

Oracle® CODASYL DBMS for OpenVMS

Table of Contents

| | |
|--|----|
| <u>Oracle® CODASYL DBMS for OpenVMS</u> | 1 |
| <u>Release Notes</u> | 2 |
| <u>Preface</u> | 6 |
| <u>Purpose of This Manual</u> | 7 |
| <u>Intended Audience</u> | 8 |
| <u>Document Structure</u> | 9 |
| <u>Conventions</u> | 10 |
| <u>Chapter 1 Installing Oracle CODASYL DBMS</u> | 11 |
| <u>1.1 Oracle CODASYL DBMS on OpenVMS I64</u> | 12 |
| <u>1.2 Using Databases from Releases Earlier Than V7.0</u> | 13 |
| <u>1.3 Requirements</u> | 14 |
| <u>1.4 Installation of Oracle CODASYL DBMS Software</u> | 15 |
| <u>1.5 Documentation in Adobe Acrobat Format</u> | 16 |
| <u>Chapter 2 Enhancements Provided</u> | 17 |
| <u>2.1 DBO /SHOW VERSION Displays System Architecture and Version</u> | 18 |
| <u>2.2 DBO /SHOW STATISTICS "Checkpoint Statistics" new counters</u> | 19 |
| <u>2.3 Performance Enhancements With Internal Lock Data Structures</u> | 20 |
| <u>2.4 DBO/DUMP/BACKUP/MULTITHREAD/OPTIONS=ROOT/HEADER ONLY displays the header information only</u> | 21 |
| <u>2.5 AIJ Extend Additional Information In Operator Notification New Feature</u> | 24 |
| <u>2.6 Hot Standby LRS Database Prefetch Count Limit</u> | 25 |
| <u>Chapter 3 Problems Corrected</u> | 26 |
| <u>3.1 Bugcheck With SYSTEM-F-ROPRAND in KODTXN\$POST TSNBLK UPDATE</u> | 27 |
| <u>3.2 Incorrect Messages From DBO /MONITOR START When DBM\$MON USERNAME Specifies Non-existent Account</u> | 28 |

Table of Contents

| | |
|--|----|
| <u>3.3 Incorrect LOCK TIMEOUT value with DBO/BACKUP/MULTI/ONLINE/LOCK TIMEOUT</u> | 29 |
| <u>3.4 VMS\$BUFFER OBJECT USER Not Always Checked</u> | 30 |
| <u>3.5 Potential INVEXCEPTN System Crash Using LARGE MEMORY IS ENABLED or MEMORY MAPPING IS SYSTEM on Itanium</u> | 31 |
| <u>3.6 Incremental Backup With Row Cache</u> | 32 |
| <u>3.7 Use of external Media Manager or Tape Librarian causes a hang or an ACCVIQ</u> | 33 |
| <u>3.8 DBO/BACKUP/MULTITHREAD sometimes dismounts the last volume in a multi-tape drive case</u> | 34 |
| <u>3.9 DBO-W-AIJBCKFAIL – DBO/RECOVER reports incomplete AIJ backup</u> | 35 |
| <u>3.10 Potential System Crash Using LARGE MEMORY IS ENABLED or MEMORY MAPPING IS SYSTEM on Itanium</u> | 36 |
| <u>3.11 Default Behavior Change, New Syntax for DBO/RECOVER/CONFIRM</u> | 37 |
| <u>3.12 Can't Disable After-Image Journaling when Fast-Commit is Enabled</u> | 39 |
| <u>3.13 DBO/SHOW STATISTICS Row Cache Overview Invalid Percentage</u> | 40 |
| <u>3.14 Application hangs using ABS</u> | 41 |
| <u>3.15 Failed DBO /MOVE or /COPY deletes wrong files</u> | 42 |
| <u>3.16 Memory Leak On Systems With RAD Support Enabled</u> | 43 |
| <u>Chapter 4 Known Problems and Restrictions</u> | 44 |
| <u>4.1 Ensure No Processes Have DBMSHR Image Activated</u> | 45 |
| <u>4.2 Syntax for Prestart Transaction Timeout</u> | 46 |
| <u>4.3 Patch Required When Using VMS V8.3 or V8.2-1 on Itanium</u> | 47 |
| <u>4.4 /LOCK TIMEOUT Documentation Clarification</u> | 48 |
| <u>4.5 Unexpected RCS termination</u> | 49 |
| <u>4.6 Slight Relaxation Of VMS\$MEM RESIDENT USER Requirement</u> | 50 |
| <u>4.7 Patch Required When Using VMS V8.3 and Dedicated CPU Lock Manager</u> | 51 |

Table of Contents

| | |
|--|----|
| <u>4.8 VM\$MEM RESIDENT USER Rights Identifier Required</u> | 52 |
| <u>4.9 Features Not Yet Available for OpenVMS I64</u> | 53 |
| <u>4.10 Oracle CODASYL DBMS and IEEE Floating Point Support</u> | 54 |
| <u>4.11 Expect Additional Memory Consumption</u> | 55 |
| <u>4.12 ILINK-E-INVOVRINI Error on I64</u> | 56 |
| <u>4.13 Default Floating Point Format</u> | 57 |
| <u>4.14 SYSTEM-F-IN\$FMEM Fatal Error With SHARED SYSTEM MEMORY or LARGE MEMORY Enabled in Galaxy Environment</u> | 58 |
| <u>4.15 Oracle CODASYL DBMS and OpenVMS ODS-5 Volumes</u> | 59 |
| <u>4.16 Carryover Locks and NOWAIT Transaction Clarification</u> | 60 |
| <u>4.17 Both Application and Oracle CODASYL DBMS Using SY\$HIBER</u> | 61 |
| <u>4.18 Row Cache Not Allowed While Hot Standby Replication is Active</u> | 63 |
| <u>4.19 Exclusive Access Transactions May Deadlock with RCS Process</u> | 64 |
| <u>Chapter 5 New Features and Corrections in Previous Releases</u> | 65 |
| <u>5.1 New Features for Release 7.2.2.0</u> | 66 |
| <u>5.1.1 Server Output File Names As Database Attributes</u> | 66 |
| <u>5.2 Corrections in Release 7.2.2.0</u> | 67 |
| <u>5.2.1 DBO/MOVE/ROOT Did Not Retain The Unjournalled Changes Warning</u> | 67 |
| <u>5.2.2 Call Stack Not Symbolized In Bugcheck Dump Files With Resident Images On Alpha</u> | 67 |
| <u>5.2.3 Bugcheck in DIOCCH\$FETCH SNAP_SEG</u> | 68 |
| <u>5.3 New Features for Release 7.2.1.3</u> | 69 |
| <u>5.3.1 DBO/BACKUP/MULTITHREAD /NORECORD New Qualifier</u> | 69 |
| <u>5.3.2 DBO/SHOW LOCKS Per Database New Feature</u> | 69 |
| <u>5.3.3 COMPRESS Qualifier for After-Image Journal Backup Command</u> | 69 |
| <u>5.4 Corrections in Release 7.2.1.3</u> | 71 |
| <u>5.4.1 Latch Hangs Possible From DBO /SHOW STATISTICS</u> | 71 |
| <u>5.4.2 LRS Shutdown Failure DBM-F-PARTDTXNERR/SYSTEM-F-NOSUCHID</u> | 71 |
| <u>5.4.3 DBO/SHOW LOGICAL NAMES Does Not Include DBM\$MONITORnn</u> | 71 |
| <u>5.4.4 DBO/SHOW STATISTICS Bugcheck In KUTDIS\$LONG TX NOTIFY</u> | 71 |
| <u>5.4.5 AIJ Backup Operation Aborts With NONAME-F-NOMSG Message Number 00000004</u> | 72 |
| <u>5.4.6 DBO/SHOW STATISTICS AIJ ARB:I/O ratio, Blocks-per-I/O ratio Problems</u> | 72 |
| <u>5.4.7 Adding a large AIJ file to a DB fails with either an ACCVIO or OPCDEC error</u> | 72 |

Table of Contents

| | |
|---|-----------|
| <u>5.4 Corrections in Release 7.2.1.3</u> | |
| <u>5.4.8 Unable to Fully Disable Hot Standby Governor</u> | 73 |
| <u>5.4.9 DBO/DUMP/BACKUP/MULTITHREAD fails with an ACCVIO or an overrun error</u> | 73 |
| <u>5.4.10 DBO Tape Support Added For SDLT600, LTO2, LTO3 Drives</u> | 73 |
| <u>5.4.11 Incorrect DBO/SHOW STATISTICS Transaction Recovery Duration Estimates</u> | 74 |
| <u>5.4.12 DBO/SHOW STATISTICS Stall Statistics Aggregate Duration Incorrectly Scaled Values</u> | 74 |
| <u>5.4.13 DBO /SHOW STATISTICS /ALARM=n Not Waiting n Seconds</u> | 74 |
| <u>5.4.14 Hot Standby Node Failure Recovery When Using DBO/OPEN/CACHE=NOENABLE</u> | 74 |
| <u>5.4.15 State Value Truncated on Hot Standby Statistics Display</u> | 75 |
| <u>5.4.16 Possible Shared Memory Corruption When Multiple Databases Attached</u> | 75 |
| <u>5.4.17 Bugcheck at COSI\$TIMER GET REQIDT With DBMS-F-NOREQIDT</u> | 76 |
| <u>5.4.18 Qualifier /[NO]CONFIRM For DBO /RECOVER Command</u> | 76 |
| <u>5.4.19 /ORDER AIJ FILES Removes Some Unnecessary Files For DBO /RECOVER Command</u> | 77 |
| <u>5.4.20 ACCVIO with DBO/BACKUP/MULTITHREAD/DISK=WRITER=m/THREADS=n</u> | 77 |
| <u>5.4.21 DBO /BACKUP/MULTI to tape with /ENCRYPTION can cause a bugcheck</u> | 78 |
| <u>5.5 New Features for Release 7.2.1.0</u> | 79 |
| <u>5.5.1 DBO/BACKUP/MULTI/COMPRESSION</u> | 79 |
| <u>5.5.2 DBO /{BACKUP/MULTICOPY MOVE} /THREADS=n New Qualifier</u> | 79 |
| <u>5.5.3 Increased Date/Time String Display Precision</u> | 81 |
| <u>5.6 Corrections in Release 7.2.1.0</u> | 82 |
| <u>5.6.1 Problem with Remote Access and FETCH..USING</u> | 82 |
| <u>5.6.2 Area File not Renamed after DBO/MODIFY/RESTRICTURE</u> | 83 |
| <u>5.6.3 Mixing Cobol and Fortran or DML modules on Interity Servers</u> | 84 |
| <u>5.6.4 Using OpenVMS Reserved Memory Registry With DBMS</u> | 84 |
| <u>5.6.5 DBO/CONVERT Bugchecks in PIO\$LOCK PAGE When Statistics Disabled</u> | 86 |
| <u>5.6.6 Hangs or Looping When Lots of Page Contention</u> | 87 |
| <u>5.6.7 DBO/SHOW STATISTICS Hot Standby Statistics State Display Field</u> | 87 |
| <u>5.6.8 File-System Caching Avoided For Various IO Operations</u> | 87 |
| <u>5.6.9 Processes Don't Always Terminate After Monitor Terminates</u> | 88 |
| <u>5.6.10 DBO/RECOVER of Journalled Row Cache Changes Corrupts Database</u> | 88 |
| <u>5.6.11 DBO/BACKUP/AFTER Ignores /EDIT FILENAME When Backup Filespec Omitted</u> | 89 |
| <u>5.6.12 Concealed Logical Names Defined in LNM\$SYSCLUSTER TABLE Table Allowed</u> | 89 |
| <u>5.6.13 Hot Standby Status Symbols From DBO /SHOW AFTER JOURNAL /BACKUP CONTEXT</u> | 90 |
| <u>5.6.14 DBO /SHOW STATISTICS Defined Logicals List Incomplete</u> | 90 |
| <u>5.6.15 Incorrect Backup Checksum And Crc Values On I64</u> | 91 |

Oracle® CODASYL DBMS for OpenVMS

Release Notes

Release 7.2.4.0 for OpenVMS Alpha and
HP OpenVMS Industry Standard 64 for Integrity Servers

SEPTEMBER 2009

Oracle CODASYL DBMS Release Notes, Release 7.2.4.0 for OpenVMS Alpha and OpenVMS I64

Copyright © 2009 Oracle Corporation. All rights reserved.

The Programs (which include both the software and documentation) contain proprietary information of Oracle Corporation; they are provided under a license agreement containing restrictions on use and disclosure and are also protected by copyright, patent and other intellectual and industrial property laws. Reverse engineering, disassembly or decompilation of the Programs, except to the extent required to obtain interoperability with other independently created software or as specified by law, is prohibited.

The information contained in this document is subject to change without notice. If you find any problems in the documentation, please report them to us in writing. Oracle Corporation does not warrant that this document is error-free. Except as may be expressly permitted in your license agreement for these Programs, no part of these Programs may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose.

If the Programs are delivered to the U.S. Government or anyone licensing or using the programs on behalf of the U.S. Government, the following notice is applicable:

U.S. GOVERNMENT RIGHTS Programs, software, databases, and related documentation and technical data delivered to U.S. Government customers are "commercial computer software" or "commercial technical data" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the Programs, including documentation and technical data, shall be subject to the licensing restrictions set forth in the applicable Oracle license agreement, and to the extent applicable, the additional rights set forth in FAR 52.227-19, Commercial Computer Software—Restricted Rights (June, 1987). Oracle Corporation, 500 Oracle Parkway, Redwood City, CA 94065.

The Programs are not intended for use in any nuclear, aviation, mass transit, medical, or other inherently dangerous applications. It shall be the licensee's responsibility to take all appropriate fail-safe, backup, redundancy, and other measures to ensure the safe use of such applications if the Programs are used for such purposes, and we disclaim liability for any damages caused by such use of the Programs.

Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.

The Programs may provide links to Web sites and access to content, products, and services from third parties. Oracle is not responsible for the availability of, or any content provided on, third-party Web sites. You bear all risks associated with the use of such content. If you choose to purchase any products or services from a third party, the relationship is directly between you and the third party. Oracle is not responsible for: (a) the quality of third-party products or services; or (b) fulfilling any of the terms of the agreement with the third party, including delivery of products or services and warranty obligations related to purchased products or services. Oracle is not responsible for any loss or damage of any sort that you may incur from dealing with

any third party.

• Preface Preface

Chapter 1 Installing Oracle CODASYL DBMS

- ◆ 1.1 Oracle CODASYL DBMS on OpenVMS I64
 - ◆ 1.2 Using Databases from Releases Earlier Than V7.0
 - ◆ 1.3 Requirements
 - ◆ 1.4 Installation of Oracle CODASYL DBMS Software
 - ◆ 1.5 Documentation in Adobe Acrobat Format
-

Chapter 2 Enhancements Provided

- ◆ 2.1 DBO /SHOW VERSION Displays System Architecture and Version
 - ◆ 2.2 DBO /SHOW STATISTICS "Checkpoint Statistics" new counters
 - ◆ 2.3 Performance Enhancements With Internal Lock Data Structures
 - ◆ 2.4 DBO/DUMP/BACKUP/MULTITHREAD/OPTIONS=ROOT/HEADER ONLY displays the header information only
 - ◆ 2.5 AIJ Extend Additional Information In Operator Notification New Feature
 - ◆ 2.6 Hot Standby LRS Database Prefetch Count Limit
-

Chapter 3 Problems Corrected

- ◆ 3.1 Bugcheck With SYSTEM-F-ROPRAND in KODTXN\$POST TSNBLK UPDATE
 - ◆ 3.2 Incorrect Messages From DBO /MONITOR START When DBM\$MON USERNAME Specifies Non-existent Account
 - ◆ 3.3 Incorrect LOCK TIMEOUT value with DBO/BACKUP/MULTI/ONLINE/LOCK TIMEOUT
 - ◆ 3.4 VMSS\$BUFFER OBJECT USER Not Always Checked
 - ◆ 3.5 Potential INVEXCEPTN System Crash Using LARGE MEMORY IS ENABLED or MEMORY MAPPING IS SYSTEM on Itanium
 - ◆ 3.6 Incremental Backup With Row Cache
 - ◆ 3.7 Use of external Media Manager or Tape Librarian causes a hang or an ACCVIO
 - ◆ 3.8 DBO/BACKUP/MULTITHREAD sometimes dismounts the last volume in a multi-tape drive case
 - ◆ 3.9 DBO-W-AIJBCKFAIL – DBO/RECOVER reports incomplete AIJ backup
 - ◆ 3.10 Potential System Crash Using LARGE MEMORY IS ENABLED or MEMORY MAPPING IS SYSTEM on Itanium
 - ◆ 3.11 Default Behavior Change, New Syntax for DBO/RECOVER/CONFIRM
 - ◆ 3.12 Can't Disable After-Image Journaling when Fast-Commit is Enabled
 - ◆ 3.13 DBO/SHOW STATISTICS Row Cache Overview Invalid Percentage
 - ◆ 3.14 Application hangs using ABS
 - ◆ 3.15 Failed DBO /MOVE or /COPY deletes wrong files
 - ◆ 3.16 Memory Leak On Systems With RAD Support Enabled
-

Chapter 4 Known Problems and Restrictions

- ◆ 4.1 Ensure No Processes Have DBMSHR Image Activated
- ◆ 4.2 Syntax for Prestart Transaction Timeout
- ◆ 4.3 Patch Required When Using VMS V8.3 or V8.2-1 on Itanium
- ◆ 4.4 /LOCK TIMEOUT Documentation Clarification

- ◆ [4.5 Unexpected RCS termination](#)
 - ◆ [4.6 Slight Relaxation Of VM\\$MEM RESIDENT USER Requirement](#)
 - ◆ [4.7 Patch Required When Using VMS V8.3 and Dedicated CPU Lock Manager](#)
 - ◆ [4.8 VM\\$MEM RESIDENT USER Rights Identifier Required](#)
 - ◆ [4.9 Features Not Yet Available for OpenVMS I64](#)
 - ◆ [4.10 Oracle CODASYL DBMS and IEEE Floating Point Support](#)
 - ◆ [4.11 Expect Additional Memory Consumption](#)
 - ◆ [4.12 ILLINK-E-INVOVRINI Error on I64](#)
 - ◆ [4.13 Default Floating Point Format](#)
 - ◆ [4.14 SYSTEM-F-IN\\$FEMEM Fatal Error With SHARED SYSTEM MEMORY or LARGE MEMORY Enabled in Galaxy Environment](#)
 - ◆ [4.15 Oracle CODASYL DBMS and OpenVMS ODS-5 Volumes](#)
 - ◆ [4.16 Carryover Locks and NOWAIT Transaction Clarification](#)
 - ◆ [4.17 Both Application and Oracle CODASYL DBMS Using SY\\$HIBER](#)
 - ◆ [4.18 Row Cache Not Allowed While Hot Standby Replication is Active](#)
 - ◆ [4.19 Exclusive Access Transactions May Deadlock with RCS Process](#)
-

Chapter 5 [New Features and Corrections in Previous Releases](#)

- ◆ [5.1 New Features for Release 7.2.2.0](#)
 - ◇ [5.1.1 Server Output File Names As Database Attributes](#)
- ◆ [5.2 Corrections in Release 7.2.2.0](#)
 - ◇ [5.2.1 DBO/MOVE/ROOT Did Not Retain The Unjournalled Changes Warning](#)
 - ◇ [5.2.2 Call Stack Not Symbolized In Bugcheck Dump Files With Resident Images On Alpha](#)
 - ◇ [5.2.3 Bugcheck in DIOCCH\\$FETCH SNAP_SEG](#)
- ◆ [5.3 New Features for Release 7.2.1.3](#)
 - ◇ [5.3.1 DBO/BACKUP/MULTITHREAD /NORECORD New Qualifier](#)
 - ◇ [5.3.2 DBO/SHOW LOCKS Per Database New Feature](#)
 - ◇ [5.3.3 COMPRESS Qualifier for After-Image Journal Backup Command](#)
- ◆ [5.4 Corrections in Release 7.2.1.3](#)
 - ◇ [5.4.1 Latch Hangs Possible From DBO /SHOW STATISTICS](#)
 - ◇ [5.4.2 LRS Shutdown Failure DBM-F-PARTDTXNERR/SYSTEM-F-NOSUCHID](#)
 - ◇ [5.4.3 DBO/SHOW LOGICAL NAMES Does Not Include DBM\\$MONITORnn](#)
 - ◇ [5.4.4 DBO/SHOW STATISTICS Bugcheck In KUTDIS\\$LONG TX NOTIFY](#)
 - ◇ [5.4.5 AIJ Backup Operation Aborts With NONAME-F-NOMSG Message Number 00000004](#)
 - ◇ [5.4.6 DBO/SHOW STATISTICS AIJ ARB:I/O ratio, Blocks-per-I/O ratio Problems](#)
 - ◇ [5.4.7 Adding a large AIJ file to a DB fails with either an ACCVIO or OPCDEC error](#)
 - ◇ [5.4.8 Unable to Fully Disable Hot Standby Governor](#)
 - ◇ [5.4.9 DBO/DUMP/BACKUP/MULTITHREAD fails with an ACCVIO or an overrun error](#)
 - ◇ [5.4.10 DBO Tape Support Added For SDLT600, LTO2, LTO3 Drives](#)
 - ◇ [5.4.11 Incorrect DBO/SHOW STATISTICS Transaction Recovery Duration Estimates](#)
 - ◇ [5.4.12 DBO/SHOW STATISTICS Stall Statistics Aggregate Duration Incorrectly Scaled Values](#)
 - ◇ [5.4.13 DBO /SHOW STATISTICS /ALARM=n Not Waiting n Seconds](#)
 - ◇ [5.4.14 Hot Standby Node Failure Recovery When Using DBO/OPEN/CACHE=NOENABLE](#)
 - ◇ [5.4.15 State Value Truncated on Hot Standby Statistics Display](#)
 - ◇ [5.4.16 Possible Shared Memory Corruption When Multiple Databases Attached](#)

- ◇ 5.4.17 Bugcheck at COS\$TIMER GET REQIDT With DBMS-F-NOREQIDT
- ◇ 5.4.18 Qualifier /[NO]CONFIRM For DBO /RECOVER Command
- ◇ 5.4.19 /ORDER AIJ FILES Removes Some Unnecessary Files For DBO /RECOVER Command
- ◇ 5.4.20 ACCVIO with DBO/BACKUP/MULTITHREAD/DISK=WRITER=m/THREADS=n.
- ◇ 5.4.21 DBO /BACKUP/MULTI to tape with /ENCRYPTION can cause a bugcheck.
- ◆ 5.5 New Features for Release 7.2.1.0
 - ◇ 5.5.1 DBO/BACKUP/MULTI/COMPRESSION
 - ◇ 5.5.2 DBO /{BACKUP/MULTI/COPY|MOVE} /THREADS=n New Qualifier
 - ◇ 5.5.3 Increased Date/Time String Display Precision
- ◆ 5.6 Corrections in Release 7.2.1.0
 - ◇ 5.6.1 Problem with Remote Access and FETCH..USING
 - ◇ 5.6.2 Area File not Renamed after DBO/MODIFY/RESTRUCTURE
 - ◇ 5.6.3 Mixing Cobol and Fortran or DML modules on Interity Servers
 - ◇ 5.6.4 Using OpenVMS Reserved Memory Registry With DBMS
 - ◇ 5.6.5 DBO/CONVERT Bugchecks in PIO\$LOCK PAGE When Statistics Disabled
 - ◇ 5.6.6 Hangs or Looping When Lots of Page Contention
 - ◇ 5.6.7 DBO/SHOW STATISTICS Hot Standby Statistics State Display Field
 - ◇ 5.6.8 File-System Caching Avoided For Various IO Operations
 - ◇ 5.6.9 Processes Don't Always Terminate After Monitor Terminates
 - ◇ 5.6.10 DBO/RECOVER of Journaled Row Cache Changes Corrupts Database
 - ◇ 5.6.11 DBO/BACKUP/AFTER Ignores /EDIT FILENAME When Backup Filespec Omitted
 - ◇ 5.6.12 Concealed Logical Names Defined in LNM\$\$SYSCLUSTER TABLE Table Allowed
 - ◇ 5.6.13 Hot Standby Status Symbols From DBO /SHOW AFTER JOURNAL /BACKUP CONTEXT
 - ◇ 5.6.14 DBO /SHOW STATISTICS Defined Logicals List Incomplete
 - ◇ 5.6.15 Incorrect Backup Checksum And Crc Values On I64

Tables

- ◆ 5-1 Server types and Logical Names
-
-

Preface

Purpose of This Manual

This manual contains release notes for Oracle CODASYL DBMS release 7.2.4.0. The notes describe changed and enhanced features, upgrade and compatibility information, new and existing software problems and restrictions, and software and documentation corrections.

Intended Audience

This manual is intended for use by all Oracle CODASYL DBMS users. Read this manual before you install, upgrade, or use Oracle CODASYL DBMS release 7.2.4.0.

Document Structure

This manual consists of the following chapters:

| | |
|------------------|--|
| <u>Chapter 1</u> | Describes how to install Oracle CODASYL DBMS release 7.2.4.0. |
| <u>Chapter 2</u> | Describes new and changed features in Oracle CODASYL DBMS release 7.2.4.0. |
| <u>Chapter 3</u> | Describes problems fixed in Oracle CODASYL DBMS release 7.2.4.0. |
| <u>Chapter 4</u> | Describes problems, restrictions, and workarounds known to exist in Oracle CODASYL DBMS release 7.2.4.0. |
| <u>Chapter 5</u> | Describes new features and fixed problems in previous releases. |

Conventions

Oracle CODASYL DBMS is often referred to as DBMS in this manual.

HP OpenVMS Industry Standard 64 for Integrity Servers is often referred to as OpenVMS I64.

OpenVMS refers to both OpenVMS Alpha and OpenVMS I64.

Chapter 1

Installing Oracle CODASYL DBMS

All Oracle CODASYL DBMS release 7.2.4.0 kits are full kits. There is no requirement to install any prior release of Oracle CODASYL DBMS prior to installing this release.

1.1 Oracle CODASYL DBMS on OpenVMS I64

In addition to the HP OpenVMS Alpha platform, Oracle CODASYL DBMS is available on the HP OpenVMS Industry Standard 64 for Integrity Servers platform. In general, the Oracle CODASYL DBMS functionality is comparable between the two platforms.

This release provides a full set of Oracle CODASYL DBMS functionality for both platforms, including local and remote database access, as well as native DML and DDL operations. This means that users running on OpenVMS I64 can create Oracle CODASYL DBMS databases, compile, link, and run their database applications natively.

Because the Oracle CODASYL DBMS database format is the same across all supported platforms, you can, for example, back up an Oracle CODASYL DBMS database on an Alpha system, then restore it on an I64 system (the reverse is also true). If necessary, implicit forward conversions are performed to bring the database version to the currently installed level.

With remote access, you can bind to an Oracle CODASYL DBMS database on an Alpha system from an I64 system, or vice versa, as long as the appropriate Oracle CODASYL DBMS software is available on both platforms.

Additionally, if your environment consists of Alpha and I64 systems in a mixed cluster environment, you can access an Oracle CODASYL DBMS release 7.2.4.0 database from either system, or both systems concurrently.

1.2 Using Databases from Releases Earlier Than V7.0

You cannot convert or restore databases from versions earlier than 7.0 directly. The DBO CONVERT command for Oracle CODASYL DBMS 7.2.4.0 supports conversions from V7.0 and V7.1 only.

If you have a V3.3 through V6.1 database, you must convert it to at least V7.0 and then convert it to 7.2.4.0 in two steps. For example, if you have a V4.2 database, install the latest update to DBMS 7.1, convert the database to that version, install DBMS 7.2.4.0 then convert the V7.1 database to 7.2.4.0.

If you attempt to convert or restore a database version prior V7.0 directly to 7.2.4.0, Oracle DBO generates an error.

1.3 Requirements

This version of Oracle CODASYL DBMS supports OpenVMS Alpha 8.3–x and OpenVMS I64 8.3–x.

One of the following conditions must be met in order to install this software:

- OpenVMS Alpha version 8.2 or later
- OpenVMS I64 version 8.2 or later.

1.4 Installation of Oracle CODASYL DBMS Software

Please refer to the *CODASYL DBMS 7.2 Installation Guide* for detailed Oracle CODASYL DBMS installation instructions. Oracle strongly recommends that you read the installation guide before attempting an installation.

To extract either the PostScript (PS) or text (TXT) version of the installation guide from the kit, use one of the following commands:

For OpenVMS Alpha:

```
$ BACKUP <device>:DBM07240A072.A/SAVE/SEL=DBM072_INSTALL_GDE.PS
$ BACKUP <device>:DBM07240A072.A/SAVE/SEL=DBM072_INSTALL_GDE.TXT
```

For OpenVMS I64:

```
$ BACKUP <device>:DBM07240I072.A/SAVE/SEL=DBM072_INSTALL_GDE.PS
$ BACKUP <device>:DBM07240I072.A/SAVE/SEL=DBM072_INSTALL_GDE.TXT
```

The release 7.2 installation guide is available on MetaLink and OTN in Adobe Acrobat PDF format.

1.5 Documentation in Adobe Acrobat Format

You can view the documentation in Adobe Acrobat format using the Acrobat Reader, which allows anyone to view, navigate, and print documents in the Adobe Portable Document Format (PDF). For information about obtaining a free copy of Acrobat Reader and for information on supported platforms, see the Adobe Web site at:

<http://www.adobe.com>

The Oracle CODASYL DBMS and Hot Standby documentation in Adobe Acrobat format is available on MetaLink and OTN.

Chapter 2

Enhancements Provided

This chapter describes new and changed features in Oracle CODASYL DBMS release 7.2.4.0.

2.1 DBO /SHOW VERSION Displays System Architecture and Version

The DBO /SHOW VERSION command has been enhanced to include information about the system architecture and OpenVMS version as shown in the following example:

```
$ DBO /SHOW VERSION  
Executing DBO for Oracle CODASYL DBMS V7.2-40 on OpenVMS IA64 V8.3-1H1  
$
```

2.2 DBO /SHOW STATISTICS "Checkpoint Statistics" new counters

Previously, on the "Checkpoint Statistics" screen of the "DBO /SHOW STATISTICS" utility, two of the possible checkpoint conditions were not being captured for display. The new conditions displayed are:

- "clear" indicates that a process's checkpoint information is to be cleared in the root file
- "initial" indicates that a process has performed its initial checkpoint to establish a checkpoint starting location

Aggregate Total

Because some of the checkpoint conditions can occur in combination, the sum total of all of the possible checkpoint types may exceed the aggregate total "checkpoints" value displayed.

2.3 Performance Enhancements With Internal Lock Data Structures

In order to help performance for certain classes of applications that lock a large number of records within a transaction, several optimizations have been implemented:

- An internal hash table, used to access a list of record locks owned by a database user, has been increased in size to help speed access to entries within the table
- An internal data structure, used in conjunction with the hash table, is now allocated in larger segments to reduce the number of memory allocations

2.4

DBO/DUMP/BACKUP/MULTITHREAD/OPTIONS=ROOT/HEADER_ONLY displays the header information only

A new feature has been added to the DBO/DUMP/BACKUP/MULTITHREAD/OPTIONS=ROOT command to process only the header information when /HEADER_ONLY qualifier is used.

In prior releases of Oracle CODASYL DBMS, the user had to wait until the entire backup file (.DBF) was processed. If the backup file was stored on tape and spanned multiple tapes then all the tapes had to be mounted and processed. When using /HEADER_ONLY, DBO now ceases processing of the backup file once the header has been displayed.

```
$ DBO/DUMP/BACKUP/OPTIONS=ROOT/HEADER PARTS.DBF
*-----
* Oracle CODASYL DBMS V7.2-40                      14-APR-2009 11:20:27.04
*
* Dump of Database Backup Header
*   Backup filename: PARTS.DBF
*   Backup file database version: 7.2
*
*-----
```

Database Parameters:

```
Root filename is "PARTS$DIR:PARTS.R00;1"
Created at 5-NOV-1987 09:34:21.63
Oracle CODASYL DBMS structure level is 72.1
Maximum user count is 10
Maximum node count is 16
Database open mode is AUTOMATIC
Database close mode is AUTOMATIC
Database will be mapped in process space
Prestarted transactions are enabled
Snapshot mode is NON-DEFERRED
Statistics are enabled
Operator notification is disabled
Row Caches...
- Active row cache count is 0
- Reserved row cache count is 1
- Checkpoint information
  No time interval is specified
  Default source is updated rows
  Default backing file directory is database directory
  RUJ Global Buffers are enabled
- WARNING: Maximum node count is 16 instead of 1
- WARNING: Fast commit is disabled
Buffers...
- Default user buffer count is 10
- Default recovery buffer count is 10
- Global buffers are disabled
  Global buffer count is 50
  Maximum global buffer count per user is 5
  Large memory is disabled
- Buffer size is 10 blocks
  Maximum pages per buffer is 5
- Asynchronous pre-fetch is enabled
  Maximum pre-fetch depth is 8 buffers
- Detected asynchronous pre-fetch is enabled
```

Oracle® CODASYL DBMS for OpenVMS

```
Maximum pre-fetch depth is 4 buffers
Pre-fetch threshold is 4 buffers
- Asynchronous batch-write is enabled
  Clean buffer count is 5
  Maximum batch size is 10 buffers
- Optimized page transfer is disabled
Locking...
- Adjustable record locking is enabled
  Fanout factor 1 is 10 (10 pages)
  Fanout factor 2 is 10 (100 pages)
  Fanout factor 3 is 10 (1000 pages)
- Carry-over lock optimization is enabled
- Lock tree partitioning is disabled
RUJ Journaling...
- No default recovery-unit journal directory
AIJ Journaling...
- After-image journaling is enabled
- Database is configured for 1 journal
- Reserved journal count is 1
- Available journal count is 1
- LogMiner is disabled
- Journal is automatically extended when full
- Exclusive database access required to reserve additional journals
- Journal "DBM$JOURNAL" is current
- All journals are accessible
- Shutdown time is 60 minutes
  Shutdown is immediate because only 1 journal is active
- Backup operation is manual
- Default backup filename edits are not used
- Log server startup is MANUAL
- Journal overwrite is disabled
- AIJ cache on "electronic disk" is disabled
- Default journal allocation is 512 blocks
- Default journal extension is 512 blocks
- Default journal initialization is 512 blocks
- Current roll-forward sequence number is 1
- Current backup sequence number is 1
- Database backup AIJ sequence number is 1
- Next journal to be backed up is "DBM$JOURNAL"
  Backup sequence number is 1
- AIJ Journal "DBM$JOURNAL"
  Filename is "PARTS$DIR:PARTS.AIJ;1"
  Default AIJ filename is "SYS$DISK:[]PARTS.AIJ"
  Journal is current
  Journal was activated 13-AUG-1997 17:54:49.06
  Backup sequence number is 1
  Journal has been modified with transaction data
  Allocation is defaulted to 512 blocks
  Extension is defaulted to 512 blocks
  Initialization is defaulted to 512 blocks
  Journal has never been backed up
  Last Commit TSN is 0:1
Fast Commit...
- Fast commit is disabled
- No checkpointing AIJ interval is specified
- No checkpointing time interval is specified
- No checkpointing transaction interval is specified
- Commit to AIJ optimization is disabled
- Transaction interval is 256
Hot Standby...
- WARNING: Fast commit is disabled
- WARNING: Log server startup is MANUAL
```

Oracle® CODASYL DBMS for OpenVMS

- Informational: Operator notification is disabled
- Database is not currently being replicated

Security Auditing...

- Security auditing is disabled
- Security alarm is disabled
- No audit journal filename is specified
- No alarm name is specified
- Synchronous audit record flushing is disabled
- Audit every access

Database Backup...

- Fast incremental backup is enabled
- Full database backup has not yet been performed
- Full database restore has not yet been performed

Derived Data...

- Global section size
 - With global buffers disabled is 982246 bytes (1MB)
 - With global buffers enabled is 1259199 bytes (2MB)
 - With Large memory global buffers enabled...
 - Database TROOT section is 1003199 bytes (1MB)
 - Large memory global buffers section is 256000 bytes (1MB)
- Row Cache RUJ buffers section size is 2626560 bytes (3MB)

2.5 AIJ Extend Additional Information In Operator Notification New Feature

Bug 8286207

In order to help understand the impact of AIJ extension operations on the system, a new optional feature can be used to display additional OPCOM messages and perform validation (read checking of initialized data) during AIJ extend operations.

If the logical name `DBM$BIND_AIJ_EXTEND_ADDITIONAL_INFO` is defined to a value of "1" (Oracle recommends that this logical be defined system-wide if you intend to take advantage of this feature), and if the database is configured to send operator notifications, additional OPCOM messages will be generated during an AIJ extend operation. This optional feature also includes a validation of the initialization pattern written to the AIJ file. If an invalid pattern is detected, the process performing the extension will bugcheck.

The following example shows the format of the additional messages that indicate the old and new physical EOF locations, the number of blocks of the AIJ file being initialized, the number of IO operations required for the initialization and the ID of the process performing the extension and initialization.

```
%%%%%%%%%% OPCOM 25-MAR-2009 02:31:45.95 %%%%%%%%%%%
Message from user SUPERDOME on BRDBRY
Oracle CODASYL V7.2-40 Event Notification for Database
$1$DGA301:[SUPERDOME.V72]FOO.ROO;3
```

```
AIJ journal 512 block extension in progress (new size is 95552 blocks)
```

```
%%%%%%%%%% OPCOM 25-MAR-2009 02:31:45.95 %%%%%%%%%%%
Message from user SUPERDOME on BRDBRY
Oracle CODASYL DBMS V7.2-40 Event Notification for Database
$1$DGA301:[SUPERDOME.V72]FOO.ROO;3
```

```
AIJ new PEOF = 95616, old PEOF = 95040, init count = 576, PID = 0000049E
```

```
%%%%%%%%%% OPCOM 25-MAR-2009 02:31:45.95 %%%%%%%%%%%
Message from user SUPERDOME on BRDBRY
Oracle CODASYL DBMS V7.2-40 Event Notification for Database
$1$DGA301:[SUPERDOME.V72]FOO.ROO;3
```

```
AIJ initialize IO count = 3, validating VBN 95041 to 95616, PID = 0000049E
```

2.6 Hot Standby LRS Database Prefetch Count Limit

Previously, the LRS process would set its APF (asynchronous prefetch) depth to half of its buffer count. For large numbers of buffers, this depth could result in a significant number of outstanding database prefetch IO requests. In some cases, this could result in possible quota exhaustion or storage controller saturation.

This problem has been addressed by providing additional control of the LRS process APF depth along with a lower default limit.

The logical name (must be defined system-wide prior to the startup of an LRS process) `DBM$BIND_LRS_MAX_APF_DEPTH` can be used to limit the maximum number of default LRS APF IO depth. If not specified, the default value is 500 and the minimum value is 2 and the maximum value is 524288. If the database specifies a higher APF depth value, that value will be utilized.

Chapter 3

Problems Corrected

This chapter describes software errors corrected in Oracle CODASYL DBMS release 7.2.4.0.

3.1 Bugcheck With SYSTEM-F-ROPRAND in KODTXN\$POST_TSNBLK_UPDATE

Bug 7193991, 8796832

It is possible for a process to bugcheck due to a corrupt internal queue header with a reserved operand fault in the routine KODTXN\$POST_TSNBLK_UPDATE. Correcting the memory corruption requires closing and re-opening the database. This problem will generally present with an bugcheck exception "footprint" similar to the following:

```
***** Exception at 00000000815C89D2 : DBMSHR72\KODTXN$POST_TSNBLK_UPDATE
+ 000000D2
%SYSTEM-F-ROPRAND, reserved operand fault at PC=00000000815C89D2, PS=00000009
Saved PC = 00000000815C3EF0 : DBMSHR72\KOD$START + 00000D40
```

Analysis of the bugcheck dump file will often indicate that at least one of the "TUPB_RELQHD" queue headers will contain an entry containing "00000000:00000001" as in the following example where entry 13 has been corrupted:

```
TUPB_RELQHD_VEC[1.] @04910A00 = 00000000:00000000 (04910A00:04910A00)
TUPB_RELQHD_VEC[2.] @04910A08 = 00000000:00000000 (04910A08:04910A08)
TUPB_RELQHD_VEC[3.] @04910A10 = 00000000:00000000 (04910A10:04910A10)
TUPB_RELQHD_VEC[4.] @04910A18 = 00000000:00000000 (04910A18:04910A18)
TUPB_RELQHD_VEC[5.] @04910A20 = 00000000:00000000 (04910A20:04910A20)
TUPB_RELQHD_VEC[6.] @04910A28 = 00000000:00000000 (04910A28:04910A28)
TUPB_RELQHD_VEC[7.] @04910A30 = 00000000:00000000 (04910A30:04910A30)
TUPB_RELQHD_VEC[8.] @04910A38 = 00000000:00000000 (04910A38:04910A38)
TUPB_RELQHD_VEC[9.] @04910A40 = 00000000:00000000 (04910A40:04910A40)
TUPB_RELQHD_VEC[10.] @04910A48 = 00000000:00000000 (04910A48:04910A48)
TUPB_RELQHD_VEC[11.] @04910A50 = 00000000:00000000 (04910A50:04910A50)
TUPB_RELQHD_VEC[12.] @04910A58 = 00000000:00000000 (04910A58:04910A58)
TUPB_RELQHD_VEC[13.] @04910A60 = 00000000:00000001 (04910A60:04910A61)
```

The cause of the problem was related to an incorrect synchronization between processes manipulating a relative memory queue within the database global section. This (or related) problem may impact all DBMS databases that perform transactions by more than one database user.

The possibility of corruption increases with higher transaction rates and when there are more database users performing transactions. Generally, databases configured for less than 168 users will not see this problem and databases with fewer than 168 simultaneous will not see this problem.

This problem has been corrected. The shared memory access to "TUPB_RELQHD" queue headers is now correctly synchronized. Oracle recommends that all DBMS installations upgrade to at least Oracle CODASYL DBMS Release 7.2.4.0 to implement the correction to this problem.

3.2 Incorrect Messages From DBO /MONITOR START When DBM\$MON_USERNAME Specifies Non-existent Account

Bug 8420114

In prior releases, when the logical name DBM\$MON_USERNAME is defined to specify a non-existent username, the DBO /MONITOR START command would return incorrect or misleading messages. The following example shows such output:

```
$ DBO /MONITOR START
%DBO-F-CANTCREMON, unable to start database monitor process
%F
%?-RESULTOVF
%F-CTRLERR
%I-POWERFAIL
-PLI
%NOMSG, Message number 0053474E
%BADPARAM
%NORMAL
Message number 00081C48
-INPSMB
-JBC, normal successful completion
-TRACE, Message number 0009A930
%F-NOMSG, Message number 4F525024
```

As a workaround, either do not define DBM\$MON_USERNAME or make sure that it specifies a valid username.

This problem has been corrected. If you specify an invalid value for DBM\$MON_USERNAME, you will get a correctly formatted error message:

```
$ DBO/MON START
%DBO-F-CANTCREMON, unable to start database monitor process
-DBO-F-NOSUCHUSER, unknown user "PAUL"
```

3.3 Incorrect LOCK_TIMEOUT value with DBO/BACKUP/MULTI/ONLINE/LOCK_TIMEOUT

In prior releases of Oracle CODASYL DBMS if both DBO/BACKUP/AFTER_IMAGE and DBO/BACKUP/MULTITHREAD specify LOCK_TIMEOUT then it appears that subsequent timeouts are increased. For example, if /LOCK_TIMEOUT=60 is specified on an after image backup it stalls for approximately this time. If the database backup also has a 60 wait time then this appears to double and it waits for 2 minutes.

This problem has now been corrected.

3.4 VMS\$BUFFER_OBJECT_USER Not Always Checked

Bug 8464087

In some cases, the OpenVMS rights identifier VMS\$BUFFER_OBJECT_USER was not being required for database buffer object use. This could allow users to utilize the buffer objects feature even though they did not have the identifier granted.

This problem has been corrected. Users attempting to utilize buffer object features now must always have the VMS\$BUFFER_OBJECT_USER rights identifier granted.

It is possible that applications that worked previously when using the buffer objects feature with processes that did not have the VMS\$BUFFER_OBJECT_USER rights identifier granted may now correctly fail with messages similar to the following:

```
-DBM-F-SYS_REQUEST, error from system services request  
-DBM-F-CANTCREBOB, error creating Buffer Object  
-SYSTEM-E-NOBUFOBJID, requires rights identifier VMS$BUFFER_OBJECT_USER
```

These messages indicate that the process must be granted the VMS\$BUFFER_OBJECT_USER rights identifier before attempting to use the buffer objects feature. In many cases, granting the identifier to the user account and then logging in again will resolve the issue.

3.5 Potential INVEXCEPTN System Crash Using LARGE MEMORY IS ENABLED or MEMORY MAPPING IS SYSTEM on Itanium

Bug 8541571

When closing a database when using the MEMORY MAPPING IS SYSTEM or LARGE MEMORY IS ENABLED feature on some Itanium systems, it was possible for Oracle CODASYL DBMS to cause an OpenVMS system crash with a bugcheck type of "INVEXCEPTN, Exception while above ASTDEL". The INVEXCEPTN can be triggered by an invalid access to the OpenVMS PTE database.

The following OpenVMS crash "footprint" is a result of this problem:

```
Bugcheck Type:      INVEXCEPTN, Exception while above ASTDEL
Node:               RDBI64      (Cluster)
CPU Type:           HP rx8640   (1.60GHz/12.0MB)
VMS Version:        V8.3-1H1
Current Process:    DBMS_MONITOR72
Current Image:      $1$DGA4000:[SYS2.SYSCOMMON.][SYSEXE]DBMMON72.EXE;3
Failing PC:         00000000.0057DDD0      DEALLOC_PHY_BUFFER_C+001C0
Failing PS:         00000000.00000803
Module:             DBMPRV72
Offset:             000A7DD0
```

This problem only effects those Itanium systems with physical memory accessible to the system of PFNs greater than 268,435,455 (Hex 0FFFFFFF). The SDA command CLUE CONFIG can be used to display the system memory configuration.

The workaround to this problem, for such systems with PFNs greater than 268,435,455, is to discontinue use of the LARGE MEMORY IS ENABLED and MEMORY MAPPING IS SYSTEM features, if enabled, by using one, or both, of the following commands:

- DBO/MODIFY .../GLOBAL_BUFFERS=(NOLARGE_MEMORY)
- DBO/MODIFY .../MEMORY_MAPPING=(PROCESS,RESIDENT)

This problem has been corrected. The DBMS VLM feature correctly processes 64-bit PFN values when closing databases using MEMORY MAPPING IS SYSTEM or LARGE MEMORY IS ENABLED feature on some Itanium systems.

3.6 Incremental Backup With Row Cache

Bug 8363084

Previously, it was possible for incremental database backups to not correctly save all modified database records since the last full backup when the row cache feature was in use. When modified rows were copied from cache back to the database, the "MAX_SNAP_TSN" field on the database page was not correctly maintained. This field is used by the incremental database backup feature as an indication of when rows on the page may have been modified and if it is out of date, the incremental backup may not consider the page content as a candidate to be saved.

As a possible workaround for this problem, perform full database backups rather than incremental database backups when using the row cache feature.

This problem has been corrected. The "MAX_SNAP_TSN" field on the database page is now maintained correctly when modified rows are copied from cache back to the database. c

3.7 Use of external Media Manager or Tape Librarian causes a hang or an ACCVIO

It is possible for a DBO multithreaded BACKUP or RESTORE command to fail with an ACCVIO or hang, especially when using a media manager or tape librarian. This problem could occur if the per thread stack became exhausted, causing a stack overflow or underflow.

To help detect this problem, a no-access virtual memory page has been added to either side of a per thread stack. This will cause an ACCVIO if a thread tries to use stack space beyond the stack limits.

If such a problem is detected, you can add extra stack space by defining the DBM\$BIND_LIBRARIAN_ADDITIONAL_STACK logical. For example:

```
$ DEFINE DBM$BIND_LIBRARIAN_ADDITIONAL_STACK 10240
```

will add another 10KB stack space per DBO thread.

This logical can be used on DBO/MULTITHREAD /BACKUP and /RESTORE commands even if no media manager or tape librarian is being used.

3.8 DBO/BACKUP/MULTITHREAD sometimes dismounts the last volume in a multi-tape drive case

When running a DBO multithreaded backup using multiple tape drives, the last volume was sometimes erroneously dismounted.

In a multi-tape drive case, all volumes except the last one are considered continuation volumes and cannot be appended to. Hence these volumes can be dismounted at the end of the backup. However, the last volume can still be appended to and therefore should not be dismounted.

The problem was caused by a false setting of a last volume flag. This has now been corrected with this version.

3.9 DBO-W-AIJBCKFAIL – DBO/RECOVER reports incomplete AIJ backup

When attempting to recover an after-image journal file, backed up with the /FORMAT=NEW_TAPE qualifier, you may encounter the following warning at the end of the recovery:

```
$ DBO /RECOVER /NOLOG PARTS.AIJBCK /FORMAT=NEW_TAPE
...
%DBO-W-AIJBCKFAIL, the AIJ backup that created the AIJ file did not complete
%DBO-I-AIJALLDONE, after-image journal roll-forward operations completed
%DBO-I-AIJFNLSEQ, to start another AIJ file recovery, the sequence number needed will be 0
```

This can happen when the DBO/BACKUP/AFTER_JOURNAL command would exactly fill an internal buffer when saving the last AIJ record. A block counter was not correctly incremented and the final AIJ_END record was tagged with a duplicate block number. The problem remains undetected during the save operation. All AIJ records are restored during a recover operations – only the reported next sequence number is incorrect which may prevent a further recovery operation.

This has been corrected.

3.10 Potential System Crash Using LARGE MEMORY IS ENABLED or MEMORY MAPPING IS SYSTEM on Itanium

When using the MEMORY MAPPING IS SYSTEM or LARGE MEMORY IS ENABLED feature on some Itanium systems, it was possible for Oracle CODASYL DBMS to cause an OpenVMS system crash with a bugcheck type of "MACHINECHK, Machine check while in kernel mode". The MACHINECHK can be triggered by an invalid PFN (page frame number) value being loaded into a PTE (page table entry).

This problem only effects those Itanium systems with physical memory accessible to the system of PFNs greater than 268,435,455 (Hex 0FFFFFFF). The SDA command CLUE CONFIG can be used to display the system memory configuration.

The workaround to this problem, for such systems with PFNs greater than 268,435,455, is to discontinue use of the LARGE MEMORY IS ENABLED and MEMORY MAPPING IS SYSTEM features, if enabled, by using one, or both, of the following commands:

- DBO/MODIFY/GLOBAL BUFFERS=(NOLARGE_MEMORY)
- DBO/MODIFY/MEMORY_MAPPING=(PROCESS,RESIDENT)

This problem has been corrected. The DBMS VLM feature now correctly processes 40-bit PFN values.

3.11 Default Behavior Change, New Syntax for DBO/RECOVER/CONFIRM

The default behavior for confirming DBO/RECOVER operations that require users intervention has been changed. Typically, intervention is required if a missing or out-of-sequence after-image journal (AIJ) file is encountered. The default could be changed by specifying the /NOCONFIRM on the command line, in which case, processing would continue.

The old behavior for batch mode operations was /NOCONFIRM and an exception would be raised if you attempt to specify /CONFIRM. This assumed that the user did not want to terminate the recovery and would continue applying journals, even if a missing AIJ sequence was detected. Skipping the recovery of a AIJ file could result in loss of data or invalid indexes. It was possible that these errors could go undetected until a full verify operation was performed.

Starting with this release, the default qualifiers for interactive recoveries continues to be /CONFIRM, which prompts the user to see if he wants to continue, and /NOCONFIRM for batch mode. However, the behavior of the /NOCONFIRM qualifier has changed. Now, DBO/RECOVER/NOCONFIRM, in either interactive or batch mode, will cause the recovery to terminate at the point where an out of sequence AIJ file is detected.

Two new keywords have been added to /CONFIRM to provide compatibility with the previous behavior.

```
/CONFIRM=CONTINUE
```

Do not prompt the user; if a sequence gap is detected on the next AIJ file to be rolled forward, ignore the missing AIJ file and continue rolling forward.

```
/CONFIRM=ABORT
```

Do not prompt the user; if a sequence gap is detected on the next AIJ roll forward, terminate the recovery at this point.

Effectively, /NOCONFIRM has the same meaning as /CONFIRM=ABORT.

The following example shows the new "/CONFIRM=CONTINUE" syntax used to allow DBO/RECOVER to continue rolling forward if a sequence gap is detected:

```
DBO/RECOVER/CONFIRM=CONTINUE/LOG/ROOT=USER$TEST:FOO FAIJBCK1,FAIJBCK2,FAIJBCK4
%DBO-I-LOGRECDB, recovering database file DEVICE:[DIRECTORY]FOO.ROO;1
...
%DBO-I-LOGOPNAIJ, opened journal file DEVICE:[DIRECTORY]FAIJBCK4.AIJ;1
  at 25-FEB-2009 17:26:04.00
%DBO-W-AIJSEQAFT, incorrect AIJ file sequence 8 when 7 was expected
%DBO-I-AIJONEDONE, AIJ file sequence 8 roll-forward operations completed
%DBO-I-LOGRECOVR, 1 transaction committed
%DBO-I-LOGRECOVR, 0 transactions rolled back
%DBO-I-LOGRECOVR, 0 transactions ignored
%DBO-I-AIJNOACTIVE, there are no active transactions
%DBO-I-AIJSUCCESS, database recovery completed successfully
%DBO-I-AIJNXTSEQ, to continue this AIJ file recovery, the sequence number
  needed will be 9
%DBO-I-AIJALLDONE, after-image journal roll-forward operations completed
%DBO-I-LOGSUMMARY, total 3 transactions committed
%DBO-I-LOGSUMMARY, total 0 transactions rolled back
```

Oracle® CODASYL DBMS for OpenVMS

```
%DBO-I-LOGSUMMARY, total 0 transactions ignored
%DBO-I-AIJSUCCEB, database recovery completed successfully
%DBO-I-AIJFNLSEQ, to start another AIJ file recovery, the sequence number
  needed will be 9
%DBO-I-AIJNOENABLED, after-image journaling has not yet been enabled
```

The following example shows the new `"/CONFIRM=ABORT"` syntax used so that `DBO/RECOVER` will not continue rolling forward if a sequence gap is detected.

```
DBO/RECOVER/CONFIRM=ABORT/LOG/ROOT=USER$TEST:FOO FAIJBCK1,FAIJBCK2,FAIJBCK4
%DBO-I-LOGRECDB, recovering database file DEVICE:[DIRECTORY]FOO.ROO;1
...
%DBO-I-LOGOPNAIJ, opened journal file DEVICE:[DIRECTORY]FAIJBCK4.AIJ;1
  at 25-FEB-2009 17:27:42.29
%DBO-W-AIJSEQAFT, incorrect AIJ file sequence 8 when 7 was expected
%DBO-E-AIJRECESQ, AIJ roll-forward operations terminated due to sequence error
%DBO-I-AIJALLDONE, after-image journal roll-forward operations completed
%DBO-I-LOGSUMMARY, total 2 transactions committed
%DBO-I-LOGSUMMARY, total 0 transactions rolled back
%DBO-I-LOGSUMMARY, total 0 transactions ignored
%DBO-I-AIJFNLSEQ, to start another AIJ file recovery, the sequence number
  needed will be 7
%DBO-I-AIJNOENABLED, after-image journaling has not yet been enabled
```

3.12 Can't Disable After-Image Journaling when Fast-Commit is Enabled

BUG 8286207

In certain circumstances, attempts to disable after-image journaling (AIJ) in Oracle CODASYL DBMS would fail with the following error message when the Fast-Commit feature was enabled:

```
$ DBO/MODIFY/JOURNAL_OPTIONS=(NOENABLE) PARTS
%DBO-F-MUSTRECDB, database must be closed or recovered
```

When Fast-Commit is enabled, certain checks must be executed to ensure that committed transactions are synchronized between the database and AIJ file before journaling could be disabled.

If the database was closed cleanly (no users remaining), then after-image journaling can be disabled. However, if the database was closed abnormally while users were still attached, a check is made to see determine if any of those users had an active checkpoint. If so, journaling could not be disabled.

It was recently discovered that this second level check was not being performed correctly and would report that an abnormally-terminated user had an active checkpoint when they, in fact, did not.

This problem has now been fixed.

3.13 DBO/SHOW STATISTICS Row Cache Overview Invalid Percentage

BUG 8366854

The DBO/SHOW STATISTICS "Row Cache Overview" was not correctly processing all quadword statistics values. This could lead to integer truncation which would lead to invalid results when calculating percentages prior to display.

This problem has been corrected.

3.14 Application hangs using ABS

Using automatic AIJ backups (ABS) the application could hang while waiting for the next AIJ to become available. A dump of the database shows inaccessible AIJ files.

```
$ DBO/DUMP db
...
- 1 journal is inaccessible
  AIJ backup not possible
...
  File is inaccessible
    journal has been made inaccessible by system
    journal is not empty
...
```

The database dump may also show other symptoms of failed or stalled AIJ backups.

This issue has been fixed in this release.

3.15 Failed DBO /MOVE or /COPY deletes wrong files

A failed DBO /MOVE or /COPY operation could delete the wrong version of a created database file at the target location. This can happen, for example, if during the operation a target device becomes full.

For this to happen, there have to be other files in the target location with the exact same filenames as the current database.

This was caused in the cleanup code after a failure using no file version number to find the correct file for deletion.

This issue has been fixed in this release.

3.16 Memory Leak On Systems With RAD Support Enabled

Bug 8410893

When running on an Alpha system with RAD support enabled, a memory leak was possible during database unbind/bind sequences. The size of the leak would be related to the size of the per-RAD database statistics global section.

As a possible workaround, the system parameter RAD_SUPPORT can be set to zero.

This problem has been corrected.

Chapter 4

Known Problems and Restrictions

This chapter describes problems and restrictions relating to Oracle COADASYL DBMS release 7.2.4.0 and includes workarounds where appropriate.

4.1 Ensure No Processes Have DBMSHR Image Activated

The Oracle CODASYL DBMS installation procedure checks to make sure that the DBMS Monitor (DBMMON) process is not running. However, it is also important to make sure that there are no processes on the cluster that have images activated with a prior version DBMSHR image. Such processes may not be currently attached to a database but may do so in the future and could cause problems by using an older DBMSHR image with a later DBMS installation.

The following command procedure can be used on each cluster node that shares the system disk to determine if there are any processes that have activated the DBMSHR72.EXE image. This procedure should be executed by a privileged account after MONSTOP72.COM has been run. Any processes that have DBMSHR72.EXE activated at this point should be terminated prior to starting the DBMS installation procedure.

```
$ DBM$TMP = "SYS$SCRATCH:'F$UNIQUE()' .TMP
$ DEFINE /NOLOG /USER DBM$TMP 'DBM$TMP
$ ANALYZE /SYSTEM
    SET OUTPUT DBM$TMP
    SHOW PROCESS /CHANNELS ALL
    EXIT
$ SEARCH /OUTPUT='DBM$TMP' 'DBM$TMP';-1 DBMSHR72.EXE,"PID:"
$ SEARCH 'DBM$TMP' DBMSHR72.EXE /WINDOW=(1,0)
$ DELETE /NOLOG 'DBM$TMP';*{text}
```

In the following example, the process 2729F16D named "FOO\$SERVER" has the image DBMSHR72.EXE activated even after RMONSTOP72.COM has been executed and this process should be terminated prior to starting the DBM installation procedure:

```
$ @SYS$STARTUP:RMONSTOP72.COM
.
.
.
$ @FIND_DBMSHR72_PROC.COM

OpenVMS system analyzer

Process index: 016D   Name: FOO$SERVER   Extended PID: 2729F16D
0240 7FEF4460 8384F300 $1$DGA2:[VMS$COMMON.SYSLIB]DBMSHR72.EXE;722
$
```

4.2 Syntax for Prestart Transaction Timeout

The ability to define a timeout value for a prestarted transaction has been available on Oracle CODASYL DBMS since version V7.1, however the usage was never documented.

To define a timeout value for a prestarted transaction, enter the syntax:

```
$ DBO/MODIFY/TRANSACTION=PRESTART=(TIMEOUT=nnn) <database name>
```

where, 'nnn' is a value (range 0:3600) in seconds. This value represents the number of seconds to wait before aborting the prestarted transaction. Timing out the prestarted transaction may prevent snapshot file growth in environments where servers stay attached to the database with long periods of inactivity.

Additional functionality added to an update of V7.1 included an enhancement to force a process to obtain a new transaction sequence number (TSN) if the same TSN has been reused throughout the duration of the prestarted transaction timeout interval. This provides the ability for processes that constantly reuse TSNs to periodically obtain a new TSN, thus preventing excessive snapshot growth.

4.3 Patch Required When Using VMS V8.3 or V8.2–1 on Itanium

During qualification testing, a possible problem related to OpenVMS image activation on some Itanium systems was discovered. This problem could in some cases result in unexpected messages similar to the following:

```
%LIB-E-ACTIMAGE, error activating image  
-SYSTEM-F-NOPRIV, insufficient privilege or object protection violation
```

To avoid this problem, Oracle recommends that customers install one of the following architecture-specific patch kits (or subsequent replacement if superseded) for Itanium systems: VMS821I_SYS-V0400 (I64) VMS83I_SYS-V0200 (I64)

4.4 /LOCK_TIMEOUT Documentation Clarification

The /LOCK_TIMEOUT qualifier can be used on a number of DBO commands to specify how long an operation should wait for locks to be granted before timing out. These locks could be either the QUIET POINT lock or any other lock required for online operations.

Some Oracle CODASYL DBMS documentation suggests that there is a default value for this qualifier. However, this is not true.

If you specify the /LOCK_TIMEOUT qualifier, you must specify the number of seconds to wait:

```
$ DBO/BACKUP/AFTER/LOCK_TIMEOUT=5 . . .
```

will cause DBO to wait 5 seconds before returning a time out message.

4.5 Unexpected RCS termination

It has been observed in internal testing of Oracle Codasyl DBMS V7.2.2.0 that if the Record Cache Server (the RCS), terminates in an uncontrolled fashion this may under some conditions cause corruption of the database and/or the After Image Journal file.

When the RCS terminates the database is shut down and a message like the following is written to the monitor log:

```
6-DEC-2007 15:04:17.02 - Received Record Cache Server image termination from 22ED5144:1
- database name "device:[directory]database.R00;1" [device] (1200,487,0)
- abnormal Record Cache Server termination detected
- starting delete-process shutdown of database:
  - %DBM-F-RCSABORTED, record cache server process terminated abnormally
- sending process deletion to process 22ED10F9
- sending process deletion to process 22ECED59
- sending process deletion to process 22EC0158
- sending process deletion to process 22EB9543 (AIJ Log server)
- database shutdown waiting for active users to terminate
```

A future attempt to roll forward the AIJ following a restore of a database backup might fail with a bugcheck dump if this problem has happened.

The only currently known situation where this problem has been observed is if the logical name `DBM$BIND_RCS_VALIDATE_SECS` is defined to some value and the logical name `DBM$BIND_RCS_LOG_FILE` at the same time is undefined or defined incorrectly.

To prevent this problem, Oracle recommends any customer using the Row Cache feature either avoid defining the logical name `DBM$BIND_RCS_VALIDATE_SECS`, or if this logical name needs to be defined, makes sure that `DBM$BIND_RCS_LOG_FILE` is correctly defined (i.e. defined with the `/SYSTEM` and `/EXECUTIVE` qualifiers and pointing to a valid file name in an existing directory on a cluster accessible device with sufficient free space). This recommendation applies to all versions of Oracle Codasyl DBMS.

4.6 Slight Relaxation Of VMS\$MEM_RESIDENT_USER Requirement

Bug 5859487

Previously, the VMS\$MEM_RESIDENT_USER identifier was required to open a database that had any row cache configured for resident memory even if no caches were enabled for the database.

This restriction has been relaxed. If the database is not enabled for row caches, the VMS\$MEM_RESIDENT_USER identifier is not required even if caches are defined for resident memory.

4.7 Patch Required When Using VMS V8.3 and Dedicated CPU Lock Manager

During qualification testing of Oracle CODASYL DBMS Release 7.2.1 on OpenVMS V8` systems, a problem with the use of Extended Lock Value Blocks and the OpenVMS Dedicated CPU Lock Manager feature was discovered.

To avoid this problem, Oracle strongly recommends that customers wishing to use DBMS and the OpenVMS Dedicated CPU Lock Manager feature with OpenVMS V8.3 install one of the following architecture-specific patch kit (or subsequent replacement if superseded) prior to using Oracle CODASYL DBMS Release 7.2.1, or later, on OpenVMS V8.3 systems:

- VMS83I_SYS-V0200 (I64)
- VMS83A_SYS-V0100 (Alpha)

4.8 VMS\$MEM_RESIDENT_USER Rights Identifier Required

Oracle CODASYL DBMS release 7.1 introduced additional privilege enforcement for the database or row cache qualifiers MEMORY_MAPPING=SYSTEM and LARGE_MEMORY. If a database utilizes any of these features then the user account that opens the database must be granted the VMS\$MEM_RESIDENT_USER rights identifier. Also, any process attempting to change these attributes, to convert, or restore a database with these attributes enabled must also hold the right.

Oracle recommends that the DBO/OPEN command be used when utilizing these features.

4.9 Features Not Yet Available for OpenVMS I64

The following features or capabilities or components are not currently available to run or are known to not run reliably on OpenVMS I64 with this Oracle CODASYL DBMS release.

- Oracle CODASYL DBMS ADA precompiler
- PL/I compiler and Oracle CODASYL DBMS PL/I precompiler

4.10 Oracle CODASYL DBMS and IEEE Floating Point Support

Currently, Oracle CODASYL DBMS does not support floating point IEEE formats for either OpenVMS Alpha or OpenVMS I64. Because of the default float point behavior on OpenVMS IA64, if your Oracle CODASYL DBMS metadata contains floating point data items, you must compile your OpenVMS I64 applications with the `FLOAT=G_FLOAT` compiler switch.

Note

This restriction should not impact the storing or fetching float point items with the DBQ utility.

Oracle will look into lifting or easing this restriction for a future release.

For more information about IEEE floating point and OpenVMS I64, please refer to [Section 4.13](#) in this document.

4.11 Expect Additional Memory Consumption

Due to the increased sizes of image files (especially on Integrity servers) and more aggressive buffering and caching schemes and larger I/O size defaults, you should expect to allocate additional page file quota, working set sizes and buffered I/O byte limit quota when using Oracle CODASYL DBMS release 7.2. In particular, when running on Integrity servers, a page file quota of perhaps three times larger may be required for some applications.

4.12 ILINK-E-INVOVRINI Error on I64

When linking an application with multiple modules, the following error message may be returned:

```
%ILINK-E-INVOVRINI, incompatible multiple initializations for overlaid section
  section: DBM$UWA_B
  module: M1
  file: DKA0:[BLD]M1.OBJ;1
  module: M2
  file: DKA0:[BLD]SYS.OLB;1
```

On I64 systems, you cannot have a program section that attempts to be initialized a subsequent time where the non-zero portions of the initializations do not match. This is a difference from OpenVMS Alpha and VAX systems where the linker permitted such initializations.

This can be seen when linking multiple FORTRAN DML modules, where some modules use the default (non-stream) UWA, and another uses a "naked" invoke, which only contributes an abbreviated contribution to the DBM\$UWA_B psect.

For example, A.FOR contains:

```
PROGRAM AFOR
  INVOKE (SUBSCHEMA = FORTRAN_SUBSCHEMA,
1      SCHEMA = PARTS,
2      DATABASE = PARTS)
  CALL BSUB()
  END
```

B.FOR contains:

```
SUBROUTINE BSUB
  INVOKE
  RETURN
  END
```

On VAX or ALPHA, the above code will link and run correctly, However, on I64, the linker will generate the following:

```
%ILINK-E-INVOVRINI, incompatible multiple initializations for overlaid section
  section: DBM$UWA_B
  module: AFOR
  file: A.OBJ
  module: BSUB
  file: B.OBJ
```

4.13 Default Floating Point Format

The Itanium architecture has a 64-bit model and basic system functions similar to the Alpha chip. However, there are some implementation differences between the two platforms that might affect user-written applications.

One of the differences is the availability of hardware-supported floating-point formats. The Itanium architecture implements floating-point arithmetic in hardware using the IEEE floating-point formats, including IEEE single and IEEE double. The Alpha architecture supports both IEEE and VAX floating-point formats in hardware, and OpenVMS compilers generate code using the VAX formats by default, with options (on Alpha) to use IEEE formats. Irrespective of whether it was originally written for VAX or Alpha, an OpenVMS application that uses the default VAX floating-point formats needs to produce equivalent behavior on the Itanium architecture using IEEE formats at the lowest level.

- On OpenVMS VAX and OpenVMS Alpha, VAX float is the default. VAX format data is assumed and VAX floating instructions are used.
- On OpenVMS Alpha, you can specify the compiler option `/FLOAT=IEEE`. In this case, IEEE format data is assumed and IEEE floating instructions are used.
- On OpenVMS I64, IEEE float is the default. IEEE format data is assumed and IEEE floating instructions are used.
- On OpenVMS I64, you can specify the compiler option `/FLOAT=D_FLOAT` or `/FLOAT=G_FLOAT`.

When you compile an OpenVMS application that specifies an option to use VAX floating-point on the Itanium architecture, the compiler automatically generates code for converting floating-point formats. Whenever the application performs a sequence of arithmetic operations, this code does the following:

1. Converts VAX floating-point formats to either IEEE single or IEEE double floating-point formats.
2. Performs arithmetic operations in IEEE floating-point arithmetic.
3. Converts the resulting data from IEEE formats back to VAX formats.

Note that where no arithmetic operations are performed (VAX float fetches followed by stores), conversions will not occur. The code handles such situations as moves. VAX floating-point formats have the same number of bits and precision as their equivalent IEEE floating-point formats. For most applications, the conversion process will be transparent. In a few cases, arithmetic calculations might have different results because of the following differences between VAX and IEEE formats:

- Values of numbers represented
- Rounding rules
- Exception behavior

For more information, Oracle recommends reviewing the white paper "OpenVMS floating-point arithmetic on the Intel Itanium architecture" available from HP.

4.14 SYSTEM-F-INSFMEM Fatal Error With SHARED SYSTEM MEMORY or LARGE MEMORY Enabled in Galaxy Environment

When GALAXY support is enabled in an OpenVMS Galaxy environment, a *%SYSTEM-F-INSFMEM, insufficient dynamic memory error* message may be returned when mapping row caches or opening the database. One source of this problem specific to a Galaxy configuration is running out of Galaxy Shared Memory regions. For Galaxy systems, GLX_SHM_REG is the number of shared memory region structures configured into the Galaxy Management Database (GMDB).

While the default value of 64 regions (for OpenVMS versions through at least V7.3-1) might be adequate for some installations, sites using a larger number of databases or row caches when the SHARED MEMORY IS SYSTEM or LARGE MEMORY IS ENABLED features are enabled may find the default insufficient.

If a *%SYSTEM-F-INSFMEM, insufficient dynamic memory* error is returned when mapping record caches or opening databases, Oracle Corporation recommends that you increase the GLX_SHM_REG parameter by two times the sum of the number of row caches and number of databases that might be accessed in the Galaxy at one time. As the Galaxy shared memory region structures are not very large, setting this parameter to a higher than required value does not consume a significant amount of physical memory. It also may avoid a later reboot of the Galaxy environment. This parameter must be set on all nodes in the Galaxy.

Galaxy Reboot Required

Changing the GLX_SHM_REG system parameter requires that the OpenVMS Galaxy environment be booted from scratch. That is, all nodes in the Galaxy must be shut down and then the Galaxy reformed by starting each instance.

To enable Galaxy support, issue the command:

```
$ DBO/SET GALAXY/ENABLED <db>
```

To enable SYSTEM SHARED MEMORY, issue to command;

```
$ DBO/MODIFY/MEMORY_MAPPING=SYSTEM <db>
```

To enable LARGE MEMORY for record cache, issue the command:

```
$ DBO/CACHE/MODIFY/LARGE_MEMORY <db> <cache>
```

4.15 Oracle CODASYL DBMS and OpenVMS ODS-5 Volumes

The OpenVMS Version 7.2 release introduced an Extended File Specifications feature, which consists of two major components:

- A new, optional, volume structure, ODS-5, which provides support for file names that are longer and have a greater range of legal characters than in previous versions of OpenVMS.
- Support for "deep" directory trees.

ODS-5 was introduced primarily to provide enhanced file sharing capabilities for users of Advanced Server for OpenVMS 7.2 (formerly known as PATHWORKS for OpenVMS), as well as DCOM and JAVA applications.

In some cases, Oracle CODASYL DBMS performs its own file and directory name parsing and explicitly requires ODS-2 (the traditional OpenVMS volume structure) file and directory name conventions to be followed. Because of this knowledge, Oracle does not support any Oracle CODASYL DBMS database file components (including root files, storage area files, after-image journal files, record cache backing store files, database backup files, after-image journal backup files, and so forth) that utilize any non-ODS-2 file naming features. For this reason, Oracle recommends that Oracle CODASYL DBMS database components not be located on ODS-5 volumes.

Oracle CODASYL DBMS does support database file components on ODS-5 volumes provided that all of these files and directories strictly follow the ODS-2 file and directory name conventions. In particular, all file names must be specified entirely in uppercase and special characters in file or directory names are forbidden.

4.16 Carryover Locks and NOWAIT Transaction Clarification

In NOWAIT transactions, the BLAST (Blocking AST) mechanism cannot be used. For the blocking user to receive the BLAST signal, the requesting user must request the locked resource with WAIT (which a NOWAIT transaction does not do).

Oracle CODASYL DBMS defines a resource called NOWAIT, which is used to indicate that a NOWAIT transaction has been started. When a NOWAIT transaction starts, the user requests the NOWAIT resource. All other database users hold a lock on the NOWAIT resource so that when the NOWAIT transaction starts, all other users are notified with a NOWAIT BLAST.

The BLAST causes blocking users to release any carryover locks. There can be a delay before the transactions with carryover locks detect the presence of the NOWAIT transaction and release their carryover locks. You can detect this condition by examining the stall messages. If the "Waiting for NOWAIT signal (CW)" stall message appears frequently, the application is probably experiencing a decrease in performance, and you should consider disabling the carryover lock behavior.

4.17 Both Application and Oracle CODASYL DBMS Using SYS\$HIBER

In application processes that use Oracle CODASYL DBMS and the \$HIBER system service (possibly by RTL routines such as LIB\$WAIT), it is important that the application ensures that the event being waited for has actually occurred. Oracle CODASYL DBMS uses \$HIBER/\$WAKE sequences for interprocess communications particularly when the ALS (AIJ log server) feature is enabled.

The Oracle CODASYL DBMS use of the \$WAKE system service can interfere with other users of \$HIBER (such as the routine LIB\$WAIT) that do not check for event completion, possibly causing a \$HIBER to be unexpectedly resumed without waiting at all.

To avoid these situations, consider altering the application to use a code sequence that avoids continuing without a check for the operation (such as a delay or a timer firing) being complete.

The following pseudo-code shows one example of how a flag can be used to indicate that a timed-wait has completed correctly. The wait does not complete until the timer has actually fired and set TIMER_FLAG to TRUE. This code relies on ASTs being enabled.

```
ROUTINE TIMER_WAIT:
BEGIN
! Clear the timer flag
TIMER_FLAG = FALSE

! Schedule an AST for sometime in the future
STAT = SYS$SETIMR (TIMADR = DELTATIME, ASTRTN = TIMER_AST)
IF STAT <> SS$NORMAL
THEN BEGIN
LIB$SIGNAL (STAT)
END

! Hibernate. When the $HIBER completes, check to make
! sure that TIMER_FLAG is set indicating that the wait
! has finished.
WHILE TIMER_FLAG = FALSE
DO BEGIN
SYS$HIBER()
END
END

ROUTINE TIMER_AST:
BEGIN
! Set the flag indicating that the timer has expired
TIMER_FLAG = TRUE

! Wake the main-line code
STAT = SYS$WAKE ( )
IF STAT <> SS$NORMAL
THEN BEGIN
LIB$SIGNAL (STAT)
END
END
```

In OpenVMS V7.2, the LIB\$WAIT routine has been enhanced through the FLAGS argument (with the LIB\$K_NOWAKE flag set) to allow an alternate wait scheme (using the \$SYNCH system service) that can

avoid potential problems with multiple code sequences using the \$HIBER system service.

4.18 Row Cache Not Allowed While Hot Standby Replication is Active

The row cache feature may not be enabled on a Hot Standby database while replication is active. The Hot Standby feature will not start if row cache is enabled.

A new command qualifier, `/CACHE=NOENABLED`, has been added to the `DBO/OPEN` command. To open the Hot Standby database prior to starting replication, use the `/CACHE=NOENABLED` qualifier on the `DBO/OPEN` command.

4.19 Exclusive Access Transactions May Deadlock with RCS Process

If a record is frequently accessed by long running transactions that request read/write access, reserving the record for exclusive update, and if the record has one or more indexes, you may experience deadlocks between the user process and the row cache server (RCS) process.

There are at least three suggested workarounds to this problem:

1. Reserve the record for CONCURRENT UPDATE.
 2. Close the database and disable row cache for the duration of the exclusive transaction
 3. Change the checkpoint interval for the RCS process to a time longer than the time required to complete the batch job and then trigger a checkpoint just before the batch job starts. Set the interval back to a smaller interval after the checkpoint completes.
-

Chapter 5

New Features and Corrections in Previous Releases

5.1 New Features for Release 7.2.2.0

This section contains new features and technical changes for Oracle CODASYL DBMS release 7.2.2.0.

5.1.1 Server Output File Names As Database Attributes

Previously, logical names could be used to control various server output or log file names and locations. In many cases these logical names would have to be defined system-wide and thus could effect the servers of multiple databases.

This situation has been improved. The output or log file names for a number of database server processes are now also controlled by optional database attributes.

The "DBO /SET SERVER /[NO]OUTPUT=filespec servertype" command can be used to specify the default output file specification for several of the database server processes. Existing logical names are still valid and supported and will override the database attribute if defined.

If the output file specification is empty or if /NOOUTPUT is used, the output file server logging will be disabled.

Valid values for the "servertype" parameter and the matching logical name are:

Table 5-1 Server types and Logical Names

| Server | Servertype | Logical Name |
|-----------------------------|------------|--------------------------------|
| AIJ Backup Server | ABS | DBM\$BIND_BIND_ABS_OUTPUT_FILE |
| AIJ Log Server | ALS | DBM\$BIND_BIND_ALS_OUTPUT_FILE |
| AIJ Log Roll-Forward Server | LRS | DBM\$BIND_LRS_OUTPUT_FILE |
| AIJ Log Catch-Up Server | LCS | DBM\$BIND_LCS_OUTPUT_FILE |
| Database Recovery Server | DBR | DBM\$BIND_DBR_LOG_FILE |
| Row Cache Server | RCS | DBM\$BIND_RCS_LOG_FILE |

The /LOG qualifier can be used to display a log message at the completion of the DBO /SET operation.

Examples of using the "DBO /SET SERVER /OUTPUT=filespec servertype" command:

```
$ DBO /SET SERVER RCS /OUTPUT=RCS_PID.LOG /LOG DUA0:[DB]MYDB.ROO
$ DBO /SET SERVER ALS /OUTPUT=ALS$LOGS:ALS_DB1.LOG DUA0:[DB1]MFP.ROO
$ DBO /SET SERVER DBR /OUTPUT=DBR$LOGS:DBR.LOG DUA0:[ADB]ADB.ROO
```

The following example shows how the output file entry can be disabled:

```
$ DBO /SET SERVER LRS /NOOUTPUT DUA0:[ZDB]ZDB.ROO
$ DBO /SET SERVER LRS /OUTPUT=" " DUA0:[ZDB]ZDB.ROO
$ DBO /SET SERVER LRS DUA0:[ZDB]ZDB.ROO
```

5.2 Corrections in Release 7.2.2.0

This section describes software errors corrected in Oracle CODASYL DBMS release 7.2.2.0.

5.2.1 DBO/MOVE/ROOT Did Not Retain The Unjournalled Changes Warning

The DBO/MOVE_AREA/ROOT command, which specifies that the database root should be moved as well as storage areas, incorrectly cleared the entry in the moved root which indicates that unjournalled changes have been made to a DBMS database storage area. If /ROOT was not specified with the DBO/MOVE_AREA command this information was correctly maintained in the unmoved database root file. This problem has now been fixed and DBO/MOVE_AREA/ROOT will retain in the moved root file the information that some unjournalled changes have been made to the database that are not saved in an After Image Journal file.

This problem has been corrected in this release.

5.2.2 Call Stack Not Symbolized In Bugcheck Dump Files With Resident Images On Alpha

Bug 6634194

In certain cases on Alpha systems with Oracle Codasyl DBMS images installed /RESIDENT, routines are not correctly symbolized in the call stack of a bugcheck dump file. The following example shows one possible "footprint" of routines not being symbolized where they might otherwise be (note the system-space virtual addresses indicative of a resident image):

```
***** Exception at FFFFFFFF81653234 : Image DBMSHR72 + 004DD234
%COSI-F-BUGCHECK, internal consistency failure
Saved PC = FFFFFFFF81640E88 : Image DBMSHR72 + 004CAE88
Saved PC = FFFFFFFF816415D4 : Image DBMSHR72 + 004CB5D4
Saved PC = FFFFFFFF81461464 : Image DBMSHR72 + 002EB464
Saved PC = FFFFFFFF814401C4 : Image DBMSHR72 + 002CA1C4
Saved PC = FFFFFFFF8143FB70 : Image DBMSHR72 + 002C9B70
Saved PC = FFFFFFFF8143FB70 : Image DBMSHR72 + 002C9B70
Saved PC = FFFFFFFF8144401C : Image DBMSHR72 + 002CE01C
Saved PC = FFFFFFFF814440DC : Image DBMSHR72 + 002CE0DC
Saved PC = FFFFFFFF8143FC78 : Image DBMSHR72 + 002C9C78
Saved PC = FFFFFFFF8144401C : Image DBMSHR72 + 002CE01C
Saved PC = FFFFFFFF814440DC : Image DBMSHR72 + 002CE0DC
Saved PC = FFFFFFFF8143FC78 : Image DBMSHR72 + 002C9C78
Saved PC = FFFFFFFF81443574 : Image DBMSHR72 + 002CD574
Saved PC = FFFFFFFF81443750 : Image DBMSHR72 + 002CD750
Saved PC = 0000000014B9DCC : symbol not found
Saved PC = FFFFFFFF8145A5F4 : Image DBMSHR72 + 002E45F4
Saved PC = FFFFFFFF8122849C : Image DBMSHR72 + 000B249C
Saved PC = FFFFFFFF81688294 : Image DBMSHR72 + 00512294
```

As a workaround, do not install images /RESIDENT.

This problem has been corrected. The call stack is now correctly symbolized.

5.2.3 Bugcheck in DIOCCH\$FETCH_SNAP_SEG

Bug 5240329

In unusual conditions when using the row cache feature, it was possible for access to an internal data structure to be incorrectly synchronized. This problem could cause a read only transaction to fail with a bugcheck having a "footprint" similar to the following example (though other symptoms are possible):

```
***** Exception at 010BA554 : DIOCCH$FETCH_SNAP_SEG + 000009E4
%COSI-F-BUGCHECK, internal consistency failure
Saved PC = 010A8F14 : DIOFETCH$FETCH_ONE_LINE + 00000994
Saved PC = 010A95C8 : DIO$FETCH_DBKEY + 000002F8
```

This problem has been corrected. The data structure access is now correctly synchronized between read-only and read-write transactions. All customers using the Row Cache feature are encouraged to upgrade.

5.3 New Features for Release 7.2.1.3

This section contains new features and technical changes for Oracle CODASYL DBMS release 7.2.1.3.

5.3.1 DBO/BACKUP/MULTITHREAD /NORECORD New Qualifier

A new qualifier has been added which avoids the modification of the database with recent backup information. Hence the database appears like it had not been backed up at this time.

The main purpose of this qualifier is to allow a backup of a hot standby database without modifying the database files.

Examples using the /NORECORD qualifier:

```
$ DBO /BACKUP /MULTITHREAD /NORECORD FOO BCK
```

5.3.2 DBO/SHOW LOCKS Per Database New Feature

BUG 6004181

In previous Oracle CODASYL DBMS releases, using the DBO/SHOW LOCKS command could be difficult on systems with multiple open databases due to the amount of output and difficulty in determining what database a particular lock references.

This problem has been corrected. The DBO/SHOW LOCKS command now accepts a root file specification that can be used in some cases to additionally filter lock displays to a specific database.

Note that in some cases the DBO/SHOW LOCKS command may be unable to filter locks prior to display. When using the lock-partition tree feature, the DBO/SHOW LOCKS command with a root file specification will be unable to associate area, page, and record locks with the specified database because the database lock is not the lock tree root for these lock types.

5.3.3 COMPRESS Qualifier for After-Image Journal Backup Command

After-Image Journal backup files can now be compressed the same way database backup files can be compressed. Compression for AIJ backup files can be combined with encryption.

The following commands have been modified to work with compressed AIJ backup files:

```
DBO /BACKUP /AFTER_JOURNAL /COMPRESSION  
DBO /DUMP /AFTER_JOURNAL  
DBO /RECOVER
```

Restrictions:

Oracle® CODASYL DBMS for OpenVMS

Compression is only supported for AIJ backup files using the NEW_TAPE format. Therefore all commands listed above must have /FORMAT=NEW_TAPE added to the command line.

The /LOG qualifier reports the achieved compression at the end of the log output.

Example:

```
DBO /BACKUP /AFTER /FORMAT=NEW_TAPE FOO.ROO FOO.BAIJ /COMPRESS=ZLIB /LOG
%DBO-I-AIJBCKBEG, beginning after-image journal backup operation
...
%DBO-I-LOGCOMPR, data compressed by 55% (27152 KB in/12471 KB out)
```

5.4 Corrections in Release 7.2.1.3

This chapter describes software errors corrected in Oracle CODASYL DBMS release 7.2.1.3.

5.4.1 Latch Hangs Possible From DBO /SHOW STATISTICS

Bugs 4397634 and 5842040

In prior release of Oracle CODASYL DBMS, it was possible in a very small timing window for processes running the DBO /SHOW STATISTICS command to become hung while manipulating "latches" during the database attach sequence. Depending on the exact timing and sequence of events, this process may block other users of the database.

This problem has been corrected.

5.4.2 LRS Shutdown Failure DBM-F-PARTDTXNERR/SYSTEM-F-NOSUCHID

Bug 5754461

A possible problem with the Oracle CODASYL DBMS Hot Standby feature has been identified. If the OpenVMS \$GETGTI system service returns a status value of SS\$_NOSUCHID, the LRS process could be unable shutdown cleanly. This could result in an inconsistent standby database.

This problem has been corrected. The LRS process now treats a returned SS\$_NOSUCHID status the same as a SS\$_NOSUCHTID status and will be handled normally and will not be cause the LRS to fail.

5.4.3 DBO/SHOW LOGICAL_NAMES Does Not Include DBM\$MONITORnn

Bug 5847856

Previously, the list of logical names displayed by the DBO/SHOW LOGICAL_NAMES did not include the logical name "DBM\$MONITORnn" though it did include the logical name "DBM\$MONITOR".

This problem has been corrected. The logical name "DBM\$MONITORnn" (where "nn" refers to the multi-version DBMS installation version of DBO being executed) is now displayed.

5.4.4 DBO/SHOW STATISTICS Bugcheck In KUTDIS\$LONG_TX_NOTIFY

In Oracle CODASYL DBMS Release 7.2.1, it was possible for the DBO /SHOW STATISTICS command to fail with a bugcheck dump when using the configuration option LONG_TX_SECONDS. The bugcheck dump footprint would be similar to the following:

```
SYSTEM-F-ACCVIO, access violation  
Exception occurred at DB072\KUTDIS$LONG_TX_NOTIFY + 00000424
```

Called from DBO72\KUTDIS\$EVENT_NOTIFY + 00000054
Called from DBO72\KUTDIS\$DISPLAY_ASTX + 00000584
Called from DBO72\KUT\$DISPLAY + 0000199C

This problem has been corrected.

5.4.5 AIJ Backup Operation Aborts With NONAME-F-NOMSG Message Number 00000004

In rare cases, an after-image journal backup operation may fail with an unexpected incorrect status value. The actual value may vary, but at least one customer report of the problem indicated a value of 00000004. A bugcheck dump file "footprint" of this problem is:

```
***** Exception at 0054D94C : AIJBCK$GET_NEXT_JOURNAL + 00000CFC  
Saved PC = 005452E8 : AIJBCK$FULL_BACKUP + 00000FF8  
Saved PC = 00543C0C : AIJBCK$BACKUP + 0000113C
```

This problem has been corrected. The errant status value was the result of an uninitialized return status being passed back. The correct status is now returned.

5.4.6 DBO/SHOW STATISTICS AIJ ARB:I/O ratio, Blocks-per-I/O ratio Problems

There was a problem with detecting the warning thresholds set for the "Examine ARB:I/O ratio" and "Examine blocks-per-I/O ratio" options on the DBO/SHOW STATISTICS "AIJ Analysis" screen. This caused the "ARB:I/O ratio" warning:

```
## ARBs per I/O below ## threshold
```

and the the "blocks-per-I/O ratio" warning:

```
## blocks written per I/O below ## threshold
```

to not always be output when the threshold was crossed.

This problem was caused by treating these thresholds as percent values instead of count values. This problem has been fixed and the misleading percent signs have been removed from these warning messages.

5.4.7 Adding a large AIJ file to a DB fails with either an ACCVIO or OPCDEC error

Creating a large after image journal file for a database fails with either an ACCVIO or an OPCDEC error.

The reason was a bug in the code which prematurely cleared a synchronization flag. This allowed the request, created by an expired prestarted transaction timer, to execute before the current request had completed. The side effect of this was a stack corruption.

As a workaround use a larger prestarted transactions timer value or, disable the prestarted transactions timer completely.

This problem has been corrected.

5.4.8 Unable to Fully Disable Hot Standby Governor

Bug 5166721

Previously, when the Hot Standby Governor was explicitly disabled, it was still possible during periods of very high load for the Governor to be re-enabled when more than 75% of the LRS buffers on the standby system were in use.

This behaviour has been disabled by default. The Governor will not be re-enabled even when more than 75% of the LRS buffers on the standby system are in use.

If it is desired to revert back to the prior behaviour, the system-wide logical name `DBM$BIND_LRS_ALLOW_AUTOMATIC_HOT_STANDBY_GOVERNOR` may be defined to a value of "1" to allow the Governor to re-enable itself as in prior releases.

5.4.9 DBO/DUMP/BACKUP/MULTITHREAD fails with an ACCVIO or an overrun error

The command `DBO/DUMP/BACKUP/MULTITHREAD` for a backup file generated with the `/COMPRESSION=ZLIB` qualifier fails with:

```
%SYSTEM-F-ACCVIO, access violation, reason mask=04, virtual address=..., PC=..., PS=0000001B
%DBO-F-FATALOSI, Fatal error from the Operating System Interface.
```

The command `DBO/DUMP/BACKUP/MULTITHREAD` for a backup file generated with the `/COMPRESSION=HUFF` qualifier fails with:

```
Illegal output buffer overrun
%DBO-E-INVRECEXP, Error expanding compressed backup file record.
%DBO-F-FATALERR, fatal error on DUMP_BACKUP
```

The error occurred in a `/DUMP` specific code section which did not switch to the correct compression context for an area.

Both problems have been corrected.

5.4.10 DBO Tape Support Added For SDLT600, LTO2, LTO3 Drives

Support for the VMS tape density and compaction values for the Super DLT600, Ultrium460 and Ultrium960 tape drives has been added to the DBO multithreaded (`/BACKUP/MULTITHREAD` and `/RESTORE/MULTITHREAD`) utilities.

This will allow the following new density values to be specified with the /DENSITY qualifier for those DBO commands that write to these drives:

```
/DENSITY = (SDLT600,[NO]COMPACTION) - Super DLT600
/DENSITY = (LTO2,[NO]COMPACTION) - Ultrium460
/DENSITY = (LTO3,[NO]COMPACTION) - Ultrium960
```

5.4.11 Incorrect DBO/SHOW STATISTICS Transaction Recovery Duration Estimates

In previous DBMS 7.2 releases, it was possible for the time values on the Transaction Recovery Duration Estimates display to be inaccurate. The values were generally vastly larger than they should have been.

This problem has been corrected. The estimates are now scaled to more realistic range values.

5.4.12 DBO/SHOW STATISTICS Stall Statistics Aggregate Duration Incorrectly Scaled Values

In previous DBMS 7.2 releases, stall duration values on the aggregate stall statistics display were not correctly scaled and displayed as exceptionally large values.

This problem has been corrected.

5.4.13 DBO /SHOW STATISTICS /ALARM=n Not Waiting n Seconds

In previous DBMS 7.2 releases, it was possible for stall notification alarms to fire inaccurately. Typically the stall notification was much faster than expected. For example, the following should alarm via OPCOM if a stall longer than 60 seconds was detected. Alarms could be generated much earlier than they should be:

```
$ DBO /SHOW STATISTICS PRODUCTION_DB -
  /NOINTERACTIVE -
  /BROADCAST -
  /TIME=60 -
  /ALARM=60 -
  /NOTIFY=(OPER12) -
  /UNTIL=TOMORROW
```

This problem has been corrected. Stall notification alarms are not generated unexpectedly early.

5.4.14 Hot Standby Node Failure Recovery When Using DBO/OPEN/CACHE=NOENABLE

BUG 5957364

In configurations using the Row Cache and Hot Standby features, row caching must be explicitly disabled on the standby database using the DBO/MODIFY/NOCACHE command prior to starting hot standby for the first

time on the database. However, it is also possible (though not recommended) to use the DBO/OPEN/CACHE=NOENABLE command on the standby database in order to suppress row caching.

When using the DBO/OPEN/CACHE=NOENABLE command, if a system failure occurred, it was possible that the database recovery upon reopening the database would attempt to start with a very old last checkpoint location. This location was based on the row cache checkpoint from when the master database had been originally backed up to create the standby database. In some cases, the required AIJ files would be no longer online and the recovery would fail.

This problem has been corrected. The DBR process now ignores the row cache oldest checkpoint location when not recovering from a node failure when the RCS process had been active.

5.4.15 State Value Truncated on Hot Standby Statistics Display

Bug 6044632

Previously, it was possible when using a Hot Standby TCP/IP port number greater than 9999 that the port number would be truncated on the DBO /SHOW STATISTICS Hot Standby Statistics display.

For example, when using a TCP/IP port number of 12345, the state display could be shown as "State: TCP/IP:1234"

This problem has been corrected. The state display field now allows a 5–digit TCP/IP port number to be displayed.

5.4.16 Possible Shared Memory Corruption When Multiple Databases Attached

Starting with Oracle CODASYL DBMS V7.1.2 and Oracle CODASYL DBMS V7.2.0, it was possible for shared memory to become corrupt. The corruption often would appear as (or would be caused by) data from one DBMS root file being written into the shared memory for another database. Once this corruption has occurred, reliability and functionality of the database and database users can be compromised.

Conditions leading to this corruption include:

- Processes accessing multiple databases
- Multiple database users
- Databases accessed from multiple nodes in a cluster
- Databases configured with node count greater than 1.

The memory corruption was caused by incorrect IO buffer synchronization while refreshing root file information in to shared memory.

This problem has been resolved. Oracle strongly recommends that customers with applications or procedures that may attach or more than one database at a time upgrade to this or a later release to avoid this potential memory corruption problem.

5.4.17 Bugcheck at COSI\$TIMER_GET_REQIDT With DBMS-F-NOREQIDT

Applications using the fast commit feature that periodically detach and reattach to a database within the same program run may eventually run out of DBMS timer blocks and bugcheck with a footprint similar to:

```
***** Exception at 01235994 : COSI$TIMER_GET_REQIDT + 00000294
%DBMS-F-NOREQIDT, reached internal maximum number of simultaneous
timer requests
Saved PC = 01235C38 : COSI_TIMER_SET + 00000288
Saved PC = 01235DA8 : COSI_TIMER_SLEEP + 00000078
Saved PC = 012A7548 : KOD$COMMIT + 00000508
```

This problem has been corrected. The problem was caused by an internal timer data structure being allocated but not being deallocated if the timer had expired. If the timer had not expired, the internal timer data structure was correctly deallocated. Thus, in some cases, the timer data structure was being "leaked" which could eventually lead to the bugcheck exception of "DBMS-F-NOREQIDT, reached internal maximum number of simultaneous timer requests".

5.4.18 Qualifier /[NO]CONFIRM For DBO /RECOVER Command

The /CONFIRM qualifier for the DBO /RECOVER command causes the operator to be queried when an incorrect sequence of AIJ files is detected.

In the following example, note that the backed up AIJ files are specified in the order B1, B3, B2, B4 representing sequence numbers 1, 3, 2, 4:

```
$ DBO/RECOVER/NOLOG B1,B3,B2,B4
%DBO-I-LOGRECDB, recovering database file $1$DGA203:[DB]FOO.R00;1
%DBO-W-AIJSEQPRI, AIJ file sequence number 1 created prior to
expected sequence 2
%DBO-I-LOGRECSTAT, transaction with TSN 0:224 ignored
%DBO-I-AIJONEDONE, AIJ file sequence 1 roll-forward operations completed
%DBO-W-NOTRANAPP, no transactions in this journal were applied
%DBO-W-AIJSEQAFT, incorrect AIJ file sequence 3 when 2 was expected
do you wish to continue the roll-forward operation [N]:
```

DBO detects the improper journal order and displays the message "DBO-W-AIJSEQAFT, incorrect AIJ file sequence 3 when 2 was expected". DBO then asks the operator if the roll-forward operation using the incorrect AIJ file sequence 3 should be allowed to continue. If the operator specifies "Y", then the roll-forward operation on AIJ file sequence 3 will continue. Otherwise, DBO will move to the next journal (AIJ file sequence 2 in this example).

Note

Oracle recommends that, in general, an incorrect journal sequence not be applied as a corrupt database may result.

The /ORDER_AIJ_FILES qualifier can be used to help ensure that the specified journals are applied in the correct order.

The default setting for the /CONFIRM qualifier is /NOCONFIRM for batch processes and /CONFIRM otherwise.

5.4.19 /ORDER_AIJ_FILES Removes Some Unnecessary Files For DBO /RECOVER Command

The /ORDER_AIJ_FILES qualifier, in addition to ordering the specified input AIJ files by ascending sequence number, now also can eliminate some AIJ files from processing if they are known to be prior to the database recovery sequence starting point.

In the following example, note that the backed up AIJ files are specified in the order B1, B3, B2, B4 representing sequence numbers 1, 3, 2, 4. The /ORDER_AIJ_FILES sorts the journals to be applied into ascending sequence order and then is able to remove B1 from processing because the database recovery starts with AIJ file sequence 2 as shown in the DBO/RESTORE output.

```
$ DBO/RESTORE/NEW/NOADD/NOAFTER FOO
%DBO-I-RESTXT_00, Restored root file DUA0:[DB]FOO.R00;16
.
.
.
%DBO-I-AIJREFCUL, Recovery of the entire database starts with
AIJ file sequence 2
%DBO-I-COMPLETED, RESTORE operation completed at 24-MAY-2007 12:23:32.99
$!
$ DBO/RECOVER/LOG/ORDER_AIJ_FILES B1,B3,B2,B4
.
.
.
%DBO-I-LOGOPNAIJ, opened journal file DUA0:[DB]B2.AIJ;24
%DBO-I-LOGRECSTAT, transaction with TSN 0:256 ignored
%DBO-I-LOGRECSTAT, transaction with TSN 0:257 ignored
%DBO-I-RESTART, restarted recovery after ignoring 2 committed transactions
%DBO-I-AIJONEDONE, AIJ file sequence 2 roll-forward operations completed
%DBO-I-LOGRECOVR, 0 transactions committed
%DBO-I-LOGRECOVR, 0 transactions rolled back
%DBO-I-LOGRECOVR, 2 transactions ignored
%DBO-I-AIJNOACTIVE, there are no active transactions
%DBO-I-AIJSUCCE, database recovery completed successfully
%DBO-I-AIJNXTSEQ, to continue this AIJ file recovery, the
sequence number needed will be 3
.
.
.
```

Note that due to the fact the AIJ backup files might have more than one journal sequence in them, it is not always possible for DBO to eliminate every journal file that might otherwise appear to be unneeded. But for those journals where DBO is able to know for certain that the journal could not be needed based on the database recovery restart information, journals can be avoided from having to be processed.

5.4.20 ACCVIO with DBO/BACKUP/MULTITHREAD/DISK=WRITER=m/THREADS=n.

Certain combinations of m and n for DBO/BACKUP/MULTITHREAD/DISK=WRITER=m/THREADS=n cause an ACCVIO.

For example:

```
$ DBO /BACKUP /MULTITHREAD /NOLOG TESTDB [.T1]TESTBCK,[.T2]/DISK=(WRITER=1)/THREADS=1
%DBO-I-BUGCHKDMP, generating bugcheck dump file ...
%SYSTEM-F-ACCVIO, access violation, reason mask=00,
    virtual address=0000000000000070, PC=...
```

This problem has been corrected.

5.4.21 DBO /BACKUP/MULTI to tape with /ENCRYPTION can cause a bugcheck.

A plain DBO/BACKUP/MULTI to tape using a non-zero XOR group and encryption can cause a bugcheck.

Example:

```
$ DBO/BACKUP/MULTI/ENCRYPTION=(VAL="mysecretkey") PARTS $1$MKA100:PARTS.DBF
...
%DBO-I-BUGCHKDMP, generating bugcheck dump file ...
%SYSTEM-F-ACCVIO, access violation, reason mask=04, virtual address=...
%DBO-F-FATALERR, fatal error on BACKUP
```

The problem was caused by the encryption code using a wrong buffer size which was modified before by the XOR code.

This problem has been corrected.

5.5 New Features for Release 7.2.1.0

This section contains new features and technical changes for Oracle CODASYL DBMS release 7.2.1.0.

5.5.1 DBO/BACKUP/MULTI/COMPRESSION

The DBO/BACKUP/MULTITHREADED utility now supports data compression via the /COMPRESSION qualifier.

The /COMPRESSION qualifier accepts the following keywords:

- HUFFMAN – HUFFMAN encoding algorithm.
- LZSS – Lempel–Ziv algorithm.
- ZLIB=level – ZLIB algorithm. The "level" value is an integer between 1 and 9 specifying the relative compression level with one being the least amount of compression and nine being the greatest amount of compression. Higher levels of the compression use increased CPU time while generally providing better compression. The default compression level of 6 is a balance between compression effectiveness and CPU consumption.

The ZLIB algorithm and software was developed by Jean–loup Gailly and Mark Adler. This implementation generally uses the same or less CPU time and is generally more effective (compresses better) than either of the HUFFMAN or LZSS algorithms.

If you specify the /COMPRESSION qualifier without a value, the default is /COMPRESSION=ZLIB=6.

Examples using the /COMPRESS qualifier. Note that if "/LOG=FULL" is specified, data compression statistics information is displayed.

```
$ DBO/BACKUP/MULTI/COMPRESS/NOLOG FOO BCK
$ DBO/BACKUP/MULTI/COMPRESS=ZLIB:9 /LOG=FULL FOO BCK
.
.
.
BACKUP summary statistics:
    Data compressed by 53% (9791 KB in/4650 KB out)
```

Compression Effectiveness Varies

The actual amount of compression for any algorithm is strongly dependent on the actual data being compressed. Some database content may compress quite well and other content may compress not at all and may actually result in expansion of the output.

When using the /ENCRYPT and /COMPRESS features together, data is first compressed and then encrypted. This provides effective compression as well as effective encryption.

5.5.2 DBO /{BACKUP/MULTI|COPY|MOVE} /THREADS=n New Qualifier

A new qualifier has been added to allow the user to better control the system load created by a multithreaded

backup, copy or, move operation. The new qualifier allows the user to specify the number of threads to use by DBO.

DBO creates so called internal 'threads' of execution to read data from one specific storage area. Threads run quasi parallel within the process executing the DBO image. Each thread generates its own I/O load and consumes resources like virtual address space and process quotas (e.g. FILLM, BYTLM). The more threads the more I/Os can be generated at one point in time and the more resources are needed to accomplish the same task.

Performance increases with more threads due to parallel activities which keeps disk drives more busy. However, at a certain number of threads performance suffers because the disk I/O subsystem is saturated and I/O queues build up for the disk drives. Also the extra CPU time for additional thread scheduling overhead reduces the overall performance. Typically 2–5 threads per input disk drive are sufficient to drive the disk I/O subsystem at its optimum. However, some controllers may be able to handle the I/O load of more threads, e.g. disk controllers with RAID sets and extra cache memory.

In a copy or move operation one thread moves the data of one storage area at-a-time. If there are more storage areas to be moved than there are threads then the next idle thread takes on the next storage area. Storage areas are moved in order of the area size – largest areas first. This optimizes the overall elapsed time by allowing other threads to move smaller areas while an earlier thread is still working on a large area. If no threads qualifier is specified then 10 threads are created by default. The minimum is 1 thread and the maximum is the number of storage areas to be copied or moved. If the user specifies a value larger than the number of storage areas then DBO silently limits the number of threads to the number of storage areas.

In a multithreaded backup operation one writer thread is created per output stream. An output stream can be either a tape drive, a disk file or, a media library manager stream. In addition DBO creates a number of reader threads and their number can be specified. DBO assigns a subset of reader threads to writer threads. DBO calculates the assignment so that roughly the same amount of data is assigned to each output stream. By default five reader threads are created for each writer thread. If the user has specified the number of threads then this number is used to create the reader thread pool. DBO always limits the number of reader threads to the number of storage areas. A threads number of 0 causes DBO to create one thread per storage area which start to run all in parallel immediately. Even though this may sound like a good idea to improve performance this approach suffers for databases with a larger number (>10) of storage areas. For a very large number of storage areas (>800) this fails due to hard limitations in system resources like virtual address space.

The old `READER_THREAD_RATIO` qualifier has been deprecated but is still accepted and works exactly the same as in previous versions.

Examples using the `/THREADS` qualifier:

Copying one storage area at a time:

```
$ DBO /COPY /THREADS=1 /LOG FOO BCK
%DBO-I-MOVTEXT_04, Starting move of storage area ...
%DBO-I-MOVTEXT_01, Completed move of storage area ...
%DBO-I-MOVTEXT_05, Moved snapshot area file ...
%DBO-I-MOVTEXT_04, Starting move of storage area ...
%DBO-I-MOVTEXT_01, Completed move of storage area ...
%DBO-I-MOVTEXT_05, Moved snapshot area file ...
.
.
.
```

Copying three storage areas in parallel:

```
$ DBO /COPY /THREADS=3 /LOG FOO BCK
%DBO-I-MOVTEXT_04, Starting move of storage area ...
%DBO-I-MOVTEXT_04, Starting move of storage area ...
%DBO-I-MOVTEXT_04, Starting move of storage area ...
%DBO-I-MOVTEXT_01, Completed move of storage area ...
%DBO-I-MOVTEXT_05, Moved snapshot area file ...
%DBO-I-MOVTEXT_04, Starting move of storage area ...
%DBO-I-MOVTEXT_01, Completed move of storage area ...
%DBO-I-MOVTEXT_05, Moved snapshot area file ...
.
.
.
```

5.5.3 Increased Date/Time String Display Precision

For several values where there is enough space on the display, the DBO SHOW STATISTICS utility now displays time/date stamps with precisions greater than 0.01 second units. In several cases (stall displays, for example), the screen display width must be 100 or more columns in order to display the full date/time with seven fractional digits.

For example, the "short" time and/or date format displays include only two fractional digits:

- 16:23:16.17
- 13-NOV-2006 16:23:16.17

While the "long" time and/or date format displays include seven fractional digits:

- 16:23:16.1776975
- 13-NOV-2006 16:23:16.1776975

5.6 Corrections in Release 7.2.1.0

This section describes software errors corrected in Oracle CODASYL DBMS release 7.2.1.0.

5.6.1 Problem with Remote Access and FETCH..USING

BUG 5685084

A problem has been uncovered with Oracle CODASYL DBMS when using remote database access with either DBQ or DML applications. If you attempt to FETCH a record via a USING clause, the fetch may fail with a DBM-F-END condition, even though the record does exist.

The problem will ONLY occur if one of the data items specified in the USING clause is the last data item defined in that record.

The error does not occur with local database access or with remote access when using the WHERE clause.

For example, given the following schema:

```
AREA NAME IS A1

RECORD NAME IS R1
  WITHIN A1
  ITEM NAME IS I1
    TYPE IS CHARACTER 5
  ITEM NAME IS I2
    TYPE IS CHARACTER 5
  ITEM NAME IS I3
    TYPE IS CHARACTER 5

SET NAME IS ALL_R1
  OWNER IS SYSTEM
  MEMBER IS R1
    INSERTION IS AUTOMATIC
    RETENTION IS FIXED
  ORDER IS SORTED BY
    ASCENDING I3
```

and assuming that there is an R1 record with the following values:

```
I1 = 'AAAAA'
I2 = 'BBBBB'
I3 = 'CCCCC'
```

The following remote query attempting to fetch record R1 will fail:

```
dbq> bind dbmfetrmtdb
dbq> ready
dbq> set noprompt
dbq> move 'CCCCC' TO I3
dbq> fetch first within ALL_R1 using I3
%DBM-F-END, end of collection
```

whereas, the same logical query using a WHERE clause will succeed:

```
dbq> fetch first within ALL_R1 where I3 eq 'CCCCC'
I1 = AAAAA
I2 = BBBBB
I3 = CCCCC
```

This problem has now been fixed. No application programming changes are required.

5.6.2 Area File not Renamed after DBO/MODIFY/RESTRUCTURE

BUG 2260168

The Oracle CODASYL DBMS reload utility (DBO/MODIFY/RESTRUCTURE) moves database records from a specified target area to a new area.

In versions of DBMS prior to V7.0, the default behavior was to create the new storage area with the same filename (and in the same directory) as the target original area, with an incremented file version number. Note: only offline reload is available in pre-V70 versions.

Starting with DBMS v7.0, these defaults were modified to ensure that the new storage area filename was unique by attempting to append an "_A" (OR "_B", etc) to the storage area name. This was done as part of the work to support online reload (DBO/MODIFY/RESTRUCTURE/ONLINE), where the reload could be stopped and restarted in the middle of execution.

The idea was to make sure that there was no confusion between the original area and the new area, if the reload were stopped for any reason, and to make sure that certain file actions, such as a \$PURGE, would not delete the original area prior to reload completion.

If you wish to retain the old behavior, include the /FILE= qualifier on the DBO/MODIFY/RESTRUCTURE command and specify the original storage area filename as the parameter. This qualifier should be included on the restructure operation that performs the EXECUTE phase for offline reload, or the PREPARE phase in the case of online reload.

For example, assume that you wished to reload the BUY area in the PARTS database.

In pre-V70 offline reloads, the default would be to create a storage area, BUY.DBS;2 (assuming that BUY.DBS;1 was the original area filename). In V70 and later, the default would be to create BUY_A.DBS;1.

To maintain the old behavior, issue DBO/MODIFY/RESTRUCTURE PARTS BUY/FILE=BUY. Note that you could also specify the /DIRECTORY qualifier to have the new storage area created in a new directory.

To modify the storage area file name of a previously reloaded area, you can rename the file, then use the DBO/ALTER utility and execute:

```
DBALTER> DEPOSIT FILE <area> SPECificaion <new-filename>
```

5.6.3 Mixing Cobol and Fortran or DML modules on Integrity Servers

Starting with DBMS 7.2 on Integrity Servers, if you attempt to link together Cobol modules with modules compiled with the DBMS Fortran or DML precompilers, you would receive a linker error message similar to:

```
%ILINK-E-INVOVRINI, incompatible multiple initializations for overlaid section
  section: DBM$UWA_B
  module: DMLMIXUWA
  file: DISK:[DIRECTORY]DMLMIXUWA_COB1.OBJ;VERSION
  module: DMLMIXUWA_FOR
  file: DISK:[DIRECTORY]DMLMIXUWA_FOR1.OBJ;VERSION
```

This error message occurs because the Cobol compiler and CODASYL DBMS precompiler utilities generate a different value for one field in the User Work Area (UWA) data structure. Specifically, COBOL initialize the UWA message condition field (DB-CONDITION) with a '0', while DBMS precompilers initialize the same field with a '1'. UWA structures from modules with the same stream will be overlaid by the linker into one program section (PSECT).

On I64 systems, you cannot have a program section that attempts to be initialized a subsequent time where the non-zero portions of the initializations do not match. This is a difference from OpenVMS Alpha and VAX systems where the linker permitted such initializations.

However, even with "-E-" message status, in most cases an executable image is produced and useable.

Starting with this release of Oracle CODASYL DBMS, the Fortran and DML precompilers will generate the same initialization values for the UWA as does the COBOL compiler.

As a side effect of this change, you could still continue to see the ILINK-E-INVOVRINI if you attempt to link a FORTRAN or DML module (compiled under this release) with other FORTRAN or DML modules compiled under previous releases of DBMS 7.2.

To work around this problem, two new logicals have been established for this release. The DBM\$FDML_INIT_DBCOND_1 and DBM\$DML_INIT_DBCOND_1 logicals will allow the DBMS precompilers to revert to the prior behavior and make newly compiled modules linker-compatible with previously compiled modules.

For example, if you define DBM\$FDML_INIT_DBCOND_1 to any value, the DBMS FORTRAN precompiler will assign a value of 1 to the UWA condition field. If you define DBM\$DML_INIT_DBCOND_1 to any value, the DBMS DML precompiler will assign a value of 1 to the UWA condition field.

These logicals only affect the compilation of Integrity Servers, as this linker error does not occur on Alpha systems.

5.6.4 Using OpenVMS Reserved Memory Registry With DBMS

For Oracle CODASYL DBMS memory-resident global sections (either row cache global sections or the database root global section), it is possible to utilize the OpenVMS Reserved Memory Registry feature to

reserve physical memory. This reserved memory can be useful to allow the use of granularity hint (GH) regions which can further improve performance by using fewer processor translation buffer entries to map a large range of physical memory pages. Use of the reserved memory is optional and any performance gains are application specific.

In order to take advantage of the OpenVMS Reserved Memory Registry feature, global sections must be configured as "SHARED MEMORY IS PROCESS RESIDENT". This can be done with DBO statements "DBO/MODIFY/MEMORY_MAPPING=(PROCESS,RESIDENT)" and "DBO/CACHE/MODIFY/MEMORY_MAPPING=(PROCESS,RESIDENT)".

The name of the global section is required in order to register a global section in the OpenVMS shared memory registry. The "DBO/DUMP/HEADER" command can be used to display the global section names for the database root global section and the row cache global sections. This command also displays the size of the global sections in megabytes rounded up to the next whole megabyte.

For example, information about a row cache global section in the output from the DBO/DUMP/HEADER command might include the following:

```
Shared Memory...
- Shared memory will be mapped resident
- Global Section Name is "DBM72R$1$DGA2031064003D000000000005"
- Shared memory section requirement is 77,070,336 bytes (74MB)
```

Information about the database global section in the output from the DBO/DUMP/HEADER command might include the following:

```
Derived Data...
- Global section size
  With global buffers disabled is 2,047,042 bytes (2MB)
  With global buffers enabled is 33,860,114 bytes (33MB)
  .
  .
  .
- Global Section Name is "DBM72N$1$DGA2031064003D000000000000"
```

From these examples, the row cache section size would be 74 megabytes and the database global section size (with global buffers enabled) would be 33 megabytes.

To reserve the memory, use the SYSMAN utility RESERVED_MEMORY ADD command and then run AUTOGEN as in the following examples:

```
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> RESERVED_MEMORY ADD DBM72N$1$DGA2031064003D000000000000 -
  /ALLOCATE /SIZE=33
SYSMAN> RESERVED_MEMORY ADD DBM72R$1$DGA2031064003D000000000005 -
  /ALLOCATE /SIZE=74
SYSMAN> EXIT
$ @SYS$UPDATE:AUTOGEN ...
```

The OpenVMS system must be then shutdown and restarted for the memory reservations to be in effect.

After rebooting and reopening databases, the SHOW MEMORY /RESERVED command can be used to see that the reserved memory is in use. For example:

Oracle® CODASYL DBMS for OpenVMS

\$ SHOW MEMORY/RESERVED

| Memory Reservations (pages): | Group | Reserved | In Use | Type |
|-------------------------------------|--------|----------|--------|------------|
| DBM72R\$1\$DGA408451A6A000000000002 | | | | |
| | SYSGBL | 2 | 2 | Page Table |
| DBM72R\$1\$DGA408451A6A000000000002 | | | | |
| | SYSGBL | 1536 | 1353 | Allocated |
| Total (12.01 MBytes reserved) | | 1538 | 1355 | |

Database Root File Specific

Changes to the size of the database or row cache global sections will require that the memory reservation size be updated (either by removing and re adding or modifying the existing reservation). Further, because the device and file identification of the database root file are encoded in the global section names, any operation (such as restoring or moving) that changes either the file identification or the device identification of the root file will result in the global section names changing.

If the reserved memory is specified with a size smaller than the actual size of the global section, the section may fail to be created when the database is opened or accessed with a message similar to "SYSTEM-F-INSFLPGS, insufficient Fluid Pages available".

For further information, review the OpenVMS documentation set including "HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems", "HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes", and "HP OpenVMS System Services Reference Manual".

5.6.5 DBO/CONVERT Bugchecks in PIO\$LOCK_PAGE When Statistics Disabled

If statistics were disabled while executing an **DBO/CONVERT** command the DBO utility would bugcheck with a stack footprint similar to the following:

```
***** Exception at 0000000000719708 : DBO72\PIO$DEMOTE_PAGE + 000001A8
%SYSTEM-F-ACCVIO, access violation, reason mask=00, virtual
address=0000000000000000, PC=0000000000719708, PS=0000001B
Saved PC = 0000000000722E14 : DBO72\PIOUTL$EMPTY_ONE_BUFFER + 000002B4
Saved PC = 000000000071D654 : DBO72\PIOFETCH$WITHIN_DB_HNDLR + 00000134
Saved PC = FFFFFFFF81104EC8 : Image LIBOTS + 00008EC8
Saved PC = FFFFFFFF800A693C : symbol not found
***** Exception at 000000000071C020 : DBO72\PIO$LOCK_PAGE + 00000320
Saved PC = 000000000071E114 : DBO72\PIOFETCH$WITHIN_DB + 00000924
Saved PC = 000000000071B444 : DBO72\PIOFETCH$FETCH + 000002E4
Saved PC = 000000000071A4E4 : DBO72\PIO$FETCH + 000008F4
```

The same problem may also occur when an implied conversion is done by restoring a backup that was made with a prior version of Oracle CODASYL DBMS.

This problem can be avoided by deassigning the **DBM\$BIND_STATS_ENABLED** logical prior to executing the **DBO/CONVERT** command.

This problem has been corrected.

5.6.6 Hangs or Looping When Lots of Page Contention

Applications that had lots of page contention could sometimes hang due to page locks not being released by a process or they could enter a CPU loop. This problem was only in Oracle CODASYL DBMS Release 7.2.

This problem would occur when an internal queue used to managing blocking AST requests would become corrupt. In that situation blocking ASTs could be lost, or processing of the queue could result in an infinite loop.

There is no workaround for this problem.

This problem has been corrected.

5.6.7 DBO/SHOW STATISTICS Hot Standby Statistics State Display Field

Bug 5396571

Previously, when using the TCP/IP network transport with the Hot Standby feature, the DBO /SHOW STATISTICS "Hot Standby Statistics" display "State:" field could overwrite the "UserSync:" heading as in the following example:

```
Node: HSVMS (1/1/16) Oracle CODASYL DBMS V7.1-24 Perf. Monitor 18-JUL-2006 06`
Rate: 3.00 Seconds Hot Standby Statistics Elapsed: 00:07:28.63
Page: 1 of 1 $MYDISK:[MYDB]PARTS.R00;1 Mode: Online
-----
State: TCP/IP:72 rSync: Cold Current.Msg: 1 C1 Mstr.AIJ: 1:2
LagTime: 00:00:00 AutoSync: Cold Stalled.Msg: none 1 Stby.AIJ: 1:2
Stby.DB: $MYDISK:[MYDB_STANDBY]PARTS.
```

The line starting with "State:" partly overwrites "UserSync:".

This problem has been corrected.

5.6.8 File–System Caching Avoided For Various IO Operations

In order to reduce CPU consumption and XFC spinlock contention and to help avoid "thrashing" the file system cache and to streamline file read and write operations, caching by the operating system is disabled for various files and operations including:

- DBO /COPY
- DBO /MOVE
- DBO /BACKUP /MULTITHREAD
- DBO /RESTORE /MULTITHREAD
- Most Database Root File IO
- Most Database RUJ File IO
- Most Row–Cache Backing Store File IO
- Most Recovery Work File IO

Testing on various configurations indicates that, in general, avoiding the operating system's XFC cache for these database file IO operations results in better over-all performance as balanced between CPU and IO costs.

5.6.9 Processes Don't Always Terminate After Monitor Terminates

BUG 5361981

When the Oracle CODASYL DBMS monitor process terminates abnormally all user processes that are attached to databases on that node should immediately terminate. However, there were cases where that didn't happen, and those user processes would continue to access Oracle CODASYL DBMS resources after the monitor failed. Consider the following example.

User 1, node 1:

```
DBQ> BIND PARTS
```

User 2, node 2:

```
DBQ> BIND PARTS
```

User 3, node 1:

```
$ STOP/ID={pid of monitor process on node 1}
```

In the above sequence of events, the user process on node 1 should have terminated as soon as the monitor process was killed, but it remained active.

This problem can be avoided by using the *DBO/OPEN* command and manually opening databases on all nodes that will have users accessing the database.

This problem has been corrected.

5.6.10 DBO/RECOVER of Journaled Row Cache Changes Corrupts Database

BUG 5469750

If a database had row cache parameters changed, and the database was restored and recovered, the resulting database would be corrupt. Sometimes the *DBO/RECOVER* process would fail as well, and occasionally the Oracle CODASYL DBMS monitor process would fail.

Depending on what row cache parameters were changed, various failures may occur in the *DBO/RECOVER* operation or in the database monitor. In the reported problem *DBO/RECOVER* would fail with the following exception:

```
***** Exception at 007E35BC : PIO$FETCH + 000003EC
%SYSTEM-F-ACCVIO, access violation, reason mask=00, virtual address=0000000000000000, PC=00000000
```

Also, the database monitor failed with the following exception:

```
**** Exception at hhhhhhhh : MON$DELETE_UNREFERENCED_GBL + 00000DAC
%SYSTEM-F-ACCVIO, access violation, virtual address=000000000414000
```

To avoid this problem do a full database and journal backup after altering any row cache parameters. If this problem is encountered it is possible to recover the restored database up until the point in the journal that contains the row cache changes. That is, using the `/UNTIL` qualifier, recover the journals up to the point in time that the row cache changes were made.

This problem has been corrected.

5.6.11 DBO/BACKUP/AFTER Ignores /EDIT_FILENAME When Backup Filespec Omitted

BUG 5464971

When a *DBO/BACKUP/AFTER* command was issued, if the */EDIT_FILENAME* qualifier was included but no output filename was given, the default journal filename would be used and the contents of the */EDIT_FILENAME* qualifier were ignored. For example:

```
$ DBO/BACKUP/AFTER/LOG -
  /EDIT=( "_", VNO, "_", YEAR, MONTH, DAY_OF_MONTH, "_QP" ) -
  DBM$DATABASE " "
.
.
.
%DBO-I-LOGCREBCK, created backup file DEV:[DIR]JOURNAL_1.AIJ:1
```

In the above example, no output filename was specified, that is, "" was given as the output file. The journal that was being backed up had the filename "JOURNAL_1". The backup filespec constructed by DBO should have been "JOURNAL_1_0_20060829.AIJ", but the contents of the */EDIT_FILENAME* qualifier were not incorporated in the output filename.

This problem can be avoided by explicitly providing the backup output filename in the backup command.

This problem has been corrected.

5.6.12 Concealed Logical Names Defined in LNM\$SYSCUSTER_TABLE Table Allowed

Previously, many uses of concealed logical device names were required to be defined in the LNM\$SYSTEM_TABLE logical name table. This requirement is in place to ensure that various components of the database system running in separate process contexts would all have access to the same logical name definitions. Uses of concealed logical device names that were not defined in the LNM\$SYSTEM_TABLE could result in a *COSI-F-NOTSYSCONCEAL "non-system concealed device name in filename" status*.

This restriction has been somewhat relaxed. While all processes using a database still require access to the same logical name definitions, this can now be accomplished by using LNM\$SYSTEM_TABLE logical name table or the LNM\$SYSCUSTER_TABLE logical name table (which represents a cluster-wide resource).

Note, however, that it is strongly recommended that concealed logical device names are not defined in both tables at the same time on any cluster node as this can lead to unpredictable results possibly leading to database corruption or instability.

5.6.13 Hot Standby Status Symbols From DBO /SHOW AFTER_JOURNAL /BACKUP_CONTEXT

Additional DCL symbols indicating the Hot Standby replication state are now created by the DBO /SHOW AFTER_JOURNAL /BACKUP_CONTEXT command.

The symbol names are listed below:

- DBM\$HOT_STANDBY_STATE – Contains the current replication state. Possible state strings and the description of each state are listed below:
 - ◆ "Inactive" – Inactive
 - ◆ "DB_Bind" – Binding to database
 - ◆ "Net_Bind" – Binding to network
 - ◆ "Restart" – Replication restart activity
 - ◆ "Connecting" – Waiting for LCS to connect
 - ◆ "DB_Synch" – Database synchronization
 - ◆ "Activating" – LSS server activation
 - ◆ "SyncCmpltn" – LRS synchronization redo completion
 - ◆ "Active" – Database replication
 - ◆ "Completion" – Replication completion
 - ◆ "Shutdown" – Replication cleanup
 - ◆ "Net_Unbind" – Unbinding from network
 - ◆ "Recovery" – Unbinding from database
 - ◆ "Unknown" – Unknown state or unable to determine state
- DBM\$HOT_STANDBY_SYNC_MODE – Contains the current replication synchronization mode when replication is active. Possible synchronization mode strings are listed below:
 - ◆ "Cold"
 - ◆ "Warm"
 - ◆ "Hot"
 - ◆ "Commit"
 - ◆ "Unknown"

5.6.14 DBO /SHOW STATISTICS Defined Logicals List Incomplete

BUG 5600122

Previously, it was likely that the DBO /SHOW STATISTICS Defined Logicals display did not properly list all logicals when the display was set to "Full" mode. This problem was caused by an incorrect calculation of the number of logical names possible.

This problem has been corrected. The full list of logical names is correctly displayed.

5.6.15 Incorrect Backup Checksum And Crc Values On I64

In some cases, the checksum or crc values within a .DBF backup (DBO/BACKUP/MULTITHREADED) file on I64 systems starting with CODASYL DBMS Release V7.2.0.2 may be incorrect. This difference could result in checksum errors during restore operations when using /CRC=CHECKSUM.

As a workaround, Oracle recommends using the default CRC algorithm of /CRC=AUTODIN_II rather than /CRC=CHECKSUM.

This problem has been corrected. The checksum value calculated by Oracle CODASYL is now the same on all platforms and versions.

[| Contents](#)