that must run on each system that has access to the data that will be migrated.

The z/OS Migrator server includes path validation services to ensure data integrity by ensuring z/OS Migrator is active on each LPAR/system where a volume migration group source device is found ONLINE. These services are controlled by the CONFIG file global OPTIONS value PATHVAL which is the default if not specifically set in the CONFIG. See “PATHVAL/NOPATHVAL” on page 308 for more information.

The z/OS Migrator server provides the following functionality:

◆ Fulfills data migration requests from other components such as the z/OS Migrator ISPF Monitor. For this reason, the z/OS Migrator server must be up and running before any data migration activities can take place.

◆ During a migration, the z/OS Migrator server initiates, coordinates, and performs the following actions:
  
  - Once z/OS Migrator groups are defined, they are promoted to the z/OS Migrator server, which validates them and stores them in the z/OS Migrator database.

  - Manages migration groups through all stages of a migration across all systems in the migration environment, including Promotion, Activation, Copy, Synchronization, Diversion, and Completion. Refer to “z/OS Migrator migration process” on page 105 for more information.

  - Copies and synchronizes all migration groups during a migration.

CAUTION

The z/OS Migrator server must be installed and operational on all z/OS images that can access the data being migrated. If it is not, then you may be exposed to possible data integrity issues.

z/OS Migrator database

The z/OS Migrator database primary purpose is the storing and sharing of all information about z/OS Migrator data migration activities and resources. The z/OS Migrator database is used to arbitrate change across the z/OS Migrator server complex ensuring all participating systems are updated and aware of change, for example, group phase transition. This ensures data integrity across all participating systems on which the z/OS Migrator server is active.

z/OS Migrator I/O monitor

The z/OS Migrator I/O monitor is a subcomponent of the z/OS Migrator server. The z/OS Migrator I/O monitor is responsible for the following functions:

◆ Monitors all I/O activity to source datasets (extents).

◆ When in Mirroring phase, mirrors all write I/O activity to the target datasets to ensure that they are always synchronized.
Overview

- When in *Diversion* phase, redirects (diverts) all I/O activity, including reads and writes, to the target dataset until completion has been achieved.
- Prevents all non-z/OS Migrator I/O to the target datasets until diversion.
- Monitors source volume VTOCs to ensure that all changes to extents, including additions, deletions, or modifications to such, are dynamically reflected on the target volumes.

### Multi-LPAR considerations

z/OS Migrator is designed to be used in a multi-LPAR environment with shared DASD. In most cases, the z/OS Migrator complex will consist of individual z/OS Migrator server instances running one per LPAR on each LPAR requiring access to the shared DASD. These server instances will have a shared z/OS Migrator database used to coordinate functions between the LPARs. Each server will have its own command prefix and subsystem ID unique to the LPAR on which it runs.

There may be situations where a second z/OS Migrator complex may be necessary and the servers associated with this second z/OS Migrator complex might run on the same LPARs as the first z/OS Migrator complex. This second z/OS Migrator complex and all associated servers must share its own unique z/OS Migrator database.

**Note:** A database cannot be shared between complexes or between servers running on a single LPAR.

The z/OS Migrator server must be active on all LPARs that have host connectivity to the volume pairs involved in the migration or mirroring operation.

The z/OS Migrator server must be active on ALL logical partitions or systems that have host connectivity to the volume pairs involved in the migration or mirroring operation. z/OS Migrator server allows for pathing validation for all involved source and target devices to ensure environment is correct without risking data integrity. The reason the z/OS Migrator server, and all associated system interfaces, must be installed and operational is to ensure proper monitoring of any and all application I/O that may affect the mirror or migration operation. With this protection in place, data integrity for all migration types can be assured.

Normally, the interfaces, once installed, may operate independently of the server. However, the server provides management of certain storage resources for the interfaces and if a storage request can not be satisfied, the interfaces have no choice but to suspend mirroring for a device pair or even a whole group. In some cases, if the z/OS Migrator server is not available to service a particular request, an application I/O may be blocked until the server is restarted.

Even if there is no current application I/O on an LPAR in the "z/OS Migrator complex," a number of state changing commands require that all participating servers be actively accessing the database. In some cases, you may receive a message indicating that the command system is waiting for another LPAR where the z/OS Migrator server appears to be idle.

**Note:** Refer to the IDLE parameter description on page 301 for more information about the idle state.
If the “idle” LPAR is actually out of service, there is a command which allows processing to continue.

**Note:** The REMOVE command is described on page 181.

Otherwise, corrective action should be taken if required.

**Owner server**

The z/OS Migrator server to which the Activate command is issued is known as the 'owner' host. Most all z/OS Migrator group actions, such as Divert for a dataset group, can only be performed from the owner.

**Multi-server communication**

In addition to running on all LPARs, all of the z/OS Migrator servers must share the same z/OS Migrator database. The database is used to communicate group status and other cross-system functional requests.

Note that certain z/OS Migrator actions are serialized through the use of device reserves issued against the device on which the z/OS Migrator database resides. For this reason, you should place the z/OS Migrator database on a lightly-used volume against which no other reserves are issued. You cannot perform mirror, migrate or logical functions (including PROMOTIONS and ACTIVATIONS) against the volume on which the z/OS Migrator database resides, or any dataset contained on the volume.

**Parallel Access Volume (PAV) status**

PAV status after a volume swap is the result of the architectural implementation of PAV in the operating system and the configuration of the devices.

A PAV-enabled VMAX configuration is one where the device configuration includes PAV MODE=COM-PAV/MA and the UCB is a device defined as a 3390B.

If the FROM device is configured in a PAV-enabled VMAX system and is defined as a PAV-capable UCB (3390B), then PAV aliases can be bound for the TO device of a migration when the TO device is also in a PAV-enabled VMAX system.

If the TO device is not configured in a PAV-enabled VMAX system, then it will have a non-PAV status.

If the FROM device is NOT configured in a PAV-enabled VMAX system, and/or NOT defined as a PAV-capable UCB, then it will have a non-PAV status. It does not matter whether the TO device is PAV-capable or not.
Overview

The following table shows the PAV status results after a swap:

**Table 2** Determination of PAV status after a swap

<table>
<thead>
<tr>
<th>FROM device</th>
<th>TO device</th>
<th>TO device status</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCB required:</td>
<td>Configuration required:</td>
<td>Configuration and UCB required:</td>
</tr>
<tr>
<td>• UCB = 3390B (PAV)</td>
<td>• config = PAV</td>
<td>• config = PAV</td>
</tr>
<tr>
<td>• UCB = 3390 (non-PAV)</td>
<td>MODE = COM-PAV/MA</td>
<td>MODE = COM-PAV/MA</td>
</tr>
<tr>
<td>Non-PAV</td>
<td>Non-PAV</td>
<td>Non-PAV</td>
</tr>
<tr>
<td>Non-PAV</td>
<td>PAV</td>
<td>Non-PAV</td>
</tr>
<tr>
<td>PAV</td>
<td>Non-PAV</td>
<td>Non-PAV</td>
</tr>
<tr>
<td>PAV</td>
<td>PAV (alias bound)</td>
<td></td>
</tr>
</tbody>
</table>

As shown in the **Table 2**, the important factor is the FROM device UCB and the TO device configuration. The only case where the TO device gets a proper UCB and bound alias is when the FROM device UCB is PAV (3390B) and the TO device VMAX device is configured PAV.

The TO device MVS definition is not relevant because it is not going to be accessible. The FROM UCB is always going to be online, both before and after swap, and as a result, there is not a bound alias. The UCB is never swapped from an offline device.

Control interfaces

You interact with the z/OS Migrator server through three alternative control interfaces:

- z/OS Migrator ISPF Monitor
- z/OS Migrator command line interface
- z/OS Migrator batch interface

z/OS Migrator ISPF Monitor

The z/OS Migrator ISPF Monitor is the primary interface to the z/OS Migrator product. From the ISPF Monitor, you can perform the following functions:

- Manage migration groups by adding, modifying, deleting, and promoting migration groups to the z/OS Migrator server.
- Interact with the z/OS Migrator server to monitor and actively manage active migrations from Activation to Completion phase. Moreover, you can use the interface to perform configuration modifications.

**Note:** Chapter 6, “Using the z/OS Migrator ISPF Monitor,” describes the ISPF Monitor and Chapter 9, “z/OS Migrator Examples,” describes how to use the ISPF screens for z/OS Migrator.
Overview

z/OS Migrator command line interface

z/OS Migrator also has an operator command interface. Although the ISPF interface is the primary means of communicating with the z/OS Migrator server, the operator commands allow you to initiate essentially all server actions.

Note: Chapter 7, “z/OS Migrator Command Line Interface,” describes the command line interface.

z/OS Migrator batch interface

You can use the z/OS Migrator batch interface to generate and promote configuration elements as well as to submit z/OS Migrator commands to the server and retrieve the response. The z/OS Migrator Batch Utility provides simple automation of routine migration tasks.

Note: Chapter 10, “z/OS Migrator Batch Utility,” describes the batch interface.
Supported storage subsystems and dataset types

z/OS Migrator only supports 3380 and 3390 architecture, like geometry devices, and provides support for the following:

- Direct Access (DA) datasets
- Extended format sequential datasets
- Extended partitioned datasets (PDSE)
- GDG base names and GDG datasets
- Extended format VSAM keyed sequential datasets (KSDS)
- Partitioned (PO) datasets (TYPE=HFS is not supported)
- Physical sequential (PS) datasets
- Striped sequential datasets
- BDAM datasets
- VSAM datasets:
  - Alternate Index (AIX)
  - ESDS
  - KSDS
  - Linear
  - RRDS
  - Spheres (KSDS | ESDS + PATHS + AIX)
  - VRRDS
- Large sequential datasets indicated by DSNTYPE=LARGE (z/OS 1.7 and higher)
- Extended Address Volume (EAV) devices on volume migrations and volume mirroring processing only
- Computer Associates (CA) OPS/MVS SYSCHK1 and OPSLOG volumes

**Note:** (CA) OPS/MVS SYSCHK1 and OPSLOG volume migrations are intended to run when paging to these file types is limited or not actively being done. If during the migration, a page fault requires access to the CA OPS/MVS SYSCHK1 or OPSLOG files, then the migration automatically defers and processing returns to a synchronized state.

- JES2 spool and checkpoint datasets
- z/OS Sysplex Couple datasets
- Common and Pageable Link Pack Area (PLPA) datasets (volume migration only)

**Note:** Common and PLPA page datasets migrations are intended to run when paging to these datasets is limited or not actively being done. If during the migration, a page fault requires access to the Common /PLPA datasets then the migration automatically defers and processing returns to a synchronized state.

1. Support requires MFE version 8.0 base level and later.
Overview

Consistent volume or logical dataset migrations do not support Common/PLPA page datasets.

For local page volumes EMC recommends using the existing z/OS Page Delete operator command to delete the page dataset prior to a migration. A new page dataset may be specified by the Page Add or by the Page Delete Replace option. Refer to the following example of using the z/OS PD and PA, or PD REPLACE commands.

```
PD DELETE,PAGE=SYS1.PAGE.LOCAL3
PA SYS1.PAGE.LOCAL4
or
PD REPLACE,PAGE=(SYS1.PAGE.LOCAL5,SYS1.PAGE.LOCAL6)
```

- z/OS Migrator supports 1TB EAV devices.

Operating system support

z/OS Migrator is compatible with all IBM supported versions of the z/OS operating system.

Restrictions

z/OS Migrator has the following storage architecture and dataset types restrictions.

z/OS Migrator runtime restrictions

You have the option of defining the z/OS Migrator LIKLIB as an extended partitioned dataset (PDSE). However, the SECCOM dataset allocated during installation MUST NOT be defined as a PDSE.

Any DASD DEFRAG operation, whether automated or by request, that may be run against any SOURCE volume involved in a volume or logical migration action, should be disabled for the duration of all migration actions. Once the migration groups have completed, DEFRAG events may be re-enabled.

Note: Restrictions that apply to both volume and logical migrations are mentioned in both of the following topics, “Volume Migrator restrictions” and “Logical migration restrictions”.

Volume Migrator restrictions

The following restrictions apply to volume migrations.

- In addition to the requirement that the target device in a volume migration pair be as large or larger than the associated source device with regards to cylinder count, the target controller must also be at an equal or higher technology level and be downward compatible. In other terms, you cannot migrate data from a 2105 model controller to a 3990, but you can migrate data from a 3390 model controller to a 2105.

Note: Migration between different device geometries is not supported. You can only migrate data between similar geometry devices, for example 3380 to 3380, or 3390 to 3390.
Migration of system datasets, that is, datasets used by the operating system, typically located on system residence volumes (SYSRES), including linklisted datasets, is a complex operation. If a migration is necessary, extreme care should be taken in executing this migration.

If the Computer Associates Multi Image Manager product is in use on your systems and a DASDONLY communications control datasets is specified via MIMINIT, the volume holding this CDS cannot be part of a volume migration group whose ending action involves a swap.

EMC advises using CA MIM's option to switch to an alternate CDS on a volume not involved with the Migrator group and then, once the z/OS Migrator group has completed, switching the CDS back to the original volser. Refer to your CA MIM documentation for instructions on performing this switch to an alternate CDS or contact your CA representative for further assistance.

Volumes containing Local Page datasets cannot be migrated.

The following volumes are not supported as source or targets of a migration:

- FBA volumes
- Virtual devices (VDEVs)
- CSC gatekeeper volumes
- z/VM volumes when the z/VM operating system is active

**WARNING**

If z/VM is active, and z/OS Migrator attempts to move z/VM volumes, the volumes will be corrupted!

Logical migration restrictions

The following restrictions apply to logical (dataset) migrations.

- The target controller must be at an equal or higher technology level and be downward compatible. In other terms, you cannot migrate data from a 2105 model controller to a 3990, but you can migrate data from a 3990 model controller to a 2105.

**Note:** Migration between different device geometries is not supported. You can only migrate data between similar geometry devices, for example: 3380 to 3380, or 3390 to 3390.

- Datasets cataloged on System Resident (SYSRES) volumes: migration of system datasets, that is, datasets used by the operating system, typically located on system residence volumes, including linklisted datasets, is a complex operation. Be careful.

- Dataset types **not** currently supported in z/OS Migrator include:
  - VSAM datasets with the IMBED, KEYRANGE, and REPLICATE parameters. These are obsolete VSAM parameters. Target dataset extents cannot be allocated using these parameters because z/OS does not support new allocations using them. The physical layout of extents of datasets defined with
these parameters is different from the physical layout of datasets without them. Copying extents from a dataset containing these to a newly defined dataset that does not have them yields an unusable dataset.

- If you copy an IMBED cluster to NOIMBED (the only type you can currently define), the target data component would have a track full of sequence set records at the start of each CA that VSAM would think was actual data.

- Dataset migrations, which have active RLS I/O, are not supported. Attempts to migrate datasets which have active RLS I/O may have a detrimental effect on the address space SMSVSAM.

- Catalogs
- ISAM
- IMS OSAM databases
- Individual PDS members (but z/OS Migrator does support migrating an entire PDS)
- Page and Swap datasets
- Hierarchical File System Datasets
- Datasets that are designated as “Unmoveable” are not supported, that is, DSORG=U|PSU
- VTOC, VVDS, and VTOCIX datasets
- Temporary (&&) datasets
- Common/PLPA datasets
- EAV (Extended Address Volume) datasets are not supported for logical migration. However, volume migration of volumes containing EAV datasets is still supported.

- Uncataloged datasets

  **Note:** Uncataloged datasets will fail activation.

- Datasets cataloged in the master catalog

  - If running Real Time Defrag (RTD) from Interchip, verify that OPTIONS=RDTCHK is specified or defaulted.

**Dynamic Volume Expansion (DVE)**

If Dynamic Volume Expansion (DVE) is active on a z/OS Migrator-managed source device, the existing migration group containing the device will be suspended and/or deactivated and appropriate messages will be issued to the operator/systems console and/or Migrator SYSPUT output indicating that a DVE event has cancelled/interrupted the migration.
CHAPTER 2
z/OS Migrator Installation

This chapter describes how to install z/OS Migrator. Topics include:

- Preinstallation checklist ......................................................................................... 36
- z/OS Migrator installation steps ............................................................................ 47
Preinstallation checklist

Before you install z/OS Migrator, take the following steps:

- Ensure that your system meets the hardware and software requirements listed in “Hardware and software requirements” on page 36 and in the z/OS Migrator Release Notes.
- Check the EMC Online support website for any z/OS Migrator updates or current release notes and download any available updates or release notes. Refer to the procedure described in “Downloading z/Migrator maintenance updates” on page 41.
- Install/upgrade the EMCSCF component of ResourcePak® Base (if you do not already have the latest version on your host) as described in “Installing/upgrading EMCSCF (Mainframe Enablers)” on page 42.

**Note:** z/OS Migrator 8.0 requires ResourcePak Base (EMCSCF) 8.0 or higher.

- Gather preinstallation information as listed in “Gathering z/OS Migrator installation information” on page 45.

Hardware and software requirements

Table 3 lists EMC storage hardware and operating system requirements. Before you install the z/OS Migrator software, ensure your system meets these requirements.

**Table 3** EMC storage system requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td>All currently supported EMC storage systems.</td>
</tr>
<tr>
<td>Enginuity/HYPERMAX OS release</td>
<td>HYPERMAX OS 5977, Enginuity 5876, Enginuity 5773</td>
</tr>
</tbody>
</table>

**IMPORTANT**

This minimum supported release level is accurate at the time of publication and is subject to change. Check the Release and End of Life Service Dates on support.EMC.com for the most current information. Contact your EMC Customer Support Engineer to verify that your system meets these requirements.

Table 4 lists the mainframe hardware and software requirements for z/OS Migrator. Before you install the z/OS Migrator software, ensure your mainframe system meets these requirements.
### Table 4 Mainframe hardware and software requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirements</th>
</tr>
</thead>
</table>
| **Hardware**          | • Any system that supports versions of the z/OS operating system currently supported by IBM  
                          • Open systems host  
                          • FTP or TSO connection to the open systems host |
| **Storage devices**   | All 3380 and 3390 z/OS formatted volumes supporting Count Key Data/Extended (CKD/E) format.                                                                                                                   |
| and arrays            | Note: FBA formatted devices are not supported.                                                                                                                                                               |
| **Software**          | • All z/OS-based operating systems that are currently supported by IBM.  
                          z/OS Migrator is not suitable for use with native z/VM and VM/ESA, native VM/XA, native VSE/ESA, native VSE/XA or DOS, and z/VSE.                                                                 |
|                       | Note: z/OS Migrator is not supported in native VM. However, z/OS Migrator can run in a z/OS guest under VM. VM does not allow volumes defined as unsupported to be attached to SYSTEM, or used to IPL a virtual machine. When running as a guest under VM, z/OS Migrator requires special consideration. You must define volumes to VM (SET RDEV) as Type UNSUPPORTED DEVClass DASD DPS Yes RESERVE_RELEASE Yes, and you must attach volumes to the guest. |
|                       | • z/OS Migrator requires MFE/SCF version 8.0 and higher on all participating LPARs.                                                                                                                       |
|                       | • TCP/IP protocol stack from IBM Version 3.1 or later.                                                                                                                                                         |
|                       | • RACF 1.9 or higher, or an equivalent SAF-compliant security product.                                                                                                                                         |

1. z/OS Migrator supports both the JES2 and JES3 environments.
Reserve handling requirements

As part of managing your global serialization environment, the handling of hardware RESERVES must be considered. An alternative to using hardware RESERVES, where the entire device is serialized upon, involves the conversion of these RESERVES to globally propagated ENQ requests, referred to as software reserves.

See your MVS Planning: Global Resource Serialization and MVS Initialization and Tuning Reference documentation for specific instructions on updating and managing your environment.

The required changes to your environment depend on a few factors and, as with all such changes, should be carefully reviewed by your systems programming staff prior to implementation. Consider the following when integrating z/OS Migrator into your environment.

Have you already converted all hardware RESERVES to software reserves?

There are requests made by z/OS Migrator that should remain hardware RESERVES. If your installation has converted all hardware RESERVES to software reserves, add the following to your GRSRNLxx:

/* -- z/OS Migrator -- Exclude the following from RESERVE conversion -- */
RNLDEF RNL(EXCL) TYPE(SPECIFIC) QNAME(EMC$FM) RNAME(zosm.database.name)
RNLDEF RNL(EXCL) TYPE(GENERIC) QNAME(ZMIGSYNC)

Do you plan on using z/OS Migrator Logical Migration feature?

If you have converted all hardware RESERVES to software reserves

If your installation has converted all physical hardware RESERVES to software reserves and you intend to run logical migration groups, add the following changes into your GRSRNLxx. Note that these changes also include those mentioned above for converting hardware reserves.

/* -- z/OS Migrator - Change SYSTEM level ENQ to SYSTEMS level ENQ request - */
RNLDEF RNL(INCL) TYPE(GENERIC) QNAME(SYSDSN)
/* -- z/OS Migrator -- Exclude the following from RESERVE conversion -- */
RNLDEF RNL(EXCL) TYPE(SPECIFIC) QNAME(EMC$FM) RNAME(zosm.database.name)
RNLDEF RNL(EXCL) TYPE(GENERIC) QNAME(ZMIGSYNC)

If you have not converted all hardware RESERVES to software reserves

If your installation has not converted all physical hardware RESERVES to software reserves and you intend to run logical migration groups, add the following changes into your GRSRNLxx. Note that these changes also include those mentioned above for converting hardware reserves.

/* -- z/OS Migrator - Change SYSTEM level ENQ to SYSTEMS level ENQ request - */
RNLDEF RNL(INCL) TYPE(GENERIC) QNAME(SYSDSN)
/* -- z/OS Migrator - Convert RESERVE to globally propagated ENQ request - */
RNLDEF RNL(CON) TYPE(GENERIC) QNAME(SPFDSN)
RNLDEF RNL(CON) TYPE(GENERIC) QNAME(SPPEDIT)
RNLDEF RNL(CON) TYPE(GENERIC) QNAME(SYSIGOV2)
RNLDEF RNL(CON) TYPE(GENERIC) QNAME(SYSZTOC)
RNLDEF RNL(CON) TYPE(GENERIC) QNAME(SYSZVVDSD)
RNLDEF RNL(CON) TYPE(GENERIC) QNAME(EMCTF)
/* -- z/OS Migrator -- Exclude the following from RESERVE conversion -- */
RNLDEF RNL(EXCL) TYPE(SPECIFIC) QNAME(EMC$FM) RNAME(zosm.database.name)
RNLDEF RNL(EXCL) TYPE(GENERIC) QNAME(ZMIGSYNC)
Running CA MIM

For customers running Computer Associates (CA) MIM, EMC recommends that you run with PROCESS=ALLSYSTEMS mode in order to convert all the hardware RESERVES to Global enqueues. RESERVES=CONVERT should be defined for default Reserve processing. If you need assistance converting to ALLSYSTEMS mode, CA MIM support can assist with your setup.

If you are running PROCESS=SELECT, you need, at a minimum, to include the following statements in your MIMQNAME member.

```
SPFDSN  GDIF=YES,
        SCOPE=SYSTEMS,
        EXEMPT=YES,
        ECMF=NO

SPFEDIT GDIF=YES,
        SCOPE=SYSTEMS,
        EXEMPT=YES,
        ECMF=NO

SYSIGG2 GDIF=YES,
        SCOPE=SYSTEMS,
        EXEMPT=YES,
        ECMF=NO

SYSTOGC GDIF=YES,
        SCOPE=SYSTEMS,
        EXEMPT=YES,
        ECMF=NO

SYSZVDS GDIF=YES,
        SCOPE=SYSTEMS,
        EXEMPT=YES,
        ECMF=NO

EMCTF   GDIF=YES,
        SCOPE=SYSTEMS,
        EXEMPT=YES,
        ECMF=NO
```

In MIMINIT RESERVES=CONVERT should be defined.

In your GDIEXMPT member, you need to include the following statement to exclude propagation of the Database DSN.

```
LOCAL QNAME=EMC$FM,RNAME=ZOSM.DATABASE.DSN
LOCAL QNAME=ZMIGSYNC,RNAME=*
```

These are required exclusions to ensure z/OS Migrator safely protects source volumes from an update, during a small window during the copy phase, when a RESERVE is taken if a decision is made to convert RESERVEs to global ENQs.

**Note:** If you are using CA-MIM’s EDIF facility, the database file and the SECCOM library must NOT be protected by EDIF. Protecting these files with EDIF may result in MIM4005 and MIM4008 messages.

“Reserve handling requirements” on page 81 provides complete details on reserve handling.
z/OS Migrator storage requirements

The basic ECSA, CSA, and Extended Private storage requirements for z/OS Migrator are as follows:
- A global area is acquired: 3584 bytes of fixed ECSA - \texttt{X'E00'}.
- Operating system interface modules are loaded into fixed ECSA, and require at least \texttt{X'DAA08'} bytes (874.5 KB).
- The PC routine is loaded into pageable ECSA, currently \texttt{X'B3F00'} bytes (720 KB).
- The storage pools (all fixed ECSA) are initialized with \texttt{X'480000'} bytes (4.5 MB). When groups are mirroring or diverting, the storage pools will expand depending on the complexity of the channel programs being intercepted.

\textbf{Note:} At least 0.85 MB will be resident in fixed ECSA until the next IPL for all components, except for the PC routine and possibly the storage pools.

- When a group is promoted and activated, the parsing routine currently uses ECSA to store images.
- For each active group, there are (in fixed ECSA):
  - Control blocks for which space is not freed:
    - One DWGRP block, \texttt{X'D8'} (216) bytes, until the next IPL, or z/OS Migrator is shut down.
    - One DWGDEV block for each source and target device, \texttt{X'F8'} (248) bytes.
    - A sparse array for extent look-up from each device block. Minimum size is \texttt{X'5C4'} or 1476 bytes.
  - Control blocks for which space is freed when the group completes:
    - One QCDSN block for every dataset and each individual VSAM component or AIX, \texttt{X'2C8'} or 712 bytes.
    - One DWEXT block for each dataset extent, \texttt{X'68'} (104) bytes.
**Downloading z/Migrator maintenance updates**

If there is no current maintenance, keep these instructions for future use when you do need to download maintenance.

You can download the latest maintenance updates and current release or service notes (identical to release notes) from the EMC online support site:

https://support.EMC.com

**Note:** Keep in mind that you must register on as a valid EMC customer before you can access the EMC online support site.

On the page for your product, you will see files for different product versions. For your version, you may see the following types of files:

- **ReadMe_prodvr.txt** — contains starter instructions for the electronic kit.
- **ReadMe_prodvr Fixes.txt** — contains information about the release.
- **Service Notes_prodvr.pdf** (or .txt) — contains information discovered after initial release of the product.
- **prodvr Fixes.zip** — contains the previous two documents as well as a software patch file and instructions about how to apply this maintenance.

where:

- **prod** is the product prefix.
- **vrm** is the version, revision level, and modification level of the software you want.

Take the following steps to download these files:

1. Log in to:

   https://support.EMC.com

2. Enter the product name (**z/OS Migrator**) in the Search field.

   **Result:** You see a page with DOWNLOADS, DOCUMENTATION, and other selection options for the product you selected in a side panel.

3. From the side panel you can select:
Installing/upgrading EMCSCF (Mainframe Enablers)

z/OS Migrator requires that you install EMCSCF (the ResourcePak Base environment, a component of Mainframe Enablers) and any currently available maintenance before you install z/OS Migrator. Your z/OS Migrator task requires the SCF$nnnn DD statement, which establishes the connection between Migrator and EMCSCF that will satisfy z/OS Migrator's SCF requests. The DD statements in EMCSCF and Migrator tasks must match exactly.

An example of this DD statement would be:

```
//SCF$nnnn DD DUMMY
```

Where:

\( nnnn \)

Defines this instance of EMCSCF as a unique z/OS subsystem. The DD statement would then be used in any task (in this case the z/OS Migrator task) where the service of this EMCSCF environment is required.

If the required version of EMCSCF (Mainframe Enablers) is not installed before you install z/OS Migrator, the SMP/E APPLY job fails with a missing PREREQ. If this happens, you must install the required version of EMCSCF before you can rerun the SMP/E APPLY job.

**Note:** Only the most recent version of EMCSCF should be installed on your system.

If you do not have EMCSCF running on the system, or do not have the required version running on your system, you can download the Mainframe Enablers kit from the EMC Online Support website.

**Note:** The *EMC z/OS Migrator Release Notes* may contain current additional requirements.

Shutting down an existing version of EMCSCF

An older version of EMCSCF may already be running on the systems on which you are installing z/OS Migrator, so it is important that you perform an orderly shutdown of that version of EMCSCF and remove it before you install a new version of EMCSCF.

You can remove the existing EMCSCF from memory by entering:

```
F server,INI,SHUTDOWN
```

If MSC ¹ is active, before you can shutdown EMCSCF, you must enter:
Installing the new versions of EMCSCF

Take the following steps to download and install Mainframe Enablers from EMC Online Support:

1. Log in to a privileged account on an open systems host (root on UNIX or administrator on Windows).

2. Allocate a working directory on the open system for installation.

3. Using your browser, open:
   
   https://support.EMC.com

4. From the EMC Support home page, navigate to the DOWNLOADS page for Mainframe Enablers.

   Note: If you are not able to access this location, you may not have registered your software or registered it incorrectly. Follow the prompts to register your software, correct your registration, or contact EMC in the event of a problem.

5. Click the version of Mainframe Enablers you want to download. The product version consists of a zip file that contains the installation kit and the installation instructions.

6. After you download the installation kit and instructions, choose logout from the menu bar at the top of any page.

7. Unpack the zip file and follow the instructions within the zip file to install Mainframe Enablers.

8. After z/OS Migrator is installed and customized, restart the most current version of EMCSCF.

Running multiple EMCSCF instances and migrating production data

While it is suggested to run a single EMCSCF subsystem on a z/OS system, a requirement may arise to run more than one instance (for example, a production and test subsystem).

Use of the production EMCSCF subsystem instance, which provides for device consistency across all z/OS systems, is required for the following reasons:

- z/OS Migrator needs access to the production Consistency Group to ensure that a migration does not move a volume to a UCB that is not part of the Consistency Group containing the original UCB.

- z/OS Migrator will instruct EMC AutoSwap to temporarily hold planned and unplanned AutoSwap events during the short Volume Migration SWAP processing window.

1. In SRDF/A environments, the Multi-Session Consistency (MSC) task provides consistency across multiple VMAX systems for SRDF/A groups.
Consistency must be maintained in the use of and management of device UCBs across z/OS system involved in migration events. Consistency with respect to device configuration in the EMCSCF initialization file can provide significant protection against the possibility of data loss and the small possibility for the need to IPL a system should a migration event fail, involving system devices where there are discrepancies in how the devices are addressed, in their UCB definitions, or in their shared definition via HCD in general.

Check the following when running more than one EMCSCF instance:

- Ensure that each EMCSCF instance shares the same device configuration as defined in the EMCSCF initialization file.

  **Note:** The *ResourcePak Base for z/OS Product Guide* discusses the EMCSCF initialization file.

- Ensure that each z/OS Migrator server instance is configured for communication with the production EMCSCF subsystem responsible for those devices defined to the volume and logical migration groups.

  In other words, on each z/OS system where the z/OS Migrator server is active, the corresponding EMCSCF subsystem must be using the same device configuration as defined in the EMCSCF initialization file. This ensures that each Migrator/EMCSCF combination is aware of and addresses each device in a consistent fashion across all z/OS systems as whole with no missing devices or differences in UCB assignment.

- EMC recommends using the EMCSCF initialization parameter SCF.CSC.INSTANCE to ensure a unique group of EMCSCF subsystem tasks, across the complex, for each z/OS Migrator server to communicate with.

  **Note:** Refer to the *ResourcePak Base for z/OS Product Guide* for information about SCF.CSC.INSTANCE.

  If the SCF.CSC.INSTANCE parameter is specified in the EMCSCF initialization file, use the same value of SCF.CSC.INSTANCE for all EMCSCF instances used by z/OS Migrator across all z/OS systems in the z/OS Migrator complex. Note that the SCF.CSC.INSTANCE value must be unique if more than one SCF subsystem is to be run on a given system.
Running multiple EMCSCF instances as separate subsystems

For testing new versions of EMCSCF or EMCSCF-enabled products, you can run multiple instances of EMCSCF as separate subsystems.

To run multiple instances of EMCSCF as separate subsystems, each instance of SCF must have its own unique SCF$nnnn connector DD name established using the SCF$nnnn DD statement.

//SCF$nnnn DD DUMMY

Where:

nnnn

Defines this instance of EMCSCF as a unique z/OS subsystem. The DD statement would then be used in any task (in this case the z/OS Migrator task) where the service of this SCF environment is required.

If running more than one SCF subsystem within an LPAR, use the SCF.CSC.INSTANCE initialization parameter of EMCSCF to ensure segregation of all communication. A unique SCF.CSC.INSTANCE value in the SCF initialization file for each SCF subsystem, in addition to the unique SCF$nnnn DD statement pairing between z/OS Migrator and EMCSCF, ensures no opportunity for communications overlap.

Note: Refer to the ResourcePak Base for z/OS Product Guide for an explanation and example of the SCF.CSC.INSTANCE initialization parameter.

Note that no changes to the z/OS Migrator CONFIG file are required in order to use CSC instances.

For example:

Test version of EMCSCF

//EMCSCF EXEC PGM=SCFMAIN,TIME=1440,REGION=0M
//STEPLIB DD DISP=SHR,DSN=test.load_library
//SCFINI DD DISP=SHR,DSN=init_dataset
//SYSABEND DD SYSOUT=* 
//SCF$0100 DD DUMMY

Any task needing to use this instance of EMCSCF would add a //SCF$nnnn DD DUMMY statement. If an instance of z/OS Migrator needed to use this instance of EMCSCF, the ZOSMPROC JCL for EMC z/OS Migrator would use the matching DD statement.

If the SCF.CSC.INSTANCE parameter is specified in the EMCSCF initialization file, use the same value of SCF.CSC.INSTANCE for all EMCSCF instances used by z/OS Migrator.

Gathering z/OS Migrator installation information

Before beginning the z/OS Migrator installation, identify, or decide upon, the following items:

CLIST library and EDIT macro

You need to determine the name of a CLIST library where you can store the edit macro. You also need to determine a name for the edit macro created by the installation dialog.
Product dataset name prefix

You need to choose the dataset prefix you will use to install z/OS Migrator. Names for the product datasets consist of a final qualifier, such as LINKLIB, and a dataset prefix.

For example, if you choose a dataset prefix of EMC.ZOSMvrm, the LINKLIB dataset is named:

EMC.ZOSMvrm.LINKLIB

EMC recommends that you use EMC.product (that is, EMC.ZOSMvrm) if it agrees with your site standards.

Ensure that you have RACF ALTER authority (or the equivalent from another security manager) for the datasets created with this dataset prefix.

Note: Hereafter, datasets created using this dataset prefix are referred to as if they had been created with the suggested value. The actual fmid for your installation may be different.

Mainframe Enablers dataset prefix

You need to specify the dataset prefix you used when you installed Mainframe Enablers. EMC recommends that you use EMC.fmid if it agrees with your site standards.

SMP/E dataset name prefix

You need to choose the prefix for the SMP/E datasets into which you install z/OS Migrator. If you have installed another EMC product using SMP/E, you should install z/OS Migrator into the same CSI.

For example, if you already have SMP/E maintained EMC products and the SMPLOG dataset is called “EMC.SMPE.SMPLOG,” the SMP/E dataset prefix should be “EMC.SMPE.”

If you are installing an EMC SMP/E maintained product for the first time, EMC recommends using “EMC.SMPE.”

SMP/E datasets volser

You need to choose the disk volume onto which you will install the distribution libraries (required by SMP/E). This may be the same volume as you use for the product libraries. However, many customer sites prefer to keep SMP/E-related datasets on separate volumes from product libraries. An amount of space similar to that needed for the product libraries is required.

Install to disk volser

You need to determine the disk volume onto which you will install the target (that is, runtime) datasets. The space required is nominal.

Disk unit name

Decide upon a disk unit name for the above volumes. For many users, “SYSDA” will suffice. However, use whatever generic or esoteric name your local standards require.
z/OS Migrator installation steps

The z/OS Migrator installation kit consists of a PDS containing TSO TRANSMIT images of files needed to perform an SMP/E indirect-library installation on the product. This PDS is packaged as a TSO TRANSMIT file available for download from EMC Online Support website.

To install z/OS Migrator on an IBM mainframe, complete the following steps:

- Step 1: Load ZOSMvrm.XMITLIB to disk
- Step 2: Run ZOSMvrm.XMITLIB(#EXTRACT)
- Step 3: Customize RI MLIB JCL
- Step 4: Run installation jobs
- Step 5: Run #06CLEAN
- Step 6: Verify EMCSCF settings
- Step 7: Apply maintenance
- Step 8: Shut down and restart EMCSCF
- Step 9: Prepare to execute z/OS Migrator
- Step 10: Allocate z/OS Migrator system information dump dataset
- Step 11: Allocate z/OS Migrator database
- Step 12: Configure z/OS Migrator server parameters
- Step 13: Customize and run z/OS Migrator server
- Step 14: Specify parameters in SAMPLIB prior to first execution
- Step 15: Start/stop z/OS Migrator server

Step 1: Load ZOSMvrm.XMITLIB to disk

1. Log in to a privileged account on an open systems host (root on UNIX or administrator on Windows).
2. Allocate a working directory on the open system for the installation.
3. Log on to the EMC Online Support website.
4. Navigate to DOWNLOADS. Then, enter z/OS Migrator to search for the files.

**Note:** If you are not able to access this location, you may not have registered your software or registered it incorrectly. Follow the prompts to register your software, correct your registration, or contact EMC in the event of a problem.

**Result:** You see a page for the product you selected.

5. Click the product version you want to download. The product version consists of a zip file that contains the installation kit and the installation instructions.
6. Download the installation kit into the working directory on the open system.
7. If your current host is a Windows system, unzip the file in the working directory. If your current host is a UNIX system, unzip and untar the file in the working directory.

8. Locate the ZOSMvrm.XMITFILE. This file is in TSO TRANSMIT format and contains a flattened copy of ZOSMvrm.XMITLIB, a PDS that holds other TRANSMIT images, the JCL to extract them, and necessary SMP/E installation files.

9. On the target mainframe, allocate a file to which you can FTP ZOSMvrm.XMITFILE. Use the dataset name prefix you intend to use for product installation.

   For example, if you intend to install the product with a dataset name prefix of EMC.ZOSMvrm, as recommended, name the file EMC.ZOSMvrm.XMITFILE.

10. Allocate the dataset with the following characteristics:

    LRECL=80
    BLKSIZE=3120
    DSORG=PS
    SPACE=(CYL,(36,2))

    Note: The SPACE parameter here and elsewhere assumes that you are allocating the dataset on a 3390 device.

11. FTP the file to the mainframe in binary format. Your FTP session may look something like the following:

    ftp hostname
    (username and password prompts)
    cd ..
    25 "'" is working directory name prefix
    binary
    put ZOSMvrm.XMITFILE 'EMC.ZOSMvrm.XMITFILE'

12. Use TSO RECEIVE to receive the file into a PDS. The PDS is created by the RECEIVE command and does not have to be preallocated. However, you must specify a dataset name using the DA[taset] parameter or the file will be allocated using your TSO prefix (usually your logonid). The dataset name specified must have the final qualifier of XMITLIB. For example:

    receive indataset('EMC.ZOSMvrm.XMITFILE')

    INMR901I Dataset EMC.ZOSMvrm.XMITLIB from userid on nodename
    INMR906A Enter restore parameters or 'DELETE' or 'END' +
    da('EMC.ZOSMvrm.XMITLIB')

    If you did not specify “DA(...)” as above, the dataset would be allocated as userid.XMITLIB.
Step 2: Run ZOSMvrm.XMITLIB(#EXTRACT)

Run ZOSMvrm.XMITLIB(#EXTRACT) to extract ds-prefix.RIMLIB and the SMP/E indirect libraries. Take the following steps:

1. Edit the #EXTRACT member of the newly RECEIVED library. You can edit the #EXTRACT job by running the SETUP REXX program you can find in the XMITLIB dataset. The SETUP REXX program prompts you for all of the information needed to edit the JOB.

   If you wish to edit the JOB manually, make the following changes:
   a. Change the job card to one that conforms to your standards.
   b. Globally change ds-prefix to the dataset prefix of this library (which will be the dataset prefix for the product libraries).
   c. Globally change DVOL to a disk volser that can be used to hold the extracted libraries.
   d. Globally change DISK_UNIT to a site-appropriate unit name.

2. Submit #EXTRACT. Step completion codes should be 0, except for the DELETE step, which will have a step completion code of 8 unless the job is a rerun.

Step 3: Customize RIMLIB JCL

The RIMLIB library (ds-prefix.RIMLIB) is a PDS containing JCL to install the product. After you extract the RIMLIB PDS, you find that RIMLIB has the contents shown in Table 5.

Table 5 RIMLIB contents

<table>
<thead>
<tr>
<th>File</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>#01ALLOC</td>
<td>Allocate target and distribution libraries</td>
</tr>
<tr>
<td>#02DDDEF</td>
<td>Add or replace product library DDDEFS to SMP/E CSI</td>
</tr>
<tr>
<td>#03RECEV</td>
<td>SMP/E RECEIVE z/OS Migrator function into global zone</td>
</tr>
<tr>
<td>#04APPLY</td>
<td>SMP/E APPLY z/OS Migrator function into target zone</td>
</tr>
<tr>
<td>#05ACCPT</td>
<td>SMP/E ACCEPT product sysmods into distribution zone</td>
</tr>
<tr>
<td>#06CLEAN</td>
<td>Deletes indirect libraries and DDDEFs used for them</td>
</tr>
<tr>
<td>#90SAFJB</td>
<td>JCL to assemble and link z/OS Migrator with EMCSAFD(^1)</td>
</tr>
<tr>
<td>#92SAFJB</td>
<td>JCL to re-enable the use of the EMC supplied EMCSAFI security module.</td>
</tr>
<tr>
<td>#99MAINT</td>
<td>SMP/E RECEIVE and APPLY service</td>
</tr>
<tr>
<td>SETUP</td>
<td>JCL customization dialog launcher</td>
</tr>
<tr>
<td>ZOSJCL</td>
<td>JCL customization dialog driver</td>
</tr>
<tr>
<td>ZOSWIN1</td>
<td>JCL customization dialog data entry panel</td>
</tr>
</tbody>
</table>

1. Member EMCSAFI is the security interface. Member EMCSAFD contains assembler source code that you can use to disable the EMCSAFI security interface.
Take the following steps to customize the installation JCL using the automated dialog:

1. **Edit the RIMLIB library** (ds-prefix.RIMLIB).
2. **Locate the member named SETUP on the member selection list, type EX in the selection column next to it and press Enter.**

   ![Menu Functions Confirm Utilities Help]
   ![EDIT ]
   
<table>
<thead>
<tr>
<th>Name</th>
<th>Prompt</th>
<th>Size</th>
<th>Created</th>
<th>Changed</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>#01ALLOC</td>
<td>yyyy/mm/dd yyyy/mm/dd hh:mm:ss idstring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#02DDDEF</td>
<td>yyyy/mm/dd yyyy/mm/dd hh:mm:ss idstring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#03RECEV</td>
<td>yyyy/mm/dd yyyy/mm/dd hh:mm:ss idstring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#04APPLY</td>
<td>yyyy/mm/dd yyyy/mm/dd hh:mm:ss idstring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#05ACCPPT</td>
<td>yyyy/mm/dd yyyy/mm/dd hh:mm:ss idstring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#06CLEAN</td>
<td>yyyy/mm/dd yyyy/mm/dd hh:mm:ss idstring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#90SAFJB</td>
<td>yyyy/mm/dd yyyy/mm/dd hh:mm:ss idstring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#92SAFJB</td>
<td>yyyy/mm/dd yyyy/mm/dd hh:mm:ss idstring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#99MAINT</td>
<td>yyyy/mm/dd yyyy/mm/dd hh:mm:ss idstring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>End</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   The customization panel shown in **Figure 5** is displayed.

   ![Figure 5 EMC JCL Customization Utility panel]

   **Figure 5** EMC JCL Customization Utility panel

3. **Enter or change the following information on the panel shown in Figure 5 to customize your installation:**
   
   a. **The CLIST library field is set by default to the name of the RIMLIB library. This field should contain the name of a library in which you want the edit macro created by this dialog to be stored.**

      The default value is fine for most users and need not be changed.
   
   b. **In the Edit macro name field, either:**
      - Accept the default name displayed.
– If necessary, change the name of the edit macro.

Note: Normally, you should not have to change the name.

Result: The edit macro is created in the CLIST or EXEC library from the data entered on this panel and applied to all members of RIMLIB that start with a # character.

c. In the Product dsname prefix field, enter the dataset name prefix you want to use for the z/OS Migrator target datasets. EMC suggests EMC.fmid (for example, EMC.ZOSMvrm).

d. In the Mainframe Enablers dsname prefix field, enter the dataset name prefix that was used to install EMCSCF.

e. In the SMP/E dsname prefix field, enter the dataset name prefix of the SMP/E datasets into which you installed EMCSCF.

For example, if you called the SMPSCDS dataset EMCS.MPE.SMPS.CDS, enter EMC.MPE.

f. In the SMP/E datasets volser field, enter the six-character volume serial number of the disk volume on which you want to allocate the SMP/E distribution libraries for z/OS Migrator.

This volume may be the same as the volume you specify in step g, or you may elect to keep these datasets on a separate volume.

g. In the Install-to disk volser field, enter the six-character volume serial number of the disk volume to which you want to install the z/OS Migrator libraries.

h. In the Disk unit name field, you can specify an esoteric disk name that is appropriate to your site. SYSDA is the default, but you can overtype it with another esoteric disk name.

i. Enter a site-appropriate job card.

The job card is initially set to a value which may be suitable to many users. The first seven characters of the job name is set to your TSO userid, plus “X.”

You can set the job name to %MEMBER% This causes the edit macro to set each job name equal to the JCL member name (that is, #01ALLOC, #02DDDEF, and so forth).

Do not use any parameter that contains an ampersand (&), such as NOTIFY=&SYSUID. An ampersand in the job card can cause edit macro errors.

4. When you are satisfied with your entries, type exec on the command line and press Enter.

Result: If the dialog completes successfully, you see something similar to the following:

BUILDING AN EDIT MACRO(z/OS Migrator) IN 'EMC.ZOSMvrm.RIMLIB'
PROCESSING MEMBER: #01ALLOC
PROCESSING MEMBER: #02DDDEF
PROCESSING MEMBER: #03RECEV
PROCESSING MEMBER: #04APPLY
PROCESSING MEMBER: #05ACCT
PROCESSING MEMBER: #06CLEAN
PROCESSING MEMBER: #90SAFJB
PROCESSING MEMBER: #92SAFJB
PROCESSING MEMBER: #99MAINT
***
Step 4: Run installation jobs

Carefully examine each job before you submit it to ensure that it was customized the way you intended.

Submit the customized jobs in the following order, making sure that each job completes successfully before submitting the next one:

1. #01ALLOC

   **Note:** In job #01ALLOC, the default allocation parameters for both the z/OS Migrator LINKLIB and SECCOM specify a partitioned dataset (PDS). You have the option to allocate the LINKLIB as a PDS/E; however, the SECCOM dataset **MUST NOT** be defined as a PDSE.

2. #02DDDEF
3. #03RECEV
4. #04APPLY
5. #05ACCPT

   You should expect completion codes of 0 (zero) for all jobs except for #02DDDEF and #05ACCPT, where 04 is acceptable.

SMP/E installation is now complete.

Step 5: Run #06CLEAN

After you are satisfied that z/OS Migrator is correctly installed and functioning properly, run the #06CLEAN job to delete datasets and DDDEFS used during the installation process that are no longer needed.

Step 6: Verify EMCSCF settings

z/OS Migrator 8.0 requires EMCSCF (ResourcePak Base) version 8.0. Ensure that the EMCSCF initialization file contains proper settings.

**Note:** The *ResourcePak Base for z/OS Product Guide* discusses EMCSCF initialization file.

LFCs

z/OS Migrator no longer requires that you provide licensed feature code (LFC) entries in the EMCSCF initialization file. The z/OS Migrator LFC entries you may have in your EMCSCF initialization file should be removed.

AutoSwap services

If you intend to use dynamic AutoSwap services while using z/OS Migrator, you will need to add the following entry to all of your EMCSCF initialization files to ensure the AutoSwap services are available to all of your instances of EMCSCF.
Group migration work is run on the z/OS Migrator owner instance with the agent system providing support and device monitoring services during all owner migration activities. z/OS Migrator owner and all agent instances require a corresponding EMCSCF instance. Each instance requires the SCF.DAS.ACTIVE entry in the EMCSCF initialization file.

This required entry also ensures the Cross Systems Communications (CSC) facility is available to all participants.

```
SCF.DAS.ACTIVE=YES
```

For more information concerning this EMCSCF initialization parameter, refer to the ResourcePak Base for z/OS Product Guide.

If there is any question as to whether AutoSwap and/or CSC are running under your EMCSCF task, look for the following messages in your EMCSCF task log:

```
SCF0301I SCF.DAS.ACTIVE=YES
SCFS175I AutoSwap Initialization complete.
SCFS285W AutoSwap waiting for EMCSCF Cross System Communication
SCFS226I AutoSwap has initialized with EMCSCF Cross System Communication
```

**Step 7: Apply maintenance**

_If there is no current maintenance, keep these instructions for future use when you do need to download maintenance._

You need to install any available maintenance for z/OS Migrator before you start running. You can obtain the latest maintenance updates and current release or service notes (identical to release notes) from the **DOWNLOADS** option on the top menu at the EMC Online Support website.

**Note:** You must register on EMC Online Support as a valid EMC customer before you can access the site. Confirm that your license for this software is registered. Otherwise you will not be able to access the DOWNLOADS and other options of the EMC Online Support website.

On the product page there may be more than one version listed. For your version, you may see the following types of files:

- **ReadMe_ZOSMvrm_Fixes.txt** — Lists the fixes included in the release.
- **Service_Notes_ZOSMvrm.txt** — Updates the release notes with information discovered after initial product release.
- **ZOSMvrm_Fixes.zip** — Contains the two previous files as well as a software patch file (EZ300Fix.bin) and a sample job (smpjob.txt) with instructions about how to apply the maintenance.

**Downloading files from EMC Online Support**

1. Log on to:

   `https://support.EMC.com`

2. Enter your product name in the Search field.
Result: You see a page with `DOWNLOADS`, `DOCUMENTATION`, and other options for the product you selected, in a side panel.

3. Select **DOWNLOADS**, and take either of the following steps:
   - To download a copy of a document, click `ReadMe_ZOSMvrm_Fixes.txt`, or `Service_Notes_ZOSMvrm.txt`.
   - To download the zip file, click `ZOSMvrm_fixes.zip`. Download the zip file to your home system, unpack the zip file, and follow the instructions it contains.

4. When you are finished reading or copying from EMC Online Support, return to the previous pages to view other products and services, or choose logout from the menu bar at the top of any page.

**Step 8: Shut down and restart EMCSCF**

After you install z/OS Migrator, you need to shut down and restart the latest versions of EMCSCF (ResourcePak Base).

*Note:* The ResourcePak Base for z/OS Product Guide provides information about starting EMCSCF.

**Step 9: Prepare to execute z/OS Migrator**

Before you can start utilizing z/OS Migrator to perform dataset and volume migrations, you must customize z/OS Migrator to run in your environment. The following steps must be followed to perform the initial setup of the z/OS Migrator components for execution after installation.

- Review “SYSOPTN1 system defaults” on page 55 for information on setting up and running the z/OS Migrator server.
- Review “Running z/OS Migrator ISPF Monitor” on page 104 for information on setting up and running the z/OS Migrator ISPF Monitor.

**SYSOPTN1 sample job**

Member SYSOPTN1 contains the input statements for the z/OS Migrator system defaults.

The initial z/OS Migrator display contains the following default dataset values:

- Company: *YOUR COMPANY*
- Site: *YOUR SITE*
- WTO/WTOR for AutoOps (messages for automated operations required): NO
- WTO AutoOps Route Codes (MVS routecodes): 2, 4
- Local Time on Messages (display time): LOCAL

You can change these values by running the SYSOPTN1 batch job, with the new values you want displayed for your company.

Review and select the z/OS Migrator system defaults listed in Table 6 on page 55.
SYSOPTN1 system defaults

Table 6 describes the system defaults (SYSOPTN1 batch job). For examples of the SYSOPTN1 batch job, refer to member SYSOPTN1 in SAMPLIB.

Table 6  SYSOPTN defaults and options

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Function</th>
<th>Option</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/OS Migrator VERSION</td>
<td>Must be the first non-comment entry. Specifies what version of z/OS Migrator is being executed.</td>
<td>8</td>
<td>The option must be specified.</td>
</tr>
<tr>
<td>Company Name</td>
<td>Customer corporation name. Used in the Monitor display and SYSOUT listings. Up to 64 characters allowed.</td>
<td>Customer name</td>
<td>YOUR COMPANY</td>
</tr>
<tr>
<td>Site</td>
<td>Local customer site name for a specific site, for example. Up to 64 characters allowed.</td>
<td>Name</td>
<td>YOUR SITE</td>
</tr>
<tr>
<td>WTO/WTOR for AutoOps</td>
<td>Specifies whether messages for automated operations are required.</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>WTO AutoOps Route Codes</td>
<td>Specifies the MVS routing codes.</td>
<td>1-28</td>
<td>2, 4</td>
</tr>
<tr>
<td>Display Time As</td>
<td>z/OS Migrator defaults to Local time on SYSOUT. This can be set to another value, such as GMT (Greenwich Mean Time). (&quot;Option 3 – Display Configuration Information&quot; on page 156 provides information on setting displays.)</td>
<td>GMT</td>
<td>LOCAL</td>
</tr>
</tbody>
</table>
Step 10: Allocate z/OS Migrator system information dump dataset

z/OS Migrator writes comprehensive system diagnostic information to the datasets defined by the SYSMDUMP DD statement. To aid in timely analysis and diagnosis, EMC recommends that all z/OS Migrator server started tasks be created with the capability to write dump output to a Generation Data Group (GDG) dataset, as shown in Figure 6.

```plaintext
JOBCARD1
JOBCARD2
/*/ SAMPLE JCL TO DEFINE THE SYSMDUMP GDG BASE */
RECOMMENDED NUMBER OF GDG ENTRIES IS 3
ONE SUCH GDG MUST BE DEFINED FOR EACH LPAR THAT Z/OS MIGRATOR RUNS ON.
THE GDG SHOULD HAVE THE FOLLOWING FORMAT, SINCE THE SAME VALUES
WILL HAVE TO BE SPECIFIED IN THE Z/OS MIGRATOR SERVER JCL
DHLQ = YOURHLQ     HIGH LEVEL QUALIFIER FOR DUMPS
VER = ZOSM800       Z/OS MIGRATOR VERSION
SMF = SMFID         SMFID

//DEFGDG EXEC PGM=IDCAMS,REGION=1024K
//SYSPRINT DD SYSOUT=* 
//SYSIN DD *
DEFINE GDG ( 
  NAME(YOURHLQ.ZOSM800.SMFID.SYSMDUMP) /* NAME */ 
  LIMIT(3)   /* MAX NR OF GENERATIONS */ 
  OWNER(ZOSM800) /* OWNER MAX 8 CHARS */ 
  SCRATCH /* DELETE VERSION IF UNCATALOGED */ 
) 
LISTCAT ENTRIES(YOURHLQ.ZOSM800.SMFID.SYSMDUMP) ALL
/*/ 

Figure 6 Sample of z/OS Migrator SYSMDUMP GDG creation JCL

hlq.ZOSM800.SAMPLIB contains a member named 'DEF@GDG' for use in defining the SYSMDUMP dataset GDG base. Alternative methods exist for administering the SYSMDUMP dataset. For more information, contact EMC Technical Support.

One GDG must be defined for each LPAR that z/OS Migrator runs on. The GDG should have the following format, since the same values will have to be specified in the z/OS Migrator server JCL:

DHLQ = YOURHLQ     High-level qualifier for dumps
VER = ZOSM800       z/OS Migrator version
SMF = SMFID         SMFID

Some installations can secure the ability to write data out to SYSMDUMP, SYSDUMP, SYSABEND and, further, through use of the SDUMPX program macro. If your installation has the following resource profiles in the FACILITY class defined to your security product, the user ID associated with the z/OS Migrator server needs to have READ access permitted.

IEAABD.DMPAUTH
IEAABD.DMPAKEY
Once installation is complete, issue the z/OS Migrator DUMP command to test compliance with this requirement and ensure an SVC dump may be taken when required.
Step 11: Allocate z/OS Migrator database

The z/OS Migrator database is used to pass information between z/OS Migrator systems. It contains all information related to data migration operations. The z/OS Migrator database is automatically initialized by the z/OS Migrator server when it first starts.

The z/OS Migrator database must be allocated before you start the z/OS Migrator server. Figure 7 on page 57 provides sample allocation details. hlq.ZOSM800.SAMPLIB contains a member named 'DEF@DB' for use in defining the z/OS Migrator database.

⚠️ CAUTION ⚠️

It is imperative that you properly allocate the z/OS Migrator database as described in the following example, and not preformat it in any way. This also includes ensuring there are no changes to any dataset attributes that might result from SMS ACS processing. One way to ensure this is to check that the DATACLAS associated with the Migrator database remains NULLS or an installation defined NULL CLASS. When the z/OS Migrator server starts, it automatically formats the database. Additionally, both the primary and secondary allocations MUST be of the same size.

```
//DEF EXEC PGM=IEFBR14
//SYSPRINT DD SYSOUT=* 
//ZOSMDB DD DSN=YOURHLQ.ZOSM.DB, 
//DCB=(RECFM=F,LRECL=4096,BLKSIZE=4096), 
//UNIT=SYSALLDA, 
//VOL=SER=XXXXXX, 
//SPACE=(CYL, (XX,XX),RLSE,CONTIG), 
//DATACLAS=, 
//DISP=(,CATLG) 
```

Figure 7 Sample of z/OS Migrator database creation JCL
Note: Multiple servers that are expected to cooperate MUST share the same database file. If there are multiple database files, you must NOT activate the same group using different databases. Using multiple databases is NOT recommended and can lead to data loss.

Placing the z/OS Migrator database

The z/OS Migrator database should be placed on a volume with low activity. The volume must also not contain data that you will wish to migrate from or to. It is recommended that the z/OS Migrator database not be placed on a volume where other control datasets reside (such as, MIM, the StorageTek LSM Control dataset, and so on).

⚠️ CAUTION

Short-term reserves will be issued against the volume containing the z/OS Migrator database by the z/OS Migrator servers. You should carefully consider the placement of the z/OS Migrator database. It is strongly recommended that you choose a volume against which no other reserves are generally issued and which is not heavily active.

z/OS Migrator will not migrate datasets to or from the volume containing the active z/OS Migrator database; keep this in mind when considering placement of the dataset.

The database uses a RESERVE with the following major/minor name and may be converted to a global ENQ only if all LPARs involved in the migration are in the same GRS/MIM environment.

Note: If you are using CA-MIM, the database file and the SECCOM library must NOT be protected by CA-MIM. The MIM4006 and MIM4008 messages in the CA-Multi-Image Manager Statements and Commands manual provide additional detail.

- Major name (qname): EMC$FM
- Minor name (rname): <44-byte database name>

z/OS Migrator will periodically issue RESERVE macros to the volume containing the z/OS Migrator database and this might affect other applications if this RESERVE is not being converted to a global ENQ by GRS.
Step 12: Configure z/OS Migrator server parameters

The z/OS Migrator server started task JCL specifies the configuration PDS member that contains the startup parameters. The z/OS Migrator server configuration PDS member is located in hlq.ZOSM800.SAMPLIB(CONFIG). These parameters are described in detail in Appendix B, "Detailed Parameter Reference" on page 291.

Figure 8 provides an example of a z/OS Migrator server configuration PDS.

```plaintext
*  *--------------------------------------------------------------------*
*  z/OS Migrator Sample Start Up Configuration Parameter File        *
*  *--------------------------------------------------------------------*
*  4 Digit Server ID / Sub system Identifier name                  *
*  Must be unique for both Migrator and unique z/OS systems. Alias SSID *
*  *--------------------------------------------------------------------*
*  SUBNAME=xxxx                           /* Subsystem Name          */
*  *SSID=xxxx                             /* Subsystem ID             */
*  *--------------------------------------------------------------------*
*  z/OS Command Prefix - 1 to 8 characters - Unique to z/OS system   *
*  Command prefix used for issuing Server command via Console/SDSF/ISPF *
*  *--------------------------------------------------------------------*
*  CPFX=cpfx                              /* Command Prefix            */
*  *--------------------------------------------------------------------*
*  The z/OS Migrator Data Base File Name (full name w/o mask/symbolics) *
*  *--------------------------------------------------------------------*
*  DB=yourhlq.ZOSM.DB                     /* Data Base Full name       */
*  *--------------------------------------------------------------------*
*  SWAP Options used Globally for all volume migration groups. See Product Guide for multiple options available and restrictions. Group SWAP options specifications override global settings. *
*  *--------------------------------------------------------------------*
*  SWAPOPT=(xxxxxx,xxxxxxxx,xxxxxxxx)     /* Global SWAP Options       */
*  *--------------------------------------------------------------------*
*  DEBUG parameters to be used via direction of EMC Technical Support *
*  *--------------------------------------------------------------------*
*  DEBUG=00000000,00000000                /* DEBUG bit setting values */
*  *--------------------------------------------------------------------*
*  Maximum Overall I/O Concurrency                                               *
*  Allows for multiple I/O Pipelines during volume/logical migrations.         *
*  *--------------------------------------------------------------------*
*  MAXIO=30                               /* Maximum I/O Concurrency */
*  *--------------------------------------------------------------------*
*  Maximum I/O Concurrency per Channel Path                                        *
*  *--------------------------------------------------------------------*
*  MAX_CHANNEL_IO=15                /* Maximum CHPID Concurrency */
*  *--------------------------------------------------------------------*
*  Maximum I/O Concurrency per Individual Device                                       *
*  *--------------------------------------------------------------------*
*  MAX_DEVICE_IO=2                       /* Maximum Dev Concurrency */
```
Maximum Volume concurrency during volume migration events. Max # concurrently active volume migration copy pairs. Zero indicates no restriction on concurrency.

MAXVOL=0 /* Maximum Vol Concurency */

Indicates the number of Asynchronous subtasks to run in support of multiple device pairs during volume and logical migration. Dflt=10

SSUB#=0010 /* Asynchronous Subtasking # */

Indicates the minimum number of seconds another LPAR must be unresponsive before it is considered IDLE (Default is 45 seconds)

IDLE=0045 /* IDLE duration indicator */

DIVERSION Subset parameter sets the number of datasets processed between RESERVE/RELEASE on SOURCE/TARGET Catalog Pairs during DIVERSION. Default is zero and this allows the RESERVE to be held for the time it takes to RENAME/RECATLG all datasets in the logical migration group being processed.

DIVERSION_SUBSET=0 /* Diversion Pair Count # */

High Level Qualifiers for Target Extent Control Files (HLQ only). Can be multiple qualifiers but must allow for suffixing with 'LM' + the VOLSER + '.DB' and fit within 44 character DSN requirement.

LMPFX=yourhlq.EXTMAP /* Target Extent Mapping DB */

LOGINCL determines the actions of central logging in allocating various sysout datasets for the Migrator task.

LOGINCL=(EFMM*,QCOUT*) /* Dynamic Logging INCLUSION */

LOGEXCL determines the actions of central logging in deciding which sysout datasets are NOT to be allocated. The following list includes output file used for debugging and can be quite large. Under normal circumstances, these file are NOT allocated.

LOGEXCL=(*DBRE,*LST,*VUCB,FC*,*DBA,*DBLD,*CT*)/* Dynamic Logging EXCLUSION */

OPTIONS allows for specifying specific behaviors within the Migrator Server. Many have default settings and most all can be dynamically changed via the Migrator SET directive (see the z/OS Migrator Product Guide for further information).

VIOREFV/NOVIOREFV
This parameter allows for usage of VIO rather than SYSALLDA during
z/OS Migrator Installation

* dynamic allocation calls to ICKDSF during REFVTOC processing.
* RTDCHK/NORTDCHK
* This parameter allows for detection of the Interchip's Real Time Defrag product. DSCB updates methods used by RTD are incompatible with z/OS Migrator and require toleration/compatibility processing.

* OPTIONS=VIOREFV /* use VIO for ICKDSF calls */
OPTIONS=RTDCHK /* check alloc vs freespace */
* CONGROUP=xxxxxxxxxx allows for configuring the name of the associated EMC Congroup task against which Migrator would automatically issue MODIFY commands in order to disable and/or enable Automated SWAP (AUTOSWAP) GROUP processing during various migration events.

* CONGROUP=xxxxxxxxxx /* CONGROUP task to MODIFY */

* REFVTASK=xxxxxxxxxx allows for configuring the name of the started task initiated at group termination if REFORMAT REFVTOC requests are to be processed for the group. EFMRFVTC is the default STC name

* REFVTASK=EFMRFVTC /* REFVTOC STC to initiate */

* Diagnostic Trace setting - default is OFF. See Product Guide.

* TRACE=OFF /* TRACE/DIAGNOSTICS setting */

*** End Of CONFIG Parameters

Figure 8 Sample z/OS Migrator server startup configuration file

Some additional MAXVOL considerations when using ZOSMPROC, include:
- You can control concurrency by dynamically lowering MAXVOL, using the console command to z/OS Migrator.
- Set MAXVOL=1 when working with JES2 or Couple volumes.
- On resource constrained systems, use a lower MAXVOL value, such as 8.

Step 13: Customize and run z/OS Migrator server

Before you can begin using z/OS Migrator to migrate data, you must customize and initialize the z/OS Migrator server. The z/OS Migrator server is the integral part of the z/OS Migrator product and is required to run on all z/OS images that will be accessing the data being migrated. The z/OS Migrator LINKLIB must be APF authorized on all LPARs before activating the server.

z/OS Migrator is a server system address space charged with responding to and maintaining the environment where migration events occur. Server input can come from both the console interface, as well as the z/OS Migrator ISPF application. In addition, Migrator monitors all channel activity concerning source DASD volumes.
and/or selected datasets. Naturally, as with any server address space, z/OS Migrator requires the proper relative priority in order to run efficiently and maintain proper communications between the owning and agent server systems running on separate logical partitions (LPARs). EMC requires that the z/OS Migrator address space be assigned to a high priority service class under Workload Manager, recommending it be assigned to the SYSSTC service class.

Review all of the information on setting up and operating the z/OS Migrator server before attempting to perform any data migrations.

Running z/OS Migrator server as started task

The z/OS Migrator server is intended to be run as a started task. In this way, z/OS Migrator will always be available to ensure migrations can be performed when required. This also ensures that processing continues for active migrations if one or more cooperating LPARs or servers is restarted.

You should implement the z/OS Migrator started task to run with performance attributes that are equivalent to that used by system started tasks, generally above batch processing. The z/OS Migrator server is an I/O oriented task but should have appropriate priority to schedule internal events in a timely manner.

Figure 9, displayed on the following pages, provides an example of z/OS Migrator server JCL.

**Note:** The JCL located in hlq.ZOSM800.SAMPLIB(ZOSMPROC) might have been updated and therefore may differ from the example provided here.

**Figure 9** z/OS Migrator server JCL

```plaintext
// *--------------------------------------------------------------------*
// *                                                                 *
// *            z/OS Migrator Server Started Task Procedure             *
// *                                                                 *
// *  For detailed assistance, refer to the z/OS Migrator Product Guide, *
// *  Chapter 2, "z/OS Migrator Installation" for information on the    *
// *  initialization, customization and running of z/OS Migrator        *
// *--------------------------------------------------------------------*

//ZOSMPROC PROC CHLQ=,           HIGH LEVEL QUALIFIER FOR Z/OS MIGRATOR
//             MEM=,             CONFIGURATION MEMBER NAME
//             VER=ZOSMnnn,      Z/OS MIGRATOR VERSION nnn
//             START=WARM,       WARM START THE Z/OS MIGRATOR SERVER
//             DHLQ=,            HIGH LEVEL QUALIFIER FOR DUMPS
//             SMF=              SYSTEM ID
// *
//IEFBR14   EXEC PGM=IEFBR14
//SYSUT1   DD  DSN=&DHLQ..&VER..&SMF..SYSMDUMP(+1),DISP=(,CATLG),
//             DCB=(LRECL=4160,RECFM=FBS),DSORG=PS,
//             UNIT=SYSALLDA,SPACE=(CYL,(500,500),RLSE)
// *
//ZOSMnnn  EXEC PGM=EFMMMAIN,COND=(0,LT),REGION=0M,
//             PARM=('CFG=&CHLQ..&VER..SAMPLIB(&MEM),                  X
//             START=&START')
// *--------------------------------------------------------------------*
/*
/* Following is the z/OS Migrator LINK Library. It is recommended this remain in STEPLIB and that the LINK library not be added to *
/* the link list in order to avoid conflict with any other EMC *
/* product. *
/* * If z/OS Migrator was installed using SMP/E, the EMC Mainframe *
/* Enablers LINKLIB must be added to this STEPLIB concatenation in *
/*
```
// order to avoid any potential S806 (module not found) ABENDs.
//
//*--------------------------------------------------------------------*
//* STEPLIB DD DISP=SHR,DSN=&CHLQ..&VER..LINKLIB
//* DD DISP=SHR,DSN=DS-SCF-PREFIX.LINKLIB
//*--------------------------------------------------------------------*
//* Following is the z/OS Migrator Security (SECCOM) Library DD
//*--------------------------------------------------------------------*
//SECCOM DD DISP=SHR,DSN=&CHLQ..&VER..SECCOM
//*--------------------------------------------------------------------*
//* SYSPRINT DD SYSOUT=* ----> z/OS Migrator messages
//* SYSOUT DD SYSOUT=* ----> z/OS Migrator messages
//*--------------------------------------------------------------------*
//* SYSDUMP DD DISP=MOD,DSN=&DHLQ..&VER..&SMF..SYSMDUMP(+1)
//* SCF$nnnn DD DUMMY -> nnnn must match the SCF$nnnn DD in the SCF
//* task with which Migrator is to communicate
//*--------------------------------------------------------------------*
//* EMC optional DD statement overrides
//*--------------------------------------------------------------------*
//* Through the use of debug flag settings and specific overrides,
//* additional diagnostic information can be generated to various
//* DD sysout statements under the z/OS Migrator task. This helps
//* both in resolving any issues that might arise while running and
//* also provides a vehicle to better understanding how Migrator
//* works. Under normal circumstances, the information provided is
//* usually sufficient, however, at the direction of EMC support
//* personnel, you may be asked to enable further diagnostics and
//* tracing options to aid in problem resolution.
//*--------------------------------------------------------------------*
//* REQUIRED DD Statements for z/OS Migrator
//*--------------------------------------------------------------------*
//* Under JES2:
//* None of the following DD statements are necessary as the current
//* Migrator dynamically allocates those it requires automatically.
//*--------------------------------------------------------------------*
//* Under JES3:
//* Please uncomment the following DD statements to ensure diagnos-
//* tic task data is recorded properly and available when needed.
//*--------------------------------------------------------------------*
//* EFMMSYNC DD SYSOUT=* ----> PROCESS / volume migration messages
//* EFMMSSUB DD SYSOUT=* ----> Asynchronous volume migration tasks
//* EFMMSYLM DD SYSOUT=* ----> PROCESS / logical migration messages
//* EFMMIMAL DD SYSOUT=* ----> Asynchronous logical migration tasks
//* EFMMVUCB DD SYSOUT=*             
//* EFMMMAIN DD SYSOUT=*             
//* EFMMRMAN DD SYSOUT=*             
//* EFMMRENEM DD SYSOUT=*            
//* EMCALLLOC DD SYSOUT=*            
//* EFMMCTIO DD SYSOUT=*             
//* EMCTLM DD SYSOUT=*               
//* EFMMDBHB DD SYSOUT=*             
//* EFMMDBLD DD SYSOUT=*             
//* EFMMMSMF DD SYSOUT=*             
//* EFMMSNAP DD SYSOUT=*             
//* EFMMUTIL DD SYSOUT=*             
//* EFMMXMAP DD SYSOUT=*             
//* EFMMCONS DD SYSOUT=*             
//* EFMMAPII DD SYSOUT=*             
//*--------------------------------------------------------------------*
//* EMC SNAP DD statements
//*--------------------------------------------------------------------*
//* QCOUTPUT DD SYSOUT=* ----> SNAP API MESSAGES
//* QCOUT002 DD SYSOUT=* ----> SNAP API MESSAGES
Note: The SCF$nnnn statement is only necessary if z/OS Migrator uses a non-default instance of EMCSCF (ResourcePak Base).

### z/OS Migrator JCL substitution variables

Table 7 defines the JCL substitution variables and their meaning:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Function</th>
<th>Option</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHLQ=</td>
<td>High-level qualifier specified for the z/OS Migrator product when it was installed.</td>
<td>None. Must be specified.</td>
<td></td>
</tr>
<tr>
<td>MEM=</td>
<td>Name of the configuration member. The configuration file defines the operational parameters for the z/OS Migrator server. “Step 12: Configure z/OS Migrator server parameters” on page 59 provides more information.</td>
<td>None. Must be specified.</td>
<td></td>
</tr>
<tr>
<td>START=</td>
<td>Specifies the type of startup for z/OS Migrator to perform. Refer to “z/OS Migrator server START options” on page 65 for more details.</td>
<td>HOT \ WARM \ COLD</td>
<td>WARM</td>
</tr>
<tr>
<td>VER=</td>
<td>Specifies the version of z/OS Migrator.</td>
<td>ZOSM800</td>
<td></td>
</tr>
<tr>
<td>DHLQ=</td>
<td>High-level qualifier specified for the system information dump dataset, created in “Step 10: Allocate z/OS Migrator system information dump dataset” on page 56.</td>
<td>None. Must be specified.</td>
<td></td>
</tr>
<tr>
<td>SMF=</td>
<td>SMFID for the LPAR on which this started task will run.</td>
<td>SMFID</td>
<td>Must be specified.</td>
</tr>
</tbody>
</table>
The Mainframe Enablers LINKLIB must be concatenated under STEPLIB with the z/OS Migrator LINKLIB.

In the STEPLIB DD statement, change "DS-SCF-PREFIX" to the hlq specified for Mainframe Enablers when it was installed.

**z/OS Migrator server START options**

The z/OS Migrator server stores its operating parameters and maintains migration control and status information. This data provides key information on the data migration activities being managed by z/OS Migrator. The START option, specified when starting the z/OS Migrator server, controls how z/OS Migrator will treat previous information it finds in memory. There are two START options:

- **WARM start** (interchangeable with HOT start)
- **COLD start**

**WARM start**

WARM start is the default option. It is also interchangeable with HOT start.

During a WARM start, all existing common data structures and the data space are simply reused as-is. All prior I/O interface routines remain in place. There should be no impact on any active work, although if an application I/O request for a mirrored dataset could not be serviced during the hiatus, the group may have been suspended and should be resumed.

If there was an intervening IPL, then there are no existing common structures or data space. The group configuration objects and target extent files are read to re-establish a working environment and the groups should come up in whatever state they were in before the IPL, with the exception that a group that has not reached mirror state will not be resumed if the restart is done on the owner.

**HOT start**

A HOT start can be used interchangeably with a WARM start.

**COLD start**

During a COLD start, the previous data structures are abandoned and the server will come up as though there had been an IPL. Thus, the I/O interfaces will not have been continuously active, resulting in a data integrity exposure if there were intervening application I/O. A HOT or WARM start after an IPL is actually no different from a COLD start except for the assumption that there were no “interesting” application I/O from the “failure” of the old environment until z/OS Migrator was restarted after the IPL. A COLD start with mirroring groups will cause the groups to suspend, and is automatically disallowed if any groups were in Diversion phase.

**Implementing REFVTOC starting task JCL**

*Note:* This section applies to z/OS Migrator 8.0 with PTF fix MM80005, which changes how automated REFVTOC requests are processed. If you are installing z/OS Migrator 8.0, plan on installing all service updates available for z/OS Migrator including MM80005.

Implement the REFVTOC started task JCL and enable it via PROCLIB concatenation.
The z/OS Migrator server can initiate the z/OS Migrator REFVTOC started task to process all batched REFVTOC requests for a given group or set of groups. At end of group processing, or SWAP processing for a consistent migration group, the task identified via the REFVTASK global configuration parameter (described in "REFVTASK" on page 312) will be started. The procedure for this can be found in the SAMPLIB dataset included with the z/OS Migrator installation files.

Implement the z/OS Migrator REFVTOC started task to run with performance attributes that are equivalent (or better) to that used by the z/OS Migrator server (or other system started tasks), generally above Batch Service Class processing. The z/OS Migrator REFVTOC started task, like the server proper, is an I/O-oriented task but should also have appropriate priority to process properly and efficiently while other z/OS Migrator server activities are concurrently active.

The z/OS Migrator external REFVTOC started task EMCRFVTC (or customer defined task name) is initiated at migration group's end or via the REFVTOC command. Be sure to keep the z/OS Migrator server task active through to EMCRFVTC task completion. EMCRFVTC requires access to the internal queues and services provided by your z/OS Migrator instance. If z/OS Migrator is terminated prematurely, the EMCRFVTC started task is automatically terminated. While this issue applies only to the owner instance (where the migration group was run), it is suggested to allow all ancillary tasks to complete before terminating any z/OS Migrator instances.

Figure 10 provides an example of the contents for the z/OS Migrator REFVTOC started task. The only update required for this PROC is to specify the z/OS Migrator LINKLIB in use (should be authorized as defined earlier).

```plaintext
//*---------------------------------------------------------------*
//* z/OS Migrator 8.0 - Reformat VTOC processing                *
//*---------------------------------------------------------------*
//EFMRFVTC PROC PROG=EFMMREFV
//EFMRFVTC EXEC PGM=&PROG,TIME=1440,REGION=0M
//STEPLIB DD DISP=SHR,DSN=DS-PREFIX.LINKLIB
//SYSABEND DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//REFVTOCL DD SYSOUT=*  
```

**Figure 10** z/OS Migrator REFVTOC started task
Figure 11 provides an example of the expected output to be found under 
DDNAME REVFTOCL.

11:31:20.30 EFMMREFV Reformat REVFTOC process initiated for z/OS Migrator
ESNP993I ICKDSF - MVS/ESA   DEVICE SUPPORT FACILITIES 17.0 TIME: 11:31:20 09/02/16   PAGE 1
ESNP993I
ESNP993I REFORMAT DDNAME(EMCREFV ) REVFTOC VERIFY(SW1B7B)
ESNP993I ICK007001 DEVICE INFORMATION FOR 618B IS CURRENTLY AS FOLLOWS:
ESNP993I   PHYSICAL DEVICE = 3390
ESNP993I   STORAGE CONTROLLER = 2107
ESNP993I   STORAGE CONTROL DESCRIPTOR = E8
ESNP993I   DEVICE DESCRIPTOR = 0A
ESNP993I   ADDITIONAL DEVICE INFORMATION = 4800003C
ESNP993I   TRKS/CYL = 15, # PRIMARY CYLS = 3399
ESNP993I ICK040001 DEVICE IS IN SIMPLEX STATE
ESNP993I ICK03091I EXISTING VOLUME SERIAL READ = SW1B7B
ESNP993I ICK01520I THE VTOC-INDEX WAS DELETED
ESNP993I ICK01314I VTOC IS LOCATED AT CCHH=X'0001 0000' AND IS 15 TRACKS.
ESNP993I ICK01502I BUILDIX FUNCTION STARTED
ESNP993I ICK01503I 618B REQUEST RECEIVED TO CONVERT VTOC TO IXFORMAT
ESNP993I ICK01504I 618B VTOC FORMAT IS CURRENTLY OSFORMAT, REQUEST ACCEPTED
ESNP993I ICK01513I 618B BUILDIX PROCESSING COMPLETED: VTOC IS NOW IN IXFORMAT
ESNP993I ICK01317I VTOC-INDEX IS LOCATED AT CCHH=X'0000 0001' AND IS 14 TRACKS.
ESNP993I ICK00001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

ESNP993I ICKDSF - MVS/ESA   DEVICE SUPPORT FACILITIES 17.0 TIME: 11:31:20 09/02/16   PAGE 1
ESNP993I
ESNP993I REFORMAT DDNAME(EMCREFV ) REVFTOC VERIFY(SW1B7F)
ESNP993I ICK007001 DEVICE INFORMATION FOR 618F IS CURRENTLY AS FOLLOWS:
ESNP993I   PHYSICAL DEVICE = 3390
ESNP993I   STORAGE CONTROLLER = 2107
ESNP993I   STORAGE CONTROL DESCRIPTOR = E8
ESNP993I   DEVICE DESCRIPTOR = 0A
ESNP993I   ADDITIONAL DEVICE INFORMATION = 4800003C
ESNP993I   TRKS/CYL = 15, # PRIMARY CYLS = 3399
ESNP993I ICK040001 DEVICE IS IN SIMPLEX STATE
ESNP993I ICK03091I EXISTING VOLUME SERIAL READ = SW1B7F
ESNP993I ICK01520I THE VTOC-INDEX WAS DELETED
ESNP993I ICK01314I VTOC IS LOCATED AT CCHH=X'0001 0000' AND IS 15 TRACKS.
ESNP993I ICK01502I BUILDIX FUNCTION STARTED
ESNP993I ICK01503I 618F REQUEST RECEIVED TO CONVERT VTOC TO IXFORMAT
ESNP993I ICK01504I 618F VTOC FORMAT IS CURRENTLY OSFORMAT, REQUEST ACCEPTED
ESNP993I ICK01513I 618F BUILDIX PROCESSING COMPLETED: VTOC IS NOW IN IXFORMAT
ESNP993I ICK01317I VTOC-INDEX IS LOCATED AT CCHH=X'0000 0001' AND IS 14 TRACKS.
ESNP993I ICK00001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

Figure 11 Sample REVFTOCL output
Step 14. Specify parameters in SAMPLIB prior to first execution

Prior to the first execution of z/OS Migrator, EFMXEXEC in the z/OS Migrator SAMPLIB needs to be edited with specify installation specific parameters. The following values need to be replaced with your installation specific data. Values that need to be replaced include:

- **DS PREFIX** — The z/OS Migrator dataset prefix for ISPF libraries.
- **INSTALLED_LIB** — HLQ used when installing z/OS Migrator.
- **YOUR_MIRROR_COMMAND_PREFIX** — The command prefix used for communicating with the z/OS Migrator subsystem, which should match the value specified in the z/OS Migrator configuration/execution parameter CPFX.
- **YOUR_MIRROR_LINKLIB** — The fully qualified dataset name of the z/OS Migrator LINKLIB created during installation.
- **YOUR_MIRROR_SECURITY_LIBRARY** — The fully qualified dataset name of the SECCOM library create during installation.

Figure 12 provides an example from the EFMXEXEC showing the values that need to be replaced.

```plaintext
DS_PREFIX = "INSTALLED.LIB"  /* specify the ISPF DS-PREFIX here */
TYPEM     = ''
IDM       = ''
APPID     = "EFM#"
/* Note: The code below allows you to set variables for all users using */
/* this REXX clist. While the users can modify these variables in */
/* their current session, these variables will override them the */
/* next time this exec is invoked. Set these variables to a value */
/* or '' otherwise unwanted variable values will result. Setting a*/
/* variable to '' allows the user to specify their own value and */
/* retain it until the variable is set in this procedure. */
UNIT                        = "SYSALLDA"
VOLUME                      = ''
UNITSW                      = "3390"
MIR_PREFIX                  = "YOUR_MIRROR_COMMAND_PREFIX"
ZOSM_LOAD_LIBRARY           = "'YOUR_MIRROR_LINKLIB'"
ZOSM_SECURITY_LIBRARY       = "'YOUR_MIRROR_SECURITY_LIBRARY'"
```

Figure 12  EFMXEXEC values example

**Note:** For more information on the ISPF Monitor, refer to Chapter 6, “Using the z/OS Migrator ISPF Monitor”.

Step 15: Start/stop z/OS Migrator server

Starting z/OS Migrator server

You are now ready to start the z/OS Migrator server. To start the server with the default parameters, issue the start command as follows:

```
S procname
```

Substitute the procname you have created. This will start the z/OS Migrator server started task with the default parameters that you specified during customization.

**CAUTION**

The z/OS Migrator server must always be active and able to immediately process requests. z/OS Migrator requires a high execution priority and should be put in a response-oriented performance group.

Shutting down z/OS Migrator server

When you stop the z/OS Migrator server, the z/OS Migrator I/O Monitor routines will remain active within the system.

**CAUTION**

In the extreme situation where the z/OS Migrator server will not exit the system, the MVS FORCE ARM command may be used. It is highly recommended that this situation be avoided and that you follow IBM guidelines for the FORCE ARM command. Before attempting this, however, we recommend that you contact EMC Customer Support.

The commands that you enter can be through a z/OS Modify command or by using the z/OS Migrator server command prefix you specified when configuring the z/OS Migrator server. The valid options are:

- SHUTDOWN
- STOP

Running z/OS Migrator in shared storage environment

z/OS Migrator supports running in a shared storage environment. This might include multiple LPARs running z/OS, separate processors, single or multiple sysplexes, or a combination of all.

**CAUTION**

When running in a shared storage environment, the z/OS Migrator server must be running on all active z/OS systems and utilizing the same z/OS Migrator database. If you do not comply with this requirement, you will be exposing yourself to serious data integrity issues.

All processors active in the shared storage environment MUST be running as part of the same z/OS Migrator environment.

To accomplish this, you simply need to ensure that the z/OS Migrator started task is:

- Active on all z/OS images
- Utilizing the same z/OS Migrator database across all z/OS Migrator servers.
This chapter contains migration methodology, and best practice guidelines to be used in conjunction with a logical (dataset) migration project. Additionally, because z/OS Migrator is a dataset-level migration tool that includes updating the information in the ICF catalog and interacts with SMS, there are sections that discuss their role in the migration process. Topics include:

- Planning logical migration ................................................................. 72
- Logical migration considerations ...................................................... 76
Planning logical migration

Planning for migration prior to execution contributes to having a successful migration. Planning includes establishing a migration management team, and performing pre-migration tasks.

Frequently you have to work with the local Customer Engineer (CE) and the z/OS systems programmer (sysprog) who perform the I/O generation (gen) of the newly added storage system containing the target devices. Together you establish when the EMC box will be ready (task:CE), as well as when the I/O gen is complete and the new UCBs have assigned volume serial numbers (task:Sysprog). With this knowledge you can feel comfortable that the target devices are ready for the migration.

Migration team

You should create a migration management team to manage the migration process and a migration team to perform the pre-migration tasks. When establishing a migration management team, ensure that the team consists of at least the following people:

◆ Primary Migration Manager
◆ Alternate Migration Manager
◆ Application Coordinator
◆ Security Coordinator
◆ Technical Lead Coordinator

The migration team should include a technical data migration team, whose members have been trained to use z/OS Migrator and can also act as migration mentors.

Pre-migration tasks

Before performing dataset migrations, complete the pre-migration tasks to ensure that the migration will go smoothly and to minimize the risk of problems.

Perhaps the most basic preparation is to ensure the prospective target devices have been genned, and volumes labeled. It is also important to know what features have been specified and whether source volumes are currently participating in ConGroups. See Appendix F on page 333 for additional considerations in this area.

Use the following list to help with the pre-migration tasks:

1. Identify the application owners.
2. Notify the entire application community about the upcoming migration at least 30 days prior to the intended migration date. Include an invitation to attend the initial migration kickoff meeting.
3. Gather information about the SMS storage environment and applications.
4. Inform Security and Compliance groups about the migration.
5. Schedule a pre-migration rehearsal that includes all the members of the migration team and define a data sampling that will enable the application groups to appropriately conduct the pre- and post-migration verification process.
6. Establish a weekly meeting schedule that includes remote participants.
7. Identify and follow the required change control process.
8. Establish a migration status call-in process.
9. Use the “Pre-migration planning checklist” on page 74 to ensure that all of the pre-migration planning steps have been executed.
11. Create a new target volume SMS storage group configuration.
12. Add the volume to the appropriate storage group in DISNEW status.
13. Change the status of the source configuration to DISNEW.
14. Create a list of source volumes that contain data to be moved and the associated target volumes or storage group.
15. Establish a naming standard for the temporary names of the new target datasets.

**Note:** The Source name becomes the Target name. Naming is discussed in “Source and target dataset names” on page 106.

16. Establish a naming standard for the migration groups.
17. Identify the time slot for the migration process to transition from mirroring to diversion, and then to completion, based on DSN or group activity, and fallback requirements. Mirroring, diversion, and completion are explained in “z/OS Migrator migration process” on page 105.

**Note:** Based on internal policies associated with a data migration process, some of the aforementioned list items may not be applicable.
# Pre-migration planning checklist

**Table 8** Pre-migration planning checklist (1 of 2)

<table>
<thead>
<tr>
<th>Action item</th>
<th>Assigned to</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a migration management team consisting of the following people:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Primary migration manager</td>
<td></td>
<td></td>
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<tr>
<td>- Alternate migration manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Application coordinator</td>
<td></td>
<td></td>
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<tr>
<td>- Security coordinator</td>
<td></td>
<td></td>
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<tr>
<td>- Technical lead coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create a migration team to perform the pre-migration tasks; ensure that the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>team members have been trained to use z/OS Migrator and can also act as</td>
<td></td>
<td></td>
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<tr>
<td>migration mentors.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify the application owners.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notify the entire application community about the upcoming migration at</td>
<td></td>
<td></td>
</tr>
<tr>
<td>least 30 days prior to the intended migration date. Include an invitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>to attend the initial migration kickoff meeting.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gather information about the SMS storage environment and applications.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inform the security and compliance groups about the migration.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule a pre-migration rehearsal that includes all the members on the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>migration team and define a data sampling that will enable the application</td>
<td></td>
<td></td>
</tr>
<tr>
<td>groups to appropriately conduct the pre- and post-migration verification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>process.</td>
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<td></td>
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<tr>
<td>Establish a weekly meeting schedule that includes remote participation</td>
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<td></td>
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<tr>
<td>dial in.</td>
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<td></td>
</tr>
<tr>
<td>Follow the required Change Control process.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish a migration status call-in process.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use the Migration Planning Checklist to ensure that all of the Pre-migration</td>
<td></td>
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<tr>
<td>planning steps have been executed.</td>
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<tr>
<td>Perform a catalog diagnostic.</td>
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<tr>
<td>Create the new target volume SMS storage group configuration.</td>
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<tr>
<td>Add the volume to the appropriate storage group in DISNEW status.</td>
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<tr>
<td>Change the status of the source configuration to DISNEW.</td>
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<tr>
<td>Create a list of source volumes that contain data to be moved and the</td>
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<tr>
<td>associated target volumes or storage group.</td>
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</tbody>
</table>
Table 8 Pre-migration planning checklist (2 of 2)

<table>
<thead>
<tr>
<th>Action item</th>
<th>Assigned to</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish a naming standard for the temporary names of the new target datasets.</td>
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<tr>
<td>Establish a naming standard for the migration groups.</td>
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<tr>
<td>Identify the time slot you want to move from mirroring to diversion to completion based on DSN or group activity, and fallback requirements.</td>
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</table>

Migration action item checklist

**Note:** Populated as part of the pre-planning process.

Table 9 Migration action item checklist

<table>
<thead>
<tr>
<th>Action Item</th>
<th>Assigned to</th>
<th>Status</th>
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</tbody>
</table>
Logical migration considerations

Before using z/OS Migrator to perform data migrations, you should review this section for details that may affect your data migration environment.

z/OS Migrator dataset selection

z/OS Migrator includes many dataset selection criteria, from a single dataset to thousands of datasets and multiple groups. The following sections outline selection factors, volume checklist, how to change SMS volume selection, and how to select datasets.

Dataset selection factors

The following are important factors related to z/OS Migrator dataset selection planning:

- VSAM CANDIDATE volumes must be identified because these volumes can change from CANDIDATE to PRIMARY. Candidate volume status can be changed using IDCAMS – ALTER REMOVEVOLUMES.
- Verify that the DSN length is less than 44 characters because a target DSN could include an additional qualifier.
- To prevent any new allocation in a SMS configuration, the status of the source volume must be DISNEW.
- Datasets that will be deleted and recreated within the z/OS Migrator migration cycle should be excluded and handled by SMS Data Redirection.
- GDG’s datasets should be reviewed for delete activity cycle. Once again, if the cycle is shorter than the z/OS Migrator migration cycle, let them move themselves.
- Non-SMS managed volumes that are mounted with a STORAGE status should be changed to PRIVATE.
- Space utilization: It is important that the storage subsystem have sufficient space to accommodate normal processing. Although in most cases there will be new storage available for a technology refresh, this might not be the case for dataset relocation or work load balancing.
- Go through a test/rehearsal type run to gain familiarity and confidence.
- Security: The security profile associated to a particular dataset might prevent moving the dataset.
- When moving a dataset for performance reasons, be sure that the new target volume does not already have a performance problem.
- When doing volume consolidation, be sure that you are not selecting multiple source volumes that have performance problems.
- Try to schedule the completion stage to take place as part of a preplanned outage.
Logical (Dataset) Migration Planning

◆ Identify Link List datasets or any other datasets that have a specific volser dependency. Since Link List datasets have a volser dependency, moving them without making the necessary changes that include the new volser could cause a problem.

◆ Identify all the volumes associated to a multi-volume dataset. The same number of target volumes will be required.

◆ Use the “Migration action item checklist” on page 75 to establish tasks, assignments, and status.

Volume checklist

◆ Ensure that the status of all the source volumes is DISNEW.

  Note: If DISNEW is enabled using VARY, the next ACS TRANSLATE and VALIDATE could reverse that status.

◆ Ensure that all source and target volumes contain an INDEX VTOC.

◆ Ensure that the target configuration is added to the appropriate storage group and the status of all volumes is DISALL. When you are ready to start the migration, change the status to ENABLE.

◆ Ensure that all the target volumes that have been initialized for SMS (ICKDSF STORAGEGROUP) contain a configuration with a large enough VVDS (10 cylinders) and contain an INDEX VTOC.

◆ Use ISMF to verify that the volumes in the target configuration have INDEX VTOC enabled. Additionally, a procedure should be implemented to verify that the status of all INDEX VTOCs is ENABLED because it is required on an SMS managed volume.

Changing SMS volume selection

The following procedure is an example of a quick way to alter the SMS allocation status for a range of volumes in an SMS storage group using ISMF. The objective of the procedure is to migrate from three MOD3s to one empty MOD9, and control allocation; the volume range is PROD01 to PROD03.

To alter the SMS allocation status:

1. Change the SMS volume selection for the three 3390 MOD3s to DISNEW.
2. Create new 3390 MOD9 PRODA1.
3. Using ISMF OPTION 6:
   a. Select Enter.
   b. Type the STORAGE GROUP name and select OPTION 4 VOLUME.
   c. Select Enter.
   d. Type the volume prefix PROD and the range FROM 01 TO 03 and select OPTION 3 ALTER.
   e. Select Enter.
   f. Change the SMS volume status for PROD01 through PROD03 to DISNEW.
4. Type `SETSMS SCDS(XX.XXXXX.SCDS)` where XX.XXXXX.SCDS is the SCDS.

5. Enable PRODA1 as `ENABLE`.

6. Complete the allocation phase.

7. Repeat step 3 and change the volume selection for PROD01 through PROD03 to `DISALL`.

`SETSMS SCDS(XX.XXXXX.SCDS)`

Where XX.XXXXX.SCDS is the SCDS.

Selecting datasets

Datasets are selected during the Activation phase by performing a catalog lookup using the Source DSN values provided in the Define Logical Migration Group panel. (“Step 1: Define group” on page 106 provides detailed information).

**Note:** Uncataloged datasets will fail activation.

The z/OS Migrator owner system (the host where the Group Activate command was submitted) performs the catalog lookup. When choosing the owner, select the system that possesses the most paths and that performs most of the I/O operations to the data that you are moving. Datasets cataloged in multiple catalogs will be migrated only from the perspective of the owner master catalog.

**CAUTION**

Source Dataset Cataloged in Multiple Catalogs:
All master catalogs (MCATs) should have equivalent alias definitions, with each alias entry pointing to the same user catalog (usercat) across all MCATs within the SYSPLEX or shared storage complex. The risk to a migration is that z/OS Migrator identifies the datasets to be migrated through a catalog search performed on the z/OS Migrator owner, the system where the z/OS Migrator Monitor is used to perform the Group ACTIVATE. If the MCATs do not have synchronized aliases, then there is a risk of having more than one catalog entry for a given dataset. The z/OS Migrator Activation phase recognizes only the dataset associated with the catalog known to the owner.

**MCAT alias synchronization errors should be resolved as part of your migration planning and preparation.**

Dataset masking rules

z/OS Migrator supports dataset masking for the SOURCE DSN, EXCLUDE DSN, and TARGET DSN parameters following the DFDSS masking rules.

- **SOURCE DSN, EXCLUDE DSN and TARGET DSN dataset name mask rules are different.** The SOURCE DSN and EXCLUDE DSN masks allow partial index level masking.

  For example, while EMC.DATA*.ABC** is valid for SOURCE DSN or EXCLUDE DSN, it is not valid as a TARGET DSN mask.
Logical (Dataset) Migration Planning

- The SOURCE DSN and EXCLUDE DSN dataset name masks follow DFDSS rules for dataset selection.
- The TARGET DSN dataset mask follows DFDSS rules for RENAME processing.

**DFDSS masking rules**

Table 10 explains the DFDSS masking rules.

<table>
<thead>
<tr>
<th>Character</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>* (single asterisk)</td>
<td>Takes the place of one qualifier or indicates that you are specifying one part of a qualifier.</td>
</tr>
</tbody>
</table>
| ** (double asterisk) | Used with other qualifiers, denotes one of the following:  
  - The non-existence of leading, trailing, and middle qualifiers.  
  - They play no role in the selection. |
| % (percentage) | Indicates a single-character mask. |

**Rules for using asterisks in a qualifier**

- The maximum number of permissible asterisks in a qualifier is two.
- When two asterisks are present in a qualifier, they must be the first and last characters. For example:
  - Permissible qualifiers:
    - **
    - *A*
  - Not permissible qualifiers:
    - **A*
    - *A*B*
    - *A*B
    - A*B*C

**Examples**

Some valid TARGET DSN masks are:

- A.** - Replaces the first index level of the source dataset name with “A” in the target dataset name.
- A.B.** - Replaces the first two index levels of the source dataset name with “A.B” in the target dataset name.

Some invalid TARGET masks are:

- **.DEF.** - Does not know which level to replace.
- A.*BCD* - The entire index level must be wild, or not at all.
Datasets allocated after activation

Datasets matching the source DSN masks that are cataloged after Activation are not included in the datasets population being migrated. If the migration objective is to depopulate the 'source' volumes, you should prevent allocations of datasets on these volumes.

In DFSMS-managed environments, the source volumes must be changed to volume status 'DISNEW' early in the migration project. This will cause these volumes to be excluded from SMS volume selection and the 'target' volumes within the storage group to be selected.

Dataset extent and multi-volume dataset handling

When migrating datasets that have multiple extents, z/OS Migrator images the target dataset to be an exact reflection of the source dataset. This means that if the source dataset in a migration currently is in six extents, then the target dataset is allocated with six identically sized extents.

Similarly, z/OS Migrator handles multi-volume datasets in a very similar manner. If a dataset over five volumes, then z/OS Migrator ensures that the target dataset being migrated is five volumes with the same number of extents on each volume as on the corresponding source volume.

z/OS allows a single dataset to have extents on up to 59 volumes. Under SMS, you only need to supply one volume in the Target Volume field. SMS will select the actual volumes based on your ACS routines.

When consolidating a group of datasets from multiple volumes to a smaller pool of new volumes, give consideration to those datasets that have been migrated into HSM. While z/OS Migrator does not recall and migrate those datasets currently HSM migrated, ensure that the new storage pool has sufficient volumes to re-stage any previously HSM migrated multi-volume dataset.

Note that the z/OS Migrator Define Logical Migration Group panel only allows 59 target volumes to be specified. If more volumes are needed, you can edit the group definition using the Modify option to add additional volumes to the group definition. Instructions on how to add more target volumes are included in “Example 2: Modifying a group definition to add more target volumes” on page 144.

Merging volumes and VTOC sizing considerations

Although z/OS Migrator facilitates the consolidation of datasets from multiple smaller volumes to larger volumes, z/OS Migrator does not resize VTOCs for the extra metadata that will reside on a larger volume.

For this reason, ensure that your larger volume VTOCs are appropriately sized to contain the data you plan on migrating to the volume.

For example, when many small datasets are consolidated onto a larger target volume, a larger VTOC may be required to hold all the dataset DSCB records. There should also be sufficient unused VTOC capacity on any volume to accommodate future additions. Otherwise, there could be unusable space on the volume due to the VTOC being full.
Multi-LPAR considerations

In general, z/OS Migrator should be active on all LPARS sharing the data to be migrated. “Multi-LPAR considerations” on page 27 provides more information. In a complex environment where DASD is only partially shared among multiple LPARs, it may be useful to develop a matrix that identifies the volumes to be migrated and the LPARs involved. This situation is best handled by having specific z/OS Migrator server complexes for each unique LPAR combination. If run concurrently, of course, each will have to have its own z/OS subsystem ID, command prefix, and most importantly, there will need to be a unique shared z/OS Migrator database for each z/OS Migrator complex.

Reserve handling requirements

z/OS Migrator has explicit requirements in the area of reserve handling. More specifically, z/OS Migrator requires that all hardware reserves issued by z/OS address spaces, including system, application, and jobs, be converted to software reserves.

Understanding global resource serialization and hardware reserves

In a shared storage environment, in which multiple z/OS images utilize the same storage resources, the z/OS operating system will issue a hardware reserve to the physical device in order to control exclusive usage of a resource. This ensures that no other z/OS image in the shared storage environment can access that device, during the time that the reserve is held.

The Global Resource Serialization (GRS) and Computer Associates Multiple Image Manager (MIM) of the z/OS operating system serialize usage of resources by converting hardware reserves to globally propagated ENQ requests. Through enqueue/dequeue facilities, the integrity of shared resources can be guaranteed. GRS and MIM communicate the need for exclusive usage across all systems in the shared storage complex and ensure exclusive usage by issuing a "software enqueue" on all systems in the shared storage environment. This converts the coarse physical protection of a hardware reserve to the more focused logical protection of a global ENQ.

Since z/OS Migrator migrates datasets from one disk volume to another, there are implications for the use of serialization facilities. Considerations for converting hardware reserves to globally propagated ENQ requests include:

- Ensuring the data integrity of data for datasets being migrated
- The avoidance of deadlocks in a multi-system environment
Ensuring data integrity of datasets being migrated

To ensure the data integrity of datasets being migrated, it is imperative that hardware reserves be converted to globally propagated ENQ requests. In Figure 13, the dataset DS1 is being migrated from source Volume A to target Volume B, and dataset DS2 is being migrated from source Volume B to target Volume A.

Figure 13 Reserve handling

If we assume that applications are running on both z/OS server MVS A and MVS B, and both require exclusive serialization of the resource, then the question becomes, How does z/OS Migrator impact normal serialization processing resulting in the requirement to convert hardware reserves to ENQ requests?

z/OS Migrator impact on serialization — z/OS Migrator requires resource serialization of catalog, VTOC, and VVDS resources during Activation and Diversion, as well as during Synchronization and Mirroring, whenever new extents are added. With regard to dataset serialization, because long-running applications continue to read and write data from the source location, all serialization will be targeted to the source location for resources on that volume. In this example, if reserves are not converted, all

---

1. Activation, Diversion, Synchronization, and Mirroring phases are discussed in “z/OS Migrator migration process” on page 105.
reserves related to dataset DS1 located on Volume A will be issued to that location across all applications and systems for serialization of the resource. Indirectly, all I/O activity mirrored or diverted to the target dataset located on Volume B will also be serialized.

z/OS Migrator impact on serialization after diversion but before completion — Once z/OS Migrator has entered the Diversion phase, it is absolutely imperative that hardware reserves are converted to global ENQ requests to ensure data integrity of dataset(s) being migrated.

Applications that were active before Diversion and that remain active during Diversion will continue to serialize usage of the resource residing on the source volume, as with DS1 on Volume A in Figure 13 on page 82.

If serialization is through hardware reserve, then the reserve will be issued against Volume A. However, a subsequent allocation to DS1 by a job starting after Diversion begins will be satisfied using the catalog entry that has been updated to refer to Volume B as the location of DS1.

Reserve serialization on behalf of this application will target Volume B. Consequently, neither access to the data will be properly serialized; changes may be lost as a consequence of the latest allocation having serialized on a different volume than that of the initial allocation.

Example

An example follows:

- MVSA reserves Volume A for dataset DS1 prior to the time when z/OS Migrator diverts the catalog entry to Volume B. MVSA reads data, updates the data, and writes it back. z/OS Migrator re-directs the update to Volume B.
- On MVSB, a new allocation of DS1 reserves Volume B, reads data from dataset DS1, modifies the data and writes it back to dataset DS1.
- During this time, the z/OS Migrator channel program for MVSA will have to wait because Volume B is reserved to MVSB. Once MVSB releases the reserve on Volume B, MVSA will overwrite the data that was changed by the user that allocated DS1 on MVSB.

In this scenario, a classic data integrity exposure exists. The data has been overlaid and there is no indication that this has occurred.

As long as all dataset-related reserves are converted to global enqueues, the resource is protected by name and remains secure. Conversely, if the reserve is not converted, the benefit of reserve protection is lost between such pre- and post-diversion allocations and the preceding scenarios can occur.

Prevention of SYSVTOC/SYSZVVDS deadlocks in multi-system environment

The SYSVTOC and SYSZVVDS resource names are the QNAMES for resource serialization of each volume's VTOC and VVDS.

Datasets grow and shrink with usage, and as they do, the VTOC is updated to reflect the dataset’s space usage on a volume. The VVDS is updated to reflect the change in extents for VSAM datasets. When extent changes occur, z/OS Migrator mirrors the
VTOC changes on the target volume. For example, if DS1 on Volume A in Figure 13 on page 82 adds a new extent, then z/OS Migrator must also add a new extent on Volume B.

If SYSVTOC and SYSZVVDS QNAMES are not converted, then hardware reserves must be issued to Volume A and Volume B. A reserve on a resource, followed by an access request on another resource, greatly increases the likelihood of a deadlock. If this type of deadlock occurs, the group can be Suspended and Deactivated prior to Diversion; otherwise, once in Diversion, the application address space must be cancelled to eliminate the deadlock. This possibility is further accentuated if there is any overlap between the source and target volume sets across active migration groups, as illustrated by the second dataset in the previous example. The conversion of SYSVTOC and SYSZVVDS hardware reserves to globally propagated ENQ requests essentially eliminates such deadlocks. z/OS Migrator still issues hardware reserves for certain functions, but special handling code in z/OS Migrator eliminates the opportunity for multiple systems to request the same volume’s resources exclusively at the same time.

Note that when there is reserve contention, the IOS Start Pending message may be seen on the console or system log. Use commands like the following to investigate the processes involved:

D GRS,C
D GRS,DEV=ccuu
D GRS,ANALYZE,BLOCKER

Converting hardware reserves

To accomplish reserve conversion, you can use IBM’s Global Resource Serialization (GRS) or Computer Associates Multiple Image Manager (MIM).

You can find the IBM publication (SA22-7600) z/OS MVS Planning: Global Resource Serialization at the following Web page:


z/OS Migrator reserve conversion requirements:

Qname: EMCTF
Rname: *

The above reserve request needs to be added to the reserve conversion list for GRS or MIM as a generic conversion. This needs to be evaluated before being implemented in the customer environment to ensure it does not conflict with other customer requirements.

z/OS Migrator Reserve Monitor

The z/OS Migrator Reserve Monitor is a program that uses the z/OS ENQ/DEQ Batched Exit (ISGNQXITBATCH) to record reserve request statistics. When correctly shut down, or in response to a Modify Display operator command, the program will display a table of reserve resources with the following elements:

- QNAME: Reserved resource major name.
- RESERVES: The number of times a reserve resulted in a request to physically reserve a device.
Logical (Dataset) Migration Planning

**CONVERTED:** The number of times a reserve was converted to a global ENQ request.

Sample Reserve Monitor output:

```
EFM9803I SWH10RMN RESERVE counts:
  _QNAME_      RESERVES  CONVERTED
  EMC$FM     155           0
  SYSZJES2   120           0
  SYSZRACF     5           0
  SYSIGGV2     0          52
  SYSZVVDS    56           0
  IGDCDSXS     4           0
  SYSVTOC      0           5

**Note:** If reserves for individual datasets are not converted to software reserves, data integrity cannot be assured once z/OS Migrator has started diverting I/O requests for datasets in the migration group. If SYSVTOC and SYSVVDS reserves are not converted, deadlock exposures exist.

To execute the Reserve Monitor, use a JCL based on the following sample:

```
//jobname   JOB
//RMON      EXEC PGM=EFMMRMON
//STEPLIB   DD DISP=SHR,DSN=<authorized load library>
//SYSUDUMP  DD SYSOUT=*  
```

**Note:** Run EFMMRMON from the z/OS Migrator load library or move it to any APF authorized library.

When the Reserve Monitor starts, a message is issued to the console displaying the name that must be used in operator Modify and Stop commands. When the monitor is submitted as a batch job, this will always be the job name:

```
EFM9802I "name" RESERVE Monitor program ready.
```

To produce an instantaneous report of the reserve requests monitored since the program became active:

- Enter the modify command:

```
F jobname,DISPLAY
```

To produce the final report and terminate the monitor:

- Enter the Stop command:

```
P jobname
```

**Restrictions on storage subsystems and dataset types**

z/OS Migrator only supports 3380 and 3390 architecture, like geometry devices. “Supported storage subsystems and dataset types” on page 31 lists the supported dataset types.

**Restrictions in regards to storage architecture and dataset types**

The target controller must be at an equal or higher technology level and be downward compatible. In other terms, you cannot migrate data from a 2105 model controller to a 3990 model controller, but you can migrate data from a 3990 model controller to a
2105 model controller. When you want to verify that the SOURCE and TARGET devices have equal device characteristics issue the following command against the SOURCE and TARGET UCBs:

```
DS QD, nnnn,RDC
```

Compare the DEVSERV device services output to ensure device compatibility during migration.

**Note:** Migration between different device geometries is NOT supported. You can only migrate data between similar geometry devices, for example: 3380 to 3380, or 3390 to 3390.

Datasets cataloged on System Resident (SYSRES) volumes

Migration of system datasets, that is, datasets used by the operating system, typically located on system residence volumes, including linklisted datasets, is a complex operation. We recommend that you contact Technical Support personnel before migrating such datasets.

Dataset types NOT currently supported in z/OS Migrator

- VSAM datasets with the IMBED, KEYRANGE and REPLICATE options specified. IMBED, REPLICATE and KEYRANGE are obsolete VSAM parameters. Target dataset extents cannot be allocated using these parameters because z/OS does not support new allocations using them. The physical layout of extents of datasets defined with these parameters is different from the physical layout of datasets without them. Copying extents from a dataset containing these to a newly defined dataset that does not have them would yield an unusable dataset.
- If you copied an IMBED cluster to NOIMBED (the only type you can currently define), the target data component would have a track full of sequence set records at the start of each CA that VSAM would think was actual data.
- Catalogs
- ISAM
- IMS OSAM databases
- Individual PDS members (z/OS Migrator does support migrating an entire PDS)
- Page and Swap datasets
- Hierarchical File System Datasets
- Datasets that are designated as "Unmoveable" are not supported, that is, DSORG=U|PSU
- VTOC, VVDS, and VTOCIX datasets
- Temporary (&&) datasets
- Common/PLPA datasets
- EAV (Extended Address Volume) datasets are not supported for logical migration. However, volume migration of volumes containing EAV datasets is still supported.
Logical (Dataset) Migration Planning

- Uncataloged datasets

  **Note:** Uncataloged datasets will fail activation.

**Systems managed storage (DFSMS) allocation**

DFSMS is a software suite that automatically manages data from the time that it is created until it expires. DFSMS provides allocation control for availability and performance, backup/restore, and disaster recovery services, space management, and tape management. DFSMS consists of DFSMSdfp, an element of z/OS; and DFSMSdss, DFSMSshm, and DFSMSrmm, features of z/OS. Using the ISMF or a VARY command, you can create a criterion to eliminate allocation of new datasets on any volume in a SMS subsystem. This status is known as DISNEW and prevents all new allocation.

When starting a migration that includes moving all the datasets that populate a volume, the status of the source volumes must be **DISNEW**. It is important to verify, using ISMF, that the storage pool containing these volumes has sufficient amount of free space to allow allocation restrictions to be enabled.

The following are the components that address dataset allocation:

**Data class** — Addresses the attributes of a dataset.

**Storage class** — The required performance level required for the dataset that is in direct alignment with a specific service level agreement (SLA).

**Management class** — The required management that addresses the appropriate backup and migration cycle of the dataset.

**Storage group** — The storage group is made up of a volume or group of volumes that are designated for specific datasets based on a pre-determined criteria (for example, size, use, type).

**SMS data redirection**

A storage subsystem that is under SMS control has the capabilities to direct and disable allocation to specific storage pools. In an environment that has a high delete and reallocation activity rate, data can be moved by simply disabling one volume and enabling a different volume in the same subsystem. This process is known as SMS data redirection.

As SMS data redirection is done on a dataset level, z/OS Migrator becomes a perfect complementary solution for those datasets that are allocated and not deleted on a scheduled basis. The first phase when migrating all the datasets in an SMS environment would be to have SMS move that data using SMS Data Redirection. z/OS Migrator will enable a scheduled dataset movement process, taking less time and enabling the utilization of performance enhancements from the new device for those datasets not moved using SMS.

When allocations are performed within an SMS environment, the SMS ACS routines are invoked. These routines are customized locally. z/OS Migrator allows you to specify several parameters as part of a migration group that influence the volumes selected for allocation of the migration group’s target dataset(s).
Source dataset name

The source dataset name determines the volume that is selected for the destination of the migrated dataset. z/OS Migrator drives the allocation of target datasets through the site's ACS routine by substituting each source dataset's attributes (dataset name, physical characteristics, management criteria) at **Activation**.

Target storage class name

z/OS Migrator allows you to specify a target storage class name to be used during **Activation**.

The target storage class name in the migration group definition (if present), is substituted for the storage class of the source dataset when z/OS Migrator passes the allocation request to SMS.

You must edit the relevant ACS routines to permit allocations to be re-directed to the target storage class prior to group activation.

**Note:** The source dataset characteristics are passed to SMS in lieu of user-specified characteristics normally required for new dataset allocations.

Alternatively, specifying a target storage class name to be used during **Activation** without enabling the ACS selection logic to direct source dataset allocations to the specified storage class first, may result in the specified target storage class being ignored or may result in an allocation error.

Target volumes

z/OS Migrator allows you to specify a volume or list of volumes to be used during allocation for all target datasets. Depending on how the ACS routines have been customized, and how the SMS volume statuses of QUINEW or DISNEW are applied, specific volumes requested during **Activation** may or may not be honored.

In cases where the target dataset takes extents that cannot be accommodated on volumes selected at **Activation**, the selection of additional target volumes comes from the storage group containing current target volumes.

Migrating data to different storage group

ACS routines determining the storage class must be customized to use z/OS Migrator to migrate datasets from one storage group to another storage group. In the case where the resulting data must remain associated with the original storage class, that is, no target storage class is specified, the ACS routines must be customized to direct new allocations to the desired storage group prior to **Activation**.

In cases where the target dataset takes extents that cannot be accommodated on volumes selected at **Activation**, the selection of additional target volumes comes from the storage group containing current target volumes.

Migrating to new volumes

If you are migrating data within a storage group, and the volumes you are migrating to are newly installed, you must ensure that you initialize and then add them to the storage group definition prior to migration. z/OS Migrator does not take any action to dynamically add volumes to a storage group.
Migrating VSAM clusters

You cannot currently migrate individual components of a VSAM cluster. This is because the metadata for VSAM clusters must be managed in its entirety. Therefore, ensure you specify the base cluster name, or a dsname mask that will include it, when setting up VSAM-oriented migration groups. Likewise, the target must be given an appropriate target cluster name. Table 18, “Target parameters,” on page 132 provides more information.

Migrating DB2 cluster datasets

Since DB2 datasets are VSAM clusters, refer to the information mentioned above in “Migrating VSAM clusters.” If you are migrating the entire database, ensure that masks matching all database clusters are included.

Hard-coded volume references

You must take into consideration instances where the ICF catalog is not the only mechanism used to locate datasets, as part of your migration planning.

Storage environments with comprehensive storage management policies implemented by DFSMS or another storage management facility are heavily reliant on the catalog environment to access datasets.

z/OS Migrator will migrate datasets and update their catalog entries without regard to the user or application design considerations that necessitate hard-coded volume serial numbers for accessing datasets. Hard-coded volume references must be updated with the new volumes selected during the migration Activation phase. This task may be performed during the Diversion phase, prior to the next restart of affected applications.

Catalog structure

Logical migration is a dataset-level migration tool that includes updating the information in the ICF catalog. It is very important that you have a high-level outline of the ICF catalog structure to help you perform diagnostics for the pre-migration process.

A healthy catalog environment is essential to a successful migration. It is important to resolve all catalog problems before starting the migration.

Note: Appendix D on page 339 shows details of the Catalog Structure.

Small versus large migration groups

It is recommended that when defining migration groups, you do not migrate too many source datasets at one time. Smaller migration groups:

- Are easier to manage during the z/OS Migrator data migration lifecycle
- Allow quicker movement through the z/OS Migrator migration phases (because a single large dataset will not delay other smaller datasets)
- Are easier to track and clean up, as compared to multiple groups
Suspending/resuming data migrations

With z/OS Migrator, it is possible to halt a data migration while the group is in Copy or Mirror state, before you reach the Pending Diversion (P-Divert) or Diversion phase. This is accomplished by using the Suspend command through the z/OS Migrator ISPF Monitor, Option 2 - Monitor Promoted Groups.

Note: You cannot suspend a group while it is in Active state, that is, during initial processing. “Active, Copy, and Mirror states” on page 151 and “z/OS Migrator migration process” on page 105 provide more information.

When the Suspend command (ISPF ‘P’ line command) is issued, the migration group is suspended indefinitely. The group can be Resumed (ISPF ‘R’ line command) at any time. When resumed, z/OS Migrator revalidates the migration group and restarts migration. In general, migration restarts in Pending Mirror phase (P-Mirror) as described in “Resuming a suspended group” on page 152.

“z/OS Migrator migration process” on page 105 describes the migration steps.

Note: Suspended groups may be unable to resume if a system failure or IPL intervenes. Therefore, it is not recommended that groups be left suspended for extended periods.
This chapter provides an overview of the Volume Mirror and Volume Migrator components of z/OS Migrator, including their features and requirements. Topics include:

- Overview .............................................................................................................. 92
- Volume Mirror .................................................................................................... 92
- Volume Migrator ................................................................................................ 100

**Note:** The words “mirror” and “migrate” in z/OS Migrator should not be confused with the VMAX concepts of mirror positions or with RAID protection mechanisms.
Overview

In addition to logical (dataset) migration, z/OS Migrator provides for volume mirroring and volume migration.

To use them, type 1 in the z/OS Migrator main window, and press Enter. When the Manage Group Members panel appears, type CR and press Enter. The Build Type pop-up appears.

```
+--------------- Build Type ----------------+      
|                                           |      
| Select with an S a build type.          |      
|   _ Build Migrate Member                |      
|   _ Build Mirror Member                 |      
|   _ Build Logical Migrate Member        |      
| F3=Cancel                                |      
+----------------------------------------+
```

To select a Mirror Group or a Migrate Group, type an S in the blank before your choice.

Volume Mirror

Volume mirroring provides mainframe installations with host-based, volume-level mirroring. This ability is particularly useful for performance-sensitive volumes. In such situations, it may provide a lower response overhead than other tools.

**Note:** The integrity of volume mirroring (and volume migration) operations depends on the cooperation of all systems that can access the devices being mirrored (or potentially migrated). Your installation needs to include the activation of the z/OS Migrator server in the IPL procedures on all of your systems.

To use Volume Mirror effectively, you need to understand how it operates. Volume Mirror operation can be divided into the following stages:

- Volume group creation
- Activation, monitoring, and mirroring
- Multi-server communication
Volume group creation

Figure 14 shows the stages of volume group creation:

![Diagram of volume group creation]

Figure 14  Volume group creation

When you initially start up the z/OS Migrator server, with no volume groups defined, the z/OS Migrator server takes the following steps:

- Builds its basic global area in common storage.
- Installs its subsystem I/O interface for command processing.

At this point, you can employ the ISPF interface to define volume groups. Each group is:

- A named list of device pairs
- A specification of various processing options

Device pairs

Each volume group can contain multiple device pairs. Each device pair in the group can be:

- A single pair of volumes
- A list of pairs
- A list of pair ranges

As described previously, a device pair consists of a source (primary) and a target (mirror) volume. The source volume is the device to which your application is writing data. The target volume is the volume to which you want z/OS Migrator to mirror the data.
The target volume needs to be a VMAX volume for consistent migrations. Other restrictions can be found in “Supported storage subsystems and dataset types” on page 31.

Processing options

The processing options are a series of configuration parameters you set at configuration time. There are three categories of configuration parameters:

◆ Execution parameters — Set values for execution.
◆ Volume group parameters — Specify how to process a particular volume group.
◆ Global parameters — Set certain values that apply to all volume groups.

You can define configuration parameters in three ways:

◆ Customize the startup JCL with execution parameters you want to use at z/OS Migrator startup.
◆ Create a partitioned dataset to hold global configuration parameters.
◆ (For volume group parameters) Use the ISPF dialog to define Volume Mirror or Volume Migrator volume groups.

Group definition storage

After you create a volume group definition, Volume Mirror stores an image of that definition in a partitioned dataset referred to as the configuration PDS. The configuration PDS is used to cache the volume group definitions and other status information.

Once defined, the volume group may be “promoted.” Promotion causes the definition to be loaded into the z/OS Migrator database, where you can access it by various Volume Mirror control functions using the global storage area.

All z/OS Migrator servers on multiple LPARs monitor the contents of the z/OS Migrator database continually. After a volume group has been promoted on one z/OS Migrator server, that volume group is automatically promoted on all z/OS Migrator servers sharing the z/OS Migrator database.

Note: Because short-term reserves are issued against the volume containing the z/OS Migrator database, you should place the z/OS Migrator database on a volume against which other reserves are not generally issued, which is not generally active, and which is shared by all participating LPARs.

Server activity

To maintain the integrity of Volume Mirror control, the z/OS Migrator server needs to be active on all systems that share any of the devices involved in volume mirroring, either as source or target devices. This is because, as a host-based product, Volume Mirror needs to monitor the I/O from all systems.

All write I/O to the source device needs to be propagated to the target device on the system on which it occurs. Additionally, each system is responsible for preventing spurious I/O from other sources from being written to the target device.
For the same reason, it is not possible to use any of the source or target devices for any operation that involves the transfer of data to the device entirely within the VMAX system. The host must be able to see all writes to the devices. For example, the source volume cannot be the target of a snap operation.

Activation, monitoring, and mirroring

Figure 15 shows the activation, monitoring, and mirroring stage:

Figure 15  Activation, monitoring, and mirroring

After you have stored a volume group, any z/OS Migrator server can activate that group through an ISPF request, an operator command, or a batch command. That z/OS Migrator server becomes the owner of the volume group.

The activation process involves the following steps:

1. Validate the current state of the volume group on the activation host.
2. Activate the Volume Mirror I/O interface for these devices.
3. Communicate the activation request to other hosts within the complex.

Volume group owner

The host that performs the activation is referred to as the owner. The owner must be able to address all the devices in the volume group. After the other z/OS Migrator servers have signaled that they have also activated, the owner proceeds with the synchronization phase.

Synchronization

During synchronization, all data is copied from the source to the target volumes. During synchronization, additional track modification is monitored. When the number of tracks remaining to be copied falls below a certain threshold, I/O is briefly suspended and the last tracks copied. At this point, the source and target are identical, and the I/O interface takes over to maintain that state.
Monitoring changed tracks

At this point all participating systems are essentially performing the same task — monitoring I/O and mirroring writes. The owner continues to provide one additional service. The owner monitors changed tracks for the possibility that mirroring on one or more pairs will be suspended, and will need to be resumed.

The role of the server

Technically, the z/OS Migrator server could be stopped on any system, including the owner, and mirroring would continue, carried on in the I/O interface. However, new activations and other command-oriented processes could not take place.

The server also provides special storage management as an ongoing service. In particular circumstances, the I/O interfaces may need to duplicate the channel program, or portions of the data from the channel program, issued to the source device. The special storage management facilities in the z/OS Migrator server provide a number of storage pools for usage by the I/O interfaces.

Absence of the z/OS Migrator server in this circumstance may result in one or more volumes in the group being suspended. The exact impact of this is difficult to predict because it is highly dependent on the nature of the channel programs used by the specific application access method. However, the server could then be restarted with a warm start and it would immediately rejoin the network of servers in the role it had before it was stopped: as owner or merely as a participating system.

In the same way, the temporary absence of a server, even the volume group owner, due to system IPL, does not disrupt mirroring function for a volume group on other systems.
Suspend and resume

Figure 16 shows the suspend and resume stage:

Volume mirroring can be suspended for a variety of causes. One possible cause of suspension is an error on the replicated I/O to the target.

In any case, if volume mirroring is suspended, there is no impact on the source application I/O; however, volume mirroring is discontinued for the affected device pair. Naturally, console messages document the event and status displays report the suspended state.

A number of options are available within Volume Mirror, depending on the user and application requirements:

- Default behavior option
- Deactivation option
- AutoVary option

Default behavior option

The default behavior of the system is to extend the suspension of one volume mirroring pair to all the pairs in the volume group automatically and consistently. This guarantees that the set of target volumes remains in a consistent state with regard to dependent I/O.

One type of suspension does not result in a consistent suspend for the volume group. If a source volume is initialized so that a format write is performed on cylinder 0, track 0, for example ICKDSF INIT, then only the pair of which it is a part is suspended.
You may subsequently direct a RESUME command at the volume group to resynchronize this volume pair. Mirroring of the affected device pair resumes without having any impact on other mirroring. Non-formatting volume label operations, such as ICKDSF REFORMAT, do not result in suspend processing.

**Deactivation option**

Another possibility is to convert any suspend event automatically into a deactivation event. Deactivation differs from suspension in that a full resynchronization is required to resume mirroring on the volume group. In addition, write processing is no longer prevented to the target volume while the volume group is deactivated.

**AutoVary option**

Another Volume Mirror option is the AutoVary option. During the synchronization process, the source volume would generally be online while the target must be offline.

After the volumes are synchronized, Volume Mirror automatically varies the target volume to match the state of the source. Thereafter, Volume Mirror continues to match the online/offline state of the target to that of the source at any time.

One good reason to do this is to bind Parallel Access Volumes (PAV) aliases to the target. To maintain performance levels, if the source device is PAV, then the target should be PAV as well. Otherwise, longer I/O queues at the target slow down I/O to the source.

**Note:** Refer to “Parallel Access Volume (PAV) status” on page 28 for more information on PAV considerations.

**Apparent volser**

Physically, the target has the same volser as the source since it is an exact copy. To allow the target to be online, Volume Mirror automatically responds to any request to read the volume label by substituting a volser altered according to a specification you make during configuration. This altered volser is referred to as the apparent volser.

After setting the apparent volser, you can perform read operations on the target. Simply ensure that your applications that logically refer to the volser use the apparent volser.

An exception is made for applications, such as backup operations, which physically read the first track. These will see the true volume label with the volser identical to that of the source. This allows you to:

- Perform a consistent suspend of the volume group
- Run backups against the target volumes to achieve a consistent backup copy of the data
- Perform a resume of the volume group

Remember that many volume accesses, which can be thought of as strictly reading from a volume, may actually update the VTOC, specifically, the last accessed date. Such accesses fail as though an I/O error has occurred because of Volume Mirror blocking the write. This condition is additionally externalized in the system log.
**Multi-server communication**

As described previously, the volume group promotion and the activation process relies on the communication of status information through the z/OS Migrator database. Volume group deletion is also communicated across z/OS Migrator servers in that way.

Currently, if you want to change a volume group definition, you must deactivate and delete that volume group definition. You can then recreate the volume group definition and promote the group again. Activation causes the volume group to be resynchronized and mirroring to resume.

Naturally, the volume mirroring process itself requires much tighter integration of multiple z/OS Migrator servers on different LPARs. The I/O interfaces accomplish this through a number of low-level techniques that physically communicate the current state to all LPARs at the moment a write is performed.

In this way, the exact moment at which full synchronization occurs is communicated, as well as suspend and resume events. This communication is managed entirely within the Volume Mirror I/O interface for maximum integrity.

On LPARs where writes are performed infrequently, the status may appear to be delayed. In this case, the status is communicated through the z/OS Migrator database during its normal polling period.

**Device pair status**

Keep in mind that a participating system may not detect the current state of a device pair until that system actually attempts application I/O. In this case, the state may be thought of as “pending” and will be fully recognized at the start of the next I/O.

Because this can make status displays somewhat confusing, status is secondarily communicated through the z/OS Migrator database. This allows the displays to reflect the current status in a user friendly way. However, because the z/OS Migrator server is only polling the z/OS Migrator database for periods of some seconds, other systems do not report the expected status instantaneously.

One important piece of information recorded in the z/OS Migrator database is the time of the last “heartbeat” for each participating z/OS Migrator server. By monitoring these values, each z/OS Migrator server can report on, and make decisions regarding, whether other z/OS Migrator servers are live. As with other status within the z/OS Migrator server, you can use an operator, ISPF, or batch command to report the z/OS Migrator server status.
Volume Migrator

Volume Migrator provides host-based services for data migration on mainframe systems.

Migrator provides installations with a volume level migration facility:
- From third-party devices to VMAX devices
- Between VMAX devices

Volume Migrator lends itself to workload balancing applications or to upgrading a site to use newer VMAX models. Volume Migrator performs volume-level migration non-disruptively, and without requiring that EMC SRDF® be installed.

Volume Migrator components

As with Volume Mirror, Volume Migrator uses z/OS Migrator server and the I/O interface. The z/OS Migrator server performs the following tasks:
- Manages the overall Volume Migrator configuration
- Loads configured volume groups
- Services user commands
- Coordinates with the actions of z/OS Migrator servers on other systems

As with Volume Mirror, you can control the z/OS Migrator server’s Volume Migrator functions through the identical set of ISPF panels¹, batch commands, and operator commands you use to control Volume Mirror.

Note: Chapter 6 on page 115 describes the ISPF interface and Chapter 9 on page 225 provides examples of how to use the ISPF screens for both Volume Mirror and Volume Migrator. Chapter 7 on page 165 provides information about the operator commands.

Volume Migrator operations

When using the Volume Migrator, you must first define migration volume groups. Each migration volume group consists of one or multiple device pairs. The pairs can be:
- A pair of volumes
- A list of pairs
- A list of pair ranges

Pairs consists of a source volume and a target volume. The source volume is a data volume from which you want to copy data. The target volume is the volume to which you want to copy that data.

The target volume needs to be a VMAX volume for consistent migrations. Other restrictions can be found in “Supported storage subsystems and dataset types” on page 31.

¹ Some of the ISPF panels have slightly different fields for Volume Mirror and Volume Migrator.
Group storage and activation

After you create a volume group, the volume group definition is stored as a member of the z/OS Migrator database. After you have stored a volume group definition, you can promote the group and, once promoted, the group is loaded into memory where you can access it through ISPF request, operator command, or batch command.

Volume group owner

As with Volume Mirror, the host that performs the activation is the owner. The owner must be able to address all the devices in the group. After the other z/OS Migrator servers have signaled that they have also activated the volume group containing all of the devices known to them, the owner proceeds with the synchronization phase.

Synchronization

During synchronization, Volume Migrator uses host resources (UCBs, CPU, and channels) to copy the contents of a source volume to a target volume. Additional track modification is monitored during the process. When the number of tracks remaining to be copied falls below a certain threshold, I/O is briefly suspended and the last tracks are copied. At that point, the source and target are identical.

Migration complete options

After achieving a state of synchronization between volumes, Volume Migrator gives you several completion options:

- Completing a group by swapping at completion of the volume copy (SWAP)
- Completing the migration consistently with CONSISTENT swap option (CONSISTENT)
- Creating a copy of a volume for testing (SPLIT)
- Doing intermittent synchronization (CONSTANTCOPY)

Note: SWAP is the only migration completion option that completes the migration. CONSISTENT is an option that leaves the group in MIRROR status, allowing the user to SWAP the volumes consistently at a later time of their choosing.

Each of these options is described below:

Swapping the source and target devices

If the SWAP option is selected, z/OS Migrator dynamically and non-disruptively swaps the source and target devices. This option performs the following tasks:

- Swaps contents of the UCBs for the source and target volume.
- Redirects all I/O to the target volume, transparently to the applications using the volume.
- Terminates the relationship between the source and target volumes.
**Consistent swapping**

If the CONSISTENT SWAP option is selected for volume migration, a Volume Mirror group is created and is managed in the following way:

- When the Volume Mirror group is activated, each volume pair is added to a specialized z/OS Migrator AutoSwap group.
- Once all pairs are added to the group, the group is validated by AutoSwap.
- Migration of the volume pairs is initiated, pair by pair.
- As the initial copy operation for each pair completes, a final synchronization is performed with application I/O entering a brief inactive state, and the pair entering Mirror mode. In this state, all application write I/O is synchronously performed to both the source and the target, thereby keeping each volume pair, and any replication pairs, in sync.
- Once all volume pairs are mirroring, the group will be reported to be in Mirror state and the user may enter the z/OS Migrator SWAP group command to initiate a group swap from all source volumes to all target volumes. Complete data consistency is maintained across such a swap.

Once the swap has completed, various cleanup operations are automatically performed and the group is then reported as Complete.

**Splitting the source and target volumes**

If the SPLIT option is selected, z/OS Migrator severs the relationship between the source and target volumes and leaves the target volume offline.

- An option is available to relabel the target volume with a user-specified volser and vary the volume online to the z/OS Migrator owner host.
- Another leaves the target volume offline without changing the volume serial numbers.

**Constant Copy mode**

If the CONSTANT COPY option is selected, z/OS Migrator continues to copy additional changed tracks periodically from the source to the target volumes.

This option maintains a state of near synchronization between the source and target volumes on a continuous basis. Volumes in constant copy mode can be subsequently SPLIT or SWAPed without waiting for a long synchronization period to complete.

Change tracking during the synchronization process and in CONSTANT COPY mode is achieved by using the Symmetrix Differential Data Facility (SDDF) for VMAX devices and by using proprietary system interfaces for third-party migration source volumes.
This chapter provides information for running z/OS Migrator and includes starting the z/OS Migrator ISPF Monitor, as well as the basic steps for starting the migration process. Topics include:

- Running z/OS Migrator ISPF Monitor .......................................................... 104
- z/OS Migrator migration process ................................................................. 105
Running z/OS Migrator ISPF Monitor

Before you can begin using the z/OS Migrator ISPF Monitor, it must be customized to your environment. (Refer to “Option S – Set User Session Options” on page 118 for more information.) The z/OS Migrator ISPF Monitor is a feature that is installed at the same time as the z/OS Migrator program. The z/OS Migrator ISPF Monitor utilizes REXX execs. As an ISPF application, it requires ISPF Version 5.2 and TSO/E Version 2.4 at the minimum.

Note: Refer to “Step 14. Specify parameters in SAMPLIB prior to first execution” on page 68, for details on the required editing of the z/OS Migrator SAMPLIB file with specific installation parameters prior to the first execution of z/OS Migrator.

Starting and customizing z/OS Migrator ISPF Monitor

1. Start the z/OS Migrator ISPF Monitor.
   
   Execute the supplied REXX exec, replacing the hlq with the high-level qualifier you specified when installing the z/OS Migrator product.

   EX 'hlq.ZOSM800.SAMPLIB(EFMXEXEC)'

2. Customize User Session Options.
   
   When entering the z/OS Migrator ISPF Monitor for the first time, the Specify the Session parameters panel displays.

   You will be required to fill in the information so that your z/OS Migrator ISPF Monitor can interact with the z/OS Migrator server.
Each time the z/OS Migrator ISPF Monitor is started, it checks to see if it was started with a different version of the monitor. If a change was detected, a panel will pop up indicating this situation and informing you that you will be sent to the User Session Options panel to verify the settings.

On the User Session Options panel, you will be required to set the configuration and control parameters according to the settings specified during the z/OS Migrator server customization process. Refer to “Option S – Set User Session Options” on page 118 for additional information.

3. Save your User Session Options.

You must save the User Session Options you have defined by pressing Enter.

**z/OS Migrator migration process**

The following sections describe the general process and phases that are involved in migrating datasets and volumes.

All product features and capabilities discussed here, as well as how to use the z/OS Migrator ISPF Monitor, are explained in greater detail in “Using the z/OS Migrator ISPF Monitor” on page 115.

*Table 11* outlines the z/OS Migrator dataset migration process and phases.

<table>
<thead>
<tr>
<th>Migration Phases</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1: Define group</strong></td>
<td>The dataset(s) to be migrated are defined in a migration group.</td>
<td>“Step 1: Define group” on page 106 and “Selecting datasets” on page 78.</td>
</tr>
<tr>
<td><strong>Step 2: Activate</strong></td>
<td>Activating a migration group initiates the data migration process for the defined migration group.</td>
<td>“Step 2: Activate” on page 108.</td>
</tr>
<tr>
<td><strong>Step 3: Copy</strong></td>
<td>Data is asynchronously copied from the source datasets to the target datasets that are defined in a migration group.</td>
<td>“Step 3: Copy” on page 108.</td>
</tr>
<tr>
<td><strong>Step 4: Synchronize</strong></td>
<td>All final differences between source and target datasets in a migration group are synchronized and the migration group is prepared for Mirroring.</td>
<td>“Step 4: Synchronize” on page 109.</td>
</tr>
<tr>
<td><strong>Step 5: Mirror</strong></td>
<td>The migration group is put into a state of synchronous mirroring.</td>
<td>“Step 5: Mirror” on page 109.</td>
</tr>
<tr>
<td><strong>Step 6: Divert</strong></td>
<td>In the Diversion phase, the actual logical relocation of datasets occurs. Source and target datasets metadata are modified and all I/O activity is redirected to the new location.</td>
<td>“Step 6: Divert” on page 109.</td>
</tr>
<tr>
<td><strong>Step 7: Complete</strong></td>
<td>Although the metadata has been modified, applications that were active before diversion will continue to have their I/O redirected until they de-allocate the dataset.</td>
<td>“Step 7: Complete” on page 111.</td>
</tr>
<tr>
<td><strong>Step 8: Post-Completion</strong></td>
<td>Once the migration has completed, you will want to clean up your migration group’s source datasets and the storage resources they reside upon.</td>
<td>“Step 8: Post-completion” on page 112.</td>
</tr>
</tbody>
</table>
Step 1: Define group

Before a data migration can begin, a group definition must first be created. A group definition consists of the following:

- Migration group name
- Migration options
- Source dataset(s)
- Target dataset(s) name and location

Source and target dataset names

Referring to the affected datasets during a migration can be confusing, so we provide the following discussion of terminology.

When defining source dataset(s), you must use:

- A minimum of a dataset name, either an absolute dataset name or a dataset name mask, or a comma-delimited list of either or both dataset name formats.
- And/or a valid DFSMS storage class name.

You can optionally select the EXCLUDE field to bypass the selection of datasets that match the Source DSN, Volume or Storage Class criteria. EXCLUDE can be an absolute dataset name or a dataset name mask, or a comma-delimited list.

As part of the group definition, you also specify a “target dataset name.” Of course, the objective of the dataset migration is to relocate the original dataset to a new target location under its own name.

By “target dataset name” we actually mean a name which is given to the dataset in the target location during the migration process, and then reassigned to the source dataset after the migrated dataset becomes active in the new location.

You specify a target DSN as an absolute dataset name or dataset name mask. A target dataset is cataloged and paired with each selected source dataset. It functions as a work dataset in a source-target dataset pair. The following requirements should be carefully considered when selecting a target dataset name:

- The name (mask) must be easily identifiable. Once the migration has completed, you will, at some point, wish to delete the datasets from the source volumes. Following the migration, the source volumes contain the datasets cataloged as the target dataset names. Ensuring that these are easily identifiable is important.

- In a DFSMS managed environment, the target storage class field can be used to direct the allocations to a different storage group than the one that currently contains the volumes where the source datasets reside. To accomplish this, the site's ACS routines must also allow new allocations of the source datasets to be placed into the specified target storage class. “Systems managed storage (DFSMS) allocation” on page 87 provides more information.

Note: In DFSMS managed environments, the source dataset name determines the volume that is selected for the destination of the migrated dataset because z/OS Migrator drives the allocation through the site's ACS routines using each source dataset's attributes (dataset name, physical characteristics, management criteria) at Activation.
◆ You can specify one or a list of target volumes. In a DFSMS managed environment, specific volumes will have their target datasets allocated if they are within a storage group that is valid for the source datasets' storage class or the target storage class, if specified, and they have been assigned the Guaranteed Space attribute.

**CAUTION**

If you migrate target datasets that are not owned by z/OS Migrator, extra care must be taken since these datasets are not protected on the non-owning system.

Swap of names during diversion

The key moment in the migration of any dataset is called Diversion, actually the start of the period during which existing application I/O is redirected to the target location. As part of the Diversion process, the prior dataset names of the source (the “real” name) and the target are “swapped” with the result that the target becomes the “real” dataset and the source can be abandoned or deleted. In fact, depending on options you have selected (see ACTVTERM), you may have to wait until the migration is fully complete for the group as a whole before you can delete the renamed source datasets and their volumes.

Remember that once the migration is complete, the dataset with the original source dataset name is the one you want to keep. The dataset with the original “target” dataset name is the one you want to delete.

Group definition options

There are a number of options you may specify for a group definition. These focus on diagnostic information as well as options related to reusing target datasets. Table 16, “Group options,” on page 124 provides more information.

Refer to “Option 1 – Manage Groups” on page 120 for specific information on the defining group procedure.
Step 2: Activate

During the Activation phase, z/OS Migrator allocates datasets on the target volumes. If any errors occur during allocation, the migration group may not activate.

**Note:** HSM migrated datasets are skipped when you activate a migration group, and therefore are not migrated. As a result, these datasets are not visible when you attempt to display them using the Display DSN `groupname /S` command.

To activate a migration group, select Option 2 - Monitor Promoted Groups as described in “Option 2 – Monitor Promoted Groups” on page 146. As part of that procedure, you place an `A`, for activate, next to the migration group and press Enter.

The time to activate a migration group depends on the number of target datasets that must be allocated and cataloged. In this case, the migration group will temporarily go into a P-Active (pending activate) state.

Once the migration group has been activated, z/OS Migrator automatically moves the migration group to the Copy phase.

“Activating a group” on page 150 provides more information on Activation. Refer to “Datasets allocated after activation” on page 80 for more information on datasets allocated after Activation.

Step 3: Copy

During the Copy phase, z/OS Migrator initiates and performs these tasks:

- The z/OS Migrator server asynchronously copies the source datasets to the target datasets.
- The z/OS Migrator I/O Monitor Routines monitor all activity to all source datasets and track all modifications to the source dataset.
- Once having completed the initial copy of source datasets, the z/OS Migrator server refreshes the changed data repeatedly until it reaches a point where it can quickly synchronize the source and target datasets with minimal disruption to applications or the system. Once this point is achieved, z/OS Migrator automatically moves to the Synchronization phase for this migration group.

In some instances, a migration group may take some time to complete the Copy phase across all datasets in the migration group. The Copy phase happens after the group is activated. “Activating a group” on page 150 provides more information.

Managing performance during the copy phase

During the Copy phase, depending on the size of a migration group, a good deal of I/O could possibly be driven by z/OS Migrator. To control the pacing of I/O during the z/OS Migrator Copy phase, you can modify parameters that the z/OS Migrator server uses.

The parameters that can be modified include:

- `MAXIO`
- `MAX_CHANNEL_IO`
- `MAX_DEVICE_IO`

These parameters are located in the z/OS Migrator configuration member as documented in “Running z/OS Migrator ISPF Monitor” on page 104.
Step 4: Synchronize

A migration group enters the Synchronization phase when z/OS Migrator determines it can quickly synchronize all data between source and target datasets in the migration group without causing disruption to the systems and applications using this data.

During the Synchronization phase, z/OS Migrator initiates and performs the following tasks:

◆ The z/OS Migrator I/O Monitor routines dynamically hold all I/O to the source dataset so final synchronization can be achieved.
◆ Copies all remaining differences from the source datasets to the target datasets. At this point, there is very little difference between datasets and this operation occurs very quickly.
◆ Allows normal I/O operations to continue once synchronization has been achieved.

When the Synchronization phase has completed, the migration group indicates that it is in Mirror state.

Step 5: Mirror

Once the source and target datasets within the migration group have successfully synchronized, they enter the Mirror phase.

During the Mirror phase, updates to source and target datasets in the migration group are applied simultaneously. If an I/O error occurs at the target volume, the Group is Suspended.

Once the Mirror phase has been achieved, mirroring continues until one of the following occurs:

◆ A Divert command is issued against the migration group.
◆ A Suspend command is issued against the migration group.

Step 6: Divert

The Diversion phase executes in two sub-phases:

◆ Substep 1: Process Divert command
◆ Substep 2: Divert I/O from active applications to target dataset

Substep 1: Process Divert command

During this substep, z/OS Migrator modifies all metadata for the source and target dataset pairs within the migration group, effectively swapping the identities of the source and target.

To accomplish this, z/OS Migrator:

◆ Serializes access to the metadata for collections of datasets cataloged in a particular source/target catalog pair.
Running z/OS Migrator

- Updates all metadata to accomplish the identity swapping of the source and target datasets:
  - Modifies all volume-based metadata in the VTOC, VTOCIX, and VVDS.
  - Modifies the catalog entries for the source and target dataset pairs, and refreshes catalog data buffers for the catalogs involved across all z/OS images in a shared storage complex.

Substep 2: Divert I/O from active applications to target dataset

With the source and target dataset identities switched, I/O to any of the source datasets previously allocated by ongoing applications is diverted to the target dataset instead.

**Note:** Once the Divert command processing is completed, any new application allocations will automatically be directed to the target dataset.

“Diverting a logical migration group” on page 152 provides more information on the Diversion phase. The following outlines the process you must initiate to move a migration group to the Divert phase.

To divert a migration group:

1. Select **Option 2 - Monitor Promoted Groups** as described in “Option 2 – Monitor Promoted Groups” on page 146.

2. Place a V, for Divert, next to the migration group and press **Enter**.

The migration group enters Pending Diversion state (P-Divert). Once all metadata changes have been made and the entire migration group has been diverted, the state of the migration group changes to Diverted.

The z/OS Migrator monitor executing on an LPAR will reflect the status of the group on that LPAR. Datasets that are allocated on their source volumes (persistent allocations) by jobs executing on this LPAR will be shown as Diverted. If there are group datasets with persistent allocations on other LPARs, but none are still being diverted on this LPAR, the z/OS Migrator monitor will show the group as Pending Complete.

**Note:** While z/OS Migrator diverts active DB2 volumes, the I/Os are temporarily held until the renaming is complete.
Datasets allocated PRIOR TO diversion

Prior to Diversion, various z/OS address spaces may have source datasets allocated. Once the Divert command processing has completed, the z/OS Migrator I/O Monitor ensures that all I/O requests for these address spaces are diverted (that is redirected) to the target dataset, which now has the original source dataset’s name. This continues until the address space or application terminates, or the allocation is freed. (See previous note.)

Datasets allocated AFTER diversion

After the Divert command processing has completed, the catalog correctly points to the target datasets, which have been given the original source dataset names. Therefore, any new allocations made using the source dataset name will be made directly to the target datasets on their new volumes. The source datasets may now be referred to using the original target dataset name, generally just to be deleted after Completion as no longer useful. Remember that, after Diversion, the source datasets become out-of-date as application I/O is no longer directed to them.

Note: “Source and target dataset names” on page 106 discusses the naming of target dataset names.

Step 7: Complete

Dataset migration groups will remain in the Diversion phase until all applications have relinquished their allocation of migrating datasets and z/OS Migrator no longer has to redirect I/O to the targets. Group Completion is achieved LPAR by LPAR in the shared storage complex depending on the dataset usage of the applications on each server. Each server periodically examines allocation information to see if any active address space still has any source dataset allocated. Once all such allocations are freed through the normal action or completion of the system or application processing, then it is no longer necessary for z/OS Migrator to divert any I/O. Locally, the z/OS Migrator processing is complete for the group. However, the group cannot be marked fully Complete until all LPARs reach the same state.

The default operation of z/OS Migrator is to keep the source dataset and source volume allocated to the application during the diversion phase. This prevents the space occupied by the dataset from being reused and also prevents the source volume from being varied offline. Once all applications free the original source allocation then the source resources may be reused.

If the ACTVCMP option is set, and you also have AUTOTRM set or have entered the COMPLETE command, additional processing is performed by z/OS Migrator while I/O is still being diverted, and while the group is attempting to complete.

This processing redirects allocations for the source datasets/devices to the target datasets/devices. This allows for removal or reuse of the source devices while the group is still in diversion. I/O still needs to be redirected until the group moves to completed status. The group remains in diversion status even though the source device can now be varied offline.

There are events that occur in the usage of a dataset when z/OS Migrator determines diversion is no longer required. Some examples of these events are:
Running z/OS Migrator

- Application reopens the dataset
- New extents are allocated to the dataset
- Applications are recycled

When these events occur the group goes to completed status and the processing for the group is terminated.

Depending on timing and the manner in which you display the status of a group, that is, z/OS Migrator ISPF Monitor versus operator command, you may see the group progress locally from Divert to Pending Complete to Pending All Complete. The group will remain in Pending All Complete status until z/OS Migrator servers see the group in that status. The status of the group will then display as Complete.

Identifying address spaces being diverted

To identify z/OS address spaces that are being diverted is a simple process with z/OS Migrator. By using the z/OS Migrator ISPF Monitor, Option 2 - Monitor Promoted Groups, you can display all address spaces that are currently diverted across all z/OS images in a shared storage environment.

Step 8: Post-completion

Data migrations in many cases are undertaken to free a storage resource. Plans for the storage resources may include freeing the physical storage array as it is coming off lease, or reusing the storage for other application data needs. Regardless of the reason, before the resources can be reused, you must take the following actions.

To initiate post-completion storage resource clean-up:

1. Ensure that the migration group has Completed.

   In the z/OS Migrator ISPF Monitor, Option 2 - Monitor Promoted Groups, check that the migration group is in the Complete state.

2. Delete the renamed source datasets of the migration group. (“Source and target dataset names” on page 106 discusses the naming of source and target datasets.)

   Once you have identified these datasets, you may then delete them, which will make the space available for reuse or, once all data has been migrated, free the storage resource for disposition.

   **CAUTION**

   Never reallocate storage space from migration groups where the migration group is not in the Complete state. If you do, you may experience serious data integrity problems.

3. Delete the migration group from the z/OS Migrator database.

   Once the migration group has completed, you must delete the migration group from the z/OS Migrator database. Simply go to the z/OS Migrator ISPF Monitor, Option 2 - Monitor Promoted Groups, to delete the group.

   When a migration group is deleted, z/OS Migrator performs these tasks:
- It ensures that the migration group is in a state that will allow it to be deleted.
- It removes the migration group from internal z/OS storage (memory). This frees valuable system memory.
- It deletes the migration group from the z/OS Migrator database.

**Note:** If you do not delete migration groups, there is a possibility that you may eventually run into z/OS memory issues with ECSA. Therefore, it is recommended that you delete the migration group once it reaches completion.
CHAPTER 6
Using the z/OS Migrator ISPF Monitor

This chapter provides detailed descriptions and procedures for using the z/OS Migrator ISPF Monitor. Topics include:

- **Overview** ............................................................................................................. 116
- **z/OS Migrator Functions panel** ........................................................................... 117
- **Option S – Set User Session Options** ............................................................... 118
- **Option 1 – Manage Groups** .............................................................................. 120
- **Option 2 – Monitor Promoted Groups** ................................................................. 146
- **Option 3 – Display Configuration Information** .................................................. 156
- **Option 4 – Operator Interface** ........................................................................... 157
- **Option 5 – Display Host Messages** .................................................................... 157
- **Option 6 – System Change Summary** ................................................................. 159
- **Option 7 – Message Help** .................................................................................. 160
- **Option 8 – Monitor Command Line Help** ............................................................ 162
- **Option 9 – Display installation Options** ............................................................. 163
- **Option V – View or Browse Log dataset** .............................................................. 164
Overview

The z/OS Migrator ISPF Monitor is a component that is installed at the same time as the z/OS Migrator product. The Monitor component consists of REXX execs, which require ISPF Version 5.2 and TSO/E Version 2.4 at the minimum. The ISPF Monitor is used to create group definitions, including relevant source/target pairs, and manage the dataset migration environment.

Your tool for controlling both logical and volume migration is the ISPF interface. You initiate the ISPF interface using the EFMXEXEC REXX script that you can associate with a menu item in an installation menu.

Note: To ensure that only one copy of the ISPF Monitor is run by each TSO user, the monitor is protected by the allocation of a dummy dataset. Should the ISPF Monitor terminate abnormally for any reason, this dataset may be left allocated. If this situation occurs, attempting to restart the ISPF Monitor will fail with the message: Exec Already Active. To correct, ensure there is not another copy of the ISPF Monitor being used by the current TSO user, and issue the TSO command, FREE Fi(LOCK). A restart of the ISPF Monitor should now be successful.

Figure 18 shows the general structure of the z/OS Migrator panels:

![Figure 18 z/OS Migrator functions panel topology](image)

Most of the infrastructure shown in Figure 18 is common to both dataset and volume migration. They diverge in the appearance of specific panels for displaying the group unit list and for defining groups.
Once the monitor (EXEC hlq.ZOSM800.SAMPLIB(EIFMEXEC) located in the z/OS Migrator SAMPLIB) has been started, it provides complete control over z/OS Migrator session(s).

The first panel displayed is the z/OS Migrator Functions panel, also referred to as the main menu or the main panel.

<table>
<thead>
<tr>
<th>Function Number</th>
<th>06/03/15 10:10:19</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMFID: X04</td>
<td>CPFX: @$</td>
</tr>
</tbody>
</table>

**Z/OS Migrator 8.0.0 Functions**

1 Manage Groups                      6 System Change Summary
2 Monitor Promoted Groups           7 Message Help
3 Display Configuration Information 8 Monitor Command Line Help
4 Operator Interface                 9 Display installation Options
5 Display Host Messages              

S Set User Session Options
V View or Browse Log dataset

F1=HELP       F3=Exit

**Figure 19 z/OS Migrator Functions panel**

The z/OS Migrator Functions panel provides the following functions:

- **Option S – Set User Session Options**
- **Option 1 – Manage Groups**
- **Option 2 – Monitor Promoted Groups**
- **Option 3 – Display Configuration Information**
- **Option 4 – Operator Interface**
- **Option 5 – Display Host Messages**
- **Option 6 – System Change Summary**
- **Option 7 – Message Help**
- **Option 8 – Monitor Command Line Help**
- **Option 9 – Display installation Options**
- **Option V – View or Browse Log dataset**

**Note:** Option V - View or Browse Log dataset is only displayed on the z/OS Migrator Functions panel if the Use Log PDS option is set to “Y” on the Specify the Session parameters panel. “Option S – Set User Session Options” on page 118 provides details.

Help panels are available for all actions within the z/OS Migrator ISPF Monitor. Some panels have multiple help panels depending upon the location of the cursor.
Option S – Set User Session Options

This option allows you to configure your z/OS Migrator session options and control parameters, including setting the command prefix value and specifying the PDS configuration database.

Starting z/OS Migrator ISPF Monitor for the first time

When the z/OS Migrator ISPF Monitor is started for the first time, the Set User Session Options panel displays. This is where you set your user environment options.

When invoked, Option S displays the Specify the Session parameters panel.

![Specify the Session parameters panel](image)

To modify or specify configuration and control parameters on the Specify the Session parameters panel:

1. Type the required information next to the corresponding parameter(s).
2. Press Enter, followed by PF5 to save your settings.
**Table 12** describes the configuration and control parameters on the Specify the Session parameters panel.

**Table 12** Configuration and control parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Prefix</td>
<td>Command prefix value used to identify the z/OS Migrator subsystem and communicate with the z/OS Migrator service task. This must match the prefix (CPFX=) specified at runtime in the execution parameters.</td>
</tr>
<tr>
<td>Configuration PDS</td>
<td>When initially created, group definitions and all their corresponding configuration information are stored in the group definition dataset or PDS. Once a group definition is promoted, it is transferred to the z/OS Migrator database, and the original member remains. Enter a fully qualified PDS name in standard ISPF format. Automatic compression of the PDS occurs when a group configuration/member is deleted. If the specified dataset does not exist, you will be prompted for space allocation. This definition may be specified in multiple user configurations on the same LPAR or other LPARs, assuming the dataset is available on other LPARs. <strong>Note:</strong> Multiple users specifying the same dataset implies that the dataset could be reserved by one user and lock out another.</td>
</tr>
<tr>
<td>Use Log PDS</td>
<td>A value of Y enables the logging feature. When logging is enabled, the specified PDS is created and each day’s worth of data is stored as a PDS member. If logging is enabled, you must specify a Log PDS Name.</td>
</tr>
<tr>
<td>Days to save</td>
<td>Specify a value from 1 to 30 days.</td>
</tr>
<tr>
<td>Background Logging</td>
<td>Indicates whether you want commands and responses logged to the Monitor message log PDS.</td>
</tr>
<tr>
<td>Use Browse or View</td>
<td>Specify B to browse or V to view log output (when logging is enabled).</td>
</tr>
<tr>
<td>Log PDS Name</td>
<td>Enter your log PDS name in standard ISPF format. You must specify a fully qualified dataset name.</td>
</tr>
<tr>
<td>ZOSM Load Library</td>
<td>Specify the installed z/OS Migrator Load library dataset name. The name will be verified and must be a fully qualified dataset.</td>
</tr>
<tr>
<td>ZOSM Security Library</td>
<td>Specify the installed z/OS Migrator Security library dataset name. The name will be verified and must be a fully qualified dataset.</td>
</tr>
<tr>
<td>UNIT... and VOLUME..</td>
<td>Specify the unit and volume serial number if the log PDS or other intermediate datasets must be allocated.</td>
</tr>
<tr>
<td>Stack Console output</td>
<td>Indicates whether you want commands and responses to be “pushed down” in the Operator Interface dialog.</td>
</tr>
<tr>
<td>Clear variables</td>
<td>Setting this value to Y causes the panel variables to be cleared when moving between panels. A value of N retains any panel variables that were entered.</td>
</tr>
<tr>
<td>Simulate Mode</td>
<td>This mode affects the Configure and Query commands. When this mode is enabled by specifying Y, the query and configure commands are built, echoed back to the terminal, and not processed.</td>
</tr>
<tr>
<td>Debug Mode</td>
<td>Setting this value to Y enables the debug trace facility in this interface.</td>
</tr>
</tbody>
</table>

If one of the critical datasets is changed to a new dataset (as detected during the SAVE process), a popup appears, informing you that you need to close and restart the ISPF Monitor. This message appears only once it has been verified that the dataset(s) are cataloged and that no error is present in the user settings.
Option 1 – Manage Groups

Select the Manage Groups option from the z/OS Migrator Functions panel to display the Manage Group Members panel. The Manage Group Members panel allows you to create and manage group definitions, edit an existing definition, validate/verify a new group definition for adherence to syntax and system parameters, delete a group definition, and promote a group definition.

You must have UPDATE, ALTER, or CONTROL authority, or the security must be inactive (SAF Not Active, or No Security) for you to be able to perform the following functions: Promote, Verify, and Restore. If not, you will get the following message:

This user does not have the required authority for the z/OS Migrator server database. You may proceed with limited functionality. For full functionality, you must change your security setting to be able to update this dataset.

Figure 21 Manage Group Members panel

The Manage Group Members panel lists both the members of the configuration PDS and those groups that have been promoted. Once a group is promoted, both its original PDS member and the promoted group will appear in the list. Group definitions are listed by the member names you assigned when they were created—all names are prefixed with “LD”. Promoted groups are listed by group name and are identified by a “P” to the right of the name in the list. Each entry in the list for group members created via the ISPF interface provides information as to when the group was defined. “Promoting a group definition” on page 143 provides more information.
Primary commands

When creating a new group definition, you need to be familiar with the primary commands, usually noted at the top of each panel. The commands that you can specify change depending on which panel is currently being viewed.

The Primary commands that you will encounter while using the panels of Option 1 are described in the following table. Notice that some are the same as the line commands, described in Table 14 on page 122.

Note: The primary commands listed in Table 13 apply to several or all options of the z/OS Migrator ISPF Monitor. Refer to this table as you use the other options.

Table 13  Define z/OS Migrator Group panel - Primary commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Create</strong></td>
<td>Creates a new migration group. A member with the following format will be created: <strong>LDxxxxxx</strong> - Group Definition member where <em>xxxxxx</em> is a 6-character name specified by the user. This type of member can be modified and promoted.</td>
</tr>
<tr>
<td><strong>EXIT</strong></td>
<td>Exits the group creation process. (Or use PF3.)</td>
</tr>
<tr>
<td><strong>Find</strong></td>
<td>Finds the next occurrence of the specified string. The row containing the string is moved to the top of the display.</td>
</tr>
<tr>
<td><strong>FILTER</strong></td>
<td>Limits the list to show only the promoted groups (indicated with a “P” next to the group name) or the unpromoted groups.</td>
</tr>
<tr>
<td><strong>Import</strong></td>
<td>Allows a dataset (up to 44 characters) and member (up to 8 characters) to be specified for import. This member should contain a list of dataset name exclusion masks. Note: This command is available if option 'Build Data Set Exclude List' is set to 'Y' when entering the source options for a logical migration group.</td>
</tr>
<tr>
<td><strong>SWITCH</strong></td>
<td>Allows a direct switch to Option 2 - Monitor Promotion Groups from Option 1.</td>
</tr>
<tr>
<td><strong>MORE</strong></td>
<td>Returns to the source parameter panel to define additional selections for the group.</td>
</tr>
<tr>
<td><strong>EDIT</strong></td>
<td>Enters ISPF edit for the group member being created. Can be used to make minor corrections or to extend the group definition manually.</td>
</tr>
<tr>
<td><strong>SAVE</strong></td>
<td>Saves the group definition that has been created. You will be prompted to enter the 6-character unique member name suffix. A prefix of LD will be used to complete the name. If the name provided isn't unique, a member name with the following format will be substituted. <strong>LDjjjsss</strong> - where LD is the normal prefix, <em>jjj</em> is the current Julian day and <em>sss</em> is a sequential number starting at 001.</td>
</tr>
<tr>
<td><strong>VERIFY</strong></td>
<td>Submits the group definition to the server for syntax scan. This option will cause the service task to analyze the selected definition's configuration parameters and syntax to ensure that they match system requirements. You cannot verify a promoted group.</td>
</tr>
<tr>
<td><strong>PROMOTE</strong></td>
<td>Loads the defined group into server memory. This makes the group available to be activated. The promoted group will be identified by a ‘P’, signifying its promoted status.</td>
</tr>
</tbody>
</table>
## Line commands

Table 14 lists the line commands you can enter on the Manage Group Members panel.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| Copy (C) | Place a C next to a group definition to copy the selected definition. You will be prompted to enter a 1- to 6-character member name. You cannot copy a promoted group.  
**Note:** The time stamp for the copied group will reflect the time stamp of the original group. Edit the time stamp manually to reflect the time the new group was created. |
| Delete (D) | Place a D next to a group definition to delete the group definition member from the configuration PDS. This option is valid only for non-promoted groups.  
“Option 2 – Monitor Promoted Groups” on page 146 describes how to delete a promoted group. |
| Restore (E) | Place an E next to a promoted group to copy the selected group back to the configuration PDS. You will be prompted to enter a unique 6-character member name suffix; the new name will be prefixed with “LD”. This option is only valid for promoted groups.  
**Note:** Restoring a promoted group does not in any way affect the group; z/OS Migrator makes a copy of the group in the configuration PDS. |
| Modify (M) | Place an M next to a group definition to enter ISPF edit for the specified group definition member. This option is not valid on promoted groups. |
| Promote (P) | Place a P next to a group definition to load the group into server memory and store it in the z/OS Migrator database. All cooperating servers will automatically promote the group as well. The promoted group will be identified by ‘P’ to the right of the group name in the menu. |
| Rename (R) | Place an R next to a group definition to rename the selected definition. This option is valid only for non-promoted groups.  
To rename a promoted group, first Restore the group to its original group definition state and rename the restored definition. |
| Display (S) | Place an S next to a group definition to view the selected definition. This option is not valid on promoted groups. |
| Verify (V) | Place a V next to a group definition to validate its syntax and configuration parameters. This option will cause the service task to analyze the selected definition’s configuration parameters and syntax to ensure that they match system requirements. You cannot verify promoted groups. |
Creating a new group definition

To create a new group definition:

Type the CREATE command (or CR) on the Manage Group Members panel and press Enter. The Build Type pop-up appears.

```
+------------------ Build Type ------------------+
| Select with an S a build type.                |
| _ Build Migrate Member                        |
| _ Build Mirror Member                         |
| _ Build Logical Migrate Member                |
| F3=Cancel                                     |
+---------------------------------------------+
```

Figure 22  Build Type pop-up

The pop-up gives you the option of creating one of the three kinds of groups.

Table 15  Kinds of build types

<table>
<thead>
<tr>
<th>Build Member Type</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrate Member</td>
<td>Migrating a set of volumes</td>
</tr>
<tr>
<td>Mirror Member</td>
<td>Host-based mirroring for a set of volumes</td>
</tr>
<tr>
<td>Logical Migrate Member</td>
<td>Logical migration of a collection of datasets</td>
</tr>
</tbody>
</table>

Type an S on the line of the group type you wish to define.

- “Defining a volume migration group” on page 135 shows you how to create a Migrate Member. Migrate and Mirror groups are volume-oriented.
- “Defining a Volume Mirror group” on page 139 shows you how to create a Mirror Member.
- “Defining a logical migration group” on page 124 shows you how to create a Logical Migrate, or dataset, group definition.
Defining a logical migration group

1. Type an S at Build Logical Migrate Member.
   The Define z/OS Migrator Group panel displays.

   ![Define z/OS Migrator Group panel](image)

   **Figure 23 Define z/OS Migrator Group panel**

   **Note:** If you select **Build Mirror Member** or **Build Migrate Member**, an appropriate panel for mirroring or migrating a volume will start you on a path toward defining a volume group.

2. On the Define z/OS Migrator Group panel, type a name for the group and specify Y or N for the group options.

   **Table 16 Group options**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Name</td>
<td>Specify a 1- to 8-character name by which this group will be known once it is promoted.</td>
</tr>
</tbody>
</table>
   | Replace Existing Data Sets | This parameter causes z/OS Migrator to replace an existing target dataset. Valid input characters are Y and N:  
   |                         |   - Y specifies that an existing target dataset may be replaced. The existing target dataset is erased, and the new target dataset is allocated.  
   |                         |   - N specifies that an existing target dataset may not be replaced. The migration will fail if the target dataset name already exists.  
   |                         | **Note:** This affects all datasets defined for the group. N (or no) is the default setting. |
Using the z/OS Migrator ISPF Monitor

**Table 16** Group options

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| Tolerate Allocation Failure      | Valid input characters are Y and N:  
• Y specifies that execution continues on successfully allocated targets (overrides normal target allocation failure procedures). This is useful when the target dataset name uses wildcard characters.  
• N specifies that group activation fails upon detection of allocation errors. |
| SelectMulti                      | Allows selection of datasets to be controlled relative to a Source Volume List in the following way:  
• All specifies that all volumes of the dataset must be in the specified list for the dataset to be selected.  
• Any specifies the default behavior, if any volume is in the list all volumes will automatically be included for this dataset.  
• First specifies that only if the first volume of a dataset is in the list will it and all volumes of this dataset be included. |
| Consolidate                      | For the parameter VOL, to the degree possible, the target space will be allocated in consolidated extents on the corresponding target volumes for each source volume. The target dataset will still require as many volumes as the source.  
For the parameter All, the target space will be consolidated on as few volumes as possible for each source dataset. This results in a reduction of the number of volumes required for each dataset where possible. |

3. **Press Enter.**

The Define z/OS Migrator Group – Source Data Set Options panel displays.

![Define z/OS Migrator Group - Source Data Set Options panel](image)

4. **On the Define z/OS Migrator Group – Source Data Set Options panel, enter the source dataset mask and optional source volumes.**
Instead of individual source volumes, you may enter the name of a source volume list to be created in a subsequent panel. Select other options as described in Table 17.

### Table 17  Source dataset options (Page 1 of 4)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace</td>
<td>If selected, z/OS Migrator will produce diagnostic output during the migration cycle. No output is the default setting.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: Each SET statement comprises a complete selection specification, and each may have a different dataset value.</td>
</tr>
<tr>
<td>AllocSeq</td>
<td>Dataset allocation sequence. Valid input characters for this option are:</td>
</tr>
<tr>
<td></td>
<td>• D (Dataset) specifies to process datasets in ascending name sequence.</td>
</tr>
<tr>
<td></td>
<td>• S (Size) specifies to process datasets in descending size sequence. The largest datasets are processed first and the smallest are processed last.</td>
</tr>
<tr>
<td></td>
<td>• N (None) specifies to process datasets in the order that they are selected for processing. This may appear random.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: N is the default setting.</td>
</tr>
<tr>
<td>Sphere</td>
<td>This parameter specifies whether, for any VSAM cluster copied, all associated AIX clusters and paths are to copied. Individual names of sphere components do not need to be specified. Only the base cluster is eligible to be migrated if SPHERE(N) is specified, individual AIX clusters are ineligible. Each SET statement comprises a complete selection specification, and each may have a different SPHERE value. Valid input characters are Y and N:</td>
</tr>
<tr>
<td></td>
<td>• Y specifies that all associated AIX clusters and PATHs are to be copied.</td>
</tr>
<tr>
<td></td>
<td>• N specifies that only the selected base cluster will be copied.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: Y is the default setting; however, when migrating non-VSAM datasets, z/OS Migrator ignores the SPHERE parameter.</td>
</tr>
<tr>
<td></td>
<td>If SPHERE(Y) is specified, then the selection of the base cluster is determined by the source selection mask, however, multiple related components (KSDS</td>
</tr>
<tr>
<td>Rename UnConditional</td>
<td>Builds a RENAMEUnconditional statement. A method to provide alternate naming conventions to components being copied as part of a sphere.</td>
</tr>
<tr>
<td></td>
<td>“RENAMEUnconditional(...)” on page 213 provides more information.</td>
</tr>
<tr>
<td>Build Data Set Exclude list</td>
<td>Builds the dataset exclusion list. A method to eliminate datasets from the selection list. Valid input characters are Y and N:</td>
</tr>
<tr>
<td></td>
<td>• Y specifies to allow the creation of the exclusion list.</td>
</tr>
<tr>
<td></td>
<td>• N specifies not to create the exclusion list.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: You may specify multiple dataset names or dataset masks to exclude by modifying the group definition. “Example 1: Modifying a group definition to exclude multiple datasets” on page 144 provides more information.</td>
</tr>
</tbody>
</table>
SelectMulti

Allows selection of datasets to be controlled relative to a source volume list in the following way:
- All specifies that all volumes of the dataset must be in the specified list for the dataset to be selected.
- Any specifies the default behavior, if any volume is in the list all volumes will automatically be included for this dataset.
- First specifies that only if the first volume of a dataset is in the list will it and all volumes of this dataset be included.

Source Data Set Name/Mask

Enter the source dataset name for this required parameter. To specify multiple datasets as source, use dataset name masking. “Selecting datasets” on page 78 provides detailed information on dataset masking rules.

Both the source and target datasets must resolve to compatible devices. These devices may be within the same storage array, or they may be on different storage arrays. All extents for the source dataset(s) must reside on devices that are currently online and accessible.

Note: The source dataset name must be different from the target dataset name. Neither the source mask nor any source dataset name should be a substring of the target mask. The specified qualifiers of the target mask replace the corresponding qualifiers of the source dataset name one for one. Therefore, it is not possible to insert a new qualifier.

Note: In SMS environments, care should be taken when specifying a source dataset mask that resolves to a storage group containing a small number of volumes enabled for new allocations. The default target storage group will be the same storage group as the source datasets. Local SMS rules dictate the target storage group selection. Depending on circumstances, most or all of those volumes may be identified as source volumes. A source volume cannot be a target volume within the scope of the dataset mask. This would mean few or no volumes available as targets, which in turn may cause the migration to fail. You should be aware of this possibility when setting up your dataset migration groups, specifying a different target storage class and/or additional target volumes in the group definitions if necessary.

“Restrictions on storage subsystems and dataset types” on page 85 provides a detailed listing of both supported and unsupported dataset types.
Using the z/OS Migrator ISPF Monitor

Table 17  Source dataset options (Page 3 of 4)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| Source Volume List Name | Specify a 1- to 8-character name for the source volume list. If a valid name is entered, an additional panel will be displayed to allow entry of source volumes or volume masks. May not exceed 127 volumes or volume masks, with each entry delimited by a comma. To the right of the source volume list name are the names of the last four source volume lists defined and saved:  
  - If you reuse one of the names, that definition's list will be presented on the panel that allows the volume to be entered. Any changes to the definition will be saved when the group definition is saved.  
  - If you specify a new name and the group definition is saved, it will be saved in the first position and the others will move to the right with the original fourth entry deleted.  
  If a Source Volume List is specified, then the list of candidate datasets is built by scanning the VTOCs of the specified volumes. The catalog is then used to identify any other volumes containing the discovered datasets.  
  Note: Source Volume List Name and Source Volumes are mutually exclusive. Either may be used with or without a storage class as optional filters. |
| Storage Class           | Define the source data volume storage class. This parameter acts as a filter that is applied after the catalog search. Only datasets returned by the catalog search and having a matching storage class will be selected for migration with the current group. Enter the storage class for the source dataset(s) represented by the dataset name mask. The source storage class is a filter that further qualifies the datasets selected at Activation.  
  Note: Source Volume List Name and Source Volumes are mutually exclusive. Either may be used with or without a storage class as optional filters. |
| Source Volume(s)        | Specify one or more source data volume serial numbers. When specified, these volumes serve essentially as an unnamed source volume list, usable for just this dataset mask. Only datasets returned by the catalog search and having a matching volume serial number will be selected for migration with the current group. Be careful not to confuse this parameter with “Source Volume List Name.”  
  Note: Source Volume List Name and Source Volumes are mutually exclusive. Either may be used with or without a storage class as optional filters. |
When using a Source Volume or Source Volume List, the source DSN mask must be
general enough to match a dataset's FMT1 DSCB entry (or entries) in the VTOC. For
example:

Incorrect:

GROUP (LDSRCV)  MODE (LMIGR)
SRCVLIST  LIST5200 (SMS0A0,SMS0A1,SMS0A2,SMS0A3,SMS0A7)
SET  TRACE (N)
SOURCE (DSN (SRCE.LD5200.VSAM.CL1 )  )  --  The cluster name is a catalog
       entity only.
       SRCVLIST (LIST5200)  )  
       TARGET (VOL (SMS0B )  )
       DSN (TGT.LD5200.VSAM.CL1 )

The error condition is reported (in the server log and group error log) as follows:

EFM2024I  LDSRCV  is  now  NULL  (80->00)  at  ES_ACTIVATE_GROUP+08D4
EFM0555I  Activation  failed  for  group  LD5200.  Return  code:  1029.

The help message for EFM0555I is:

EFM0555I  Activation  failed  for  group  <group>.  Return  code:  <return-code>.
Explanation:  An  activation  command  was  unsuccessful.  The  return  code  in  the
message  can  be  one  of  the  following:

1029  No  datasets  selected  for  migration.
A correct alternative definition would be:

Correct:

GROUP (LDSRCV)  MODE (LMIGR)
SRCVLIST LIST5200 (SMS0A0, SMS0A1, SMS0A2, SMS0A3, SMS0A7)
  SET TRACE (N) -
  SOURCE (DSN (SRCE.LD5200.VSAM.CL1.**) -
      SRCVLIST (LIST5200) ) -
  TARGET (VOL (SMS0B0 ) -
      DSN (TGT.LD5200.VSAM.CL1.**) ) /

The corrected source and target DSN masks cause the actual VSAM components to be found on the specified volumes. The catalog locate performed during Activation returns the cluster name and all of the truename records for the VSAM cluster. The truename records have matching FMT1 DSCB records in the VTOC of the volume(s) where the VSAM components are located.

5. Once you have specified the desired values, press Enter. Depending on the options selected, a panel like one of the following displays.

![Figure 25 Define Source Volume List panel](image)

![Figure 26 Specify Exclude Masks panel](image)
6. Press **Enter** and proceed to the **Target Specifications panel**.

![Figure 27 Specify Rename Unconditional Masks panel](image1)

![Figure 28 Target Specifications panel](image2)
7. Specify the Target Data Set Name/Mask, Target Volume Storage Class, and Target Volume(s) parameters, as described in Table 18.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Data Set Name/Mask</td>
<td>Specify a complete target dataset name, or use a mask. The mask is applied against each source dataset to create a target dataset name. A corresponding Target dataset is allocated and cataloged for each selected source dataset. Target dataset names must be valid dataset names and must be authorized by site security rules. Note: You cannot specify the same dataset name on both the Source DSN and Target DSN parameters. Neither the source mask nor any source dataset name should be a substring of the target mask. The source and target masks should have the same number of specific qualifiers. The specified qualifiers of the target mask replace the corresponding qualifiers of the source dataset name one for one. Therefore, it is not possible to insert a new qualifier. It is important that the target dataset name (mask) is easily identifiable and unique within the storage environment. Once the migration is complete, the target and source datasets will have exchanged names. Thus, once success has been verified, the datasets remaining with the target names can be deleted to make the source volumes ready for reuse or removal. Ensuring that target dataset names are unique and easily identifiable is important to avoid confusion with production datasets. “Selecting datasets” on page 78, and “Small versus large migration groups” on page 89 provide more information about target dataset masks. DB2 linear datasets have a specific naming convention. The second level qualifier denotes whether it is the cluster or the data portion of the dataset. z/OS Migrator can only be used against the cluster; an individual component of the cluster cannot be specified. All cluster components will automatically be selected. The following two examples use z/OS Migrator to duplicate DB2 linear datasets. Both of the options require the use of wildcarding that is available in z/OS Migrator. For the following source dataset:</td>
</tr>
</tbody>
</table>
8. Once you have entered all the relevant group/pair parameters, press Enter.

### Table 18  Target parameters (Page 2 of 2)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| Target Volume Storage Class | Enter the storage class for the target volume(s). This parameter substitutes this SMS storage class for the existing storage class associated with the source dataset in the source/target dataset pair.  

**Note:** Local SMS ACS routines may place the target dataset in a storage class other than that specified by this parameter. As with all SMS datasets, specifying storage class is only a suggestion to SMS, and may or may not be accepted by SMS. If an existing target dataset is reused, its relevant storage class information will not be changed. |
| Consolidate             | For the parameter VOL, to the degree possible, the target space will be allocated in consolidated extents on the corresponding target volumes for each source volume. The target dataset will still require as many volumes as the source.  
For the parameter All, the target space will be consolidated on as few volumes as possible for each source dataset. This results in a reduction of the number of volumes required for each dataset where possible. |
| Target Volume(s)        | Enter the volume serial number where the target dataset(s) resides. You may specify up to 59 volume names. “Example 2: Modifying a group definition to add more target volumes” on page 144 shows how to specify more target volumes.  

**Note:** Esoteric name and unit name are not valid values for Target Volume(s). This parameter is an absolute volume name, no masking is supported. |
The generated group definition displays.

<table>
<thead>
<tr>
<th>EFMPDEF8</th>
<th>Define z/OS Migrator Group</th>
<th>Row 1 of 31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command</td>
<td>save</td>
<td>Scroll --&gt; DATA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Commands</th>
<th>EXit</th>
<th>MOre</th>
<th>EDit</th>
<th>SAve</th>
<th>VErify</th>
<th>PRomote</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP(CAPTURE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MODE(LMIGR())</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOLERATE_ALLOCATION_FAILURE(YES)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAXRC(8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REPLACE(YES)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOURCE_VOLUME_LIST</td>
<td>SVLCAP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYM719,SYM71A,SYM71B,SYM71C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SET</td>
<td>ALLOCSEQ(NONE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRACE(NO)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPHERE(YES)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOURCE</td>
<td>DSN (XYZTEST.**)</td>
<td>SOURCE_VOLUME_LIST (SVLCAP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXCLUDE ( -</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- XYZTEST.DONT.**,</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- XYZTEST.UDD.**,</td>
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<tr>
<td></td>
<td></td>
<td>- XYZTEST.VSAM2.DB.**,</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>- XYZTEST.AAA.**,</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- XYZTEST.XYZ.**,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- XYZTEST.A000*.**,</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- XYZTEST.LMIGRX08.**</td>
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<td>) -</td>
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<td></td>
<td></td>
<td>TARGET ( -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DSN (XYZTEST2.**)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>VOLUME ( -</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SYM830, SYM831</td>
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<td></td>
<td></td>
<td>) -</td>
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</tr>
</tbody>
</table>

**Figure 29** Generated group definition

9. At this point, you may reject the defined group and start again, or edit, save, verify, or promote the newly created group.

- **EXit** Abandon the group creation (confirmation will be requested).
- **MOre** Takes you back to the Source Data Set Options panel to select more datasets.
- **EDit** Invoke ISPF Edit to manually edit the group definition.
- **SAve** Store the group definition in the configuration PDS.
- **VErify** Submit the group definition to the z/OS Migrator server for syntax scanning.
- **PRomote** Load the group definition into the server memory and the z/OS Migrator database.

Table 13, “Define z/OS Migrator Group panel - Primary commands,” on page 121 provides more information on these commands.
Defining a volume migration group

Type the Create command (or CR) on the Manage Group Members panel and press Enter.

The Build Type pop-up appears.

```
+--------------- Build Type ----------------+
|                                           |
|  Select with an S a build type.          |
|    _ Build Migrate Member                |
|    _ Build Mirror Member                 |
|    _ Build Logical Migrate Member         |
|                                           |
| F3=Cancel                                 |
+-------------------------------------------+
```

Figure 30 Build Type pop-up

1. Type an S at Build Migrate Member and press Enter.

The Specify the Migrate Group parameters panel displays.

```
==================================Specify the Migrate Group parameters ===========================
Command ===>                                                                      Scroll ===> PAGE
Group Name . . . . . . . ________
Migration options . . (S) _ FastCopy _ DeactOnSus
    (Y/N) _ Refvtoc
Migration Completion. (S) _ SplittOn _ SplittOff _ Swap _ ConstantCopy
Swap options . . . (Y/N) _ ALLOWCC _ ALLOWSYSCM _ Consistent
    _ ALLOWCPL _ ALLOWPAGE
    CFW _ VOLPx ..
Source CUU . . . . __ and Count ____ or Volser . . . . . _____
Target CUU . . . . ____ New Volser ______ or Volser Prefix . . ______
Verify Options (S) _ None or _ Empty     Volser ______ '%' matches any char
****************** Primary Commands: EDit SAve VERify PROmote ******************
****************************************************************************** Bottom of data ****************************
```

Figure 31 Specify the Migrate Group parameters panel

2. Enter the desired parameters along with the source and target device specifications.

Table 19, “Migrate Group parameters,” on page 135 shows the parameters you need to supply to create a migration group.

Table 19 Migrate Group parameters (Page 1 of 3)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Name</td>
<td>Eight-character name this group will be known by once it has been promoted.</td>
</tr>
<tr>
<td>FastCopy</td>
<td>FASTCOPY/FC option, which copies only the allocated tracks on a volume rather than the entire volume, requires the source/primary volumes to be online to z/OS. If the volume is offline, a full volume copy is performed as Migrator is unable to obtain VTOC information for the volume to perform a FASTCOPY.</td>
</tr>
<tr>
<td>DeactOnSus</td>
<td>If a suspend occurs for any reason, automatically suspend migration for the affected units.</td>
</tr>
</tbody>
</table>
Using the z/OS Migrator ISPF Monitor

### Table 19 Migrate Group parameters (Page 2 of 3)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refvtoc</td>
<td>If migration is from smaller to larger volume, automatically perform a REFVTOC function at the conclusion of the volume group migration. Specify 'N' to override a global REFVTOC specification for this group. Started task EFMRFVTOC (unless task name overridden via the REFVTASK configuration parameter) is automatically started from z/OS Migrator Server which will then process all REFVTOC requests outstanding for all non-active migration groups. Automated REFVTOC is performed for all volume migration group types with the exception of Constant Copy. Run REFVTOC manually for those devices included in a Constant Copy group where the source is migrated to a larger target device. The z/OS Migrator external REFVTOC started task EMCRFVTC (or customer defined task name) is initiated at migration group's end or via the REFVTOC command. Be sure to keep the z/OS Migrator server task active through to EMCRFVTC task completion. EMCRFVTC requires access to the internal queues and services provided by your z/OS Migrator instance. If z/OS Migrator is terminated prematurely, the EMCRFVTC started task is automatically terminated. While this issue applies only to the owner instance (where the migration group was run), it is suggested to allow all ancillary tasks to complete before terminating any z/OS Migrator instances.</td>
</tr>
<tr>
<td>SplitOn</td>
<td>At the conclusion of migration, vary the target online.</td>
</tr>
<tr>
<td>SplitOff</td>
<td>At the conclusion of migration, leave the target offline.</td>
</tr>
<tr>
<td>Swap</td>
<td>At the conclusion of migration, initiate a swap between source and target.</td>
</tr>
<tr>
<td>ConstantCopy</td>
<td>After initial migration has been completed, continue to monitor changed tracks and periodically copy them from source to target.</td>
</tr>
<tr>
<td>ALLOWWCC</td>
<td>ALLOWWCC means to check for concurrent copy operations before swapping. This is an option to AutoSwap for controlling the swap process.</td>
</tr>
<tr>
<td>ALLOWSYSCM</td>
<td>Allow a swap because of the system count. This is an option to AutoSwap for controlling the swap process.</td>
</tr>
<tr>
<td>Consistent</td>
<td>Results in the group being converted to a special Volume Mirror group where SWAP is involved, which involves maintaining a consistent re-startable point across all volumes included in the group.</td>
</tr>
<tr>
<td>ALLOWCPL</td>
<td>Specifies whether to allow volumes with Couple datasets to participate in a swap operation. This is an option to AutoSwap for controlling the swap process.</td>
</tr>
<tr>
<td>ALLOWPAGE</td>
<td>Specifies whether to allow volumes with Common or PLPA page datasets, or CA/OPS SYSCHK1 or OPSLOG file types, to participate in a swap operation. ALLOWPAGE is mutually exclusive with the CONSISTENT parameter. This is an option to AutoSwap for controlling the swap process.</td>
</tr>
<tr>
<td>CFW</td>
<td>Swap behavior relative to CacheFastWrite.</td>
</tr>
</tbody>
</table>
3. After entering the first set of values, the generated group definition statements will be shown below the parameter entry fields. Continue entering additional source and target device specifications to extend the group.

4. When satisfied that the group definition is complete, proceed with one of the primary command actions shown on the line:

```
****** Primary Commands: EDit SAve VERify PRomote ******
```

- **EDit** Invoke ISPF Edit to manually edit the group definition.
- **SAve** Store the group definition in the configuration PDS.
- **VERify** Submit the group definition to the z/OS Migrator server for syntax scanning.
- **PRomote** Load the group definition into the server memory and the z/OS Migrator database.

Table 13, “Define z/OS Migrator Group panel - Primary commands,” on page 121 provides more information on these commands.
Defining a Volume Mirror group

Type the CREATE command (or CR) on the Manage Group Members panel and press Enter.

The Build Type pop-up appears.

```
+----------------- Build Type -----------------+  
| Select with an S a build type.           |  
| _ Build Migrate Member          |  
| _ Build Mirror Member           |  
| _ Build Logical Migrate Member  |  
| F3=Cancel                        |  
+----------------------------------------+
```

Figure 32 Build Type pop-up

1. Type an S at Build Mirror Member.

   The Specify the z/OS Migrator Group parameters panel is displayed.

```
====================================Specify the z/OS Migrator Group parameters ===========================  
Command ===> Scroll ===> PAGE  
Group Name . . . . ___  
Mirror options . . .(S) _ FastCopy _ DeactOnSus _ NoAutoVary  
Primary CUU . . . . and Count . . . . or Volser . . . . . .  
Mirror CUU . . . . New Volser . . . . or Volser Prefix . .  
Verify Options . . None or _ Empty (S) Volser . . . . . .  
**************************************************************************Primary CommandsEDit SAve VERify PROmote  
************************************************************************** Bottom of data  **************************************************************************
```

Figure 33 Specify the z/OS Migrator Group parameters panel

2. Enter the desired parameters along with the source and target device specifications.

   Table 20, “Volume Mirror group parameters,” shows the parameters you need to supply to create a Volume Mirror group:

**Table 20 Volume Mirror group parameters (Page 1 of 2)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Name</td>
<td>Eight-character name this group will be known by once promoted.</td>
</tr>
<tr>
<td>FastCopy</td>
<td>Initial synchronization should be accomplished by copying only the allocated tracks. FASTCOPY/FC option, which copies only the allocated tracks on a volume rather than the entire volume, requires the source/primary volumes to be online to the z/OS Migrator owner system. If the volume is offline, a full volume copy is performed as z/OS Migrator is unable to obtain VTOC information for the volume to perform a FASTCOPY.</td>
</tr>
<tr>
<td>DeactOnSus</td>
<td>If a suspend occurs for any reason, automatically suspend mirroring for the affected units.</td>
</tr>
</tbody>
</table>
3. After entering the first set of values, the generated group definition statements will be shown below the parameter entry fields. Continue entering additional source and target device specifications to extend the group.

4. When satisfied that the group definition is complete, proceed with one of the primary command actions shown on the line.

****** Primary Commands: EDit SAve VERify PRomote *******

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NoAutoVary</td>
<td>Do not automatically vary the target to match the online state of the source. You may still manually vary the target.</td>
</tr>
<tr>
<td>Primary CUU</td>
<td>Device address of the first, or only, source device to be mirrored.</td>
</tr>
<tr>
<td>and Count</td>
<td>Count of sequential addresses to be generated by this definition.</td>
</tr>
<tr>
<td>or Volser</td>
<td>Alternatively, specify the volser of a single source.</td>
</tr>
<tr>
<td>Mirror CUU</td>
<td>Device address of the first or only target device.</td>
</tr>
<tr>
<td>New Volser</td>
<td>A mask that serves as the basis for generating the “apparent” volser of the targets.</td>
</tr>
<tr>
<td>or Volser Prefix</td>
<td>Alternatively, a prefix to be combined with the device number of the target to form an “apparent volser.”</td>
</tr>
<tr>
<td>None</td>
<td>Do not validate any of the content of the target before using.</td>
</tr>
<tr>
<td>Empty</td>
<td>Verify that the target volume is empty before using.</td>
</tr>
<tr>
<td>Volser</td>
<td>A mask used to verify the volume serial number of the targets before using.</td>
</tr>
</tbody>
</table>

3. After entering the first set of values, the generated group definition statements will be shown below the parameter entry fields. Continue entering additional source and target device specifications to extend the group.

4. When satisfied that the group definition is complete, proceed with one of the primary command actions shown on the line.

****** Primary Commands: EDit SAve VERify PRomote *******

- **Edit**: Invoke ISPF Edit to manually edit the group definition.
- **Save**: Store the group definition in the configuration PDS.
- **Verify**: Submit the group definition to the z/OS Migrator server for syntax scanning.
- **Promote**: Load the group definition into the server memory and the z/OS Migrator database.

Table 13, “Define z/OS Migrator Group panel - Primary commands,” on page 121 provides more information on these commands.

**Saving a group definition**

When the group definition is complete, type **SAVE** (or SA) in the command field, and press **Enter**.
You are prompted to enter the 6-character configuration member name suffix:

![Create Member Name pop-up](image)

Specify a member name from 1 to 6 characters long and press Enter. The member name will be prefixed with “LD” and stored in the configuration PDS. Specify a member name that you can easily associate with the group that you have defined.

The new group definition is listed (in alphanumeric order) in the Manage Group Members panel.

### Verifying a group definition

You must have UPDATE, ALTER, or CONTROL authority, or the security must be inactive (SAF Not Active, or No Security) for you to be able to perform the following functions: Promote, Verify, and Restore. If not, you will get the following message:

This user does not have the required authority for the z/OS Migrator server database. You may proceed with limited functionality. For full functionality, you must change your security setting to be able to update this dataset.

z/OS Migrator provides the VERIFY line command allowing you to validate a group definition’s configuration parameters and syntax to ensure that they match system requirements. The VERIFY line command is only available to group definitions that have not yet been promoted. You cannot verify a promoted group.

**Note:** Group definitions that have not been promoted are identified by “LD”, prefixed to the member name.

To verify an unpromoted group definition:

- On the Manage Group Members panel, place a V next to the group definition that you want to verify and press Enter.
The group definition is then parsed and checked for syntax and configuration errors as shown in Figure 35. If an inconsistency is found, a syntax error message is displayed and the error is marked.

![VIEW SYS07155.T201707.RA000.JDOE1.R0138644](image)

**Figure 35** Verifying group definition
Promoting a group definition

You must have UPDATE, ALTER, or CONTROL authority, or the security must be inactive (SAF Not Active, or No Security) for you to be able to perform the following functions: Promote, Verify, and Restore. If not, you will get the following message:

This user does not have the required authority for the z/OS Migrator server database. You may proceed with limited functionality. For full functionality, you must change your security setting to be able to update this dataset.

Once you have created a group definition, you must promote the group to initiate the migration process. Promoting a group definition transfers the selected group to the z/OS Migrator database and communicates the group’s configuration parameters to the service task. The promoted group is then identified by “P” to the right of its name in the Manage Group Members list, signifying its promoted status.

To promote a group definition:

◆ On the Manage Group Members panel, place a P next to the group definition that you want to promote and press Enter. You will be asked to confirm the action.

Before it is promoted, the group definition is initially parsed and checked for syntax and configuration errors. You will be notified once the group has been successfully promoted.

Modifying a group definition

z/OS Migrator provides the Modify line command, allowing you to edit an existing group definition. The Modify line command is only available to group definitions that have not yet been promoted. You cannot edit a promoted group.

Note: Group definitions that have not been promoted are identified by “LD” prefixed to the member name.

To modify a group definition:

1. On the Manage Group Members panel, place an M next to the group definition that you want to modify and press Enter. The group definition is then displayed in a standard ISPF Edit panel.

   Note: Chapter 8, “Defining z/OS Migrator Groups via Text Editor,” describes how to use the text editor to create or edit group definitions.

2. Modify the group definition as desired.

3. Once you have finished editing the group definition, type the SAVE command, or press PF3.
Example 1: Modifying a group definition to exclude multiple datasets

The following group was created with only one Exclude mask:

```plaintext
GROUP (DOC6) MODE (LMIGR())
SET TRACE (NO) -
  SOURCE (DSN(**) -
    VOLUME (TD5441) -
    EXCLUDE (SYS1.DATA.TD5441) -
    TARGET (VOLUME (TD5270) -
      DSN (KZP11.**))
```

Using ISPF Edit, invoked from the Manage Group Members panel, simply add a second Exclude mask on the same line or a continuation line. The list is comma-separated and may contain up to 127 masks. Continuations are indicated with a '-' after the last value on a line, for example:

```plaintext
GROUP (DOC6) MODE (LMIGR())
SET TRACE (NO) -
  SOURCE (DSN(**) -
    VOLUME (TD5441) -
    EXCLUDE (SYS1.DATA.TD5441, -
      KZP10.EMM.EXTMAP.LMTD5441.DB)) -
  TARGET (VOLUME (TD5270) -
      DSN (KZP11.**))
```

Example 2: Modifying a group definition to add more target volumes

The following is an example of adding five additional target volumes to a group previously defined with five target volumes.

The original definition:

```plaintext
GROUP (TEST105) MODE (LMIGR())
SET TRACE (NO) -
  SOURCE (DSN (TEST.**) -
    TARGET (VOLUME (RWY352, RWY532, RWY253, RWY115, RWY235) -
      DSN (MIGR.**))
```

The extended definition. Note that up to 59 volumes may be specified in a comma-separated list. Continuation is indicated with a '-' at the end of any line.

```plaintext
GROUP (TEST105) MODE (LMIGR())
SET TRACE (NO) -
  SOURCE (DSN (TEST.**) -
    TARGET (VOLUME (RWY352, RWY532, RWY253, RWY115, RWY235 -
      SWT352, SWT532, SWT253, SWT215, SWT325) -
      DSN (MIGR.**))
```
Deleting a group definition

z/OS Migrator provides the Delete line command, which allows you to delete an existing group definition. The Delete line command in the Manage Groups panel is only available to group definitions that have not yet been promoted. To delete a promoted group, you must use “Option 2 – Monitor Promoted Groups” on page 146.

Note: Group definitions that have not been promoted are identified by “LD” prefixed to the member name.

To delete a group definition:

- On the Manage Promoted Groups panel, place a D next to the group definition that you want to delete and press Enter.

  You will be asked to confirm the deletion.
Option 2 – Monitor Promoted Groups

Select the Monitor Promoted Groups option from the z/OS Migrator Functions panel to display the Monitor Promoted Groups panel. This panel displays the current status of promoted groups and their corresponding datasets or volumes.

Table 21 describes the type of group as defined by mode.

### Table 21: Modes and group types

<table>
<thead>
<tr>
<th>Mode</th>
<th>Group type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FASTMIR</td>
<td>Volume Mirror group without other options specified</td>
</tr>
<tr>
<td>MIGRATE</td>
<td>Volume migration group without other options</td>
</tr>
<tr>
<td>MIG/FC</td>
<td>Volume migration group with FastCopy specified</td>
</tr>
<tr>
<td>LOGMIGR</td>
<td>Logical (dataset) migration group</td>
</tr>
</tbody>
</table>

You can use the list of groups to activate migration for one or more groups; simply use the A line command on the desired groups to activate them.

![Figure 36: z/OS Migrator Monitor - Monitor Promoted Groups panel](image)

The Monitor Promoted Groups panel provides several line commands allowing you to perform a variety of actions on both groups and their corresponding datasets, including the following:

- Deleting a group
- Diverting a group
- Activating and deactivating a group
- Suspending and resuming migration for a group
- Displaying detailed dataset configuration information

Table 22, “Monitor Promoted Groups - line commands for groups,” on page 147 provides a complete list of actions available.
Line commands for groups

Table 22 lists the group line commands that you can enter on the z/OS Migrator Monitor - Monitor Promoted Groups panel. Note that the J, L, O, S, V, and Z line commands are specific to logical (dataset) migration groups.

Table 22 Monitor Promoted Groups - line commands for groups (Page 1 of 2)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activate (A)</td>
<td>Place an A next to a group to activate the selected group and begin the migration process. The Monitor Promoted Groups panel displays the progress of the migration process. “Activating a group” on page 150 provides more information.</td>
</tr>
<tr>
<td>Config (C)</td>
<td>Place a C next to a group to display the dataset list for the group. Additional actions may be selected from the z/OS Migrator Dataset List panel.</td>
</tr>
</tbody>
</table>
| Deact (D) | (Deactivate) Place a D next to a group to deactivate the selected group. To be deactivated, a group must first be suspended. “Suspending a group” on page 151 provides more information.  
**Note:** You cannot deactivate a group during certain phases of the migration. |
| Errors (E) | Place an E next to a group to display the group error message log. |
| Jobs (J) | For logical (dataset) migration only. Place a J next to a group in diversion to display any jobs blocking completion. |
| Volumes (L) | For logical (dataset) migration only. Place an L next to a group to display information about the first extent on each volume for each dataset. |
| VolSum (O) | (Volume Summary) For logical (dataset) migration only. Place an O next to a group to display the datasets, source and target, that are on the volume. |
| Suspend (P) | Place a P next to a group to pause or suspend migration for that group. “Diverting a logical migration group” on page 152 provides more information.  
**Note:** If you suspend a group when it is in Mirror or Copy state, you break the mirroring. Updates are not copied to the target dataset until you resume mirroring. |
| Resume (R) | Place an R next to a group to restart or resume the migration process for the group, after migration was paused or suspended. |
| ShowExt(S) | (Show Extents) For logical (dataset) migration only. Place an S next to a group to show all the extent information for the datasets in the group. |
| Reset (T) | For volume migration only. Place a T to specify a new option for constant copy groups. |
| Report (U) | Place a U next to a group to produce a printable report that formats all of the group’s parameters and status values. |
Table 22  Monitor Promoted Groups - line commands for groups (Page 2 of 2)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divert (V)</td>
<td>For logical (dataset) migration only. Place a V next to a group to divert data from the source dataset(s) to the target dataset(s). This will cause the group to enter Divert state until the target dataset(s) is recataloged and renamed. A group will remain in Divert state if there are jobs allocated to the source dataset(s). Use the J and/or N option to display a list of jobs allocated to the source dataset(s). “Diverting a logical migration group” on page 152 provides more information.</td>
</tr>
</tbody>
</table>
| Delete (X) | Place an X next to a group to delete the selected group.  
**Note:** You cannot delete a group for which a migration is currently in progress. |
| Complete (Z) | For logical (dataset) migration only. If the NOAUTOTRM option has been selected (Config member or SET command), placing a Z next to a group manually triggers the completion processing. |

Volume Mirror/Migrator volume configuration display

Using the C line command for a volume-oriented group in the z/OS Migrator Monitor - Monitor Promoted Groups panel results in a display of the devices that comprise the group.

```
--------------------------------------------------------------------- Group: PAL Configuration Information --------------------------------------------------------------------- Row 1 of 2
Command => Scroll =>

<table>
<thead>
<tr>
<th>Symm</th>
<th>MI</th>
<th>CUU</th>
<th>U Volser Sdev Serial</th>
<th>CUU</th>
<th>Status</th>
<th>New</th>
<th>Num</th>
<th>Num</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6D50</td>
<td>S</td>
<td>JWA090</td>
<td>0090 06185 6D51</td>
<td>JWA+</td>
<td>0 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6D51</td>
<td>T</td>
<td>JWA090</td>
<td>0091 06185 6D50</td>
<td>JWA+</td>
<td>0 0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

Figure 37  Volume Mirror/Migrator volume configuration display

In this panel, you may type an S on any line to show more detailed information about the device.
Logical migration dataset configuration display

Using the C line command for a logical (dataset) migration, group in the z/OS Migrator Monitor - Monitor Promoted Groups panel results in a display of the datasets that comprise the group.

---

### Table 23

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Detail (D)</strong></td>
<td>Displays a formatted list of all dataset attributes and status. This is the equivalent of the command Display DSNDET <em>dsname</em>.</td>
</tr>
<tr>
<td><strong>Jobs (J)</strong></td>
<td>If the group is in Diversion, display any jobs using this dataset and blocking completion.</td>
</tr>
<tr>
<td><strong>Volumes (L)</strong></td>
<td>Show information on the first event of this dataset on each volume it occupies.</td>
</tr>
<tr>
<td><strong>Map Vol (M)</strong></td>
<td>Displays a map of z/OS Migrator-managed extents on the first dataset volume. This is the equivalent of the command D EXTMAP <em>ccuu</em> for the first device. Use the Operator Interface to request this type of display for other managed devices.</td>
</tr>
<tr>
<td><strong>VolSum (O)</strong></td>
<td>(Volume Summary) Displays a volume summary for the dataset showing all the source and target volumes for the dataset, listed by volume.</td>
</tr>
<tr>
<td><strong>Extents (S)</strong></td>
<td>Display the detail of all extents for the dataset.</td>
</tr>
</tbody>
</table>
z/OS Migrator Dataset List filters

Logical migration groups can contain a large number of datasets. z/OS Migrator provides a filtering mechanism to limit the datasets displayed in the dataset list. In the Filter Type field, specify one of the filter types listed in Table 24. Then in the Value field specify an appropriate group name, dataset mask, or volume serial number.

Table 24 z/OS Migrator Dataset List filters

<table>
<thead>
<tr>
<th>Filter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (G)</td>
<td>Display the datasets for any other group without returning to the z/OS Migrator Monitor - Monitor Promoted Groups panel.</td>
</tr>
<tr>
<td>Dsn Mask (M)</td>
<td>Select datasets for display using a dataset name mask. The Value field should contain a mask in the same format used for Source DSN selection.</td>
</tr>
<tr>
<td>Volser (V)</td>
<td>Select datasets based on whether any part of the dataset resides on the specified volume.</td>
</tr>
<tr>
<td>Status (S)</td>
<td>Select datasets based on the current status, for example, MIRROR. The value field should contain one of the status values that normally appear in the Dataset List Status field:</td>
</tr>
<tr>
<td></td>
<td>DROPPED</td>
</tr>
<tr>
<td></td>
<td>DELETED</td>
</tr>
<tr>
<td></td>
<td>SKIPPED</td>
</tr>
<tr>
<td></td>
<td>GDGBASE</td>
</tr>
<tr>
<td></td>
<td>CLUSTER</td>
</tr>
<tr>
<td></td>
<td>SPHERE</td>
</tr>
<tr>
<td></td>
<td>NORUN</td>
</tr>
<tr>
<td></td>
<td>SYNC</td>
</tr>
<tr>
<td></td>
<td>PNDMIRR</td>
</tr>
<tr>
<td></td>
<td>MIRROR</td>
</tr>
<tr>
<td></td>
<td>PNDDVRT</td>
</tr>
<tr>
<td></td>
<td>DVRT</td>
</tr>
<tr>
<td></td>
<td>DONE</td>
</tr>
<tr>
<td></td>
<td>DVRTFAIL</td>
</tr>
<tr>
<td></td>
<td>SUPR</td>
</tr>
<tr>
<td></td>
<td>SUPN</td>
</tr>
<tr>
<td></td>
<td>DEPN</td>
</tr>
<tr>
<td></td>
<td>SUSP</td>
</tr>
<tr>
<td></td>
<td>TERM</td>
</tr>
</tbody>
</table>

In addition, some of these status values can have a suffix indicating suspend or deactivation is in process, for example, MIRRSUSP = Mirroring suspended.

Activating a group

Once a group has been defined and promoted, you must activate the group in order to start the migration process for that group.

To activate a group:

- Type A in the line command entry text field next to the group that you want to activate and press Enter.
For any of the major action commands, including Activate, you will see a pop-up message requesting that you confirm your intention to execute the command, for example:

```
+------------------- Confirm Activate Request -------------------+
| Are you sure you want to Activate TEST3? Y (Y=Yes N=No) |
+--------------------------------------------------------+
```

Figure 39  Confirm Activate Request pop-up

Type Y in the input field and press Enter to proceed.

Active, Copy, and Mirror states

When the Activate request is accepted, you will see "Activate Issued" in the upper right corner of the dialog and the Activate processing will begin.

Once the group is activated, z/OS Migrator will begin the migration process for that group. During this time, the group will transition through Active, Copy, and then Mirror states. During the Copy phase, the status will display as Syncing(nnn%) showing the amount of data that has been copied. Pressing Enter in this screen will enable the monitor to update the view of migration status.

Volume Mirror groups proceed from the Copy state to the Mirror state and remain there. Volume migration groups, other than Constant Copy groups, proceed from the Copy state to a Swap that completes the migration.

A logical migration group will remain in Mirror state until a Divert command is issued. Once mirroring has completed, it will display "Moved=100% Mirror." When a Divert command is issued, the migration process will enter the Pending-Divert state, followed automatically by the Divert state. Migration will remain in the Divert state until all direct job allocations to the source datasets are released, after which the migration will enter Pending-Complete state (waiting for allocations locally), followed by Pending All Complete (waiting for allocations globally), and finally, Complete (all source allocations relinquished).

If the group status shows that an error has occurred, use the E line command to display detained information and messages. You can always use the E line command to show possible warning messages that may have been issued during processing.

Suspending a group

You may temporarily suspend a group while it is in the Sync, Pending-Mirror, or Mirror states by using the P line command in the group list. This pauses all migration activity for the group until you issue the Resume command. Changes to the migrating data continue to be monitored during the suspension so that any changed tracks can be copied once the group has been resumed. While in Suspended state, the group and dataset displays will show the appropriate suspend status:

SYNCSUSP: synchronization suspended

PNDMSUSP: pending mirror suspended

MIRRSUSP: mirroring suspended
Resuming a suspended group

To resume a suspended group:

- Type R in the line command field next to the group you wish to resume and press Enter.

The group will revert back to the Sync or Pending-Mirror state as remaining uncopied or changed tracks are copied. Once the copy is complete, the group will enter Mirror state normally.

Diverting a logical migration group

Once a logical migration group has reached Mirror state, you may divert it. While in Divert state, all I/O from ongoing applications will automatically be diverted to the target datasets. Any newly started applications will directly allocate the target datasets.

**Note:** You may wish to wait to enter the Divert state until you are ready to restart any applications which are actively using the source datasets. While technically not necessary, it does simplify the process by shortening the amount of time that application I/O must be diverted by z/OS Migrator.

To divert a group:

- Type V next to the group that you want to divert and press Enter.

Once a group has been diverted, you can display a list of the allocated datasets in the group and the jobs that have them allocated by using the J line command at either the group level or the dataset level.
A Divert command will be rejected if a new extent allocation is in progress (BUSY). A Divert command will also be rejected if an LPAR on which the group is known is not currently active (SERVER INACTIVE). In this case, use Option 4 - Operator Interface in the z/OS Migrator Functions panel to show the status of the group on all LPARs, as shown in Figure 40.

![Figure 40](z/OS Migrator Display Group parameters panel)

Note: Refer to “Sample group display panels” for field descriptions of this panel.

If the LPAR is known to be uninvolved, you may choose Option 4 - Operator Interface and then option Z Console Interface to issue the REMOVE command and remove the LPAR from consideration.

```
REMOVE smfid
```

Take caution when performing this procedure. Data integrity will be compromised if any application is accessing any of the group datasets from the removed system.

The actual Divert is preceded by a verification process to ensure that the catalog and VTOC activities of Diversion will be successful. If an error is found, the Divert will be rejected and the group will remain in Mirror state. Any error messages generated during the diversion processing can be displayed using the E line command in the group list:

- Type E in the line command field for the group and press Enter.

**Completing a logical migration group**

Depending on selected options, Diverted groups will either proceed directly through the completion process or remain in Divert state until you enter the Complete command. In particular, if NOAUTOTRM has been specified, you will need to use the Z line command to move group completion along. (in “Step 10: Allocate z/OS Migrator system information dump dataset” on page 56 provides details.)

- Type Z in the line command field next to the group and press Enter.
Once the command has been accepted the group will start progressing through the Pending Complete, Pending All Complete, and Complete phases.

Deactivating a group

You must suspend a group before you can deactivate it. Deactivation is only an option during the Copy (Sync and Pending Mirror) and Mirror states.

To deactivate a group:

◆ Type P next to the group that you want to deactivate and press Enter.
◆ Once the Suspend has been acknowledged, type D in the line command field and press Enter.

Note: You cannot deactivate a group once it has been diverted.

Sample group display panels

Once groups are configured, a summary panel is displayed, depending on the group type.

Logical migration group display panel

Figure 41 shows an example of a display panel for a logical migration group:

<table>
<thead>
<tr>
<th>EFMP001I D G QSAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME 1ST-PAIR COUNT STATUS OWNER DEFINITION</td>
</tr>
<tr>
<td>QSAM ?????/???? 0 NEVER ACTIVE MODE(LMIG)</td>
</tr>
<tr>
<td>SMFID SSID OWN DSNS STATUS-FLAGS STATUS</td>
</tr>
<tr>
<td>AOSB MGW2 0 COMPLETE</td>
</tr>
<tr>
<td>AOSA MGW2 0 COMPLETE</td>
</tr>
<tr>
<td>AOSC MGW2 0 COMPLETE</td>
</tr>
</tbody>
</table>

Figure 41 Logical migration group display panel

The fields are described Table 25.

Table 25 Logical migration group fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>The name of the group.</td>
</tr>
<tr>
<td>1ST-PAIR</td>
<td>The first pair of source/target devices encountered in the definition.</td>
</tr>
<tr>
<td>COUNT</td>
<td>The number of datasets in the group.</td>
</tr>
<tr>
<td>STATUS</td>
<td>Descriptive phrase indicating the current or ending status of the group. For example, NEVER ACTIVE means the group was never activated or has returned to an undefined state.</td>
</tr>
<tr>
<td>OWNER</td>
<td>The SMF ID of the system on which the group was activated. Only valid while group is active.</td>
</tr>
<tr>
<td>DEFINITION MODE</td>
<td>The type of group and any qualifying attributes; for example, LMIG indicates a logical migration (that is, a dataset-oriented group).</td>
</tr>
</tbody>
</table>
Using the z/OS Migrator ISPF Monitor

**Table 25 Logical migration group fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMFID</td>
<td>This section of the display shows the current status on each participating LPAR. SMFID is the SMF ID of the LPAR.</td>
</tr>
<tr>
<td>SSID</td>
<td>The subsystem ID of the z/OS Migrator started task.</td>
</tr>
<tr>
<td>OWN</td>
<td>The SMF ID of the owning LPAR, if any.</td>
</tr>
<tr>
<td>DSNS</td>
<td>The number of datasets as known on each system. Generally this should match the Count shown above.</td>
</tr>
<tr>
<td>STATUS-FLAGS</td>
<td>For debugging purposes, a representation of various individual flag bits that indicate the status of the group as observed on each system. For example, RDY means the group has been acknowledged by an agent LPAR.</td>
</tr>
<tr>
<td>STATUS</td>
<td>The current status of the group from the vantage point of each LPAR. Generally, they will all be the same, but during state transitions there may be a several second lag.</td>
</tr>
</tbody>
</table>

**Volume migration group display panel**

Figure 42 shows an example of a display panel for a volume migration group.

<table>
<thead>
<tr>
<th>EFUMP001I D G TESTBBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>TESTBBI</td>
</tr>
<tr>
<td>SMFID</td>
</tr>
<tr>
<td>SYSB</td>
</tr>
<tr>
<td>SYSA</td>
</tr>
<tr>
<td>PAIR</td>
</tr>
<tr>
<td>EE23/9746</td>
</tr>
<tr>
<td>EE53/9745</td>
</tr>
</tbody>
</table>

**Figure 42 Volume migration group display panel**

The fields are described in **Table 26**.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>The name of the group.</td>
</tr>
<tr>
<td>1ST-PAIR</td>
<td>The first pair of source/target devices encountered in the definition.</td>
</tr>
<tr>
<td>COUNT</td>
<td>The number of device pairs.</td>
</tr>
<tr>
<td>STATUS</td>
<td>Descriptive phrase indicating the current or ending status of the group. For example, &quot;Never Active&quot; means the group was never activated or has returned to an undefined state.</td>
</tr>
<tr>
<td>OWNER</td>
<td>The SMF ID of the system on which the group was activated. Only valid while group is active.</td>
</tr>
<tr>
<td>DEFINITION MODE</td>
<td>The type of group and any qualifying attributes. For example, MIG(SWAP) indicates a volume migration group for which swap has been defined as the ending action.</td>
</tr>
<tr>
<td>SMFID</td>
<td>This section of the display shows the current status on each participating LPAR. SMFID is the SMF ID of the LPAR.</td>
</tr>
<tr>
<td>SSID</td>
<td>The subsystem ID of the z/OS Migrator started task.</td>
</tr>
</tbody>
</table>
Option 3 – Display Configuration Information

This option allows you to produce formatted displays of the following configuration elements:

1. System
   - CPU serial, SMF ID, Subsystem name
2. Global Information
   - Certain z/OS Migrator server parameters
3. Group
   - Similar to the interact with groups list
4. Device
   - Device-related information for managed devices
5. Dataset
   - Formatted display of dataset information
6. Extent
   - Formatted display of extent information

Select the desired item and enter the identifying information as requested.
Using the z/OS Migrator ISPF Monitor

Option 4 – Operator Interface

This option allows you to request z/OS Migrator Help information and interact with the server via the command interface. In addition, it presents a number of options for entering preformatted commands:

1. Display Device
   A Display DEVice command
2. Display Hosts
   A Display HOSTS command
3. Display Group
   A Display Group command
4. Display LM Paths
   A Display PATHS LM command
5. Display Dataset Detail
   A Display DSDET command
6. Display Extent
   A Display EXTMAP command
7. Display Dataset
   A Display DSN command
R Display REFVTOC
   Display outstanding requests for z/OS Migrator Server
8. Debug Options
   Display selected debugging information and set debug flags
9. Trace Options
   A SET TRACE command
H Help
   Request Help information
Z Console Interface
   Enter free-form z/OS Migrator operator commands

If you are using the monitor log dataset, then the output of all commands submitted is logged to the log dataset and may be viewed using the V option in the z/OS Migrator Functions panel.

If you are using the option Stack Console output . . Y as specified in the Set User Session Options dialog, then while in the Help or Console Interface dialogs, all commands and responses will be viewable in push-down fashion. Once you switch to another part of the monitor, the push-down log will be reinitialized. However, the commands and responses will still be viewable in the background log.

Option 5 – Display Host Messages

This option allows you to display z/OS Migrator messages for a specific host system for which the current z/OS Migrator ISPF Monitor is defined. When this option is invoked, the initial screen that is displayed lists all valid host systems currently connected.

<table>
<thead>
<tr>
<th>Subsystem @$ Host Messages</th>
<th>Row 1 to 2 of 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ===&gt;</td>
<td>Scroll ====&gt;</td>
</tr>
<tr>
<td>DATA</td>
<td></td>
</tr>
<tr>
<td>SMFID</td>
<td>SSID</td>
</tr>
<tr>
<td>X06</td>
<td>DB01</td>
</tr>
<tr>
<td>X04</td>
<td>DB01</td>
</tr>
</tbody>
</table>

Figure 43 Subsystem Host Messages panel
**Table 27** describes the available fields.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMFID</td>
<td>The SMF ID of the system.</td>
</tr>
<tr>
<td>SSID</td>
<td>The subsystem ID of z/OS Migrator.</td>
</tr>
<tr>
<td>CPUID</td>
<td>The significant digits of the hardware CPU serial number.</td>
</tr>
<tr>
<td>Idle</td>
<td>Means that the observing system considers that system to be idle as far as z/OS Migrator is concerned. This means that the started task is not running.</td>
</tr>
</tbody>
</table>

**Note:** The integrity of z/OS Migrator operations depends on the z/OS Migrator server being active on all systems with access to any of the devices involved. If a required system appears to be idle with regard to z/OS Migrator, ensure that the system is actually down or the subject volumes are all offline to that system. Otherwise, affected groups should be deactivated and restarted when all systems are operational.

| Last Server Start Time | Indicates the last server start time.                                      |

**Displaying messages for a host system**

To display messages for a specific host system:

- Enter S next to the relevant host system line, and press Enter.

The messages for the selected host are displayed in a separate panel with a date and time stamp for each message. The date and time stamp can either be in local time or GMT depending on your setting.

When you first enter the Subsystem Host Messages dialog for a host, you may see a pop-up similar to the following:

```
By default only messages after 06/11/2015 02:17:16.693 are displayed, the time stamp of last z/OS Migrator server cold start.
Oldest message available to display is 06/01/2015 18:41:01.690
After the initial display, you may enter command all or depress PF 5 to see all messages in the data base for host X04

Press ENTER to continue.
This message only shown once per z/OS Migrator monitor session.
```

**Figure 44** Message pop-up
When you press Enter, you will see a list of messages from the selected host, similar to those shown in Figure 45. Date changes in the message stream are indicated by the ***Current date*** statement.

Note: Find and repeat find functions are available in the messages panel so that you can search for specific messages without the need to scroll through the entire messages listing.

Option 6 – System Change Summary

This option displays a history of the z/OS Migrator product release in use. The PTFs are identified by a fix number.
Option 7 – Message Help

This option contains most of the z/OS Migrator messages within the system. These messages provide a more detailed explanation than what is displayed in the z/OS Migrator ISPF Monitor or in the output listing.

See the EMC z/OS Migrator Message Guide. For other types of messages, refer to the message guide for the corresponding product.

To search for a specific message:

- Type the 4-digit value, contained in the message number, on the Message Number line and press Enter. For example, EFM0006I would be searched as 0006, as shown in Figure 48 on page 160.

---

**Figure 47** z/OS Migrator Message Display

**Figure 48** z/OS Migrator Message Display example
The last character in a z/OS Migrator message indicates the severity of the message.

**Table 28 z/OS Migrator message severity table**

<table>
<thead>
<tr>
<th>Character</th>
<th>Return code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td><strong>Action message</strong> — WTO/WTOR option selected; requires a response from the z/OS console or the z/OS Migrator ISPF Monitor.</td>
</tr>
<tr>
<td>I</td>
<td>0</td>
<td><strong>Informational message</strong> — all migrations successful; no action required.</td>
</tr>
<tr>
<td>W</td>
<td>4</td>
<td><strong>Warning message</strong> — all migrations successful; one or more warning messages was issued; an action may be required.</td>
</tr>
<tr>
<td>E</td>
<td>8</td>
<td><strong>Error message</strong> — a migration did not complete successfully; a corrective action may be necessary.</td>
</tr>
<tr>
<td>S</td>
<td>12</td>
<td><strong>Severe error</strong> — the session did not start or complete successfully; a corrective action must be taken.</td>
</tr>
</tbody>
</table>

For example, if a SET statement fails to find any matching datasets, return code 8 will be returned. Depending on the TolerateAllocationFailure parameter, this may lead to the group activation failing or proceeding. In general, W or E messages indicate the situation must be reviewed to ensure that you get the result you expected. An S level severity generally indicates a server level failure.
Option 8 – Monitor Command Line Help

The z/OS Migrator ISPF Monitor does not support the standard ISPF commands on most screen displays. Select this option to obtain detailed usage information for the line commands that the z/OS Migrator ISPF Monitor does support and how they may be different from standard ISPF commands. Figure 49 on page 162 shows the display.

```plaintext
Monitor Command Line Help

Most screens presented by the monitor will not perform the normal ISPF commands. Detailed below are the commands that the Monitor supports on the command line and the differences in their action.

Monitor functions that invoke the ISPF "browse" support all ISPF commands normally.

Monitor functions that build panel display support the following commands as described.

FIND (F is the short command)
Enter FIND followed by your search argument(s). Unlike ISPF, the FIND doesn't require a ' (hex '7d') if the user wished to specify more than one word.
All of the following FINDs are valid

FIND copy
F volume serial
FIND average seek time

Both the FIND argument and data are translated to uppercase prior to the comparison. The line containing the match will be the first line displayed.

FIND supports no parameters (ie: PREVIOUS).

RFIND (set to PF5)
Entering RFIND as a line command will give the ISPF message "RFIND not active". The ISPF RFIND command is NOT passed to the monitor. The monitor simulates this function by entering FIND with no search argument. Depressing PF5 will present a FIND command with no search argument. When used, the first line searched is the 2nd line on the display. Once at the bottom of the data, the next PF5 will cause the search to wrap to the top.

PRINT
PRINT is an ISPF command and will only print the current physical screen.

ZOSMPRT (P is the short command)
Unlike ISPF, ZOSMPRT will print all the lines contained in that panel to ISPF's print dataset. Each invocation of ZOSMPRT starts on a new page.
```

Figure 49  Monitor Command Line help
Option 9 – Display installation Options

Using this option, you may review the current default options set by the optional SYSOPTN1 batch job. The initial z/OS Migrator display contains the following default dataset values:

- **Company:** YOUR COMPANY
- **Site:** YOUR SITE
- **WTO/WTOR for AutoOps (messages for automated operations required):** NO
- **WTO AutoOps Route Codes (MVS routecodes):** 2, 4
- **Local Time on Messages (display time):** LOCAL

You can change these values by running the SYSOPTN1 batch job, with the new values you want displayed for your company.

Additionally, the display option includes the operating system environment in which the z/OS Migrator ISPF Monitor is executing.

![Figure 50 Installation Options](image.png)
Option V – View or Browse Log dataset

This option allows you to browse a member in the log PDS. The naming convention for dataset logs is as follows:

\[ \text{Myyyyddd} \]

where \text{yyyy} is the year and \text{ddd} is the Julian date; for example, \text{M2015138} is 18 May 2015.

To browse or view the contents of a dataset log:

- Type \text{S} to the left of the dataset log that you wish to view and press Enter.

\textbf{Note:} The find and repeat find functions are available in the browse panel so that you can search for specific dataset logs without the need to scroll through the entire listing.

Each command that is logged is time-stamped with a message of the following format:

\[ \text{z/OS Migrator QUEUE COMMAND EXECUTED BY JDOE1 ON 06/11/15 AT 13:17:06} \]

This message shows the user ID, date, and time.
Using the z/OS Migrator ISPF Monitor
This chapter lists and describes the commands of the z/OS Migrator Command Line Interface (CLI). Topics include:

- Overview ............................................................................................................ 166
- Help facility ........................................................................................................ 167
- z/OS Migrator active commands ................................................................. 168
- z/OS Migrator query and vary device commands ....................................... 175
- z/OS Migrator environmental commands .................................................. 180
- z/OS Migrator display commands ................................................................. 191
- z/OS Migrator diagnostic commands ......................................................... 201
Overview

This chapter lists and describes the commands available via the z/OS Migrator command line interface (CLI).

In addition to the ISPF Monitor dialog, z/OS Migrator has several other modes by which you can control migrations and display status and other information. Chief among these is the command line interface.

For convenience, the description of the z/OS Migrator commands is divided into four sections, immediately following a description of the user-extendable Help facility.

- “z/OS Migrator active commands” on page 168
  Commands that initiate or modify the behavior of migration group processing.
- “z/OS Migrator query and vary device commands” on page 175
  Commands that can be used to query and vary device status.
- “z/OS Migrator environmental commands” on page 180
  Commands that can be used to set environmental parameters affecting group management.
- “z/OS Migrator display commands” on page 191
  Commands that can be used to display migration resources and their status.
- “z/OS Migrator diagnostic commands” on page 201
  Commands that can be used to aid in problem solving, if necessary.

Submitting CLI commands

The commands of the command line interface can be submitted to the z/OS Migrator server from an operator console or any equivalent command environment, such as an SDSF session if it is authorized for submitting z/OS commands.

To submit a command to the server, prefix the command with the command prefix defined for that z/OS Migrator server. The command prefix is defined with via the JCL used to start z/OS Migrator or via the CONFIGx member entry CPFX= referenced via the JCL used to start the z/OS Migrator server. This latter method is preferred. For example, if CPFX=@$, then display groups with the command:

```$DG```

z/OS Migrator commands may also be submitted using the z/OS Migrator batch utility, EFMMBAT. When including commands in the batch utility input stream, do not prefix them with the command prefix. The command prefix is provided as a parameter via the JCL. Using the batch utility allows many common z/OS Migrator migration tasks to be automated. Chapter 10 on page 277 provides more information on the batch utility.

General syntax

z/OS Migrator commands generally consist of a command verb followed by a resource type, such as GROUP or DSN (where appropriate) and a name or mask.
Dataset name masks include the following characters:
- A single asterisk (*) in the place of any number of consecutive characters, up to an entire single qualifier in any position.
- A double asterisk (**) to represent any number of consecutive qualifiers.
- One or more question marks (‘?’) to represent a single character in any position.

Any dataset matching the mask provided will be displayed or acted upon.

Certain commands have optional switches that affect the execution of the command. These generally take the form of a single character preceded by a slash (’/’). The syntax is forgiving about the placement of such switches relative to other parameters.

In the descriptions in this chapter, the required characters of any keyword are indicated by capitalization. Commands are not case sensitive.

**Syntax conventions**

The command syntax conventions are as follows:
- For easy reference, command keywords are supplemented by lowercase letters to form a meaningful word (for example, TERMinate). When typing a command, use only CAPITALIZED characters of any keyword.
- Variables are in lowercase and italics (for example, `dataset-mask`). They represent user-supplied names or values in the syntax.
- Default values are indicated by underlining the value. For example, `(Yes|No)` means that “No” is the default value.
- Optional parameters are in square brackets `[ ]`. When specifying commands, optional parameters must be separated from the required syntax and from each other by commas. Optional parameters cannot have any embedded spaces.
- Alternative argument values are enclosed in “{}`" and separated by “|”.
- If punctuation marks, parentheses, arithmetic operators, or other such symbols are shown, type them as part of the syntax.

**Help facility**

z/OS Migrator includes a user-extendable help facility. z/OS Migrator SAMPLIB contains a number of help objects that can be loaded into the z/OS Migrator database to serve as basic command descriptions and supporting information. See the following members for samples:

- **HELP**
  A basic, high-level command summary, primarily of the Display commands.

- **#MODEL**
  A model for the control parameters for defining a user-specified help object.

- **#LOAD**
  Sample JCL for loading all the pre-formatted sample help objects or an individual user-defined help object.

Once the help objects are loaded to the z/OS Migrator database, you can enter the HELP command to display an individual object, as described next.
HELP

Syntax

HELP object-name

Parameters

object-name
The lowest level name qualifier of an object in the z/OS Migrator database under the name hierarchy: SYSTEM.HELP. For example, HELP DISDSN will display the object loaded from z/OS Migrator SAMPLIB member DISDSN, describing the Display DSN command.

Note: You may define and maintain your own object called SYSTEM.HELP.INDEX to serve as a high level index of help objects. If you choose not to do this, the HELP INDEX command will simply display a sorted list of the names of all the help objects currently in the z/OS Migrator database.

z/OS Migrator active commands

The z/OS Migrator active commands are those that initiate or modify the behavior of z/OS Migrator migration group processing.

ACTivate

Activate a migration group.

Syntax

ACTivate groupname [NORUN]

Parameters

groupName
Specify the name of the group you want to activate. This is the name specified in the GROUP(groupname) group definition parameter. Activation causes the group definition to be interpreted, all source datasets to be discovered, and all target datasets to be allocated as defined by the group parameters.

NORUN
An optional parameter that causes the group to be parsed, source datasets to be identified, and target dataset names to be generated. However, group processing ends at that point without actual allocation and data movement. This can be used to evaluate a group definition prior to full activation.

Note: The NORUN option is for logical (dataset) migration only. It is not accepted for volume migration.
**COMPLETE**

If not using the AUTOTRM option, the COMPLETE (or TERMinate) command is needed to signal the server to attempt to move the group from Diverted mode to Completed mode.

**Syntax**

```
COMPLETE groupname
```

**Parameters**

`groupname`

Specify the name of the group you want to complete. This is the name specified in the GROUP(`groupname`) group definition parameter.

The progress of the group from this point depends on whether the ACTVCMP option has been selected and whether all tasks with source allocations have released their allocations.

**DEACTivate**

Deactivate a suspended migration group.

Note that an active migration group must be suspended before using the DEACT command. Groups that have been deactivated cannot be resumed; they must be reactivated using the Activate command.

**Syntax**

```
DEACTivate groupname
```

**Parameters**

`groupname`

Specify the name of the group you want to deactivate. This is the name specified in the GROUP(`groupname`) group definition parameter.

**DELETE**

Delete a group from active server memory.

A group must be inactive to be deleted. Once a group has been deleted, it must be re-promoted to be known to the migration server.

**Syntax**

```
DELETE groupname
```

**Parameters**

`groupname`

Specify the name of the group you want to delete. This is the name specified in the GROUP(`groupname`) group definition parameter.
DIVert

Request that a migration group be moved to the Diverted state.

This involves the swapping of the identities of source and target datasets. If the AUTOTRM option is selected, then the group will automatically proceed to Completion as all tasks allocating the source datasets release their allocations. If the ACTVCMP option is selected, then source resources may be freed or reused prior to Completion.

**Note:** The Divert command will be rejected unless all participating migration servers are active and acknowledge the command. Other situations can cause diversion to be blocked for the group.

**Syntax**

```
DIVert groupname [RETRY]
```

**Parameters**

**groupname**

Specify the name of the group you want to divert. This is the name specified in the GROUP(groupname) group definition parameter.

**[RETRY]**

This option is used when a group has been blocked and not successfully completed diversion. The blocking problem must be resolved before using the RETRY option. Display commands against the group can be used to identify the dataset(s) causing the problem. If the problem can't be fixed then you need to use the DROP command to remove the dataset(s) from diversion processing before using the RETRY option. Any dataset(s) dropped will need to be addressed with subsequent actions for successful migration.

The RETRY option is used in cases where the Divert command was accepted and processing is underway. The option renames the targets, swaps the catalog information, and then rename the sources. Some datasets will have been renamed and some catalog entries swapped when the problem is encountered. The RETRY command reassesses the state of each dataset and its catalog entries and only does what was undone when the process became blocked. If a new problem blocks on the retry, then you can repeat the process, fixing the error or dropping additional dataset(s) and reissuing the Divert Retry command. The group remains in Divert Pending status until the Divert is completed successfully. New extent processing will be blocked until the problem is resolved.

Contact EMC Customer Support if you encounter problems using the RETRY option.
**DROP**

Dynamically exclude one or more datasets from an active group.

This command is only accepted once a group has reached Mirror state and before the group is fully in the Diverted state.

**Note:** The DROP command would commonly be used to exclude one or more datasets for which irregularities in metadata are blocking Diversion for the entire group. Once such datasets are dropped, Diversion will proceed normally for the rest of the group.

**Syntax**

```
DROP groupname dataset-mask
```

**Parameters**

- `dataset-mask`
  A dataset selection mask. All datasets and any related components will be dynamically excluded from further group processing. Such datasets will have to be remigrated in a subsequent group, if desired.

- `groupname`
  Specify the name of the group you want to affect. This is the name specified in the GROUP(groupname) group definition parameter.

**REFVTOC**

Initiate z/OS Migrator server to start the z/OS Migrator REFVTOC started task to process outstanding REFVTOC requests.

This command would be used were there a problem with a prior instance of the z/OS Migrator REFVTOC started task (EFMRFVTC or otherwise named started task) or the prior run had to be canceled. This allows picking up after processing for the problem record in the expectation of completing the other records remaining queued to the REFVTOC chain from the z/OS Migrator global control area.

The z/OS Migrator external REFVTOC started task EMCRFVTC (or customer defined task name) is initiated at migration group's end or via the REFVTOC command. Be sure to keep the z/OS Migrator server task active through to EMCRFVTC task completion. EMCRFVTC requires access to the internal queues and services provided by your z/OS Migrator instance. If z/OS Migrator is terminated prematurely, the EMCRFVTC started task is automatically terminated. While this issue applies only to the owner instance (where the migration group was run), it is suggested to allow all ancillary tasks to complete before terminating any z/OS Migrator instances.

**Syntax**

```
REFVTOC
```

**Parameters**

None.
Example

```
REFVTGC
EFMM706I EFMRFVTC successfully started via ASCRE RC(00) RS(04)
                  STJOBNM(EFMRFVTC) STSTPNM(EFMRFVTC) STFGMNM(EFMMREFV)
```

**RESume**

Resume processing for a suspended group. Groups may be suspended in the initial copy phase and while in Mirror state. Once the group is resumed, any remaining tracks as well as any changed tracks will be copied and the group will move to Mirror state.

**Syntax**

```
RESume  groupname
```

**Parameters**

- **groupname**
  
  Specify the name of the group you want to resume. This is the name specified in the GROUP(groupname) group definition parameter.

**SHUTDOWN**

The same as “STOP” on page 173.

**SPIN**

Spin off any accumulated log messages to the SYSPRINT DD and reallocate it.

**Syntax**

```
SPIN  {COLD|ALL|PRINT} [RESET]
```

**Parameters**

- **COLD|ALL|PRINT**
  
  Specify the starting point of the messages to be written to the dynamically allocated EFMMLOG DD and spun off:
  
  - **COLD**
    
    (Default) All messages since last COLD start. This is the default setting.
  
  - **ALL**
    
    All messages currently in the log.
  
  - **PRINT**
    
    Only messages since the last time they were printed.
  
  - **RESET**
    
    Reset the last-printed timestamp.
**SPLIT**

This command is used for Constant Copy groups. It represents one of the three potential group actions performed to terminate the group. These include SPLIT, SPLITMOUNT and SWAP.

The SPLIT command completes the group but keeps the target device(s) offline to the z/OS system. No further processing is done for the devices in this Constant Copy group. Source device(s) remains online. The target device remains offline with a full copy of the source device up to point of the last copy cycle performed.

**Syntax**

```
SPLIT groupname
```

**Parameters**

- `groupname`

  Specify the name of the Constant Copy group. This is the name specified in the GROUP(`groupname`) group definition parameter.

**SPLITMOUNT**

This command is used for Constant Copy groups. It represents one of the three potential group actions performed to terminate the group. These include SPLIT, SPLITMOUNT and SWAP.

The SPLITMOUNT command allows the target device(s) to be brought online once the group has completed. The target device is varied online to the z/OS Migrator owner instance only. Agent systems continue to reflect the device(s) as offline.

**Note:** Before using SPLITMOUNT, ensure that each device pair is defined with the NEWVOLSER or NEWVOLP parameter as this is used to create the target device's volser under which the device is then brought online.

**Syntax**

```
SPLITMOUNT groupname
```

**Parameters**

- `groupname`

  Specify the name of the Constant Copy group. This is the name specified in the GROUP(`groupname`) group definition parameter.

**STOP**

Causes the migration server to terminate.

This command will only be accepted if there are no logical migration groups in either the Diversion or Mirror phase.

**Syntax**

```
STOP [NOPRINT]
```
Parameters

NOPRINT

Normally, all log messages since the last print will be spun off at shutdown. NOPRINT overrides this and leaves the messages queued for later printing.

SUSpend

Temporarily stop processing for a group.

Groups can only be suspended during the Copy and Mirror phases.

Syntax

SUSpend groupname

Parameters

groupName

Specify the name of the group you want to suspend. This is the name specified in the GROUP(groupname) group definition parameter.

SWAP

This command is used for either Constant Copy or Consistent Migration groups to initiate a swap of all devices in the group.

- For Constant Copy groups, the swap is done by device. The swap group is set up dynamically when the SWAP command is issued via communications with the AutoSwap task running under the associated MFE/SCF address space. Group validation is performed at SWAP time.

- For a Consistent Migration group, the swap done is by group. The swap group is set up at group activation via communications with the AutoSwap task running under the associated MFE/SCF address space (as with Constant Copy). Group validation is performed at activation time for Consistent Migration.

Syntax

SWAP groupname

Parameters

groupName

Specify the name of the Constant Copy or Consistent Migration group. This is the name specified in the GROUP(groupname) group definition parameter.

TERMinate

The same as “COMPLETE” on page 169.
z/OS Migrator query and vary device commands

Commands that can be used to query/vary devices status for volume migration devices and groups. These command are not meant for use with logical migration groups.

**QUERYDEV**

Queries the current device status for one or more devices or a volume migration group of devices across one or more hosts running the z/OS Migrator server.

You can query status for a single device (specified with its CCUU) or for a z/OS Migrator GROUP (which is then expanded to a set of associated devices).

Output can be limited to selected hosts or device types (source or target). The default is to process all hosts and both types of devices.

**Syntax**

```plaintext
QUERYDEV
[ccuu]
GROUP(groupname)
HOST(smfid)
{{SOURCE|PRIMARY}} | {{TARGET|MIRROR}} | BOTH
```

**Parameters**

- **BOTH**
  - **(Default)** Specify ‘BOTH’ to include both source and target devices in the output.

- **ccuu**
  - Specify the CCUU of the device you want to query.

- **groupname**
  - Specify the name of the volume migration group you want to query. This is the name specified in the GROUP(groupname) group definition parameter.

- **smfid**
  - Specify the SMF ID of the host you want to query.

- **SOURCE|PRIMARY**
  - Specify ‘SOURCE’ if you want to limit output to source devices. ‘PRIMARY’ is an alias to SOURCE.

- **TARGET|MIRROR**
  - Specify ‘TARGET’ if you want to limit output to target devices. ‘MIRROR’ is an alias to TARGET.
Examples

**Example 1**

```plaintext
EFM423I QUERYDEV device 51F2
EFM422I Device 51F2 OFFLINE to system X113
EFM422I           ONLINE to system X114
EFM422I           ONLINE to system N22A
```

**Example 2**

```plaintext
EFM423I QUERYDEV Group CKP
EFM422I Device 6C03 OFFLINE to system X113
EFM422I          OFFLINE to system X114
EFM422I Device 6C02 OFFLINE to system X113
EFM422I          OFFLINE to system X114
EFM422I Device 6C01  ONLINE to system X113
EFM422I             ONLINE to system X114
EFM422I Device 6C00  ONLINE to system X113
EFM422I             ONLINE to system X114
```

**QUERYOFF**

Shows where either a single device or volume migration group of devices is offline to one or more hosts running the z/OS Migrator server.

You can query a single device (specified with its CCUU) or a z/Migrator GROUP (which is then expanded to a set of associated devices).

Output can be limited to selected hosts or device types (source or target). The default is to process all hosts and both types of devices.

**Syntax**

```plaintext
QUERYOFF [ccuu]
GROUP(groupname)
HOST(smfid)
{{SOURCE|PRIMARY}} | {{TARGET|MIRROR}} | BOTH
```

**Parameters**

- **BOTH**
  - (Default) Specify ‘BOTH’ to include both source and target devices in the output.

- **ccuu**
  - Specify the CCUU of the device you want to query.

- **groupname**
  - Specify the name of the volume migration group you want to query. This is the name specified in the GROUP(groupname) group definition parameter.

- **smfid**
  - Specify the SMF ID of the host you want to query.

- **SOURCE or PRIMARY**
  - Specify ‘SOURCE’ if you want to limit output to source devices. ‘PRIMARY’ is an alias to SOURCE.

- **TARGET or MIRROR**
  - Specify ‘TARGET’ if you want to limit output to target devices. ‘MIRROR’ is an alias to TARGET.
QUERYON

Shows where either a single device or volume migration group of devices is online to one or more hosts running the z/OS Migrator server.

You can query a single device (specified with its CCUU) or a z/Migrator GROUP (which is then expanded to a set of associated devices).

Output can be limited to selected hosts or device types (source or target). The default is to process all hosts and both types of devices.

Syntax

QUERYON
[ccuu]
GROUP(groupname)
HOST(smfid)
{{SOURCE|PRIMARY}} | {{TARGET|MIRROR}} | BOTH

Parameters

BOTH

(Default) Specify ‘BOTH’ to include both source and target devices in the output.

ccuu

Specify the CCUU of the device you want to query.

groupname

Specify the name of the volume migration group you want to query. This is the name specified in the GROUP(groupname) group definition parameter.

smfid

Specify the SMF ID of the host you want to query.

SOURCE or PRIMARY

Specify ‘SOURCE’ if you want to limit output to source devices. ‘PRIMARY’ is an alias to SOURCE.

TARGET or MIRROR

Specify ‘TARGET’ if you want to limit output to target devices. ‘MIRROR’ is an alias to TARGET.
VARYOFF

Varies a single device or a volume migration group of devices offline for one or more hosts running the z/OS Migrator server.

Syntax

VARYOFF

[ccuu]

GROUP(groupname)

HOST(smfid)

{[{SOURCE|PRIMARY}] | [{TARGET|MIRROR}] | BOTH}

Parameters

BOTH

(Default) Specify ‘BOTH’ to change the status of both source and target devices.

cceu

Specify the CCUU of the device you want to vary offline.

groupname

Specify the name of the volume migration group you want to vary offline. This is the name specified in the GROUP(groupname) group definition parameter.

smfid

Specify the SMF ID of the host for which to vary the devices offline.

SOURCE or PRIMARY

Specify ‘SOURCE’ if you want to change the status of source devices only. ‘PRIMARY’ is an alias to SOURCE.

TARGET or MIRROR

Specify ‘TARGET’ if you want to change the status of target devices only. ‘MIRROR’ is an alias to TARGET.

Example

EFMP001I  VARYOFF GROUP(MM003) TARGET
EFMM423I VARYOFF Group MM003
EFMM424I Device 2C03 now OFFLINE to system X113
EFMM424I Device 2C04 now OFFLINE to system X114
EFMM424I now OFFLINE to system N22A
EFMM424I Device 2C02 now OFFLINE to system X113
EFMM424I now OFFLINE to system X114
EFMM424I now OFFLINE to system N22A
VARYON

Varies a single device or a volume migration group of devices online for one or more hosts running the z/OS Migrator server.

Syntax

VARYON

[ccuu]

GROUP(groupname)

HOST(smfid)

{[[SOURCE|PRIMARY]] | [[TARGET|MIRROR]] | BOTH}

Parameters

BOTH

(Default) Specify ‘BOTH’ to change the status of both source and target devices.

ccuu

Specify the CCUU of the device you want to vary online.

groupName

Specify the name of the volume migration group you want to vary online. This is the name specified in the GROUP(groupname) group definition parameter.

smfid

Specify the SMF ID of the host for which to vary the devices online.

SOURCE or PRIMARY

Specify ‘SOURCE’ if you want to change the status of source devices only. ‘PRIMARY’ is an alias to SOURCE.

TARGET or MIRROR

Specify ‘TARGET’ if you want to change the status of target devices only. ‘MIRROR’ is an alias to TARGET.

Example

FMP001I VARYON GROUP(MM003) SOURCE
EFMM423I VARYON Group MM003
EFMM424I Device 2C01 now ONLINE to system X113
EFMM424I now ONLINE to system X114
EFMM424I now ONLINE to system N22A
EFMM424I Device 2C00 now ONLINE to system X113
EFMM424I now ONLINE to system X114
EFMM424I now ONLINE to system N22A
z/OS Migrator environmental commands

Commands that can be used to set environmental parameters affecting group management.

IDLE

Reset the amount of time a system must be out of contact before it will be considered idle. Note that most group-oriented commands cannot be serviced unless all servers are known to be active.

⚠️ CAUTION

If a system is taken out of service and the migration server appears idle, you must REMOVE that server in order to proceed. Do so with extreme caution. If migrating datasets are, in fact, accessed from a system whose migration server has been removed, data integrity will be compromised.

Syntax

IDLE seconds

Parameters

seconds

Specify the number of seconds, integer only, after which an unresponsive server will be considered idle.

You should not specify a time shorter than the default, which is 45 seconds.

Note: Console messages identify the transition from active to idle and vice versa. The state of participating servers can be displayed using the Display HOSTS command.

Specifying a multi-minute time may cause certain action commands to take unacceptably long to time out if a system is actually IDLE.

MAXCIO

Reset the maximum number of concurrent I/O requests that will be scheduled on any one channel path.

“MAX_CHANNEL_IO” on page 304 provides a full description.

Syntax

MAXCIO count

Parameters

count

The number of concurrent requests.
**MAXDIO**

Reset the maximum number of concurrent I/O requests that will be scheduled for any one device pair.

"MAX_DEVICE_IO" on page 305 has more information.

**Syntax**

```
MAXDIO count
```

**Parameters**

*count*

The number of concurrent requests.

**MAXVOL**

Allows you to dynamically set the MAXVOL value. This value would remain until changed or the next system start, when it would revert to the value in the config member again.

If you specify a MAXVOL value that is larger than MAXIO or MAXDIO, you may notice that the first few volume pairs are serviced slowly until the remaining volumes are less than MAXIO/MAXDIO values. The volume pairs may appear to be out of step with the rest, but they are being serviced correctly and completely.

You can automatically adjust the MAXDIO value when this is detected. For example, if MAXIO=15 and MAXDIO=3, when MAXVOL=5, the volume pairs appear to be serviced in a timely manner. If MAXVOL=6, then you may see the slow behavior described above, where the first volume didn’t appear to be serviced until the end.

Refer to “MAXVOL” on page 306 for more information.

**Syntax**

```
MAXVOL count
```

**Parameters**

*count*

The number of concurrent requests.

**REMOVE**

Remove an idle migration server from active participation in migration activities.

⚠️ **CAUTION**

Do not remove a server unless you know that there is no I/O to migrating datasets or volumes.

**Syntax**

```
REMOVE smfid [ssid]
```
Parameters

**smfid**

The SMF ID of the server to be removed.

**ssid**

If more than one migration server is running on a single LPAR, then you must specify the subsystem ID of the server you want to remove.

**SET**

Set various processing options and debugging controls.

**Syntax**

```
SET {option | DEBUG(features)} {ON|OFF}
```

**Parameters**

**option**

The available options are:

---

**Note:** The options may also be set using the OPTIONS statement of the INI config file.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTVCMP or NOACTVCMP</td>
<td>Active Completion allows the source volumes to potentially be varied offline without recycling the processes using source datasets. NOACTVCMP is the default setting.</td>
</tr>
<tr>
<td>ALLOWGENsrc or NOALLOWGENsrc</td>
<td>Allows users to specify the following in their logical group definitions:</td>
</tr>
<tr>
<td></td>
<td>SET SOURCE(DSN(**))</td>
</tr>
<tr>
<td></td>
<td>Previously this was not allowed because it could potentially cause problems or unanticipated results.</td>
</tr>
<tr>
<td></td>
<td>NOALLOWGENSRC is the default configuration option. NOALLOWGENSRC means you MUST specify at least part of the dataset name in the masking, i.e. no DSN(**) allowed.</td>
</tr>
<tr>
<td>AUTOCLN or NOAUTOCLN</td>
<td>AUTOCLN causes the server to automatically remove interfaces and delete common resources at shutdown with no active groups. AUTOCLN is the default setting.</td>
</tr>
<tr>
<td>AUTODEL or NOAUTODEL</td>
<td>AUTODEL causes the group control blocks to automatically be freed once the group completes. AUTODEL is the default setting.</td>
</tr>
<tr>
<td>AUTOHK or NOAUTOHK</td>
<td>AUTOHK causes a group activation to automatically re-activate the system interfaces. AUTOHK is the default setting.</td>
</tr>
</tbody>
</table>
**AUTOTRM or NOAUTOTRM**

Automatic Termination means that groups will immediately attempt to go to completion as soon as divert status is achieved. Otherwise the COMPLETE command must be issued. AUTOTRM is the default setting.

**ECHO ON|OFF**

ECHO ON indicates the joblog/syslog will contain results from various display commands issued from the ISPF interface or the batch interface. Results are automatically displayed for commands issued using the command line interface. ECHO OFF will display the command issued without the results of the command. The default setting is ON.

**PATHVAL or NOPATHVAL**

Allows dynamically setting the global attribute used to determine whether z/OS Migrator performs the Path Validation process for all source and target devices in the volume group currently activating.

This validation is one of the first things done at during volume group activation. For each source device in the volume group, path validation services checks everywhere the device is online and ensures an instance of z/OS Migrator is running. If z/OS Migrator is NOT found on any system where the source is online, error message EFMM290E is issued and the activation is aborted.

Similarly, for each target device in the volume group, path validation services checks to ensure the device is offline everywhere. A target device found online results in error message EFMM290E and again the activation is aborted.

Each source and target device is checked for SOFT and SPID Fencing (if device supports this path validation detection). If a source or target device is found to be in the SOFT or SPID Fenced state, the activation is aborted.

PATHVAL is the default and results in full path validation services for all source and target devices in the activated volume groups.

NOPATHVAL results in NO path validation checking for any devices in the volume group.

This dynamic Global SET OPTION affects only volume migration groups.

It is STRONGLY recommended that PATHVAL be selected or defaulted to. The NOPATHVAL OPTION should only be used at the direction of EMC technical staff or when the customer COMPLETELY understands the impact and risk.
The **PREVENTVARY**|**NOPREVENTVARY** statement in the z/OS Migrator configuration file prevents duplicate volume labels by invalidating the VOL1 label on the target volume at the beginning of the migration. During the completion of the migration the VOL1 label is corrected.

The **SET** **PREVENTVARY**|**NOPREVENTVARY** command dynamically changes the setting. The default is **NOPREVENTVARY**.

**Note:** The **PREVENTVARY** option only applies to volume migrations groups and not to Volume Mirror or Consistent groups.

---

**REFVTOC** or **NOREFVTOC**

**REFVTOC** allows you to set the global default value on whether to invoke the IBM utility ICKDSF to automatically perform a REFVTOC for the any target volume that is larger than its corresponding source volume. **REFVTOC** rebuilds the VTOC at its current location for the current track size. **NOREFVTOC** is the default setting.

This option supports Swap and Split (Online) volume groups, including consistent migration, but does not support Mirror, Split (Offline) or Constant Copy volume groups.

For non-supported groups, or when the option is not automatic, a message is generated recommending user action.

**Note:** Automatic **REFVTOC** is avoided for offline devices because it destroys the VTOC index, resulting in a volume with serious performance issues.

Refer to the configuration file option statement **"REFVTOC"**|**NOREFVTOC** on page 309 for related information.

The user ID associated with the z/OS Migrator **REFVTOC** started task\(^1\) must be granted corresponding access via the installed security product to issue the **REFORMAT** option of the ICKDSF command process. As an example, for RACF, this involves ensuring the user ID associated with the z/OS Migrator **REFVTOC** started task has the necessary access to the known FACILITY class profiles established to protect this and any other ICKDSF functions.

The specific FACILITY class profile protecting **REFORMAT** is **STGADMIN.ICK.REFORMAT**.

Contact your systems programmer/security administrator for assistance in ensuring this ability for the z/OS Migrator **REFVTOC** started task user ID.
ROUTEMSG or NOROUTEMSG

When ROUTEMSG is specified, the console services task EFMMCONS, if not already running, is started, its common storage service area established and its services enable for this instance of z/OS Migrator. Any subsequent AutoSwap requests will be made using a specialized console ID allowing for the routing of AutoSwap messages from multiple MFE/SCF tasks, back to the 'owning' z/OS Migrator log.

When NOROUTEMSG is specified, if the console task EFMMCONS is running, the service is disabled for use, the common storage service area is freed and any subsequent AutoSwap request will not include a specialized console ID for routing back to the 'owning' z/OS Migrator's log. The service task EFMMCONS is left active to allow for the reactivation of AutoSwap message routing, if desired, via the ROUTEMSG option of the SET command.

ROUTEMSG is the default setting.
RTDCHK or NORTDCHK: Determines whether z/OS Migrator performs in-depth VTOC free space analysis on the source device to ensure Real Time Defrag (RTD) product is not actively managing the source device(s) involved in volume migration.

RTDCHK allows for additional checking of the device VTOC during both activation copy cycle start and final copy before device pair completion. RTD is incompatible with z/OS Migrator device migration processing due to RTD's method of DSCB update. If RTD and z/OS Migrator are both working with a device, during migration, there is a window where data integrity cannot be guaranteed on the target device due to the timing of DSCB updates by RTD. RTDCHK allows for more in-depth free space analysis to detect that RTD is working with a device.

If RTD is detected at start of copy and FASTCOPY has been specified for the group, the copy is modified to be FULLCOPY to ensure all tracks are included in the copy. This is the only case where the migration is allowed to continue when RTD is determined to be potentially active on a device.

If RTD is detected at the end of the device migration, z/OS Migrator has no alternative other than to cancel the device migration to ensure data integrity between the source and target devices.

**IMPORTANT:** It is strongly recommended that RTD be brought down on all systems with access to the devices in use by z/OS Migrator for its migration events. If you are absolutely certain RTD is not going to run anywhere within your environment, you can specify the NORTDCHK parameter to bypass this additional VTOC free space analysis during migration.

The default setting in the absence of this parameter is RTDCHK to avoid any data integrity scenarios while z/OS Migrator is active.

SDUMP or NOSDUMP: SDUMP results in an SDUMP being taken at any server failure. SDUMP is the default setting.
TRMCENQ or NOTRMCENQ
TRMCENQ means that z/OS Migrator will issue an ENQ request against the target datasets during the migration. TRMCENQ is the default setting.

VIOREFV or NOVIOREFV
Determines whether volume migration call to ICKDSF uses VIO or SYSALLDA for dynamic allocation of IXSYSIN and IXSYSPR ddnames.

During REFVTOC processing, the call to ICKDSF performs dynamic allocations for both IXSYSIN and IXSYSPR ddnames. To avoid any potential contention with z/OS, it is suggested to use VIO rather than SYSALLDA for the dynamic allocation calls. In many installations, if VIO is not available, SYSALLDA is used. Check with your DASD group to validate what would work best for your site.

The default setting in the absence of this parameter is VIOREFV to avoid any possible contention during automated REFVTOC processing via started task EFMRFVTC initiated by z/OS Migrator.

VMPATHV or NOVMPATHV
Allows dynamically setting the global attribute used to determine whether the z/OS Migrator Path Validation process is impacted by z/VM Hypervisor managed online PGID entries returned for devices that may be online to z/OS Guests running under z/VM.

PATHVAL/NOPATHVAL determines whether path validation is invoked in the first place at volume group activation. VMPATHV/NOVMPATHV determines whether returned online VM PGID entries abort the activation.

Again, with path validation active (PATHVAL), for each source device in the volume group, path validation services check everywhere that the device is online and ensure that an instance of z/OS Migrator is running. Similarly, for each target device in the volume group, path validation services checks to ensure the device is offline everywhere. The safest approach is to vary the device(s) offline to all z/OS guests, detach them and then vary offline from z/VM. If you are satisfied that z/OS Migrator is active on all z/OS systems, guest or native, where update could take place, the NOVMPATHV OPTIONS setting can be considered to avoid issues with returned online VM PGIDs. VMPATHV is the default.

If it STRONGLY recommended that VMPATHV be selected or defaulted to. The NOVMPATHV OPTION should only be used at the direction of EMC technical staff or when the customer COMPLETELY understands the impact and risk.

1. The name of the z/OS Migrator ERFVTOC started task is EFMRFVTC unless overridden via the REFVTASK global configuration parameter. Refer to “REFVTASK” on page 312 for details.
DEBUG(feature)

**CAUTION**

Debug features should only be set under the direction of EMC support personnel, since they produce voluminous output.

The basic DEBUG features are:

---

**Note:** The debugging features may be activated using the DEBUG execution parm also available within the INI config file.

---

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONFIG</td>
<td>Trace parameter configuration activities.</td>
</tr>
<tr>
<td>CPLDS</td>
<td>Messages related to couple datasets.</td>
</tr>
<tr>
<td>TASKMGT</td>
<td>Trace task management, internal to z/OS Migrator.</td>
</tr>
<tr>
<td>STGMGR</td>
<td>Debugging related to storage manager.</td>
</tr>
<tr>
<td>DIVERT</td>
<td>Debugging detail for group diversion.</td>
</tr>
<tr>
<td>XMAP</td>
<td>Produce a detailed dump of extent map for EXTMAP command.</td>
</tr>
<tr>
<td>DBASE</td>
<td>Trace I/O activity for the z/OS Migrator database.</td>
</tr>
<tr>
<td>SYNC</td>
<td>Trace SYNC and SYLM task activity.</td>
</tr>
<tr>
<td>PCR1</td>
<td>Trace the z/OS Migrator PC routine.</td>
</tr>
<tr>
<td>COMM</td>
<td>Debugging info for command processing.</td>
</tr>
<tr>
<td>SDDF</td>
<td>Additional debugging for SDDF related processing.</td>
</tr>
<tr>
<td>DTERM</td>
<td>Trace Diversion termination.</td>
</tr>
<tr>
<td>TRANS</td>
<td>Externalize state transition to Mirror and Divert.</td>
</tr>
<tr>
<td>DBHB</td>
<td>Messages relating to the heartbeat task.</td>
</tr>
</tbody>
</table>

Additional debug features and options related to I/O interfaces are:

- FeatureTracing related to module
  - IOTR   EFMMIOTR
  - IOTR_OK
  - IOTR_ERR
  - ENF    EFMMENFV
  - ENF_OK
  - ENF_ERR
  - ESDDF  EFMMSSDX
  - ESDDF_OK
  - ESDDF_ERR
  - HPST   EFMMHPST
  - HPST_OK
  - HPST_ERR

OptionTracing related to module
HTIO      EFMMHTIO
HTIO_OK
HTIQ_ERR
HPRV      EFMMHPRV
HPRV_OK
HPRV_ERR
HM00      EFMMHM00
HM00_OK
HM00_ERR
HPRE      EFMMHPRE
HPRE_OK
HPRE_ERR
HS00      EFMMHS00
HS00_OK
HS00_ERR
IOSM      EFMMIOSM
IOSM_OK
IOSM_ERR
SPMW      EFMMSPMW (suspend)
SPMW_OK
SPMW_ERR
IORQ      EFMMIORQ
IORQ_OK
IORQ_ERR
IOTM      EFMMIOTM
IOTM_OK
IOTM_ERR
IOVM      EFMMIOVM
IOVM_OK
IOVM_ERR
OptionTracing related to module
IODR      EFMMIODR
IODR_OK
IODR_ERR
HSIO_FE    EFMMHSIO
HSIO_FE_OK
HSIO_FE_ERR
HSIO_BE
HSIO_BE_OK
HSIO_BE_ERR
HMIH       EFMMHMIH
HMIH_OK
HMIH_ERR
HDIE       EFMMHDIE
HDIE_OK
HDIE_ERR
HEOS       EFMMHEOS
HEOS_OK
HEOS_ERR
CPTK       Trace track copy activity
z/OS Migrator display commands

The z/OS Migrator display commands can be used to display migration resources and their status.

The general format of the display commands is:

```
Display resource-type resource-mask options
```

For example:

```
Display DSN USER1.TEST.** /W
```

The above command will display any dataset under management by z/OS Migrator that fits the mask USER1.TEST.** and which has active allocations blocking movement from Diverted state to Complete.

Display DEBUG

Display internal configuration and status data.

Syntax

```
Display DEBUG MOD|ANCH|BUILD|STOR|TASK|SERV|INTERFACE|SYS
```

Parameters

ANCH
- Displays storage anchors.

BUILD
- Displays build level and date.

INTERFACE
- Displays I/O interfaces and status.

MOD
- Displays module IDs, entry points, and build dates.

SERV
- Like MOD, but for internal services.

STOR
- Displays storage management parameters.

SYS
- Displays system environmental information.

TASK
- Displays task control, debug settings, and so forth.

Note: You can also use MISC or OPT instead of TASK to display the same information.
Display DEV

Display device summary and/or detail information.

**Note:** Some device information is not available until the device(s) have been actively used in a migration group event.

Syntax

```
Display DEV {ccuu|ccuu-ccuu|ALL} [DETail] [{PRIM|MIRROR|BOTH}]
```

Parameters

**ALL**

Display summary information about all z/OS Migrator defined migration devices.

**Note:** The DETAIL parameter cannot be used with the ALL device filtering option.

**ccuu**

Specify a single unit address to get detailed information about the status and usage of the z/OS Migrator defined device.

For a device not defined to z/OS Migrator, no information is displayed.

**ccuu-ccuu**

Specify a range of devices to get summary information about all devices defined to z/OS Migrator that fall within the specified range.

**Note:** The DETAIL keyword can be specified to obtain detailed information for the devices defined to z/OS Migrator in the specified range.

**DETail**

Display detailed information about the migration devices.

**Note:** For a single specified cuu, detailed information is displayed by default.

Not all detailed information for a device or range of devices may be available until the devices are used in a migration group event. Further information can be obtained via the z/OS device command `D M DEV=(cuu)`.

The DETAIL parameter cannot be used with the ALL device filtering option. The DETAIL parameter must also be specified prior to any device usage filtering keywords (PRIM|MIRROR|BOTH).

**PRIM|MIRROR|BOTH**

This parameter is a device usage filter. It displays requested information only for those device defined as primary/source, mirror/target or both. The default is to display information for BOTH types.
Example

```
EFMP001I  D DEV FAD3-FAD4 DETAIL
EFMM505I DEFINED devices in range FAD3-FAD4
CUU: FAD3    UCB: 02868F88 (FAD3)  Volser: SWFAD3  Size(Cyl): 1113
SER: 56071  SSID: F102    CCA: 13  SymDev: 0000  MCode: 0000
   PRIMARY DEVICE IN MIRROR GROUP: CM1
   MIRROR CUU(S): 1D83
       zHPF: 32  Supported     00  Enabled
       STATUS: 8C   Valid
       OPTIONS: 23  FastCopy     NoAutoVary
CUU: FAD4    UCB: 02869070 (FAD4)  Volser: SWFAD4  Size(Cyl): 1113
   PRIMARY DEVICE IN MIRROR GROUP: CM1
   MIRROR CUU(S): 1D84
       zHPF: 32  Supported     00  Enabled
       STATUS: 8C   Valid
       OPTIONS: 23  FastCopy     NoAutoVary
```

Display DSDET

Display detailed information about one dataset.

Syntax

```
Display  DSDET  dataset-name
```

Parameters

**dataset-name**

Specify a dataset to display.

**Note:** A mask may be used but only the first dataset encountered will be displayed and it may not be lowest in the collating sequence.

Display DSN

Display status information for all datasets matching the selection criteria.

Syntax

```
Display  DSN
[{groupname | dataset-mask | ccuu | ccuu cchh}] [/{M mode | /S | /W | /V | /X}]
```

Parameters

**ccuu**

All datasets whose source or target matches the specified device address will display.

**ccuu cchh**

The dataset having an extent on the specified unit and cylinder/head address (in hex) will display.

**dataset-mask**

All datasets of any groups and matching the specified mask will display.
groupname

The name of the migration group. All datasets in the group will be displayed, subject to the optional switches.

/M mode

Only display datasets whose current status matches the specified comparend. The comparend may contain mask characters. The valid comparends include:

- SYNC Synchronizing
- PNDMIRR Pending-mirror
- MIRROR Mirror
- PNDDVRT Pending divert
- DVRT Diverted
- DONE Done
- DVRTFAIL Divert failed

The rightmost characters of the status may be qualified with one of the following:

- -SUPR Suspend requested, for example MIRR-SUPR
- -SUPN Suspend pending
- -DEPN Deact pending
- -SUSP Suspended
- -TERM Active termination

/S

Only display skipped datasets.

/W

Only display datasets with allocation blocking completion.

/V

Display first extent on each volume of selected datasets.

/X

Display all extents of selected datasets (same as Display EXT).

Display EXT

Display extent level detail for datasets in migration.

Syntax

Display EXT

\[
\text{Display EXT} \quad \{
\text{groupname} \mid \text{dataset-mask} \mid \text{ccuu} \mid \text{ccuu cchh}\}\]

\{
\langle/M \text{ mode} \mid /S \mid /W \mid /V\rangle\}

Parameters

ccuu

All datasets whose source or target matches the specified device address will display.
**ccuu cchh**

The dataset having an extent on the specified unit and cylinder/head address (in hex) will display.

**groupname**

The name of the migration group. All datasets in the group will be displayed, subject to the optional switches.

**dataset-mask**

All datasets of any groups and matching the specified mask will display.

**/M mode**

Only display datasets whose current status matches the specified comparend. The comparend may contain mask characters. The valid comparends include:

- **SYNC**    Synchronizing
- **PNDMIRR** Pending-mirror
- **MIRROR**  Mirror
- **PNDDVRT** Pending divert
- **DVRT**    Diverted
- **DONE**    Done
- **DVRTFAIL** Divert failed

The rightmost characters of the status may be qualified with one of the following:

- **-SUPR**    Suspend requested, for example MIRR-SUPR
- **-SUPN**    Suspend pending
- **-DEPN**    Deact pending
- **-SUSP**    Suspended
- **-TERM**    Active termination

**/S**

Only display skipped datasets.

**/W**

Only display datasets with allocation blocking completion.

**/V**

Display first extent on each volume of selected datasets.

**Display EXTMAP**

Display the extent map for datasets on a particular device.

**Syntax**

```
Display  EXTMAP  ccuu [cchh]
```
Parameters

\textit{cchh}

A \textit{cchh} on the device. If specified, then only the next extent at or beyond the specified cylinder and head address is displayed along with a hex dump of its extent control block.

\textit{ccuu}

The device address for the device of interest.

\textbf{Display GROUP}

Display the status and related information for one or all migration groups.

\textbf{Syntax}

\texttt{Display Group [groupname] [/C | /E | /P]}

\textbf{Parameters}

\textit{/C}

Display summary counts of datasets and tracks.

\textit{/E}

Error message detail for activation and diversion.

\texttt{groupname}

The name of the migration group. If this is omitted, then summary status of all groups will be displayed. Otherwise, detailed information will display for the specified group, including:

- High level error messages
- Group status on all LPARs as reflected in the z/OS Migrator database
- Group definition statements

\textit{/P}

Perform path group validation for all devices within a volume migration group, displaying all normal and error-indicating verbiage encountered as if this were an actual volume migration group activation. These results are displayed as though for a successful volume migration group activation or as though for a group activation failure along with the detailed errors listed for each device which includes diagnostic reasoning for each device.

Explanation for any error messages encountered can be found in the z/OS Migrator Messages Guide. Messages include:

- EFMM290E - Device path validation errors found for individual source or target
- EFMM291E - Device fencing condition found on individual source or target
- EFMM292E - Device path validation errors caused this volume migration group's activation failure
- EFMM293I - Device path validation processing was successful and this volume migration group's activation continues
EFMM2955 - All Device path validation for this volume migration group has been bypassed per customer request (OPTIONS=NOPATHVAL in the CONFIG parameter file)

Display HOSTS

Display the status and last heartbeat time-stamps for each participating migration server.

Note: The displayed status includes whether the server is considered IDLE or has been Removed.

Syntax

Display HOSTS

Parameters

None

Display JOBNames

Display the names of address spaces that still have source datasets allocated and that may be blocking group completion.

Syntax

Display JOBNames {groupname | dataset-mask}

Parameters

dataset-mask
A dataset name mask. If specified, all datasets of any group will be scanned for comparison to the mask.

groupname
Specify the name of the group you want to activate. This is the name specified in the GROUP(groupname) group definition parameter.

Display OPTIONS

Display the z/OS Migrator options currently in effect.

Syntax

Display OPTIONS [ALL]

Parameters

ALL
The ALL option displays the current status for all option values, both default and non-default. Without the ALL option, only the non-default options are displayed.
Display PATHS

Display path concurrency statistics for logical migration or volume migration. The values displayed should be evaluated relative to the MAXCIO and MAXDIO values.

Syntax

```
Display  PATHS [RESET] [LM]
```

Parameters

- **LM**
  - Display statistics for paths used by logical migration.
  - The default is statistics for volume migration.
- **RESET**
  - Reset the statistics after the display.

Display PROC

Display migration status information for the unique device pairs of a group.

---

**Note:** This command displays diagnostic information not of general use without the assistance of EMC Customer Support.

Syntax

```
Display  PROC  groupname
```

Parameters

- **groupname**
  - Specify the name of the group you want to activate. This is the name specified in the GROUP(groupname) group definition parameter.

Display REFVTOC

Display all outstanding REFORMAT REFVTOC request control blocks (@DWREFV) chained to the global control area and awaiting processing via automated batch REFVTOC task. Automated task started at either group completion of after the SWAP command has been issued for a Consistent Migration group.

Syntax

```
Display  REFVTOC
```

Parameters

- None.
Example

D REFVTOC

*Auto REFVTOC Request Queue*  Original  Reformat
CUU  VOLSER  UCB@  DWGDEV@  Size Cyl  Size Cyl  Group
6187  SW1B77  023C6660  4190F108  1113  3339  VMRVT2
618A  SW1B7A  023C6828  4190E010  1113  3339  VMRVT2
6188  SW1B78  023C66F8  4190F200  1113  3339  VMRVT2
6186  SW1B76  023C65C8  4190F010  1113  3339  VMRVT2
6185  SW1B75  023C6530  419102F8  1113  3339  VMRVT2
6189  SW1B79  023C6790  4190F2F8  1113  3339  VMRVT2
618B  SW1B7B  023C68C0  4190E108  1113  3339  VMRVT2
618E  SW1B7E  023C6A88  4190D010  1113  3339  VMRVT2
618F  SW1B7F  023C6B20  4190D108  1113  3339  VMRVT2
618D  SW1B7D  023C69F0  4190E2F8  1113  3339  VMRVT2
618C  SW1B7C  023C6958  4190E200  1113  3339  VMRVT2

The fields have the following meaning:

- **CUU**
  The device CUU.

- **VOLSER**
  The device volume serial number.

- **UCB@**
  The device UCB address.

- **DWGDEV@**
  The z/OS Migrator common storage device control block.

- **Original Size Cyl**
  The original SOURCE device geometry in cylinders.

- **Reformat Size Cyl**
  The new device geometry in cylinders.

- **Group**
  The name of the z/OS Migrator volume group.

Display TRACE

Display the control parameter settings and current status of z/OS Migrator user trace.

Note: The z/OS Migrator trace facility writes user trace records to GTF.

Syntax

Display TRACE

Parameters

None.
**Display VOLumes**

Display volume usage across groups or within a group for logical migration volumes. Configuration information for Volume Migrator and Volume Mirror groups is also displayed.

**Syntax**

```
Display VOLumes [volser-mask] [/G group] [/D dsn]
[/M mode] [{/S | /T | /B}]
```

**Note:** If no parameter is used with this command, all the volumes will display.

**Parameters**

- **/B**
  
  For logical migration groups, the /B qualifier stands for bi-directional, meaning volumes that have both source and target datasets on them.

  **Note:** For volume migrations, this parameter has no meaning and is ignored.

- **/D dsn**
  
  Limit the display to the volumes in use by datasets matching the specified dataset name mask.

- **/G group**
  
  Limit the display to the volumes in use by the specified group.

- **/M mode**
  
  Limit the display to extents that have a current status matching the specified mask. The /M parameter of "Display DSN" on page 193 provides details.

- **/S**
  
  Display only volumes and datasets currently serving as migration source.

- **/T**
  
  Display only volumes and datasets currently serving as migration target.

- **volser-mask**
  
  A volume mask for selecting the volume or volumes to be reported.

**Example**

```
EFMP0011 D VOL
Vol Grp Dsname (T=>target, S=>source) Status
EZ0011 (C211)
   GROUP1
     S DJBTEST.FIDUCIA.TEST1 MIRROR
 EZ0012 (C212) FIDUCIA
     T DJBTEST2.FIDUCIA.TEST1 MIRROR
 EZ0016 (C216) VOLMIG
     S Migrate Source, partner is EZ0016 (C217) DONE
     T Migrate Target, partner is EZ0016 (C216) DONE
```
z/OS Migrator diagnostic commands

These commands can be used to aid in problem solving, if necessary.

⚠️ CAUTION

These commands should only be used under the direction of EMC Customer Support.

COMPARE

Compare source and target data. This command is only of use during the Mirror phase.

Syntax

COMPARE dataset-name

Parameters

dataset-name

Specify the name of the dataset you want to compare. z/OS Migrator will do a track comparison of the dataset between source and target. The result will be reported through WTO. Additional information may be written to the EFMMCMPR optional sysout file.

DEBUG

Reset the DEBUG switches.

Syntax

DEBUG xxxxxxxxx,xxxxxxxx

Parameters

xxxxxxxxx,xxxxxxxx

Specify the DEBUG bit mask. The bitmap has the following structure:

1. 1... .... CONFIG 2. 1... .... SYNC 3. 1... .... IOTR
   .1... .... CPLDS  .1... .... PCR1  .1... .... ENF
   .1... .... TASKMGT .1... .... COMM .1... .... ESDDF
   ...1... .... STGMMR ...1... .... SDDF ...1... .... HDSE
   ...1... .... DIVERV ...1... .... DTERM ...1... .... HSCQ
   ......1... .... XMAP ......1... .... TRANS ......1...
   ......1... .... DBASE ......1... unused ......1... HERROR
   ......1... unused ......1... DBHB ......1... HOK

4. 1... .... HPST 5 & 6 ARE LIKE 4, LEFT TO RIGHT:
   .1... .... HTIO 5 BYTE 5 = IOSM,SPMV,IORQ,IOTM,
   ..1... .... HPTR 5 IOVM,IODR,IERROR,I0K
   ...1... .... HM00 < BYTE 6 = HO00MT,HS10 FE,HS10 BE,HMIH
   ......1... .... HPRE \- CVAF/HA8B HDIE,HEOS,HERROR,HOK
   ......1... .... HS00 .1... .... HERROR
   ......1... HOK
DUMP

Schedule an SVC dump of the server address space.

Syntax

DUMP

RELEASE

Issue DEQ (dequeue) and reset IOSLEVEL for a migration device.

Syntax

RELEASE ccuu

Parameters

cuu

Specify the device to be released.

TRACE

Activate or deactivate z/OS Migrator internal trace to GTF.

Syntax

TRACE ON|OFF,EID=xxxx,FID=xx

Parameters

EID=xxxx

Specify the EVENT-ID for coordination with the IPCS GTF subcommand for extracting and printing the resulting user trace records, for example, EID=123.

FID=xx

Specify the FORMAT-ID for coordination with the IPCS GTF subcommand, for example, FID=00. (FID=00 is the default.)

VERify

Trigger a self-evaluation cycle for a migration group. This causes the status information for all resources within the group to be surveyed and the group status possibly being reset accordingly.

Syntax

VERify groupname

Parameters

groupname

Specify the name of the migration group to be verified.
CHAPTER 8
Defining z/OS Migrator Groups via Text Editor

This chapter describes z/OS Migrator text editor commands for defining groups. Topics include:

◆ Overview ............................................................................................................. 204
◆ Syntax for defining logical migration groups ..................................................... 205
◆ Defining groups for volume migration ............................................................... 215
◆ Syntax for defining Volume Mirror groups ....................................................... 215
◆ Syntax for defining Volume Migrator groups ................................................... 219
Overview

You may define z/OS Migrator migration groups using any text editor. Once you have defined several groups with the assistance of the ISPF Monitor, you may find this method easy to use when defining or extending groups that are like other groups you have previously defined.

Groups defined using a text editor may be stored in the configuration PDS and promoted using the ISPF Monitor. They may also be promoted using the EFMMBAT utility program, either from the configuration PDS or from an in-stream definition. Chapter 10, “z/OS Migrator Batch Utility” on page 277 provides more information about the EFMMBAT utility.

This chapter describes:

- The group definition syntax for logical migrations beginning on page 205.
- The group definition syntax for volume mirroring and migrations, beginning on page 215.

General syntax rules

- Comments begin with an asterisk (‘*’) in column one and may appear anywhere.
- Parameters are generally of form keyword(value) and are separated by white-space.
- Continuations are indicated with a dash (‘-’) after the last keyword or value on a line.
- Lists can be comma or white-space separated, for example, VOL(TGT001 TGT002 TGT003).

Syntax conventions

The command syntax conventions are as follows:

- For easy reference, command keywords are supplemented by lowercase letters to form a meaningful word (for example, TERMinate). When typing a command, use only CAPITALIZED characters of any keyword.
- Variables are in lowercase and italics (for example, dataset-mask). They represent user-supplied names or values in the syntax.
- Default values are indicated by underlining the value. For example, (Yes|No) means that “No” is the default value.
- Optional parameters are in square brackets [ ]. When specifying commands, optional parameters must be separated from the required syntax and from each other by commas. Optional parameters cannot have any embedded spaces.
- Alternative argument values are enclosed in “{}” and separated by “|”.
- If punctuation marks, parentheses, arithmetic operators, or other such symbols are shown, type them as part of the syntax.
Syntax for defining logical migration groups

A group definition is a collection of statements which can include comments. The first non-comment statement must be the GROUP statement. The GROUP statement defines certain global settings for the group.

Following the GROUP statements can be a variable number of SET statements defining the source and target dataset name masks and other parameters associated with each pair. An optional SRCVLIST statement is also available for defining Source Volume Lists. Any named SRCVLIST must be defined before the SET statement that refers to it.

The following is a general example:

```plaintext
* GROUP NAME: TEST3            MEMBER GENERATED BY  JDOE1
* ON SUNDAY, 25 OCT 2015 AT 18:20:04 FROM:  LOGMIGR CONTROL COMMANDS
GROUP(TEST3) MODE(LMIGR()) REPLACE(YES) REUSE(NO) TOLALLOF(Y) -
  DEBUG(EXTRA)
SRCVLIST ABC(SYM719)
SRCVLIST ABC(SYM71A)
SRCVLIST ABC(SYM71B)
SET SOURCE(DSN(XYZTEST.*)) -
  EXCLUDE(XYZTEST.DONT.**, XYZTEST.UDD.**, -
  XYZTEST.VSAM2.DB.**, -
  XYZTEST.AAA.**, XYZTEST.XY2.**, -
  XYZTEST.LMIGRX09.**)
  SRCVLIST(ABC) -
  * VOL(U6J1AD) -
  ) -
  TARGET(VOL( -
    SYM719 -
    SYM71A -
    SYM71B -
    SYM71C -
  ) DSN(XYZTEST2.**)) -
  TRACE(Y)
* SRCVLIST ABC2(SYM71A)
SRCVLIST ABC2(SYM71B)
SET SOURCE(DSN(XYZTEST.LMIGRX09.**)) -
  SRCVLIST(ABC2) ) -
  TARGET(DSN(XYZTEST2.**)) -
  VOL(SYM71C SYM719))
* SET SOURCE(DSN(XYZTEST.ABC4)) -
  TARGET(DSN(XYZTEST2.**)) -
  VOL(SYM719, SYM71A, SYM71B))
* SET SOURCE(DSN(XYZTEST.GDG.DATASET.G0003V00)) -
  TARGET(DSN(XYZTEST2.**)) -
  VOL(SYM719, SYM71A, SYM71B))
```
GROUP

The GROUP statement delineates and defines the group. All subsequent SET statements define the datasets in the group.

Syntax

GROUP(groupname) MODE(LMIGR) [REPLACE(Y|N)] - [TOLERATE_ALLOCATION_FAILURE(Y|N)] - [SELECTMulti(ALL|ANY|FIRST)] - [DEBUG(ALL|TRACE|DUMP|EXTRA|ERROR)] - [MAXRC(n)]

Parameters

DEBUG(ALL|TRACE|DUMP|EXTRA|ERROR)

Enables debugging as follows:

- **ALL** Produces the TRACE and DEBUG information needed for most situations.
- **TRACE** Produces normal TRACE output.
- **DUMP** Produces normal TRACE and DEBUG output.
- **EXTRA** Produces all possible TRACE and DEBUG information.
- **ERROR** Records some TRACE and DEBUG output in memory. This information is placed in the message log if an error occurs.

**groupname**

Specifies a one- to eight-character name by which this group will be known, once promoted. All commands that operate on the group reference it by this name.

**MAXRC(n)**

The maximum allowed return code that the EMCSNAP interface will consider to not be an error when the SNAP1 API is called during allocation of the target devices for the logical migration group.

The default value for n is 4 unless TOLERATE_ALLOCATION_FAILURE(YES) is specified in which case, to allow for ignoring the allocation failure, the default value for n is 8. EMC recommends allowing the logical migration promotion process to set its value in the GROUP definition.

**MODE(LMIGR)**

Denotes a logical migration group.

**REPLACE(Y|N)**

This parameter causes z/OS Migrator to delete and replace an existing dataset with the target name. Options are Y and N. The default is N.

---

1. TimeFinder/Clone Mainframe Snap Facility
If the default N is accepted or specified, then an existing dataset with the target name for any source/target pair will abort the migration of that dataset. If TOLALLOF(N) is specified, the entire group activation will be aborted.

**SELECTMulti(ALL|ANY|FIRST)**

This specification can be made at the GROUP level or at the SET level. A specification at the SET level overrides the GROUP specification for any datasets selected by that SET statement.

SELECTMulti allows selection of datasets to be controlled relative to a source volume list in the following ways:

**ALL**

The dataset will be selected if all volumes of the dataset are in the specified list. When the source volume list is provided, this is the default behavior.

**ANY**

The dataset will automatically be included if any volume is in the list. When the source volume list is not provided, this is the default behavior.

**FIRST**

All volumes of the dataset will be included if the first volume of the dataset is in the list.

**TOLERATE_ALLOCATION_FAILURE|TOLALLOF(Y|N)**

The default behavior of z/OS Migrator - TOLERATE_ALLOCATION_FAILURE(N) - is to terminate group activation if any error is encountered in the discovery of source datasets or the allocation of target datasets.

If TOLERATE_ALLOCATION_FAILURE(Y) is specified in the group definition, then group activation will continue in spite of such errors and all successfully discovered and allocated datasets will be fully serviced. The failing datasets will be noted in messages to the various z/OS Migrator message outlets and display facilities. These failing datasets will be marked as skipped and will not take part in the processing for the group.

Examples of the errors that are tolerated include:

- Source dataset is not properly cataloged.
- Cataloged source dataset is not actually found on a referenced volume (not including current candidate volumes).
- Source dataset is of unsupported type (for example, page dataset), or format (for example, unmovable).
- One or more source volumes are offline.
- Any error is encountered in attempting to allocate the target.

If TOLERATE_ALLOCATION_FAILURE(Y) is specified, then:

- All components of a complex entity (that is, cluster or sphere) will be skipped if any component is found to have an error.
If the group would have had only one dataset or complex entity and that is found to have an error, then the group activation will fail with reason code 1029 - No datasets selected.

Methods of displaying dataset errors include the E line command in the Interact with Promoted Groups ISPF panel and the console command Display Group groupname /E, both of which show the error messages associated with group activation.

In most cases, the skipped datasets will be displayed in the detailed dataset displays and noted as Skipped. The console command Display DSN groupname /S can also be used to display just the skipped datasets.

**Note:** Certain generic failures do not result in a dataset block being created and, therefore, cannot be displayed with the Display DSN command. These should still be viewable in the message displays previously mentioned.

TOLERATE_ALLOCATION_FAILURE can be abbreviated to TOLALLOF.

**SRCVLIST**

The SRCVLIST (or SOURCE_VOLUME_LIST) statement can be used to define lists of volumes to serve as a filter for source dataset selection. Source datasets are identified by applying the selection mask against the contents of the VTOC for all specified volumes. Note that once a dataset has been selected, the entire dataset will be migrated even if it extends to volumes not included in the source volume list.

Multiple source volume lists may be defined and referenced by different SET statements. The only requirement is that the source volume list be defined before the SET statement that references it.

**Syntax**

```
SRCVLIST name(volume1 volume2 ...
```

**Parameters**

- **name**
  
  Specifies a one- to eight-character name for the source volume list. This name will be referenced by one or more subsequent SET statements. Multiple SRCVLIST statements may be specified having the same name and the definition of the list will be cumulative of all volumes.

- **volume1 volume2 ...**
  
  The list of volumes. Each statement may contain up to 127 six-character volume serial numbers or volume serial number masks. Use an '*' to match any number of characters; a '?' to match a single character.
SET

The SET statement defines the rule for selection of source datasets and naming of the corresponding target datasets during the migration. Once the migration is complete, each source dataset/target dataset pair will swap names.

Syntax

```
SET ALLOCSEQ(DATASET|NONE|SIZE) -
  TRACE(YES|NO) SPHERE(YES|NO) -
  [SELECTMulti(ALL|ANY|FIRST)] -
SOURCE(DSN(source-dataset-mask-list) -
  SRCVLIST(previous-volume-list) | VOLUME(source-volume) | STGCL(sms-storage-class-list) -
  EXCLUDE(exclude-mask-list)) -
TARGET(DSN(mask) -
  VOLUME(volume-list) | STGCL(sms-storage-class))
SET ...
```

Parameters

**ALLOCSEQ (DATASET|NONE|SIZE)**

Specifications the allocation sequence, with the following options:

**DATASET**

Specifies to process datasets in ascending name sequence.

**NONE**

*(Default)* Specifies to process datasets in the order in which they are selected for processing. This may appear random. This is the default setting.

**SIZE**

Specifies to process datasets in descending size sequence. The largest datasets are processed first and the smallest are processed last.

**SELECTMulti (ALL|ANY|FIRST)**

These specifications can be made at the GROUP level or at the SET level. A specification at the SET level overrides the GROUP specification for any datasets selected by that SET statement.

SELECTMulti allows selection of datasets to be controlled relative to a source volume list in the following ways:

**ALL**

The dataset will be selected if all volumes of the dataset are in the specified list.
ANY

(Default) The dataset will automatically be included (the default behavior) if any volume is in the list.

FIRST

All volumes of the dataset will be included if the first volume of the dataset is in the list.

SOURCE

The SOURCE parameter is used to define the selection criteria for the datasets to be migrated. Each source and target dataset must resolve to compatible devices. These devices may be within the same storage array, or they may be on different storage arrays. All source and target dataset(s) must reside on devices that are currently online and accessible.

The source dataset name must be different from the target dataset name. Neither the source mask nor any source dataset name should be a substring of the target mask. The source and target masks should have the same number of specific qualifiers. The specified qualifiers of the target mask replace the corresponding qualifiers of the source dataset name one for one. Therefore, it is not possible to insert a new qualifier.

In SMS environments, care should be taken when specifying a source dataset mask that resolves to a storage group containing a small number of volumes enabled for new allocations. The default target storage group will be the same storage group as the source datasets. Local SMS rules dictate the target storage group selection. Depending on circumstances, most or all of those volumes may be identified as source volumes. A source volume cannot be a target volume within the scope of the dataset mask. This would mean few or no volumes available as targets, which in turn may cause the migration to fail. You should be aware of this possibility when setting up your dataset migration groups, specifying a different target storage class and/or additional target volumes in the group definitions if necessary.

“Selecting datasets” on page 78 provides detailed information on dataset masking rules. “Restrictions on storage subsystems and dataset types” on page 85 lists both supported and unsupported dataset types.

Subparameters for SOURCE are as follows:

DSN(source-dataset-mask-list)

A list of dataset name masks separated by commas or white space. All additional subparameters of the SOURCE parameter and all subparameters of the corresponding TARGET parameter will apply to each specified mask.

SRCVLIST(previous-volume-list)

 Optionally, specify the name of a previously defined source volume list. The datasets to be migrated will be discovered by reading the VTOCs of all specified volumes and applying the specified dsname masks.
VOL(source-volume)

As an alternative, you may specify up to 16 volume serial numbers to serve as a self-contained, unnamed source volume list.

**Note:** If neither SRCVLIST nor VOL is specified, then the datasets to be migrated will be discovered solely by searching the catalog system.

STGCL(sms-storage-class-list)

You may specify up to 16 SMS storage class names to serve as an additional filter for selecting the source datasets. Only datasets of the specified storage class will be selected.

EXCLUDE(exclude-mask-list)

This parameter may be used to prevent certain datasets that would otherwise have been selected from being migrated. Enter up to 127 dsname masks to be used as exclusion rules.

SPHERE (YES | NO)

This parameter specifies whether, for any VSAM cluster copied, all associated AIX clusters and paths are to be copied. Individual names of sphere components do not need to be specified. Only the base cluster is eligible to be migrated if SPHERE(N) is specified, individual AIX clusters are ineligible. Each SET statement comprises a complete selection specification, and each may have a different SPHERE value.

Valid input characters are YES and NO:

YES

Specifies that all associated AIX clusters and PATHs are to be copied.

NO

Specifies that only the selected base cluster will be copied.

YES is the default setting; however, when migrating non-VSAM datasets, z/OS Migrator ignores the SPHERE parameter. If SPHERE(Y) is specified, then the selection of the base cluster is determined by the source selection mask, however, multiple related components (KSDS|ESDS + AIX + PATH) will be migrated in a single action, and they may not have a common naming structure. Unless there is a single AIX whose name is base-cluster-name.AIX, then the RENAME_Unconditional parameter must be used to specify the naming rule for the associated target PATH and AIX components.

TARGET

The TARGET parameter is used to specify the rule for naming the target datasets that correspond to the source datasets selected by this particular SET statement. It also specifies the target volumes or the target storage class.

Once the migration is complete, the target and source dataset names will be swapped leaving the target with the name of the original source dataset and the source with the name generated by the Target DSN rule.
**Note:** You cannot specify the same dataset name on both the SOURCE and TARGET parameters. Neither the source mask nor any source dataset name should be a substring of the target mask. The source and target masks should have the same number of specific qualifiers. The specified qualifiers of the target mask replace the corresponding qualifiers of the source dataset name one for one. It is not possible to insert a new qualifier.

Where possible, you may want to consider having a common high level qualifier for the target masks and create a distinct user catalog for this alias.

Subparameters for TARGET are as follows:

- **DSN(mask)**
  
  Specify a dsname mask to be applied against each source dataset selected by the SOURCE parameters to create the target dsname.

- **VOL(volume-list)**
  
  Specify from one to sixty volume serial numbers to serve as a pool for allocating the target datasets. Ensure that you avoid including volumes that may also be the source of any migration running concurrently. Overlapping source and target volume usage can result in deadlock conditions.

- **STGCLS(sms-storage-class)**
  
  Enter the storage class for the target volume(s). This parameter requests that the target volumes be selected using the specified SMS storage class. If you specify a storage class, you are not required to provide source volume serial number for the VOL parameter. Be aware that your SMS ACS routine may place the target dataset in a storage class other than that specified by this parameter. As with all SMS datasets, a specified storage class is only a suggestion to SMS, and may or may not be accepted by SMS.

- **TRACE(YES|NO)**
  
  If selected, z/OS Migrator will produce diagnostic output during the migration cycle; no output is the default setting. Each dataset defined for the group may use a different setting.
**RENAME Unconditional**

This parameter is used to rename alternate indexes which do not have the same high level qualifier (HLQ) as the base VSAM dataset.

RENAMEUnconditional specifies the rules for naming the target AIX and PATH components related to a selected base cluster when SPHERE(Y) is specified. Selection of spheres should be done using a SOURCE(DEVICE(source-dataset-mask-list)) suitable for selecting the base cluster. The additional components will automatically be identified using the catalog information.

Since the alternate index and path components may not match the general naming pattern of the base source and target cluster names, RENAMEUnconditional allows additional rules to be specified for building their corresponding target names. The basic mechanism is that when an `oldnamemask` matches a related source component, the `newnamemask` is used to build the corresponding target name. The `pfx` parameter provides a simplified solution where substitution of a replacement high-level qualifier is sufficient to generate unique names.

---

**Note:** RENAMEUnconditional is similar in usage and syntax to the DFDSS RENUNC parameter.

- RENAMEUnconditional is needed when the naming conventions of components of a complex VSAM cluster (commonly the AIX components) do not match the naming convention of the base cluster.
- RENUNC is a valid alias for the RENAMEUnconditional parameter.
- The RENUNC dataset name masks follow DFDSS rules for RENUNC.
- A maximum of 127 (`oldnamemask, newnamemask`) pairs may be specified.

### Syntax

```plaintext
RENAMEUnconditional(...)  
RENAMEUnconditional(pfx)  
RENAMEUnconditional((pfx) (oldnamemask, newnamemask)...)  
RENAMEUnconditional((oldnamemask, newnamemask)...)  
```

### Parameters

- **newnamemask**
  Specifies a mask used to derive the target dataset name when the existing dataset name matches the corresponding oldnamemask.

- **oldnamemask**
  Specifies a mask to be used to compare against source dataset names.

- **pfx**
  Specifies a prefix used to replace the first-level qualifier (HLQ) of the source dataset name when building the target dataset name. This parameter is optional, but if specified, it must be no longer than 8 characters, must be the first parameter in the list of sub-fields, and must be in the same catalog as the target HLQ.
The prefix is used only if the (oldnamemask, newnamemask) parameters are not specified or no oldnamemask filter matches the source dataset name.

Example

GROUP (SPHERE) MODE (LMIGR()) REPLACE (Y)
SRCVLIST LIST1 (SRC001)
SET TRACE (YES) SPHERE (YES) -
  SOURCE(-
    DSN (TEST.XYZ.C01.VUDDOB3.@04K.KSDS0001.**) -
    SRCVLIST (LIST1) -
  ) -
TARGET(-
  VOLUME (TGT001) -
  DSN (TEST2.XY.**) -
) -
RENAMEU ((TEST2) (TEST.AAA.C01.VUDDOB3.@04K.KSDSAAAA.**, -
  TEST2.AA.C01.VUDDOB3.@04K.KSDSAAAA.**))

Any sphere components matching the source mask TEST.AAA.C01.VUDDOB3.@04K.KSDSAAAA.** will have a corresponding target dataset name generated using the target mask TEST2.AA.C01.VUDDOB3.@04K.KSDSAAAA.**.

Any sphere components not matching the source mask (such as TEST.KSDSPATH) will have the first index level of the generated target dataset name changed to TEST2 (such as TEST2.KSDSPATH).
Defining groups for volume migration

When you establish your z/OS Migrator application, you must set configuration parameters to define your configuration and processing needs.

All Volume Mirror and Volume Migrator operations are initiated and controlled on a volume-group basis. Each volume group has a user defined name and consists of two basic kinds of statements:

◆ Statements that define group characteristics.
◆ Statements that define the device pairs that make up the group.

Definitions for Volume Mirror and Volume Migrator groups are similar but have different specific parameters.

“Syntax for defining Volume Mirror groups” on page 215 defines those parameters that apply to mirror groups.

“Syntax for defining Volume Migrator groups” on page 219 defines those parameters that apply to migrator groups.

Syntax for defining Volume Mirror groups

The following parameters define the volume groups for mirroring. The parameter sets are initially stored as members of the configuration PDS. After promotion, a canonical representation of the group is stored in the z/OS Migrator database.

Before promotion, you may view or edit the volume group members as needed. You may retrieve, revise, delete and re-promote promoted volume groups.

GROUP

The GROUP statement delineates and defines the group. Subsequent PAIR statements define the devices that make up the group.

Syntax

GROUP(groupname) MODE(FASTMIRROR(options))

Parameters

groupName

Specifies a one- to eight-character name by which this group will be known, once promoted. All commands that operate on the group will reference it by this name.

MODE(FASTMIRROR(options))

Denotes a Volume Mirror group. FASTMIRROR can be abbreviated to FMIR.

The following options are available:

Note: When the parameter contains more than one option, separate the options by commas.
Defining z/OS Migrator Groups via Text Editor

**DEACTONSUSP**

Automatically deactivate mirroring for the group if mirroring is suspended. You can suspend mirroring in response to a command, or if any exceptional condition is detected in servicing the mirror I/O.

Remember that SUSPEND leaves the device pairs in a state in which mirroring may be resumed with the RESUME command. To reactivate mirroring on a _deactivated_ group, an ACTIVATE command is required, and the group will have to be completely re-synchronized.

DEACTONSUSP can be abbreviated to DOS.

**FASTCOPY**

Optionally, perform a FASTCOPY/FC option, which copies only the allocated tracks on a volume rather than the entire volume. FASTCOPY requires the source/primary volumes to be online to z/OS. If the volume is offline, a full volume copy is performed as Migrator is unable to obtain VTOC information for the volume to perform a FASTCOPY.

**NoAutoVary**

The default behavior of Volume Mirror groups is to vary the mirror device automatically to match the online status of the primary device. After the device pair is synchronized, this service is ongoing.

To vary the mirror online, you must have specified the NEW VOLSER or VOLSER PREFIX value to allow Volume Mirror to simulate a unique volume serial number for the mirror.

In this case, although physically the mirror device has the same serial number as the primary device, z/OS Migrator returns the simulated serial number in response to all attempts to read the volume label. The simulated serial number is known as the apparent volser. Select the NoAutoVary option to override z/OS Migrator vary management.

Use NoAutoVary with care. When the primary device is online and has PAV aliases associated (that is, bound) with it, you should also allow the mirror device to come online and have aliases bound. In this case, WLM can monitor and reassign PAV aliases as needed. If the mirror device is not varied online, aliases are not bound and longer IOS queue times to the mirror device may result. This, in turn, could affect application I/O response times.

---

**Note:** You can use the z/OS VARY operator command to change the online/offline state of the mirror device. If you do not specify the NEWVOLSER or NEWVOLP values, the mirror device does not vary online if the primary device is online.
PAIR

One or more PAIR statements define the source-target volume pairs. You can define one or more single pairs or ranges of consecutive pairs. Devices may be defined via ccuu device numbers or by volume serial numbers.

Syntax

PAIR {PRIMARY(ccuu[,n]) | PVOLser(volser)} -
MIRROR(ccuu) -
VERTARG([*NONE*|EMPTY][,volser|volmask]) -
NEWVOLSER(volser) | NEWVOLP(pref)

Parameters

MIRROR(ccuu)

The unit that will be the target for this source. If you specify a unit count (n) on the PRIMARY parameter, then the target units begin with the unit specified and continue through the next n devices. You may not have gaps in the range.

NEWVOLP

Similar to NEWVOLSER but allows the new volume serial to be composed of the specified characters (up to 5) followed by either the remaining characters of the VMAX device number (for EMC devices) or the remaining characters of the z/OS device number (for non-EMC devices).

For example, a value of NEWVOLP(U@C) with mirror VMAX device number 0012 changes device UWC012 into U@C012.

Wildcards are not supported with NEWVOLP.

Remember that, physically, the mirror volume will always have the same volume serial number as the primary.

NEWVOLSER

The mirror volume may be varied online to take advantage of PAV access for performance. While the mirror volume will physically have the same volume serial number as the primary volume after synchronization, Volume Mirror supplies the specified volume to the system on volume label reads in order to circumvent the duplicate volume condition. This is known as the apparent volser.

The mirror device may automatically be varied online and offline by z/OS Migrator, as long as you do not specify NoAutoVary, or may be varied online and offline by the z/OS VARY operator command.

You can use the % mask character in NEWVOLSER. The % mask causes the mirror volser to be changed to the specified value with the corresponding characters from the primary volser replacing any mask characters.

For example, mirroring from UWC012 to UWD012 with a parameter value of NEWVOLSER(%@%@%%) results in an apparent new volser value of U@C012.

PRIMARY(ccuu[,n])

The source unit, that is, the unit that is to be mirrored. The first subparameter specifies the device address of the source unit. If you are defining a range of devices, use the second subparameter to specify the number of consecutive device
addresses whose definition should be generated by this PAIR statement. The addresses begin with the ccuu specified in the first subparameter and continue through the next n devices. You may not have gaps in the range.

**PVOLser(volser)**

An alternate way to specify the source volume.

You can only define a single pair of devices when you use PVOLser. You cannot define a range of devices.

PRIMARYPVOLser is an alias to PVOLser.

**VERTARG**

Enables or disables target verification. VERMIR is an alias to VERTARG.

The options are as follows:

*NONE*

*(Default) Do not do any verification on the target volume. This is the default behavior.*

**EMPTY**

Verify that the target volume is empty except for the VTOC and possible volume index.

**volser**

Verify that the target volume has the specified volume serial number before beginning the copy.

**volmask**

Verify that the target volume has a volume serial that matches the mask specified. A percent (%) character in any position of the mask matches any character in that position.

To check ranges of devices, you can substitute the mask character for volser characters. For example, VERTARG(EMPTY, UWD%%%) causes the target volumes to be checked to see that they are essentially empty, and have serial numbers with UWD in the first three positions.

**Note:** The z/OS Migrator wildcard character is the percent (%) character. A percent character in any position is a wildcard match for that position.
Syntax for defining Volume Migrator groups

The following parameters define the volume groups for migration. The parameter sets are initially stored as members of the configuration PDS. After promotion, a canonical representation of the group is stored in the z/OS Migrator database.

Before promotion, you may view or edit the group members as needed. You may retrieve, revise, delete and re-promote promoted groups.

GROUP

The GROUP statement delineates and defines the group. Subsequent PAIR statements define the devices that make up the group.

**Note:** In defining groups, you can use the SWAPOPT statement, described on page 222, to specify parameters that override the corresponding default values set in the global configuration parameters or in SCF(DAS) itself. The SWAPOPT statement, when used, should be placed between the GROUP and PAIR statements.

Syntax

```
GROUP(groupname) MODE(MIGRATE(action [,FASTCOPY]))
```

Parameters

**groupName**

Specifies a one- to eight-character name by which this group will be known, once promoted. All commands that operate on the group will reference it by this name.

**MODE(MIGRATE(...))**

Denotes a volume migration group.

**action**

One of the following, to specify what action should be taken to conclude the migration:

**CONSTANTcopy**

At completion of the initial migration, continue to periodically copy any modified tracks from source to target.

**SPLIT(OFF)**

At completion, terminate the migration and leave the target offline.

**SPLIT(ON)**

Once migration is complete, terminate the operation and mount the target volume. NEWVOLSER must be supplied on each PAIR statement.

**SWAP**

At completion, perform a device swap from the source to the target device.

**Note:** To specify a Consistent Volume Group, you need to replace the MODE(MIGRATE) parameter with (MODE(FASTMIRROR)).
FASTCOPY

Optionally, copy only the allocated tracks during the synchronization phase. This option copies only the allocated tracks on a volume rather than the entire volume, but requires the source/primary volumes to be online to z/OS. If the volume is offline, a full volume copy is performed as z/OS Migrator is unable to obtain VTOC information for the volume to perform a FASTCOPY.

PAIR

One or more PAIR statements define the source-target volume pairs. You can define one or more single pairs or ranges of consecutive pairs. Devices may be defined using ccuu device numbers or by volume serial numbers.

Syntax

PAIR SOURCE(ccuu[,n]) | SOURCEVOL(volser) TARGET(ccuu) - VERTARG([*NONE*|EMPTY][,volser|volmask]) - NEWVOLSER(volser) | NEWVOLP(pref)

Parameters

NEWVOLP

Similar to NEWVOLSER but allows the new volume serial to be composed of the specified characters (up to 5) followed by the remaining characters of the source volume serial.

For example, a value of NEWVOLP(U@C) with target VMAX device number 0012 changes device UWC012 into U@C012.

Note: Wildcards are not supported with NEWVOLP.

NEWVOLSER

Specify the new volume serial for the target. This is required for SPLIT(ON) or to terminate a CONSTANTCOPY operation with the SPLITMOUNT command (the equivalent of SPLIT(ON)).

You can also specify the volser in other circumstances as well, but it will be ignored for the SWAP case, which requires that the target volume have the same volser as the source volume.

You can use the % mask character in NEWVOLSER. The % mask causes the target volser to be changed to the specified value with the corresponding characters from the source volser, replacing any mask characters.

For example, migration from UWC012 to UWD012 with a parameter value of NEWVOLSER(%@%%%%) results in a new volser value of U@C012.

SOURCE(ccuu [,n])

The source unit, that is, the unit that is to be migrated. The first parameter specifies the device address of the source unit. If you are defining a range of devices, use the second subparameter to specify the number of consecutive device
addresses whose definition should be generated by this PAIR statement. The addresses will begin with the `ccuu` specified in the first subparameter and continue through the next `n` devices. You may not have gaps in the range.

**SOURCEVOL** *(volser)*

The volume that is to be migrated.

The SOURCEVOL parameter provides an alternate way to specify a single source unit within the PAIR parameter.

**Note:** You can only define a single pair of devices when using SOURCEVOL. You cannot define a range of devices as with SOURCE but can include multiple PAIRs.

**TARGET** *(ccuu)*

The unit that will be the target for this source. If you specify a unit count `(,n)` on the SOURCE parameter, then the target units begin with the unit specified and continue through the next `n` devices. You may not have gaps in the range.

**VERTARG**

Optionally, specify the following target verification options:

* *NONE* *(Default)* Do not do any verification on the target volume. This is the default behavior.

* EMPTY
  
  Verify that the target volume is empty except for the VTOC and possible volume index.

* volser
  
  Verify that the target volume has the specified volume serial number before beginning the copy.

* volmask
  
  Verify that the target volume has a volume serial that matches the mask specified. A percent (%) character in any position of the mask matches any character in that position.

To check ranges of devices, you can substitute the mask character for volser characters. For example, VERTARG (EMPTY, UWD%%%) causes the target volumes to be checked to see that they are essentially empty, and have serial numbers with UWD in the first three positions.

**Note:** The z/OS Migrator wildcard character is the percent (%) character. A percent character in any position is a wildcard match for that position.
The SWAPOPT statement allows you to specify parameters that override the corresponding default values set in the global configuration parameters or by SCF AutoSwap. If you do not specify a value using the SWAPOPT parameter, SCF AutoSwap sets values for these options.

Defaults for these and other swap options can be found in the *EMC Mainframe Enablers AutoSwap for z/OS Product Guide*.

The SWAPOPT statement, if provided, should be placed between the GROUP and PAIR statements.

**Syntax**

```
SWAPOPT(options)
```

**Parameters**

`options`

Specify one or more of the following options to override default AutoSwap settings for the group:

- `ALLOWCONCURRENTCOPY|NOALLOWCONCURRENTCOPY`
  Concurrent Copy may be allowed (ALLOWCC) or not allowed (NOALLOWCC) by swap processing.
  Concurrent Copy creates sessions in which a local point-in-time copy of data is created. The location of this data depends on whether the data has been updated or not. This mapping is kept in the local VMAX system. Remote VMAX systems (at the other end of SRDF links) have no knowledge of these sessions. If you swap devices involved in Concurrent Copy sessions, the sessions are lost. If you do not want to lose these sessions, EMC suggests you do not place these sessions on swappable devices. AutoSwap cannot prevent use of Concurrent Copy sessions. But AutoSwap can identify their existence, and may be used to control the swap environment.

- `ALLOWSYSTEMSCOUNTMISMATCH|NOALLOWSYSTEMSCOUNTMISMATCH`
  Specifies to allow (ALLOWSYSCM) or not to allow (NOALLOWSYSCM) other LPARS to be running with connectivity to VMAX but without EMCSCF and z/OS Migrator running.

- `ALLOWCOUPLEDDATASETS|NOALLOWCOUPLEDDATASETS`
  Specifies whether to allow (ALLOWCPL) or not allow (NOALLOWCPL) volumes with Couple datasets to participate in a swap operation.

- `ALLOWPAGE|NOALLOWPAGE`
  Specifies whether to allow (ALLOWPAGE) or not allow (NOALLOWPAGE) volumes with Common or PLPA page datasets, or CA/OPS SYSCHK1 or OPSLOG file types, to participate in a swap operation. ALLOWPAGE is mutually exclusive with the CONSISTENT parameter.

- `CFW=NO|OFF|RESume|BYPASS|OFFVALidation`
  Controls swap behavior relative to cache fast write (CFW).
NO

Indicates that CFW must be inactive for the SWAP to occur.

OFF

Indicates that CFW will be turned off on the source device VMAX system, if it is active.

RESume

Indicates that CFW will be turned off on the source device VMAX system if it is active during the swap and then back on after the swap. If CFW is active, then it is enabled for the target device VMAX system.

BYPASS

Indicates that CFW processing will be ignored.

OFFVALIDation

Indicates that CFW will be turned off during group validation.

VOLumePrefix(pp)

Specifies a two-character prefix (pp) to be used to modify the source device’s volser after a successful swap. The full volser will be ppccuu, where the prefix will be followed by the device MVS cuu.

You can use this parameter to assure that, if mounted, the source volume has a unique volser from the migration target. If you use dashes for the two characters (VOLumePrefix(--)), there will be no volser relabel.

The volume prefix value is applied to the z/OS device number (CUU) to form the new volser. For example, if the z/OS device number of the source device is 054C and you select the VOLP(ZZ) value, the resulting volser is ZZ054C.
Defining z/OS Migrator Groups via Text Editor
CHAPTER 9
z/OS Migrator Examples

This chapter provides basic examples of z/OS Migrator usage scenarios. Topics include:

- Overview
- Setting session options
- Migrating a single dataset, non-SMS
- Migrating a single multi-volume dataset, non-SMS
- Migrating multiple datasets, non-SMS
- Migrating multiple datasets, SMS volumes
- Volume Mirror example
- Volume Migrator examples
Overview

Occasionally, changes in the usage of a dataset put it in contention with other datasets located on the same volume or volumes. z/OS Migrator gives you the capability to selectively move problematic datasets to other volumes where their activity will not come in conflict with other datasets. z/OS Migrator also gives you the capability to mirror volumes from one VMAX device to another and to migrate volumes from any device to a VMAX device.

This chapter gives you a selection of examples.

Setting session options

The first time you enter the z/OS Migrator dialog, you are required to visit the Set User Session Options panel to specify various control parameters.

1. Type **s** on the z/OS Migrator Functions panel and press Enter.

The Specify the Session parameters panel appears.
2. **Set your session parameters.**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Prefix</td>
<td>ZM</td>
</tr>
<tr>
<td>Configuration PDS</td>
<td>'EMC.EFMM800.CONFIG.PDS'</td>
</tr>
<tr>
<td>Console Message Timeout</td>
<td>1 (0-10)</td>
</tr>
<tr>
<td>Use Log PDS</td>
<td>N (Y/N) Days to save</td>
</tr>
<tr>
<td>Background Logging</td>
<td>N (Y/N)</td>
</tr>
<tr>
<td>Use Browse or View</td>
<td>V (B/V)</td>
</tr>
<tr>
<td>Stack Console output</td>
<td>N (Y/N)</td>
</tr>
<tr>
<td>Clear variables</td>
<td>N (Y/N)</td>
</tr>
<tr>
<td>Simulate Mode</td>
<td>N (Y/N)</td>
</tr>
<tr>
<td>Debug Mode</td>
<td>N (Y/N)</td>
</tr>
</tbody>
</table>

**Specify the Session parameters**

Command ===> 

- Command Prefix . . . ZM
- Configuration PDS . . . 'EMC.EFMM800.CONFIG.PDS'
- Console Message Timeout. 1 (0-10)
- Use Log PDS. . . . . N (Y/N) Days to save . . 7 (1-30)
- Background Logging. . N (Y/N)
- Use Browse or View. . V (B/V)
- Log PDS Name. . . . .
- ZOSM Load Library . . 'EMC.EFMM800.LINKLIB'
- ZOSM Security Library . . 'EMC.EFMM800.SECCOM'
- UNIT . . SYSALLDA and VOLUME . . _____ (optional) for allocations
- Stack Console output . . N (Y/N)
- Clear variables. . . . N (Y/N)
- Simulate Mode. . . . . N (Y/N)
- Debug Mode . . . . . N (Y/N)

F1=Help ENTER=Save Session F3=Exit
The session parameters have the following meanings:

- **Command Prefix**
  Used to communicate with the Volume Migrator service task. This must match the prefix specified at runtime.

- **Configuration PDS**
  Configuration members are stored in two hierarchical datasets. The configuration PDS is used to store members that have not been promoted to use by the z/OS Migrator task.

- **Console Message Timeout**
  This is the console message wait time in seconds from 0-10. When using the Operator Interface and issuing a console command, this is the amount of time to wait for a response.

- **Use Log PDS**
  Save messages to a PDS for subsequent review.

- **Days to save**
  Number of days to save the log message members.

- **Background Logging**
  A value of "Y" enables logging that accumulates display data each time a panel is displayed. When this option is set, a logging member is created and display data is sent to both the panel and the log member. This option requires that "Use log PDS" be set to "Y".

- **Use Browse or View**
  Use for viewing configuration members.

- **Log PDS Name**
  Name of the optional log dataset.

- **ZOSM Load Library**
  Name of the z/OS Migrator load library.

- **ZOSM Security Library**
  Specify the library containing the output of the SYSOPTn job used to install the z/OS Migrator license code. Enter your PDS name in standard TSO format.

- **UNIT**
  The default unit for allocations.

- **VOLUME**
  Optional volume for allocations.

- **Stack Console output**
  When using the operator Interface, set this option to accumulate output in the current dialog display. The newest output is displayed first. The command response stream is reset when you leave the operator Interface.

- **Clear variables**
  Setting this value to Y causes the panel variables to be cleared when you move between panels. A value of N will retain any panel variables that you entered.

- **Simulate Mode**
  This mode allows you to create command simulations. Specify Y to enable
simulation mode. When the commands are built, they are echoed back to the terminal, but NOT processed.

- **Debug Mode**
  Setting this value to Y enables the debug trace facility.

3. Press **Enter** to submit your values.

4. Press **PF3** to exit.

**Note:** Pressing **PF3** before you press **Enter** discards your entries.
Migrating a single dataset, non-SMS

This section provides a scenario involving the migration of a single dataset that is not managed by SMS.

Storage environment

Non-SMS environment with the following source datasets to be migrated:

\[
\begin{align*}
\text{VOLSER=SRCVL1} \\
\text{PROD.BANKING.INQ} \\
\text{PROD.BANKING.INQ.CNTL} \\
\text{PROD.BANKING.ATM} \\
\text{PROD.BANKING.ATM.CNTL} \\
\text{PROD.xxxxxxxxxx.Dyyddd} \\
\text{VOLSER=TRGVL1} \\
\text{(empty)}
\end{align*}
\]

Where:

- \( xxxxxxxx \) can be anything.
- \( Dyyddd \) is the date in Julian format, with \( ddd \) being the number of day, from 1 to 365.

**Note:** If the GROUP has SPHERE set to Y, z/OS Migrator will capture the CONTROL and INDEX components; for example, PROD.BANKING.INQ.CNTL. Table 17, “Source dataset options,” on page 126 provides more information.

Migration objective

To move the PROD.BANKING.INQ dataset to a different volume, because it is causing contention with other datasets on the volume.

Defining a logical migration group

This is a simple logical (dataset) migration. A single migration group can be used to achieve the movement.

1. Type 1 in the command field of the z/OS Migrator Functions panel to display the Manage Group Members panel appears.
2. Type the CREATE command (or CR) on the Primary command line, and press Enter. The Build Type pop-up appears.

```
+--------------- Build Type ----------------+
|                                           |
|  Select with an S a build type.           |
|    _ Build Migrate Member                 |
|    _ Build Mirror  Member                 |
|    s Build Logical Migrate Member         |
|                                           |
| F3=Cancel                                 |
+-------------------------------------------+
```

3. Type an S before the type of group you want to create and press Enter.
When you select Build Logical Migrate Member, the Define z/OS Migrator Group panel appears.

4. Type **MOVE1** as the Group Name.

5. Type the **NEXT** command (or **NE**) on the Primary command line, and press **Enter**.

6. Type the Source Data Set Name/Mask and Source Volume(s) as follows: `PROD.BANKING.INQ` and `SRCVL1`.

7. Type the **NEXT** command (or **NE**) on the Primary command line, and press **Enter**.
8. Type the Target Data Set Name/Mask and Target Volume(s) as follows: 
**MIGR.BANKING.INQ.OLD** and **TRGVL1**.

9. Type the **BUILD** command (or **BU**), and press Enter.

10. Type the **SAVE** command (or **SA**), and press Enter.

11. Specify a member name by following the displayed instructions.

The definition for the migration group MOVE1 can be explained as follows:

- The specific dataset to be relocated is selected.
- Though not required, the source volume that the dataset resides on is specified.  
  (Since the dataset is cataloged, z/OS Migrator would have resolved its location via 
  using the catalog lookup.)
- A target dataset name is specified that will be easy to identify once the migration 
  group reaches the **Completion** phase.
- The target volume TRGVL1 is specified. This is the location to which z/OS Migrator 
  will try to allocate the dataset. If for any reason the dataset cannot be allocated on 
  this volume, z/OS Migrator will fail activation of this migration group.
Migrating a single multi-volume dataset, non-SMS

This section provides a scenario involving the migration of a single dataset that is not managed by SMS and that resides on multiple volumes.

Storage environment

Non-SMS environment with the following source datasets to be migrated. PROD.BANKING.ATM, PROD.BANKING.INQ and PROD.BANKING.HISTORY datasets are VSAM Key Sequence Datasets (KSDS). A KSDS dataset consists of multiple components that have catalog entries, but the dataset is referenced by its cluster name.

VOLSER=SRCVL1
  PROD.BANKING.HISTORY
  PROD.BANKING.INQ.CNTL
  PROD.BANKING.INQ
  PROD.BANKING.ATM.CNTL
  PROD.BANKING.ATM

VOLSER=SRCVL2
  PROD.BANKING.HISTORY

VOLSER=SRCVL3
  PROD.BANKING.HISTORY

VOLSER=SRCXYZ
  PROD.BANKING.HISTORY

VOLSER=TRGVL1
  (empty)

VOLSER=TRGVL2
  (empty)

VOLSER=TRGVL3
  Various other datasets

VOLSER=TRGVL4
  Various other datasets

Migration objective

To move the multi-volume dataset PROD.BANKING.HISTORY from the four volumes (SRCVL1, SRCVL2, SRCVL3, and SRCXYZ) upon which it currently resides, to the target volumes (TRGVL1, TRGVL2, TRGVL3, and TRGVL4).

Defining a logical migration group

This is a simple logical (dataset) migration. A single migration group can be used to achieve the movement, illustrated as follows:

1. Type the CREATE command (or CR) on the Primary command line of the Manage Group Members panel, and press Enter.
2. Type **MOVMULTI** as the Group Name.

3. Type the **NEXT** command (or **NE**) on the Primary command line, and press **Enter**.

4. Type the Source Data Set Name/Mask as follows: **PROD.BANKING.HISTORY**

5. Type the **NEXT** command (or **NE**) on the Primary command line, and press **Enter**.

6. Type the Target Data Set Name/Mask and Target Volume(s) as follows: **MIGR.BANKING.HISTORY.****, TRGVL1, TRGVL2, TRGVL3, and TRGVL4.**

7. Type the **BUILD** command (or **BU**), and press **Enter**.

8. Type the **SAVE** command (or **SA**), and press **Enter**.
9. Specify a member name by following the displayed instructions.

The definition for the migration group MOVMULTI can be explained as follows:

- The specific dataset to be relocated is selected. No volume is specified, therefore it will be resolved via a catalog lookup.
- A target dataset name is specified that will be easy to identify once the migration group reaches the Completion phase.
- In the source volume listing under target volumes TRGVL1, TRGVL2, TRGVL3, and TRGVL4; as listed in “Storage environment” on page 233. These are the volumes to which z/OS Migrator will relocate the multi-volume dataset. If for any reason the datasets cannot be allocated to these volumes, z/OS Migrator will fail activation for this migration group.
Migrating multiple datasets, non-SMS

This section provides a scenario involving the migration of several datasets that are not managed by SMS.

Storage environment

Non-SMS environment with the following source datasets to be migrated:

- VOLSER=SRCVL1
  - PROD.BANKING.ATM.CNTL
  - PROD.BANKING.INQ
  - PROD.BANKING.DCTR
- VOLSER=SRCVL2
  - PROD.BANKING.INQ.CNTL
  - PROD.BANKING.ATM
  - PROD.BANKING.DCTR
- VOLSER=SRCVL3
  - PROD.BANKING.ATM
  - PROD.BANKING.INQ
  - TRGVL1 (empty)

Migration objectives

1. To move the production banking datasets starting with PROD.BANKING.INQ and PROD.BANKING.ATM, to a single volume to off-load the volumes upon which the datasets currently reside. The SRCVL1 and SRCVL2 volumes will be used for the new application with datasets named PROD.BANKING.DCTR.

2. To move only the datasets on SRCVL1 and SRCVL2.

Defining logical migration groups

To achieve this migration, we use two migration groups.

1. Migrate the INQ datasets.

   The first migration group migrates the INQ datasets.

   a. Type the CREATE command (or CR) on the Primary command line of the Manage Group Members panel, and press Enter.
b. Type **MOVEVOL1** as the Group Name.

<table>
<thead>
<tr>
<th>z/OS Migrator Group</th>
<th>Command ====&gt; NE</th>
<th>Scroll ====&gt; CSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Commands</td>
<td>: EXIT  NExt</td>
<td></td>
</tr>
<tr>
<td>Group Name</td>
<td>. . . . . . . . .</td>
<td>MOVENVOL1</td>
</tr>
<tr>
<td>Group Options</td>
<td>(Y/N) . . . . .</td>
<td>Replace Existing Data Sets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y Tolerate Allocation Failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SelectMulti (S) . . Any or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>_ All or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>_ First</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consolidate (S) . . Vol or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>_ All</td>
</tr>
</tbody>
</table>

c. Type the **NEXT** command (or **NE**) on the Primary command line, and press **Enter**.

d. Type **Y** next to Build Data Set Exclude list (Y/N). You will specify the Data Set Exclude Mask in a subsequent panel.

e. Type the Source Data Set Name/Mask and Source Volume(s) as follows: **PROD.BANKING.** and **SRCVL1**.

<table>
<thead>
<tr>
<th>z/OS Migrator Group</th>
<th>Command ====&gt; NE</th>
<th>Scroll ====&gt; CSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Commands</td>
<td>: EXIT  NExt</td>
<td></td>
</tr>
<tr>
<td>Group Name</td>
<td>. . . . . . . . .</td>
<td>MOVENVOL1</td>
</tr>
<tr>
<td>Source Data Set Options</td>
<td>. . N Trace (Y/N)</td>
<td>N AllocSeq (D/S/N)</td>
</tr>
<tr>
<td></td>
<td>. . Y Sphere (Y/N)</td>
<td>N Rename UnConditional (Y/N)</td>
</tr>
<tr>
<td></td>
<td>. . Y Build Data Set Exclude list (Y/N)</td>
<td></td>
</tr>
<tr>
<td>Source Data Set Name/Mask</td>
<td>. . . . . . . . .</td>
<td><strong>PROD.BANKING.</strong></td>
</tr>
<tr>
<td>Source Volume List Name</td>
<td>. . . . . . . .</td>
<td>______</td>
</tr>
<tr>
<td>Source Volume(s)</td>
<td>. . SRCVL1</td>
<td>______</td>
</tr>
<tr>
<td></td>
<td></td>
<td>______</td>
</tr>
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<td>______</td>
</tr>
</tbody>
</table>

f. Type the **NEXT** command (or **NE**) on the Primary command line, and press **Enter**.
g. Type the Data Set Exclude Mask as follows: `PROD.BANKING.DCTR.**`.

![Define z/OS Migrator Group](image)

h. Type the `NEXT` command (or `NE`) on the Primary command line, and press Enter.

i. Type the Target Data Set Name/Mask and Target Volume(s) as follows: `MIGR.BANKING.INQ.**` and `TRGVL1`.

![Define z/OS Migrator Group](image)

j. Type the `BUILD` command (or `BU`), and press Enter.

k. Type the `SAVE` command (or `SA`), and press Enter.

l. Specify a member name by following the displayed instructions.

2. Migrate the ATM datasets.

The second migration group migrates the ATM datasets.

a. Type the `CREATE` command (or `CR`) on the Primary command line of the Manage Group Members panel, and press Enter.
b. Type MOVEVOL2 as the Group Name.

c. Type the NEXT command (or NE) on the Primary command line, and press Enter.

d. Type Y next to Build Data Set Exclude list (Y/N). You will specify the Data Set Exclude Mask in a subsequent panel.

e. Type the Source Data Set Name/Mask and Source Volume(s) as follows: PROD.BANKING.** and SRCVL2.

f. Type the NEXT command (or NE) on the Primary command line, and press Enter.

g. Type the Data Set Exclude Mask as follows: PROD.BANKING.DCTR.**.
h. Type the NEXT command (or NE) on the Primary command line, and press Enter.

i. Type the Target Data Set Name/Mask and Target Volume(s) as follows:
MIGR.BANKING.ATM and TRGVL1.


```
Command ===> BU
Scroll ===> CSR

Primary Commands : Exit Build

Group Name . . . . . . . . . MOVEVOL2
Target Data Set Name/Mask . . MIGR.BANKING.ATM.**
Target Volume Storage Class . .
Target Volumes(s) . . . . . TRGVL1

j. Type the BUILD command (or BU), and press Enter.

k. Type the SAVE command (or SA), and press Enter.

l. Specify a member name by following the displayed instructions.

The definition for the migration groups MOVEVOL1 and MOVEVOL2 are very similar.

- A dataset mask is used to select all datasets on the volume. Additionally, each migration group specifies a specific source volume, which will allow the first migration to move SRCVL1 datasets and the second migration to move SRCVL2 datasets.

- An exclude dataset mask is used to exclude the PROD.BANKING.DCTR datasets. These datasets are to remain on the SRCVL1 and SRCVL2 volumes.

- A target dataset name is specified that will be easy to identify once the migration group reaches the Completion phase on both migrations. At that time, the old source datasets for both migrations can be deleted.
Migrating multiple datasets, SMS volumes

This section provides a scenario involving the migration of several datasets that are managed by SMS.

**Note:** In cases where the target dataset takes extents that cannot be accommodated on volumes selected at Activation, the selection of additional target volumes comes from the storage group containing current target volumes.

Storage environment

SMS environment with the following source datasets to be migrated:

VOLSER=SRCVL1, STORGRP1
PROD.BANKING.ATM.CNTL
PROD.BANKING.INQ
PROD.BANKING.DCTR.D05281

VOLSER=SRCVL2, STORGRP1
PROD.BANKING.INQ.CNTL
PROD.BANKING.ATM
PROD.BANKING.DCTR.D05283

VOLSER=SRCVL3, STORGRP1
PROD.BANKING.ATM
PROD.BANKING.INQ

VOLSER=TRGVL1
(empty)

Migration objectives

For this exercise, migration objectives include:

1. To move the production banking datasets from the SRCVL1, SRCVL2 and SRCVL3 volumes that reside in the SMS storage group STORGRP1.
2. The data is being moved to a new Storage Array. A high capacity volume has been provided.
3. The SMS ACS routines at this installation are coded in such a way that all datasets starting with PROD.BANKING are assigned to the SCLASS1 storage class, which then maps to the STORGRP1 storage group.

Defining logical migration groups

To achieve this migration, we use the following process:

To consolidate volumes in a SMS environment:

1. The volume TRGVL1 is added to the STORGRP1 SMS storage group.
2. The SRCVL1, SRCVL2, and SRCVL3 volumes, which are in the STORGRP1 SMS storage group, are set to volume status DISNEW. This SMS volume status does not allow new allocations to be made to the volumes.

Note: SMS provides another option that does not allow datasets on the volumes to extent to new extents; this is volume status QUINEW. That option is not used here, as z/OS Migrator automatically moves parts of datasets as they grow during a migration.

3. The first migration group definition migrates all the datasets from SRCVL1.

a. Type the CREATE command (or CR) on the Primary command line of the Manage Group Members panel, and press Enter.

b. Type MOVBNK1 as the Group Name.

c. Type the NEXT command (or NE) on the Primary command line, and press Enter.

d. Type the Source Data Set Name/Mask and Storage Class as follows: PROD.BANKING.** and SCLASS1.

e. Type the NEXT command (or NE) on the Primary command line, and press Enter.
f. Type the Target Data Set Name/Mask, Target Volume Storage Class, and Target Volume(s) as follows: **MIGR.BANKING.**, **SCLASS1**, and **TRGVL1**.

```
Define z/OS Migrator Group
Command ===> BU
Primary Commands : EXIT BUILD

Group Name . . . . . . . . . MOVBNK1
Target Data Set Name/Mask . . MIGR.BANKING.**
Target Volume Storage Class . SCLASS1
Target Volumes(s) . . . . . TRGVL1
                 _____ _____ _____ _____ _____
                 _____ _____ _____ _____ _____
                 _____ _____ _____ _____ _____
                 _____ _____ _____ _____ _____
                 _____ _____ _____ _____ _____
                 _____ _____ _____ _____ _____
```

g. Type the BUILD command (or **BU**), and press **Enter**.

h. Type the SAVE command (or **SA**), and press **Enter**.

i. Specify a member name by following the displayed instructions.

The definition for the migration group MOVBNK1 can be explained as follows:

- A dataset mask is specified that selects all data on the volume.
- The storage class, SCLASS1, is specified to pick up all datasets on the SRCVL1, SRCVL2, and SRCVL3 volumes.
- A target dataset name of MIGR.BANKING.** is specified.
  - The DF/SMS ACS routines route dataset allocations with the high-level qualifiers of PROD.BANKING to the SMS storage class, SCLASS1.
  - The old source datasets will be easy to identify once the migration group reaches the **Completion** phase on both migrations, as they will all start with the unique MIGR.BANKING high-level qualifier.
  - During the allocation process, SMS target volumes in the storage group(s) are associated with SMS storage class ‘SCLASS1’. You may influence the SMS volume selection process by assigning a DISNEW volume status to volumes containing other source dataset candidates, that is, volumes that are planned to be source volumes in subsequent migration operations.

Following SMS volume selection rules, volumes within the same storage group that are enabled for new allocations will be available for z/OS Migrator target dataset allocations.
**Volume Mirror example**

The following panels illustrate how to create, verify, promote, and activate a Volume Mirror group. The Volume Mirror group consists of five source and five target devices.

Initially, the source devices will be copied to the target devices so their contents can be synchronized. After synchronization, Volume Mirror will continue to monitor write I/O to the primary and replicate it on the target.

**Step 1: Start the process**

1. Type 1 on the z/OS Migrator Functions panel and press Enter.

The Manage Group Members panel appears.
Step 2: Create the volume group

1. To create the new member, type CR and press Enter.

```
   Manage Group Members    Row 1 of 40
Command=>   cr         Scroll=> CSR
Primary Cmds: CR = Create EX = Exit  F = Find FIL = Filter SW = Switch
Line   Cmds:  C = Copy   D = Delete E = Restore M = Modify  SMFID
         P = Promote R = Rename S = Display V = Verify   CPFX
0@$

*****

    _  _  _ _  _
   ABC  P
   * GROUP NAME:ABC MEMBER GENERATED BY USER01
   * ON SUNDAY, 25 OCT 2015 AT 18:20:04 FROM: LOGMIGR CONTROL
   COMMANDS

   _  BIPPY  P
   * GROUP NAME:BIPPY MEMBER GENERATED BY USER01
   * ON THURSDAY, 17 DEC 2015 AT 17:30:32 FROM: MIRROR CONTROL
   COMMANDS

   _  LARGE  P
   * GROUP NAME:LARGE MEMBER GENERATED BY PTN
   * ON MONDAY, 16 NOV 2015 AT 15:26:25 FROM: z/OS Migrator CONTROL
   COMMANDS

   _  LDBACKG1
   * MIGRATION DIRECTION: FROM MOD 9'S TO MOD 3'S
   * ALL APPLICATION DATA (1520-1527) TO (1500-151F)

   _  LDBLAH
   * GROUP NAME:BLAH MEMBER GENERATED BY USER01
   * ON WEDNESDAY, 25 NOV 2015 AT 16:27:31 FROM: MIGRATE CONTROL
   COMMANDS

   _  LDCAPTUR
   * GROUP NAME:CAPTURE MEMBER GENERATED BY USER01
```

2. Enter s in the Build Mirror Member selection and press Enter.

```
++----------------------- Build Type ------------------------+
| Select with an S a build type.                        |
| _ Build Migrate Member                               |
|   s Build Mirror Member                              |
|         s Build Logical Migrate Member                |
|                                                      |
| F3=Cancel                                           |
++---------------------------------------------------------------------+

The Specify the Migrate Group parameters panel appears.

```
  --------------------- Specify the Migrate Group parameters ---------------------
  Command ===>

  Group Name . . . . . . MIRGRP1
  Mirror options . . (S) S FastCopy     _ DeactOnSys
  Primary CUU ... A012 and Count ... S_ or Volser ... .
  Mirror CUU ... 9812 New Volser ... M%%% or Volser Prefix ... 
  Verify Options . S None or _ Empty (S) Volser . .____ ' ' matches any char
  Primary Commands: Edi     Save VERify PROMote
  Bottom of data
```
Type the following values in the Specify the Migrate Group parameters panel, and then press Enter.

Table 29 Mirror Group parameter values

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Name</td>
<td>mirgrpl</td>
</tr>
<tr>
<td>Mirror options</td>
<td>Fastcopy</td>
</tr>
<tr>
<td>Primary CUU</td>
<td>A012</td>
</tr>
<tr>
<td>and Count</td>
<td>5</td>
</tr>
<tr>
<td>Mirror CUU</td>
<td>9812</td>
</tr>
<tr>
<td>Verify Options</td>
<td>NONE</td>
</tr>
</tbody>
</table>

The information just entered displays at the end of the panel.

3. To save the definition, enter sa on the command line and press Enter.

At this point, the group definition is complete.

The Create Member Name pop-up appears.
4. In the Create Member Name pop-up, enter a 6-digit member name. In this example, the member name is **MIRGP1**.

Press **Enter** and the characters **MD** will be added as a prefix to create the actual member name.

```
+----------- Create Member Name ------------+  
| Specify 6 characters to be used to create |  
| a member name to contain the data to be   |  
| saved ===>
| mirgp1                                         |  
| NOTE: Member Name is prefixed with MD          |  
| and then your 6 characters.                   |  
+-------------------------------------------+
```

A confirmation message appears with the new member name, **MDMIRGP1**.

5. You can optionally verify **MDMIRGP1** by entering **v** next to the member name and pressing **Enter**.

```
--------------------- Specify the Migrate Group parameters ---------------------
Command ===>

Group Name . . . . . . . MIRGRP1
Mirror options . . (S) S FastCopy _ DeactOnSys
Primary CUU . . . . . . New Volser . . . . . . . . . . . . . . . . . . . . . . . . .
Mirror CUU . . . . . . New Volser . . . . . . . . . . . . . . . . . . . . . . . . .
Verify Options . S None or _ Empty (S) Volser . . . . . . . . . . . . . . . . . .
Verify Options . . . . '$' matches any char
Primary Commands:EDit SAVE VERIFY PROMote  
MIR COMMAND(S) SAVED TO: LFUOC01.ZOSM800.CNTL 'MDMIRGP1')
*********************************************** Bottom of data ***********************************************
```

```
Manage Group Members                 Row 1 of 40
Command=>  Scroll=> CSR
Primary Cmds: CR = Create EX = Exit F = Find FIL = Filter SW = Switch
Line    Cm ds: C = Copy D = Delete E = Restore M = Modify SMFID X04
P = Promote R = Rename S = Display V = Verify CPFX @$
********************************************************************
  ABC          P
* GROUP NAME:ABC             MEMBER GENERATED BY  USER01          
* ON SUNDAY, 25 OCT 2015 AT 18:20:04 FROM:  LOGMIGR CONTROL COMMANDS
  BIPPY        P
* GROUP NAME:BIPPY             MEMBER GENERATED BY  USER01          
* ON THURSDAY, 17 DEC 2015 AT 17:30:32 FROM:  MIRROR CONTROL
  LARGE         P
* GROUP NAME:LARGE             MEMBER GENERATED BY  PTN            
* ON MONDAY, 16 NOV 2015 AT 15:26:25 FROM:  /OS Migrator CONTROL
  MIGRATION DIRECTION:  FROM MOD 9'S TO MOD 3'S
* ALL APPLICATION DATA   (1520-1527) TO (1500-151F)
V MDMIRGP1
* GROUP NAME:MIRGP1             MEMBER GENERATED BY  USER01          
* ON WEDNESDAY, 25 NOV 2015 AT 16:27:31 FROM:  MIGRATE CONTROL
  Capture        P
* GROUP NAME:CAPTURE             MEMBER GENERATED BY  USER01          
* ON MONDAY, 29 JUN 2015 AT 23:03:47 FROM:  MIRROR CONTROL COMMANDS
```
The VERIFY results panel appears.

Any errors or events encountered display on the panel.

6. Press F3 to proceed.

Step 3: Promote the volume group

1. To promote the volume group, in the Manage Group Members panel, enter p next to the member name and press Enter.

The Confirm Promote pop-up appears.
2. Type y in the PROMOTE confirmation pop-up and press Enter.

```
+-------------------- Confirm Promote --------------------
| Are you sure you want to PROMOTE the member MDMIRGP1 to
 The Database    ?  y (Y=Yes N=No)
+-------------------------------------------------------
```

The confirmation pop-up panel appears.

```
Menu  Utilities  Compilers  Help
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
BROWSE    SYS04106.T165027.RA000.USER1 .R0132768     Line 00000000 Col 001 080
Command ===>
-----------------------------------------------------------------------------------------------
MIGRATE PROMOTE MEMBER EXECUTED BY USER1 ON 04/15/15 AT 16:50:27...
EMCF021I PROCESSING CONFIG FILE PARAMETERS
EMCP001I GROUP NAME: MIRGRP1 MEMBER GENERATED BY USER1
EMCP001I ON Thursday, 17 Dec 2015 AT 16:54:37 FROM MIRROR CONTROL COMMANDS
EMCP001I GROUP(MIRGRP1) MODE(FASTMIRROR(FASTCOPY))
EMCP001I PAIR SOURCE(A012,5) TARGET(9812) VERTARG(*NONE*) NEWVOL(M%%)
* UPDATED ON 2015.106 AT 16:50:25, SYSTEM=Z04
GROUP(MIRGRP1) -
  MODE(FASTMIRROR(FASTCOPY))
* DEFINING SYSTEM ADDRESSES: A012 TO 9812
  PAIR SSYMM(000184600045,A0012,5) TSYMM(000184600058,980012) -
  VERTARG(*NONE*) NEWVOL(M%%)
*GROUP PROMOTED, STOW LENGTH IS 251
*** END OF DISPLAY ***
*********************************************************************** Bottom of Data ***********************
```

3. Press F3 to proceed.

Step 4: Activate the volume group

To perform actions on a promoted device group or to follow the progress and status of
promoted groups, select Monitor Promoted Groups:

1. In the z/OS Migrator Functions panel, select option 2. All promoted groups are
managed through this option.

```
EMC z/OS Migrator Migration
Function Number 11/08/15 11:07:44
or Command ==> 2  SMFID: X04
                    CPFX: @$
                    z/OS Migrator 8.0.0 Functions
1 Manage Groups  5 Display Host Messages
2 Monitor Promoted Groups  6 System Change Summary
3 Display Configuration Information7 Message Help
4 Operator Interface  8 Monitor Command Line Help
9 Display Installation Options
S Set User Session Options
V View or Browse Log data set
F1=Help  F3=Exit
```
The z/OS Migrator Monitor panel appears.

2. Type an A next to the group name MIRGRP1 and press Enter to activate the group.

```
A confirmation pop-up appears.

3. Type y and press Enter to confirm the activation of MIRGRP1.
```
Once activated, the mirror group initially displays a Current Status of SYNCING to show that the volumes in the group are synchronizing. The percentage complete also displays.

**Note:** While a group is active, the Owner field displays the system ID of the system from which the group was activated.

4. To refresh the percentage, press Enter.

When synchronization is complete, the group displays a current status of MIRROR ACTIVE.
While a Volume Mirror group is active, you may use the following line commands on the owner system:

- **C** — Display component devices.
- **D** — Deactivate mirroring for a suspended volume group.
- **E** — Display devices pairs with errors.
- **P** — Suspend mirroring for the volume group.
- **R** — Resume a suspended volume group.

**Note:** The volume group will be re-synchronized first.

- **U** — Produce a volume group report.

You can only use the 'X' (Delete) command to remove a deactivated (or NOT ACTIVE) group from the list of managed volume groups and the z/OS Migrator database.
Volume Migrator examples

The following sections describe:

◆ A split offline example
◆ A consistent migration example
◆ A constant copy example

Split offline example

The following panels illustrate how to create, verify, promote and activate a Volume Migrator group. The group consists of four source and four target devices.

The source devices will be copied to the target devices. After the copy the target devices will be split offline; that is, migration will stop and the target volumes will be left offline.

Step 1: Start the process

1. To start the process, enter 1 on the z/OS Migrator Functions panel.

The Manage Group Members panel appears.
Step 2: Create the volume group

1. To create a new group, type `cr` on the command line and press Enter.

```
--------------------------- Manage Group Members --------------------------- Row 1 of 25
Command===> cr
Primary CmDs: CR = Create  EX = Exit  F = Find  FIL = Filter  SW = Switch
Line CmDs:  C = Copy  D = Delete  E = Restore  M = Modify               SMFD X04
                        P = Promote  R = Rename  S = Display  V = Verify    CPFX @$
*******************************************************************************
_  KCHMIG       P
     * UPDATED ON 2015.085 AT 08:32:57, SYSTEM=Z04
_  KCHMR       P
     * UPDATED ON 2015.084 AT 11:25:02, SYSTEM=Z04
_  MDCAMAC1
     * GROUP NAME:CAM1FM MEMBER GENERATED BY TSMIT1
     * ON MONDAY, 16 NOV 2015 AT 14:45:32 FROM: MIRROR CONTROL COMMANDS
_  MDCLONE
     * GROUP NAME:CLONE MEMBER GENERATED BY JDOE1
     * ON SUNDAY, 25 OCT 2015 AT 19:57:04 FROM: MIGRATE CONTROL COMMANDS
_  MDDXB1
     * GROUP NAME:JED1 MEMBER GENERATED BY JDOE1
     * ON MONDAY, 16 NOV 2015 AT 13:49:41 FROM: MIRROR CONTROL COMMANDS
_  MDFMRP2
     * GROUP NAME:FMGRP2 MEMBER GENERATED BY JDOE1
```

The Build Type pop-up appears.

2. Type `s` in the pop-up to select Build Migrate Member and press Enter.

```
+--------------- Build Type ----------------+
|                                           |
|  Select with an S a build type.          |
|    _ Build Migrate Member                 |
|    _ Build Logical Migrate Member         |
|                                           |
| F3=Cancel                                 |
+-------------------------------------------+
```

The Specify the Migrate Group parameters panel appears.

3. Specify the information for the new group, and then press Enter.

The following values are used in this example:

**Table 30 New Group parameter value examples**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Name</td>
<td>fmgrp1</td>
</tr>
<tr>
<td>Migration Completion</td>
<td>S Split Offline</td>
</tr>
<tr>
<td>Source CUU</td>
<td>5970</td>
</tr>
<tr>
<td>Target CUU</td>
<td>5980</td>
</tr>
</tbody>
</table>
4. Enter `ed` at the command line and add three additional pairs to the group.

```
------------------------ Specify the Migrate Group parameters ------------------------
Command ===> ed Scroll ===> PAGE

Group Name . . . . . . . FMGRP1
Migration options . . (S) _ FastCopy _ DeactOnSus
                (Y/N) _ Refvtoc
Migration Completion. (S) _ SplitOn _ SplitOff _ Swap _ ConstantCopy
Swap options. . . (Y/N) _ ALLOWCC _ ALLOWESSCN _ Consistent
                _ ALLOWCPL _ ALLOWPAGE
                CFN _ VOLPfx .. __
Source CUU . . . ____ and Count ____ or Volser . . . . . . . .
Target CUU . . . . New Volser ____ or Volser Prefix . . __
Verify Options (S) _ None or _ Empty Volser _____ '% matches any char

*********************** Primary Commands:EDit SAv e VERify PROMote ***********************
******************** Bottom of data ********************
```

The new information displays at the bottom of the panel.

4. Enter `ed` at the command line and add three additional pairs to the group.

```
------------------------ Specify the Migrate Group parameters ------------------------
Command ===> ed Scroll ===> PAGE

Group Name . . . . . . . FMGRP1
Migration options . . (S) _ FastCopy _ DeactOnSus
                (Y/N) _ Refvtoc
Migration Completion. (S) _ SplitOn _ SplitOff _ Swap _ ConstantCopy
Swap options. . . (Y/N) _ ALLOWCC _ ALLOWESSCN _ Consistent
                _ ALLOWCPL _ ALLOWPAGE
                CFN _ VOLPfx .. __
Source CUU . . . ____ and Count ____ or Volser . . . . . . . .
Target CUU . . . . New Volser ____ or Volser Prefix . . __
Verify Options (S) _ None or _ Empty Volser _____ '% matches any char

*********************** Primary Commands:EDit SAv e VERify PROMote ***********************
******************** Bottom of data ********************
```

**Note:** There are several ways to define the additional pairs in the group including: use of the panels for each pair and, if the devices are sequentially addressed, the and Count field. Use of the `ed` option is purely illustrative.

5. Exit this screen by pressing PF3.

The newly added devices are shown on the panel. At this point, the group definition is complete.

```
*************** Primary Commands:EDit SAv e VERify PROMote ***********************
GROUP(FMGRP1) MODE(MIGRATE(SPLIT(OFFLINE)))
PAIR SOURCE(5970) TARGET(5980)
********************** Bottom of data ******************************
```

---

Volume Migrator examples 255
6. Save this definition by typing **sa** on the command line in the Specify the Migrate Group parameters panel and pressing Enter.

```
------------------------ Specify the Migrate Group parameters ------ Row 1 of 2
Command ===> sa

Migration options . . (S) _ FastCopy _ DeactOnSus
      (Y/N)  _ Refvtoc
Migration Completion. (S) _ SplitOn _ SplitOff _ Swap _ ConstantCopy
Swap options . . . (Y/N) _ AllowCC _ AllowSYSCM _ Consistent
      _ AllowCPL _ AllowPage
      CFW ______       VOLPfx .. __
Source CUU . . . . ____   and Count ____ or Volser . . . . . . ______
Target CUU . . . . ____   New Volser ____ or Volser Prefix .. ______
Verify Options (S) _ None or _ Empty     Volser ______ '%' matches any char

*************** Primary Commands:EDit SAv e VERify PROMote ***************
GROUP(FMGRP1) MODE(MIGRATE(SPLIT(OFFLINE)))
PAIR SOURCE(5970) TARGET(5980)
PAIR SOURCE(5971) TARGET(5981)
PAIR SOURCE(5972) TARGET(5982)
PAIR SOURCE(5973) TARGET(5983)

******************** Bottom of data ********************
```

The Create Member Name pop-up appears.

7. Type the member name in the pop-up window and press Enter. In this example, the member name is **fmgrp1**. The characters **MD** will prefix this name.

```
+-----------
| Create Member Name ------------+
| Specify 6 characters to be used to create a member name to contain the data to be saved ===>
| fmgrp1
| NOTEP: Member Name is prefixed with MD and then your 6 characters.
+-----------------------------------+

A confirmation message is shown with the new member name, **MDFMGRP1**.

```
------------------------ Specify the Migrate Group parameters ------- Scroll ===> PAGE
Command ===> sa

Migration options . . (S) _ FastCopy _ DeactOnSus
      (Y/N)  _ Refvtoc
Migration Completion. (S) _ SplitOn _ SplitOff _ Swap _ ConstantCopy
Swap options . . . (Y/N) _ AllowCC _ AllowSYSCM _ Consistent
      _ AllowCPL _ AllowPage
      CFW ______       VOLPfx .. __
Source CUU . . . . ____   and Count ____ or Volser . . . . . . ______
Target CUU . . . . ____   New Volser ____ or Volser Prefix .. ______
Verify Options (S) _ None or _ Empty     Volser ______ '%' matches any char

*************** Primary Commands:EDit SAv e VERify PROMote ***************
MIR COMMAND(S) SAVED TO: 'EMC.EFMM.CONFIG'(MDFMGRP1)

******************** Bottom of data ********************
```
8. You can optionally verify **MDFMGRP1** by entering **v** next to the member name in the Manage Group Members panel.

---

The VERIFY results panel appears.

---

Any errors or events encountered display on the panel.

9. Press **F3** to continue.
Step 3: Promote the volume group

1. To migrate the group, you must first promote it. Type p next to the member name in the Manage Group Members panel and press Enter.

   The Confirm Promote pop-up appears.

2. Type y and press Enter.
The PROMOTE informational panel appears.

```
Menu Utilities Compilers Help
-------------------------------------------------------------------------------
BROWSE     SYS04106.T165027.RA000.JDOE1.R0132768 Line 0000000 Col 001 080
Command ===> Scroll ===> CSR
*******************************************************************************
MIGRATE PROMOTE MEMBER EXECUTED BY DBURT1 11/15/15 AT 16:50:27...
EMCT021I PROCESSING CONFIG FILE PARAMETERS
EMCP001I * GROUP NAME:FMGRP1 MEMBER GENERATED BY JDOE1
EMCP001I GROUP(FMGRP1) MODE(MIG(SPLIT(OFFLINE)))
EMCP001I PAIR SOURCE(5970) TARGET(5980)
EMCP001I PAIR SOURCE(5971) TARGET(5981)
EMCP001I PAIR SOURCE(5972) TARGET(5982)
EMCP001I PAIR SOURCE(5973) TARGET(5983)
* UPDATED ON 2015.106 AT 16:50:25, SYSTEM-Z04
GROUP(FMGRP1) -
  MODE(MIGRATE(SPLIT(OFFLINE))
  DEFINING SYSTEM ADDRESSES: 5970 TO 5980
  PAIR SSYM(000184600045,590070,4) TSYM(000184600058,590080) -
  VERTARG(*NONE*)
*GROUP PROMOTED, STOW LENGTH IS 238

A confirmation message also displays, indicating that MDFMGRP1 has been promoted.

Once promoted, the member name prefix changes from MD to MN.

3. Press Enter to proceed.

Step 4: Activate the volume group

To perform actions on a promoted group or to follow the progress and status of the split, select option 2, Monitor Promoted Groups in the z/OS Migrator Functions panel.

1. Return to the z/OS Migrator Functions panel and select option 2. All promoted groups are managed through this option.

The z/OS Migrator Monitor panel appears.
2. To activate group FMGRP1, type A on the command line and press Enter.

```
Command===> 16:55:14 04/15/07
Line Commands: A = Activate  C = Config  D = Deact  E = Errors  J = Jobs
L = Volumes  O = VolSum  P = Suspend  R = Resume  S = ShowExt
T = Reset  U = Report  V = Divert  X = Delete  Z = Complete

Group  Name     Current   Dev   Num  Num
       Status     Mode             Owner Sets  I Dev  Comp
_________________________________________________________
   _ KCHMIG  NOT ACTIVE   MIGRATE  CONST   2  4  0
   _ KCHMIR  NOT ACTIVE   FASTMIR                       2  4  0
  a FMGRP1  NOT ACTIVE   MIGRATE  SPLIT(OFF)  5 10  0
   _ MIRRX  DEACTIVATED  FASTMIR                       2  0  0
   _ MIRR2  MIRROR ACTIVE  FASTMIR                     2  4  0

*******************************************************************************

The Confirm Activate Request pop-up appears.

3. To confirm activation, type Y and press Enter.

```
+----------------- Confirm Activate Request -----------------
| Are you sure you want to Activate the Migrate of|FMGRP1 |
| ? y (Y=Yes n=No) |
+----------------- Confirm Activate Request -----------------

Once activated, the group displays a current status of ACTIVE in the z/OS Migrator Monitor panel.

4. Press Enter to refresh the percentage.

```
Group  Current   Dev   Num  Num
Name   Status     Mode             Owner Sets  I Dev  Comp
_________________________________________________________
   _ FMGRP1  ACTIVE(8%) MIGRATE  SPLIT(OFF) Z04  5 10  5

When the migration is complete, the group displays a current status of COMPLETED:

```
   _ FMGRP1  COMPLETED MIGRATE  SPLIT(OFF) Z04  5 10  5

Consistent Migration example

The following screens illustrate how to create, promote, activate and reset a Volume Migrator Consistent Migration group. The group consists of five source and five target devices. The source devices are consistently copied to the target devices.

This means that after the initial migration is complete, additional changed tracks are copied from the source to the target such that each volume is kept in a consistent state with the other volumes in the group.

In this example, the source and target devices are then swapped on demand.
Step 1: Start the process

To start the process, enter 1 on the command line of the z/OS Migrator Functions panel and press Enter.

```
EMC z/OS Migrator

Function Number                                           10/20/11 11:33:33
or Command ==> 1                                            SMFID: AOSC
z/OS Migrator 8.0.0 Functions                              CFPX: Z3240
  1 Manage Groups                                        5 Display Host Messages
  2 Monitor Promoted Groups                                6 System Change Summary
  3 Display Configuration Information                     7 Message Help
  4 Operator Interface                                    8 Monitor Command Line Help
  9 Display Installation Options                          S Set User Session Options
  F1=Help  F3=Exit
```

Step 2: Create the group

1. To create the group, type cr on the command line and press Enter.

2. Enter s in the pop-up to select Build Migrate Member:

```
+--------------- Build Type ----------------+
|                                           |
|  Select with an S a build type.           |
|  _ Build Migrate Member                   |
|  _ Build Mirror Member                    |
|  _ Build Logical Migrate Member           |
|                                           |
| F3=Cancel                                 |
+-------------------------------------------+
```

3. Specify the information on the Specify the Migrate Group parameters panel, and then press Enter.

```
Specify the Migrate Group parameters
Command==> Scroll=>
Group Name . . . . . . . cnsistnt
Migration options . . (S) _ FastCopy _ DeactOnSus
                  (Y/N) _ RefVtoc
Swap options. . . (Y/N) _ ALLOWCC _ ALLOWSYSCM _ Y Consistent
                  _ ALLOWCLPL _ ALLOWPAGE
                  CFW _ VOLPfx ..
Source CUU . . . . 4818 and Count 5 or Volser . . . . . . .
Target CUU . . . . 4850 New Volser .. or Volser Prefix ..
Verify Options (S) _ None or _ Empty __ Volser 
t19%%%% '%%' matches any char
****************** Primary Commands: EDit SAve VERify PROMote ******************
******************************************************************************
```
The following values are used in this example:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Name</td>
<td>CNSISTNT</td>
</tr>
<tr>
<td>Migration Completion</td>
<td>S(elect SWAP)</td>
</tr>
<tr>
<td>Swap options</td>
<td>Y for Consistent</td>
</tr>
<tr>
<td>Source CUU</td>
<td>4818</td>
</tr>
<tr>
<td>Count</td>
<td>5</td>
</tr>
<tr>
<td>Target CUU</td>
<td>4850</td>
</tr>
<tr>
<td>Verify Volser</td>
<td>TL9%%%</td>
</tr>
</tbody>
</table>

4. At this point, the definition is complete. Press Enter to review the definition before saving it.

5. Save the definition by entering sa on the command line and pressing Enter.

6. Enter a member name in the Create Member Name pop-up.
A confirmation message is shown with the new member name LDCNSIST.

```
Specify the Migrate Group parameters     Row 1 to 1 of 1
Command=>

Group Name . . . . . .  
Migration options . . (S) _ FastCopy _ DeactOnSus
Migration Completion. (S) _ SpltOn _ SpltOff _ Swap _ ConstantCopy
(Y/N) _ RefVtoc 
Swap options. . . . (Y/N) _ ALLOWCC _ ALLOWSYSCH _ Consistent
             _ ALLOWCP _ ALLOWPAGE
CFW _______ VOLPfx __________
Source CUU . . . . . . . . and Count . . . . or Volser . . . . . . . .
Target CUU . . . . . . . . New Volser . . . . or Volser Prefix . .
Verify Options (S) _ None _ Empty _ Volser _ % matches any char
MIR COMMAND(S) SAVED TO: 'EMC.EFMM.CONFIG'(LDCNSIST)
******************************* Bottom of data *****************************
```

**Step 3: Promote the volume group**

To migrate the group, you must first promote it.

1. To promote the member, type `P` next to the member name LDCNSIST in the Manage Group Members panel and press Enter.

```
Command=>

Manage Group Members     Row 6 to 11 of 108
Command=>
Primary Cmds: CR = Create EX = Exit   F = Find FIL = Filter SW = Switch
Line Cmds:  C = Copy    D = Delete E = Restore M = Modify       SMFID AOSC
P = Promote R = Rename S = Display V = Verify        CPFX Z3Z40
******************************************************************************
P LDCNSIST
* GROUP NAME:CNSISTNT MEMBER GENERATED BY MGW
* ON THURSDAY, 20 OCT 2011 AT 13:13:06 FROM: MIGRATE CONTROL COMMANDS
******************************************************************************
```

2. The Confirm Promote pop-up appears. Enter `y` to confirm.

```
+-------------------------------------------+---------------------------+
| Are you sure you want to PROMOTE the member LDCNSIST to the Database ? y (Y=Yes N=No) |
|                                                                                       |
+-------------------------------------------+---------------------------+
The promote member information panel appears.

```
VIEW       SYS11293.T133058.RA000.MGW.R0503688             Columns 00001
          00072
Command ====>                                                  Scroll ===>
CSR
****** ************************************ Top of Data
***************************************
000001
000002 ZOSM PROMOTE MEMBER EXECUTED BY MGW ON 10/20/11 AT 13:30:58
000003
000004 EFMM021I Processing config file parameters
000005 EFMP001I * GROUP NAME:CNSISTNT MEMBER GENERATED BY MGW
000006 EFMP001I * ON Thursday, 20 Oct 2011 AT 13:13:06 FROM: MIGRATE
  CONTROL C
000007 EFMP001I GROUP(CNSISTNT) MODE(FMIR(SWAP))
000008 EFMP001I PAIR SOURCE(4818,5) TARGET(4850) VERTARG(,TL9%%)
000009 * UPDATED ON 2011.293 AT 13:30:58, SYSTEM=AOSC
000010 GROUP(CNSISTNT) -
000011   MODE(FASTMIRROR(SWAP))
000012 SOPT(NOASC)
000013 * DEFINING SYSTEM ADDRESSES: 4818 TO 4850
000014   PAIR SSYMM(000187400681,040418,5) TSYM(000187400681,040450)
  -
000015   VERTARG(,TL9%%)
000016 *GROUP PROMOTED, STOW LENGTH IS 250
000017 *** END OF DISPLAY ***
****** ************************************ Bottom of Data
```

**Note:** A MODE of FASTMIRROR for a Consistent Swap is normal.

A confirmation message displays, indicating that LDCNSIST has been promoted. Once promoted, the group appears in the Manage Group Members list under its group name and with a "p" to the right of the group name. The configuration member remains in the configuration PDS for future use.

Manage Group Members           Row 1 to 6 of 108
Command=>                                                        Scroll=> CSR
Primary Cmds: CR = Create EX = Exit   F = Find FIL = Filter SW = Switch
Line    Cmds:  C = Copy    D = Delete E = Restore M = Modify       SMFID
             AOSC
            P = Promote R = Rename S = Display V = Verify CPFX
Z3Z40
***********************************************************************
********
_  CNSISTNT
P
** UPDATED ON 2011.293 AT 13:30:58, SYSTEM=AOSC
********
***********************************************************************
Step 4: Activate the group

To perform actions on a promoted group or to follow the progress and status of the swap, select option 2, Monitor Promoted Groups in the z/OS Migrator Functions panel.

1. Return to the z/OS Migrator Functions panel and select option 2. All promoted groups are managed through this option.

The z/OS Migrator Monitor panel appears.

2. To activate group CNSISTNT, type a next to the group name and press Enter.

The Confirm Activate Request pop-up appears.

3. To confirm activation, type y and press Enter.
Once activated, the group has a status of SYNCING until complete, then MIRROR ACTIVE. The percentage complete is also shown.

<table>
<thead>
<tr>
<th>Group</th>
<th>Status</th>
<th>Mode</th>
<th>Action</th>
<th>Owner</th>
<th>Sets</th>
<th>I Dev</th>
<th>Num</th>
<th>Num</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNSISTNT</td>
<td>SYNCING(0%)</td>
<td>FASTMIR</td>
<td>SWAP</td>
<td>AOSC</td>
<td>5</td>
<td>10</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

4. Press Enter to refresh the percentage.
5. In Consistent Migration mode, the status will go to mirror when all volumes are synchronized.

6. To change migration actions, issue T for RESET.

The Reset Migration Action pop-up appears, showing new action choices for resetting migration action.

7. Enter W for swap and Y to confirm the change.
8. The status goes to pending divert while all LPARs in the migration complex respond to the change. An "*" next to the owner indicates the migration action was changed.

```

EMC z/OS Migrator Monitor           Row 1 to 2 of 2
Command==>                                                  14:54:37
10/20/11
Line Commands: A = Activate C = Config D = Deact   E = Errors J = Jobs
L = Volumes  O = VolSum P = Suspend R = Resume S = ShowExt
T = Reset     U = Report V = Divert  X = Delete Z = Complete
Group    Current                  Dev   Num
Name     Status      Mode      Action       Owner Sets I Dev
Comp
***********************************************************************
********
_ CNSISTNT  PEND DIVERT        FASTMIR   SWAP      * AOSC      5      10
0
******************************* Bottom of data
********************************
```

9. After the SWAP is complete, the group displays a current status of COMPLETE.

```

EMC z/OS Migrator Monitor           Row 1 to 2 of 2
Command==>                                                  14:55:15
10/20/11
Line Commands: A = Activate C = Config D = Deact   E = Errors J = Jobs
L = Volumes  O = VolSum P = Suspend R = Resume S = ShowExt
T = Reset     U = Report V = Divert  X = Delete Z = Complete
Group    Current                  Dev   Num
Name     Status      Mode      Action       Owner Sets I Dev
Comp
***********************************************************************
*********
_ CNSISTNT  COMPLETE           FASTMIR   SWAP      *           5      10
0
************************************************************************
```
Constant Copy example

The following screens illustrate how to create, promote, activate and reset a Volume Migrator Constant Copy group. The group consists of nine primary and nine target devices. The source devices are constant copied to the target devices.

This means that after the initial migration is complete, additional changed tracks are periodically copied from the source to the target. In this example, the source and target devices are then swapped on demand.

Step 1: Start the process

1. To start the process, enter 1 on the command line of the z/OS Migrator Functions panel and press Enter.

Step 2: Create the volume group

1. To create the group, type cr on the command line and press Enter to create the new member.
The Build Type pop-up appears.

2. Enter s in the pop-up to select **Build Migrate Member**:

```
+--------------- Build Type ----------------+
|                                           |
| _ Select with an S a build type.         |
| s Build Migrate Member                    |
| _ Build Mirror Member                      |
| _ Build Logical Migrate Member            |
|                                           |
| F3=Cancel                                  |
+-------------------------------------------+
```

The Specify the Migrate Group parameters panel appears.

3. Specify the information on the Specify the Migrate Group parameters panel, and press **Enter**.

The following values are used in this example:

**Table 32** Group parameter value examples

<table>
<thead>
<tr>
<th>Value</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Name</td>
<td>FMGRP2</td>
</tr>
<tr>
<td>Migration Completion</td>
<td>S Constant Copy</td>
</tr>
<tr>
<td>Source CUU</td>
<td>5978</td>
</tr>
<tr>
<td>Count</td>
<td>9</td>
</tr>
<tr>
<td>Target CUU</td>
<td>5988</td>
</tr>
<tr>
<td>Verify Volser</td>
<td>MIG%%%</td>
</tr>
</tbody>
</table>

```
--------------------- Specify the Migrate Group parameters ---------------------
Command ===>                                                 Scroll ===> PAGE
Group Name  . . . . . . . fngrp2__
Migration options . . (S) _ FastCopy _ DeactOnSus
                  (Y/N) _ Refvtoc
Migration Completion. (S) _ SplitOn _ SplitOff _ Swap _ ConstantCopy
Swap options. . . (Y/N) _ AllowCC _ AllowSYSCM _ Consistent
                  _ AllowCPL _ AllowPage
                  CFW ______       VOLPfx .. __
Source CUU . . . 5978 and Count . . 9___ or Volser . . . . . . .
Target CUU . . . 5988 New Volser . . . . . . . or Volser Prefix . . .
Verify Options . _ None or _ Empty (S) Volser . _ MIG%%% '%%' matches any char
******************************************************************************
Primary Commands:Edit SAvE VERify PROMote ***************
```

At this point, the group definition is complete.

4. Save this definition by entering **sa** on the command line.
5. Enter the member name in the Create Member Name pop-up. In this example it is FMGRP2. The characters MD will prefix this name.

A confirmation message is then shown with the new member name, MDFGRP2.

Step 3: Promote the volume group

To migrate the group, you must first promote it.

1. To promote the member, type P next to the member name MDFGRP2 and press Enter.
2. Enter y to confirm new member.

The Promote Member informational panel appears.

A confirmation message displays, indicating that MDFMGRP2 has been promoted. Once promoted, the group appears in the Manage Group Members list under its group name and with a p to the right of the group name. The configuration member remains in the configuration PDS for future use.
Step 4: Activate the volume group

To perform actions on a promoted group or to follow the progress and status of the swap, select option 2, Monitor Promoted Groups in the z/OS Migrator Functions panel.

1. Return to the z/OS Migrator Functions panel and select option 2. All promoted groups are managed through this option.

The z/OS Migrator Monitor panel appears.

2. To activate group FMGRP2, type a next to the group name and press Enter.

The Confirm Activate Request pop-up appears.

3. To confirm activation, type y and press Enter.

Once activated, the group has a current status of ACTIVE in the z/OS Migrator Monitor panel.
The percentage complete is also shown.

<table>
<thead>
<tr>
<th>Group Name</th>
<th>Current Status</th>
<th>Mode</th>
<th>Action</th>
<th>Dev</th>
<th>Num</th>
<th>Num</th>
<th>I Dev</th>
<th>Comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>_FMGRP1</td>
<td>COMPLETED</td>
<td>MIGRATE</td>
<td>SPLIT(OFF)</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_FMGRP2</td>
<td>ACTIVE(6%)</td>
<td>MIGRATE</td>
<td>CONST</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Press **Enter** to refresh the percentage.

In Constant Copy mode, the process remains active even after migration is 100% complete.

<table>
<thead>
<tr>
<th>Group Name</th>
<th>Current Status</th>
<th>Mode</th>
<th>Action</th>
<th>Dev</th>
<th>Num</th>
<th>Num</th>
<th>I Dev</th>
<th>Comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>_FMGRP1</td>
<td>COMPLETED</td>
<td>MIGRATE</td>
<td>SPLIT(OFF)</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_FMGRP2</td>
<td>ACTIVE(100%)</td>
<td>MIGRATE</td>
<td>CONST</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. You can reset the process, or change the constant copy action, by typing **t** (for reset) next to the group name and pressing **Enter**.

<table>
<thead>
<tr>
<th>Group Name</th>
<th>Current Status</th>
<th>Mode</th>
<th>Action</th>
<th>Dev</th>
<th>Num</th>
<th>Num</th>
<th>I Dev</th>
<th>Comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>_FMGRP1</td>
<td>COMPLETED</td>
<td>MIGRATE</td>
<td>SPLIT(OFF)</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>t FMGRP2</td>
<td>ACTIVE(100%)</td>
<td>MIGRATE</td>
<td>CONST</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Reset Migration Action panel with new action choices for resetting migration action appears.

6. To select Swap, type **w** after New Action and press **Enter**.

The Confirm Swap Request pop-up appears.

7. To confirm the swap request, type **y** and press **Enter**.

The action changes to **SWAP** and the percentage continues to increment if necessary.
The Reset command (T) may be used even before the group is fully migrated. The requested action takes place when the migration is complete.

The asterisk next to the SWAP status indicates that the action was temporarily changed from Constant Copy. If you subsequently reactivate this group, the action reverts to CONSTANT COPY.

After the SWAP is complete, the group displays a current status of COMPLETED.
z/OS Migrator Examples
This chapter explains the execution parameters, SYSIN commands, and provides sample batch jobs. Topics include:

- Overview ................................................................. 278
- Execution parameters ........................................... 278
- Group definition dataset ........................................ 279
- SYSIN commands .................................................. 279
- Sample batch jobs for logical migration ............... 281
- Sample batch jobs for volume migration ............... 286
Overview

A batch utility, EFMMBAT, is provided with z/OS Migrator. This batch utility allows operations to be activated using a batch job. The utility submits commands to the z/OS Migrator service task and retrieves the responses.

**Note:** Although possible, EMC recommends that you do not run the z/OS Migrator as a batch job since this negates certain safeguards.

Any command that can be submitted using the operator console can be submitted using the batch utility. In addition, there are a number of specialized commands for the batch utility environment, including the following:

- VERIFY
- PROMOTE
- WAIT
- MAXWAIT
- IF
- QUIT

The batch utility is driven by three input sources:

- Execution parameters
- Group definition dataset
- SYSIN commands

Text group definitions may also be entered from the batch utility program, although they won’t be saved to a partitioned dataset if entered this way.

Execution parameters

The following is a z/OS Migrator execution parameter:

```
PARM='CPFX=cccccccc,SSID=cccc,DEBUG=YES|NO'
```

Where:

- CPFX is a one- to eight-character command prefix for the z/OS Migrator subsystem.
- SSID identifies the z/OS Migrator subsystem ID.

**Note:** You need only specify either CPFX or SSID; however, if both are specified, they must match the settings for a z/OS Migrator subsystem in order to proceed.

- DEBUG: If set to YES, it will cause diagnostic messages to be written to an optional EFMMBAT dd statement. The default is NO. Include a CONFIG DD statement to identify the library from which members will be promoted.
Group definition dataset

All configuration members to be acted upon must reside in the configuration PDS. You can create these members using either:

- A normal editor, or
- The z/OS Migrator ISPF Monitor

Note: Configuration members coded at the command line are promoted directly to the z/OS Migrator service task and stored in the z/OS Migrator database. These members are not stored in the configuration PDS.

SYSIN commands

The SYSIN DD statement allows you to submit any z/OS Migrator command to the z/OS Migrator server. In addition, there are a number of specialized commands for controlling the Batch Utility environment.

Descriptions of z/OS Migrator SYSIN commands are as follows.

IF GROUP groupname [NOT] EXIST

This command functions like IF RC; however, the condition being tested is the existence of the specified group.

IF GROUP groupname STATUS [NOT] groupstatus

This command functions like IF RC, however, the condition being tested is the status of the specified group.

The following is a list of groupstatus values:

- SUSPEND — The group is suspended.
- ACTIVE — The group is active; this is generally a transient state when the group is first started.
- PNDACT — Waiting for other systems to acknowledge the activation.
- PNDMIRR — Synchronizing.
- MIRROR — All extents are mirroring.
- PNDIVERT — Waiting for other systems to acknowledge DIVERT request.
- DIVERT — Fully diverted.
- PNDTERM — Waiting for other systems to acknowledge TERMINATION request.
- TERM — The group is fully terminated.
- DEACT — Group has been deactivated (by command or error).
- COMPLETE — Volume migration is complete.
**IF RC operator value**

This command tests the most recent return code against a specified value. The operators are ‘>’, ‘<’, and ‘=’. The value is a positive number. If the condition is met, then the next statement is executed. Otherwise, the next command is skipped and processing continues with the subsequent command.

**MAXWAIT nnnnn**

Specifies the maximum number of seconds to wait for group status. If the time is exceeded, then the command return code (RC) is set to 4 and processing continues with the next statement.

**PROMOTE DLM=xx**

The statements immediately following the PROMOTE statement are to be interpreted as a group definition and promoted accordingly. The instream group definition ends when a statement beginning with the two characters specified via the DLM=xx parameter is encountered. This group will be added to the z/OS Migrator configuration database but not to the configuration PDS.

**PROMOTE group-member-name**

Submits the specified member to the z/OS Migrator service task for addition to the active configuration.

**QUIT**

Causes command interpretation to immediately end.

**VERIFY group-member-name**

Causes the specified group member to be submitted to the z/OS Migrator service task to verify syntax and compatibility with previously promoted members.

**WAIT GROUP groupname STATUS [NOT] groupstatus**

The specified group will be queried and batch command processing will be suspended until the specified status has been observed. A limit for this wait may be specified using the MAXWAIT command. If the MAXWAIT limit is reached before the requested condition has been met, then the return code (RC) is set to 4. Refer to the IF GROUP command for a description of the status values.

**WAIT nnnnn**

Waits the specified number of seconds before submitting the next command.

You can enter a number from 0 to 99999. A value of zero (0) means that there will be no wait. Any other value will cause z/OS Migrator to wait the specified number of seconds before executing the next command.
Usage examples

```plaintext
IF GROUP MYGROUP EXISTS
  DELETE MYGROUP
  DISPLAY GROUPS

PROMOTE DLM=\$
  GROUP(LD6255) MODE(LMIGR)
  SET SOURCE(DSN( SG2.LD6255.VSAM.*) ) -
  TARGET(STGCLS(SCBASE ) -
  DSN( SG2.LD6255.TEMP.* )
$

ACTIVATE MYGROUP
IF RC > 0
  QUIT
MAXWAIT 300
WAIT GROUP MYGROUP STATUS COMPLETED
IF RC = 4
  QUIT
```

**Note:** You can use the continuation character—a dash ( - ) at the end of the line as shown in the above example—wherever blanks are permitted in the syntax for batch interfaces. Up to 16 dataset filters can be specified for the source-dsn list.

Sample batch jobs for logical migration

The two sample jobs included for batch interface are the minimum number of separate jobs that are required to complete a z/OS Migrator migration.

**Note:** Each step could be a separate batch job.

The sample jobs listed here are used to migrate three different Partitioned Datasets (PDS). The space allocation of the datasets will be in records, tracks and cylinders. The three PDS will have more members added after the Activate operation has been completed.

- The first job is ZOSM5070.
- The second job is ZOSM5071.

**ZOSM5070**

The first job, ZOSM5070, will perform the following tasks:

1. Remove the datasets if they exist, since this is a sample job.
2. Allocate and populate the three PDSs with the same small PDS.
3. Delete the LD5070 group if it exists.
4. Define and Promote the LD5070 group.
5. Wait for a few seconds to allow the group to be recognized in the other active z/OS Migrator servers in other LPARs.
6. Activate the LD5070 group.
7. Copy more members into each source PDS after the Activate operation is complete. Add enough new members to cause each PDS to go into secondary extents.

8. Wait for the LD5070 group to Mirror after the additional members are added to the source PDS.

9. Divert the LD5070 group.

ZOSM5070 sample batch job

```
//ZOSM5070 JOB 'YOUR JOB STATEMENT'
//*************************************************************
//*        ZOSM5070 - ZOSM5071                                 *
//*                                                            *
//*        PDS IN RECORDS, TRACKS AND CYLINDERS                *
//*        z/OS Migrator TO COPY                                *
//*        EXTEND ALL PDS TO MULTIPLE EXTENTS AFTER ACTIVATE   *
//*                                                            *
//* 1. DELETE GROUP IF IT EXISTS                              *
//* 2. CREATE GROUP GROUP NAME LD5070                         *
//* 3. PROMOTE GROUP                                          *
//* 4. ACTIVATE GROUP                                         *
//* 5. DIVERT GROUP                                           *
//*                                                            *
//*************************************************************
//* SOURCE VOL : EF24                                          *
//* TARGET VOL : EF14                                          *
//* VOLSER : MVEF24 MVEF14                                     *
//*************************************************************
//DELETE EXEC PGM=IDCAMS,REGION=1024K
//SYSPRINT DD SYSOUT=*                                       
//SYSPRINT DD SYSOUT=*                                       
DEL LDSRCE.MVEF24.PDS.BLOCKS
DEL LDSRCE.MVEF24.PDS.CYL
DEL LDSRCE.MVEF24.PDS.TRK
DEL LDTGT.MVEF14.PDS.BLOCKS
DEL LDTGT.MVEF14.PDS.CYL
DEL LDTGT.MVEF14.PDS.TRK
SET MAXCC=0
/*
//STEP2B EXEC PGM=IEBCOPY
//** BLOCKS
//SYSPRINT DD SYSOUT=*                                       
//SYSSUT1 DD DSN=TEST.SMALL.PDS,DISP=SHR
//SYSSUT2 DD DSN=LDSRCE.MVEF24.PDS.BLOCKS,
//          DISP=(NEW,CATLG,DELETE),
//          UNIT=3390, VOL=SER=(MVEF24),
//          SPACE=(24000, (0004, 0010, 200))
//SYSSIN DD DUMMY
/*
//STEP2C EXEC PGM=IEBCOPY
//** CYLINDERS
//SYSPRINT DD SYSOUT=*                                       
//SYSSUT1 DD DSN= EMC.SMALL.PDS,DISP=SHR
//SYSSUT2 DD DSN=LDSRCE.MVEF24.PDS.CYL,
//          DISP=(NEW,CATLG,DELETE),
//          UNIT=3390, VOL=SER=(MVEF24),
//          SPACE=(CYL, (01, 01, 200))
//SYSSIN DD DUMMY
/*
//STEP2T EXEC PGM=IEBCOPY
```

1. ZOSMvrmm = version, release, and modification of z/OS Migrator.
 //*        TRACKS
//SYSPRINT DD SYSOUT=*  
//SYSUT1 DD DSN= TEST.SMALL.PDS,DISP=SHR  
//SYSUT2 DD DSN=LDSRCE.MVEF24.PDS.TRK,  
//        DISP=(NEW,CATLG,DELETE),  
//        UNIT=3390,VOL=SER=(MVEF24),  
//        SPACE=(TRK,(07,12,200))  
//SYSIN DD DUMMY  
//*  
//PROMOTE EXEC PGM=EFMMBAT,PARM='CPFX=WJ,DEBUG=NO',COND=(7,LE)  
//BB DD DISP=SHR,DSN=EMC.ZOSMvrm.TEST.LINKLIB  
//EFMMDB DD DISP=SHR,DSN=EMC.ZOSMvrm.DB  
//CONFIG DD DISP=SHR,DSN=EMC.ZOSM.CONFIG.PDS  
//SYSPRINT DD SYSOUT=*  
//EFMMBAT DD SYSOUT=*  
//SYSUDUMP DD SYSOUT=*  
//SYSIN DD *  
IF GROUP LD5070 EXISTS  
DELETE LD5070  
*************************************************  
* CREATE GROUP AND PROMOTE GROUP                *  
*************************************************  
PROMOTE DLM=ZZ  
GROUP(LD5070) MODE(ILMIGR)  
SET SOURCE(DSN( LDSRCE.MVEF24.PDS.* ) ) -  
TARGET(VOL(MVEF14 ) -  
DSN( LDTGT.MVEF14.PDS.* ) )  
ZZ  
D GROUPS  
/*  
//WAIT20 EXEC PGM=WAIT,PARM=20  
//ACTIVATE EXEC PGM=EFMMBAT,PARM='CPFX=WJ,DEBUG=NO',COND=(7,LE)  
//STEPLIB DD DISP=SHR,DSN=EMC.ZOSMvrm.TEST.LINKLIB  
//EFMMDB DD DISP=SHR,DSN=EMC.ZOSMvrm.DB  
//CONFIG DD DISP=SHR,DSN=EMC.ZOSM.CONFIG.PDS  
//SYSPRINT DD SYSOUT=*  
//EFMMBAT DD SYSOUT=*  
//SYSUDUMP DD SYSOUT=*  
//SYSIN DD *  
*****************************************************************************  
* ACTIVATE GROUP - WAIT FOR ACTIVATION  
*****************************************************************************  
ACTIVATE LD5070  
WAIT GROUP LD5070 STATUS MIRROR  
D GROUPS  
/*  
//****************************** AFTER ACTIVATE CAUSE THE 3 PDS TO GO INTO EXTENTS.  
//******************************  
//STEP3B EXEC PGM=IEBCOPY  
//**  
//BLOCKS  
//SYSPRINT DD SYSOUT=*  
//SYSUT1 DD DSN=TEST.LARGER.PDS,DISP=SHR  
//SYSUT2 DD DSN=LDSRCE.MVEF24.PDS.BLOCKS,  
//        DISP=SHR,  
//        UNIT=3390,VOL=SER=(MVEF24),  
//        SPACE=(24000, (0004,0010,200))  
//SYSIN DD DUMMY  
/*  
//STEP3C EXEC PGM=IEBCOPY  
//**  
//CYLINDERS  
//SYSPRINT DD SYSOUT=*  
//SYSUT1 DD DSN=TEST.LARGER.PDS,DISP=SHR  
//SYSUT2 DD DSN=LDSRCE.MVEF24.PDS.CYL,  
//        DISP=SHR,  
//        UNIT=3390,VOL=SER=(MVEF24),
// SPACE=(CYL,(01,01,200))
//SYSIN DD DUMMY

//STEP3T EXEC PGM=IEBCOPY
// TRACKS
//SYSPRINT DD SYSOUT=* 
//SYSUT1 DD DSN=TEST.LARGER.PDS,DISP=SHR
//SYSUT2 DD DSN=LDSRCE.MVEF24.PDS.TRK,
// DISP=SHR,
// UNIT=3390,VOL=SER=(MVEF24),
// SPACE=(TRK,(07,12,200))
//SYSIN DD DUMMY

//WAIT21 EXEC PGM=WAIT,PARM=20
//MIRROR EXEC PGM=EFMMBAT,PARM='CPFX=WJ,DEBUG=NO',COND=(7,LE)
//STEPLIB DD DISP=SHR,DSN=EMC.ZOSMvrm.TEST.LINKLIB
//EFMMDB DD DISP=SHR,DSN=EMC.ZOSM.DB
//CONFIG DD DISP=SHR,DSN=EMC.ZOSM.CONFIG.PDS
//SYSPRINT DD SYSOUT=* 
//EFMMBAT DD SYSOUT=* 
//SYSSDUMP DD SYSOUT=*
//SYSIN DD *

**********************************************************************
* WAIT FOR MIRROR STATUS AFTER UPDATE OF SOURCE *                    
**********************************************************************
D GROUPS
WAIT GROUP LD5070 STATUS MIRROR
D GROUPS

D GROUPS

**********************************************************************
* DIVERT GROUP -  
**********************************************************************
DIVERT LD5070
WAIT GROUP LD5070 STATUS DIVERT
D GROUPS

/*
/*
ZOSM5071

The second sample job, ZOSM5071, is built with the assumption that ZOSM5070 was run first and has completed with a return code of 4 or less.

ZOSM5071 will perform the following tasks:

1. Compare the PDS to ensure they are complete.
2. **Delete** the LD5070 group after completion.

**ZOSM5071 sample batch job**

```
//ZOSM5071 JOB 'YOUR JOB STATEMENT'
//************************************************************
//*    ZOSM5070 - ZOSM5071                                    *
//*                                                           *
//*  6. DELETE GROUP                                          *
//*                                                           *
//************************************************************
//TERMGRP EXEC PGM=EFMMBAT,PARM='CPFX=WJ,DEBUG=NO',COND=(7,LE)
//STEPLIB DD DISP=SHR,DSN=EMC.ZOSMvrm.TEST.LINKLIB
//EFMMDB DD DISP=SHR,DSN=EMC.ZOSM.DB
//CONFIG DD DISP=SHR,DSN=EMC.ZOSM.CONFIG.PDS
//SYSPRINT DD SYSOUT=*//EFMMBAT DD SYSOUT=*//SYSUDUMP DD SYSOUT=*//SYSIN DD *
*COMPARE THE PDS*
*COMPARE1 EXEC PGM=IEBCOMPR
**/
COMPARE DATASETS AND DELETE
//SYSPRINT DD SYSOUT=*//SYSUT1 DD DISP=(SHR),DSN=LDSRCE.MVEF24.PDS.TRK
//SYSUT2 DD DISP=(SHR),DSN=LDSRCE.MVEF24.PDS.CYL
//SYSIN DD *
_COMPARE TYPORG=PO/*
//COMPARE2 EXEC PGM=IEBCOMPR
*/
COMPARE DATASETS AND DELETE
//SYSPRINT DD SYSOUT=*//SYSUT1 DD DISP=(SHR),DSN=LDSRCE.MVEF24.PDS.TRK
//SYSUT2 DD DISP=(SHR),DSN=LDSRCE.MVEF24.PDS.BLOCKS
//SYSIN DD *
_COMPARE TYPORG=PO/*
//DELGROUP EXEC PGM=EFMMBAT,PARM='CPFX=WJ,DEBUG=NO',COND=(7,LE)
//STEPLIB DD DISP=SHR,DSN=EMC.ZOSMvrm.TEST.LINKLIB
//EFMMDB DD DISP=SHR,DSN=EMC.ZOSMvrm.TEST.LINKLIB
//CONFIG DD DISP=SHR,DSN=EMC.ZOSMvrm.TEST.LINKLIB
//SYSPRINT DD SYSOUT=*//EFMMBAT DD SYSOUT=*//SYSUDUMP DD SYSOUT=*//SYSIN DD *
********************************************************************
*DELETE GROUP ON WAY OUT*
********************************************************************
IF GROUP LD5070 EXISTS
DELETE LD5070 /*
Sample batch jobs for volume migration

This sample JCL displays the volume groups and their status. If group CF8 has already been promoted, then it is deleted. CF8 is then promoted and activated. After 10 seconds the summary group status displays.

The job waits up to 3600 seconds for the volume group (a migration group) to complete. If the volume group completes within the time limit then one last summary display is issued. Otherwise, command execution immediately ends.

```
//MYJOB1 JOB (EMC),CLASS=A,MSGCLASS=X,LINES=200,
     NOTIFY=&SYSUID
/*
//TESTPCR1 EXEC PGM=EFMMBAT,PARM='CPFX=@$'
//STEPLIB DD DSN=EMC.ZOSMvrm.TEST.LINKLIB,DISP=SHR
//SYSPRINT DD SYSOUT=* 
//CONFIG DD DSN=EMC.ZOSM.CONFIG.PDS,DISP=SHR
//EFMMDB DD DSN=EMC.ZOSM.DB,DISP=SHR
//SYSUDUMP DD SYSOUT=* 
//SYSIN DD *
*
* SAMPLE COMMAND STREAM
*
D GROUPS
IF GROUP CF8 EXISTS
   DELETE CF8
PROMOTE MWCF8
ACTIVATE CF8
MAXWAIT 3600
WAIT 10
D GROUPS
WAIT GROUP CF8 STATUS COMPLETE
IF RC = 4
   QUIT
D GROUPS
*/
```

Sample SYSPRINT output

This example shows a volume migration group.

```
==>
D GROUPS
NAME 1ST-PAIR PAIRS STATUS DEFINITION
CF7 9813/9812 1 NEVER ACTIVE MODE(MIG(SWAP))
SYSRES 1541/2A93 1 COMPLETED MODE(MIG(SPLIT(OFF),,FASTCOPY
** RC=0

==>
WAIT 10
STARTING 10 SECOND WAIT AT 11:34:20

==>
DELETE CF7
EMCF532I GROUP CF7 DELETED
** RC=0

==>
VERIFY SANTA
MEMBER SANTA NOT FOUND
** RC=0

==>
VERIFY LDCF7
EMCF021I PROCESSING CONFIG FILE PARAMETERS
EMCP001I * GROUP NAME:CF7 MEMBER GENERATED BY SMITH
```
EMCP001I * ON Thursday, 17 Dec 2015 AT 07:17:00 FROM: MIGRATE CONTROL
COMMANDS
EMCP001I GROUP(CF7) MODE(MIGRATE(SWAP))
EMCP001I SWAPOPT(CFW(BYPASS))
EMCP001I PAIR SOURCE(9813) TARGET(9812) VERTARG(*NONE*)
** RC=0

==> PROMOTE SANTA
MEMBER SANTA NOT FOUND
** RC=8

==> PROMOTE LDCF7
EMCF021I PROCESSING CONFIG FILE PARAMETERS
EMCP001I * GROUP NAME:CF7 MEMBER GENERATED BY SMITH
EMCP001I * ON Thursday, 17 Dec 2015 AT 07:17:00 FROM: MIGRATE CONTROL
COMMANDS
EMCP001I GROUP(CF7) MODE(MIGRATE(SWAP))
EMCP001I SWAPOPT(CFW(BYPASS))
EMCP001I PAIR SOURCE(9813) TARGET(9812) VERTARG(*NONE*)
** RC=0

===> D GROUPS
NAME 1ST-PAIR PAIRS STATUS DEFINITION
CF7 9813/9812 1 NEVER ACTIVE MODE(MIG(SWAP))
SYSRES 1541/2A93 1 COMPLETED MODE(MIG(SPLÎT(OFF),,FASTCOPY))
** RC=0
*** MAXIMUM RETURN CODE WAS 8
This appendix explains how to determine the serial number of a specific mainframe server. Topics include:

- Determining CPU serial number ................................................................. 290
Determining CPU serial number

Authorization to issue z/OS commands is required in order to determine the serial number of a specific mainframe. The command can be issued from the operator console or via a product such as System Display and Search Facility (SDSF).

- Issue the z/OS command Display Matrix for CPU. The command syntax is:

```
D M=CPU
```

The operating system will issue a Store CPU ID (STIDP) instruction, which returns a double word (8 bytes; 16 digits) of information. The format of this information is as follows:

Table 33 Deciphering D M=CPU output

<table>
<thead>
<tr>
<th>00</th>
<th>nn</th>
<th>xxxx</th>
<th>mmmm</th>
<th>0000</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>2-3</td>
<td>4-7</td>
<td>8-11</td>
<td>12-15</td>
</tr>
</tbody>
</table>

The operating system will display the following information:

```
RESPONSE=MVS1
IEE174I 13.48.57 DISPLAY M 803
PROCESSOR STATUS
ID CPU SERIAL
0 + 4055525995
2 + 6055525995

CPC ND = 05995A.140.AMH.05.00000050686
+ ONLINE - OFFLINE . DOES NOT EXIST
CPC ND CENTRAL PROCESSING COMPLEX NODE DESCRIPTOR
```

The serial number displayed is 4055525995. Using the previous chart, the CPU serial number maps out as follows:

- Version Code is not displayed.
- 40 is the LPID.
- 5552 is the CPU serial number.
- 5995 is the CPU model type.
- Zeros are not displayed.

For more information on the Store CPU ID instruction, refer to the appropriate level of the IBM z/Architecture Principles of Operations manual.
This appendix describes execution and global configuration parameters. Topics include:

- Execution and global configuration parameters .................................................. 292
- System symbols ................................................................................................. 293
- Parameter descriptions ...................................................................................... 294
**Execution and global configuration parameters**

*z/OS Migrator can be configured using execution and global configuration parameters:*

- *z/OS Migrator execution parameters* are specified in the JCL of a migration job. Refer to *Sample batch jobs for volume migration on page 286* for a sample startup JCL of a volume migration job.

- *Global configuration parameters* can be specified in an input file, generally a member of a partitioned dataset. You can specify the file name with the `PARMLIB` execution parameter or with the `//CONFIG` DD statement.

The following parameters are used for both volume and logical migrations unless otherwise specified.

**Note:** A sample member, CONFIG, can be found in `hlq.ZOSM800.SAMPLIB` located in the *z/OS Migrator SAMPLIB*.

Global configuration parameters are specified according to the following format:

- Each record in the configuration member may contain only one operation.
- Comment records are allowed and are indicated with an asterisk (*) in column 1.

*Table 34* provides a summary of *z/OS Migrator execution and global configuration parameters.*

*Table 34*  Execution and global configuration parameters

<table>
<thead>
<tr>
<th>Parameter and page reference</th>
<th>Execution or global configuration parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONGROUP on page 294</td>
<td>Global Configuration only</td>
</tr>
<tr>
<td>CONSTANT_COPY_INT on page 295</td>
<td>Execution or Global Configuration</td>
</tr>
<tr>
<td>CPFX on page 296</td>
<td>Execution or Global Configuration</td>
</tr>
<tr>
<td>DB on page 297</td>
<td>Execution or Global Configuration</td>
</tr>
<tr>
<td>DEBUG on page 298</td>
<td>Execution or Global Configuration</td>
</tr>
<tr>
<td>DIVERSION_SUBSET on page 299</td>
<td>Global Configuration only</td>
</tr>
<tr>
<td>HEARTBEAT_INT on page 300</td>
<td>Execution or Global Configuration</td>
</tr>
<tr>
<td>HEARTBEAT_INT on page 300</td>
<td>Execution or Global Configuration</td>
</tr>
<tr>
<td>IDLE on page 301</td>
<td>Execution or Global Configuration</td>
</tr>
<tr>
<td>LOGINCL/LOGEXCL on page 302</td>
<td>Global Configuration only</td>
</tr>
<tr>
<td>LMPFX on page 303</td>
<td>Execution or Global Configuration</td>
</tr>
<tr>
<td>MAXCIO on page 304</td>
<td>Execution or Global Configuration (MAX_CHANNEL_IO alias)</td>
</tr>
<tr>
<td>MAX_CHANNEL_IO on page 304</td>
<td>Execution or Global Configuration (MAXCIO alias)</td>
</tr>
<tr>
<td>MAXDIO on page 304</td>
<td>Execution or Global Configuration (MAX_DEVICE_IO alias)</td>
</tr>
</tbody>
</table>
The use of system symbols allows for sharing a common global configuration file across z/OS Migrator instances where one instance on a particular z/OS system has legitimate need for different properties from an instance running on another z/OS system.

As an example, assume z/OS Migrator is running on SYSA and SYSA has a ConGroup task called SYSACGRP while another z/OS Migrator is running on SYSB and SYSB has a ConGroup task called SYSBCGRP.

The customer can have two separate CONFIG files, one for SYSA that specifies CONGROUP=SYSACGRP and one for SYSB that specifies CONGROUP=SYSBCGRP.

The customer could also set up a system symbolic (using IEASYMxx - refer to MVS Initialization and Tuning Reference) named CGRPTASK and have a shared CONFIG file for z/OS Migrator.

**Example**

The following example illustrates using system symbols within a shared z/OS Migrator configuration file.

The IEASYMxx entry for SYSA would include:

```
SYMDEF(&CGRPTASK='SYSACGRP')
```

The IEASYMxx entry for SYSB would include:

```
SYMDEF(&CGRPTASK='SYSBCGRP')
```

The entry in the shared CONFIG file for z/OS Migrator would be:

```
CONGROUP=&CGRPTASK
```
The ability to include system symbols in the CONFIG file used with z/OS Migrator allows sharing a single configuration file across a number of z/OS Migrator instances much easier. There are no special changes or configuration steps to use this function. Just include a system symbol (z/OS system-related symbols or self-defined via IEASYMxx) in the configuration file entries.

Using system symbols also extends to the parameters passed using the PARM= string parameter in the z/OS Migrator procedure, though usually normal substitution in the procedure make this less of an desired option than in the CONFIG file. However, if a system symbol is included in the PARM= string, it is translated and parsed properly.

Parameter descriptions

The following parameters are used for both execution and global configurations, unless otherwise noted.

In a few cases where a parameter is limited to either execution or global configuration use only, the parameter is identified with the Caution icon as shown in the following example.

Example

⚠️ CAUTION

This parameter is for global configuration only.

CONGROUP

CONGROUP is a parameter used to specify the started task ID of the EMC Consistency Groups address space on the LPAR for a z/OS Migrator server. The started task ID may be different on different LPARs, so change the value accordingly if different LPARs are used as owning servers. A Modify SETSWAP command will be issued against this task ID to DISABLE/ENABLE congroups to allow the swap to occur, completing the migration.

⚠️ CAUTION

This parameter is for global configuration only.

Syntax

CONGROUP=xxxxxxxxx

Where:

xxxxxxxxx

Is the EMC Consistency Groups started task ID to be used in the z/OS Modify (F) command.

Example

CONGROUP=EMCCNGRP
CONSTANT_COPY_INT

CONSTANT_COPY_INT is a global configuration parameter for Volume Mirror/Volume Migrator. It specifies the update interval in seconds for constant copy mode. The default value is 60 seconds.

**Note:** You can abbreviate **CONSTANT_COPY_INT** as **CCINT**.

Syntax

```plaintext
CONSTANT_COPY_INT=seconds
```

Example

```plaintext
CONSTANT_COPY_INT=55
```
CPFX

CPFX is a parameter that can be used as either an execution or a global configuration parameter. It identifies the command prefix for entering z/OS Migrator server operator commands. The command prefix you enter is registered with z/OS. You can subsequently display the command prefix using the z/OS DISPLAY OPDATA.

Choosing a command prefix

z/OS Migrator supports a command prefix of up to eight characters, any or all of which can be alphabetic, however, a one-or-two-character, non-alphabetic prefix is usually the best choice.

There are special characters that, while allowed under z/OS, are ineligible for use within the command prefix under z/OS Migrator. Those excluded special characters are the equal sign (=), the less than and greater than symbols (<>, the comma (,), the apostrophe ('), the double quote ("), the colon (:), the semi colon (;), the plus sign (+), the hyphen (-) and finally, the left and right parentheses themselves ( ). In addition, as explained under the Command Prefix topic in the Authorized Assembler Services Guide, you are not allowed to use a command prefix that is either a subset or superset of another enabled command prefix. See the Authorized Assembler Services Guide for specifics concerning content and form when setting up a command prefix.

The DISPLAY OPDATA,PREFIX operator command (which can be abbreviated as “D O”) can be used to determine which command prefixes are currently in use.

For example:

```
D O
IEE603I hh.mm.ss OPDATA DISPLAY nnn
PREFIX OWNER SYSTEM SCOPE REMOVE FAILDSP
{ OPCSSATM LDM2 SYSTEM NO PURGE
{ OPCSSATM LDM1 SYSTEM NO PURGE
! OPCSSOSF LDM2 SYSTEM NO PURGE
! OPCSSOSF LDM1 SYSTEM NO PURGE
$ JES2 LDM2 SYSTEM NO SYSPURGE
$ JES2 LDM1 SYSTEM NO SYSPURGE
```

Note: There is no default value for CPFX. If you receive message EFM0047S at server startup, the usual response is to choose another command prefix. It is possible, however, for the server to terminate in a manner that does not deactivate the command prefix. In this case, code “CPFX=(xx,FORCE)” in the startup configuration file.

Syntax

```
CPFX=command_prefix

or

CPFX=(command_prefix[,SYSPLEX][,FORCE])
```
Where:

`command_prefix`

A unique one to eight character string formatted and named according to the standard rules for defining such prefixes.

`SYSPLEX`

Indicates the command prefix should have SYSPLEX scope. The default is System scope.

`FORCE`

Indicates that use of the command prefix by this server should override preexisting usage. The inclusion of this sub-parameter is intended for when the preexisting command prefix was not properly deleted during z/OS Migrator termination processing. The default for registering a command prefix does not allow for reuse. Normally, this sub-parameter should not be included as part of your CPFX specification.

As z/OS Migrator has no way of knowing what a particular command prefix relates to, you MUST USE EXTREME CAUTION when using this subparameter option to avoid overriding a command prefix for another unrelated subsystem (JES2, RACF, and so on).

Example

CPFX=FM

Default

None.

`DB`

The DB parameter can be either an execution or a global configuration parameter. It identifies the fully qualified, cataloged dataset that is the z/OS Migrator database.

**Note:** Step 11: Allocate z/OS Migrator database on page 57 provides more details on the z/OS Migrator database.

Syntax

```
DB=dsname
```

or

```
DB=database__dsn
```

Where:

`dsname`

Is the name of a dataset that is the z/OS Migrator database.

`database__dsn`

A one to 44 character z/OS Migrator database DSN.
Example

```
DB=hlq.ZOSM800.DB
```

Default

None.

**DEBUG**

DEBUG is a parameter used as either an execution or a global configuration parameter. It is used to set various debugging switches, if needed.

⚠️ **CAUTION**

**DEBUG should only be used if requested by EMC Customer Support.**

DEBUG specifies the debug options that can be utilized for problem isolation purposes. The DEBUG parameter can be changed on each LPAR using a system console command. Note that the SET command is not used for this parameter.

**Syntax**

```
cmpdfxDEBUG=mask,mask
```

Where:

- **mask**
  - Is an 8-bit pattern used internally to turn on/off certain tracing information and messages, and is provided by EMC Customer Support.

- **cmdpfx**
  - Is the CPFX value you specified using the CPFX parameter.

**Example**

```
cmpdfxDEBUG=A8A10000,00000000
```

Default

None.
**DIVERSION_SUBSET**

The DIVERSION_SUBSET parameter specified in the CONFIG file lets you define the number of datasets to be serviced within one z/OS ENQ/DEQ serialization event.

The DIVERSION_SUBSET parameter allows for better management of the system-level ENQ/DEQ CATALOG resource during logical migration dataset renaming (initiated and processed during a group's DIVERSION event).

Specifying a non-zero DIVERSION_SUBSET value results in a shorter period of time during which ENQ/DEQ serialization is held for the CATALOG pair (source and target). The overall result would be improved system performance, everywhere the involved CATALOGs are used, during the group's DIVERSION event.

⚠️ **CAUTION**

This parameter is for global configuration only.

**Syntax**

```
DIVERSION_SUBSET=n
```

**Note:** DIVSUB is an alias of DIVERSION_SUBSET.

Where:

\( n \)

Is an integer between 0 and 32,767. The default for \( n \) is 0, indicating that the dataset renaming process will continue to work as it always has, where all the datasets for a given catalog pair will be serviced within one continuous CATALOG ENQ/DEQ event.

If \( n \) is set to any non-zero value, the dataset renaming process will be broken up into units of \( n \) datasets at a time. All components of a dataset, for example, VSAM, sphere or GDG entry, will be included within a diversion subset even if that number exceeds the subset value to ensure all dataset components are processed together.

**Example**

```
DIVERSION_SUBSET=50
```

If a generation data group includes 50 generations, all of them will be included within the same subset even if the diversion subset value is less than 50. However, if the DIVERSION_SUBSET number is reached or exceeded after the inclusion of one or a group of datasets, then selection will be broken off and processing for a catalog pair bracket will proceed.
HEARTBEAT_INT

HEARTBEAT_INT controls how quickly cross-system group status changes are recognized by z/OS Migrator. You should specify a fairly short interval to enhance product responsiveness; for instance, in recognizing configuration and volume group state changes. HEARTBEAT_INT also controls how long the host must be dormant before other z/OS Migrator tasks stop waiting for it to respond.

Syntax

HEARTBEAT_INT=\textit{interval}

Where:

\textit{interval}

Has two meanings:

- The number of seconds between timer-driven reads of the z/OS Migrator database.
- A third of the time in seconds that pass before other systems consider the current system is dormant. In other words, after \( 3 \times \text{intervals} \), other z/OS Migrator systems assume that the current system is no longer functioning and stop waiting for it to respond.

\begin{itemize}
  \item Note: EMC advises that you set HEARTBEAT_INT to the same value on all systems.
\end{itemize}

The minimum value you can use is zero (0). An interval value of zero gives HEARTBEAT_INT a 15 second default. There is no set maximum value, however EMC advises that you do not use a number much higher than the default of 15 seconds. Status changes would take too long to take effect.

Example

\texttt{HEARTBEAT\_INT=10}

Default

15 seconds
IDLE

IDLE is used for logical migrations. It indicates the minimum number of seconds another LPAR must be mute before it is considered IDLE. This value may be altered using the IDLE command and displayed using the D DEBUG MISC command.

If system contention is suspected to cause z/OS Migrator servers to be incorrectly considered idle, the threshold for such judgment can be increased using either the INI parameter IDLE, or the IDLE operator command. If this is an ongoing condition, then the INI file presents the most effective solution. If transient or when first noticed, the command provides an immediate remedy.

The default is 45 seconds; increasing the value by multiples of 15 seconds is the most sensible approach. This value affects the timeout of certain command processes, therefore you should not casually set the value higher than necessary, otherwise the command processor could be adversely affected.

The IDLE parameter can be changed on each LPAR using a system console command. Note that the SET command is not used for this parameter.

Syntax

```
    cmdpfx IDLE=n.nn
```

Where:

- **n.nn**
  - Is the minimum number of seconds another LPAR must be mute before it is considered IDLE.

- **cmdpfx**
  - Is the CPFX value you specified using the CPFX parameter.

Example

```
    cmdpfx IDLE=45
```

Default

- 45 seconds
All logging DDs are supported through dynamic allocation and central logging. Logging is no longer controlled by supplying or not supplying the DD statements. For example, debugging DDs, formerly supplied in the server JCL, are now automatically allocated on demand.

Logging is performed by a central task rather than individual tasks. The DDs allocated can be included or excluded using the following configuration file statements.

⚠️ **CAUTION**

This parameter is for global configuration only.

---

**Note:** The central logging function within z/OS Migrator will automatically be suspended if too many messages are queued for processing. A report of lost lines will be provided at central logging resumption.

---

**Syntax**

```
LOGINCL=(masks_of_log_ddnames_to_generate)
LOGEXCL=(masks_of_log_ddnames_to_suppress)
```

**Example**

```
LOGINCL=(EFMM*)
LOGEXCL=(*DBRE,*LST)
```

**Note:** Normal masking rules apply.
LMPFX

The LMPFX parameter is used for logical migrations.

The z/OS Migrator server places a dataset requiring 10 cylinders of space on each volume that is the target of a migration. z/OS Migrator uses this dataset to communicate the status of mirroring operations for managed dataset extents on the volume.

⚠️ **CAUTION**

The value of LMPFX must be identical for all z/OS Migrator systems.

Syntax

LMPFX=dsn_prefix

Where:

**dsn_prefix**

Is concatenated with ".LMvolser.DB" to form the unique name that the z/OS Migrator server can allocate on each target volume to communicate track mirroring status for managed dataset extents on that volume between all participating instances of z/OS Migrator. As z/OS Migrator appends the 12 character "LMvolser.DB" to the LMPFX specified (volser is the actual volser of the target volume) to establish the dataset name used for the target volume Extent Map file, the LM Prefix can thus be a maximum of 32 characters.

Each generated dataset name must be unique within your environment and if multiple z/OS Migrator instances are being used, the **dsn_prefix** value must be specified in exactly the same way for every participating z/OS Migrator server.

**Note:** Once the logical migration prefix has been decided upon it is very difficult to change it. If this was required, it would be necessary to complete or deactivate all migration groups, shut down all the actively participating z/OS Migrator servers, delete and reallocate the primary z/OS Migrator database, and then perform a z/OS Migrator cold start on all system. All EXTMAP datasets should be excluded from any HSM migration actions that might be performed against the target volume once the migration has completed. If further logical migration could be run to a target volume, the dataset must either be resident or have been deleted prior to any subsequent migrations.

Example

LMPFX=hlq.EXTMAP

This creates a hlq.EXTMAP.LMxxxxxx.DB extent map dataset on every target volume, where xxxxxx is the target volume serial number.

Default

None.
MAXCIO

Same as MAX_CHANNEL_IO described on page 304.

MAX_CHANNEL_IO

Specifies the maximum number of concurrent I/O requests that should be issued to a channel during the Copy phase or Mirror Synchronization phase.

The MAX_CHANNEL_IO limit applies to any active I/O against a channel group, whether read or write. If the source and target devices are on the same channel group, z/OS Migrator allows total concurrent I/O requests on the channel to equal the value specified.

Together, MAXIO, MAX_CHANNEL_IO, and MAX_DEVICE_IO control the scheduling and distribution of concurrent I/O requests.

**Note:** You can also write this parameter as MAXCIO.

The MAX_CHANNEL_IO parameter can be changed on each LPAR using a system console command. Note that the SET command is not used for this parameter.

**Note:** Refer to the z/OS Migrator Best Practices whitepaper for recommendations on setting this parameter, or use the default value.

**Syntax**

```
cmdpfx MAX_CHANNEL_IO=number_of_requests
```

Where:

- `number_of_requests`
  - Is the maximum number of concurrent I/O requests. The smallest value is 0. There is no theoretical maximum value; however, the largest practical value is the current MAXIO value.

- `cmdpfx`
  - Is the CPFX value you specified using the CPFX parameter.

**Example**

```
cmdpfx MAX_CHANNEL_IO=5
```

**Default**

25

MAXDIO

Same as MAXDEVICE_IO described on page 304.
MAX\_DEVICE\_IO

MAX\_DEVICE\_IO specifies the number of concurrent I/O requests that can be issued to a device during migration or mirror synchronization. If you do not specify a value, z/OS Migrator uses a default of three (3). The maximum value is five (5). The minimum value is zero (0). If you enter zero or do not specify MAX\_DEVICE\_IO, z/OS Migrator uses the default of 3.

Together, MAXIO, MAX\_CHANNEL\_IO, and MAX\_DEVICE\_IO control the scheduling and distribution of concurrent I/O requests.

**Note:** You can also write this parameter as MAXDIO.

The DEVICE parameter can be changed on each LPAR using a system console command. Note that the SET command is not used for this parameter.

**Note:** Refer to the *z/OS Migrator Best Practices* whitepaper for recommendations on setting this parameter, or use the default value.

**Syntax**

```
cmdpfx MAX\_DEVICE\_IO=number\_of\_requests
```

Where:

- `number\_of\_requests`
  - Is the maximum number of concurrent I/O requests.
- `cmdpfx`
  - Is the CPFX value you specified using the CPFX parameter.

**Example**

```
cmdpfx MAX\_DEVICE\_IO=2
```

**Default**

```
3
```

MAXIO

MAXIO determines the maximum overall number of I/O requests that can be active at one time on the server. Since I/O buffers and control areas are allocated based on the MAXIO value, choose a number appropriate to the resources available.

**CAUTION**

This parameter has a direct impact on the amount of page fixed memory used by z/OS Migrator. Too large a value can negatively affect overall system performance or exhaust available page space.

Approximately 1 MB of memory is allocated for each integer you add to the MAXIO specification; for example, 25 MB for a MAXIO value of 25. The memory allocation is fixed during active I/O.
Together, MAXIO, MAX_CHANNEL_IO, and MAX_DEVICE_IO control the scheduling and distribution of concurrent I/O requests.

**Note:** Refer to the z/OS Migrator Best Practices whitepaper for recommendations on setting this parameter, or use the default value.

**Syntax**

```
MAXIO=number_of_requests
```

Where:

- `number_of_requests` is the maximum number of overall requests that can be active at one time on the server. The minimum value is 0. If you choose 0, or do not specify a MAXIO value, the number of overall requests defaults to 25.

**Example**

```
MAXIO=15
```

**Default**

25

**MAXVOL**

This optional parameter sets the default value for the maximum number of volumes that will be copied concurrently for each active group.

For example, MAXVOL=5 causes z/OS Migrator to limit the number of active volume copies to 5 for each group currently in the copy phase. The actual number of concurrent copy I/O operations may be further limited by the MAXIO, MAXCIO, and MAXDIO values.

If you specify a MAXVOL value that is larger than MAXIO or MAXDIO, you may notice that the first few volume pairs are serviced slowly until the remaining volumes are less than MAXIO/MAXDIO values. The volume pairs may appear to be out of step with the rest, but they are being serviced correctly and completely.

You can automatically adjust the MAXDIO value when this is detected. For example, if MAXIO=15 and MAXDIO=3, when MAXVOL=5, the volume pairs appear to be serviced in a timely manner. If MAXVOL=6, then you may see the slow behavior described above, where the first volume didn’t appear to be serviced until the end.

If MAXVOL is omitted, then the number of concurrent copies is controlled solely by the MAXIO, MAXCIO, and MAXDIO values.

**Syntax**

```
MAXVOL=number_of_volumes
```

**Example**

```
MAXVOL=5
```
**MAXTRK**

This optional parameter specifies the size of I/O operation in tracks, that is, z/OS Migrator’s I/O copy operations are to transfer less than a full cylinder (1 extent) of data. The MAXTRK value is used to reduce the application response time impact of z/OS Migrator Copy operations, immediately following Activation.

For example: MAXTRK=5 causes z/OS Migrator to move one extent in three I/O operations, dividing the time the device is unavailable to application I/O operations into three short windows, as opposed to a single, longer window.

**Syntax**

\[ \text{MAXTRK=n} \]

Where:

\[ n \]

Is a value from 1 to 15.

**Example**

\[ \text{MAXTRK=5} \]

**OPTIONS**

Sets various processing options in logical migrations.

**CAUTION**

The default settings should be used unless otherwise directed by EMC Customer Support. You can reset option values using the z/OS Migrator operator SET command.

**Syntax**

\[ \text{OPTions=value} \]

Where value is one of the following:

**ACTVCMP | NOACTVCMP**

This option is used for logical (dataset) migration only. Active completion allows the source volumes to potentially be varied offline without recycling the processes using source datasets. NOACTVCMP is the default setting.

**ALLOWGENSRC | NOALLOWGENSRC**

Allows users to specify the following in their logical group definitions:

\[ \text{SET SOURCE (DSN(**))} \]

NOALLOWGENSRC is the default.
This option can also be set as a processing option:

SET ALLOWGENsrc ON|OFF

**Note:** Refer to **SET** on page 182 for related information.

**AUTOCLN** | **NOAUTOCLN**

AUTOCLN causes the server to automatically remove interfaces and delete common resources at shutdown with no active groups. AUTOCLN is the default setting.

**AUTODEL** | **NOAUTODEL**

This option is used for logical (dataset) migration. AUTODEL causes the group control blocks to automatically be freed once the group completes. AUTODEL is the default setting.

**AUTOHK** | **NOAUTOHK**

AUTOHK causes a group activation to automatically reactivate the system interfaces. AUTOHK is the default setting.

**AUTOTRM** | **NOAUTOTRM**

This option is used for logical (dataset) migration only. Automatic Termination means that groups will immediately attempt to go to completion as soon as divert status is achieved. Otherwise the **COMP**lete command must be issued. AUTOTRM is the default setting.

**PATHVAL** | **NOPATHVAL**

Determines whether z/OS Migrator performs the Path Validation process for all source and target devices in the volume migration group undergoing activation.

This validation is one of the first things done at volume migration group activation. For each source device in the volume group, path validation services check everywhere that the device is online and ensure that an instance of z/OS Migrator is running. If z/OS Migrator is NOT found on any system where the source is online, error message EFMM290E is issued and the activation is aborted.

Similarly, for each target device in the volume group, path validation services check to ensure the device is offline everywhere. A target device found online results in error message EFMM290E and again the activation is aborted.

Each source and target device is checked for SOFT and SPID Fencing (if the device supports this path validation detection). If a source or target device is found to be in the SOFT or SPID Fenced state, the activation is aborted.

PATHVAL is the default and results in full path validation services for all source and target devices in the activated volume groups.

NOPATHVAL results in NO path validation checking for any devices in the volume groups.

This global OPTIONS feature is valid only with volume migration groups. z/OS Migrator message EFMM290E through EFMM299E illustrate issues that might arise during path validation.
It is STRONGLY recommended that PATHVAL be selected or defaulted to. The NOPATHVAL OPTION should only be used at the direction of EMC technical staff or when the customer COMPLETELY understands the impact and risk.

**PREVENTVARY | NOPREVENTVARY**

The PREVENTVARY|NOPREVENTVARY option in the z/OS Migrator configuration file prevents duplicate volume labels by invalidating the VOL1 label on the target volume at the beginning of the migration. During the completion of the migration, the VOL1 label is corrected. NOPREVENTVARY is the default setting.

The PREVENTVARY option only applies to volume migrations groups and not to Volume Mirror or Consistent groups.

**REFVTOC | NOREFVTOC**

REFVTOC allows you to optionally invoke the IBM utility ICKDSF to automatically perform a REFVTOC for the any target volume that is larger than its corresponding source volume. REFVTOC rebuilds the VTOC at its current location for the current track size. Set this option when you suspect there is a mismatch between your VTOC and VTOC INDEX, or between your VTOC or VTOC INDEX and a physical device. NOREFVTOC is the default setting.

This option supports Swap and Split (Online) volume groups, including consistent migration, but does not support Mirror, Split (Offline) or Constant Copy volume groups.

For non-supported groups, or when the option is not automatic, a message is generated recommending user action.

**Note:** Automatic REFVTOC is avoided for offline devices because it destroys the VTOC index, resulting in a volume with serious performance issues.

Refer to related information on setting this option from the environment command SET on page 182.

The user ID associated with the REFVTOC started task must be granted corresponding access via the installed security product to issue the REFORMAT option of the ICKDSF command process. As an example, for RACF, this involves ensuring the user ID associated with the REFVTOC started task has the necessary access to the known FACILITY class profiles established to protect this and any other ICKDSF functions.

The specific FACILITY class profile protecting REFORMAT is STGADMIN.ICK.REFORMAT.

Contact your systems programmer/security administrator for assistance in ensuring this ability for the REFVTOC started task user ID.

---

1. The name of the REFVTOC started task is EFMRFVTC unless overridden via the REFVTASK global configuration parameter. Refer to “REFVTASK” on page 312 for details.
The z/OS Migrator external REFVTOC started task EMCRFVTC (or customer defined task name) is initiated at migration group's end or via the REFVTOC command. Be sure to keep the z/OS Migrator server task active through to EMCRFVTC task completion. EMCRFVTC requires access to the internal queues and services provided by your z/OS Migrator instance. If z/OS Migrator is terminated prematurely, the EMCRFVTC started task is automatically terminated. While this issue applies only to the owner instance (where the migration group was run), it is suggested to allow all ancillary tasks to complete before terminating any z/OS Migrator instances.

ROUTEMSG | NOROUTEMSG

ROUTEMSG is the default and allows for the routing of AutoSwap messages from all participating and connected MFE/SCF instances across all LPARs on which our complex of z/OS Migrator instances are running. This ensures that all AutoSwap messages issued from any of the associated MFE/SCF tasks are automatically routed back to the z/OS Migrator instance which 'owns' the associated group for which AutoSwap services have been requested. This provides for a fairly complete and chronologically accurate history of the migration event which now includes all of the AutoSwap information that in prior releases had to be gathered manually and integrated into the started task output. The z/OS Migrator instance on which a group is activated becomes the 'owner' of the group and is the repository for the routed messages handled via this parameter.

NOROUTEMSG indicates we do not want to route AutoSwap messages from the participating MFE/SCF tasks across the LPARs on which our z/OS Migrator instances are running. This behavior results in no change from how z/OS Migrator processed its own messages as well as the MFE/SCF AutoSwap messages.

RTDCHK | NORTDCHK

Determines whether z/OS Migrator performs in-depth VTOC free space analysis on the source device to ensure Real Time Defrag (RTD) product is not actively managing the source device(s) involved in volume migration.

RTDCHK allows for additional checking of the device VTOC during both activation copy cycle start and final copy before device pair completion. RTD is incompatible with z/OS Migrator device migration processing due to RTD's method of DSCB update. If RTD and z/OS Migrator are both working with a device, during migration, there is a window where data integrity cannot be guaranteed on the target device due to the timing of DSCB updates by RTD. RTDCHK allows for more in-depth free space analysis to detect that RTD is working with a device.

If RTD is detected at start of copy and FASTCOPY has been specified for the group, the copy is modified to be FULLCOPY to ensure all tracks are included in the copy. This is the only case where the migration is allowed to continue when RTD is determined to be potentially active on a device.

If RTD is detected at the end of the device migration, z/OS Migrator has no alternative other than to cancel the device migration to ensure data integrity between the source and target devices.
IMPORTANT

It is strongly recommended that RTD be brought down on all systems with access to the devices in use by z/OS Migrator for its migration events. If you are absolutely certain RTD is not going to run anywhere within your environment, the NORTDCHK parameter can be set to bypass this additional VTOC free space analysis during migration.

The default setting in the absence of this parameter is RTDCHK to avoid any data integrity scenarios while z/OS Migrator is active.

**SDUMP | NOSDUMP**

SDUMP results in an SDUMP being taken at any server failure. SDUMP is the default setting.

**TRMCENQ | NOTRMCENQ**

This option is used for logical (dataset) migration. TRMCENQ means that z/OS Migrator will issue an ENQ request against the target datasets during the migration. TRMCENQ is the default setting.

**VIOREFV | NOVIREFV**

Determines whether volume migration call to ICKDSF uses VIO or SYSALLDA for dynamic allocation of IXSYSIN and IXSYSPR ddnames.

During REFVTOC processing, the call to ICKDSF performs dynamic allocations for both IXSYSIN and IXSYSPR ddnames. To avoid any potential contention with z/OS, it is suggested to use VIO rather than SYSALLDA for the dynamic allocation calls. In many installations, if VIO is not available, SYSALLDA is used. Check with your SMS DASD group to validate what would work best for your site.

The default setting in the absence of this parameter is VIOREFV to avoid any possible contention during automated REFVTOC processing via started task EFMRFVTC initiated by z/OS Migrator.

**VMPATHV | NOVMPATHV**

Determines whether the z/OS Migrator Path Validation process is impacted by z/VM Hypervisor managed online PGID entries returned for devices that may be online to z/OS guests running under z/VM.

PATHVAL/NOPATHVAL determines whether path validation is invoked in the first place at volume group activation. VMPATHV/NOVMPATHV determines whether returned online VM PGID entries abort the activation. Again, with path validation active (PATHVAL), for each source device in the volume group, path validation services check everywhere that the device is online and ensure that an instance of z/OS Migrator is running. Similarly, for each target device in the volume group, path validation services checks to ensure the device is offline everywhere. The safest approach is to vary the device(s) offline to all z/OS guests, detach them and then vary offline from z/VM. If you are satisfied that z/OS Migrator is active on all z/OS systems, guest or native, where update could take place, the NOVMPATHV OPTIONS setting can be considered to avoid issues with returned online VM PGIDs. VMPATHV is the default.
It is STRONGLY recommended that VMPATHV be selected or defaulted to. The NOVMPATHV OPTION should only be used at the direction of EMC technical staff or when the customer COMPLETELY understands the impact and risk.

Example

```
OPTIONS=ACTVCMP
```

Default

All the option defaults are positive values, with the exception of NOACTVCMP, NOPREVENTVARY, NOALLOWGENSRC & NOREFVTOC. Refer to SET on page 182 for more information on setting the default behavior for the REFVTOC parameter.

**PARMLIB**

This is an execution parameter for Volume Mirror/Volume Migrator.

The PARMLIB execution parameter specifies (optionally) the configuration parameter file in which certain global configuration parameters are specified.

**Note:** The parameter file must be a partitioned dataset. This file may also be specified with the //CONFIG JCL statement.

CFG is an alias of PARMLIB.

⚠️ **CAUTION**

This parameter is for execution only.

**Syntax**

```
PARMLIB=dsname(member)
```

**Where:**

*dsname*

The name of a partitioned dataset that is the parameter file.

*member*

The member of the partitioned dataset that holds the parameter library.

**REFVTASK**

Specifies (overrides) the started task ID used to initiate automatic, batched REFORMAT REFVTOC request processing at the end of a volume migration group eligible for REFVTOC processing and for which smaller to larger migration requests were processed.

The REFVTASK parameter allows for the use of customer-defined and protected naming standards by overriding the default task name EFMRFVTC.
As each REFVTOC request is written for batched processing at group end, a specialized control block is written to a queue anchored to the z/OS Migrator global area. This @DWREFV control block holds all of the information necessary for the call to ICKDSF to perform the REFVTOC for the target device in question. All REFVTOC requests are queued to the same chain off the z/OS Migrator global control area. Each invocation of EFMRFVTC (or the overridden task name) will process all @DWREFV control blocks for all groups that are no longer active.

A consistent migration group is an example of a group for which REFVTOC requests would exist and the group would still be active. This group requires a user-initiated SWAP command once all device pairs have reached MIRROR status, at which point the group itself is then in MIRROR status. Once the group SWAP completes, the EFMRFVTC task is again initiated to process all REFVTOC requests queued during the consistent migration.

The z/OS Migrator external REFVTOC started task EMCRFVTC (or customer defined task name) is initiated at migration group's end or via the REFVTOC command. Be sure to keep the z/OS Migrator server task active through to EMCRFVTC task completion. EMCRFVTC requires access to the internal queues and services provided by your z/OS Migrator instance. If z/OS Migrator is terminated prematurely, the EMCRFVTC started task is automatically terminated. While this issue applies only to the owner instance (where the migration group was run), it is suggested to allow all ancillary tasks to complete before terminating any z/OS Migrator instances.

### Syntax

```
REFVTASK=taskname
```

Where:

- `taskname`

  The name of the z/OS Migrator REFVTOC started task to be used to process all REFVTOC requests.

### Example

```
REFVTASK=EMCREFV
```

### Default

```
EFMRFVTC
```

### SSID

SSID can be used as either an execution parameter or as a configuration parameter. Volume migrations and logical (dataset) migrations are operated within a subsystem. This parameter identifies the subsystem you are using.

SSID has two parameter aliases, SUBNAME and SUBSYS. You can use either parameter to specify the subsystem.

**Note:** Refer to “Choosing a subsystem identifier” on page 315 for instructions on choosing a subsystem name.
Syntax

SSID=SubsystemID

Where:

SubsystemID

The name of the subsystem.

SSUB#

SSUB# specifies the number of concurrent service subtasks within the z/OS Migrator server that can simultaneously perform work.

⚠️ CAUTION

This option should only be used if requested by EMC Customer Support.

Syntax

SSUB#=number

Where:

number

Is the number of subtasks that will be initiated.

The SSUB# must be greater than 4. If the value is less than 4, a limitation error is issued and the process will skip to the end of the command.

Example

SSUB#=8

Default

10

START

The START parameter is an execution parameter. z/OS Migrator stores its operating parameters in common storage. This parameter determines whether these operating parameters are retained between executions.

⚠️ CAUTION

This parameter is for execution only.

Syntax

START=WARM | COLD
Where:

**WARM**

(Default) The operating parameters persist between executions of z/OS Migrator. (HOT start can be used interchangeably with a WARM start.)

**COLD**

The operating parameters are discarded between executions of z/OS Migrator and new I/O interfaces are installed. If you perform a COLD start after a prior startup in the same IPL, all devices in all Volume Migrator groups are deactivated. However, deactivation does not occur if this start is the initial start for the IPL.

*Note:* “SSID” on page 313 provides more information.

**SUBNAME**

z/OS Migrator server operates within a z/OS subsystem. The SUBNAME parameter identifies the subsystem identifier you choose.

SUBNAME is an alias for SSID. Refer to SSID on page 313.

*Note:* This does not correspond with the hardware SSID.

**Choosing a subsystem identifier**

You should decide on a three- or four-character subsystem identifier that is unique across the installation. The DISPLAY SSI, LIST operator command (can be abbreviated to “D SSI,L”) can be used to determine which subsystems are currently active and/or defined on each system.

For example:

```
D SSI,L
IEFJ100I  hh.mm.ss  SSI DISPLAY  nnn
SUBSYS=JES2 (PRIMARY)
  DYNAMIC=YES  STATUS=ACTIVE  COMMANDS=REJECT
SUBSYS=MSTR
  DYNAMIC=NO  STATUS=ACTIVE  COMMANDS=N/A
SUBSYS=LOGR
  DYNAMIC=YES  STATUS=ACTIVE  COMMANDS=REJECT
SUBSYS=SMS
  DYNAMIC=YES  STATUS=ACTIVE  COMMANDS=REJECT
SUBSYS=RACF
  DYNAMIC=YES  STATUS=ACTIVE  COMMANDS=REJECT
SUBSYS=EMC
  DYNAMIC=YES  STATUS=ACTIVE  COMMANDS=ACCEPT
SUBSYS=GOAL
  DYNAMIC=NO  STATUS=INACTIVE  COMMANDS=N/A
```

It is important that the chosen subsystem name does not match the z/OS Migrator started task cataloged procedure name, unless you intend to start z/OS Migrator under control of the MSTR subsystem, with no SYSOUT data definitions, and with the cataloged procedure saved in the IEFPDSI library specified in the Master JCL.
If, for any reason, you decide to use the same name (for example, z/OS Migrator) for both the subsystem and the cataloged procedure, either the SYSDUT DD statements must be removed and the cataloged procedure moved to the IEFPSI library, or the start command must specify the primary job entry subsystem. For example:

S ZOSM, Sub=JES2

Syntax

SUBNAME=subsystemID

Where:

subsystemID

Is the name you specify for the subsystem.

Example

SUBNAME=EMCF

Default

None.

SUBSYS

SUBSYS can be used as either an execution parameter or a configuration parameter. The z/OS Migrator server operates within a subsystem. The SUBSYS parameter identifies the subsystem you are using.

SUBSYS is an alias of SSID. Refer to SSID on page 313.

Note: Refer to “Choosing a subsystem identifier” on page 315 for instructions on choosing a subsystem name.

Syntax

SUBSYS=subsystemID

Where:

subsystemID

Is the name of the subsystem.

Example

SUBSYS=EMCF
SWAPOPT

SWAPOPT specifies swap options at the global level in volume migrations. You can override these at the group level with the volume group configuration parameter SWAPOPT.

**Note:** If you omit setting parameters through SWAPOPT, SCF AutoSwap sets values for these parameters. Defaults for these and other swap options can be found in the *EMC Mainframe Enablers AutoSwap for z/OS Product Guide*.

**Syntax**

```
SWAPOPT=(option_1[,option_2[,...],option_n]])
```

Where:

*option* can be as follows:

**Note:** Any option not specified defaults to the SCF-specified default behavior.

- **ALLOWCONCURRENTCOPY | NOALLOWCONCURRENTCOPY**
  
  Concurrent Copy may be allowed (ALLOWCC) or not allowed (NOALLOWCC) by swap processing.

  Concurrent Copy creates sessions in which a local point-in-time copy of data is created. The location of this data depends on whether the data has been updated or not. This mapping is kept in the local VMAX system. Remote VMAX systems (at the other end of SRDF links) have no knowledge of these sessions. If you swap devices involved in Concurrent Copy sessions, the sessions are lost. If you do not want to lose these sessions, EMC suggests you do not place these sessions on swappable devices. AutoSwap cannot prevent use of Concurrent Copy sessions. But AutoSwap can identify their existence, and may be used to control the swap environment.

- **ALLOWSYSTEMSCOUNTMISMATCH | NOALLOWSYSTEMSCOUNTMISMATCH**

  Specifies to allow (ALLOWSYSCM) or not allow (NOALLOWSYSCM) other LPARs to be running with connectivity to VMAX but without EMCSCF running.

- **ALLOWCOUPLEDDATASETS | NOALLOWCOUPLEDDATASETS**

  Specifies whether to allow (ALLOWCPL) or not allow (NOALLOWCPL) volumes with Couple datasets to participate in a swap operation.

- **ALLOWPAGE | NOALLOWPAGE**

  Specifies whether to allow (ALLOWPAGE) or not allow (NOALLOWPAGE) volumes with Common or PLPA page datasets, or CA/OPS SYSCHK1 or OPSLOG file types, to participate in a swap operation. ALLOWPAGE is mutually exclusive with the CONSISTENT parameter.

- **CFW=NO | OFF | RESume | BYPASS | OFF VALidation**

  Controls swap behavior relative to cache fast write (CFW).
NO

Indicates that CFW must be inactive for the SWAP to occur.

OFF

Indicates that CFW will be turned off on the source device VMAX system, if it is active.

RESume

Indicates that CFW will be turned off on the source device VMAX system if it is active during the swap and then back on after the swap. If CFW is active, then it is enabled for the target device VMAX system.

BYPASS

Indicates that CFW processing will be ignored.

OFFVALidation

Indicates that CFW will be turned off during group validation.

VOLumePrefix(pp)

Specifies a two-character prefix (pp) to be used to modify the source device’s volser after a successful swap. The full volser will be ppccccu, where the prefix will be followed by the device MVS cuu.

You can use this parameter to assure that, if mounted, the source volume has a unique volser from the migration target. If you use dashes for the two characters (VOLumePrefix(--)), there will be no volser relabel.

The volume prefix value is applied to the z/OS device number (CUU) to form the new volser. For example, if the z/OS device number of the source device is 054C and you select the VOLUMEPREFIX(ZZ) value, the resulting volser is ZZ054C.

TRACE

TRACE activates a diagnostic trace in volume migrations.

⚠️ CAUTION

TRACE should only be used under the direction of EMC Customer Support.

Syntax

TRACE ON|OFF

Where:

ON

Activates the diagnostic trace during a volume migration.

OFF

(Default) Ensures the diagnostic trace is not activated in a volume migration.
This appendix provides the possible reason, state and message return codes generated by z/OS Migrator. Topics include:

- EFMM message reason and state codes ............................................................ 320
- z/OS Migrator group error reason codes ............................................................ 325
- z/OS Migrator return codes ............................................................................... 328
- ABEND codes ..................................................................................................... 331
- Reading/writing the z/OS Migrator security record ........................................... 336
- EMC Mainframe Enablers error and reason codes ............................................. 337
**EFMM message reason and state codes**

The following tables list the reason and state codes found in messages EFMM301W, EFMM303I, and EFMM304I. Refer to the z/OS Migrator Message Guide for detailed description of these messages.

### EFMM301W, EFMM303I, and EFMM304I

Table 35 lists the suspend reason codes, which are the nnn value in nnn-mmm message fields or are the only value in simple reason code fields.

#### Table 35  Suspend reason codes (1 of 4)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Valid reason not set.</td>
</tr>
<tr>
<td>1</td>
<td>Target I/O failed; detected in EFMMHPST.</td>
</tr>
<tr>
<td>2</td>
<td>Target I/O could not be processed as the channel program scan of the source channel program failed.</td>
</tr>
<tr>
<td>3</td>
<td>No storage could be obtained from the EFMMIOSM interface for the requested target device channel program. Expansion could not be performed as the server was unavailable.</td>
</tr>
<tr>
<td>4</td>
<td>Suspended by user request (for example, by an operator command).</td>
</tr>
<tr>
<td>5</td>
<td>At completion of the target I/O, the source I/O status could not be determined as it is no longer queued.</td>
</tr>
<tr>
<td>6</td>
<td>Suspend request via ECA.</td>
</tr>
<tr>
<td>7</td>
<td>Could not determine the state of an inactive target. No DWGIOQ elements available. Server has either not initialized or has cleaned up.</td>
</tr>
<tr>
<td>8</td>
<td>A write was requested to a source device where the target device was not defined (for example, a target device is missing).</td>
</tr>
<tr>
<td>9</td>
<td>User withdraw requested.</td>
</tr>
<tr>
<td>10</td>
<td>Suspended channel program detected in IOS backend; these channel programs are currently unsupported.</td>
</tr>
<tr>
<td>11</td>
<td>Mirror I/O failed. Detected in EFMMHDIE.</td>
</tr>
<tr>
<td>12</td>
<td>Could not initiate a target I/O for a source write. No DWGIOQ elements available. Server has either not initialized or has cleaned up.</td>
</tr>
<tr>
<td>13</td>
<td>During volume verify processing (read/check VOL1 sequence), a target state change has been detected. The target was active, but is now inactive or suspended.</td>
</tr>
<tr>
<td>14</td>
<td>A format write of cylinder 0 track 0 has been detected on the source device. This I/O cannot be mirrored as it will invalidate the target VOL1 label.</td>
</tr>
<tr>
<td>15</td>
<td>A VOL1 label write request was being processed for VOL1 not conforming to the standard VOL1 format.</td>
</tr>
</tbody>
</table>
### Table 35  Suspend reason codes (2 of 4)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Suspend request via polling. Server detected suspend in VOL1 label during poll period.</td>
</tr>
<tr>
<td>17</td>
<td>New extent request failed for logical processing.</td>
</tr>
<tr>
<td>18</td>
<td>Dataset rename processing failed for logical processing. Detected in IGGPRE00 processing.</td>
</tr>
<tr>
<td>19</td>
<td>The target device of a logical migration has been boxed. Detected in ENF (EFMMENFV) processing.</td>
</tr>
<tr>
<td>20</td>
<td>The target device is not accessible (for example, boxed or permanent error). Detected in EFMMHSIO processing.</td>
</tr>
<tr>
<td>21</td>
<td>Target I/O failed. Detected in EFMMIORQ.</td>
</tr>
<tr>
<td>22</td>
<td>Related target I/O failed; detected in EFMMIORQ (for example, RCVOL1).</td>
</tr>
<tr>
<td>23</td>
<td>During extent verify processing (read/check extent sequence), a target state change has been detected. Mirroring was active, but is now inactive or suspended.</td>
</tr>
<tr>
<td>24</td>
<td>During extent verify processing (read/check extent sequence), a target state change has been detected such that a diverted extent is no longer diverted. This is an illegal state change.</td>
</tr>
<tr>
<td>25</td>
<td>A channel program has been encountered that is not wholly satisfied by a single extent (DWEXT).</td>
</tr>
<tr>
<td>26</td>
<td>A channel program has been encountered that is accessing a DWEXT with DWEXT_ERR_PVTIO set. This can occur if the source and target extents no longer match correctly and any access to the extents could cause a data integrity issue.</td>
</tr>
<tr>
<td>27</td>
<td>A channel program has been encountered that is accessing a DWEXT marked as unfinished (DWEXT_ST_NEW) but not deferred (DWEXT_ST_DEFER). No extent translation can occur for these extents.</td>
</tr>
<tr>
<td>28</td>
<td>A snap error has occurred.</td>
</tr>
<tr>
<td>29</td>
<td>A snap error has occurred; new extent cannot be serviced.</td>
</tr>
<tr>
<td>30</td>
<td>The extent file cannot be accessed during logical mirroring/migration processing.</td>
</tr>
<tr>
<td>31</td>
<td>Target I/O failed. Detected in x (available).</td>
</tr>
<tr>
<td>32</td>
<td>During logical processing, a target extent has been scratched. For example, the target file has been deleted during mirroring. Detected in DADSM processing.</td>
</tr>
<tr>
<td>33</td>
<td>During logical processing, a source extent has been scratched. For example, the source file has been deleted during diversion. Detected in DADSM processing.</td>
</tr>
<tr>
<td>34</td>
<td>Synchronization has been canceled.</td>
</tr>
<tr>
<td>35</td>
<td>Synchronization processing has failed.</td>
</tr>
<tr>
<td>36</td>
<td>The new extent cannot be serviced as the server is not active.</td>
</tr>
</tbody>
</table>
Reason, State and Message Return Codes

Table 35  Suspend reason codes (3 of 4)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>The new extent is added as suspended as the current extents on this device are marked suspended for this dataset (that is, it is a sympathetic suspend).</td>
</tr>
<tr>
<td>38</td>
<td>New volume extend requested in a mixed SMS migration. The source and target are not both SMS or non-SMS and the source is extending to a new volume.</td>
</tr>
<tr>
<td>39</td>
<td>A channel program has been encountered that is accessing a DWEXT with DWEXT_ST_TERM set, source space reuse is not active and the accessing UCB is not a DWUCB. This can occur if access is made to the source after @DWTERM FREE is performed or if @DWTERM FREE processing has not updated all application extent structures.</td>
</tr>
<tr>
<td>40</td>
<td>UCB swap condition; detected in EFMMHDSE.</td>
</tr>
<tr>
<td>41</td>
<td>Target I/O failed. Detected in x (available).</td>
</tr>
<tr>
<td>50</td>
<td>Channel program is self-modifying and cannot be duplicated.</td>
</tr>
<tr>
<td>51</td>
<td>Channel program contains special commands which cannot be processed.</td>
</tr>
<tr>
<td>52</td>
<td>A RS code was returned which cannot be processed.</td>
</tr>
<tr>
<td>53</td>
<td>A RS code was returned from the storage manager (SCNSMGR) which cannot be processed.</td>
</tr>
<tr>
<td>54</td>
<td>Channel scan logic failed for a VOL1 access channel program. This should not occur as the channel program was previously scanned successfully.</td>
</tr>
<tr>
<td>55</td>
<td>An internal parameter error occurred.</td>
</tr>
<tr>
<td>56</td>
<td>An internal storage error occurred. Check SYSLOG for message EFMM310I for additional information.</td>
</tr>
<tr>
<td>57</td>
<td>An internal logic error occurred.</td>
</tr>
<tr>
<td>58</td>
<td>An abend occurred in an FM monitor routine.</td>
</tr>
<tr>
<td>64</td>
<td>This is a reserved value that should not be used.</td>
</tr>
<tr>
<td>100</td>
<td>DDTSIO interface disabled due to ABEND threshold reached.</td>
</tr>
<tr>
<td>101</td>
<td>Post status interface disabled due to ABEND threshold reached.</td>
</tr>
<tr>
<td>102</td>
<td>IOSDIE interface disabled due to ABEND threshold reached.</td>
</tr>
<tr>
<td>103</td>
<td>EFMMHMHIH interface disabled due to ABEND threshold reached.</td>
</tr>
<tr>
<td>104</td>
<td>EFMMHPRV interface disabled due to ABEND threshold reached.</td>
</tr>
<tr>
<td>105</td>
<td>DDTEOS interface disabled due to ABEND threshold reached.</td>
</tr>
<tr>
<td>106</td>
<td>EFMMIORQ service ABENDed.</td>
</tr>
<tr>
<td>107</td>
<td>EFMMHTIO interface disabled due to ABEND threshold reached.</td>
</tr>
<tr>
<td>108</td>
<td>EFMMHPRS interface disabled due to ABEND threshold reached.</td>
</tr>
<tr>
<td>109</td>
<td>EFMMHS00 interface disabled due to ABEND threshold reached.</td>
</tr>
</tbody>
</table>
Table 35  Suspend reason codes (4 of 4)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>EFMMHDSE interface disabled due to ABEND threshold reached.</td>
</tr>
<tr>
<td>151</td>
<td>An invalid DWGDEV was located via DWINDX.</td>
</tr>
<tr>
<td>152</td>
<td>A source&gt;target mismatch was detected.</td>
</tr>
<tr>
<td>153</td>
<td>A device entry to UCB mismatch was detected.</td>
</tr>
<tr>
<td>154</td>
<td>An invalid active target device chain was detected.</td>
</tr>
<tr>
<td>155</td>
<td>An extent mismatch was detected in logical processing. The start extent in the DWEXT did not match the extent map.</td>
</tr>
<tr>
<td>156</td>
<td>An extent mismatch was detected in logical processing such that the source/target devices do not match the DWGDEV where the extent was located.</td>
</tr>
<tr>
<td>157</td>
<td>An invalid parameter was passed to the extent monitor processing via the channel scan logic.</td>
</tr>
<tr>
<td>158</td>
<td>Invalid DWGROUP located.</td>
</tr>
<tr>
<td>241</td>
<td>Suspend due to ConGroup suspend.</td>
</tr>
<tr>
<td>242</td>
<td>Suspend due to SRDF Host Component suspend.</td>
</tr>
<tr>
<td>255</td>
<td>Suspend reason unknown.</td>
</tr>
</tbody>
</table>

Table 36 and Table 37 show the state codes, which are the mmm in the nnn-mmm message fields.

For physical volumes, state specifies the current volume state. Table 36 lists the possible physical volume state values.

Table 36  Suspend physical volume state codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>VOL1 label is overlaid.</td>
</tr>
<tr>
<td>1</td>
<td>Device error detected (DWVOL1_MWERR).</td>
</tr>
<tr>
<td>3</td>
<td>Device mirroring suspended (DWVOL1_MIRRS).</td>
</tr>
<tr>
<td>4</td>
<td>Device in pending mirror mode (DWVOL1_PNDMW).</td>
</tr>
<tr>
<td>5</td>
<td>Device in constant copy mode (DWVOL1_COPYM).</td>
</tr>
<tr>
<td>6</td>
<td>Device in migration mode (DWVOL1_MIGRM).</td>
</tr>
<tr>
<td>7</td>
<td>Device mirroring deactivate (DWVOL1_MIRRD).</td>
</tr>
<tr>
<td>31</td>
<td>Device error detected (DWVOL1_MWERR+DWVOL1_MIRRI).</td>
</tr>
<tr>
<td>33</td>
<td>Device mirroring inconsistent; suspended (DWVOL1_MIRRS+DWVOL1_MIRRI).</td>
</tr>
<tr>
<td>37</td>
<td>Device mirroring inconsistent; deactivate (DWVOL1_MIRRD+DWVOL1_MIRRI).</td>
</tr>
<tr>
<td>254</td>
<td>Target device could not be accessed.</td>
</tr>
<tr>
<td>255</td>
<td>Cannot determine mode.</td>
</tr>
</tbody>
</table>
For logical extents, state specifies the current logical resource state. 

Table 37 lists the possible logical extent state values.

**Table 37** Suspend logical extent state codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>DWEXT is overlaid.</td>
</tr>
<tr>
<td>1</td>
<td>Extent error detected (DWEXT_ERR_DETECT).</td>
</tr>
<tr>
<td>3</td>
<td>Extent mirroring suspended (DWEXT_SUSP_SUSPEND).</td>
</tr>
<tr>
<td>4</td>
<td>Extent in pending mirror mode (DWEXT_ST_PNDMIRR).</td>
</tr>
<tr>
<td>5</td>
<td>Extent in constant copy mode (DWEXT_CCOPY)</td>
</tr>
<tr>
<td>6</td>
<td>Extent in migration mode (DWEXT_LMIG).</td>
</tr>
<tr>
<td>8</td>
<td>Diversion illegal; inactivate (DWEXT no longer set to DWEXT_ST_PNDIVERT or DWEXT_ST_DIVERT).</td>
</tr>
<tr>
<td>255</td>
<td>Cannot determine mode.</td>
</tr>
</tbody>
</table>
z/OS Migrator group error reason codes

Table 38 lists group error reason codes that may appear in z/OS Migrator messages, for example, message EFM0586E.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>SECONDARY NOT FOUND</td>
</tr>
<tr>
<td>225</td>
<td>ERROR INSERTING INTERFACE</td>
</tr>
<tr>
<td>226</td>
<td>ERROR REMOVING SYSTEM INTERFACE</td>
</tr>
<tr>
<td>231</td>
<td>I/O DRIVER FAILED TO START</td>
</tr>
<tr>
<td>242</td>
<td>CSC ERROR DURING GROUP ADD</td>
</tr>
<tr>
<td>243</td>
<td>CSC ERROR DURING DEVICE VALIDATION</td>
</tr>
<tr>
<td>244</td>
<td>SWAP ERROR</td>
</tr>
<tr>
<td>245</td>
<td>LM EAV DEVICES NOT ALLOWED @420</td>
</tr>
<tr>
<td>248</td>
<td>TARGET WAS ONLINE</td>
</tr>
<tr>
<td>250</td>
<td>TARGET HAD WRONG VOLSER</td>
</tr>
<tr>
<td>251</td>
<td>TARGET WASN'T EMPTY</td>
</tr>
<tr>
<td>252</td>
<td>RACF AUTH TEST FAILED FOR VOLUME</td>
</tr>
<tr>
<td>253</td>
<td>REJECTED DUE TO SAR</td>
</tr>
<tr>
<td>254</td>
<td>SCF NOT ACTIVE</td>
</tr>
<tr>
<td>1001</td>
<td>DEACTIVATED BY USER</td>
</tr>
<tr>
<td>1002</td>
<td>WORK AREA GETMAIN FAILED</td>
</tr>
<tr>
<td>1003</td>
<td>ERROR BUILDING MIGRATION BLOCK</td>
</tr>
<tr>
<td>1004</td>
<td>ERROR BUILDING I/O BLOCK</td>
</tr>
<tr>
<td>1005</td>
<td>ERROR WRITING VOLUME LABEL - MIR</td>
</tr>
<tr>
<td>1006</td>
<td>ERROR WRITING VOLUME LABEL - PNDMIRR</td>
</tr>
<tr>
<td>1007</td>
<td>ERROR WRITING VOLUME LABEL - MIG</td>
</tr>
<tr>
<td>1008</td>
<td>CSC ERROR</td>
</tr>
<tr>
<td>1009</td>
<td>SDDF OPEN ON PRIMARY FAILED</td>
</tr>
<tr>
<td>1010</td>
<td>SDDF OPEN ON MIRROR FAILED</td>
</tr>
<tr>
<td>1011</td>
<td>SDDF RESET ON PRIMARY FAILED</td>
</tr>
<tr>
<td>1012</td>
<td>SDDF RESET ON MIRROR FAILED</td>
</tr>
<tr>
<td>1013</td>
<td>SDDF GET ON PRIMARY FAILED</td>
</tr>
<tr>
<td>1014</td>
<td>SDDF GET ON MIRROR FAILED</td>
</tr>
<tr>
<td>1015</td>
<td>SDDF SET ON PRIMARY FAILED</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>1016</td>
<td>SDDF SET ON MIRROR FAILED</td>
</tr>
<tr>
<td>1017</td>
<td>SET ECA FAILED</td>
</tr>
<tr>
<td>1018</td>
<td>RESERVE FAILED</td>
</tr>
<tr>
<td>1019</td>
<td>RESERVE FAILED</td>
</tr>
<tr>
<td>1020</td>
<td>COPY-TRACKS ERROR</td>
</tr>
<tr>
<td>1021</td>
<td>UCB ADDRESS HAS CHANGED</td>
</tr>
<tr>
<td>1022</td>
<td>LOCKED BY ANOTHER PRODUCT</td>
</tr>
<tr>
<td>1023</td>
<td>CONFLICTING MIGRATOR USAGE</td>
</tr>
<tr>
<td>1024</td>
<td>CONFLICTING CONGROUP/SWAP USAGE</td>
</tr>
<tr>
<td>1025</td>
<td>A MIRROR DEVICE HAS BEEN SUSPENDED</td>
</tr>
<tr>
<td>1026</td>
<td>SOME DEVICES UNADDRESSABLE</td>
</tr>
<tr>
<td>1027</td>
<td>SOMEONE ELSE OWNS GROUP</td>
</tr>
<tr>
<td>1028</td>
<td>FUNCTION NOT LICENSED</td>
</tr>
<tr>
<td>1029</td>
<td>NO DATA SETS SELECTED</td>
</tr>
<tr>
<td>1030</td>
<td>SNAP DETECTED ERROR</td>
</tr>
<tr>
<td>1031</td>
<td>SNAP PARSING ERROR</td>
</tr>
<tr>
<td>1032</td>
<td>UCB Validation error</td>
</tr>
<tr>
<td>1033</td>
<td>Key error</td>
</tr>
<tr>
<td>1034</td>
<td>Group too large for quantity key</td>
</tr>
<tr>
<td>1035</td>
<td>Divert fail-group inactive</td>
</tr>
<tr>
<td>1036</td>
<td>Divert fail-diverted already</td>
</tr>
<tr>
<td>1037</td>
<td>Divert fail-not mirroring</td>
</tr>
<tr>
<td>1038</td>
<td>Divert fail-new extent pending</td>
</tr>
<tr>
<td>1039</td>
<td>Divert verification failed</td>
</tr>
<tr>
<td>1040</td>
<td>Divert fail-inactive server</td>
</tr>
<tr>
<td>1041</td>
<td>Divert fail-not Constant Copy</td>
</tr>
<tr>
<td>1042</td>
<td>Divert fail-not owner</td>
</tr>
<tr>
<td>1043</td>
<td>Divert fail-some errors</td>
</tr>
<tr>
<td>1044</td>
<td>Verify complete</td>
</tr>
<tr>
<td>1045</td>
<td>Verify error</td>
</tr>
<tr>
<td>1046</td>
<td>SETSWAP error - see log</td>
</tr>
<tr>
<td>1047</td>
<td>Incorrect version of SNAP</td>
</tr>
<tr>
<td>1048</td>
<td>Local paging or NOALLOWPAG</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>1049</td>
<td>Device not defined to SCF/HCD</td>
</tr>
<tr>
<td>1050</td>
<td>QVRY returned unspecified error</td>
</tr>
<tr>
<td>1051</td>
<td>Group Validation error</td>
</tr>
<tr>
<td>1052</td>
<td>Dynamic Volume Expansion (DVE) detected for source device in group</td>
</tr>
<tr>
<td>1053</td>
<td>VTOC DSCB/VPSM space mismatch during Copy phase</td>
</tr>
<tr>
<td>1054</td>
<td>Source cylinder count &gt; target cylinder count</td>
</tr>
<tr>
<td>1055</td>
<td>Group not known to all z/Migrator hosts</td>
</tr>
</tbody>
</table>
z/OS Migrator return codes

The return codes documented in this section are in decimal notation unless otherwise stated.

**EFMMMAIN**

0  **Cause:** Normal exit from z/OS Migrator. z/OS Migrator sessions completed successfully.
   **Action:** None.

4  **Cause:** One or more warning messages were issued by z/OS Migrator. z/OS Migrator sessions completed successfully.
   **Action:** Review the output from the migration job. Evaluate the warning messages and respond accordingly.

8  **Cause:** One or more error messages were issued by z/OS Migrator. One or more volume migrations did not complete successfully.
   **Action:** Review the output from the master migration job and all agent systems. Evaluate the error messages and respond accordingly.

12  **Cause:** One or more severe error messages were issued by z/OS Migrator. One or more volume migrations did not complete successfully.
   **Action:** Review the output from the master migration job and all agent systems. Evaluate the error messages and respond accordingly.

**EFMMUKEY**

General purpose register 15 on completion of EFMMUKEY contains both the reason code in bits 0-15 and the return code in bits 16-31.

0  **Cause:** Successful execution. EFMMUKEY completed normally.
   **Action:** None.

200  **Cause:** BLDL error. EFMMUKEY completed in error. The reason code in bits 0-15 is the return code from the BLDL macro request.
   **Action:** Evaluate the return code from BLDL and respond accordingly. Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.
   If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

204  **Cause:** The EFMMKEYS load module has multiple text records, or its format is invalid. EFMMUKEY completed in error.
   **Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.
If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

208 Cause: TTR conversion error. The TTR returned by the BLDL macro is not valid for the SECCOM dataset.

EFMMUKEY completed in error. The reason code in bits 0-15 is the non-zero return code from IECPCNVT.

Action: Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

212 Cause: Unsuccessful I/O operation (Read). EFMMUKEY completed in error.

The first eight bits of the reason code are copied from the ECB used for the EXCP request. Refer to a description of the IOBECBCC field in the DFSMS/MVS documentation to interpret this value.

Action: Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

216 Cause: Unsuccessful I/O operation (Write). EFMMUKEY completed in error.

The first eight bits of the reason code are copied from the ECB used for the EXCP request. Refer to a description of the IOBECBCC field in the DFSMS/MVS documentation to interpret this value.

Action: Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

220 Cause: GETMAIN error. EFMMUKEY completed in error.

The reason code in bits 0-15 is the return code from the GETMAIN macro request.

Action: Evaluate the return code from GETMAIN and respond accordingly. If the problem persists, review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

224 Cause: RDJFCB error. EFMMUKEY completed in error.

The reason code in bits 0-15 is the return code from the RDJFCB macro request.
Action: Evaluate the return code from RDJFCB and respond accordingly. If the problem persists, review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

228 Cause: Bad buffer address. The I/O buffer address which was passed by the caller to EFMMUKEY was zero. Probable programming error. EFMMUKEY completed in error.

Action: Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

232 Cause: Invalid function code. EFMMUKEY completed in error.

The requested function was not “Read,” “Update” or “Read with reserve.” Probable programming error.

Action: Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.
ABEND codes

This section lists all ABEND codes, in numerical order.

U0101

**Cause:** Syntax error in the supplied execution parameter.

Detecting CSECT: EFMMVTOC

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

U0103

**Cause:** Open failure for the SYSPRINT output file.

Detecting CSECT: EFMMVTOC

The reason code is the return code from the OPEN SVC, SVC 19.

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

U0104

**Cause:** Unexpected return code from the UCBSCAN service.

Detecting CSECT: EFMMVTOC

The reason code is comprised of the UCBSCAN reason code in bits 0-15 and the UCBSCAN return code in bits 16-31.

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

U0105

**Cause:** Dynamic allocation failed for a VTOC.

Detecting CSECT: EFMMVTOC

The parameters used were:

```
DSN=FORMAT4.DSCB,DISP=SHR,UNIT=SYSALLDA,VOL=SER=volser
```

The reason code is the return code from SVC 99. R14 contains the address of the dynamic allocation request block.
**U0106**

**Cause:** RDJFCB failed for the dynamically allocated FORMAT4.DSCB dataset (VTOC).

Detecting CSECT: EFMMVTOC

The reason code is the return code from SVC 64 (RDJFCB).

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

**U0107**

**Cause:** Open failure for the Volume Table of Contents (VTOC) on the dynamically allocated volume.

Detecting CSECT: EFMMVTOC

The reason code is the return code from SVC 22.

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

**U0108**

**Cause:** Five second interrupt for VTOC OPEN processing.

Detecting CSECT: EFMMVTOC

SDRPVTOC normally recovers from this internally generated notification abend and will continue normal processing. If it does not, SDRPVTOC will terminate the step.

The reason code is the device number currently being processed.

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

**U4001**

**Cause:** z/OS Migrator execution is terminated.

Detecting CSECT: EFMMMAIN, EFMMRTNM
**Action:** Contact the EMC Customer Support Center for assistance.

**U4003**

**Cause:** z/OS Migrator execution is terminated.
Detecting CSECT: EFMMMAIN, EFMMRTNM

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

**U4008**

**Cause:** TRANSWAP error.
Detecting CSECT: EFMMINIT

z/OS Migrator execution is terminated.

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

**U4010**

**Cause:** Unable to obtain storage.
Detecting CSECT: EFMMMAIN

z/OS Migrator execution is terminated.

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

**U4011**

**Cause:** Unable to obtain storage for the main z/OS Migrator control block from the ECSA subpool.
Detecting CSECT: EFMMMAIN

z/OS Migrator execution is terminated.

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.
U4012

**Cause:** z/OS Migrator execution is terminated.

Detecting CSECT: EFMMRTNV

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

U4013

**Cause:** Unable to obtain storage.

Detecting CSECT: EFMMMAIN

z/OS Migrator execution is terminated.

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

U4014

**Cause:** Unable to obtain storage.

Detecting CSECT: EFMMMAIN

z/OS Migrator execution is terminated.

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

U4015

**Cause:** Unable to obtain storage.

Detecting CSECT: EFMMMAIN

z/OS Migrator execution is terminated.

**Action:** Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

U4039

**Cause:** Out of save area stack entries.

Detecting CSECT: EFMMCMSG, EFMMINIT, EFMMRTNM, EFMMRTNV, EFMMVUCB
z/OS Migrator execution is terminated.

Action: Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

U4040

Cause: LOAD macro failed for a z/OS Migrator module.

Detecting CSECT: EFMMMAIN

z/OS Migrator execution is terminated.

The name of the module that could not be loaded into virtual storage is placed into general purpose registers 4 and 5. The ABEND reason code contains, in bits 0-15, the original hexadecimal abend code from the LOAD macro and, in bits 16-31, the corresponding reason code.

For example, if the module name in GPR 4 and 5 could not be found in the STEPLIB library, the reason code will be “08060004.”

Action: Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.

U4095

Cause: Save area stack indicator corrupted.

Detecting CSECT: EFMMCMMSG, EFMMINIT, EFMMRTNM, EFMMRTNV, EFMMVUCB

z/OS Migrator execution is terminated.

The z/OS Migrator save area stack entry word 0 indicates that the entry is neither free or in use.

Action: Review the JOB log and SYSLOG for errors. Search the EMC Knowledgebase on the EMC Online Support website for applicable solutions relating to this message ID.

If further assistance is needed, contact the EMC Customer Support Center for technical assistance. Ensure you have all relevant job documentation available.
Reading/writing the z/OS Migrator security record

Table 39 documents all possible return codes and their meaning from the program for reading/writing the z/OS Migrator security record.

**Table 39 z/OS Migrator security record return codes**

<table>
<thead>
<tr>
<th>Return code decimal (hex)</th>
<th>Description</th>
<th>Reason/action</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 (00)</td>
<td>Successful</td>
<td>Normal return code. Authorization is good.</td>
</tr>
<tr>
<td>200 (C8)</td>
<td>BLDL error</td>
<td>Missing SECCOM DD statement or dataset does not exist or is misspelled.</td>
</tr>
<tr>
<td>204 (CC)</td>
<td>BLDL list in error</td>
<td>EFMMKEYS load module has multiple text records or the format is invalid.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact the EMC Customer Support Center for technical assistance.</td>
</tr>
<tr>
<td>208 (D0)</td>
<td>TTR conversion error</td>
<td>Verify that JCL is correct. Contact the EMC Customer Support Center for technical assistance.</td>
</tr>
<tr>
<td>212 (D4)</td>
<td>Unsuccessful I/O operation (read)</td>
<td>The first eight bits of RC are copied from the ECB used for the EXCP request. Refer to description of IOBECBCC field in the DFSMS/z/OS documentation. Contact the EMC Customer Support Center for technical assistance.</td>
</tr>
<tr>
<td>216 (D8)</td>
<td>Unsuccessful I/O operation (write)</td>
<td>The first eight bits of RC are copied from the ECB used for the EXCP request. Refer to description of IOBECBCC field in the DFSMS/z/OS documentation. Contact the EMC Customer Support Center for technical assistance.</td>
</tr>
<tr>
<td>220 (DC)</td>
<td>GETMAIN error</td>
<td>Unable to allocate required storage. Rerun job.</td>
</tr>
<tr>
<td>224 (E0)</td>
<td>RDJFCB error</td>
<td>Dataset does not exist or is misspelled.</td>
</tr>
<tr>
<td>228 (E4)</td>
<td>Bad buffer address</td>
<td>Verify that JCL is correct. Contact the EMC Customer Support Center for technical assistance.</td>
</tr>
<tr>
<td>232 (E8)</td>
<td>Invalid function code</td>
<td>Verify that JCL and input statements are correct. Contact the EMC Customer Support Center for technical assistance.</td>
</tr>
</tbody>
</table>
EMC Mainframe Enablers error and reason codes

Many of the values you receive from z/OS Migrator are numeric return and reason codes from EMC Mainframe Enablers products, such as TimeFinder/Clone Mainframe Snap Facility, TimeFinder/Mirror, and ResourcePak Base.

Table 40 lists the EMC manuals that describe these codes.

<table>
<thead>
<tr>
<th>For a list and explanation of</th>
<th>refer to the following manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>TimeFinder/Clone Mainframe Snap Facility error codes</td>
<td>TimeFinder/Clone Mainframe Snap Facility Product Guide</td>
</tr>
<tr>
<td>TimeFinder/Mirror error codes</td>
<td></td>
</tr>
<tr>
<td>DOIO error codes</td>
<td></td>
</tr>
<tr>
<td>VMAX interface error codes</td>
<td></td>
</tr>
<tr>
<td>User abend codes</td>
<td></td>
</tr>
<tr>
<td>Group Name Service reason codes</td>
<td>ResourcePak Base for z/OS Product Guide</td>
</tr>
<tr>
<td>SAICALL error codes</td>
<td></td>
</tr>
<tr>
<td>SCF abend codes</td>
<td></td>
</tr>
</tbody>
</table>
This appendix describes the structure of the ICF catalog. Topics include:

- Overview ............................................................................................................. 340
- Catalog management considerations ............................................................... 341
- Catalog diagnostic recommendations ............................................................... 342
Overview

As z/OS Migrator is a dataset-level migration tool that includes updating the information in the ICF catalog, it is very important that you have a high-level outline of ICF catalog structure to help you perform diagnostics for the pre-migration process.

The ICF catalog records are stored in two components: the basic catalog structure (BCS) and the VSAM volume dataset (VVDS). The BCS can be considered the main catalog, whereas VVDS can be considered an extension of the VTOC. A BCS can point to multiple VVDSs and a VVDS can point to multiple BCSs, which signify a one-to-many relationship.

The BCS is a VSAM KSDS and its primary function is to point to the volumes on which a dataset is located. The BCS is created when either a user or master catalog is defined using Access Method Services (AMS). A BCS does not have to be on the same volume as the dataset it references, and there can be more than one BCS on a volume.

The VVDS is a VSAM ESDS that contains information required to process VSAM datasets. In a Storage Management Subsystem (SMS) environment, it also contains the volume-related information for non-VSAM SMS-managed datasets. There is one VVDS on each DASD volume that contains a VSAM or SMS-managed dataset cataloged in an ICF catalog. The VVDS is always on the same volume as the datasets it references. For this reason, any volume containing a BCS will also contain a VVDS because the BCS is itself a VSAM dataset.

The records in both the VVDS and BCS consists of variable length cells and subcells. The two cell types that are often referred to are the VSAM volume record (VVR) and the non-VSAM volume record (NVR), which are both held in the VVDS. The VVR contains information relating to VSAM datasets and the NVR contains information relating to non-VSAM SMS-managed datasets. Most datasets will have entries in only one VVDS except multi-volume datasets, which can have entries in the VVDS of each volume to which they are allocated (type Q for a secondary record).

<table>
<thead>
<tr>
<th>Information</th>
<th>VSAM dataset</th>
<th>SMS-managed non-VSAM dataset</th>
<th>Non-SMS non-VSAM dataset</th>
<th>Uncataloged datasets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>BCS</td>
<td>BCS</td>
<td>BCS</td>
<td>n/a</td>
</tr>
<tr>
<td>Dataset Type</td>
<td>BCS</td>
<td>BCS</td>
<td>BCS</td>
<td>n/a</td>
</tr>
<tr>
<td>Association</td>
<td>BCS</td>
<td>BCS</td>
<td>BCS</td>
<td>n/a</td>
</tr>
<tr>
<td>Ownership</td>
<td>BCS</td>
<td>BCS</td>
<td>BCS</td>
<td>n/a</td>
</tr>
<tr>
<td>SMS Class info</td>
<td>BCS &amp; VVDS</td>
<td>BCS &amp; VVDS</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Dataset Attributes</td>
<td>VVDS</td>
<td>VVDS &amp; VTOC</td>
<td>VTOC</td>
<td>VTOC and/or VVDS</td>
</tr>
<tr>
<td>Extent Description</td>
<td>VVDS &amp; VTOC</td>
<td>VTOC</td>
<td>VTOC</td>
<td>VTOC and/or VVDS</td>
</tr>
<tr>
<td>Catalog Name</td>
<td>VVDS</td>
<td>VVDS</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Catalog management considerations

Separate catalog(s) and unique target dataset high-level qualifiers should be established as part of the migration planning process. The use of dedicated catalogs and unique target high-level qualifiers will mitigate catalog growth impact of adding large numbers of target dataset entries and will simplify the management of post-migration dataset deletion tasks.

BCS record types

Each cell in each catalog record has a cell type field. The first cell type field in each record is also the record type field (or ID) identified by the DIAGNOSE command. The following are the possible BCS ID record types and their one-character identifiers:

- A – non-VSAM dataset
- B – generation data group
- C – cluster
- D – data component
- E – VSAM extension record
- G – Alternate index
- H – GDS
- I – Index component of a cluster
- J – GDG extension cell
- L – library
- R – path
- T – true name
- U – user catalog connector
- W – volume
- X – alias

VSAM volume record (VVR)

- Type Z for a primary record.
- Type Q for a secondary record and for datasets allocated with IMBED **.
- Type N Non-VSAM Record (NVR) for non-VSAM datasets.
Catalog diagnostic recommendations

As z/OS Migrator logical migration data movement involves alterations to the catalog environment including the BCS, VVDS and VTOC structures, it is essential that any logical migrations start with a healthy catalog structure. This includes the critical step of verifying the candidate datasets are all cataloged correctly on all system(s) to which z/OS Migrator will require access. IBM's IDCAMS as well as a number of other third-party Catalog tools can be used to perform these required diagnostics.
This appendix describes how to run tests and report issues for diagnostic purposes. Topics include:

- Reporting results ............................................................................................... 344
- z/OS Migrator group syntax (for logical migrations only) ............................... 344
- z/OS Migrator unresponsive, no apparent activity ............................................. 348
- z/OS Migrator diagnostic facilities .................................................................... 350
- Obtaining a z/OS Migrator address space dump ................................................ 352
Reporting results

It is expected that all executions of z/OS Migrator will be successful, however, unexpected results may occur. To ensure that any issues or problems are addressed as soon as possible, it is requested that all problems be documented with the appropriate supporting documentation to facilitate timely problem-resolution.

z/OS Migrator group syntax (for logical migrations only)

z/OS Migrator group syntax allows user selection of various levels of diagnostic messaging.

If recreating a problem situation, include the DEBUG(EXTRA) setting on the GROUP statement. This will produce relevant data from your migration. For example:

```
GROUP(TEST3) MODE(LMIGR()) REPLACE(YES) REUSE(NO) TOLALLOF(Y) - DEBUG(EXTRA)
```

Requested information for diagnostics

As part of the diagnostic process, the following information is requested:

1. All the SYSOUT from the z/OS Migrator server(s) output, as well as all JESMSGLG, JESJCL, and JESYSMSG. This should be saved in a dataset using the SDSF command, PRINT ODSN, or via the use of SDSF action "SE", and creating an ISPF member for each SYSOUT DD output.

   The progress through the test phases can be annotated in the server log using a "COMMENT" command entered at the SDSF console command field. Enter the command prefix followed by an asterisk and text up to 70 characters, for example:

   ```
   @*$I just started the test job
   ```

   In logical migrations only, there are operator commands that will put the documentation in the server job log, for example:

   ```
   Display Groups
   Display Group groupname
   Display DSN
   Display DSN groupname
   Display DSN dsn-mask
   Display MEM EXT dsn-mask
   Display PROC groupname
   ```

   Users should familiarize themselves with these commands and think of them as situations present themselves. For example, if a group or test job seems to be hung, having a few of these displays in the log at the time will help.

2. In logical migration only, execute the z/OS Migrator COMPARE utility when the group state is "Mirror Active" for all datasets in the group.

   **Note:** If the COMPARE utility is used in a multi-LPAR environment, it is possible to have mismatches as the other LPARs are not prevented from updating the data while the COMPARE is running. If a mismatch occurs, it is recommended that the comparison be rerun. If the same mismatch occurs, this may indicate a problem, but it is not conclusive.
3. If requested by EMC Customer Support, turn on the z/OS Migrator event tracing. Use the TRACE ON EID=123 command. The EID must match the value specified in the USR=GTF option, referenced in step 4.

Select the appropriate diagnostic information. The DEBUG flags may be specified to diagnose various functions in z/OS Migrator. Specify `cmdpfx=DEBUG 0000FFFF,FFFF0000` to trace all I/O function processing. Other debug flags may be requested depending on the nature of the problem. Note that tracing will have a performance impact on z/OS Migrator processing.

Recommended DEBUG flags for typical testing:

```
DEBUG A8A10000,00000000
```

4. If a problem occurs that appears to be related to the I/O processing during the Mirroring or Diversion phases, then a GTF trace is recommended for the related volume:

```
//GTFMGS8   PROC TRACE='HLQ.GTF.TRACE28',MBR=GTFMGS
//*
//IEFPROC   EXEC PGM=AHLGTF,REGION=6M,
//          PARM='MODE=EXT,BLOK=500K,AB=40K,TIME=YES'
//IEFORDER  DD   DISP=SHR,DSN=&TRACE
//SYSLIB    DD   DSN=HLQ.JCL.LIB(&MBR),DISP=SHR
```

Where the SYSLIB input is as follows, change the device range in the IO=SSCH list to match the devices to be traced.

```
TRACE=IOP,SSCHP,CCWP,CSCH,HSCCH,MSCH,PCI,USR
IO=SSCH=({sourcecuu-sourcecuu,targetcuu-targetcuu})
* for a range of source and target cuu's
USR=(123)
CCW=(SI,CCWN=256,DATA=256,IOSB) END
```

To turn tracing on the server:

```
TRACE ON,EID=123
```

**Note:** Only start the trace once you are mirroring, otherwise it will get too many logs.

Set debug flags:

```
cmdpfx=DEBUG A8A10000,00000000
```

where `cmdpfx` is the CPFX currently in use.

5. Provide application-related sysout or log showing errors.

6. Write an English language narrative of what the job was expected to do and how the result differed from the expected results. Make clear references to phases (ACTIVATE, MIRROR, P-DIVERT, and so forth), where reported error messages, anomalies or unexpected results occurred.

7. Provide LOGREC data. Many z/OS Migrator errors are captured as software records in LOGREC. This includes ABEND information in addition to symptom records, which will be created to describe particular error situations.

Ensure that the LOGREC on the current system is recording.
Following any tests, execute IFCEREP1 to generate LOGREC software records.

- If each system records to its own dataset:

  ```
  /XPALSFT PROC
  /STEP1 EXEC PGM=IFCEREP1,PARM='CARD'
  /EREPP   DD  SYSOUT=*  
  /TOURIST DD  SYSOUT=* 
  /
  /SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
  /ACCDEV DD DUMMY
  /
  /SYSIN DD DSN=SYS3.DEVELOP.PROCLIB(PALSFTI),DISP=SHR
  ```

- The following example assumes that all systems record to a logstream:

  ```
  // SET LOGRECOU='DSN-for-logrec-output' < where logrec is to write the records
  // SET LOGRECIN='logrec-logstream-input' < logstream for logrec
  //*
  //DELIT   EXEC PGM=IEFBR14
  //SYSPRINT DD  SYSOUT=*  
  //ACCDEV   DD  DISP=(MOD,DELETE),DSN=&LOGRECOU,
  //         VOL=vvvvvv,UNIT=SYSALLDA,SPACE=(CYL,(20,20)),
  //         DCB=(RECFM=VB,BLKSIZE=12000)
  //*
  //DETAIL  EXEC PGM=IFCEREP1,PARM=('HIST,ACC=Y,ZERO=N,TABSIZE=4096K',
  //'*     'PRINT=NO')
  /
  /TOURIST DD  SYSOUT=* 
  //EREPP   DD  SYSOUT=* 
  /DIRECTWK DD UNIT=VIO,SPACE=(CYL,(100,100))
  /
  /SYSIN DD DUMMY
  /ACCIN DD DISP=SHR,DSN=&LOGRECIN,
  //         RECFM=VB,BLKSIZE=4000,
  //         SUBSYS=(LOGR,IFBSEXIT,
  //         FROM=(yyys/julians,hh:mm:ss-s),TO=(yyye/juliane,hh:mm:ss-e),LOCAL')
  //*
  //ACCDEV DD  DISP=(,CATLG),DSN=&LOGRECOU,
  //         UNIT=SYSALLDA,SPACE=(CYL,(20,20)),
  //         DCB=(RECFM=VB,BLKSIZE=12000)
  //*
  ```

Where:

- **DSN-for-logrec-output** is the fully qualified dsname of the output dataset. It will be created.

- **logrec-logstream-input** is the fully qualified dsname of the logstream containing logrec data.

- **vvvvvv** is the volser.

- **yyys** is the year for starting date.

- **julians** is the Julian date of the day to start (without the year).

- **hh:mm:ss-s** is the start time (24 hr clock).

- **yyye** is the year for ending date.

- **juliane** is the Julian date of the day to end (without the year).

- **hh:mm:ss-e** is the end time (24 hr clock).

Date/time specification example:

```
'FROM=(2016/113,16:40:00),TO=(2016/113,17:20:00),LOCAL')
```
Send the raw data to EMC Customer Support personnel. Note that the sample JCL for LOGREC in logstream extracts the records to a flat file. The flat file MUST be compressed and then sent in binary format.

8. In logical migration only, a dump of the VTOC, VTOCIX and VVDS for all volumes in the z/OS Migrator group before z/OS Migrator processing begins and after the anomaly. The following utilities are recommended; formatted LISTCAT output is useful as well:

- **EMCSNAP:**

  ```
  DEBUG DATASET ( [ INDDNM(ddname) ] | [ SOURCE(dsname) ] )
  ```

  Where either `ddname` or `dsname` can be used.

  Run once with the source dataset and a second time with the target dataset.

- **Dump a VTOC:**

  ```
  AMASPZAP
  //PALPRINT JOB (EMC),CLASS=A,MSGCLASS=X
  /**
  //PRNTVTOC EXEC PGM=AMASPZAP,PARM='IGNIDRFULL'
  //SYSPRINT DD SYSOUT=* 
  //SYSLIB DD DISP=SHR,DSN=FORMAT4.DSCB,KEYLEN=44,
  // VOL=SER=PALSRC,UNIT=SYSALLDA
  //SYSIN DD *
  ABSDUMPT ALL
  /**
  ```

- **AMASPZAP**

  Dump the VVDS and VTOCIX:

  ```
  AMASPZAP
  //PALIDCAM JOB ,'IDCAMS',CLASS=A,MSGCLASS=X
  //STEP1 EXEC PGM=IDCAMS
  //VVDSDD DD DSN=SYS1.VVDS.VPALSRC,DISP=SHR,
  // VOL=SER=PALSRC,UNIT=SYSALLDA
  //VTOCIXDD DD DSN=SYS1.VTOCIX.PALSRC,DISP=SHR,
  // VOL=SER=PALSRC,UNIT=SYSALLDA
  //SYSPRINT DD SYSOUT=* 
  //SYSSIN DD *
  PRINT INFILE(VVDSDD)
  PRINT INFILE(VTOCIXDD)
  //
  ```
z/OS Migrator unresponsive, no apparent activity

If processing hangs, look at the job log and the messages and determine if time-stamped messages are being produced. If no activity is evident from the job log message stream, issue the following commands at the console or through SDSF, using the defined command prefix:

Display Group groupname
Display MEM Group groupname
Display PROC groupname

Display any GRS conflicts - D GRS,C - and display the unit status of the z/OS Migrator control file volume and any volumes involved in z/OS Migrator testing if practical.

Interrogating the dataset allocation status

Use the following GRS command on all the LPARs participating in the migration. The dataset name can be specified in full, or as one or more high level qualifiers followed by an asterisk.

D GRS,RES=(SYSDSN,dataset name)

Requesting an address space dump

The DUMP COMM command takes an SVC dump that will be written to the dump datasets as defined by your site's system standards.

To request an SVC dump:

1. Take an SVC dump of the server address space:
   
   DUMP COMM=(Description of the z/OS Migrator Symptom)

2. At the prompt, enter the following:

   **Note:** If you are not using the default subsystem name, z/OS Migrator, substitute the appropriate name for the DSPNAME= parameter in the command.

   R yy JOBNAME=ZOSMjob,SDATA=(ALLNUC,PSA,CSA,SQA,TRT,RGN,SWA,GRSQ),CONT
   R yy DSPNAME=(0001."zos"),END

   Where ZOSMjob is the server job name, and zos is the first three characters of your subsystem name (‘ZOSM’ is the default subsystem name).

   **Note:** EMC Customer Support personnel may require you to provide dumps of servers from all LPARs.

   ◆ A message similar to the following indicates that all requested data has been successfully dumped to the dump dataset:

   IEA611I COMPLETE DUMP ON SYS1.X14.DMP00009 223

   ◆ A message similar to the following indicates that the dump is incomplete and not useful:

   IEA611I PARTIAL DUMP ON SYS1.X14.DMP00009 223
You must resolve the problem that caused the partial dump to occur and take the dump again. Insufficient space on the dump device(s) is often the problem that causes partial dumps.

SYSMDUMP dump

A dataset containing the output of a SYSMDUMP contains a summary dump for the failing program, plus some system data for the failing task.

A SYSMDUMP DD statement, utilizing a Generation Data Group (GDG) dataset is provided in the z/OS Migrator server started task JCL member, ZOSMPROC. Figure 9 on page 62 shows a sample of ZOSMPROC.

Changing SYSMDUMP defaults

The IBM-supplied IEADMR00 PARMLIB member for SYSMDUMP defaults specifies "SDATA=(NUC,SQA,LSQA,SWA,TRT,RGN,SUM)", so dumped storage will only include CSA-resident control blocks that match the SYSMDUMP criteria (pointed to by registers at the time of the ABEND). Since a lot of important z/OS Migrator data are resident in ECSA, a short-term co-requisite is the Changedump command.

The following Changedump command may be used on each LPAR before starting z/OS Migrator for the first time. An accompanying change to PARMLIB member IEADMR00 will make the added CSA value effective at each IPL.

To change a dump:

CD SET, SYSMDUMP=(CSA), ADD
z/OS Migrator diagnostic facilities

z/OS Migrator uses the following diagnostic facilities available through z/OS Migrator and the mainframe operating system:

- Diagnostic messages
- z/OS dump services
- z/OS GTF tracing service
- z/OS logrec (EREP) data

Where a condition occurs that prevents continued mirroring, z/OS Migrator takes the following steps:

- Suspends processing
- Generates a symptom record in the logrec dataset

If an ABEND is associated with the error, z/OS Migrator formats VRA data and creates a logrec record.

To facilitate problem diagnosis, retain the logrec software EREP records for EMC Customer Support. You can format the software records using the following JCL.

---

Note: The IBM publication, EREP Reference provides more information.

- The following example assumes that each system records to its own dataset and SYS1.LOGREC is being used.

```jcl
//STEP1   EXEC PGM=IFCEREP1,PARM='CARD'
//EREPPT  DD  SYSOUT=*  
//TOURIST DD  SYSOUT=*  
//SERLOG  DD DSN=SYS1.LOGREC,DISP=SHR  
//ACCDEV  DD DUMMY
//SYSIN   DD *
PRINT=PS  
HIST=N
TYPE=S  
ENDPARM
```

- The following example assumes that all systems record to a logstream:

```jcl
//   SET LOGRECOU='DSN-for-logrec-output' < where logrec is to write the records
//   SET LOGRECIN='logrec-logstream-input' < logstream for logrec
//*
//DELIT   EXEC PGM=IEFBR14  
//SYSPRINT DD  SYSOUT=*  
//ACCDEV   DD  DISP=(MOD,DELETE),DSN=&LOGRECOU,  
// VOL=SER=vvvvvv,UNIT=SYSALLDA,SPACE=(CYL,(20,20)),  
// DCB=(RECFM=VB,BLKSIZE=12000)
//*
//DETAIL  EXEC PGM=IFCEREP1,PARM=('HIST,ACC=Y,ZERO=N,TABSIZE=4096K',  
// 'PRINT=NO')
//TOURIST DD SYSOUT=* 
//EREPPT  DD SYSOUT=*  
//DIRECTWK DD UNIT=VIO,SPACE=(CYL,(100,100))
//SYSIN   DD DUMMY
//ACCIN   DD DISP=SHR,DSN=&LOGRECIN,  
//    RECFSM=VB,BLKSIZE=4000,  
//    SUBSYS=(LOGR,IFBSEXIT,  
//    'FROM=(yyys/julians,hh:mm:ss-s),TO=(yyye/juliane,hh:mm:ss-e),LOCAL')
```
Where:

- **DSN-for-logrec-output** is the fully qualified dsname of the output dataset. It will be created.
- **logrec-logstream-input** is the fully qualified dsname of the logstream containing logrec data.
- **vvvvvv** is the volser.
- **yyys** is the year for starting date.
- **julians** is the Julian date of the day to start (without the year).
- **hh:mm:ss-s** is the start time (24 hr clock).
- **yyyy** is the year for ending date.
- **juliane** is the Julian date of the day to end (without the year).
- **hh:mm:ss-e** is the end time (24 hr clock).

**Date/time specification example:**

'FROM=(2016/113,16:40:00),TO=(2016/113,17:20:00),LOCAL')

Send the raw data to EMC Customer Support personnel. Note that the sample JCL for LOGREC in logstream extracts the records to a flat file. The flat file MUST be compressed and then sent in binary format.
Obtaining a z/OS Migrator address space dump

The best dump of the z/OS Migrator address space, is obtained by using the z/OS Migrator DUMP command. If the address space is still responsive and accepting commands, issue the DUMP command and that will produce the desired SVCDUMP.

If you cannot use the z/OS Migrator DUMP command, the z/OS DUMP COMM command takes an SVC dump that will be written to the dump datasets as defined by your site's system standards.

To request an SVC dump:

1. Take an SVC dump of the server address space:

```
DUMP COMM=(description of the z/OS Migrator symptom)
```

2. At the prompt, enter the following:

```
R yy JOBNAME=ZOSMjob,SDATA=(ALLNUC,LPA,PSA,CSA,SQA,TRT,GRN,SWA,GRSQ),
CONT R yy DSPNAME=(0001.*zos*),END
```

Where:

- **ZOSMjob** is the server job name.
- **zos** is the first three characters of your subsystem name (‘ZOSM’ is the default subsystem name).

A message similar to the following indicates that all requested data has been successfully dumped to the dump dataset:

```
IEA611I COMPLETE DUMP ON SYS1.X14.DMP00009 223
```

Obtaining SYSMDUMP dump

A dataset containing the output of a SYSMDUMP contains a summary dump for the failing program, plus some system data for the failing task.

A SYSMDUMP DD statement, utilizing a Generation Data Group (GDG) dataset is provided in the z/OS Migrator server started task JCL member, ZOSMPROC. In addition, the GDG is created as part of the install procedure.
Changing SYSMDUMP defaults

The IBM-supplied IEADMR00 PARMLIB member for SYSMDUMP defaults specifies the following:

SDATA=(NUC, SQA, LSQA, SWA, TRT, RGN, SUM)

So, dumped storage will only include CSA-resident control blocks that match the SYSMDUMP criteria (pointed to by registers at the time of the ABEND). Since a lot of important z/OS Migrator data are resident in ECSA, a short-term co-requisite is the Changedump command.

The following Changedump command may be used on each LPAR before starting z/OS Migrator for the first time. An accompanying change to PARMLIB member IEADMR00 will make the added CSA value effective at each IPL.

To change a dump:

CD SET,SYSMDUMP=(CSA),ADD
This appendix introduces the EMCSAFI Security Interface and references specific z/OS Migrator information that is not contained in the *Mainframe Enablers Installation and Customization Guide*. Topics include:

- Overview ............................................................................................................. 356
- ACF2 requirements ............................................................................................. 357
Overview

The EMCSAFI Security Interface feature uses SAF calls (RACROUTE) to request authorization to use resources. The input to EMCSAFI is the EMCSAFRB request block that describes the authorization.

EMCSAFI requires that RACF version 1.9 or later, or an equivalent SAF-compliant security product, be installed and activated. The security interface is active by default, but you can choose to disable it.

For complete information about EMCSAFI Security Interface, refer to the Mainframe Enablers Installation and Customization Guide. The guide provides the following information:

- An overview of the EMCSAFI Security Interface
- Class and resource names
- Disabling the security interface
- Customizing the security interface
- Restoring the EMC-supplied SAF interface

How z/OS Migrator uses EMCSAFI

z/OS Migrator uses standard SAF security calls for DASDVOL and DATASET classes. DASDVOL and DATASET classes are checked to ensure access to the volume(s) and datasets used during migration.

As z/OS Migrator uses TF/Clone Mainframe Snap Facility for the calls to EMCSAFI, refer to the Mainframe Enablers Installation and Customization Guide for detailed information about TF/Clone Mainframe Snap Facility resources.

z/OS Migrator-specific considerations for EMCSAFI

The following paragraphs supplied z/OS Migrator-specific considerations to the information supplied in the Mainframe Enablers Installation and Customization Guide.

EMCSAFD routine

Member EMCSAFD in the ResourcePak Base SAMPLIB contains assembler source code that you can employ to disable the EMCSAFI security interface. Use member #90SAFJB in the z/OS Migrator RIMLIB to assemble and link the modules.
Disabling EMCSAFI interface

To disable the EMCSAFI interface, take the following steps:

1. Change the JCL to conform to your installation standards.
2. Run the job.

**Result:** Program EFMMMAIN is relinked.

**Note:** Ensure that SAF checks from TimeFinder (EMCSNAP) are also disabled. To do this, run member #90SAFJB of the Mainframe Enablers SAMPLIB. For detailed instructions, refer to the *Mainframe Enablers Installation and Customization Guide*.

EMCSAFI routine

Member EMCSAFI in the ResourcePak Base SAMPLIB dataset contains assembler source code for the security interface. Use member #90SAFJB in the z/OS Migrator RIMLIB to assemble and link the modules, making sure to change all occurrences of literal *SAFMBR* to EMCSAFI.

The source code included in ResourcePak Base SAMPLIB is the code linked with EFMMMAIN. This source is provided to allow you to customize the behavior of the security code to match your installation requirements.

To customize the interface, take the following steps:

1. Change the JCL to conform to your installation standards.
2. Change the source for EMCSAFI to suit your needs.
3. Run the job.

**Result:** Program EFMMMAIN is relinked.

ACF2 requirements

In order to maintain system integrity, CA-ACF2 requires that a user be authorized to access security definitions. To accommodate this situation, ACF2 will now allow the security administrator to define the specific calls for which the authorization check for STATUS=ACCESS will be bypassed.

The bypassing of the authorization check in ACF2 is done through use of the new NOAPFCHK keyword added to the GSO SAFDEF record. NOAPFCHK will only be honored for STATUS=ACCESS calls. The following is an example of the SAFDEF entry used for z/OS Migrator:

```plaintext
INSERT SAFDEF.zosm PROGRAM(EFMM****) RB(EFMM****) NOAPFCHK
RACROUTE(REQUEST=AUTH, CLASS=DATASET, STATUS=ACCESS)
```
APPENDIX G
Using non-EMC devices with z/OS Migrator

This appendix discusses the rules for non-EMC device support. Topics include:

◆ Rules for non-EMC devices ................................................................. 360
Rules for non-EMC devices

To further enhance the value of z/OS Migrator as both a migration and replication tool, the following rules are established with respect to non-EMC device support.

Logical migration groups

There are no restrictions concerning the use of non-EMC devices with a Logical migration group (also referred to as a Dataset Migration group). For this type of group, the source, target, or both, can be a non-EMC device.

Volume migration groups with intended SWAP completion

Volume migration groups with a completion option of SWAP provide for copying any number of device pairs. Once each individual device pair is fully copied, z/OS Migrator automatically issues the SWAP command for that pair, allowing the use of the new volume (prior target) in place of the original volume (prior source).

As the swap occurs independently for each device pair, consistency is not maintained across the group as with a consistent migration group (described in “Consistent migration groups” on page 360). For this type of group, one device in each pair must be an EMC device.

Volume migration groups without intended SWAP completion

Volume migration groups without a completion option of SWAP provide replication services. This includes groups where the intention is to SPLIT (ONLINE or OFFLINE) as a completion option. For this type of group, one or both devices in the pairing can be non-EMC.

The special consideration here involves a Constant Copy group, which does allow SWAP to be issued as the completion option. The final action against the group is determined later by the user, since z/OS Migrator has no way of knowing which completion option is to be used and cannot verify that each pair includes an EMC device.

When the SWAP is issued, if the group is determined to be a Constant Copy group, z/OS Migrator verifies that each device pair does include an EMC device. The Constant Copy group SWAP is not allowed if both pair of devices are non-EMC devices.

Consistent migration groups

For this type of group (a specialized Volume Mirror group where SWAP is the specified completion option), only the source device in the pairing can be non-EMC. A consistent migration group provides for a full copy of each device pair, after each pair enters a mirroring relationship that is maintained throughout the entire time the group is active.

This maintains a consistent and restart-able image across all included device pairs up to the point where the customer initiates the SWAP action to complete the group and then begins working with the new and consistent SWAPPED volumes.
**Mirror migration groups**

This group type (also referred to as a *Fast Mirror migration* group) also provides for a full copy of each device pair after each pair enters a mirroring relationship that is maintained throughout the entire time the group is active.

The basic mirror group does not have a normal end state unless the user issues a command to suspend and deactivate the group.

⚠️ **CAUTION**

This is the only z/OS Migrator group type that does not allow non-EMC devices as either source or target.