PACLOG for DB2
Reference Manual

Supporting
PACLOG for DB2 1.4

July 2006
Contacting BMC Software

You can access the BMC Software website at http://www.bmc.com. From this website, you can obtain information about the company, its products, corporate offices, special events, and career opportunities.

United States and Canada

<table>
<thead>
<tr>
<th>Address</th>
<th>Telephone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC SOFTWARE INC</td>
<td>713 918 8800</td>
<td>713 918 8000</td>
</tr>
<tr>
<td>2101 CITYWEST BLVD</td>
<td>or 800 841 2031</td>
<td></td>
</tr>
<tr>
<td>HOUSTON TX 77042-2827</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Outside United States and Canada

<table>
<thead>
<tr>
<th>Telephone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>(01) 713 918 8800</td>
<td>(01) 713 918 8000</td>
</tr>
</tbody>
</table>

Copyright 2006 BMC Software, Inc., as an unpublished work. All rights reserved.

BMC Software, the BMC Software logos, and all other BMC Software product or service names are registered trademarks or trademarks of BMC Software, Inc.

IBM is a registered trademark of International Business Machines Corporation.

DB2 is a registered trademark of International Business Machines Corporation.

All other trademarks belong to their respective companies.

BMC Software considers information included in this documentation to be proprietary and confidential. Your use of this information is subject to the terms and conditions of the applicable End User License Agreement for the product and the proprietary and restricted rights notices included in this documentation.

Restricted rights legend

U.S. Government Restricted Rights to Computer Software. UNPUBLISHED -- RIGHTS RESERVED UNDER THE COPYRIGHT LAWS OF THE UNITED STATES. Use, duplication, or disclosure of any data and computer software by the U.S. Government is subject to restrictions, as applicable, set forth in FAR Section 52.227-14, DFARS 252.227-7013, DFARS 252.227-7014, DFARS 252.227-7015, and DFARS 252.227-7025, as amended from time to time. Contractor/Manufacturer is BMC SOFTWARE INC, 2101 CITYWEST BLVD, HOUSTON TX 77042-2827, USA. Any contract notices should be sent to this address.
Customer support

You can obtain technical support by using the Support page on the BMC Software website or by contacting Customer Support by telephone or e-mail. To expedite your inquiry, please see “Before Contacting BMC Software.”

Support website

You can obtain technical support from BMC Software 24 hours a day, 7 days a week at http://www.bmc.com/support_home. From this website, you can:

- read overviews about support services and programs that BMC Software offers
- find the most current information about BMC Software products
- search a database for problems similar to yours and possible solutions
- order or download product documentation
- report a problem or ask a question
- subscribe to receive e-mail notices when new product versions are released
- find worldwide BMC Software support center locations and contact information, including e-mail addresses, fax numbers, and telephone numbers

Support by telephone or e-mail

In the United States and Canada, if you need technical support and do not have access to the web, call 800 537 1813 or send an e-mail message to support@bmc.com. Outside the United States and Canada, contact your local support center for assistance.

Before contacting BMC Software

Before you contact BMC Software, have the following information available so that Customer Support can begin working on your problem immediately:

- product information
  - product name
  - product version (release number)
  - license number and password (trial or permanent)
- operating system and environment information
  - machine type
  - operating system type, version, and service pack or other maintenance level such as PUT or PTF
  - system hardware configuration
  - serial numbers
  - related software (database, application, and communication) including type, version, and service pack or maintenance level
- sequence of events leading to the problem
- commands and options that you used
- messages received (and the time and date that you received them)
  - product error messages
  - messages from the operating system, such as file system full
  - messages from related software
## Contents

**About this book** 13
- Related documentation .......................................................... 14
  - Online and printed books .................................................. 14
  - Online help ......................................................................... 15
  - Release notes and other notices ......................................... 15
- Conventions ........................................................................ 15
  - Panel-flow diagrams .......................................................... 16
  - Syntax statements ................................................................ 16
  - Syntax diagrams .................................................................. 17
- Summary of changes ................................................................. 19

**Chapter 1  Introduction to PACLOG** 21
- Introduction ......................................................................... 21
- DB2 archive log issues ............................................................ 21
- The PACLOG solution ............................................................. 22
- Benefits of PACLOG functionality .......................................... 23
- The BMC Software archive history file .................................. 26
- How PACLOG works ............................................................... 26
- PACLOG in disaster recovery ............................................... 28
- XCA subsystem control .......................................................... 29
- Restrictions .......................................................................... 29

**Chapter 2  Getting started with PACLOG** 31
- For first-time users ................................................................. 31
- Prerequisites and preferences ............................................... 33
  - Software environment ......................................................... 33
  - PACLOG installation .......................................................... 33
  - PACLOG authorizations ..................................................... 34
- DB2 environment settings ....................................................... 35
- Recommended archive log processing practices ...................... 35
- PACLOG and RECOVER PLUS compatibility .......................... 36
- Understanding PACLOG options ........................................... 36
  - Deciding which logs to process .......................................... 37
  - Deciding which copies to make and when ............................ 38
  - Choosing the output medium ............................................. 39
  - Removing unwanted records and objects ............................ 39
  - Reprocessing a processed local site archive log .................. 40
  - Compressing archive log records ....................................... 41
Using PACLOG to simulate log processing .............................................. 42
Using PACLOG to conserve disk space ...................................................... 42

Chapter 3 The PACLOG logging environment modeling tool 45
Overview .............................................................................................................. 45
Viewing and modeling logging environment statistics ................................. 47
Logging environment panel field descriptions ............................................. 49
Viewing active log information ...................................................................... 54
Active log information panel field descriptions ......................................... 55
Viewing archive log information .................................................................. 56
Archive log copy 1 and copy 2 information panels field descriptions ........... 58
Audit synchronization ...................................................................................... 59

Chapter 4 PACLOG syntax 61
Syntax overview ............................................................................................. 61
Syntax rules ...................................................................................................... 62
Syntax diagram ............................................................................................... 63
Option descriptions ......................................................................................... 65
  Archive copy specification ....................................................................... 66
  Global options ......................................................................................... 68
  Device type options .............................................................................. 70
  Filter options ......................................................................................... 71
  Tape options .......................................................................................... 72
  Disk options ......................................................................................... 73

Chapter 5 Building and running PACLOG jobs 75
Building PACLOG jobs .................................................................................. 75
  JOB statement ....................................................................................... 76
  EXEC statement ..................................................................................... 76
  STEPLIB DD statement ......................................................................... 76
  Specifying the PACLOG data set DD statements ................................ 76
Sample jobs ................................................................................................... 79
Archive log management reports .................................................................. 82
  Processed archive log data set report .................................................... 83
  Expired archive log data sets report ...................................................... 84
  Using output from the reports ............................................................... 84
Running jobs and responding to processing errors ...................................... 85

Chapter 6 Examples of PACLOG JCL 87
Determining archive log size reduction ......................................................... 87
Using data compression to tape .................................................................. 89
Processing archive logs ................................................................................ 91
Limiting the archive logs that are processed .............................................. 93
Creating offsite copies of archive logs ....................................................... 94
Printing the PACLOG history file ............................................................. 96
Uncompress archive log data sets ............................................................... 97
Create and initialize archive history data set ............................................. 98
### Chapter 7  XCA subsystem control

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview</td>
<td>99</td>
</tr>
<tr>
<td>BMCP (primary subsystem)</td>
<td>101</td>
</tr>
<tr>
<td>BCSS (consolidated subsystem)</td>
<td>101</td>
</tr>
<tr>
<td>Data set for BCSS commands</td>
<td>102</td>
</tr>
<tr>
<td>MVS command support</td>
<td>102</td>
</tr>
<tr>
<td>Subsystem naming conventions</td>
<td>102</td>
</tr>
<tr>
<td>Address space dispatching priorities</td>
<td>103</td>
</tr>
<tr>
<td>Engine level mask</td>
<td>103</td>
</tr>
<tr>
<td>Subsystem commands</td>
<td>104</td>
</tr>
<tr>
<td>BMCP commands</td>
<td>105</td>
</tr>
<tr>
<td>BCSS commands</td>
<td>107</td>
</tr>
<tr>
<td>XCA commands</td>
<td>109</td>
</tr>
<tr>
<td>PACLOG processing only (PPO) mode</td>
<td>112</td>
</tr>
<tr>
<td>PPO commands</td>
<td>113</td>
</tr>
</tbody>
</table>

### Appendix A  PACLOG installation

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>About the installation system</td>
<td>117</td>
</tr>
<tr>
<td>Installing PACLOG on multiple DB2 subsystems</td>
<td>118</td>
</tr>
<tr>
<td>Integrating PACLOG with RECOVERY MANAGER for DB2</td>
<td>118</td>
</tr>
<tr>
<td>Sample ALM$OPTS file</td>
<td>119</td>
</tr>
<tr>
<td>PACLOG memory requirements</td>
<td>119</td>
</tr>
<tr>
<td>BMC Software subsystems</td>
<td>120</td>
</tr>
<tr>
<td>Non-VSAM compression component</td>
<td>120</td>
</tr>
<tr>
<td>PACLOG installation options</td>
<td>121</td>
</tr>
</tbody>
</table>

### Appendix B  Obtaining trace and maintenance information

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtaining a trace for a batch job</td>
<td>123</td>
</tr>
<tr>
<td>Determining applied maintenance</td>
<td>124</td>
</tr>
</tbody>
</table>

### Glossary

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glossary</td>
<td>125</td>
</tr>
</tbody>
</table>

### Index

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>133</td>
</tr>
</tbody>
</table>
Figures

PACLOG Processing .......................................................... 27
PACLOG main menu ......................................................... 46
Logging Environment panel .................................................. 47
Logging Environment Model for SSID panel ............................. 48
Logging Environment panel ................................................... 54
Active Log Information panel ............................................... 55
Logging Environment panel ................................................... 57
Archive Log Information panel ............................................. 57
PACLOG syntax (Part 1 of 2) ............................................... 63
ARCHIVE copy option syntax .............................................. 66
Global options syntax ....................................................... 68
Device type options syntax ................................................ 70
Filter options syntax ....................................................... 71
Tape options syntax ....................................................... 72
Disk options syntax ....................................................... 73
Sample job ................................................................. 79
Sample job print output ..................................................... 80
Total log records by type (ALMLSTAT) ................................. 81
Total Log Records by DB2 Object (ALMOSTAT) ......................... 82
Sample of a processed primary archive log report ..................... 83
Sample of a processed secondary archive log report ................... 83
Sample of an Expired Archive Log Report .............................. 84
Sample job for determining archive log size reduction ............... 88
Sample job for data compression to tape ................................ 90
Sample job for compressing archive logs ............................... 91
Sample job using the LIMIT option ..................................... 93
Sample job for offsite log creation ..................................... 95
Sample job for printing the PACLOG history file ..................... 96
Sample job to uncompress archive log data sets ....................... 97
Sample job to create and initialize the archive history data set .... 98
Sample ALMS$OPTS file .................................................. 119
## Tables

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of PACLOG functionality</td>
<td>23</td>
</tr>
<tr>
<td>Topics for first-time PACLOG users</td>
<td>32</td>
</tr>
<tr>
<td>PACLOG filter options</td>
<td>40</td>
</tr>
<tr>
<td>Selecting PACLOG options</td>
<td>65</td>
</tr>
<tr>
<td>Report messages</td>
<td>84</td>
</tr>
<tr>
<td>OS/390 operator commands</td>
<td>105</td>
</tr>
<tr>
<td>CSA Storage for the BMC Software Subsystems</td>
<td>120</td>
</tr>
<tr>
<td>Non-CSA storage for the compression component</td>
<td>120</td>
</tr>
<tr>
<td>CSA storage for the compression component</td>
<td>121</td>
</tr>
</tbody>
</table>
About this book

This book contains detailed information about PACLOG for DB2 and is intended for OS/390 systems programmers, direct access storage device (DASD) managers, DB2 system administrators, and DB2 database administrators (DBAs). It assumes that you are familiar with OS/390, DB2, and job control language (JCL).

Like most BMC Software documentation, this book is available in printed and online formats. Visit the BMC Software Customer Support page at http://www.bmc.com/support_home to request additional printed books or to view online books and notices (such as release notes and technical bulletins). Some product shipments also include the online books on a documentation CD.

**NOTE**

Online books are formatted as Portable Document Format (PDF) or HTML files. To view, print, or copy PDF books, use the free Adobe Reader from Adobe Systems. If your product installation does not install the reader, you can obtain the reader at http://www.adobe.com.

The software also offers online Help. To access Help, press F1 within any product, or click the Help button in graphical user interfaces (GUIs).
Related documentation

The following related publications supplement this book and the online Help:

<table>
<thead>
<tr>
<th>Category</th>
<th>Document</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>installation documents</td>
<td>Backup and Recovery Products for DB2 Installation Guide</td>
<td>provides information on using the Install System to customize your installation of PACLOG and other BMC Software backup and recovery products for DB2</td>
</tr>
<tr>
<td>related documents</td>
<td>RECOVERY MANAGER for DB2 User Guide</td>
<td>describes the RECOVERY MANAGER for DB2 product from BMC Software</td>
</tr>
<tr>
<td></td>
<td>RECOVERY MANAGER for DB2 Reference Manual</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DATA ACCELERATOR Compression Reference Manual</td>
<td>describe the DATA ACCELERATOR Compression product from BMC Software</td>
</tr>
<tr>
<td></td>
<td>DATA ACCELERATOR Compression Installation Guide</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DATA ACCELERATOR Compression Messages Manual</td>
<td></td>
</tr>
<tr>
<td>supplemental documents</td>
<td>PACLOG for DB2 Release Notes</td>
<td>describes features new to this release, including problem resolutions</td>
</tr>
</tbody>
</table>

Online and printed books

The books that accompany BMC Software products are available in online and printed formats. Online books are formatted as Portable Document Format (PDF) files. Some online books are also formatted as HTML files.

To access online books

To view any online book that BMC Software offers, visit the Customer Support page of the BMC Software Web site at [http://www.bmc.com/support_home](http://www.bmc.com/support_home). You can also access PDF books from the documentation compact disc (CD) that accompanies your product.

To request additional printed books

BMC Software provides printed books with your product order. To request additional books, go to [http://www.bmc.com/support_home](http://www.bmc.com/support_home).
Online help

The PACLOG product includes online Help. In the PACLOG ISPF interface, you can access Help by pressing F1 from any ISPF panel.

Release notes and other notices

Printed release notes accompany each BMC Software product. Release notes provide current information such as

- updates to the installation instructions
- last-minute product information

In addition, BMC Software sometimes provides updated product information between releases (in the form of a flash or a technical bulletin, for example). The latest versions of the release notes and other notices are available on the Web at http://www.bmc.com/support_home.

Conventions

This book uses the following special conventions:

- All syntax, operating system terms, and literal examples are presented in this typeface.

- Variable text in path names, system messages, or syntax is displayed in italic text:
  
  testsys/instance/fileName

- The symbol => connects items in a menu sequence. For example, Actions => Create Test instructs you to choose the Create Test command from the Actions menu.
Panel-flow diagrams

Panel-flow diagrams summarize the ISPF panels that you see while completing specific tasks. The following example explains how to read a panel-flow diagram:

Characters above or to the right of flow arrows indicate the option that you use to advance to the next panel.

Dashed arrows indicate panels that you go to only under certain circumstances.

Syntax statements

The following example shows a sample syntax statement:

```
COMMAND KEYWORD1 [KEYWORD2 | KEYWORD3] KEYWORD4={YES | NO} fileName...
```

The following table explains conventions for syntax statements and provides examples:

<table>
<thead>
<tr>
<th>Item</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items in italic type represent variables that you must replace with a name or value. If a variable is represented by two or more words, initial capitals distinguish the second and subsequent words.</td>
<td>alias</td>
</tr>
<tr>
<td></td>
<td>databaseDirectory</td>
</tr>
<tr>
<td></td>
<td>serverHostName</td>
</tr>
<tr>
<td>Brackets indicate a group of optional items. Do not type the brackets when you enter the option. A comma means that you can choose one or more of the listed options. You must use a comma to separate the options if you choose more than one option.</td>
<td>{tableName, columnName, field}</td>
</tr>
<tr>
<td>Braces indicate that at least one of the enclosed items is required. Do not type the braces when you enter the item.</td>
<td>{DBDName</td>
</tr>
<tr>
<td></td>
<td>UNLOAD device={disk</td>
</tr>
</tbody>
</table>
The following figure shows the standard format for syntax diagrams:

<table>
<thead>
<tr>
<th>Item</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A vertical bar means that you can choose only one of the listed items. In the example, you would choose either commit or cancel.</td>
<td>{commit</td>
</tr>
<tr>
<td>An ellipsis indicates that you can repeat the previous item or items as many times as necessary.</td>
<td>columnName ...</td>
</tr>
</tbody>
</table>

**Syntax diagrams**

The following figure shows the standard format for syntax diagrams:
The following example illustrates the syntax for a DELETE statement. Because the FROM keyword, alias variable, and WHERE clause are optional, they appear below the main command line. In contrast, the tableName variable appears on the command line because the table name is required. If the statement includes a WHERE clause, the clause must contain a search condition or a CURRENT OF clause. (The searchCondition variable appears on the main line for the WHERE clause, indicating that this choice is required.)

```
DELETE tableName
FROM alias
WHERE CURRENT OF searchCondition cursorName
```

The following guidelines provide additional information about syntax diagrams:

- Read diagrams from left to right and from top to bottom.
- A recursive (left-pointing) arrow above a stack indicates that you may choose more than one item in the stack.
- An underlined item is a default option.
- If a diagram shows punctuation marks, parentheses, or similar symbols, you must enter them as part of the syntax. Asterisks are exceptions. An asterisk in a diagram indicates a reference note.
- In general, MVS commands, keywords, clauses, and data types are displayed in uppercase letters. However, if an item can be shortened, the minimum portion of the MVS command or keyword might be displayed in uppercase letters with the remainder of the word in lowercase letters (for example, CANcel).
- The following conventions apply to variables in syntax diagrams:
  - Variables typically are displayed in lowercase letters and are always italicized.
  - If a variable is represented by two or more words, initial capitals distinguish the second and subsequent words (for example, databaseName).
Summary of changes

This section provides an overview of the major changes in the BMC Software PACLOG product. It includes changes to product functionality, product enhancements, and any major changes to the documentation. The summary of changes is listed by product version and release date. All significant changes to this manual since the last release are marked with revision bars.

Version 1.4.00  July 2006

This release of PACLOG for DB2 includes the following product enhancements and changes:

- **SMP/E**—supports the IBM product System Modification Program Extended (SMP/E). To install the product, you can use either an SMP/E or a Standard (IEBCOPY) installation. To apply maintenance, you must use SMP/E.

  For more information about installation and maintenance, see the Backup and Recovery Products for DB2 Installation Guide.

  As part of this change, the names of product libraries and the placement of members within those libraries have changed. Examine any processes in your environment that depend on product library names or the presence of a given member within a library. Modify the processes if necessary.

  Be aware of the following changes. (In all names, HLQ01 and HLQ02 represent high-level qualifies that are assigned in your environment during installation.)

<table>
<thead>
<tr>
<th>Product item</th>
<th>Former library name</th>
<th>Current library name</th>
</tr>
</thead>
<tbody>
<tr>
<td>executable modules, batch portion</td>
<td>HLQ01.HLQ02.LOAD</td>
<td>HLQ01.HLQ02.DBLINK</td>
</tr>
<tr>
<td>executable modules, online interface</td>
<td>HLQ01.HLQ02.ISPLLIB</td>
<td>HLQ01.HLQ02.DBLINK</td>
</tr>
<tr>
<td>recommended libraries (for use in STEPLIB statements or the link list)</td>
<td>HLQ01.HLQ02.LOAD</td>
<td>HLQ01.HLQ02.DBLINK</td>
</tr>
<tr>
<td></td>
<td>HLQ01.HLQ02.DBLINK</td>
<td>HLQ01.HLQ02.XXLINK</td>
</tr>
<tr>
<td></td>
<td>HLQ01.HLQ02.DBLINK</td>
<td>HLQ01.HLQ02.BBLINK</td>
</tr>
<tr>
<td>CLIST for execution of product</td>
<td>HLQ01.HLQ02.CNTL</td>
<td>HLQ01.HLQ02.DBCLIB</td>
</tr>
<tr>
<td>sample files, other reference information</td>
<td>HLQ01.HLQ02.CNTL</td>
<td>HLQ01.HLQ02.DBSAMP</td>
</tr>
</tbody>
</table>

- **Enhanced log support**—supports up to 9999 logs when running with DB2 version 8

- **All-resident libraries**—now uses all-resident libraries and no longer requires the SAS/C transient libraries
- **filter enhancements**—the DB2LOGPRODUCT option so that you can specify that PACLOG *not* filter any log records that might be used by log products (page 70)

- **modeling tool change**—the removal of the option to view DSNJU004 output online from the modeling tool menu (page 46)

**Version 1.3.03  July 2004—Documentation refresh only**

This book is being released in a new template format. Features of these new templates include

- extensive use of graphical elements for improved usability
- larger typeface in body text and tables for improved readability
- use of color and shading in the PDF version

When viewing a book online in Adobe PDF format (from the documentation CD included with your product shipment), all Table of Contents entries, Index entries, and cross-references are displayed in a blue font. All these elements are coded as hyperlinks to provide click-and-go access to the referenced page, section, or topic.

**Version 1.3.03  July 31, 2001**

This release incorporates the maintenance that is described in the Release Notes document dated July 31, 2001. It also provides support for version 1.5.01 of the BMC Software DATA ACCELERATOR Compression product.

**Version 1.3.02  July 31, 2000**

This release of the PACLOG product provides

- a new and improved tool for modeling the logging environment
- updated commands for the subsystems that are used to implement log compression
Introduction to PACLOG

This chapter presents the following topics:

Introduction .................................................. 21
DB2 archive log issues .................................. 21
The PACLOG solution .................................. 22
Benefits of PACLOG functionality ................. 23
The BMC Software archive history file .......... 26
How PACLOG works .................................. 26
PACLOG in disaster recovery ....................... 28
XCA subsystem control ............................... 29
Restrictions ................................................. 29

Introduction

The BMC Software PACLOG product is a DB2 log management batch utility that provides substantial storage media savings while preserving the integrity of all archived log data that might be needed for recovery. The product assists the database administrator (DBA) in determining what data is retained in archive log data sets and in choosing the archive log storage media. It also provides statistics useful in the management of archive log data sets.

DB2 archive log issues

Typically, DB2 installations create a large amount of log data. When a DB2 active log data set becomes full, DB2 automatically creates an archive log data set. IBM recommends the creation of dual archive log data sets. Because of the cost and availability of the DASD space necessary to store the amount of archive log data that DB2 might generate, many DBAs choose tape as the medium for storing their DB2 archive log data sets, thus sacrificing the improved access for recovery and
application backout provided by DASD. In large installations, DB2 may create hundreds of archive log data sets per week. Storing so many archive log data sets on tape can be costly because of the number of tapes required and the physical space required to store them.

Another issue regarding the DB2 archive log is that much of the data within the archive log data set is completely unnecessary for any DB2 forward recovery process. A considerable amount of log data recorded by DB2 is there only to allow any transaction backouts that may be required. After the data has been committed, up to 80 percent of the data recorded in the log is not needed by any DB2 forward recovery process. Also, some DB2 objects may exist within your environment that will never require a DB2 forward recovery involving access to log data. These objects can always be recovered in a recovery to a specified image copy or be re-created by batch processes. However, DB2 does not give you the option to omit logging of the information on such objects.

Data compression of the archive log data sets does allow you to reduce the storage media required to contain the log data. However, IBM recommends that hardware data compression not be used when you store archive log data sets on tape due to the adverse effect on performance when you perform transaction backouts (in cases where archive log data is needed to perform the backout).

Even without data compression, when an application is terminated and archive log data residing on tape is required to allow DB2 to back out the application, the backout process can impose a heavy burden on DB2 resources. DBAs, therefore, must choose between the following two options for storing archive log data sets:

- Storing them on DASD, which allows faster backouts but is more costly
- Storing them uncompressed on tape, which is less expensive but provides slower access for backouts

In an attempt to compromise, many DBAs keep as much data as possible in the active logs, thus increasing the amount of DASD dedicated to DB2 log data.

**The PACLOG solution**

The PACLOG utility provides solutions to the problems described in “DB2 archive log issues” on page 21. The product provides impressive savings of archive log media along with a set of archive log management functions that include an interactive modeling tool that helps you optimize the number of active logs and their size.

PACLOG achieves media savings in the following ways:

- Replaces log data records not needed by any DB2 recovery process with easily compressible data
Benefits of PACLOG functionality

The functionality provided by the PACLOG product offers substantial time and resource savings and performance benefits, as shown in Table 1.

Table 1  Benefits of PACLOG functionality (part 1 of 4)

<table>
<thead>
<tr>
<th>Functionality and benefits</th>
<th>More information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time and Resource Savings</td>
<td></td>
</tr>
<tr>
<td>reduction of up to 95 percent or more in the amount of media that is required to store</td>
<td>“Removing unwanted records and objects” on page 39</td>
</tr>
<tr>
<td>archive log data</td>
<td></td>
</tr>
<tr>
<td>Because you have control over which types of records to retain and compress, you can</td>
<td>“Compressing archive log records” on page 41.</td>
</tr>
<tr>
<td>considerably reduce the media space that is required to store archive logs.</td>
<td></td>
</tr>
<tr>
<td>potential reduction in the size and number of active logs with a corresponding reduction</td>
<td>“Using PACLOG to conserve disk space” on page 42</td>
</tr>
<tr>
<td>in the amount of DASD that is needed for them</td>
<td></td>
</tr>
<tr>
<td>The ability to keep archive logs on DASD eliminates any need to keep large amounts of</td>
<td>Chapter 3, “The PACLOG logging environment modeling tool”</td>
</tr>
<tr>
<td>data in active logs.</td>
<td></td>
</tr>
<tr>
<td>You can use the interactive PACLOG modeling tool to calculate the optimum size for your</td>
<td></td>
</tr>
<tr>
<td>active logs.</td>
<td></td>
</tr>
<tr>
<td>increase in the time period that is covered by a given amount of media that is used for</td>
<td>“Recommended archive log processing practices” on page 35</td>
</tr>
<tr>
<td>log data</td>
<td></td>
</tr>
<tr>
<td>More jobs access the logs concurrently when you perform a recovery using the BMC Software</td>
<td></td>
</tr>
<tr>
<td>the BMC Software RECOVER PLUS product as the recover utility.</td>
<td></td>
</tr>
<tr>
<td>reduction in the time that is required to perform a recovery when the logs are on</td>
<td>none</td>
</tr>
<tr>
<td>DASD instead of tape</td>
<td></td>
</tr>
</tbody>
</table>
### Benefits of PACLOG functionality

<table>
<thead>
<tr>
<th>Functionality and benefits</th>
<th>More information</th>
</tr>
</thead>
<tbody>
<tr>
<td>elimination of tape mounts for log access when the logs are on DASD instead of tape</td>
<td>none</td>
</tr>
<tr>
<td>reduction in the time that is needed to transmit log data over a communications network</td>
<td>none</td>
</tr>
<tr>
<td>notification when an archived log data set is no longer needed, thus releasing DASD and</td>
<td>“Archive log management reports” on page 82</td>
</tr>
<tr>
<td>tape for other purposes</td>
<td>“PACLOG in disaster recovery” on page 28</td>
</tr>
<tr>
<td>assistance in disaster recovery</td>
<td></td>
</tr>
<tr>
<td>You can make and catalog additional copies of processed archive log data sets specifically</td>
<td>“Using PACLOG to simulate log processing” on page 42</td>
</tr>
<tr>
<td>for recovery site use. You can also use PACLOG to restore these log data sets to disk at</td>
<td></td>
</tr>
<tr>
<td>the recovery site.</td>
<td></td>
</tr>
<tr>
<td>trial processing of archive logs before disposing of the original log</td>
<td></td>
</tr>
<tr>
<td>You can perform simulation runs without performing any actions on the original log.</td>
<td></td>
</tr>
</tbody>
</table>

### Performance benefits

<table>
<thead>
<tr>
<th>Functionality and benefits</th>
<th>More information</th>
</tr>
</thead>
<tbody>
<tr>
<td>allows compression of processed archive log data sets</td>
<td>“Compressing archive log records” on page 41</td>
</tr>
<tr>
<td>- This feature reduces the amount of media required for archived logs and supports</td>
<td></td>
</tr>
<tr>
<td>effective capacity planning.</td>
<td></td>
</tr>
<tr>
<td>- PACLOG syntax provides separate compression options for disk and tape.</td>
<td></td>
</tr>
<tr>
<td>allows for the removal of unwanted log records, which further reduces the amount of</td>
<td>“Removing unwanted records and objects” on page 39</td>
</tr>
<tr>
<td>media required</td>
<td></td>
</tr>
<tr>
<td>PACLOG provides the option to remove log data that is</td>
<td></td>
</tr>
<tr>
<td>- not required for recovery</td>
<td></td>
</tr>
<tr>
<td>- for user-specified DB2 objects</td>
<td></td>
</tr>
<tr>
<td>You can specify multiple filter options separately for each copy of a processed log data</td>
<td></td>
</tr>
<tr>
<td>set.</td>
<td></td>
</tr>
<tr>
<td>searches for original archive log data sets (optionally, according to user-specified</td>
<td>“Deciding which logs to process” on page 37</td>
</tr>
<tr>
<td>limits) and meets users’ needs for scheduling flexibility</td>
<td></td>
</tr>
<tr>
<td>PACLOG allows retrieval of original archive logs in different ways:</td>
<td></td>
</tr>
<tr>
<td>- over a specified number of the most recent hours</td>
<td></td>
</tr>
<tr>
<td>- over a specified relative byte address (RBA) range</td>
<td></td>
</tr>
<tr>
<td>- for a specified number of the most recent original logs</td>
<td></td>
</tr>
</tbody>
</table>
### Table 1  Benefits of PACLOG functionality (part 3 of 4)

<table>
<thead>
<tr>
<th>Functionality and benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>concurrently creates and processes up to four copies of the original unprocessed archive log data sets</td>
</tr>
<tr>
<td>allows scheduling of log data set processing to match available resources to meet users’ needs for flexibility and efficiency</td>
</tr>
<tr>
<td>PACLOG options allow any mix of up to two local site copies and up to two offsite copies.</td>
</tr>
<tr>
<td>allows table space pattern matching in table space specifications</td>
</tr>
<tr>
<td>provides flexibility in customizing log data set processing to meet users’ needs</td>
</tr>
<tr>
<td>PACLOG syntax lets you use wildcards with the FILTERTS option.</td>
</tr>
<tr>
<td>allows different output device types for each copy of the processed archive log data set</td>
</tr>
<tr>
<td>PACLOG provides flexibility and efficiency and optimizes media usage by</td>
</tr>
<tr>
<td>writing processed copy 1 to disk</td>
</tr>
<tr>
<td>allowing either tape or disk for each of the other copies</td>
</tr>
<tr>
<td>allowing copies to be stacked to tape</td>
</tr>
<tr>
<td>while processing an archived log data set, gathers and reports information useful for log management</td>
</tr>
<tr>
<td>This feature facilitates administrative decision making by providing management reports that:</td>
</tr>
<tr>
<td>report which archive log data sets were processed</td>
</tr>
<tr>
<td>list any archive log data sets that have expired</td>
</tr>
<tr>
<td>provide filtered and unfiltered record statistics</td>
</tr>
<tr>
<td>allows report output to be used by other tools</td>
</tr>
<tr>
<td>This feature facilitates integration with other technology by allowing customization of the interface between PACLOG and your tool.</td>
</tr>
<tr>
<td>allows reprocessing of previously processed log data sets</td>
</tr>
<tr>
<td>This feature provides maximum media savings over a wide range of environments by allowing (for example) reprocessing to remove previously uncommitted transactions.</td>
</tr>
<tr>
<td>allows simulated processing of original archive log data sets</td>
</tr>
<tr>
<td>You can create processed log data sets without taking any action against original log data sets. This enables you to evaluate the PACLOG product without disrupting production work. You have flexibility in simulation because PACLOG allows several levels of process simulation.</td>
</tr>
<tr>
<td>More information</td>
</tr>
<tr>
<td>“Deciding which copies to make and when” on page 38</td>
</tr>
<tr>
<td>“Removing unwanted records and objects” on page 39</td>
</tr>
<tr>
<td>“Choosing the output medium” on page 39</td>
</tr>
<tr>
<td>“Archive log management reports” on page 82</td>
</tr>
<tr>
<td>“Archive log management reports” on page 82</td>
</tr>
<tr>
<td>“Reprocessing a processed local site archive log” on page 40</td>
</tr>
<tr>
<td>“Using PACLOG to simulate log processing” on page 42</td>
</tr>
</tbody>
</table>
The BMC Software archive history file

The BMC Software archive history file is a control file used by PACLOG to determine which archive logs to process. It is not intended for any direct use by the customer. The file is shared by the BMC Software RECOVERY MANAGER for DB2 product.

The archive history file contains an entry for each archive log recorded in the BSDS. It is automatically updated and backed up by PACLOG with each PACLOG operation. The backup file name is the same as the log file name except for the first character of the suffix, which is .H instead of .A. The archive history file is not required for recovery processing.

Normally, there is no need to recover the archive history file. If the file is damaged or lost, a new one can be created by running the ALMHIST job in the .SAMP data set. To avoid processing old logs after re-creating an archive history file, update the LIMIT STARTRBA syntax option (see “LIMIT” on page 68) to reflect which logs have already been processed. This process has no impact on the usability of logs previously processed by PACLOG.

Because the archive history file is not used during recovery, its use at the disaster recovery site is limited to the processing of new logs that have been created at the recovery site. If you need an archive history file for this purpose, create it by running the ALMHIST job and coding the LIMIT STARTRBA option to reflect the RBAs of logs that you expect to create at the recovery site.

How PACLOG works

In normal mode (nonsimulation mode), PACLOG examines the BSDS and the archive history file to identify the archive log data sets that have not yet been processed by PACLOG. It also reads the active log, performing a checkpoint analysis to identify committed data.
For each archive log data set so identified, PACLOG performs the following processing:

1. copies the BSDS to the medium that is specified in the job input

2. copies the archive log data set to the medium that is specified while performing the filtering that is specified in the job input

3. replaces the original archive log with the processed log

4. updates the archive history file and copies the replaced version to the medium that is specified in the job input

Figure 1 on page 27 illustrates normal mode processing.

To keep the original primary and backup archive logs intact and at the same time make additional (processed) copies, or to perform PACLOG trials, you can use PACLOG in simulation mode. In simulation mode, PACLOG examines the BSDS and BMC Software archive history file to identify the archive log data sets that have not yet been processed by PACLOG and then performs a series of tasks that is slightly different from normal mode.
For each archive log so identified, PACLOG performs the following processing:

1. copies the BSDS to the medium that is specified in the job input

2. copies the archive log data set to the medium that is specified while performing the filtering that is specified in the job input

3. updates the archive history file if so specified in the job input

4. copies an updated version of the archive history file to the medium that is specified in the job input

5. deletes or retains all copies according to the job input specifications, as follows:
   - If deletion was specified, PACLOG deletes all copies created in this operation.
   - If retention was specified, PACLOG retains all copies created in this operation.

See “SIMULATE” on page 69 for information about the syntax required to specify simulation and about how retained copies are named.

**PACLOG in disaster recovery**

When a disaster recovery is necessary, only local site data that has already been dispatched to the recovery site can be used in the recovery. The point in time to which applications can be recovered is determined by the end point of the most recent local site archive log taken to the recovery site. Records of transactions occurring after the last archive log was created and prior to the failure exist only in the active log and cannot be recovered from the data taken to the recovery site.

PACLOG can contribute to disaster recovery contingency planning in the following areas:

- At the local site, PACLOG can make and catalog additional archive logs (copies 3 and 4) for use at the recovery site. Using PACLOG for this task allows you to filter and compress the logs before dispatching them to the recovery site.

If you use RECOVERY MANAGER for DB2, consider using PACLOG to make processed offsite archive logs instead of using the RECOVERY MANAGER archive log copy program (ARMBARC) to make copies of the original (unprocessed) archive logs.
At the recovery site, PACLOG can restore archive log copies 3 and 4 to disk.

If you use RECOVERY MANAGER, this step can be automatically included in the disaster recovery JCL. If you do not use RECOVERY MANAGER, you must first restore the BSDS at the recovery site and then use the CHANGE LOG INVENTORY utility to modify it so that archive log copies 3 and 4 are renamed as copies 1 and 2.

**NOTE**

If archive log copies 3 and 4 are being compressed, then the PACLOG subsystem started tasks must be started at the recovery site when the system is started.

For detailed information about the role of archive logs in disaster recovery, see the chapter on disaster recovery in the *RECOVERY MANAGER for DB2 User Guide*.

**XCA subsystem control**

In routine PACLOG operations, the XCA compression subsystems do not require your direct intervention. The choices you make during PACLOG installation provide the required defaults for your environment. However, in some circumstances, such as a system initial program load (IPL), you may need to perform shutdown and restart procedures for these subsystems.

See Chapter 7, “XCA subsystem control,” for an overview and for information on specific subsystem control.

**Restrictions**

The following restrictions apply to PACLOG:

- All original archive log data sets that need to be processed by PACLOG must be cataloged. PACLOG does not process uncataloged archive log data sets.

- PACLOG always writes copy 1 of the processed archive log data set to disk. *It does not write this copy to tape.*

- PACLOG does not filter DB2 catalog and directory spaces information in the log.
Getting started with PACLOG

This chapter presents the following topics:

For first-time users ................................................................. 31
Prerequisites and preferences ................................................ 33
  Software environment ....................................................... 33
  PACLOG installation ....................................................... 33
  PACLOG authorizations ................................................... 34
  DB2 environment settings ............................................... 35
  Recommended archive log processing practices .................... 35
  PACLOG and RECOVER PLUS compatibility ......................... 36
Understanding PACLOG options ............................................ 36
  Deciding which logs to process ....................................... 37
  Deciding which copies to make and when .......................... 38
  Choosing the output medium ........................................... 39
  Removing unwanted records and objects ........................... 39
  Reprocessing a processed local site archive log ................. 40
  Compressing archive log records .................................... 41
Using PACLOG to simulate log processing ............................. 42
Using PACLOG to conserve disk space ................................. 42

For first-time users

This chapter provides important information that you should be familiar with before using PACLOG for the first time. Table 2 outlines the key topics and the sections in this book that provide more details.
Table 2  Topics for first-time PACLOG users

<table>
<thead>
<tr>
<th>Topic</th>
<th>See section</th>
</tr>
</thead>
<tbody>
<tr>
<td>prerequisites for using PACLOG:</td>
<td></td>
</tr>
<tr>
<td>■ required operating system and DB2 environment</td>
<td>“Software environment” on page 33</td>
</tr>
<tr>
<td>■ installation requirements</td>
<td>“PACLOG installation” on page 33</td>
</tr>
<tr>
<td>■ appropriate authorizations</td>
<td>“PACLOG authorizations” on page 34</td>
</tr>
<tr>
<td>preferred settings and practices</td>
<td></td>
</tr>
<tr>
<td>■ setting up the DB2 environment</td>
<td>“DB2 environment settings” on page 35</td>
</tr>
<tr>
<td>■ recommended processing practices for the archive log data set</td>
<td>“Recommended archive log processing practices” on page 35</td>
</tr>
<tr>
<td>using the various PACLOG options for normal processing and for simulated processing</td>
<td>“Understanding PACLOG options” on page 36</td>
</tr>
<tr>
<td>■ conserving disk space by using the PACLOG modeling tool</td>
<td>“Using PACLOG to simulate log processing” on page 42</td>
</tr>
<tr>
<td>■ assisting in disaster recovery</td>
<td>Chapter 3, “The PACLOG logging environment modeling tool”</td>
</tr>
<tr>
<td>■ providing reports that help you manage archive log data sets</td>
<td>“PACLOG in disaster recovery” on page 28</td>
</tr>
<tr>
<td>■ actions that you may need to take to allow log data sets that have been processed by PACLOG to be used in a recovery by some versions of the RECOVER PLUS utility</td>
<td>“Archive log management reports” on page 82</td>
</tr>
<tr>
<td>■ information you may need to control the Extended Compression Architecture (XCA) compression subsystems in certain situations</td>
<td>Chapter 7, “XCA subsystem control,”</td>
</tr>
</tbody>
</table>
Prerequisites and preferences

This section provides information about items that require special consideration or action before you use PACLOG.

Software environment

The *minimum* software environment for using this release of PACLOG is as follows:

- OS/390 or z/OS
- DB2 version 7.1 or later
- ISPF version 3.1 or later

Archive log data sets processed by PACLOG can be used in a recovery by the BMC Software RECOVER PLUS for DB2 product or DB2 RECOVER.

PACLOG installation

**NOTE**

Before you install the product, review the section about installation considerations for PACLOG in the *Backup and Recovery Products for DB2 Installation Guide*.

PACLOG is installed by using the BMC Software OS/390 and z/OS Installer. The installation process does not require any modifications to DB2. However, it does require that you choose values for certain PACLOG options. See “PACLOG installation options” on page 121 for more information.

The installation process is for a single DB2 subsystem. To install PACLOG on additional subsystems using the same operating system after the initial installation, you simply add the new subsystems to the PACLOG control information and create the new history files.

For more information, see “Installing PACLOG on multiple DB2 subsystems” on page 118.

Shared PACLOG and RECOVERY MANAGER features

When the PACLOG and RECOVERY MANAGER for DB2 products coexist in a DB2 subsystem, they should use the same options file. You can designate that the two products share a common options file during product installation.
PACLOG authorizations

Sharing the same options file ensures that both products use the same archive history file, time stamp value, DB2 load library, and work data sets, all of which are specified in the options file. See “The BMC Software archive history file” on page 26 for a discussion of the archive history file.

For more information, see “Integrating PACLOG with RECOVERY MANAGER for DB2” on page 118.

PACLOG authorizations

You must have the following authorizations to run PACLOG:

- ALTER authority for DB2 active log data sets
- DELETE and DEFINE authority for DB2 archive log data sets 1, 2, 3, and 4
- READ authority for the DB2 BSDS
- UPDATE authority for the archive history file
- authorization for the XCA compression started tasks as follows

  — For advanced communications function 2 (ACF2) security, authorize BMCP and BCSS as started tasks under started task control.

  — For resource access control facility (RACF) or TOP SECRET security, authorize BMCP and BCSS as started tasks in the started task table.

- authorized program facility (APF) authorization for all STEPLIB and JOBLIB libraries (PACLOG and XCA)

**NOTE**

When all of the following circumstances exist, add ALMUMAN to the list of commands in the TSOCommandLine module:

- you use the PACLOG logging environment modeling tool
- you use the CA-ACF2® Security system
- your shop restricts TSO commands
DB2 environment settings

BMC Software recommends that you always set up your DB2 environment as follows:

- Use dual active logs to provide backup in the event of a disk failure that affects one log.

- Use the PACLOG logging environment modeling tool to calculate the optimum size for your active log data sets.

- Keep a minimum of three active logs to allow operation to continue unimpeded in the event of a failure involving one of the logs. If you use PACLOG and keep one archive log on disk, you do not need more than three active logs. This practice helps to reduce log data redundancy because active data is replicated in the archive log.

- Keep 1,000 entries in the BSDS.

Recommended archive log processing practices

When you use PACLOG, BMC Software recommends that you follow these guidelines. These should be considered in conjunction with the information provided in “PACLOG in disaster recovery” on page 28.

- Use dual archive logs at your local site. If a DB2 forward recovery becomes necessary at the local site that requires the use of the archive log, dual archive logging provides backup if the primary log fails.

- If you plan to use archive logs for disaster recovery, create both primary and secondary offsite copies of the archive logs. Although dual logging does allow you to send the local backup copy offsite, if that copy were needed at the local site, the required data would be unavailable and the DB2 subsystem would hang. See the RECOVERY MANAGER for DB2 User Guide for more information about the use of offsite archive logs in disaster recovery.

- To help you decide how frequently to run PACLOG against the local site archive logs, you can use the ALMEX01 sample job in the .SAMP data set. This example shows how to run PACLOG in simulation mode to determine the effect of processing multiple logs during processing. You can also find this example in “Determining archive log size reduction” on page 87.
If you are making offsite copies of archive log data sets as part of your disaster recovery contingency planning, run PACLOG as soon as practical after archiving the active log. For example, run PACLOG after the DB2 -ARCHIVE LOG command that forces the active log to be archived and prior to backing up the OS/390 and tape management catalogs. If practical, use the DB2 archive completion message to start PACLOG.

Use the LIMIT option when you begin using PACLOG; otherwise, PACLOG attempts to process all cataloged archive log data sets. Use LIMIT until all existing original log data sets have been processed. See “Deciding which logs to process” on page 37 for more information.

Catalog all original archive log data sets. PACLOG does not process uncataloged log data sets.

When you archive the active log, archive it to disk.

RECOVER PLUS for DB2 fully supports log data sets that are created by PACLOG. If you have any questions about how the products work together, contact your BMC Software technical support analyst for RECOVER PLUS.

PACLOG allows you to copy and process original cataloged archive log data sets in a variety of ways. Using PACLOG syntax options, you can

- decide which original archive log data sets to copy and process by using the search limits provided with PACLOG
- decide whether to make one, two, three, or four copies of each original archive log data set

**NOTE**
PACLOG automatically catalogs all copies it makes.

- separately specify the output medium (tape or disk) for each copy
- separately specify which log record types and objects to remove for each copy
Deciding which logs to process

- reprocess a log that has already been processed by PACLOG
- compress the log data written to tape or disk
- simulate archive log data set processing using PACLOG syntax options

See “Using PACLOG to simulate log processing” on page 42 for more information.

Deciding which logs to process

When you use PACLOG for the first time, you may not want to process all of the archive logs that are recorded in the BSDS. You may want to process only a recent subset of these log data sets. Use the LIMIT option to limit the log data sets (from the most recent to the least recent) to be considered for processing.

Select the log data sets to be processed by specifying one of the following:

- the number of log data sets
- a time in hours
- an RBA range

All log data sets processed in the normal (nonsimulation) mode are recorded in the archive history file so that PACLOG can determine whether a particular original log data set has been processed previously.

After all archive logs in the BSDS have been processed and recorded in the archive history file, you do not normally need to continue to use the LIMIT. For more information and examples of the use of the LIMIT option, see “LIMIT” on page 68 and Chapter 6, “Examples of PACLOG JCL.”

**NOTE**

Log data sets processed in simulation mode are optionally recorded in the archive history file. See “SIMULATE” on page 69 for information about the SIMULATE option.
Deciding which copies to make and when

PACLOG lets you make one, two, three, or four processed copies of each archive log data set. Copy 1 is intended for use as a local site primary copy to replace the original (unprocessed) primary archive log data set. Where dual archive logging is in use, copy 2 is intended for use as a local site backup to replace the corresponding original (unprocessed) backup archive log. Copies 3 and 4 are intended for offsite use (recovery site primary and backup).

PACLOG provides considerable flexibility in the processing of all archive log copies. You can process one, two, three, or four copies at one time in the same job, with one exception: copy 2 can be processed only if you use dual archive logging in your DB2 subsystem. You can make filtering, compression, and medium selections separately for each copy.

NOTE
For important information regarding archive logs, see “Recommended archive log processing practices” on page 35.

A typical approach to archive log processing might be to create all four copies at the same time using the maximum filtering. This approach is provided by filtering defaults and identifying any objects that never need recovery. Copy 1 might be compressed and directed to disk using the defaults, and copies 2, 3, and 4 might be directed to tape. See “Archive copy specification” on page 66 through “STORCLAS” on page 74 for more information about specifying each copy.

The syntax for this approach is as follows:

```
ARCHIVE1 Filterts (DBASE.TSPACE1)
ARCHIVE2 Filterts (DBASE.TSPACE1)
   TAPE UNIT CART
ARCHIVE3 Prefix OFFSITE.DB2A.ARC1
   TAPE UNIT CART
   Filterts (DBASE.TSPACE1)
ARCHIVE4 Prefix OFFSITE.DB2A.ARC2
   TAPE UNIT CART
   Filterts (DBASE.TSPACE1)
```

Variations on this scenario include the following:

- If the number of tape drives required to process all copies together is a concern, you could first process copies 1 and 2 as described previously and then later process copies 3 and 4. This approach results in copies 3 and 4 inheriting any filtering that was performed on copy 1 when it was processed.
Choosing the output medium

Consider scheduling the job to process copies 3 and 4 to match the movement of offsite resources (see the *RECOVERY MANAGER for DB2 User Guide*). This approach has the added advantage of potentially improving stacking efficiency because more than one log data set can be written to the tape.

- If you anticipate that log data might be required for uses other than recovery (such as audit reporting), then copy 2 might be made with no filtering and directed to tape. However, if you plan to follow this approach, you must create copy 2 when you first process copy 1.

### Choosing the output medium

With the exception of copy 1, you can choose either disk or tape as the output medium independently for each copy of the processed log. For copy 1, you can only use disk as the medium. If you do not specify an output medium, PACLOG uses disk as the default. Writing copy 1 to disk may substantially reduce the resources required by the active logs. Read the online overview included with the PACLOG logging environment modeling tool (described in Chapter 3, “The PACLOG logging environment modeling tool”) for more information about this subject. See “Device type options” on page 70 for information about specifying the output medium.

You can write copy 2 of the processed log to tape and optionally specify that the log data sets be stacked to the tape. Copies 3 and 4 (the offsite copies) can also be stacked to tape for transport to a recovery site. If you require compression of the processed copies, you specify it differently for tape and disk. See “Compressing archive log records” on page 41 for more information.

### Removing unwanted records and objects

PACLOG provides filter options that remove certain record types and objects from the archive log. In general, these records are not needed for DB2 forward recovery processes. They are initially written to the log to allow update data backout in the event that a transaction does not complete successfully. Table 3 shows the filter options available in PACLOG. For more information about DB2 log record types, see the IBM DB2 administration guide.

---

**WARNING**

To guard against the inadvertent removal of records that you might need for purposes other than recovery, consider using different filter options for each of your processed copies.
Reprocessing a processed local site archive log

You can use the REDO option to tell PACLOG to reprocess a local site archive log data set that has already been processed and cataloged. The new log data set replaces the prior version and updates the archive history file. You should use the LIMIT option in conjunction with the REDO option to control which log data sets are reprocessed.

**NOTE**

If the current syntax specifies less filtering than was previously performed, the log data set is still processed but a warning message is issued.

You can use the REDO option in situations such as these:

- Because PACLOG does not filter uncommitted transaction data, original log data sets that contain uncommitted data may be insufficiently processed the first time. After the data is committed, a processed log data set can be reprocessed if the REDO option is used. The reprocessed log data set replaces the prior version.

---

### Table 3 PACLOG filter options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>FILTERIX</td>
<td>Use this option to replace index-related records that are not needed for DB2 recovery purposes with easily compressible data.</td>
<td>72</td>
</tr>
<tr>
<td>FILTERIX EXCEPT (ixSpaceList)</td>
<td>Use this option to exclude selected index spaces from filtering, thus allowing index recovery from log data.</td>
<td>72</td>
</tr>
<tr>
<td>FILTERRECTYPE</td>
<td>Use this option to replace records that are not needed for DB2 recovery processes (other than those removed by FILTERIX) with easily compressible data.</td>
<td>72</td>
</tr>
</tbody>
</table>
| FILTERTS (tsSpaceList) | **Warning:** If you use this option and you attempt to recover a table space that requires the DB2 log, the recovery will fail.  
- Use this option with a table space specification to replace all records pertaining to those table spaces with easily compressed data.  
- To specify the table spaces, you can use a list, wildcard specifications, or a combination of both. | 71       |
Compressing archive log records

- If you process an archive log data set in simulation mode and update the BMC Software archive history file (by using the UPDATEHIST keyword with the SIMULATE option), and then you want to process the same archive log data set in normal mode, you must use the REDO option. This action tells PACLOG that an entry already exists in the archive history file and that it needs to be updated when normal mode processing is complete.

- You want to perform additional filtering on one or more archive log data sets.

- You want to move one or more archive log data sets from one medium to another (for example, from tape to disk).

See Chapter 6, “Examples of PACLOG JCL” for examples that show how to use REDO and LIMIT.

---

**WARNING**

The REDO option is valid for only copies 1 and 2 of the original archive log data set. You cannot use the REDO option with copies 3 and 4 (the offsite copies).

---

**Compressing archive log records**

You can optionally compress the filtered archive log data produced by PACLOG to reduce the amount of tape or disk space required for storage.

**Compressing data to tape**

When you write the processed log data sets to tape, you can choose to use the hardware compression feature in the tape drive. The PACLOG tape option TRTCH provides this choice. TRTCH syntax is described on “TRTCH” on page 73.

**Compressing data to disk**

When you write the processed log data sets to disk, you can choose to compress the data by using the COMPRESS option. COMPRESS provides a high degree of data compression and uses the BMC Software XCA technology. COMPRESS syntax is described on “COMPRESS” on page 74.

---

**NOTE**

If you already have DASD hardware compression enabled, do not use the COMPRESS option. If you need to determine whether you have DASD hardware compression installed on your system, contact your DASD hardware provider.
Using PACLOG to simulate log processing

You can simulate the processing of archive log data sets by PACLOG without performing any action against the original archive log data set. This capability lets you become familiar with the processing without altering your data.

When you use the SIMULATE keyword in addition to the syntax options used for normal PACLOG processing, PACLOG performs log data set processing without replacing the original log data set or cataloging the processed log data set. When you use SIMULATE, you can

- update the archive history file by using the keyword UPDATEHIST

  If you use UPDATEHIST, PACLOG updates the archive history file when processing is successfully completed. If you subsequently reprocess the same original log data set in normal mode, you must then use the REDO option to inform PACLOG to update the entry in the archive history file.

- keep or delete the processed log data set that was created in SIMULATE mode by using the keywords KEEP or NOKEEP

  If you use KEEP, the processed log data set is retained. If you use NOKEEP, the processed log data set is deleted. In both cases, no action is performed against the original log data set.

  **NOTE**
  
  If you use NOKEEP with UPDATEHIST, the entry in the archive history file is not deleted.

For more information, see the following sections:

- “Syntax diagram” on page 63 for a description of the syntax
- “Determining archive log size reduction” on page 87
- “Using data compression to tape” on page 89 for examples of the use of SIMULATE

Using PACLOG to conserve disk space

A major benefit of the PACLOG utility is the conservation of disk space. This space conservation results from increased flexibility in the allocation of such space to DB2 logs. Because the utility can reduce the size of the archive log by a considerable amount (up to 95 percent or more), it becomes feasible to keep archive logs on disk, thereby making it possible to reduce the number and size of the active logs.
The precise active log size that is optimal for your DB2 subsystem depends on the following factors:

- number of hours of active or archive log kept on disk
- number of archive logs kept on disk
- number of active logs
- number of days covered by the BSDS
- number of archive logs recorded in the BSDS
- average logging rates
- whether you use a 3380 or 3390 disk device
- expected log size reduction factor due to removed records and data compression

The number of variables makes manual methods of determining an optimal active log size unattractive. To show the impact of using PACLOG and to determine the optimal size for your logs, a modeling tool is supplied with the utility. The modeling tool is described in Chapter 3, “The PACLOG logging environment modeling tool.”
The PACLOG logging environment modeling tool

This chapter presents the following topics:

Overview ................................................................. 45
Viewing and modeling logging environment statistics .............................. 47
Logging environment panel field descriptions ..................................... 49
Viewing active log information ...................................................... 54
Active log information panel field descriptions .................................. 55
Viewing archive log information ....................................................... 56
Archive log copy 1 and copy 2 information panels field descriptions .......... 58
Audit synchronization ....................................................................... 59

Overview

The PACLOG logging environment modeling tool allows you to examine and view different logging scenarios for a selected DB2 subsystem in order to optimize the amount of DASD space required by the archive logs. In addition, you can display active and archive log information. By using the modeling tool’s optimization capabilities, you may be able to dramatically reduce the amount of DASD space required by your logging environment.

The modeling tool provides the following information:

- current logging environment statistics (“Viewing and modeling logging environment statistics” on page 47)
- information about the active logs (“Viewing active log information” on page 54)
- information about the archive logs (“Viewing archive log information” on page 56)
existence of an archive copy 1 data set for each archive copy 2 data in the BSDS ("Audit synchronization" on page 59)

The modeling tool operates interactively through ISPF panels and includes a comprehensive help system that is automatically installed when you install PACLOG. See the Backup and Recovery Products for DB2 Installation Guide for information about installing PACLOG.

Figure 2 on page 46 shows the modeling tool menu. To run the modeling tool, issue the following TSO command, where prefix is the prefix you specified during the installation process:

```
'prefix.CLIST(ALMISPF)
```

**NOTE**
The CLIST is tailored during installation to include data set names at your site.
Viewing and modeling logging environment statistics

To view and model the logging environment, begin on the Logging Environment panel. Select the Model option, type the DB2 subsystem ID, and then press Enter.

To view and model the logging environment

Start this procedure at the PACLOG Main Menu.

1 Enter a subsystem ID and press Enter.

The Logging Environment panel is displayed.

Figure 3  Logging Environment panel

```
ALMLG00A =========== Logging Environment - DEC1 ===============
Command ===> _____________________________________________________

Type information. Then press Enter.

Option . . . 1. Model Display current statistics & model changes
              2. Actives Display active log information
              3. Archives Display archive log information
DASD type . . 2 1. 3380 Device type used in rate calculations
              2. 3390
```

2 Enter 1. Model, specify the DASD type in your environment, and press Enter.

The Logging Environment Model for SSID panel is displayed.
You can use the Logging Environment Model panel to change the following logging environment variables to see what effect those changes would have on the required amount of DASD and other logging environment variables:

- days of log data recorded in the BSDS
- hours of log required on DASD
- highest logging rate
- active log size in cylinders
- number of active log pairs
- number of entries in the BSDS
- hours of archive 2 on DASD

In addition, you can choose to have the modeling tool optimize your logging environment based on these criteria:

- the number of days of log data that you want to record in the BSDS
- the number of hours of log that you require to be kept on DASD
Logging environment panel field descriptions

This section describes the fields on the Logging Environment Model panel.

Source of highest logging rate

This field determines how the logging environment model obtains the highest logging rate: from the BSDS, a user entry, or a list of previous rates.

- Select BSDS to display the highest logging rate found in the BSDS. The logging environment modeling tool searches the BSDS to find the highest rate of activity for the period of nn hours, where nn equals the value in the Hours of log required on DASD field.

- Select User if you want to enter the highest logging rate yourself in the High logging rate for that period field.

- Select List to select the highest logging rate from a list encompassing the highest rates of activity for the period of nn hours, where nn is the number of hours for which the average logging rate is calculated. Use the Hours of log required on DASD field to specify nn. When the list is displayed, enter / or S beside the rate you want and press Enter.

Optimize fields marked * for DASD archives

The logging environment modeling tool can calculate the optimal size of your active logs, assuming that the archive logs will be on DASD. All fields marked with a * are included in the optimization process. To perform the optimization, select Yes in this field, enter data in the following fields, and then press Enter.

- Hours of log required on DASD
- Days of log data recorded in BSDS
- Expected compression ratio

The tool initializes the following fields, then performs the optimization.

- Number of active log pairs is set to 3
- Number of entries in BSDS is set to 1000
- Hours of archive 2 on DASD is set to 1

Current

Figures in the Current column describe the current logging environment of your system as determined from the BSDS.
Model

Fields in the Model column allow you to change the logging environment settings in order to determine the overall effect of the changes on DASD or the logs.

Prev

The Prev column displays the results of the previous model you created, allowing you to compare two different scenarios.

Expected compression ratio

This field displays expected compression of an archive log when PACLOG is used. Compression percentages of 70 to 90 percent can be expected in most circumstances.

Days of log data recorded in BSDS

This field displays the number of days of log data to be kept in the BSDS. BMC Software recommends that you keep a few more days than is usually necessary to allow for periods of unexpectedly high activity. For example, if you want 14 days of log available for recovery, then you should ensure that you have 17 days of log available in the BSDS.

If you choose Yes in the Optimize fields marked * for DASD archives field, then you must enter the number of days you want to keep log data.

If you choose No in the Optimize fields marked * for DASD archives field, then this value is calculated as follows:

\[(\text{active log size}) \times (\text{number of entries in BSDS}) \div (\text{highest logging rate}) \times 24\]

Hours of log required on DASD

This field displays the number of hours you want to retain log data on DASD. This is the length of time that you want recovery data to be available on DASD. Valid values range from 1 to 999.

If you do not archive to DASD (hours of archive 2 on DASD=0), then the value entered in this field, along with the average logging rate for this time period, is used to determine the number of days of data that is stored in the BSDS.

**NOTE**

The value in the Current column is the value determined by the shortest length of time taken to fill all of the active log data sets.
High logging rate for that period

The logging environment modeling tool searches the BSDS to find the highest rate of log activity for the period of nn hours, where nn equals the value in the **Hours of log required on DASD** field. You can also enter a logging rate manually or choose a logging rate from a list of high rates.

- To have the logging environment modeling tool find the highest rate, choose **BSDS** in the **Source of highest logging rate** field.

- To enter the logging rate of your choice, choose **User** in the **Source of highest logging rate** field and enter the logging rate you want in this field.

  Valid values range from 1 to 99999 cylinders per hour.

- To select a logging rate from a list of the highest 15 logging rates, select **List** as the **Source of highest logging rate** and press **Enter**. When the list is displayed, enter **S** or **/** beside your choice and press **Enter**.

Active log size

This field displays the active log size in cylinders.

If you choose **Yes** in the **Optimize fields marked * for DASD archives** field, then the size in cylinders is calculated as follows:

\[
A \times 24 \times B / C + 1
\]

<table>
<thead>
<tr>
<th>Variable</th>
<th>Equals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>number of days of data in BSDS</td>
</tr>
<tr>
<td>B</td>
<td>high logging rate</td>
</tr>
<tr>
<td>C</td>
<td>number of entries in the BSDS</td>
</tr>
</tbody>
</table>

If you choose **No** in the **Optimize fields marked * for DASD archives** field, then you must enter a value for the active log size.

Number of active log pairs

This field shows the number of active log pairs for the DB2 subsystem. The entry in the **Current** column shows your current DB2 log configuration.

BMC Software recommends that you keep only three active logs if you place archive logs on DASD. In the event of a DASD failure on any log, DB2 operation can continue unimpeded with the two remaining logs while you recover the third log. Keeping only three logs also reduces redundant log information (the active data that is replicated in the archive log data sets).
If you choose Yes in the **Optimize fields marked * for DASD archives** field, then the logging environment modeling tool sets the number of active log pairs to 3.

**Number of entries in BSDS**

This field shows the number of entries kept in the BSDS. The entry in the **Current** column shows number of entries currently kept in the BSDS. BMC Software recommends that you always use the maximum value of 1000. The amount of DASD space occupied by these entries is only a few cylinders. If you choose Yes in the **Optimize fields marked * for DASD archives** field, the logging environment modeling tool sets this figure to 1000.

If you do not currently keep 1000 entries in the BSDS, you can determine how changing the number of entries affects the number of days of log data recorded in the BSDS by performing log environment modeling.

**Hours of archive 2 on DASD**

This field shows the amount of time that you want to retain ARCHLOG2 on DASD before migrating it to tape. The logging environment modeling tool sets this to one hour when you choose to optimize. You can also use the logging environment modeling tool to determine the impact on DASD usage if you are currently keeping more than the optimal number of hours. To view the effect of keeping a larger number of hours of ARCHLOG2 on DASD, follow these steps:

1. Select No in the **Optimize fields marked * for DASD archives** field.
2. Set or verify the following fields:
   - Expected compression ratio
   - Days of log data recorded in BSDS
   - Hours of log required on DASD
3. Set the **Hours of archive 2 on DASD** as desired, and then press Enter.

**NOTE**

If you do not store either copy of the archive log on DASD, set this value to 0.

**Hours of archive 1 on DASD**

This field shows the amount of time that ARCHLOG1 should be retained on DASD before migrating it to tape. This figure is determined by the number of hours you indicate in the **Hours of log required on DASD** field.
**Total cylinders without PACLOG**

The total number of cylinders required if you do not use PACLOG compression is calculated in the following formulas.

- If you do not keep any archive log on DASD (hours of archive 2 on DASD=0), the total number of cylinders required is as follows:

  \[ A \times B \times 2 \text{ (if you are using dual logs)} \]

- If you keep archive data on DASD, the total number of cylinders required is as follows:

  \[ (A \times B \times 2) + (C \times [D - E]) + (C \times F) \]

<table>
<thead>
<tr>
<th>Variable</th>
<th>Equals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>size of the active log data sets</td>
</tr>
<tr>
<td>B</td>
<td>number of log data sets</td>
</tr>
<tr>
<td>C</td>
<td>highest logging rate</td>
</tr>
<tr>
<td>D</td>
<td>number of hours of ARCLOG1</td>
</tr>
<tr>
<td>E</td>
<td>total hours of active log</td>
</tr>
<tr>
<td>F</td>
<td>hours of ARCLOG2</td>
</tr>
</tbody>
</table>

**Total cylinders with PACLOG**

The total number of cylinders required if you use PACLOG compression is calculated as the amount required without PACLOG, except that the requirements for ARCLOG1 and ARCLOG2 are reduced by the percentage you entered in the **Expected compression ratio** field.

**Cylinders saved by PACLOG**

The number of cylinders saved by using PACLOG compression is calculated by subtracting the cylinders required when using PACLOG from the cylinders required when not using PACLOG.
Viewing active log information

PACLOG enables you to view active log information, including

- total cylinders of active log
- average number of hours represented in the active logs
- minimum number of hours represented in the active logs
- start and end times of each active log

To view active log information

Start this procedure at the PACLOG Main Menu.

1. Enter a subsystem ID and press Enter.

The Logging Environment panel is displayed.

Figure 5  Logging Environment panel

![Logging Environment panel](Figure5.png)
2. Enter 2. **Actives**, specify the DASD type in your environment, and press Enter.

The Active Log Information panel is displayed.

**Figure 6  Active Log Information panel**

```
ALMLG02A ============ Active Log Information - DECI ========= Row 1 to 3 of 3
Command ===> ________________________________________________ Scroll ===> PAGE
Total cyls of actives (1 and 2) :      576
Average hours of data in actives:     1.38
Minimum hours of data in actives:     0.01 From: 2006-05-15 MON 10:12:07.6
                                       To: 2006-05-15 MON 10:12:31.5

Current active log copy 1 data sets

<table>
<thead>
<tr>
<th>Start time</th>
<th>End time</th>
<th>Cyls</th>
<th>cyl/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006-05-15 Mon 14:32:14</td>
<td>--- INVALID END TIME ---</td>
<td>96</td>
<td>UNKNOWN</td>
</tr>
</tbody>
</table>
```

---

**Active log information panel field descriptions**

This section describes the fields on the Active Log Information panel.

**Total cyls of actives (1 and 2)**

This field displays the total number of cylinders allocated to active logs. This includes copy 1 data sets and copy 2 data sets, if they exist.

**Average hours of data in actives**

For all log data recorded in the BSDS, this field displays the average number of hours for which data was available in the active logs. This number is based on the current number of active log sets.

**Minimum hours of data in actives**

For all log data recorded in the BSDS, this field displays the minimum number of hours for which data was available in the active logs. This is the shortest timespan in which all of the active logs were filled.
Start time

This field displays the start time for each active log, in the format \textit{yyyy-mm-dd wkd hh:mm:ss}, where:

- \textit{yyyy} is the 4-digit year
- \textit{mm} is the month of the year
- \textit{dd} is the day of the month
- \textit{wkd} is the 3-character abbreviation of the day of the week
- \textit{hh} is hour of the day in military format
- \textit{nn} is minutes
- \textit{ss} is seconds

End time

This field displays the end time for each active log in the same format as \textbf{Start time}.

Cyls

This field displays the number of cylinders that this log occupies.

cyl/hr

This field displays the logging rate in cylinders per hour for each active log.

Viewing archive log information

PACLOG enables you to view archive log information, including

- details about every archive log 1
- details about every archive log 2
- audit details about archive copy 1 and 2 synchronization

To view archive log information

Start this procedure at the PACLOG Main Menu.

1 Enter a subsystem ID and press Enter.

   The Logging Environment panel is displayed.
2 Enter 3. Archives, specify the DASD type in your environment, and press Enter.

The Archive Log Information panel is displayed.

3 Specify Copy 1 detail, Copy 2 detail or Audit sync. and press Enter.

See the following sections for detailed information:

- “Archive log copy 1 and copy 2 information panels field descriptions” on page 58
- “Audit synchronization” on page 59
Archive log copy 1 and copy 2 information panels field descriptions

This section describes the fields on the archive log copy 1 and copy 2 information panels. To access these panels, select the Copy 1 detail option or the Copy 2 detail option from the Archive Log Information panel.

Sort by

You can choose to sort the list of archive logs by start time, by cylinders per hour in descending order (largest to smallest), or by cylinders per hour in ascending order (smallest to largest).

Average cyls per hour

This field displays the average number of cylinders per hour for all of the logs in the list.

Number of days covered

This field displays the number of days covered by all of the logs in the list, that is, from the start time of the first log to the end time of the last log.

Start time

This field displays the start time for each archive log, in the format yyyy-mm-dd wkd hh:mm:ss, where:

- yyyy is the 4-digit year
- mm is the month of the year
- dd is the day of the month
- wkd is the 3-character abbreviation of the day of the week
- hh is hour of the day in military format
- nn is minutes
- ss is seconds

End time

This field displays the end time for each archive log in the same format as Start time.

Cyls

This field displays the number of cylinders that this log would occupy if on DASD.
Audit synchronization

You can verify the existence of an archive copy 1 data set for each archive copy 2 data set in the BSDS. To access this information, select the Audit sync. option from the Archive Log Information panel. You receive one of the following results:

- If the copies are synchronized, a message is displayed at the top of the panel. This means that there is an ARCHLOG1 data set that matches each ARCHLOG2 data set found in the BSDS.

- If the copies are not synchronized, one or more messages are displayed listing each ARCHLOG2 data set for which there is no matching ARCHLOG1 data set.

cyl/hr

This field displays the logging rate in cylinders per hour for each archive log.
Audit synchronization
PACLOG syntax

This chapter presents the following topics:

Syntax overview .......................................................... 61
Syntax rules ................................................................ 62
Syntax diagram .............................................................. 63
Option descriptions ......................................................... 65
  Archive copy specification ............................................ 66
  Global options ............................................................ 68
  Device type options ...................................................... 70
  Filter options ............................................................. 71
  Tape options .............................................................. 72
  Disk options .............................................................. 73

Syntax overview

PACLOG syntax is designed to make the utility easy to install and operate. The
ALMIN control statement options enable you to specify up to four processed archive
log data sets. PACLOG dynamically allocates both the input (original) log data sets
and the output (processed) log data sets. You can choose to write each processed log
data set to tape or disk (except copy 1, which can go only to disk) and to specify the
filtering options that you want PACLOG to use when processing each log data set.

Specifying minimal command syntax, as shown in the following example, produces
two copies of the processed log data sets for the local site.

ARCHIVE1 ARCHIVE2
Both copies are written to disk and cataloged. By default, maximum record filtering is used when processing the original log data sets. Also by default, the data is compressed when it is written to disk. Because no search limits are specified, all original archive log data sets that have not previously been processed by PACLOG (as indicated by the archive history file) are processed by this job. The original (unprocessed) archive log data sets are replaced.

The following example produces two copies of the processed log data sets for the local site, as in the previous example.

```
ARCHIVE1 ARCHIVE2
ARCHIVE3 PREFIX prefix3 TAPE UNIT CART FILTERIX NONE
ARCHIVE4 PREFIX prefix4 TAPE UNIT CART
```

This example also produces two copies of the processed log data sets for recovery site use. The recovery site log data sets are written to tape and cataloged at the local site. One of these data sets has maximum record filtering, and the other retains the index-related records. See Chapter 6, “Examples of PACLOG JCL” for more examples.

**Syntax rules**

Use the following rules when you specify the options in the SYSIN data set:

- Group filter options together.
- Group device type options together.
- Specify at least one `ARCHIVE` keyword.
- Specify the data set prefix immediately after each `ARCHIVE3` or `ARCHIVE4` keyword.
- Place subordinate keywords immediately after the corresponding primary keyword.
Syntax diagram

Figure 9 shows the syntax for PACLOG, with default values underscored. Table 4 on page 65 lists each option alphabetically and describes each option.

**NOTE**
The conventions used in the diagram are described in “Syntax diagrams”.

**Figure 9**  PACLOG syntax (Part 1 of 2)
Figure 9    PACLOG syntax (Part 2 of 2)
Option descriptions

Table 4 describes the options that you can specify with PACLOG and includes default values and other information. The validity of each option is shown for both tape and disk output. See the referenced page for more information about a particular option.

**Table 4  Selecting PACLOG options**

<table>
<thead>
<tr>
<th>Syntax option</th>
<th>Option type</th>
<th>Options for disk output</th>
<th>Options for tape output</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCHIVEn</td>
<td>copy specification</td>
<td>required</td>
<td>required</td>
<td>66</td>
</tr>
<tr>
<td>COMPRESS</td>
<td>disk</td>
<td>defaults to YES</td>
<td>not valid</td>
<td>74</td>
</tr>
<tr>
<td>DATACLAS</td>
<td>disk</td>
<td>optional</td>
<td>not valid</td>
<td>74</td>
</tr>
<tr>
<td>DISK</td>
<td>device type</td>
<td>default medium</td>
<td>not valid</td>
<td>71</td>
</tr>
<tr>
<td>EXPDT</td>
<td>tape</td>
<td>not valid</td>
<td>optional; not valid with RETPD or for copy 1</td>
<td>73</td>
</tr>
<tr>
<td>FILTERIX</td>
<td>filter</td>
<td>defaults to ALL</td>
<td>defaults to ALL</td>
<td>72</td>
</tr>
<tr>
<td>FILTERRECTYPE</td>
<td>filter</td>
<td>defaults to ALL</td>
<td>defaults to ALL</td>
<td>72</td>
</tr>
<tr>
<td>FILTERTS</td>
<td>filter</td>
<td>optional</td>
<td>optional</td>
<td>72</td>
</tr>
<tr>
<td>KEEP</td>
<td>global</td>
<td>valid only with SIMULATE</td>
<td>valid only with SIMULATE</td>
<td>69</td>
</tr>
<tr>
<td>LIMIT</td>
<td>global</td>
<td>optional</td>
<td>optional</td>
<td>68</td>
</tr>
<tr>
<td>MGMTCLAS</td>
<td>disk</td>
<td>optional</td>
<td>not valid</td>
<td>74</td>
</tr>
<tr>
<td>NOKEEP</td>
<td>global</td>
<td>valid only with SIMULATE</td>
<td>valid only with SIMULATE</td>
<td>70</td>
</tr>
<tr>
<td>PREFIX</td>
<td>copy specification</td>
<td>required for copies 3 and 4; not valid for copies 1 and 2</td>
<td>required for copies 3 and 4; not valid for copies 1 and 2</td>
<td>67</td>
</tr>
<tr>
<td>REDO</td>
<td>copy specification</td>
<td>optional; valid only with ARCHIVE1 or ARCHIVE2</td>
<td>optional; valid only with ARCHIVE1 or ARCHIVE2</td>
<td>67</td>
</tr>
<tr>
<td>RETPD</td>
<td>tape</td>
<td>not valid</td>
<td>optional; not valid with EXPDT or for copy 1</td>
<td>73</td>
</tr>
<tr>
<td>SIMULATE</td>
<td>global</td>
<td>optional</td>
<td>optional</td>
<td>69</td>
</tr>
<tr>
<td>STACK</td>
<td>tape</td>
<td>not valid</td>
<td>defaults to YES; not valid for copy 1</td>
<td>73</td>
</tr>
<tr>
<td>STORCLAS</td>
<td>disk</td>
<td>optional</td>
<td>not valid</td>
<td>74</td>
</tr>
<tr>
<td>TAPE</td>
<td>device type</td>
<td>not valid</td>
<td>required for tape output; not valid for copy 1</td>
<td>71</td>
</tr>
<tr>
<td>TRTCH</td>
<td>tape</td>
<td>not valid</td>
<td>optional; not valid for copy 1</td>
<td>73</td>
</tr>
<tr>
<td>UNIT</td>
<td>device type</td>
<td>defaults to SYSALLDA</td>
<td>defaults to SYSALLDA</td>
<td>71</td>
</tr>
<tr>
<td>UPDATEHIST</td>
<td>global</td>
<td>valid only with SIMULATE</td>
<td>valid only with SIMULATE</td>
<td>69</td>
</tr>
</tbody>
</table>
Archive copy specification

Figure 10 shows the syntax diagram for the ARCHIVE option, which you use to specify which copies to make of each log data set. You can make up to four processed copies of each log data set and specify options that apply to all of the copies. You can also specify device options and filter options separately for each copy. For ARCHIVE1 and ARCHIVE2 you can also specify the REDO option. See the following sections for more information:

- “Global options” on page 68
- “Device type options” on page 70
- “Filter options” on page 71

Following are descriptions for the ARCHIVE copy option and its parameters.

ARCHIVENn

When you do not specify the REDO option, ARCHIVENn (where n = 1, 2, 3, or 4) specifies one of up to four processed copies of original log data sets. The original log data sets must be within the range specified by the LIMIT option or be indicated as unprocessed by the archive history file. The original log data sets are deleted, unless this is a simulation (see “SIMULATE” on page 69).
When you specify the REDO option, PACLOG processes copies 1 and 2 of log data sets that have already been processed and found within the same range.

---

**NOTE**

You can process copy 2 only if dual archive logging is used in your DB2 system.

---

Use ARCHIVE1 and ARCHIVE2 to create processed copies for local site use and ARCHIVE3 and ARCHIVE4 to create processed copies for recovery site use.

**PREFIX prefix**

Use this option to tell PACLOG to use prefix as the high-level qualifier in the data set names for the third or fourth processed log data sets (ARCHIVE3 and ARCHIVE4). PREFIX is only valid for the third and fourth processed log data sets and provides a means of identifying these log data sets as offsite logs. PREFIX is a required option for ARCHIVE3 and ARCHIVE4.

---

**WARNING**

Ensure that the data set prefixes that you specify for the third or fourth copies are different from the prefixes used for the original local site archive logs. Otherwise, you might not be able to restart the job.

---

If the installation option TSTAMP is set to YES, prefix cannot be more than 17 characters. If TSTAMP is set to NO, prefix can be up to 35 characters. See Appendix A, “PACLOG installation,” for information about installation options.

**REDO**

When you specify the REDO option with either ARCHIVE1 or ARCHIVE2, PACLOG processes (or reprocesses) all log data sets (original or already processed) that are found within the range that is specified by the LIMIT option.

If a log data set within the range specified has already been processed and the current syntax specifies less filtering than the previous processing, PACLOG still processes the log data set, but you receive a warning message.

---

**NOTE**

Do not specify the REDO option with ARCHIVE3 and ARCHIVE4.
Global options

PACLOG updates the archive history file when reprocessing is completed. See “Reprocessing a processed local site archive log” on page 40 for more information. Also, see “The BMC Software archive history file” on page 26 for a discussion of the archive history file.

Global options

The global options apply to all archive log data sets processed concurrently by PACLOG. Figure 11 shows the syntax diagram for the global options.

Figure 11  Global options syntax

Following are descriptions for the global options and their parameters.

LIMIT

Use this option to specify the limits to be used by PACLOG when searching for original archive log data sets to process. You can express the limit as a number of hours, a number of logs, or a relative byte address (RBA) range. If you do not specify LIMIT, PACLOG uses the entries in the DB2 bootstrap data set (BSDS) and the BMC archive history file to determine those original archive log data sets that have not yet been processed and then processes those log data sets.

You can also use the LIMIT option when reprocessing archive log data sets that have already been processed, that is, when you use the REDO option (see “REDO” on page 67). The limit you specify applies to all archive log data sets being processed. See “Recommended archive log processing practices” on page 35 and “Deciding which logs to process” on page 37 for more information about using the LIMIT option.

LIMIT HOURS \( n \)

Use this option to limit the number of original log data sets that have been selected for processing to those covering the last \( n \) hours. The number must be in the range 1 through 999 and greater than the interval between successive PACLOG operations. LIMIT HOURS uses the end RBA timestamp in determining which logs to process. The end RBA timestamp is based on Greenwich Mean Time (GMT).
LIMIT LOGS n

Use this option to specify the number of original log data sets to be processed by PACLOG. Log data sets are counted backwards with the most recent archive log data set considered as the first data set. The number must be in the range of 1 through 999.

--- NOTE ---

For DB2 version 8 and later, the LIMIT LOGS value range is 1 to 9999.

LIMIT RBARANGE startRba endRba

Use the LIMIT RBARANGE option with start and end values (in hexadecimal notation) to specify an RBA range to be searched by PACLOG for original log data sets.

If you want to search from a specific start RBA to the current time, specify an end RBA of FFFFFFFFFFFFFF to ensure that the whole period is searched.

SIMULATE

Use this option to specify that the current PACLOG job is a simulation. PACLOG generates processed log data sets, but it performs no action against the original log data sets. You can specify whether to keep or delete the processed log data sets and whether to update the BMC archive history file. If you do not specify SIMULATE, PACLOG performs processing for normal archive log data sets.

UPDATEHIST

Use this option to specify that the archive history file is to be updated. Otherwise, the archive history file is not updated.

KEEP

Use this option (SIMULATE UPDATEHIST KEEP) to specify that the processed copies of the log data sets that have been produced by the current job should be retained and cataloged. Copies of all three files are retained: the BSDS file, the archive log file, and the archive history file.
When the copies are cataloged, copies 1 and 2 are named as follows to distinguish them from the original copies:

- BSDS copy: `prefix.YdataSetNumber`
- archive log copy: `prefix.ZdataSetNumber`
- archive history file: `prefix.HdataSetNumber`

**NOKEEP**

Use this option (SIMULATE UPDATEHIST NOKEEP) to specify that the data sets produced by the current job should be deleted.

---

**NOTE**

If you use SIMULATE UPDATEHIST NOKEEP, the entry in the archive history file is *not* deleted.

---

**DB2LOGPRODUCT**

If you use a DB2 log processing product, such as the BMC Software Log Master product, use the DB2LOGPRODUCT keyword to specify that PACLOG is *not* to filter log records that may be needed by the log product.

---

**Device type options**

Figure 12 shows the syntax diagram for the device type options. All of the options are available for use with ARCHIVE2, ARCHIVE3, and ARCHIVE4. For ARCHIVE1, DISK (and disk options) and UNIT are available; TAPE is not available.

**Figure 12 Device type options syntax**

Following are descriptions of each of the device type options.
**TAPE**

Use this option to write the processed log data sets to tape. See “Tape options” on page 72 for descriptions of the options you can use when you write the log data sets to tape. If you do not specify TAPE, PACLOG uses DISK as the default.

---

**NOTE**

PACLOG always writes copy 1 of the processed archive log data set to disk. It does not write this copy to tape.

---

**DISK**

Use this option (the default) to write the processed log data sets to disk. See “Disk options” on page 73 for descriptions of the options that you can use when you write the log data sets to disk.

**UNIT**

Use this option to specify the symbolic name for the tape drive or disk drive to be used when you generate processed log data sets. The default unit name is SYSALLDA.

---

**Filter options**

Figure 13 shows the syntax diagram for the filter options.

---

**WARNING**

To guard against the inadvertent removal of records that you might need for purposes other than recovery, consider using different filter options for each of your processed copies.

---

**Figure 13  Filter options syntax**
Following are descriptions of each of the filter options.

**FILTERIX**

Use this option to specify whether to remove index-related records from the archive log data set. Use FILTERIX NONE to keep all such records. Use FILTERIX ALL (the default) to filter out those records. Use FILTERIX EXCEPT (database.indexSpace) to exclude selected index spaces from filtering, thus allowing index recovery from log data. You can use an asterisk (*) as a wildcard to pattern match on either or both the database and index space names.

**FILTERRECTYPE**

Use this option to specify whether to remove other record types that are not needed for DB2 forward recovery processes from the archive log. Use FILTERRECTYPE NONE to keep all such records. Use FILTERRECTYPE ALL (the default) to filter out those records.

**FILERTS (database.tablespace, . . ..)**

Use this option and a DB2 table space specification to remove all records that pertain to those table spaces from the archive log. The list must be enclosed in parentheses, and the items in the list must be separated by commas. You can use an asterisk (*) as a wildcard to pattern match on either or both the database and table space names.

---

### Tape options

Figure 14 shows the syntax diagram for the tape options. These options are available when you select TAPE as the medium for the processed log data set. All of these options are invalid for disk.

---

**NOTE**

None of these tape options are valid for copy 1. PACLOG always writes this copy of the processed archive log data set to disk.
Following are descriptions of each tape options.

RETPD

Use this option to specify the retention period in days for the current log data set. The valid range is 0 through 9999. PACLOG does not provide a default.

EXPDT

Use this option to specify the expiration date for a tape copy data set. The date must be in the format yyyy/ddd, where yyyy is the four-digit year and ddd is the three-digit Julian day (001 through 366). PACLOG does not provide a default.

--- NOTE ---

RETPD and EXPDT are mutually exclusive. If you specify neither of these options, an OS/390 or tape management system default may apply.

STACK

Use this option to specify whether to stack the ARCHIVE log data sets that are processed in this job contiguously on a new tape volume. STACK YES is the default.

TRTCH

Use this option to specify whether to use the data compression feature in the tape drive for the current processed log data set. Use TRTCH COMP to enable data compression. Use TRTCH NOCOMP to disable data compression. If you do not specify TRTCH, an OS/390 or tape management system default may apply.

Disk options

Figure 15 shows the syntax diagram for the disk options. These options are available when you specify DISK (whether explicitly or by default) as the medium for the processed log data sets. All of these options are invalid for tape.

Figure 15  Disk options syntax
Following are descriptions of each of the disk options.

**COMPRESS**

Use this option to specify whether the processed log data sets are to be compressed. The default is to compress the data (Yes). See “Compressing archive log records” on page 41 for more information.

---

**WARNING**

If you already have DASD hardware compression enabled, you should not use the COMPRESS option. If you need to determine whether you have DASD hardware compression installed in your system, consult with your DASD hardware provider.

---

**COMPRESS YES**

COMPRESS YES is the default. PACLOG uses the BMC Software Extended Compression Architecture (XCA) services to provide maximum data compression when writing to disk.

**COMPRESS NO**

This option tells PACLOG not to use compression for this log data set.

---

**WARNING**

Always use COMPRESS NO when you have DASD hardware compression enabled.

---

**DATACLAS**

Use this option to specify a valid storage management subsystem (SMS) data class name for this log data set. The name must not exceed eight characters. If you do not specify this option, PACLOG does not use SMS.

**MGMTCLAS**

Use this option to specify a valid SMS management class name for this log data set. The name must not exceed eight characters. If you do not specify this option, PACLOG does not use SMS.

**STORCLAS**

Use this option to specify a valid SMS storage class name for this log data set. The name must not exceed eight characters. If you do not specify this option, PACLOG does not use SMS.
Building and running PACLOG jobs

This chapter presents the following topics:

Building PACLOG jobs ................................................................. 75
  JOB statement ................................................................. 76
  EXEC statement ............................................................... 76
  STEPLIB DD statement ...................................................... 76
  Specifying the PACLOG data set DD statements .................... 76
Sample jobs ............................................................................. 79
  Processed archive log data set report .................................... 83
  Expired archive log data sets report ....................................... 84
  Using output from the reports ............................................... 84
Archive log management reports .............................................. 82
Running jobs and responding to processing errors .................... 85

Building PACLOG jobs

Building a PACLOG job involves creating JCL that includes the following:

- a JOB statement
- an EXEC statement that includes a utility parameter to specify the ID of the DB2 subsystem against which the job will run
- DD statements that specify the PACLOG and DB2 load libraries
- DD statements that specify various optional and required data sets

The following descriptions provide more details. See “Sample jobs” on page 79 for a sample of PACLOG JCL.
JOB statement

The JOB statement starts with a job name and includes standard JOB statement parameters, such as accounting information and a run identifier.

EXEC statement

The EXEC statement has the following format:

```
//STEP1 EXEC PGM=ALMMAIN, PARM='ssid', REGION=4M
```

In this statement, PGM=ALMMAIN specifies the processing module for PACLOG, and PARM specifies a single utility parameter, ssid, which is the ID of the DB2 subsystem against which the job will run.

A REGION size of three megabytes is sufficient for PACLOG operation.

STEPLIB DD statement

The STEPLIB DD statement optionally identifies the PACLOG and DB2 load libraries that you want to use, for example:

```
//STEP1 DD DISP=SHR, DSN=BMCALM.TEST.OVERRIDE1
//                DD DISP=SHR, DSN=BMCALM.TEST.DBLINK
//                DD DISP=SHR, DSN=BMCALM.TEST.XXLINK
//                DD DISP=SHR, DSN=SYS3.DECI.DSNEXIT
//                DD DISP=SHR, DSN=CSGI.DB2V81M.DSNLOAD
```

Specifying the PACLOG data set DD statements

This section describes the data sets that PACLOG uses. Each data set is specified by a ddbname (data definition name). You must specify all required data sets in the JCL.

**NOTE**

You do not need to specify DD statements for the input archive log data sets or the output copy data sets. PACLOG dynamically allocates these data sets.
Specifying the PACLOG data set DD statements

- **ALMIN (required)**

  The input data set that contains one or more control statements. Attributes for this data set must be fixed-length records with a length of 80 (RECFM=F or FB, LRECL=80).

- **ALMPRINT (required)**

  The output for messages that are returned from PACLOG. PACLOG also echoes the contents of the ALMIN data set in the ALMPRINT output. ALMPRINT can be allocated to SYSOUT or to a data set with a data control block (DCB) of LRECL=121, RECFM=VBA.

- **ALMOPTS (required)**

  The PACLOG control options data set created during installation with the default name of $hilvl.ALM.DBCNTL(ALM$OPTS). The data set must be allocated with DISP=SHR.

**NOTE**

PACLOG and RECOVERY MANAGER for DB2 share the options file. If RECOVERY MANAGER is already installed on this subsystem, PACLOG should use the same data set as that used by RECOVERY MANAGER. The options file is common to all DB2 subsystems and contains the following information:

- names of the archive history file
- time stamps for each DB2 subsystem on which PACLOG is installed
- name of the work unit which is common to all subsystems
- bootstrap data set (BSDS)
- production DSN load library for DB2

- **ALMMSGS (required)**

  The PACLOG messages data set created during installation with the default name of $hilvl.ALM.DBCNTL(ALMMSGS). The data set must be allocated with DISP=SHR.

- **BMCERROR (optional)**

  The output for compiler run time errors. If compiler errors are detected and BMCERROR is not present in the JCL, the errors are printed in the JES log. The data set can be allocated to SYSOUT or to a data set with a DCB of LRECL=121, RECFM=VBA.
Specifying the PACLOG data set DD statements

- **SYSUT1 (optional)**

  The BSDS (either BSDS01 or BSDS02) for the subsystem named in the EXEC statement. For example //SYSUT1 DD DISP=SHR,DSN=DB21CAT.BSDS01. If it is not specified, PACLOG gets the BSDS name from the control options and dynamically allocates the BSDS.

- **ALMLSTAT (optional)**

  A listing of the total number of records in the log for each record type. The data set can be allocated to SYSOUT or to a data set with a DCB of LRECL=133, RECFM=FBA.

- **ALMOSTAT (optional)**

  A listing of the total number of records in the log for each DB2 object. The data set can be allocated to SYSOUT or to a data set with a DCB of LRECL=133, RECFM=FBA.

- **ALMLIST1 (required)**

  A listing of local primary archive log data sets that have been processed. The data set can be allocated to SYSOUT or to a data set with a DCB of LRECL=133, RECFM=FBA.

- **ALMLIST2 (required)**

  A listing of local secondary archive log data sets that have been processed. The data set can be allocated to SYSOUT or to a data set with a DCB of LRECL=133, RECFM=FBA.

- **ALMLIST3 (optional)**

  A listing of offsite archive log data sets for which the primary offsite copy was processed. The data set can be allocated to SYSOUT or to a data set with a DCB of LRECL=133, RECFM=FBA.

- **ALMLIST4 (optional)**

  A listing of offsite archive log data sets for which the secondary offsite copy was processed. The data set can be allocated to SYSOUT or to a data set with a DCB of LRECL=133, RECFM=FBA.
- **ALMXPIRE** (required)

A listing of all expired archive log data sets (those archive log data sets found in the archive history file but which no longer exist in the BSDS). The data set can be allocated to SYSOUT or to a data set with a DCB of LRECL=133, RECFM=FBA.

---

**NOTE**

Data sets that are no longer represented in the BSDS are deleted automatically from the archive history file by PACLOG. However, PACLOG does not delete the physical data set.

---

## Sample jobs

This section provides sample PACLOG JCL. See Chapter 6, “Examples of PACLOG JCL” for additional sample jobs.

Figure 16 shows a sample of a PACLOG job that processes a primary archive log data set and writes the filtered output to disk. The job completes after creating and cataloging the processed data set.

The BSDS, PACLOG messages and options, print files, and listings of processed log data sets and expired log data sets are all specified in the JCL by the DD statements described on previous pages.

The ALMIN DD statement specifies log processing options. Both record filtering options, FILTERIX and FILTERRECTYPE, are specified along with the FILTERTS option, which is used to remove DB2 objects. By default, PACLOG compresses the processed log data set before writing it to the disk.

---

### Figure 16  Sample job (part 1 of 2)

```plaintext
//PACLOG EXEC PGM=ALMAIN, PARM='DECI ', REGION=4M
//STEPLIB DD DISP=SHR, DSN=BMCALM.TEST.OVERRIDE1
// DD DISP=SHR, DSN=BMCALM.TEST.DBLINK
// DD DISP=SHR, DSN=BMCALM.TEST.XXLINK
// DD DISP=SHR, DSN=BMCALM.TEST.BBLINK
// DD DISP=SHR, DSN=SYS3.DECI.DSNEXIT
// DD DISP=SHR, DSN=CSGI.DB2V81M.DSNLOAD
//SYSUT1 DD DISP=SHR, DSN=DBNCAT.BSDS01
//ALMMSGS DD DISP=SHR, DSN=BMCALM.TEST.DBCNTL(ALMMSGS)
//ALMOPTS DD DISP=SHR, DSN=BMCALM.TEST.DBCNTL(ALM$OPTS)
//BMCERROR DD SYSOUT=* 
//ALMPRI NT DD SYSOUT=* 
//ALMLSTAT DD SYSOUT=* 
//ALMOSTAT DD SYSOUT=* 
//ALMLIST1 DD SYSOUT=* 
```
The output shown in Figure 17 echoes the ALMIN control statement from the JCL, provides progress reports on the operations performed by PACLOG, and provides the following statistics:

- the percentage of compression
- the filtered byte count for each filter option that is specified
- the total filtered byte count
- the total unfiltered byte count
- the total processed byte count
- the unfiltered byte count for uncommitted transactions
- the unfiltered byte count for records that are required by DB2

**NOTE**

In jobs that process more than one log data set, separate statistics are provided for each one.
The output shown in Figure 18 shows the total number of records in the log for each record type.

**NOTE**

The record type numbers are described in the IBM DB2 administration guide.
The output shown in Figure 19 show the total number of records in the log for each DB2 object.

**Figure 19  Total Log Records by DB2 Object (ALMOSTAT)**

```
** PACLOG - V1.4.00 ***** BMC SOFTWARE, INC. ***** 05/17/2006 1300010000

DBNAME  OBNAME   DBID/OBID  TYP     RECORDS       BYTES             
DSNDB01 DSNLUX01  00010044    X            2         180             
DSNDB01 DSNLUX02  00010046    X           10        1022             
DSNDB01 DSNLLX02  00010086    X           19        1596             
DSNDB01 DSNLLX01  00010087    X           19        1672             
DSNDB01 SYSUTILX  000100AF    T            28       56538             
DSNDB01 SYSLGRNX  000100CF    T            38        4230             
DSNDB06 SYSCOPY   00060010    T            17        3627             
DSNDB06 DSNUCH01  00060072    X           14        1484             
DSNDB06 DSNUCX01  00060076    X           14        1652             
BMCUTIL BMCUTIL   01040002    T            4         586             
BMCUTIL BMCSYNC   01040004    T            47       20795             
BMCUTIL CUTX     01040036    X            2         180             
BMCUTIL SYX1     01040038    X            26       3248             
BMCUTIL SYX2     0104003A    X            26       2706             
BMCUTIL CUTX1    0104005E    X            2         212             
BMCUTIL SYX3     01040060    X            25       2303             
ARMLOGSP TS8ON5   01120007    T        80000     8920000             
ARMLOGSP TS8OP6   0112000C    T        40000     5480000             
ARMLOGSP TS8OP9   01120013    T        60000     7200000             
ARMLOGSP TS8ON10  01120018    T        94199     15669412             
ARMLOGSP TS8ON14  01120020    T        33697     6335036             
```

Archive log management reports

PACLOG provides the following management reports for log data sets, all of which are generated by DD statements in the JCL. Figure 20 on page 83 and Figure 21 on page 83 provide samples of these reports.

- The processed archive log data set report provides lists of archive log data sets that have been processed by the most recently completed PACLOG job.

PACLOG generates two lists: one of all primary copies of the log data sets that have been processed, and a second of all secondary copies processed. These lists are written to the data sets that are specified by the ALMLIST1, ALMLIST2, ALMLIST3, and ALMLIST4 DD statements, which must be included in your PACLOG JCL.
The expired archive log data set report lists all archive log data sets (found by the most recently completed PACLOG job) in the BMC archive history file that have been dropped from the BSDS since the prior PACLOG job.

These archive log data sets are also removed from the archive history file. This list is written to the data set that is specified by the ALMXPIRE DD statement, which you must include in your PACLOG JCL.

You can also use the output from all reports as input to other tools to facilitate further processing of the data sets that are included in the reports.

### Processed archive log data set report

Figure 20 shows a sample processed primary archive log data set report. Three archive log data sets were processed, and the lists were written to the file specified by the ALMLIST1 statement.

**Figure 20  Sample of a processed primary archive log report**

<table>
<thead>
<tr>
<th>ALMLIST1</th>
<th>DB21CAT.ARCHLOG1.A0003766 PROCESSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALMLIST1</td>
<td>DB21CAT.ARCHLOG1.A0003767 PROCESSED</td>
</tr>
<tr>
<td>ALMLIST1</td>
<td>DB21CAT.ARCHLOG1.A0003768 PROCESSED</td>
</tr>
</tbody>
</table>

Figure 21 shows a sample processed secondary log data set report. Again, three log data sets were processed. The lists were written to the file specified by the ALMLIST2 DD statement.

**Figure 21  Sample of a processed secondary archive log report**

<table>
<thead>
<tr>
<th>ALMLIST2</th>
<th>DB21CAT.ARCHLOG2.A0003766 PROCESSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALMLIST2</td>
<td>DB21CAT.ARCHLOG2.A0003767 PROCESSED</td>
</tr>
<tr>
<td>ALMLIST2</td>
<td>DB21CAT.ARCHLOG2.A0003768 PROCESSED</td>
</tr>
</tbody>
</table>

For more information, see page 78. Similar reports are available for the offsite copies by specifying the by ALMLIST3 and ALMLIST4 DD statements.
Expired archive log data sets report

Figure 22 on page 84 shows a sample of an expired archive log data set report. It shows six archive log data sets that are no longer in the BSDS. The list is written to the file that is specified by the ALMXPIRE DD statement (see page 79).

Figure 22  Sample of an Expired Archive Log Report

| ALMXPIRE DB21CAT.ARCHLOG1.A0003264 NO LONGER IN ARCHIVE HISTORY |
| ALMXPIRE DB21CAT.ARCHLOG2.A0003264 NO LONGER IN ARCHIVE HISTORY |
| ALMXPIRE BMCARM.DB21CY31.A0003264 NO LONGER IN ARCHIVE HISTORY |
| ALMXPIRE DB21CAT.ARCHLOG1.A0003265 NO LONGER IN ARCHIVE HISTORY |
| ALMXPIRE DB21CAT.ARCHLOG2.A0003265 NO LONGER IN ARCHIVE HISTORY |

Using output from the reports

You can use the output from the processed log data set reports and the expired log data set report to perform further processing of the data sets that have been reported. For example, you might want to delete the data sets that were reported by the expired log data set report.

To allow you to process the output from these reports, PACLOG writes a unique message for each completed report to the PACLOG messages file. You can customize this message to initiate further processing by the tool you want to use.

Table 5 shows the messages and how you can use them. You can find the messages in the file indicated by the ALMMSGS DD statement, which is delivered as .DBCNTL(ALMMMSGS). The listed messages are identified as 00651I, 00652I, 00663I, 00664I, and 00654I in the ALMMSGS member.

Table 5  Report messages

<table>
<thead>
<tr>
<th>Message Number</th>
<th>Use for</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC93651I</td>
<td>ALMLIST1 report postprocessing</td>
</tr>
<tr>
<td>BMC93652I</td>
<td>ALMLIST2 report postprocessing</td>
</tr>
<tr>
<td>BMC93663I</td>
<td>ALMLIST3 report postprocessing</td>
</tr>
<tr>
<td>BMC93664I</td>
<td>ALMLIST4 report postprocessing</td>
</tr>
<tr>
<td>BMC93654I</td>
<td>ALMXPIRE report postprocessing</td>
</tr>
</tbody>
</table>
You can customize the contents of each message to create appropriate syntax for postprocessing of the reports.

**NOTE**

It is important that you maintain the original number of % symbols in the message. These terms are used for variable substitution (such as data set name).

**Running jobs and responding to processing errors**

A PACLOG job runs as an OS/390 batch job that starts when you submit it for operation. To execute a PACLOG job, you must have the proper authorizations. Refer to “PACLOG authorizations” on page 34 for details.

When you execute a PACLOG job, error messages might be issued. Some of the key error messages are discussed in the following subsection. See the *Backup and Recovery Products for DB2 Messages Manual* for information about PACLOG messages.

If you encounter errors while running a PACLOG job, correct the errors and then execute the job again. You do not have to clean up any files that were created by the failed operation because PACLOG automatically does this for you.

The following error messages require special attention.

**BMC93576E**  
**ALLOCATION FAILED FOR dsName**

PACLOG attempted to process an archive log copy, but dynamic allocation of the named log data set failed. Additional messages are printed to the job log. This error usually occurs for one of the following reasons:

- The current BMC Software archive history file is not being used, which causes log data sets that have already been processed to be reprocessed. To correct the situation, ensure that the current archive history file is available, and then execute the job again.

- You do not have the necessary authorization to create the data set that is named in the message. To correct the situation, you must be granted the necessary authorization, or the prefix specified in the control statement must be changed to a name that you are authorized to use. After the authorization problem is fixed, execute the job again.
BMC93584E   UNABLE TO OPEN dsName

PACLOG could not open the named data set. This error usually occurs for one of the following reasons:

- The named data set is old and is no longer available. To correct the situation, use the LIMIT keyword to limit processing to log data sets that are available, and then execute the job again.

- If the named data set is a current input archive log data set (an original unprocessed DB2 archive log data set) and should be available, check the job log for further information about the failure. Recover the named archive log data set from the corresponding copy 2 (for example, by using RECOVERY MANAGER for DB2), and then execute the job again.

BMC93693E   UNCATALOGED ARCHIVE LOG NOT SUPPORTED dsName

PACLOG found an original archive log data set in the BSDS that was not cataloged. This situation occurs when CATLG NO is specified in the subsystem parameters (ZPARMs). PACLOG does not support uncataloged archive log data sets.

Ensure that your original archive log data sets are cataloged if you expect to use PACLOG to process them.

BMC93694E   CATALOG FAILED FOR DSNAME dsName, RC = 8

PACLOG attempted to write an archive log data set copy to tape, but dynamic allocation of the copy failed. Additional messages are printed to the job log. This error usually occurs for one of the following reasons:

- The BMC Software archive history file is not being used, and this causes log data sets that have already been processed to be reprocessed. To correct the situation, ensure that the current archive history file is available, and then execute the job again.

- You do not have the necessary authorization to create the data set name that is indicated in the message. To correct the situation, you must be granted the necessary authorization, or the prefix that is specified in the control statement must be changed to a name that you are authorized to use. After the authorization problem is fixed, execute the job again.
Examples of PACLOG JCL

This chapter presents the following topics:

- Determining archive log size reduction ........................................... 87
- Using data compression to tape ...................................................... 89
- Processing archive logs ................................................................. 91
- Limiting the archive logs that are processed .................................... 93
- Creating offsite copies of archive logs ............................................. 94
- Printing the PACLOG history file ................................................... 96
- Uncompress archive log data sets .................................................... 97
- Create and initialize archive history data set .................................... 98

Determining archive log size reduction

Run a job such that shown in Figure 23 to demonstrate the reduction in the size of the original archive log data sets that record filtering and subsequent compression can achieve. The compressed logs are written to disk. The job runs in simulation mode, so no changes are made to the original log data sets. Message BMC93658I (written to the ALMPRINT data set) provides the percentage compression that was achieved by PACLOG for this job.

For clarity, all of the required processing in this example is specified by the appropriate keywords in the ALMIN data set. You can simplify the syntax shown in Figure 23 by omitting the keywords that specify defaults, as shown in the following syntax:

```
LIMIT LOGS 3
SIMULATE NOKEEP
ARCHIVE REDO
```

For more syntax information, see Chapter 4, “PACLOG syntax.” For DD statement information, see “Building PACLOG jobs” on page 75.
Determining archive log size reduction

Figure 23 Sample job for determining archive log size reduction (part 1 of 2)

```hll
// PACLOG1 JOB (5212), 'EXAMPLE 1', CLASS=A, MSGCLASS=X
// *******************************************************************************************
//**
//** THIS JOB CAN BE USED TO DETERMINE THE DATA COMPRESSION
//** PACLOG WILL PROVIDE ON A GIVEN DB2 SUBSYSTEM, USING A
//** GIVEN NUMBER OF ARCHIVE LOG DATA SETS. IT WILL NOT
//** MAKE ANY MODIFICATIONS TO YOUR DB2 ARCHIVE LOGS!
//**
//** IT CAN BE RUN MULTIPLE TIMES AGAINST THE SAME DB2 SUBSYSTEM,
//** VARYING THE NUMBER OF LOGS PROCESSED TO DETERMINE HOW THE
//** REDUCTION PERCENTAGE IS AFFECTED.
//**
//** THE JOB AS SHOWN BELOW, WILL INPUT THE LAST THREE ARCHIVE LOG
//** DATA SETS AND CREATE THREE FILES PER ARCHIVE LOG. EACH FILE
//** NAME WILL BE BUILT USING THE ARCHIVE LOG DATA SET NAME AS
//** FOLLOWS:
//**
//** <ARCLOG1PREFIX>.Y<DSNUMBER> FOR THE BSDS
//** <ARCLOG1PREFIX>.Z<DSNUMBER> FOR THE ARCHIVE LOG DATA SET
//** <ARCLOG1PREFIX>.H<DSNUMBER> FOR THE PACLOG HISTORY FILE
//**
//** IF YOU DO NOT RUN WITH SIMULATE, THESE FILES WILL BE RENAMED
//** TO REPLACE THE CURRENT ARCHIVE LOG DATA SET FILES!
//**
//** NOTE: THIS JOB DOES NOT UPDATE THE PACLOG HISTORY FILE, SO
//** IF IT IS RUN REPEATEDLY, IT WILL PROCESS THE SAME ARCHIVE LOGS
//** PROCESSED PREVIOUSLY.
//**
//*******************************************************************************************
// COMP1 EXEC PGM=ALMMAIN, REGION=4M,
//            PARM='DECI'                        <=== DESIRED DB2 SSID
// STEPLIB DD DISP=SHR, DSN=BMCALM.TEST.OVERRIDE1
//          DD DISP=SHR, DSN=BMCALM.DBLINK         <=== PACLOG LOAD LIB
//          DD DISP=SHR, DSN=BMCALM.XXLINK         <=== INFRASTRUCTURE 1
//          DD DISP=SHR, DSN=BMCALM.BBLINK         <=== INFRASTRUCTURE 2
//          DD DISP=SHR, DSN=SYS3.DECI.DSNEXIT     <=== DB2 DSNEXIT LIB
//          DD DISP=SHR, DSN=SYS2.DB2V81M.DSNLOAD  <=== DB2 DSNLOAD LIB
// SYSUT1 DD DISP=SHR, DSN=DECICAT.BSDS01        <=== DB2 BSDS
// ALMMGS DD DI SP=SHR, DSN=BMCALM.DBCNTL(ALMMGS) <=== MSGS DS
// ALMOPTS DD DI SP=SHR, DSN=BMCALM.DBCNTL(ALM$OPTS) <=== OPTS DS
//**
// ALMPRINT DD SYSDOUT=*  REQUIRED PRINT OUTPUT
// ALMXPIRE DD SYSDOUT=*  REQUIRED EXPIRED ARCHIVE REPORT
// ALMLIST1 DD SYSDOUT=*  REQUIRED LOCAL PRIMARY ARCHIVE LIST
// ALMLIST2 DD SYSDOUT=*  REQUIRED LOCAL SECONDARY ARCHIVE LIST
//**
// ALMLIST3 DD SYSDOUT=*  OPTIONAL OFFSITE PRIMARY ARCHIVE LIST
// ALMLIST4 DD SYSDOUT=*  OPTIONAL OFFSITE SECONDARY ARCHIVE LIST
// ALMSTAT DD SYSDOUT=*  OPTIONAL RECORD TYPE REPORT
// ALMOSTAT DD SYSDOUT=*  OPTIONAL DB2 OBJECT REPORT
// BMCERROR DD SYSDOUT=*  OPTIONAL SAS/C ERROR MESSAGES
// ALMIN DD  
// LIMIT LOGS 3
```
Using data compression to tape

Run a job such that shown in Figure 24 to determine the impact of writing processed archive logs to tape. After filtering, the processed logs are compressed by using the tape drive hardware compression that is specified by TRTCH COMP. Because the job runs in simulation mode, it makes no changes to the original archive log data sets. Message BMC93658I (written to the ALMPRINT data set) provides the percentage compression that PACLOG achieved for this job. See Figure 24 for a sample job. The job header provides more detailed information.

NOTE
This job does not update the archive history file.

All processing is specified in the ALMIN data set. You can simplify the syntax shown in Figure 24 by omitting the keywords that specify defaults, as shown in the following example:

```
LIMIT LOGS 3
SIMULATE NOKEEP
ARCHIVE2
   TAPE UNIT CART RETPD 1 STACK YES TRTCH COMP REDO
```
Using data compression to tape

For more syntax information, see Chapter 4, “PACLOG syntax.” For DD statement information, see “Building PACLOG jobs” on page 75.

Figure 24  Sample job for data compression to tape (part 1 of 2)

```sql
//PACLOG2 JOB (5212), 'EXAMPLE 2', CLASS=A, MSGCLASS=X

***************************************************************
//* THIS JOB CAN BE USED TO SEE THE EFFECT OF USING TRTCH COMP
//* TO STACKED TAPE OUTPUT. IT WILL NOT MAKE ANY MODIFICATIONS
//* TO YOUR DB2 ARCHIVE LOGS!
//* LIKE EXAMPLE 1, IT CAN BE RUN MULTIPLE TIMES AGAINST THE
//* SAME DB2 SUBSYSTEM, VARYING THE NUMBER OF LOGS PROCESSED
//* TO DETERMINE HOW THE COMPRESSION PERCENTAGE IS AFFECTED.
//*
//* THE JOB AS SHOWN BELOW, WILL INPUT THE LAST THREE ARCHIVE LOG
//* DATA SETS AND CREATE THREE FILES PER ARCHIVE LOG. THESE FILES
//* WILL NOT BE CATALOGED, BUT THE STACKED TAPE WILL HAVE A ONE
//* DAY RETENTION PERIOD. EACH FILE NAME WILL BE BUILT USING THE
//* ARCHIVE LOG DATA SET NAME AS FOLLOWS:
//*
//* <ARCLOG2PREFIX>.Y<DSNUMBER> FOR THE BSDS
//* <ARCLOG2PREFIX>.Z<DSNUMBER> FOR THE ARCHIVE LOG DATA SET
//* <ARCLOG2PREFIX>.H<DSNUMBER> FOR THE PACLOG HISTORY FILE
//*
//* NOTE: THIS JOB DOES NOT UPDATE THE PACLOG HISTORY FILE, SO
//* IF IT IS RUN REPEATEDLY, IT WILL PROCESS THE SAME ARCHIVE LOGS
//* PROCESSED PREVIOUSLY.
//*
//***************************************************************
//COMP2 EXEC PGM=ALMMMAIN,REGION=4M,
//            PARM='DECI'                        <=== DESIRED DB2 SSID
//STEPLIB DD DISP=SHR,DSN=BMCALM.TEST.OVERRIDE1
//          DD DISP=SHR,DSN=BMCALM.DBLINK         <=== PACLOG LOAD LIB
//          DD DISP=SHR,DSN=BMCALM.XXLINK         <=== INFRASTRUCTURE 1
//          DD DISP=SHR,DSN=BMCALM.BBLINK         <=== INFRASTRUCTURE 2
//          DD DISP=SHR,DSN=SYS3.DECI.DSNEXIT     <=== DB2 DSNEXIT LIB
//          DD DISP=SHR,DSN=SYS2.DB2V81M.DSNLOAD  <=== DB2 DSNLOAD LIB
//SYSUT1 DD DISP=SHR,DSN=DECICAT.BSDS01        <=== DB2 BSDS
//ALMMGS DD DD SP=SHR,DSN=BMCALM.DBCNTL(ALMMGS)   <=== MSGS DS
//ALMIOPTS DD DD SP=SHR,DSN=BMCALM.DBCNTL(ALMIOPTS) <=== OPTS DS
//*
//ALMPIRNT DD DD SYSOUT=* REQUIRED PRINT OUTPUT
//ALMXPIRE DD DD SYSOUT=* REQUIRED EXPIRED ARCHIVE REPORT
//ALMLIST1 DD DD SYSOUT=* REQUIRED LOCAL PRIMARY ARCHIVE LIST
//ALMLIST2 DD DD SYSOUT=* REQUIRED LOCAL SECONDARY ARCHIVE LIST
//*
//ALMLIST3 DD DD SYSOUT=* OPTIONAL OFFSITE PRIMARY ARCHIVE LIST
//ALMLIST4 DD DD SYSOUT=* OPTIONAL OFFSITE SECONDARY ARCHIVE LIST
//ALMLSTAT DD DD SYSOUT=* OPTIONAL RECORD TYPE REPORT
//ALMOSTAT DD DD SYSOUT=* OPTIONAL DB2 OBJECT REPORT
//BMCCERROR DD DD SYSOUT=* OPTIONAL SAS/C ERROR MESSAGES
//ALMN DD *

LIMIT LOGS 3
```
Processing archive logs

Run a job such that shown in Figure 25 to compress archive log data sets. The job replaces the original archive log data sets with the processed log data sets. The data sets are filtered and compressed. The job header provides information about how you can ensure that the objects that you want to recover will use the archive log.

All processing is specified in the ALMIN data set. You can simplify the syntax shown in Figure 25 by omitting the keywords that specify defaults, as shown in the following example:

```
LIMIT LOGS 3 ARCHIVE1
```

For more syntax information, see Chapter 4, “PACLOG syntax.” For DD statement information, see “Building PACLOG jobs” on page 75.

Figure 24  Sample job for data compression to tape (part 2 of 2)

```plain
SIMULATE NOKEEP

ARCHIVE2
TAPE UNIT CART RETPD 1 STACK YES TRTCH COMP
FILTERIX ALL
FILTERRECTYPE ALL
REDO
```

Figure 25  Sample job for compressing archive logs (part 1 of 2)

```plaintext
//PACLOG3 JOB (5212), "EXAMPLE 3", CLASS=A, MSGCLASS=X
/*****************************************************************************
**                         THIS JOB CAN BE USED TO COMPRESS AR**
**                         TIVE LOG DATA SETS FOR USE**
**                         IT WILL REPLACE YOUR ARCHIVE LOG DATA**
**                         SETS WITH COMPRESSED DATA SETS! TO UNCOMPRESS THE RESULT**
**                         ING DATA SETS, REFER TO EXAMPLE 7.**
**                         BEFORE YOU START, IT IS BEST TO CHECK THAT YOU HAVE OBJECTS**
**                         THAT WILL USE THE ARCHIVE DATA SETS FOR RECOVERY. DO THIS**
**                         BY RUNNING BMC'S RECOVER PLUS WITH THE ANALYZE ONLY OPTION.**
**                         YOU COULD ALSO RUN THE DB2 REPORT RECOVERY JOB AND CHECK**
**                         THAT ANY COPIES REQUIRED ARE AVAILABLE.**
**                         THE JOB AS SHOWN BELOW, WILL PROCESS THE LAST THREE ARCHIVE LOG**
**                         DATA SETS. IF THE DATA FOR YOUR RECOVERY IS FURTHER BACK IN**
**                         THE ARCHIVE LOGS, CHANGE THE NUMBER ACCORDINGLY OR USE**
**                         "LIMIT RBARANGE <STARTRBA> FFFFFFFF" INSTEAD OF "LIMIT LOG"**
```
SPECIFYING THE START RBA FROM THE LOG.

AFTER THIS JOB COMPLETES SUCCESSFULLY, SIMPLY RECOVER YOUR SELECTED OBJECT(S) AND VERIFY THAT THE RECOVERY IS USING THE PROCESSED LOGS.

COMP3 EXEC PGM=ALMMMAIN, REGION=4M,
PARM='DECI'                        <=== DESIRED DB2 SSID
STEPLIB DD DISP=SHR, DSN=BMCALM.TEST.OVERRIDE1
   DD DSIP=SHR, DSN=BMCALM.DBLINK         <=== PACLOG LOAD LIB
   DD DSIP=SHR, DSN=BMCALM.XXLINK        <=== INFRASTRUCTURE 1
   DD DSIP=SHR, DSN=BMCALM.BBLINK        <=== INFRASTRUCTURE 2
   DD DSIP=SHR, DSN=SYS3.DECI.DSNEXIT    <=== DB2 DSNEXIT LIB
   DD DSIP=SHR, DSN=SYS2.DB2V81M.DSNLOAD <=== DB2 DSNLOAD LIB
   DD DSIP=SHR, DSN=DECICAT.BSDS01       <=== DB2 BSDS
   DD DSIP=SHR, DSN=BMCA3M.DBCNTL(ALMmsgs)  <=== MSGS DS
   DD DSIP=SHR, DSN=BMCA3M.DBCNTL(ALM$OPTS) <=== OPTS DS

ALMPRINT DD SYSOUT= *    REQUIRED PRINT OUTPUT
ALMXPIRE DD SYSOUT= *    REQUIRED EXPIRED ARCHIVE REPORT
ALMLIST1 DD SYSOUT= *    REQUIRED LOCAL PRIMARY ARCHIVE LIST
ALMLIST2 DD SYSOUT= *    REQUIRED LOCAL SECONDARY ARCHIVE LIST

ALMLIST3 DD SYSOUT= *    OPTIONAL OFFSITE PRIMARY ARCHIVE LIST
ALMLIST4 DD SYSOUT= *    OPTIONAL OFFSITE SECONDARY ARCHIVE LIST
ALMLSTAT DD SYSOUT= *    OPTIONAL RECORD TYPE REPORT
ALMOSTAT DD SYSOUT= *    OPTIONAL DB2 OBJECT REPORT
BMCERROR DD SYSOUT= *    OPTIONAL SAS/C ERROR MESSAGES

ALMIN DD *

LIMIT LOGS 3

ARCHIVE1
   DISK UNIT SYSALLDA
   COMPRESS YES
   FILTERIX ALL
   FILTERRECTYPE ALL
Limiting the archive logs that are processed

Run a job such that shown in Figure 26 to begin running production jobs. It processes all archive logs starting with the log that has the RBA that is specified by the value after the LIMIT keyword. The job header provides more detail. Note the recommendation about using the LIMIT option when you first start running this job.

All processing is specified in the ALMIN data set. You can simplify the syntax shown in Figure 26 by omitting the keywords that specify defaults, as shown in the following example:

```
LIMIT RBARANGE <startrba> FFFFFFFFFF
ARCHIVE1
ARCHIVE2
TAPE UNIT CART RETPD 31 STACK YES TRTCH COMP
```

For more information, see the following sections:

- Chapter 4, “PACLOG syntax”
- “Building PACLOG jobs” on page 75
- “Deciding which logs to process” on page 37

Figure 26   Sample job using the LIMIT option  (part 1 of 2)

```c
//PACLOG4 JOB (5212), 'EXAMPLE 4', CLASS=A, MSGCLASS=X
//***************************************************************
//*) THIS JOB CAN BE USED TO START RUNNING PRODUCTION PACLOG JOBS.
//*) IT WILL PROCESS ALL ARCHIVE LOGS CREATED SINCE THE PREVIOUS
//*) EXECUTION OF PACLOG. THIS JOB REPLACES YOUR ARCHIVE LOG
//*) DATA SETS WITH COMPRESSED DATA SETS, CREATING ARCHIVE 1 LOGS
//*) TO DASD AND ARCHIVE 2 LOGS TO STACKED TAPE, SAVING THE TAPE(S)
//*) FOR 31 DAYS.
//*) REPLACE THE "<STARTRBA>" VALUE IN THE LIMIT STATEMENT BELOW
//*) WITH THE STARTRBA OF THE FIRST ARCHIVE LOG THAT YOU WANT PACLOG
//*) TO PROCESS. THIS VALUE SHOULD NOT BE CHANGED ON SUBSEQUENT
//*) PACLOG EXECUTIONS UNTIL PACLOG HAS PROCESSED ALL LOGS RECORDED
//*) IN THE BSDS, THEN THE LIMIT STATEMENT SHOULD BE REMOVED.
//*) REFER TO CHAPTER 2 "DECIDING WHICH LOGS TO PROCESS".
//***************************************************************
//COMP   EXEC PGM=ALMMAIN, REGION=4M,
//       PARM="DECI"  <= DESIRED DB2 SSID
//STEPLIB DD DISP=SHR, DSN=BMCALM.TEST.OVERRIDE1
//       DD DISP=SHR, DSN=BMCALM.DBLINK <= PACLOG LOAD LIB
//       DD DISP=SHR, DSN=BMCALM.XXLINK <= INFRASTRUCTURE 1
//       DD DISP=SHR, DSN=BMCALM.BBLINK <= INFRASTRUCTURE 2
//       DD DISP=SHR, DSN=SYS3.DECI.DSNEXIT <= DB2 DSNEXIT LIB
//       DD DISP=SHR, DSN=SYS2.DB2V81M.DSNLOAD <= DB2 DSNLOAD LIB
```
Creating offsite copies of archive logs

Run a job such that shown in Figure 27 to create archive log copies 3 and 4 to send to your remote site for storage. The copies are stacked on tape and are retained for a period of 31 days. The job header provides more detail. Note the recommendation about using the LIMIT option when you first start running this job.

All processing is specified in the ALMIN data set. You can simplify the syntax shown in Figure 27 by omitting the keywords that specify defaults, as shown in the following example:

```plaintext
ARCHIVE1
    DISK UNIT SYSALLDA
    COMPRESS YES
    FILTERIX ALL
    FILTERRECTYPE ALL

ARCHIVE2
    TAPE UNIT CART RETPD 31 STACK YES TRTCH COMP
    FILTERIX ALL
    FILTERRECTYPE ALL
```

Figure 26   Sample job using the LIMIT option (part 2 of 2)

```plaintext
//SYSUT1   DD DISP=SHR,DSN=DECICAT.BSDS01        <== DB2 BSDS
//ALMMSGS  DD DISP=SHR,DSN=BMCALM.DBCNTL(ALMMSGS)   <== MSGS DS
//ALMOPTS  DD DISP=SHR,DSN=BMCALM.DBCNTL(ALMOPTS)  <== OPTS DS
// *
//ALMPRINT DD SYSOUT=*    REQUIRED PRINT OUTPUT
//ALMPRINT DD SYSOUT=*    REQUIRED EXPIRED ARCHIVE REPORT
//ALMLIST1 DD SYSOUT=*    REQUIRED LOCAL PRIMARY ARCHIVE LIST
//ALMLIST2 DD SYSOUT=*    REQUIRED LOCAL SECONDARY ARCHIVE LIST
// *
//ALMLIST3 DD SYSOUT=*    OPTIONAL OFFSITE PRIMARY ARCHIVE LIST
//ALMLIST4 DD SYSOUT=*    OPTIONAL OFFSITE SECONDARY ARCHIVE LIST
//ALMLSTAT DD SYSOUT=*    OPTIONAL RECORD TYPE REPORT
//ALMOSTAT DD SYSOUT=*    OPTIONAL DB2 OBJECT REPORT
//BMCERROR DD SYSOUT=*    OPTIONAL SAS/C ERROR MESSAGES
//ALMIN    DD *

LIMIT RBARANGE <STARTRBA> FFFFFFFFFFF

ARCHIVE1
    DISK UNIT SYSALLDA
    COMPRESS YES
    FILTERIX ALL
    FILTERRECTYPE ALL

ARCHIVE2
    TAPE UNIT CART RETPD 31 STACK YES TRTCH COMP
    FILTERIX ALL
    FILTERRECTYPE ALL
```

Creating offsite copies of archive logs

Run a job such that shown in Figure 27 to create archive log copies 3 and 4 to send to your remote site for storage. The copies are stacked on tape and are retained for a period of 31 days. The job header provides more detail. Note the recommendation about using the LIMIT option when you first start running this job.

All processing is specified in the ALMIN data set. You can simplify the syntax shown in Figure 27 by omitting the keywords that specify defaults, as shown in the following example:

```plaintext
ARCHIVE3 PREFIX <vcatname>.BMCLOG1
    TAPE UNIT CART RETPD 31 STACK YES TRTCH COMP
ARCHIVE4 PREFIX <vcatname>.BMCLOG2
    TAPE UNIT CART RETPD 31 STACK YES TRTCH COMP
```
For more syntax information, see the following sections:

- Chapter 4, “PACLOG syntax”
- “Building PACLOG jobs” on page 75
- “Deciding which logs to process” on page 37

Figure 27  Sample job for offsite log creation (part 1 of 2)

```cmavo
// PACLOGS JOB (5212), 'EXAMPLE 5', CLASS=A, MSGCLASS=X
// ***********************************************************************
// *  THIS JOB CAN BE USED TO CREATE THE ARCHIVE 3 AND 4 COPIES
// *  TO SEND TO YOUR REMOTE SITE STORAGE. IT WILL PROCESS ALL
// *  ARCHIVE LOGS THAT DO NOT CURRENTLY HAVE COPIES 3 & 4. IT
// *  WILL MAKE THESE COPIES TO STACKED TAPE, COMPRESSED WITH THE
// *  TRTCH OPTION AND SAVE THE TAPES FOR 31 DAYS.
// *  BE SURE TO EDIT THE PREFIX NAMES FOR ARCHIVE3 AND ARCHIVE4
// *  BELOW TO USE A VALID HI-LEVEL QUALIFIER FOR THE NEW DATA SETS.
// *  NOTE: WHEN YOU FIRST START RUNNING THIS JOB, PICK A STARTING
// *  RBA FOR THE FIRST PROCESS AND ADD
// *          'LIMIT RBARANGE <STARTRBA> FFFFFFFF'
// *  TO AVOID PROCESSING OF EVERY DATA SET RECORDED IN THE BSDS.
// *  REFER TO CHAPTER 2 "DECIDING WHICH LOGS TO PROCESS".
// ***********************************************************************
// COMP   EXEC PGM=ALMMAIN, REGION=4M,
//        PARM='DECI'                        <=== DESIRED DB2 SSID
// STEPLIB DD DISP=SHR, DSN=BMCALM.TEST.OVERRIDE1
//         DD DISP=SHR, DSN=BMCALM.DBLINK         <=== PACLOG LOAD LIB
//         DD DISP=SHR, DSN=BMCALM.XXLINK         <=== INFRASTRUCTURE 1
//         DD DISP=SHR, DSN=BMCALM.BBLINK         <=== INFRASTRUCTURE 2
//         DD DISP=SHR, DSN=SYS3.DECI.DSNEXIT     <=== DB2 DSNEXIT LIB
//         DD DISP=SHR, DSN=SYS2.DB2V81M.DSNLOAD  <=== DB2 DSNLOAD LIB
// SYSUT1   DD DISP=SHR, DSN=DECICAT.BSDS01        <=== DB2 BSDS
// ALMMGS   DD DISP=SHR, DSN=BMCALM.DBCNTL(ALMMSGS)   <=== MSGS DS
// ALMOPTS  DD DISP=SHR, DSN=BMCALM.DBCNTL(ALM$OPTS)  <=== OPTS DS
// *  ALMPRINT DD SYSOUT=*    REQUIRED PRINT OUTPUT
// *  ALMXPIRE DD SYSOUT=*    REQUIRED EXPIRED ARCHIVE REPORT
// *  ALMLIST1 DD SYSOUT=*    REQUIRED LOCAL PRIMARY ARCHIVE LIST
// *  ALMLIST2 DD SYSOUT=*    REQUIRED LOCAL SECONDARY ARCHIVE LIST
// *  ALMLIST3 DD SYSOUT=*    OPTIONAL OFFSITE PRIMARY ARCHIVE LIST
// *  ALMLIST4 DD SYSOUT=*    OPTIONAL OFFSITE SECONDARY ARCHIVE LIST
// *  ALMLSTAT DD SYSOUT=*    OPTIONAL RECORD TYPE REPORT
// *  ALMOSTAT DD SYSOUT=*    OPTIONAL DB2 OBJECT REPORT
// *  BMCERROR DD SYSOUT=*    OPTIONAL SAS/C ERROR MESSAGES
// ALMIN    DD *
// ARCHIVE3 PREFIX <VCATNAME>.BMCLOG1
// TAPE UNIT CART RETPD 31 STACK YES TRTCH COMP
// FILTER IX ALL
```
Printing the PACLOG history file

Run a job such that shown in Figure 28 to print the PACLOG history file. The history file includes the following information:

- Whether PACLOG has processed the file
- Whether index records been dropped
- Whether record types been dropped
- Whether table space records been dropped

Figure 28  Sample job for printing the PACLOG history file (part 1 of 2)

```
// PACLOG6 JOB (5212), 'EXAMPLE 6', CLASS=A, MSGCLASS=X
/* ***********************************************************************
/* THIS JOB CAN BE USED TO PRINT THE ENTRIES IN THE PACLOG HISTORY FILE.
/* FOR DATA IN THE HISTORY FILE, ALMHSTP WILL REPORT AS FOLLOWS:
/* 
/* BMC93860I 500 ARC PR IX RT TS RBA <STARTRBA> - <ENDRBA>
/*   1 Y Y N  DBBHCAT.ARCHLOG1.A0003285
/*   2 Y Y N  DBBHCAT.ARCHLOG2.A0003285
/* 
/* WHERE THE NUMBER AFTER THE MESSAGE ID IS A RELATIVE BSDS ENTRY NUMBER AND EACH MESSAGE HAS UP TO FOUR DISPLAY LINES, ONE FOR EACH COPY OF THE ARCHIVE LOG. THE Y/N FLAGS SHOW PROCESSING AS FOLLOWS:
/* PR  HAS PACLOG HAS PROCESSED THE FILE?
/* IX  HAVE INDEX RECORDS BEEN DROPPED?
/* RT  HAVE RECORD TYPES BEEN DROPPED?
/* TS  HAVE ANY TABLESPACE RECORDS BEEN DROPPED?
/* IF THE FILE IS EMPTY, THE PROGRAM ENDS CC=0 WITH NO OUTPUT.
/* ***********************************************************************
/* HISTORY EXEC PGM=ALMHSTP, REigon=A4M,
/* PARM='DEC1'  <== DESIRE DB2 SSID
/* STEPLIB DD DISP=SHR, DSN=BMCALM.TEST.OVERRIDE1
/* DD DISP=SHR, DSN=BMCALM.DBLINK <== PACLOG LOAD LIB
/* DD DISP=SHR, DSN=BMCALM.XXLINK <== INFRASTRUCTURE 1
```
Uncompress archive log data sets

Run a job such that shown in Figure 29 to uncompress the archive log data sets previously processed with PACLOG.

The resulting data sets must be placed on DASD but can be migrated to tape using the data set migration procedures. Before submitting this job, check the history file to determine the STARTRBA of the oldest log processed by PACLOG (see Figure 28 to view the job that prints the history file).

Figure 28  Sample job for printing the PACLOG history file (part 2 of 2)

```
//          DD DISP=SHR, DSN=BMCALM.BBLINK         <=== INFRASTRUCTURE 2
//          DD DISP=SHR, DSN=SYS3.DECI.DSNEXIT     <=== DB2 DSNEXIT LIB
//          DD DISP=SHR, DSN=SYS2.DB2V81M.DSNLOAD  <=== DB2 DSNLOAD LIB
//ALMMGS   DD DISP=SHR, DSN=BMCALM.DBCNTL(ALMMGS)  <=== MSGS DS
//ALMOPTS  DD DISP=SHR, DSN=BMCALM.DBCNTL(ALMOPTS) <=== OPTS DS
//BMCERROR DD SYSOUT=*                          //BMCERROR DD SYSOUT=*                          //ALMPRINT DD SYSOUT=*
```

Figure 29  Sample job to uncompress archive log data sets (part 1 of 2)

```
PACLOG7 JOB (5212), 'EXAMPLE 7', CLASS=A, MSGCLASS=X
/****************************************************************************
/*  THIS JOB CAN BE USED TO UNCOMPRESS THE ARCHIVE LOG DATA SETS
/*  PREVIOUSLY PROCESSED WITH PACLOG. THE RESULTING DATA SETS
/*  MUST BE PLACED ON DASD BUT MAY BE MIGRATED TO TAPE USING THE
/*  DATA SET MIGRATION PROCEDURES IN PLACE IN YOUR SHOP.
/*
/*  BEFORE SUBMITTING THIS JOB, CHECK THE HISTORY FILE TO DETERMINE
/*  THE STARTRBA OF THE OLDEST LOG PROCESSED BY PACLOG (SEE ALMEX06).
/*  ENTER THAT NUMBER IN THE <STARTRBA> FIELD BELOW.
/*
/****************************************************************************
//UNCOMP EXEC PGM=ALMMAIN, REGION=4M,  //PARM='DECI'                        //ALMMAIN EXEC PGM=ALMMAIN, REGION=4M,  //PARM='DECI'
//STEPLIB DD DISP=SHR, DSN=BMCALM.TEST.OVERRIDE1  //STEPLIB DD DISP=SHR, DSN=BMCALM.TEST.OVERRIDE1
// DD DISP=SHR, DSN=BMCALM.DBCNTL(ALMMGS)  <=== MSGS DS
// DD DISP=SHR, DSN=BMCALM.DBCNTL(ALM$OPTS)  <=== OPTS DS
```

Uncompress archive log data sets
Create and initialize archive history data set

Run a job such as that shown in Figure 30 to create and initialize the archive history data set with six cylinders (required by DB2 Version 8).

Figure 29  Sample job to uncompress archive log data sets (part 2 of 2)

```
// ALMLIST3 DD SYSOUT=* OPTIONAL OFFSITE PRIMARY ARCHIVE LIST
// ALMLIST4 DD SYSOUT=* OPTIONAL OFFSITE SECONDARY ARCHIVE LIST
// ALMLSTAT DD SYSOUT=* OPTIONAL RECORD TYPE REPORT
// ALMOSTAT DD SYSOUT=* OPTIONAL DB2 OBJECT REPORT
// BMERROR DD SYSOUT=* OPTIONAL SAS/C ERROR MESSAGES
// ALMIN DD *

LIMIT RBARANGE <STARTRBA> FFFFFFFF

ARCHIVE1
   DISK UNIT SYSALLDA
   COMPRESS NO
   REDO
```

Figure 30  Sample job to create and initialize the archive history data set

```
// HISTORY JOB ('5212') , 'EXAMPLE', CLASS=A, MSGCLASS=X, REGION=4M,
// NOTIFY=&SYSUID
// *
// *=--------------------------------------------------------------------------------
// */ DB2 VERSION 8 (EXPANDED) REQUIRES 6 CYLINDERS
// */ USE THIS JOB TO CREATE AND INITIALIZE THE ARCHIVE HISTORY DATASET
// */ IF IT WAS NOT CREATED DURING THE PACLOG INSTALLATION.
// */ *=--------------------------------------------------------------------------------
// */ *
// ALMHIST EXEC PGM=IEBDG
// SYSPRINT DD SYSOUT=* HISTORY
// DD DSN=BMCALM.DBW1.HISTORY,DISP=(,CATLG),
// UNIT=SYSDA,SPACE=(CYL,6),
// DCB=(RECFM=FB,LRECL=196,BLKSIZE=8820)
// SYSIN DD *

DSD OUTPUT=(HISTORY)
FD NAME=HDR1,LENGTH=01,STARTLOC=02,P I C T U R E =1, B'1'
FD NAME=HDR2,LENGTH=01,STARTLOC=04,P I C T U R E =3, B'196'
CREATE QUANTITY=1,FILL=X'00',NAME=(HDR1,HDR2)
// *
// */
XCA subsystem control

This chapter presents the following topics:

Overview ......................................................... 99
BMCP (primary subsystem) ................................... 101
BCSS (consolidated subsystem) ............................. 101
   Data set for BCSS commands ............................. 102
MVS command support ....................................... 102
   Subsystem naming conventions ......................... 102
Address space dispatching priorities ..................... 103
Engine level mask ............................................. 103
Subsystem commands ....................................... 104
   BMCP commands ......................................... 105
   BCSS commands ......................................... 107
   XCA commands ......................................... 109
PACLOG processing only (PPO) mode .................... 112
   PPO commands ......................................... 113

Overview

The PACLOG product uses BMC Software Extended Compression Architecture (XCA) subsystems to implement log compression. A major advantage of using subsystem architecture is that virtual storage requirements in user address spaces are significantly reduced. PACLOG requires two OS/390 subsystems—the BMC Software Primary Subsystem (BMCP) and the BMC Software Consolidated Subsystem (BCSS). PACLOG can share these subsystems with other BMC Software products.

NOTE
If PACLOG does not share these subsystems with other products, or if it shares them with only noncompression products, you might be able to improve PACLOG operation in your system. See “PACLOG processing only (PPO) mode” on page 112 for more information.
You must use a one- to four-character name to identify the BMCP and the BCSS subsystems to OS/390. The install system uses the default names BMCP and BCSS. If either name conflicts with a non-BMC Software subsystem installed on your system, you can use the SUBSYSID parameter in the BMCP or BCSS startup procedure to change the subsystem names.

The install system tailors two subsystem procedures: one to start BMCP (default procedure member name BMCBMCP), and one to start BCSS (default procedure member name BMCBCSS). Each procedure contains the required parameter and statements for the subsystem. If either default name conflicts with the name of another procedure member, you can provide a different member name during installation.

Because the BMCP and BCSS subsystems are maintained independently of PACLOG, their maintenance levels do not correspond to the maintenance levels of PACLOG. When you install a new or updated BMC Software product that uses the BMCP and BCSS subsystems, use the Installation Check program to determine the level of the existing subsystems against the level of the subsystems from the distribution tape. Always use the highest level of subsystem code that is available.

The commands used in this chapter are a subset of the DATA ACCELERATOR Compression (DAC) product commands. For a complete list of DAC commands, see the DATA ACCELERATOR Compression Reference Manual.
BMCP (primary subsystem)

The BMCP subsystem establishes supervisory services and allows interception of the following supervisor call (SVC) requests for BCSS across multiple BMC Software products.

- OPEN
- BDL/FIND
- STOW
- CLOSE
- ATTACH
- LINK

These products share the BMCP, so only one copy of the BMCP is needed in your system. All such products continue to operate normally even if the BMCP is stopped.

BCSS (consolidated subsystem)

The BCSS subsystem performs processing of the intercepted SVCs. It also manages the I/O to data sets for BMC Software product registration, collectively called the REGISET. PACLOG does not use the REGISET but other BMC Software products such as DAC and the Application Enhancement Series (AES) product set require the REGISET.

More than one BCSS can be active on an OS/390 image. The AES product set and others can share a BCSS with PACLOG or use a separate BCSS. The BMCP ensures that each BCSS receives control at the proper time for the products that use that BCSS.

You must use the MODE parameter in the startup procedure to designate one (and only one) BCSS on an OS/390 image as the public BCSS. All others must be designated as private subsystems. The BMCP allows the public BCSS first access to an intercepted request. The BCSS that is used for PACLOG must be the public BCSS. For more information about sharing the BCSS with other BMC Software products, refer to the documentation for those products.
Data set for BCSS commands

The data set for BCSS commands contains BCSS and non-BCSS commands that need to be issued automatically after BCSS startup. The data set must be a sequential data set or must be specified as a member of a partitioned data set. The name of this data set must appear on the COMMANDS DD statement in the BCSS startup JCL. When you install PACLOG with the recommended settings, a default data set for BCSS commands is created automatically.

You can edit the data set for BCSS commands to add or delete BCSS and non-BCSS commands. See “MVS command support” for information about the use of non-BCSS commands in that data set.

When entering commands into the data set for BCSS commands, follow these guidelines:

- Omit the BCSS ID term (BCSSID) from each command.
  
  For example, the `bcssid DAC NONVSAM CL LOCAL` command must appear in the data set for BCSS commands as `DAC NONVSAM CL LOCAL`.

- Start the commands in column one; enter only one command per line.
- Place an asterisk (*) in column one for comment lines.

MVS command support

You can insert non-BCSS commands, including OS/390 console commands, in the data set for BCSS commands. After the BCSS has completely initialized and is prepared for processing, non-BCSS commands run sequentially.

You must prefix each OS/390 command in the data set for BCSS commands with MVS. For example, to issue an MVS start command after BCSS initialization is completed, add the following command to that data set:

```
MVS S PROC01
```

Subsystem naming conventions

The BMCP and BCSS subsystems use a four-character name to identify the subsystem to OS/390. PACLOG installation uses the default names BMCP and BCSS. If either name conflicts with a non-BMC Software subsystem installed on your system, you can change that name during installation.
If you change the name of the BMCP or BCSS after the subsystem starts, you must perform an IPL.

**NOTE**

In the command examples in this manual, `bmcpId` and `bcssId` represent the one- to four-character BMCP or BCSS subsystem ID, respectively.

### Address space dispatching priorities

When you are installing the JCL for the BMC Software subsystems (BMCP and BCSS), you must consider the dispatching priorities at your location. The address spaces should run at a level that allows timely initialization and operation.

**NOTE**

BMC Software recommends that these address spaces use the same dispatching priority as other system tasks, monitors, and subsystems. Also, you should use a fixed dispatching priority.

Compression and expansion activities occur at the dispatching priority of the user and not at the dispatching priority of these BMC Software subsystem address spaces.

### Engine level mask

The Engine Level Mask (ELM) value determines which compression techniques are available for use by the VSAM data component and the non-VSAM data component. BMC Software changes the ELM value when it introduces new compression engines and when it modifies existing compression engines. Not all modifications to existing compression engines require a change to the ELM value.

BMC Software provides a new ELM value when modifications to existing compression techniques require backward compatibility with the modified technique. For example, an older version of PACLOG may not be able to expand data that is compressed with the latest version of PACLOG.
The most current ELM value is set in the BCSS command sample named ALMELM. It is shipped with PACLOG as a member of the data set HLQ.Vnnn.DBSAMP.

**WARNING**

When you install a new release of PACLOG and change the ELM value, data that was compressed by the new engine may not be expandable by older engines. If you are testing the new release in a shared DASD environment, do not compress data that is accessible from multiple systems using new or enhanced engines unless these engines are available on all systems. Otherwise, expansion of the data on systems using the old engines may not be possible.

You can set an ELM value at the product level or the BCSS level. The product-level command (see “Setting the PACLOG ELM” on page 111) sets an ELM value that supersedes the BCSS value. BMC Software recommends that you set a product-level ELM value. The BCSS-level command (see “Setting the PACLOG ELM”) provides a default ELM for PACLOG and other BMC Software products that use BCSS but do not set a product-level ELM.

**Subsystem commands**

This section describes the BMCP and BCSS operator commands that are available with XCA. It also includes those commands that apply only to the PACLOG compression subsystems. Table 6 on page 105 lists the available commands, the access required, and the page number on which the command descriptions can be found.

When starting DB2, you must issue the commands in this order:

1. Start the BMCP.
2. Start the BCSS.

Conversely, when stopping DB2, you must issue the commands in this order:

1. Stop DB2.
2. Shut down the BCSS.
3. Shut down the BMCP.
Table 6  OS/390 operator commands

<table>
<thead>
<tr>
<th>Command type</th>
<th>Command format</th>
<th>Security required</th>
<th>Action</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMCP operator</td>
<td>S BMCP, SUB=&lt;MSTR</td>
<td>JES2</td>
<td>JES3&gt;</td>
<td>none</td>
</tr>
<tr>
<td>commands</td>
<td>bmcpId SHUTDOWN</td>
<td>CONTROL</td>
<td>stop the BMCP</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>bmcpId STATUS</td>
<td>READ</td>
<td>display the BMCP status</td>
<td>107</td>
</tr>
<tr>
<td>BCSS operator</td>
<td>S BMBCSS, OPTION=&lt;REFRESH</td>
<td>NREFRESH&gt;</td>
<td>none</td>
<td>start the BCSS</td>
</tr>
<tr>
<td>commands</td>
<td>bcssld SHUTDOWN</td>
<td>CONTROL</td>
<td>stop the BCSS</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td>bcssld STATUS</td>
<td>READ</td>
<td>display BCSS status</td>
<td>109</td>
</tr>
<tr>
<td></td>
<td>bcssld REINIT DAC</td>
<td>CONTROL</td>
<td>start or reinitialize DAC</td>
<td>109</td>
</tr>
<tr>
<td>XCA operator</td>
<td>BCSS DAC NONVSAM [ENABLE</td>
<td>DISABLE]</td>
<td>none</td>
<td>enable or disable compression</td>
</tr>
<tr>
<td>commands</td>
<td>BCSS DAC STATUS</td>
<td>none</td>
<td>return the compression status</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>BCSS DAC NONVSAM CL LOCAL</td>
<td>none</td>
<td>enable or disable Local Compression option</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>bcssld ELM value</td>
<td>CONTROL</td>
<td>set Engine Level Mask</td>
<td>111</td>
</tr>
<tr>
<td>PPO mode</td>
<td>BCSS DAC PPO ON</td>
<td>OFF</td>
<td>none</td>
<td>enable or disable PPO mode</td>
</tr>
<tr>
<td>commands</td>
<td>BCSS DAC PPO SHUTDOWN</td>
<td>none</td>
<td>stop BMCP and BCSS while allowing PACLOG archive log compression</td>
<td>114</td>
</tr>
</tbody>
</table>

BMCP commands

This section provides information about BMCP operator commands that start the BMCP subsystem, shut it down, and display its status. You can issue the commands as needed from the operator console. See the following sections for more information:

- “Starting the BMCP” on page 105
- “Shutting down the BMCP” on page 106
- “Displaying BMCP status” on page 107

Starting the BMCP

You must start the BMCP subsystem before starting any applications. For normal operations, place the OS/390 START command in a COMMNDxx member of SYS1.PARMLIB so that the BMCP subsystem starts automatically during an IPL.

To start a BMCP subsystem manually after you have stopped it, issue the START command from the operator console. Start the BMCP by issuing the following command, where the variable bmcp is the name of the member that contains the BMCP procedure:
Check the system log to ensure that the command completed successfully. The BMCP responds with messages that indicate its availability.

Optionally, you can issue the OS/390 `DISPLAY ACTIVE LIST (D A, L)` command. OS/390 responds with the following information. An active BMCP appears in this display.

```
<table>
<thead>
<tr>
<th>JOBS</th>
<th>M/S</th>
<th>TS</th>
<th>USERS</th>
<th>SYSAS</th>
<th>INIT</th>
<th>ACTIVE/MAX</th>
<th>VTAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>00004</td>
<td>0025</td>
<td>00150</td>
<td>00009</td>
<td>00013</td>
<td>00150/00250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMCCBSS</td>
<td>BMCCBSS</td>
<td>SSAS</td>
<td>NSW</td>
<td>BMCP</td>
<td>BMCP13</td>
<td>BSPMD5PO</td>
<td>NSW</td>
</tr>
</tbody>
</table>
```

**NOTE**

After an IPL, the BMCP subsystem name is not defined to OS/390. The OS/390 START command will wait until the primary subsystem has initialized, then proceed as normal. However, after the subsystem has been started, the subsystem name for BMCP is defined to OS/390.

If the procedure name and the subsystem name are the same, special considerations are necessary to avoid the PROC NOT FOUND message from OS/390. To avoid the PROC NOT FOUND message, either ensure the BMCP procedure is in the system SYS1.PROCLIB data set or include the SUB=JESx parameter on the OS/390 START command.

**Shutting down the BMCP**

If you are not running in PACLOG Processing Only (PPO) mode, you should leave the BMCP subsystem running at all times. However, you must shut it down when you need to install maintenance modules. You must also shut down the BMCP subsystem as part of an orderly shutdown of OS/390 before an IPL. Shut down the BMCP subsystem after shutting down the BCSS subsystem and after DB2 has terminated.

To shut down the BMCP subsystem, issue the following command, where the variable `bmcpid` is the one- to four-character BMCP subsystem ID:

```
bmcpid SHUTDOWN
```

The BMCP subsystem responds with messages that indicate the progress of the shutdown. You need DELETE authority to use this command.

For more information on PPO mode, see “PACLOG processing only (PPO) mode” on page 112.
Displaying BMCP status

You can display the status of BMCP to determine whether it is active. To display the status, issue the following command, where the variable \textit{bmcpId} is the one- to four-character BMCP subsystem ID:

\begin{verbatim}
  bmcpId STATUS
\end{verbatim}

BMCP responds with messages that indicate the status of the address space. You need READ authority to use this command.

You can also include the STATUS command in a COMMNDxx member of SYS1.PARMLIB so that the BMCP status is displayed automatically during an IPL.

BCSS commands

This section provides information about BCSS operator commands that start the BCSS subsystem, shut it down, display its status, and reinitialize PACLOG. You can use the BCSS operator commands as follows:

- Place them in a COMMNDxx member of SYS1.PARMLIB so that they are issued automatically during an IPL.
- Place them in a data set for BCSS commands so that they are issued at BCSS start-up.
- Issue them as needed from the operator console.

\textit{NOTE}

Commands issued from the operator console remain active until the next IPL, at which time the values in the data set for BCSS commands are reinstated.

See the following subsections for more information:

- “Starting the BCSS” on page 108
- “Shutting down the BCSS” on page 108
- “Displaying BCSS status” on page 109
- “Reinitializing XCA compression” on page 109
Starting the BCSS

You must start the BCSS before starting any applications. For normal operations, include the OS/390 START command in a COMMNDxx member of SYS1.PARMLIB so that the BCSS starts automatically during an IPL. To start the BCSS manually after a shutdown, issue the START command from the operator console. To start the BCSS, issue one of the following OS/390 commands, where the variable bmcBcss is the name of the member that contains the BCSS procedure:

```
START bmcBcss,OPTION=REFRESH
```

This command starts the BCSS subsystem with new copies of resident BCSS modules. OPTION=REFRESH is the default for BCSS startup.

```
START bmcBcss,OPTION=NREFRESH
```

This command starts the BCSS subsystem with existing copies of resident BCSS modules.

Check the system log to ensure that the command completed successfully. The BCSS responds with messages that indicate its availability.

Optionally, you can issue the OS/390 DISPLAY ACTIVE LIST (D A, L) command. OS/390 responds with the following information. An active BCSS appears in this display.

<table>
<thead>
<tr>
<th>JOBS</th>
<th>M/S</th>
<th>TS</th>
<th>USERS</th>
<th>SYSAS</th>
<th>INIT S</th>
<th>ACTIVE/MAX VTAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>00004</td>
<td>00025</td>
<td>00150</td>
<td>00009</td>
<td>00013</td>
<td>00150/00250</td>
<td></td>
</tr>
<tr>
<td>LLA</td>
<td>LLA</td>
<td>LLA</td>
<td>NSW</td>
<td>RMF</td>
<td>A</td>
<td>IEFPROC</td>
</tr>
<tr>
<td>NET</td>
<td>NET</td>
<td>NETNCP</td>
<td>OWT</td>
<td>TSO</td>
<td>TSO</td>
<td>STEP1</td>
</tr>
<tr>
<td>BMCBCSS</td>
<td>BMCBCSS</td>
<td>SSAS</td>
<td>NSW</td>
<td>BMCP</td>
<td>BMCP13</td>
<td>BPSMDSP0</td>
</tr>
</tbody>
</table>

Shutting down the BCSS

If you are not running in PPO mode, you should leave the BCSS subsystem running at all times. However, you must shut it down when you need to install maintenance modules. You must also shut down the BCSS subsystem as part of an orderly shutdown of OS/390 before an IPL.

Shut down the BCSS subsystem after DB2 subsystems have been stopped and before you shut down the BMCP. To shut down the BCSS subsystem and terminate its address space, issue the following command, where the variable bcssid is the one- to four-character BCSS subsystem ID:

```
bcssid SHUTDOWN
```
The BCSS responds with messages that indicate the progress of the shutdown. The shutdown may take several minutes. BCSS will remain active until all SVCs intercepted by BCSS have completed processing. You need DELETE authority to use this command.

---

**WARNING**

*Do not cancel the BCSS started task.* Many cross-memory links are set between BCSS and other address spaces. Cancelling BCSS may abnormally terminate other jobs that are running.

---

For more information on PPO mode, see “PACLOG processing only (PPO) mode” on page 112.

### Displaying BCSS status

You can display BCSS status to determine the status of the address space. To display the status, issue the following command, where the variable `bcssId` is the one- to four-character BCSS subsystem ID:

```
bcssId STATUS
```

The BCSS responds with messages that indicate the status of the address space. You need READ authority to use this command.

### Reinitializing XCA compression

You must reinitialize the XCA compression modules after an IPL or after the XCA components have been upgraded. When you reinitialize, XCA initializes only those components that are licensed. To reinitialize PACLOG, issue the following command, where the variable `bcssId` is the one- to four-character BCSS subsystem ID:

```
bcssId REINIT DAC
```

BCSS responds with messages that indicate that initialization completed. You need DELETE authority to use this command.

### XCA commands

This section describes commands that you issue through the BCSS that apply only to PACLOG compression components. These commands specify the BCSS ID and the compression component name (DAC).
Enabling and disabling PACLOG compression components

You can enable or disable the PACLOG compression components on any BCSS. When a component is disabled, compression is not available and PACLOG jobs cannot run.

To enable the PACLOG compression component, issue the following command, where the variable `bcssId` is the one- to four-character BCSS subsystem ID:

```
bcssId DAC NONVSAM ENABLE
```

**WARNING**
This command has changed from previous releases of PACLOG. Using the old syntax, `DAC ENABLE`, can have a negative impact on your system.

To disable the PACLOG compression component, issue the following command, where the variable `bcssId` is the one- to four-character BCSS subsystem ID:

```
bcssId DAC NONVSAM DISABLE
```

The named BCSS responds with messages indicating which components have been enabled or disabled.

Displaying the status of PACLOG compression components

You can display status information about the compression components (DAC). To display status information, issue the following command, where the variable `bcssId` is the one- to four-character BCSS subsystem ID:

```
bcssId DAC STATUS
```

This command displays general status information about the compression components, such as the engine level mask value, version and release information, and the date on which the DAC tape was generated.

Optionally, check the system log to ensure that the command completed successfully. BCSS responds with messages indicating the status of the selected components.
Enabling global or local compression

You can use local or global compression. The compression default is local compression. Global compression uses cross-memory services and requires more CPU resources. To set local compression, issue the following command, where the variable bcssId is the one- to four-character BCSS subsystem ID:

```
bcssId DAC NONVSAM CL LOCAL
```

The named BCSS subsystem responds with messages indicating the status of the local compression option.

Setting the PACLOG ELM

You can specify the compression ELM for PACLOG. The ELM value that is specified overrides all other specifications of the ELM, including those set at the BCSS level. When you do not specify a product-level engine level mask, the BCSS-level ELM is used.

To specify the required ELM, issue the following command, where the variable bcssId is the one- to four-character BCSS subsystem ID and the variable value is the required ELM mask value:

```
bcssId DAC NONVSAM ELM value
```

This command sets the product-level ELM to value for the non-VSAM component.

The ELM command that you use to specify the engine level mask has been removed from the BCSSCMDS data set. When the ELM is not specified, DATA ACCELERATOR defaults to the highest level that is available. The current ELM mask is documented in member DACELM in the .CNTL data set.
PACLOG processing only (PPO) mode

If you do not run the BMC Software DATA ACCELERATOR non-VSAM component, you can run PACLOG in PPO mode. PPO mode provides the following benefits:

- eliminates monitoring of the following SVCs:
  - ATTACH
  - LINK
  - BDL/FIND
  - STOW

- eliminates interception of SORT and IEBCOPY

- eliminates I/O to any REGISET defined in the BCSS procedure

- allows you to share the BCSS subsystem with other BMC Software products that use a REGISET (for example, the AES product family) without incurring the overhead due to the presence of the REGISET
PPO commands

The following sections describe the OS/390 commands that you can use in PPO mode.

Running in PPO mode

To run PACLOG in PPO mode each time the BCSS is started, insert the following command as the last line in the data set for BCSS commands:

```
DAC PPO ON
```

--- WARNING ---

Do not issue the `DAC PPO ON` command if you are running the DATA ACCELERATOR non-VSAM product. If you issue that command, any attempt to open a compressed data set fails and the following messages are issued:

```
BMC32740E OPEN failed under PPO because data set profile not created by API
BMC32402I DDNAME(ddName) DSNAME(dsName)
```

The following message may be issued if the IBM utility IEBCOPY is run and the output PDS has been compressed:

```
IEB127I RECFM INCOMPATIBLE
```

The following is an example of the PACLOG BCSS commands.

--- NOTE ---

The fifth line applies only if you are running in PPO mode. The sixth line applies only when you shut down the started tasks.

```
REINIT DAC
DAC NONVSAM ENABLE
DAC NONVSAM CL LOCAL
DAC STATUS
DAC PPO ON
DAC PPO SHUTDOWN
```
Shutting down the started tasks

Use the command DAC PPO SHUTDOWN to terminate the started tasks when you are not running any other BMC Software products that require the BCSS. To issue the command from an OS/390 console, use the following command, where the variable bcssid is the one- to four-character BCSS subsystem ID:

```
bcssid DAC PPO SHUTDOWN
```

**NOTE**
You must restart the BCSS if you wish to enter any further commands. See “Restarting PPO mode” on page 114 for more information.

To terminate the started tasks automatically after the subsystems have completed initialization, insert the following command in the data set for BCSS commands:

```
DAC PPO SHUTDOWN
```

**WARNING**
Do not issue the DAC PPO SHUTDOWN command if you are sharing the BCSS subsystem with any other BMC Software product. Shutting down the BCSS started task that is used for the AES or other products causes failures in those products.

Reinstating full compression services

If you want to disable PPO mode and reinstate full compression services, issue the following commands from the OS/390 console:

```
START BCSS
```

Wait for the BCSS initialization to complete, then issue the following commands, where the variable bcssid is the one- to four-character BCSS subsystem ID:

```
bcssid DAC PPO OFF
bcssid DAC NONVSAM ENABLE ATTACH
bcssid DAC NONVSAM ENABLE LINK
```

Restarting PPO mode

If you have stopped PPO mode, use the following command to restart PPO mode.

```
DAC PPO ON
```
To issue the command from an OS/390 console, use the following command, where the variable \texttt{bcssid} is the one- to four-character BCSS subsystem ID:

\texttt{bcssid DAC PPO ON}
PACLOG installation

This appendix presents the following topics:

About the installation system .................................................. 117
Installing PACLOG on multiple DB2 subsystems ....................... 118
Integrating PACLOG with RECOVERY MANAGER for DB2 ............. 118
Sample ALM$OPTS file .......................................................... 119
PACLOG memory requirements ............................................... 119
PACLOG installation options ................................................... 121

About the installation system

The PACLOG installation process generates a customized installation data set. This data set contains all of the jobs that are required to install PACLOG in your DB2 environment. The member named $C30DOPT establishes your initial control information for PACLOG.

When you submit the $C30DOPT job that is contained in the installation options, it copies the PACLOG options to the ALM$OPTS member of the .DBCNTL data set and creates the history file for the subsystem.

The PACLOG modeling tool is automatically tailored with your installation’s data set names and copied to your .EXEC data set when you install PACLOG.
Installing PACLOG on multiple DB2 subsystems

After the PACLOG compression services are installed on an OS/390 system, PACLOG can be activated on all DB2 subsystems for that OS/390 system by simply adding the new DB2 subsystems to the PACLOG control information and creating the history data set.

If you have RECOVERY MANAGER for DB2, see “Integrating PACLOG with RECOVERY MANAGER for DB2” for instructions. Otherwise, edit the data set referred to by the ALMSOPTS DD statement by adding the new control variables HIST, BSDS1, TSTAMP, and PROD.DSNLOAD. You must have OS/390 data set READ and WRITE authority to edit the control information member. Then, create a new history file that refers to the PACLOG .DBCNTL data set member ALMHIST for a sample job.

Integrating PACLOG with RECOVERY MANAGER for DB2

---

**NOTE**

If RECOVERY MANAGER coexists with PACLOG in the target DB2 subsystem, the two products should share the RECOVERY MANAGER options file and archive history data set.

You can update the control information by specifying the new DB2 subsystem ID and selecting Control Information on the RECOVERY MANAGER Main Menu. You can then browse DB2 Subsystem Resource Information and ensure that the history file is specified for the new DB2 subsystem.

If you are not currently using the RECOVERY MANAGER history file, you must specify a history data set name and create the data set. Refer to the PACLOG control information (.DBCNTL) data set member ALMHIST for a sample job to create a new history file.
Sample ALM$OPTS file

The following example shows a PACLOG control information data set.

**NOTE**
You can choose any valid OS/390 data set name for the history file during installation. However, the name must be unique for each subsystem. You cannot use the same data set for multiple subsystems. The naming conventions shown in the sample ensure a unique name for each subsystem.

<table>
<thead>
<tr>
<th>Sample ALM$OPTS file</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBAA. BSDS1 = DBAACAT. BSDS01</td>
</tr>
<tr>
<td>DBAA. PROD. DSNLOAD = SYS2. DB2V81M. DSNLOAD</td>
</tr>
<tr>
<td>DBAA. HIST = BMCALM. TEST. DBAA. HISTORY</td>
</tr>
<tr>
<td>DBAA. TSTAMP = Y</td>
</tr>
<tr>
<td>DBN. HIST = BMCALM. TEST. DBN. HISTORY</td>
</tr>
<tr>
<td>DBN. TSTAMP = N</td>
</tr>
<tr>
<td>DBN. BSDS1 = DSNDBN. BSDS01</td>
</tr>
<tr>
<td>DBN. PROD. DSNLOAD = SYS2. DB2V81M. DSNLOAD</td>
</tr>
<tr>
<td>WORKUNIT = WORK</td>
</tr>
</tbody>
</table>

PACLOG memory requirements

PACLOG uses less than 64 KB in nonextended common storage and uses 1.5 MB in extended common storage. Most of PACLOG’s private storage requirements [(noncommon service area (non-CSA))] are obtained from extended private storage. The actual amount of private storage is variable, and depends on the following items:

- the number of concurrently open files in a job
- whether you are using the PACLOG compression component to compress the files
- the memory usage on your system

The following subsections describe storage requirements for the BMC Software subsystems and the PACLOG compression component.
BMC Software subsystems

Table 7 shows the CSA storage requirements for the BMC Software Primary Subsystem (BMCP) and the BMC Software Consolidated Subsystem (BCSS). These requirements are for each OS/390 system on which the BMC Software subsystems run.

Table 7  CSA Storage for the BMC Software Subsystems

<table>
<thead>
<tr>
<th>CSA storage for modules (per OS/390 system)</th>
<th>Amount</th>
<th>Above 16-MB line</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMCP</td>
<td>22 KB</td>
<td>all</td>
</tr>
<tr>
<td>BCSS</td>
<td>1771 KB</td>
<td>all</td>
</tr>
</tbody>
</table>

Non-VSAM compression component

The following tables show the storage requirements for the PACLOG compression component, as follows:

Table 8 shows non-CSA storage requirements.

Table 8  Non-CSA storage for the compression component

<table>
<thead>
<tr>
<th>Non-CSA storage in application address spaces</th>
<th>Total</th>
<th>Above 16-MB line</th>
</tr>
</thead>
<tbody>
<tr>
<td>control blocks per address space</td>
<td>512 bytes</td>
<td>all</td>
</tr>
<tr>
<td>control blocks per OPEN DCB per data set</td>
<td>3 KB</td>
<td>all except 1536 bytes</td>
</tr>
<tr>
<td>data areas per OPEN DCB per</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- data set</td>
<td>.5 MB</td>
<td>all except 32 KB</td>
</tr>
<tr>
<td>- QSAM LM (1) in MVS/DFP</td>
<td>.5 MB</td>
<td>all except 77 KB</td>
</tr>
<tr>
<td>- QSAM LM (1) in DFSMS/MVS</td>
<td>.5 MB</td>
<td>all</td>
</tr>
<tr>
<td>- QSAM MM (2) in MVS/DFP</td>
<td>.5 MB</td>
<td>all except 77 KB</td>
</tr>
<tr>
<td>- QSAM MM (2) in DFSMS/MVS</td>
<td>.5 MB</td>
<td>all</td>
</tr>
<tr>
<td>- BSAM in MVS/DFP</td>
<td>.5 MB</td>
<td>all except 98 KB</td>
</tr>
<tr>
<td>- BSAM in DFSMS/MVS</td>
<td>.5 MB</td>
<td>all except 2 KB</td>
</tr>
</tbody>
</table>

(1)LM—Locate Mode GET and PUT operations
(2)MM—Move Mode GET and PUT operations
Table 9 shows CSA storage requirements.

### Table 9  CSA storage for the compression component

<table>
<thead>
<tr>
<th>Maximum common storage required</th>
<th>Total</th>
<th>Above 16-MB line</th>
</tr>
</thead>
<tbody>
<tr>
<td>modules per OS/390 system</td>
<td>277 KB</td>
<td>all except 57KB</td>
</tr>
<tr>
<td>control blocks per OS/390 system</td>
<td>16 KB</td>
<td>all</td>
</tr>
<tr>
<td>control blocks per OS/390 address space with compression and expansion activity</td>
<td>2 KB</td>
<td>all</td>
</tr>
</tbody>
</table>

## PACLOG installation options

This section describes the PACLOG installation options and their default values.

**WORKUNIT=SYSALLDA**

WORKUNIT specifies the default unit for work data sets dynamically allocated by PACLOG. You can specify another valid unit name during installation if you do not want to use the default, SYSALLDA.

**TSTAMP=YES**

TSTAMP specifies to PACLOG that the timestamp (if it exists) is to be copied into the data set name of archive log copies 3 and 4. If TSTAMP is set to YES, the prefix for ARCHIVE3 and ARCHIVE4 cannot be more than 17 characters. If TSTAMP is set to NO, the prefix can be up to 35 characters. For more information, see “PREFIX prefix” on page 67.

**HIST=dataSetName**

HIST specifies the subsystem’s BMC Software archive history data set. See “The BMC Software archive history file” on page 26 for a discussion of the archive history file.

**BSDS1=dataSetName**

BSDS1 specifies the bootstrap data set file name.

**PROD.DSNLOAD=dataSetName**

PROD.DSNLOAD specifies the production DB2 load library.
Obtaining trace and maintenance information

When you contact customer support with a problem, you might be asked to provide a trace so that the events leading up to the problem can be analyzed. This appendix provides instructions for obtaining a trace in batch mode, obtaining a trace in online mode, and determining what maintenance has been applied.

Obtaining a trace for a batch job

Use one of the following methods to obtain a trace for a batch job:

- To send the trace to a user-defined data set, add the following DD statement to the batch job:

```
//ALMTRACE DD DSN=dsName,DISP=(,CATLG)
//UNIT=SYSDA, SPACE=(CYL,(10,10))
```

**NOTE**

The DCB characteristics are RECFM=FB,LRECL=80
To send the trace to SYSOUT, add the following DD statement to the batch job:

```
// ALMTRACE DD SYSOUT=*
```

**WARNING**
The trace produces a large amount of output. For that reason, you may want to consider sending the output to a data set.

---

**Determining applied maintenance**

Use one of the following methods to determine what maintenance zaps and fixes have been applied to PACLOG:

- Run a trace (see “Obtaining a trace for a batch job” on page 123) to view the fix history that is included at the beginning of the ARMTRACE file.

- The fixes that have been applied are printed after the report heading of the ALMPRINT file in most batch jobs.
Glossary

A

active log
The DB2 log data set that is used to record incoming updates to tables and other events. For recovery purposes, this is the log data set in use when a failure occurs. See also log and archive log.

AES
The BMC Software Application Enhancement Series, which includes the APPLICATION RESTART CONTROL products for IMS, DB2, and VSAM and the BATCH CONTROL FACILITY products.

APF
Authorized program facility.

archive log
A DB2 active log data set that is no longer in use and has been archived. The log data set may be retrievable for recovery purposes. See also log and active log.

B

backup copy
In DB2 installations, a duplicate of the primary copy of a DB2 data set. This copy can be used for recovery when a recovery using the primary copy fails. A backup copy may be designated for a local site or for a recovery site. See also primary copy.

BCSS
BMC Consolidated System Subsystem.

BMCP
BMC Primary Subsystem.

bootstrap data set (BSDS)
A VSAM data set that contains DB2 name and status information. It also contains RBA range specifications for active and archive log data sets, catalog and directory passwords, and lists of conditional restart and checkpoint records.

BSDS
See bootstrap data set.
C

catalog
The OS/390 data set catalog or the DB2 catalog, depending on the context of the reference.

common service area
In OS/390, a part of the common area that contains data areas that can be addressed by all address spaces.

compression
A process whereby a given amount data is compressed into a smaller number of bytes or characters without losing any of the information represented by the data.

CSA
See common service area.

D

DAC
The BMC Software DATA ACCELERATOR Compression product.

DASD
See direct access storage device.

data definition name (ddname)
The name of a data definition (DD) statement that corresponds to a data control block that contains the same name.

data sharing
A DB2 mode of operation in which multiple DB2s can share data resources (such as table spaces).

database administrator
An individual responsible for the design, development, operation, safeguarding, maintenance, and use of a database.

DB2 catalog
Tables maintained by DB2 that contain descriptions of DB2 objects such as tables, views, and indexes.

DBA
See database administrator.

DCB
Data control block.
ddname
   See data definition name.

DD statement
   Data definition statement.

direct access storage device (DASD)
   A device in which access time is effectively independent of the location of the data. Used in reference to fixed disk drives.

disaster recovery
   The recovery of data that has been lost due to a major catastrophe at a computer installation. The recovery is performed at a remote recovery site using copies of the data made before the catastrophe.

E

Engine Level Mask (ELM)
   An identification number of the compression engine used by the DATA ACCELERATOR Compression product. A new ELM is provided when a new compression engine becomes available or when changes are made to existing compression engines.

I

ICF
   Integrated catalog facility.

index record
   A type of record written to a DB2 log that contains index information. This type of record is not required for recovery purposes.

I/O
   Input/output.

IPL
   Initial Program Load.

ISPF
   Interactive System Productivity Facility. A mainframe interactive interface that allows users to access mainframe utilities, tools, and applications.
**J**

**JES**
Job entry subsystem.

**JCL**
See job control language.

**job control language (JCL)**
A control language used to identify a job to an operating system and to describe the requirements of the job.

**L**

**local site**
A physical DB2 system installation where DB2 applications are installed and are in use. See also recovery site.

**log**
A collection of records that describe the events that occur during DB2 processing and their sequence. This recorded information is used for recovery in the event of a failure during DB2 execution. In particular, the log records are used to reconstruct damaged tables and indexes.

**logging environment modeling tool**
An interactive component of PACLOG that helps you to represent a multi-variable process mathematically with the goal of finding the optimum values of one or more of those variables.

**M**

**modeling tool**
See logging environment modeling tool.

**multiple virtual storage (MVS)**
The mainframe operating system under which DB2, IMS, and VSAM run. In PACLOG documentation, MVS means MVS/XA, MVS/ESA, MVS/370, and OS/390, unless otherwise noted.

**MVS**
See multiple virtual storage (MVS).

**O**

**OS/390**
An IBM product that bundles MVS, TCP/IP, TSO, and VTAM. The first version of OS/390 (version 1.1, or R1) was equivalent to MVS version 5.2.2. In addition to earlier versions of MVS, the PACLOG products support OS/390 version 1.1 and later.
partitioned data set (PDS)
An MVS data set in direct access storage that is divided into portions, called members. Each member can contain a program, part of a program, or data. PDS is synonymous with library.

partitioned table space
In DB2, a table space subdivided into parts (based on the index key range), each of which may be processed by utilities independently.

password activation deadline
The date (either the 15th or the last day of the month) through which a password will be accepted (installed) by the product authorization interface. When this date has passed, BMC Software Contracts Administration must issue another password.

PDS
See partitioned data set.

primary authorization ID
The authorization ID used to identify the application process to DB2.

primary copy
In DB2 installations, a copy of a DB2 data set. It is the first copy to be used (when specified) in an attempted recovery of the data set. A primary copy may be designated for a local site or for a recovery site. Contrast with backup copy.

RACF
See Resource Access Control Facility.

RBA
See relative byte address.

recovery
In DB2 installations, the process of rebuilding DB2 table spaces after a failure of those spaces.

recovery site
A physical DB2 system installation designated as the backup system for a local site in the event that a disaster recovery is necessary.

REGISET
The product registration data set.
relative byte address
   (RBA) A hexadecimal address (offset) that uniquely identifies a DB2 log record. The RBA is with respect to the start of the log (offset = zero).

resource access control facility (RACF)
   An IBM-licensed program that provides for access control by identifying and by verifying the users to the system, authorizing access to protected resources, logging the detected unauthorized attempts to enter the system, and logging the detected accesses to protected resources.

S

simulation
   In PACLOG, the process of creating processed copies of archive logs without performing any actions against the original logs.

SMS
   Storage Management Subsystem.

stacked tape
   A tape on which a series of data sets are stored in succession. In PACLOG, these are copies of processed archive logs.

supervisor call (SVC)
   A request that serves as the interface into operating system functions, such as allocating storage. The SVC protects the operating system from inappropriate user entry. All operating system requests must be handled by SVCs.

SVC
   See supervisor call.

SYSADM
   System administration privileges.

system resources
   In DB2, those items controlled by DB2 such as the bootstrap data set, the logs, and the catalog and directory.

T

table space
   In DB2, a page set that is used to store the records of one or more tables.
**V**

version code
See submodel.

**Virtual Storage Access Method (VSAM)**
An IBM data-access method that allows efficient sequential and direct access to MVS data sets.

**VSAM**
See Virtual Storage Access Method.

**W**

work file
A temporary file that is used for the temporary storage of data that is being processed.

**X**

XCA
See Extended Compression Architecture.
Index

Symbols

.CNTL data set 26, 35, 111, 118

A

active log
  dual logging 35
  factors affecting size 42
  log pairs 51
  number recommended 35
  number used 42
  optimum size 42
  size 51
address space, dispatching priorities 103
ALMIN DD statement 77
ALMISPF CLIST 46
ALMLG001 panel 47, 54, 57
ALMLG01A panel 48
ALMLG02A panel 55
ALMLG03A panel 57
ALMLIST1 DD statement 78
ALMLIST2 DD statement 78
ALMLIST3 DD statement 78
ALMLIST4 DD statement 78
ALMLSTAT DD statement 78
ALMMSGS DD statement 77
ALMOPTS DD statement 77
ALMOSTAT DD statement 78
ALMOPTS DD statement 77
ALMOSTAT DD statement 78
ALMPRIM panel 46
ALMPRINT DD statement 77
ALMXPIRE DD statement 79
APF authorization 34
archive copy specification 66
archive history data set, creating 98
archive history file
  authorization 34
  description 26
  updating 40, 68
archive log
  cataloging 35, 70
  data compression 41
  issues 21
  limiting number processed 37
  local site copies 38, 66
  media to use 35, 39
  archive log (continued)
    offsite copies 38, 66
    processing practices 35
    recorded in BSDS 42
    reprocessing 40, 67
    specifying number of copies 38
    using in recovery 91
ARCHIVE LOG command 36
ARCHIVEn option 66
ARCHIVMAXV DB2 install option 35
ARCHLOG1 52
ARCHLOG2 52
ARMBARC program DD statements 76
authorizations
  for active logs 34
  for archive history file 34
  for BSDS 34
  for JOBLIB 34
  for started tasks 34
  for STEPLIB 34

B

backing out data 39
BCSS
  architecture 99
  commands 105, 107
  commands data set 102
  dispatching priorities 103
  displaying status 109
  ELM overview 103
  naming convention 102
  shutting down 108
  starting 108
  subsystem ID 100
BMC Software Consolidated Subsystem. See BCSS
BMC Software Primary Subsystem. See BMCP
BMC Software, contacting 2
BMCERROR DD statement 77
BMCP
  architecture 99
  commands 105
  dispatching priorities 103
  naming convention 102
  overview 101
BMCP (continued)
  shutting down 106
  starting 105
  status 107
  subsystem ID 100
  supervisory services 101
bootstrap data set. See BSDS
BSDS
  days of log data in 50
  number of entries in 52
BSDS (bootstrap data set)
  archive logs recorded in 42
  ARCHIVMAXV parameter 35
  authorization 34
  number of entries 35
BSDS1 option 121
building a PACLOG job 75

C

cataloging archive logs 35, 70
CLIST, ALMISPF 46
commands
  ARCHIVE LOG 36
    available with XCA 104
    BCSS 105, 107
    BMCP 105
    order for DB2 shutdown 104
    order for DB2 startup 104
    PPO mode 113
    XCA 105, 109
common service area 119
COMPRESS option 41, 74
compressing archive log data sets
  hardware compression 41, 74
  hardware limitation 74
  to disk 41, 74
  to reduce media used 41
  to tape 41, 73
  using XCA technology 41, 74
compression
  COMPRESS option 74
  disabling components 110
  enabling components 110
  global options 111
  local options 111
  options 73, 74
  ratio 50
  subsystem, architecture 99
  to disk 41, 74
  to tape 41, 73
  TRTCH option 73
compression address space (CAS), dispatching priorities 103
conserving disk space 42
control information. See DBCNTL data set 119

conventions, documentation 15
creating offsite copies of logs 94
customer support 3

D

DAC (DATA ACCELERATOR Compression) 100, 105, 110
DASD compression limitation 74
DATA ACCELERATOR Compression. See DAC
data backout 39
data compression
  example 89
    hardware limitations 22
    to disk 74
    to tape 73
    using XCA technology 41
DATAACLAS option 74
DB2LOGPRODUCT option 70
DBCNTL data set 117
determining log size reduction 87
device type syntax options 70
diagrams, panel-flow 16
disabling compression components 110
disaster recovery
  offsite log copies 28, 67
  planning 36
  restoring offsite log copies to disk 29
  using PACLOG 28
  using RECOVERY MANAGER 28
disk space
  conserving with PACLOG 42
dispatching priorities 103
displaying status
  of BCSS 109
  of BMCP 107
  of compression components 110
documentation information 13, 15
dual logging 66
dynamic allocation of log data sets 61

E

electronic documentation 13
ELM
  overview 103
  specifying the mask value 111
  enabling compression components 110
Engine Level Mask. See ELM
environment settings for PACLOG 35
examples
  creating offsite copies of logs 94
  expired logs report 84
  JCL 79
  job printout 79
  limiting log processing 93
examples (continued)
   processed log report 83
   syntax 38, 61
   using archive logs in recovery 91
   using data compression 89
EXEC statement 76
EXPDT option 73
expiration date for tape data sets 73
Extended Compression Architecture. See XCA

F
filter
   features 39
      remove index records 72
      remove records not needed for recovery 72
   syntax 71
FILTERIX option 40, 72
FILTERRECTYPE option 40, 72
FILTERTS option 40, 72
fixes, determining applied 124
formats, syntax diagrams 17

G
global compression 111
global syntax options 68

H
hardware compression 41, 73
Help, online 13
help, online 15
HIST option 121

I
installation
   of logging environment modeling tool 117
   of PACLOG 117
   options file 34
      process 117
installation options
   BSDS1 121
      for copying timestamp 34, 121
   HIST 121
   PROD.DSNLOAD 121
   TSTAMP 121
ISPF panel-flow diagram conventions 16

J
JCL
   EXEC statement 76
      for PACLOG job 75
   JOB statement 76
      STEPLIB DD statement 76
   JOB statement 76

K
KEEP option 42, 69

L
LIMIT HOURS option 68
LIMIT LOGS option 69
LIMIT option 35, 37, 68
LIMIT RBARANGE option 69
limitations of PACLOG 29
limiting log processing 93
load library 76
local compression 111
local site copies 66
log
   data set statistics 80
      determining size reduction of 87
      synchronization 59
logging environment modeling tool
   about 45
      active log pairs 51
      active log size 51
      audit synchronization 59
      compression ratio 50
      days of log data in BSDS 50
      entries in BSDS 52
      features 45
      hours of log on DASD 50
      installation 117
      logging environment model field descriptions 49
      logging rate 51
      menu 46
      optimize fields for DASD archives 49
      source of highest logging rate 49
      tutorial 46
logging rate 42, 49, 51

M
maintenance, determining applied 124
memory requirements 119
MGMTCLAS option 74
modeling tool. See logging environment modeling tool
naming log copies
  local site copies 70
  offsite copies 67
NOKEEP option 42, 70
normal mode operation 26

offsite copies 66
offsite log data set prefix 67
OK status 123
online Help 13
online help 15
options
  COMPRESS 41, 74
  DATACLAS 74
  DB2LOGPRODUCT 70
  device type 70
  EXPD 73
  filter 71
  FILTERIX 40, 72
  FILTERRECTYPE 40, 72
  FILTERTS 40, 72
  global 68
  KEEP 42
  LIMIT 37
  LIMIT RBARANGE 69
  MGMTCLAS 74
  NOKEEP 42, 70
  PREFIX 67
  REDO 40, 67
  RETPD 73
  SIMULATE 42, 69
  STACK 73
  STORCLAS 74
  TAPE 71
  tape 72
  TRTCH 41, 73
  UNIT 71
  UPDATEHIST 42, 69
  WORKUNIT 121

PACLOG (continued)
  load library 76
  prerequisites 32
  time and resource savings with 23
PACLOG Processing Only. See PPO mode
panel-flow diagram conventions 16
pattern matching 72
PPO (PACLOG Processing Only) mode
  about 112
  commands 113
  restarting 114
  running PACLOG in 113
PREFIX option 67
processed logs report 82
PROD.DSNLOAD option 121
product registration data set 101
product support 3
records not needed for recovery 39
RECOVERY MANAGER shared features 33
RECOVERY MANAGER software requirements 33
recovery site copies 66
REDO option 40, 67
REGION parameter 76
REGISET data set 101, 112
reinitializing XCA compression 109
reinstating compression services 114
related documentation 13
release notes 15
removing
  index records 40, 72
  records not needed for recovery 40, 72
  table space records 40, 72
  unwanted records and objects from archive log 39
reports 82
  ALMLSTAT 81
  archive log management 82
  expired archive log 84
  expired log 84
  of archive logs processed 82
  primary archive log 83
  processed log 83
  processed secondary archive log 83
  total records 81
reprocessing a processed log 40, 67
restarting PPO mode 114
retaining log copies 70
retention period of tape data sets 73
RETPD option 73

reprocessing a processed log 40, 67
restarting PPO mode 114
retaining log copies 70
retention period of tape data sets 73
RETPD option 73

PACLOG
  benefits 22
  compression feature 41
  compression ratio 50
  cylinder calculation 53
  cylinders saved by 53
  features shared with RECOVERY MANAGER 33
  in disaster recovery 28, 36
  JOB statement 76
S
samples
ALMOSTAT report 81
expired archive log report 84
expired logs report 84
JCL 79
job printout 79
primary archive log report 83
processed log reports 83
processed secondary archive log report 83
syntax 38
total records reports 81
shared RMGR and PACLOG features 33
shutting down
  BCSS 108
  BMCP 106
  started tasks 114
SIMULATE option 69
simulating log processing 42
simulation feature 42
simulation mode operation 27
SMS
data class name 74
  management class name 74
  storage class name 74
  when not used by PACLOG 74
software requirements 33
source of highest logging rate 49
specifying analysis limits 69
STACK option 73
stacked tape option 73
started tasks 29
  authorization 34
  default names 100
  library 100
  shutting down 113, 114
starting
  a PACLOG job 85
  BCSS 108
  BMCP 105
statistics, for log data set 80
status, of compression components 110
status, of DB2 objects
  OK 123
  unacceptable status 123
STEPLIB DD statement 76
storage
  CSA 120
  non-CSA 120
STORCLAS option 74
support, customer 3
SVC monitoring 112
synchronization, logs 59
syntax
device type 70
diagrams 63
examples 61
filter 71
global 68
overview 61
statement conventions 16
tape 72
syntax, format for diagrams 17
SYSUT1 DD statement 78

T
table space specification 72
TAPE option 71
tape syntax options 72
technical support 3
timestamp, using in data set name 121
trace
  batch 123
TRTCH option 41, 73
TSTAMP installation option 67, 121

U
unit for processed log copies 71
UNIT option 71
unwanted records and objects
  removing from archive log 39
UPDATEHIST option 42, 69

W
wildcards in table space specification 72
WORKUNIT option 121
writing copies
  to disk 39
  to tape 39, 71

X
XCA
  commands 105, 109
  compression, reinitializing 109
technology 41

Z
zaps, determine applied 124
Notes