

Oracle® JDBC for Rdb

Release Notes
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Oracle JDBC for Rdb Release Notes, Release 7.3.2.0.0

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Contents

| | |
|---|----|
| Preface..... | 8 |
| Purpose of This Manual..... | 8 |
| Intended Audience..... | 8 |
| Access to Oracle Support..... | 8 |
| Document Structure..... | 8 |
| Conventions..... | 8 |
| Chapter 1 Installation and Documentation..... | 10 |
| 1.1 Accessing the Documentation..... | 10 |
| 1.2 System and Software Requirements..... | 11 |
| 1.3 Installation..... | 12 |
| 1.3.1 Remove Prior BETA Versions of Oracle JDBC for Rdb Release 7.3..... | 13 |
| 1.3.2 Contents of the Oracle JDBC for Rdb Kit..... | 13 |
| 1.3.3 Installation Procedure..... | 15 |
| 1.3.4 Rdb Thin driver software on Windows..... | 19 |
| 1.3.5 Rdb Thin driver software on Other operating systems..... | 20 |
| Chapter 2 Enhancements Provided in Oracle JDBC for Rdb Release 7.3.2.0..... | 21 |
| 2.1 Server Options List Inheritance..... | 21 |
| 2.2 Oracle JDBC for Rdb Manager Server..... | 22 |
| 2.3 Restricting Server Access by IP..... | 22 |
| 2.4 Executor Balancing..... | 23 |
| 2.5 MinFreeExecutors..... | 23 |
| 2.6 Executor Reuse..... | 23 |
| 2.7 LogFile Patterns..... | 23 |
| 2.8 New Server configuration option retainRdbSQLState..... | 24 |
| Chapter 3 Problems Corrected..... | 25 |
| 3.1 Event Flag problem with long Executor name Prefixes..... | 25 |
| 3.2 Executor Process Termination Problem..... | 26 |
| 3.3 Some Server Characteristics not Correctly Inherited from DEFAULT..... | 26 |
| 3.4 Memory Problem with Pool Servers and Java 1.6.0-2..... | 28 |
| 3.5 Exception not Thrown when Record Locked during Update..... | 28 |
| Chapter 4 Known Problems and Workarounds..... | 30 |
| 4.1 Thin Server deadlocks..... | 30 |
| 4.2 Using Java Fast VM on OpenVMS..... | 30 |
| 4.3 Using the Oracle SQL/Services Management GUI and JDBC Dispatchers..... | 31 |
| 4.4 Blob Columns and Correlation names..... | 31 |
| 4.5 Blob Columns and Update Statements..... | 32 |
| 4.6 External Procedures and Thin Server..... | 33 |
| 4.7 Limitations..... | 33 |
| 4.7.1 Unsupported Methods..... | 33 |
| 4.7.2 Auto-generated keys..... | 35 |
| 4.7.3 String truncation warnings..... | 35 |
| 4.7.4 Numeric and string functions in JDBC..... | 35 |
| Chapter 5 New Features and Corrections in Previous Releases..... | 36 |
| 5.1 New Features for Release 7.3.1.0..... | 36 |

| | |
|--|----|
| 5.1.1 “Owner” may be used in XML configuration files..... | 36 |
| 5.1.2 SQL Statement Restriction and Denial | 36 |
| 5.1.3 Event Notification..... | 37 |
| 5.2 Corrections in Release 7.3.1.0. | 37 |
| 5.2.1 MP Server Connection Hang when Executor Dies..... | 37 |
| 5.2.2 MP Executor process terminates unexpectedly. | 38 |
| 5.2.3 Pooled server AutoRestart problem..... | 38 |
| 5.2.4 getGeneratedKeys() and OutOfBounds Exception..... | 39 |
| 5.2.5 MultiProcess Server fails when Persona used | 40 |
| 5.2.6 RestrictAccess being Applied even when Disabled..... | 41 |
| 5.2.7 MultiProcess problem in the Native Driver..... | 41 |
| 5.3 New Features for Release 7.3.0.2. | 42 |
| 5.3.1 Server Network Keep Alive..... | 42 |
| 5.4 Corrections in Release 7.3.0.2. | 42 |
| 5.4.1 Null pointer Exception during Server viability check by Pool Server..... | 42 |
| 5.4.2 MINUS and INTERSECT problem..... | 43 |
| 5.4.3 Memory Leak when Executor Process fails to Run..... | 43 |
| 5.4.4 Lost Executor not caught by MultiProcess Server..... | 43 |
| 5.4.5 MultiProcess Native driver problem..... | 44 |
| 5.4.6 PreparedStatement.getGeneratedKeys() problem..... | 44 |
| 5.4.7 Excessive IOs during Metadata Retrieval..... | 44 |
| 5.4.8 Syntax error SQL-F-CONVARUND..... | 44 |
| 5.4.9 MultiProcess Server hang..... | 45 |
| 5.4.10 SSL Socket Intrusion problem..... | 45 |
| 5.5 New Features for Release 7.3.0.1. | 46 |
| 5.5.1 Reopen Server Log files using Poll subcommand. | 46 |
| 5.6 Corrections in Release 7.3.0.1. | 46 |
| 5.6.1 Show Clients not Showing Column Names..... | 47 |
| 5.6.2 Batched Statement Fails with MULTIPLE_RECORDS Exception. | 48 |
| 5.6.3 Incompatibility between 7.3.0.0 Thin Driver and Prior Release Servers. | 48 |
| 5.6.4 Global Memory leak when Executors are run-down. | 49 |
| 5.6.5 Autorestart on Pooled Servers not Working. | 49 |
| 5.6.6 setFetchSize() hint ignored by PreparedStatement..... | 50 |
| 5.6.7 Missing Stmt Exception on Subsequent Execution of PreparedStatement..... | 50 |
| 5.6.8 EOFException on READ_ROW with nested statements | 51 |
| 5.6.9 DatabaseMetaData.getUDTs()..... | 52 |
| 5.6.10 Using MultiProcess with the JDBC Native Driver..... | 52 |
| 5.6.11 Prepared Statement not Closing underlying Cursor..... | 53 |
| 5.6.12 Release Statement synchronization problem | 53 |
| 5.6.13 Uninitialized SQLCA block in MP server | 54 |
| 5.6.14 Controller SHOW CLIENTS and MP Server problem..... | 54 |
| 5.6.15 Documentation Error – Record Streaming | 55 |
| 5.6.16 ResultSet.updateRow() and ResultSet.deleteRow() problem | 55 |
| 5.6.17 Problem using column renaming with dbkey. | 56 |
| 5.6.18 Class cast error on Scaled integer Retrieval after ResultSet.insertRow()..... | 57 |
| 5.6.19 ResultSet.deleteRow() behaviour change. | 57 |

| | |
|---|----|
| 5.6.20 Underlying Blob handles not released when using ResultSet.getBlob() | 59 |
| 5.6.21 Sequence values not visible to ResultSet get methods using column name.. | 59 |
| 5.6.22 Scaled integer problem. | 61 |
| 5.6.23 Server Matching Exception may Stop Poll handling..... | 61 |
| 5.7 New Features for Release 7.3.0.0. | 62 |
| 5.7.1 Shutdown Thread..... | 62 |
| 5.7.2 Driver.attach()..... | 63 |
| 5.7.3 Returning List of Known Databases..... | 63 |
| 5.7.4 Controller Enhancements..... | 63 |
| 5.7.5 RDB_EXT.JAR file..... | 63 |
| 5.7.6 Performance Enhancements..... | 65 |
| 5.8 Corrections in Release 7.3.0.0. | 66 |
| 5.8.1 Server startup failure when using CFG file | 66 |
| 5.8.2 AccessViolation on disconnect when Inserting Blobs..... | 67 |
| 5.8.3 PreparedStatement and Parameter Markers Known Problem now Resolved.. | 67 |
| 5.8.4 Controller SHOW CLIENTS and MP Server problem | 68 |
| 5.8.5 Possible memory leak when updating Blob columns | 69 |
| 5.8.6 Access Violation with trace and Network Dump | 69 |
| 5.8.7 Named Input Parameters not working with CallableStatements | 70 |
| 5.9 New Features for Release 7.2.5.5. | 71 |
| 5.10 Corrections in Release 7.2.5.5. | 71 |
| 5.10.1 Long-running Query Holds up New Connections in MP Server | 71 |
| 5.11 New Features for Release 7.2.5.4. | 72 |
| 5.12 Corrections in Release 7.2.5.4. | 72 |
| 5.12.1 Access Violation at Java_rdb_JNI_SetStrVal. | 72 |
| 5.12.2 DCL Command Line Too Long..... | 73 |
| 5.12.3 Access Violation during DriverManager.getConnection() when Database Specification is Missing..... | 73 |
| 5.12.4 Unaligned memory faults on IA64 | 74 |
| 5.12.5 Read-Only Transactions not Enforced on Connection Switch | 74 |
| 5.12.6 Sockets not Correctly Closing on OpenVMS Clients causing Accumulation of Mailboxes..... | 75 |
| 5.12.7 Cast problem when Converting String to Date/Time | 75 |
| 5.13 New Features for Release 7.2.5.3. | 77 |
| 5.14 Corrections in Release 7.2.5.3. | 77 |
| 5.14.1 Interaction of DatabaseMetaData methods with Blobs may Crash the Thin Server | 77 |
| 5.14.2 BigDecimal scaling Incorrect when used with PreparedStatement setObject() Methods..... | 78 |
| 5.14.3 Connection.nativeSQL() method throws Null Pointer Exception. | 78 |
| 5.14.4 Calling Resultset.isLast() method May Change Transaction Behavior..... | 78 |
| 5.15 New Features for Release 7.2.5.2. | 79 |
| 5.15.1 DEC_KANJI and DEC_HANZI Support Enabled..... | 79 |
| 5.16 Corrections in Release 7.2.5.2. | 79 |
| 5.16.1 ResultSet.getBigDecimal() not working with system ResultSets..... | 79 |
| 5.16.2 Setting TraceLevel fails when using Hexadecimal Notation..... | 80 |

| | |
|--|----|
| 5.16.3 Delimited Identifier Problem in AS clause of Select Statement..... | 80 |
| 5.16.4 Configuration file problem in "DEFAULT" Server definition..... | 80 |
| 5.16.5 Pool Server May choose Incompatible Pooled Server when User Restriction Enabled..... | 81 |
| 5.16.6 Potential problem when dumping SQLDA in trace..... | 82 |
| 5.16.7 Connection.getCatalog() returns wrong value for single Schema Databases | 82 |
| 5.16.8 Potential memory leak with Views..... | 83 |
| 5.17 New Features for Release 7.2.5.1..... | 83 |
| 5.17.1 SQLDA dumping..... | 83 |
| 5.17.2 failSAFE IP with Pool Servers..... | 83 |
| 5.17.3 HandshakeTries and HandshakeWait on MultiProcess Native Connections | 84 |
| 5.17.4 Server Access Security Enhancements..... | 84 |
| 5.17.5 Restriction on using Multiple Blob fields in Join now removed..... | 84 |
| 5.18 Corrections in Release 7.2.5.1..... | 85 |
| 5.18.1 Incorrect row number returned after ResultSet.getLast() call..... | 85 |
| 5.18.2 Pool Server startup of Pooled Servers may fail when Persona is used..... | 86 |
| 5.18.3 Last Column in Select List may be Inaccessible in Some Queries..... | 87 |
| 5.18.4 Abnormal Client Termination may Prevent Executor Re-use..... | 87 |
| 5.18.5 Decimal Column Problem with Native Driver..... | 88 |
| 5.18.6 'EFN xx is not available' Message on Executor startup..... | 88 |
| 5.18.7 Extraneous log message during Auto-restart check by Pool Server..... | 89 |
| 5.18.8 Logfile not correctly set for servers started using the Controller..... | 89 |
| 5.19 New Features for Release 7.2.5.0..... | 89 |
| 5.19.1 Persona..... | 89 |
| 5.20 Corrections in Release 7.2.5.0..... | 90 |
| 5.20.1 Incorrect SQLSRV_JDBC_SERVER_STARTUP72 Installed with V7.2-41 Oracle JDBC for Rdb kit..... | 90 |
| 5.20.2 MultiProcess Server May Show Continuous DIO Activity Even When Idle | 90 |
| 5.20.3 Client idleTimeout Does Not Work for Prestarted and Reused Executors.... | 91 |
| 5.20.4 Syntax Error in Query Generated for DatabaseMetaData.getTables..... | 91 |
| 5.20.5 Show Clients in Controller may Crash Connected Thin Server..... | 92 |
| 5.21 New Features for Release 7.2.4.1..... | 92 |
| 5.21.1 Client and Server Timeout Feature..... | 93 |
| 5.21.2 Executor Name Prefix..... | 93 |
| 5.22 Corrections in Release 7.2.4.1..... | 93 |
| 5.22.1 Release Notes Specify Incorrect Installation Directory for RDBJDBCCFG.XML..... | 93 |
| 5.22.2 Persona Not Handled Correctly by the MultiProcess and Pool Servers..... | 94 |
| 5.22.3 MultiProcess Server / Executor Handshake Timeout May Be Too Short on Heavily Loaded Systems..... | 94 |
| 5.22.4 Problems with srv.idleTimeout and srv.bindTimeout Configuration Variables and Their Use with SSL servers..... | 95 |
| 5.22.5 IA64 Problem Causes Array Out of Bounds Exception When Handling String Indexing..... | 96 |
| 5.22.6 Comments within SQL Text Not Handled Correctly..... | 96 |

| | |
|--|----|
| 5.22.7 Prepared Statements May Cause a Memory Leak with MultiProcess Servers | 97 |
| 5.23 Corrections in Release 7.2.4.0. | 97 |
| 5.23.1 Maximum Size of Single Data Row Increased to 65,272 Octets..... | 97 |
| 5.23.2 Another Connection Overlap Window Found with Pool Servers..... | 98 |
| 5.23.3 SSL Server Information Not Correctly Set from XML-Formatted Configuration File..... | 98 |

Preface

Purpose of This Manual

The Oracle JDBC for Rdb 7.3.2.0 release notes summarize new features, corrections to software, restrictions, workarounds, and problems. They also include new features and corrections provided in releases 7.2.4.0 through 7.3.1.0. These release notes cover Oracle JDBC for Rdb for OpenVMS on both Alpha and Integrity Servers.

Intended Audience

This document is intended for users responsible for:

- System management
- Database administration
- Application programming

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

Document Structure

This document consists of five chapters:

| | |
|---------------------------|---|
| Chapter 1 | Describes location of documents and installation directions. |
| Chapter 2 | Describes new features and technical changes in this release. |
| Chapter 3 | Describes corrected software errors in this release. |
| Chapter 4 | Describes known problems, restrictions, and workarounds. |
| Chapter 5 | Describes new features and corrected software errors in releases 7.2.4.0 through 7.3.1.0. |

Conventions

Oracle JDBC for Rdb is often referred to as JDBC.

Hewlett-Packard Company is often referred to as HP.

The following conventions are used in this document:

| | |
|-------------|--|
| word | A lowercase word in a format example indicates a syntax element that you supply. |
| [] | Brackets enclose optional clauses from which you can choose one or none. |
| { } | Braces enclose clauses from which you must choose one alternative. |
| ... | A horizontal ellipsis means you can repeat the previous item. |
| · · · | A vertical ellipsis in an example means that information not directly related to the example has been omitted. |

Conventions in Code Examples

Code examples illustrate Java code, SQL or other command-line statements. They are displayed in a monospace (fixed-width) font and separated from normal text as shown in this example:

```
SELECT last_name FROM employees WHERE last_name = 'TOLIVER';
```

The text of exception messages that may be raised are also displayed using the same convention.

▲ [contents](#)

Chapter 1 Installation and Documentation

This chapter contains installation and documentation information for Oracle JDBC for Rdb 7.3.2.0.

1.1 Accessing the Documentation

You can extract release notes or an Oracle JDBC for Rdb document from the PCSI kit prior to installation by following one of these procedures:

- To extract a copy of the release notes, define PCSI\$SOURCE to point to the location (device name and directory) of the PCSI kit. Then, enter the PRODUCT EXTRACT RELEASE_NOTES command followed by the product name at the DCL prompt.

```
$ DEFINE PCSI$SOURCE DKA400:[KITS]
$ PRODUCT EXTRACT RELEASE_NOTES RDBJDBC73
```

- To extract a list of files contained in a software product kit, define PCSI\$SOURCE to point to the location (device name and directory) of the PCSI kit. Then, enter the PRODUCT LIST command followed by the product name at the DCL prompt.

```
$ DEFINE PCSI$SOURCE DKA400:[KITS]
$ PRODUCT LIST RDBJDBC73
```

- To extract a specified file, define PCSI\$SOURCE to point to the location (device name and directory) of the PCSI kit. Then, enter the PRODUCT EXTRACT FILE command followed by the product name and file name at the DCL prompt.

```
$ DEFINE PCSI$SOURCE DKA400:[KITS]
$ PRODUCT EXTRACT FILE RDBJDBC73/SELECT=filename.ext
```

The Oracle JDBC for Rdb documentation is also available on My Oracle Support and OTN.

The installation procedure copies the Oracle JDBC for Rdb release notes to the SYSS\$HELP directory.

1.2 System and Software Requirements

Oracle JDBC for Rdb requires the following software products to be installed:

| Software | Minimum Version | |
|------------------|---------------------|---------------------|
| | Alpha | Integrity |
| HP OpenVMS | V8.2 | V8.2-1 |
| HP Java™ SDK/RTE | V5.0-1 (1.5.0-1) | V5.0-1 (1.5.0-1) |
| Oracle Rdb | V7.2.1 | V7.2.1 |

On the client side, you must install the following software product in order to use the Oracle JDBC for Rdb Thin driver:

| Software | Minimum Version |
|---------------|-----------------|
| Java™ SDK/RTE | V1.5.0-1 |

In addition, if you need to start and stop Oracle JDBC for Rdb servers using Oracle SQL/Services, the following product must be installed:

| Software | Minimum Version | |
|---------------------|-----------------|-----------|
| | Alpha | Integrity |
| Oracle SQL/Services | V7.1.6 | V7.2 |

Note

The minimum version of Java required changed in Oracle JDBC for Rdb release 7.3.0.0. JDK 5.0 is now the minimum SDK/RTE version supported on all platforms for both server and client Oracle JDBC for Rdb components

Detailed information about installing Hewlett-Packard Java for OpenVMS system may be found at the following web site:

<http://www.hp.com/java>.

Documentation for HP's Java for OpenVMS system may be found at the following web sites:

<http://h18012.www1.hp.com/java/documentation/index.html>

In line with HP recommendations for Java applications, Oracle recommends the following minimum quota setting on accounts used to start up Thin servers, in particular those used to start MultiProcess servers.

| | |
|--------------------|---------|
| UAF Fillm | 4096 |
| Channelcnt | 4096 |
| Wsdef | 4096 |
| Wsquo | 8192 |
| Wsextent and Wsmax | 32768 |
| Pgflquo | 3145728 |
| bytlim | 4000000 |
| biolm | 150 |
| diolm | 150 |
| tqelm | 100 |

Be sure to set your systems quotas appropriately to accommodate these process quotas.

See the Java for OpenVMS release notes for more information on OpenVMS quotas and resources required by Java.

Also refer to your Oracle Rdb documentation for recommendations on OpenVMS quotas required for Oracle Rdb.

1.3 Installation

This section describes how to install Oracle JDBC for Rdb and includes a sample log.

1.3.1 Remove Prior BETA Versions of Oracle JDBC for Rdb Release 7.3.

If you were participating in a BETA trial of Oracle JDBC for Rdb 7.3.x.x.x then you must remove any previously installed BETA kits before proceeding with the installation of this release.

Failure to remove previous 7.3 kits may prevent Oracle JDBC for Rdb from functioning correctly. In particular, several changes have been made to the client/server communication protocol during the life of the 7.3 BETA releases that may cause connection failures if 7.3 BETA thin driver jars are used to connect to a 7.3 server or vice-versa.

In addition, ensure that all deployed copies of the 7.3.x.x.x BETA rdbThin.jar are replaced. If not, connection failures may result in the applications using these BETA driver jars.

1.3.2 Contents of the Oracle JDBC for Rdb Kit

The Oracle JDBC for Rdb kit uses OpenVMS Polycenter to simplify the installation of the product. Please refer to your OpenVMS documentation on the use of OpenVMS Polycenter.

The Oracle JDBC for Rdb kit product installation file is named ORCL-pppVMS-RDBJDBC73-V0703-xxxxxx-1.PCSI where ppp will be the platform and xxxxxx will be the build instance of this kit, for example:

```
ORCL-AXPVMS-RDBJDBC73-V0703-0V0A18-1.PCSI  
or  
ORCL-I64VMS-RDBJDBC73-V0703-0V0A18-1.PCSI
```

The installation file is located in the RDBJDBC directory of the Rdb Software distribution CD. If you obtained the Oracle JDBC for Rdb kit from the Web, the installation file is contained in the RDBJDBC73xxxxx.ZIP file, where xxxxxx refers to the build instance of the kit.

The installation kit is comprised of the following files:

| | |
|---|--|
| BUILD_CERTS.COM | Command procedure example of building certificates for SSL. |
| OracleJDBCForRdbClient73000.msi OracleJDBCForRdbClient73000X64.msi | Microsoft installer file for client-side software installation on Windows. |

| | |
|-----------------------|---|
| RDBJDBCCKECHKUP.CLASS | Use to verify the installation of this kit. |
| RDBJDBCCKECHKUP.JAVA | Use to verify the installation of this kit. |
| RDBJDBCCEXEC73.EXE | Executor image in conjunction with a MultiProcess server. |
| RDBJDBCCKCFG.XML | Example XML formatted configuration file. |
| RDBJDBCSTR73.EXE | Shared image required for Oracle Rdb database access. |
| RDBJDBCMPSTR73.EXE | Shared image required for MultiProcess Oracle Rdb database access. |
| RDBJDBC_EXECCLI.COM | CLI helper command procedure. |
| RDBJDBC_INSTALL.COM | Installation command procedure used by Polycenter during installation. |
| RDBJDBC_STARTEXEC.COM | Command procedure used by Oracle JDBC for Rdb Multi-Process server to start up an executor process. |
| RDBJDBC_STARTSRV.COM | Command procedure used when Oracle JDBC for Rdb servers are started up from the Oracle JDBC for Rdb controller. |
| RDB_EXT.JAR | Java jar file containing classes and java code for extensions to Oracle JDBC for Rdb. |
| RDBNATIVE.JAR | Java jar file containing the classes for the Oracle JDBC for Rdb native driver. |
| RDBTHIN.JAR | Java jar file containing the classes for the Oracle JDBC for Rdb thin driver. |
| RDBTHINSRV.JAR | Java jar file containing the classes for the Oracle JDBC for Rdb servers. |
| RDBTHINCONTROL.JAR | Java jar file containing the classes for the Oracle JDBC. |

| | |
|---------------------------------|---|
| | for Rdb controller. |
| RDBTHINSRVPOOL.JAR | Java jar file containing the classes for the Oracle JDBC for Rdb pool server. |
| RDBMANSRV.JAR | Java jar file containing the classes for the Oracle JDBC for Rdb manager server. |
| RDBJDBC_<version>_RELNOTES.PDF | Oracle JDBC for Rdb Release Notes. |
| RDBJDBC_<version>.RELEASE_NOTES | Text version of Oracle JDBC for Rdb release notes. |
| RDBJDBC_USERGUIDE.PDF | User guide. |
| SQLSRV_JDBC_SERVER_STARTUP*.COM | Command procedures used by Oracle SQL/Services to start up an Oracle JDBC for Rdb server. |
| WATCHEVENTS.JAR | Sample application for watching Oracle JDBC for Rdb server events. |

Note

The HTML version of the user guide and release notes are no longer supplied.

1.3.3 Installation Procedure

Follow these steps to install the Oracle JDBC for Rdb kit:

1. If you obtained the kit in ZIP format, restore the kit file to a temporary directory:

```
$ unzip RDBJDBC73xxxx.ZIP -d MY_DIR
```

This will unzip the Polycenter kit for Oracle JDBC for Rdb and you will have access to the PCSI file, ORCL-pppVMS-RDBJDBC73-V0703-xxxxxx-1.PCSI, where ppp is the platform and xxxxxx is the build instance of this kit.

2. Use the Polycenter PRODUCT command to install the kit.

Details of the version of the kit will be displayed and you will be asked if you want to proceed. The following examples of installation on an ALPHA system assume the kit

build instance is 0V0A18, and that the directory where the PCSI file can be found is MY_DIR.

```
$ PRODUCT INSTALL RDBJDBC73/SOURCE=MY_DIR

The following product has been selected:
    ORCL AXPVMS RDBJDBC73 V7.3-0V0A18      Layered Product
[Installed]

Do you want to continue? [YES]

Configuration phase starting ...

You will be asked to choose options, if any, for each selected
product and for any products that may be installed to satisfy
software dependency requirements.

ORCL AXPVMS RDBJDBC73 V7.3-0V0A18: Oracle JDBC for Rdb

    Copyright © 1995, 2010, Oracle Corporation. All Rights Reserved.

This product does not have any configuration options.

Execution phase starting ...

The following product will be installed to destination:
    ORCL AXPVMS RDBJDBC73 V7.3-0V0A18
DISK$AXPVMSSYS:[VMS$COMMON.]

Portion done: 0%...10%...30%...40%...50%...60%...70%...80%...90%

Oracle JDBC for Rdb has been successfully installed in :

DISK$AXPVMSSYS:[SYS1.SYSCOMMON.rdb$jdbc.0703-0V0A18]

To help you setup the required logical names, a file named
RDBJDBC_STARTUP.COM has been added to this installation directory

RDBJDBC_STARTUP.COM:
$! Oracle JDBC for Rdb startup command procedure
$!
$ DEFINE/SYSTEM RDB$JDBC_HOME -
DISK$AXPVMSSYS:[SYS1.SYSCOMMON.rdb$jdbc.0703-0V0A18]
$ DEFINE/SYSTEM RDB$JDBC_LOGS -
DISK$AXPVMSSYS:[SYS1.SYSCOMMON.rdb$jdbc.logs]
$ DEFINE/SYSTEM RDB$JDBC_COM -
DISK$AXPVMSSYS:[SYS1.SYSCOMMON.rdb$jdbc.com]
$ DEFINE/SYSTEM RDBJDBC_SHR RDB$JDBC_HOME:RDBJDBC_SHR73.EXE
$ DEFINE/SYSTEM RDBJDBCMP_SHR RDB$JDBC_HOME:RDBJDBCMP_SHR73.EXE
$ DEFINE/SYSTEM RDBJDBCCEXEC RDB$JDBC_HOME:RDBJDBCCEXEC73.EXE

...100%

The following product has been installed:
```


The installation procedure will copy all the kit files to the appropriate Oracle JDBC for Rdb product directory in the SYS\$COMMON:[RDB\$JDBC] directory.

If they are not already present, the installation procedure will create two new directories, SYS\$COMMON:[RDB\$JDBC.LOGS] and SYS\$COMMON:[RDB\$JDBC.COM].

If an RDBJDBCCFG.XML file is not already present in the SYS\$COMMON:[RDB\$JDBC] directory, the installation procedure will copy the one included in the installation there.

```
$ dir sys$common:[rdb$jdbc]/col=1  
  
Directory SYS$COMMON:[RDB$JDBC]  
  
0703-0V0A18.DIR;1  
COM.DIR;1  
LOGS.DIR;1
```

In addition, the command procedures SQLSRV_JDBC_SERVER_STARTUP*.COM will be copied to the system specific SYS\$MANAGER directory.

3. Use the command procedure RDBJDBC_STARTUP.COM found in the Oracle JDBC for Rdb product installation directory to define the required system logical names:

RDB\$JDBC_HOME to point to the installation home.

```
$ define/system RDB$JDBC_HOME SYS$COMMON:[RDB$JDBC.0703-0V0A18]
```

RDB\$JDBC_LOGS to point to the Oracle JDBC for Rdb log directory.

```
$ define/system RDB$JDBC_LOGS SYS$COMMON:[RDB$JDBC.LOGS]
```

RDB\$JDBC_COM to point to the Oracle JDBC for Rdb command directory.

```
$ define/system RDB$JDBC_COM SYS$COMMON:[RDB$JDBC.COM]
```

RDBJDBCshr to point to the shared image RDBJDBCshr73.EXE.

```
$ define/system RDBJDBCshr -  
SYS$COMMON: [RDB$JDBC.0703-0V0A18]RDBJDBCshr73.EXE
```

RDBJDBCmpshr to point to the shared image RDBJDBCmpshr73.EXE.

```
$ define/system RDBJDBCmpshr -  
SYS$COMMON: [RDB$JDBC.0703-0V0A18]RDBJDBCmpshr73.EXE
```

RDBJDBCexec to point to the shared image RDBJDBCexec73.EXE.

```
$ define/system RDBJDBCexec -  
SYS$COMMON: [RDB$JDBC.0703-0V0A18]RDBJDBCexec73.EXE
```

You must define the RDB\$JDBC_HOME logical name if you want to use a Thin MultiProcess server or use the Controller or Pool servers to start server processes.

4. Include the rdbnative.jar and rdbthin.jar files in your Java CLASSPATH by using either the logical names CLASSPATH or JAVA\$CLASSPATH or the -classpath option on the Java command line:

```
$ define JAVA$CLASSPATH -  
[,RDB$JDBC_HOME:RDBNATIVE.JAR,RDB$JDBC_HOME:RDBTHIN.JAR
```

5. Test your installation using the "RdbJdbcCheckup" Java class in the RDBJDBCCHKUP.CLASS file. During the installation RDBJDBCCHKUP.CLASS is copied to RDB\$JDBC_HOME. Copy this file to your default directory and then you can invoke it using Java. You will be prompted for a username and password and an Oracle Rdb database to test the installation against. If the test succeeds, the text "*Your JDBC installation is correct.*" is displayed.

```
$ java "RdbJdbcCheckup"  
Please enter information to test connection to the database  
user: my_username  
password: my_password  
database: my_db_dir:personnel  
Connecting to the database...Connecting  
connected.  
Hello World  
Your JDBC installation is correct.  
$
```

Test the Thin server by using the following commands:

```
$spawn/nowait/proc=rdbthinsrvtest java -jar rdbthinsrv.jar
$java "RdbJdbcCheckup" "-t"
Please enter information to test connection to the database
user: my_username
password: my_password
database: my_db_dir:personnel
Connecting to the database...Connecting...
connected.
Hello World
Your JDBC installation is correct.
$stop rdbthinsrvtest
```

Note

As Java is a case-sensitive language, it is important to specify class and method names exactly as they are described in the various APIs. By default, the OpenVMS operating system uppercases command line parameters unless you surround them with double quotation marks.

1.3.4 Rdb Thin driver software on Windows

If you are developing or deploying Windows applications that use the Oracle JDBC for Rdb thin driver, you will have to copy the provided **RDBTHIN.JAR** file to each of the Windows systems you will be using. In addition you should consult your application, IDE or Microsoft Windows software guides to determine how to let the application or development environment know where the Rdb thin driver jar can be found.

In order to facilitate installation of the Rdb thin driver on your Windows client systems, included in the Oracle JDBC for Rdb installation kit are two Microsoft Software Installation images, **OracleJDBCForRdbClient73000.msi** and **OracleJDBCForRdbClient73000X64.msi** that may be used on your client Windows systems to install the RdbThin and the RdbThinControl jars.

The **OracleJDBCForRdbClient73000X64.msi** may be used on Windows 64 Bit systems. **OracleJDBCForRdbClient73000.msi** can also be used on Windows 64 Bit systems; however the installation will be placed in the 32 bit subsystem.

Once the appropriate MSI file has been copied to your Windows system, double-click the filename to invoke the Microsoft installer, and then follow the directions provided by the installation Wizard.

This installation will place a copy of the RdbThin and RdbThinControl jars as well as the current JDBC documentation into the designated installation directory on your Windows system.

In addition, pointers to the uninstall procedure, the Rdb Thin Controller shortcut and documentation will be added to your Program Menu.

1.3.5 Rdb Thin driver software on Other operating systems

If you are developing or deploying applications that use the Oracle JDBC for Rdb thin driver, you will have to copy the provided **RdbThin.jar** file to each of the systems you will be using.

You should consult your application, IDE or operating system software guides to determine how to let the application or development environment know where the Rdb thin driver jar can be found.

▲ [contents](#)

Chapter 2 Enhancements Provided in Oracle JDBC for Rdb Release 7.3.2.0.

This chapter describes new and changed features in Oracle JDBC for Rdb release 7.3.2.0.

2.1 Server Options List Inheritance

When a XML-Formatted configuration file is used, many server characteristics may be inherited from either the DEFAULT or the DEFAULTSSL server definitions.

If a characteristic is specified within a specific server definition, that specification will take precedence. If the characteristic is not specified in the specific server definition then if it exists in the default server definition it will be inherited.

In previous versions of Oracle JDBC for Rdb, some characteristics were not inherited and even if specified within the default server definition they would not be passed on to other servers in the same configuration file.

The characteristic that did not get inherited were all list options that included:

Server Configuration List Options

Option

<allowDatabase name="database-name">

<allowPrivUser name="user-name">

<allowUser name="user-name">

<deny sql ="sql-pattern">

<enableEvent name="event-name">

List options provide a mechanism to specify one or more named options that may be used by the server for validity, event checking and other operations. Each server definition may contain multiple values for the same named option, for example, multiple `allowUser` entries can be used to provide a list of users that will be allowed to access that server.

Starting with release 7.3.2.0, the list options specified above may now be inherited from the default server.

The inheritance of these options is cumulative, in that the resultant list of options is the combination of those present in both the default and the specific server definitions.

If a server definition already has an option with the same type and name, it will not be replaced.

Note

An error in prior documentation specified that the `enableEvent` configuration option would be inherited; this is not true for versions of Oracle JDBC for Rdb prior to release 7.3.2.0.

2.2 Oracle JDBC for Rdb Manager Server

The Oracle JDBC for Rdb manager server is a server-side component that services JDBC management requests.

The main purpose of the manager server is to provide a mechanism that will allow JDBC servers to be started up on nodes remote to the one the controlling application, such as the Oracle JDBC for Rdb controller, is running.

Please see the *Oracle JDBC for Rdb Manager Server* section of the *Oracle JDBC for Rdb User Guide* for more information on manager servers.

2.3 Restricting Server Access by IP

JDBC servers may now check incoming connection IPs to determine if the client connection will be accepted.

Using the new server configuration options:

- `<allow ip = "<valid ip mask>" />`
- `<deny ip = "<valid ip mask>" />`

you may restrict access to the server by having the server check the originating IP of the client connection to either accept or reject that IP. The valid IP mask may be either a simple IP specification or may be JAVA regular expression.

See the *Restricting Server, Database and Operational Access* section of the *Oracle JDBC for Rdb User Guide* for more details.

2.4 Executor Balancing

By default, the multi-process server uses a first-in/first-out (FIFO) scan of its free executor list to select the next executor process to allocate to the new connection request.

Oracle JDBC for Rdb now allows you to choose from several new executor balancing protocols.

Please see the *Executor Balancing* section of the *Oracle JDBC for Rdb User Guide* for more information.

2.5 MinFreeExecutors

Multi-process servers may now be configured to maintain a minimum set of free executor processes when the server is cleaning up executor processes that have exceeded their maximum idle time.

Please see the *MultiProcess Server Configuration Options* and the *Executor Maintenance* sections of the *Oracle JDBC for Rdb User Guide* for more information.

2.6 Executor Reuse

Multi-process servers may now be configured to change the way they reuse executor processes.

Please see the *MultiProcess Server Configuration Options* and the *Executor Reuse* sections of the *Oracle JDBC for Rdb User Guide* for more information.

2.7 LogFile Patterns

The server `logfile` configuration option provides an absolute or relative file specification to use as a log file. This specification may also be a special pattern, in which case certain key character sequences may be used in conjunction with normal ASCII filename characters to specify the automatic creation of the log file name.

See the *Logfile Pattern* section of the *Oracle JDBC for Rdb User Guide* for more information.

2.8 New Server configuration option **retainRdbSQLState**

In keeping with third party application requirements, during the processing of INSERT statements, the SQL State returned when using the `SQLException.getSQLState()` method is set to the value "S1000" indicating an error has occurred. The message text of the exception contains the details of the error raised.

Oracle Rdb delivers more specific SQL State values including Rdb specific ("Rxxxx") state values, but these may be suppressed by JDBC.

The server `retainRdbSQLState` configuration option may be used to change this behaviour. When set to "true", JDBC will return the original SQL State raised by the underlying database.

For example:

```
<server
  name = "DEFAULT"
  type = "RdbThinSrv"
  url = "://localhost:1701/"
  retainRdbSQLState = "true" />
```

See the *Server Configuration Options* section of the *Oracle JDBC for Rdb User Guide* for more information.

▲ [contents](#)

Chapter 3

Problems Corrected

This chapter describes software errors corrected in Oracle JDBC for Rdb release 7.3.2.0.

3.1 Event Flag problem with long Executor name Prefixes

Fixed in Instance Build 20120821.

During the creation of an executor process by the MultiProcess server, the server attempts to provide a unique process name for the executor so that it may be easier to recognize when using system tools such as SHOW SYSTEM.

By default, the server will create the process name by utilizing the server name and the unique connection id.

To allow better control of process naming, the prefix of the executor process name may also be explicitly specified by using the server configuration option `srv.execPrefix`. The server will use this prefix and append a sequence number to it in an attempt to provide an unique name.

As there is a limit of 15 characters allowed for OpenVMS process names it is possible that longer prefixes may cause the unique portion of the name to cycle around faster and increase the probability that a process name may be chosen that matches an existing running executor process.

If the process name matches an existing process, the startup of the new executor will fail and the executor process will not be present to acknowledge startup completion to the server.

Normally an executor process failure will be correctly caught by the server and the appropriate exceptions raise, however if the failure happens after the process is correctly created but before this initial acknowledgement, the server will not see the failure for several minutes.

Eventually, an exception similar to the following will be raised:

```
oracle.rdb.jdbc.common.RdbException: Executor not responding on
EFN 66 EFNMASK 4 after 302 seconds
```

This message will be written to the server log. In addition other messages describing the reason for the failure may be found in the log files associated with the executor in the JDBC log area which by default is pointed to by the logical name RDB\$JDBC_LOGS.

The MultiProcess server has now been changed to try to better handle process name clashes by doing further name checking on the running system prior to attempting to start the new process.

3.2 Executor Process Termination Problem

Fixed in Instance Build 20120821.

During the normal shutdown of an executor, the MultiProcess server will request the executor process to self-terminate to ensure that all resources are correctly released prior to the OpenVMS process terminating.

After this self-termination is requested, the server will then check to see if the process is still there, and if it is, will forcibly stop the process.

In heavily utilized systems it is possible that the executor process self-termination has not completed by the time the server does its secondary check and subsequent process termination. In this situation the process may get into a “limbo” state where it fails to closedown correctly and depending on when the second termination is issued the executor process may get trapped in an endless exception handler loop.

The result of this problem is that the executor process may start to consume large amounts of CPU, or may remain idle on the system without releasing resources. In addition this process may cause other problems if the server is restarted and tries to use the same process name for a newly created executor.

This has now been fixed, the server will now allow a greater amount of time for the self-termination to occur before forcing an image exit.

3.3 Some Server Characteristics not Correctly Inherited from DEFAULT

BUG 14510287.

Fixed in Instance Build 20120821.

Some server characteristics are not correctly copied from the DEFAULT or DEFAULTSSL server definitions when named servers are used.

For example if `mycfg.xml` contains the following:

```
.  
. .  
. .  
<server  
  name="DEFAULT"  
  type="RdbThinSrv"  
  url="//localhost:1701/"  
  maxClients="-1"  
  restrictAccess = "true"  
  >  
  <allowUser name = "JDBC_USER"/>  
</server>  
  
<server name="srv1" />  
. . .
```

Starting the server using this configuration and using the `-verify` switch to verify the server characteristics:

```
java -jar rdb$jdbc_home:rdbthinsrv.jar -cfg mycfg.xml -name "srv1" -verify
```

will raise the following exception:

```
java.lang.NullPointerException  
  at oracle.rdb.jdbc.srv.RdbSrv.logServerDetails
```

Although the `restrictAccess` option is correctly inherited, the `allowUser` option from the `DEFAULT` server is not, causing this problem.

Other server characteristics may also fail to be inherited, although several may not cause immediately obvious problems.

The following is a list of server configuration options that are not correctly inherited from either of the default server definitions:

Server Configuration Option

Option

`<allowDatabase name="database-name">`

`<allowPrivUser name="user-name">`

`<allowUser name="user-name">`

`<deny sql ="sql-pattern">`

`<enableEvent name="event-name">`

A workaround is to place these options explicitly in each server definition that requires them.

This has now been fixed.

3.4 Memory Problem with Pool Servers and Java 1.6.0-2

Fixed in Instance Build 20120822.

A problem in Java 1.6.0-2 in the recovery of memory when byte streams are garbage collected may prevent the associated memory from being recovered correctly which may lead to a memory leak in the Java VM. This problem does not occur if the byte streams are explicitly closed prior to garbage collection.

JDBC servers try to ensure that all byte streams used are correctly closed prior to releasing the socket connection to the client, however, a problem within Pool Servers may cause the explicit closure of a byte stream to be bypassed.

The failure of the byte stream to be garbage collected correctly may eventually result in Java VM problems and may cause an exception similar to the following which will terminate the Pool Server:

```
%SYSTEM-F-ASTFLT, AST fault, SP=0082D250, param=7FFEFFC8,  
.  
.  
.
```

The Pool Server has now been modified to ensure that all byte streams are correctly closed prior to socket closure.

OpenVMS Java engineering is aware of this problem.

3.5 Exception not Thrown when Record Locked during Update

Fixed in Instance Build 20130301.

Normally, if JDBC finds a record locked during an insert, update or delete Statement operation, a Record Locked exception will be raised.

However, a problem in the handling of record locks by the Native driver prevents the driver from raising a locked record exception correctly.

Instead, if a locked record is found, the update operation will be aborted and the statement's update count, obtained using the `Statement.getUpdateCount()` method will be set to -4.

Although an exception is not raised, you may still determine if a record lock has occurred by calling the `Statement.getUpdateCount()` after calling the statement execute. If the value returned is -4, a locked record was found. If no locked records were found, the value returned will be the number of records affected by the update.

This problem affects the Native driver only. The Thin driver is not affected.

This problem has been fixed.

▲ [contents](#)

Chapter 4

Known Problems and Workarounds

This chapter describes known problems, restrictions, and workarounds for Oracle JDBC for Rdb Release 7.3.2.

4.1 Thin Server deadlocks

When using a thin server, the Rdb database environment and binds are within the OpenVMS process context of the server process.

When multiple clients attach to database using the same server, each client is allocated its own thread and has its own connection context within Rdb, but from the Rdb engines viewpoint, all of these connections are held by a single process.

The locking behavior of Rdb for connections within a single process differs from that of connections made using discrete OpenVMS processes. In particular when two separate processes try to get the same lock, by default, the second process will wait until the first releases the lock. In contrast when two connections within the same process try to get the same lock, a deadlock may be raised.

Oracle recommends, when using thin servers, that the `lockwait` connection switch or server option be used to prevent deadlocks. By choosing a lock wait duration shorter than your system deadlock wait, and then choosing an appropriate `maxtries` value which determines how many times the server will attempt to get the lock before giving up, deadlocks may be prevented. In addition keeping your transaction duration small, will reduce the time locks are held and thus allowing better concurrency.

See *Lockwait and Maxtries* in your *Oracle JDBC for Rdb User Guide* for more information.

4.2 Using Java Fast VM on OpenVMS

Using Java Fast VM on OpenVMS when you start up thin servers may limit the number of clients a single server may be able to handle concurrently. This is because using Fast VM drastically reduces the amount of certain system memory that the Oracle Rdb subsystem has access to.

The usual symptom of running out of memory due to this situation is when the server process issues COSI-VASFULL errors.

Refer to the OpenVMS Java documentation on using Fast VM for suggestions on how memory usage may be altered.

Heap size used by the Java VM is important in determining how much memory will be pre-allocated by the Java VM. You can set the size of the heap using the `-Xmx` option. By default, the Fast VM looks at your quota and the size of physical memory on the system to decide how large a heap to give you. So if both are very large, you may wind up with a larger heap than you really need. You can use `-verbosegc` on the command line of the command used to start a server to see the current heap size.

Memory usage may also be altered by using the `"-Xglobal"` switch.

If the thin servers are getting COSI-VASFULL errors when Fast VM is enabled, Oracle suggests trying the following switch settings as a first pass at rectifying the problem.

```
$ java "-Xmx24m" "-Xglobal120m" -jar rdbthinsrv.jar
```

4.3 Using the Oracle SQL/Services Management GUI and JDBC Dispatchers

The existing version of the Oracle SQL/Services Management GUI does not recognize dispatchers of the type JDBC. Unfortunately, this means that you will no longer be able to use the GUI once a JDBC dispatcher has been defined.

Removing the JDBC dispatcher from your Oracle SQL/Services definitions will alleviate this problem.

4.4 Blob Columns and Correlation names

Due to the nature of the parsing carried out by the Oracle JDBC for Rdb drivers it is required that all blob columns referenced from the second and subsequent tables in a multi-table join must be qualified using correlation names as shown below:

```
Select ta.blob, tb.blob from table1 ta, table2 tb
where ta.name = tb.name
```

Failure to use a correlation name in conjunction with the blob column name may result in SQL parsing errors when data is retrieved from the blob field as the drivers do not have enough information to determine the correct table to access the blob data from.

```
SQL-F-FLDNOTCRS, Column <blob col> was not found in the tables
in current scope
```

This limitation also means that the use of "*" in the select clause for a join across two or more tables that include blob fields may also cause a similar SQL error.

4.5 Blob Columns and Update Statements

When the SQL statements compiled by the Oracle JDBC for Rdb drivers contain reference to list of byte varying columns (Blobs) the drivers must create auxiliary statements to carry out the required operations on the Blob columns within the database.

These statement handle the preparation of list cursors required by Rdb to access the underlying list of byte varying columns and use the dbkeys of the target rows to establish the correct currency on the parent tables when using the list cursors.

To achieve this, code is added to any Select queries containing reference to Blob columns in order to retrieve the dbkey of the parent table row. Code is also added to Insert and Update statement to return the dbkey of the affected row.

If a Blob column is updated within an SQL Update statement, it is required that the execution of the statement only updates a single row as only a single dbkey can be returned to the drivers.

For example:

```
.
.
.
PreparedStatement prep = Conn.prepareStatement(
    "update resumes set resume = ? where employee_id = '91111'");
prep.setBinaryStream(1, bs, sss.length());
prep.execute();
.
.
.
```

If the resumes table contains more than one row satisfying the query selection criteria then an exception will be raised by Rdb during the execute() :

```
%RDB-E-MULTIPLE_MATCH, record selection criteria should identify
only one record; more than one record found
```


4.6 External Procedures and Thin Server

Due to the way that Rdb carries out internal communication of handles between different component during external procedure execution it is possible that concurrent clients within the same Thin Server trying to use external procedures may see exceptions related to the Rdb error `BAD_DB_HANDLE`.

Currently it is not possible to rectify this limitation within the Thin Server, as the process model used internally by Rdb for using external procedures does not align with how multi-threading has to be carried out within the Thin Server.

As the MultiProcess Server (MP) uses a separate OpenVMS process for each connection, it aligns better with the expected Rdb process model and consequently external procedures may be used by concurrent clients.

Oracle suggests that if external procedures are expected to be executed by concurrent clients, an MP Server should be used to handle these connections.

4.7 Limitations

4.7.1 Unsupported Methods

The following JDBC 2.0, JDBC 3.0 and JDK 1.4 methods are not currently supported:

`Blob.setBytes`

`Blob.setBinaryStream`

`Clob.setString`

`Clob.setAsciiStream`

`Clob.setCharacterStream`

`Clob.truncate`

`Connection.setSavepoint`

`Connection.rollback(savepoint)`

`Connection.releaseSavepoint`

`DatabaseMetaData.getSQLKeywords`

PreparedStatement.setRef
PreparedStatement.setArray
PreparedStatement.setNull(int, int, String)
PreparedStatement.setURL(int, URL)
ResultSet.getRef
ResultSet.getArray
ResultSet.updateAsciiStream
ResultSet.updateBinaryStream
ResultSet.updateCharacterStream
ResultSet.updateRef
ResultSet.updateArray
ResultSet.rowUpdated
ResultSet.rowInserted
ResultSet.rowDeleted
ResultSet.updateBytes
Statement.cancel
Statement.setQueryTimeout
Statement.getMoreResults
Statement.executeUpdate(String sql, int autoGeneratedKeys)
Statement.executeUpdate(String sql, int[] columnIndexes)
Statement.executeUpdate(String sql, String[] columnNames)
Statement.execute(String sql, int autoGeneratedKeys)
Statement.execute(String sql, int[] columnIndexes)
Statement.execute(String sql, String[] columnNames)

The following features or datatypes in JDBC 2.0 and JDBC 3.0 are not supported:

- Array
- Ref
- Clob
- User Defined datatypes
- Scroll cursors
- Savepoints

4.7.2 Auto-generated keys

The total number of markers and fields allowed in a single SQL statement is 250.

4.7.3 String truncation warnings

The Oracle JDBC for Rdb drivers follow the SQL-92 rules for string truncation that differ depending on whether it is a store or retrieval.

If a string truncation happens during a store operation, Oracle Rdb signals the error RDB\$_TRUN_STORE, unless all of the truncated characters are spaces, in which case there is no error. If a string truncation happens during a retrieval, Oracle Rdb signals the SQL warning RDMS\$K_SQLCODE_TRUNCWARN.

4.7.4 Numeric and string functions in JDBC

A number of JDBC standard Numeric and String functions are not supported within Oracle Rdb unless you have previously prepared the database for use with OCI Services for Oracle Rdb using the sql_functions.sql script. Refer to the Oracle SQL/Services documentation for more details on using this script.

▲ [contents](#)

Chapter 5

New Features and Corrections in Previous Releases

5.1 New Features for Release 7.3.1.0.

This section describes new and changed features in Oracle JDBC for Rdb 7.3.1.0.

5.1.1 “Owner” may be used in XML configuration files.

The keyword `OWNER` may be used in certain sections that require a username in the XML Server configuration file.

The keyword `OWNER` specifies the OpenVMS account username of the account used to start the server, and may be used instead of a username in sections such as `AllowUser` or `AllowPrivUser`. For example:

```
.  
. .  
. .  
. .  
<server  
    name = "rdbthnsrv8"  
    type = "RdbThinSrv"  
    url = "//localhost:1708/"  
    restrictAccess = "true"  
    srv.showPoll = "true"  
    allowAccessToCL = "true"  
    >  
        <allowUser name = "jdbc_user"/>  
        <allowUser name = "owner"/>  
        <allowPrivUser name = "owner"/>  
</server>  
. .  
. .
```

5.1.2 SQL Statement Restriction and Denial

Servers may be configured to restrict or deny certain SQL statements. See section *Restricting SQL Statements* in the *Oracle JDBC for Rdb User Guide* for more details.

5.1.3 Event Notification

Servers may be configured to notify enlisted event listeners of events as they occur on the server. Events such as connect and disconnect and memory usage may be monitored.

See section *Event Logging and Notification* in the *Oracle JDBC for Rdb User Guide* for more details.

5.2 Corrections in Release 7.3.1.0.

This section describes software errors corrected in Oracle JDBC for Rdb 7.3.1.0.

5.2.1 MP Server Connection Hang when Executor Dies.

Fixed in Instance Build 20111110

If an executor process dies or is forcibly terminated it is possible that the associated connection within the MP Server may hang indefinitely waiting on a response from the non-existent executor.

Executor process termination is notified to the server through several different internal mechanisms, however inherent in Pthread mutex operations is the possibility that locking operations may prevent the associated thread from acting on the termination notification. If this termination notification is missed or blocked, the thread may wait indefinitely.

The MP server has been changed to include an executor process sweeper thread that will check each active connection utilizing an MP executor to determine if it is still viable.

If the sweeper finds that an executor has been flagged as terminated but the connection is still active and has not been rundown, the thread for the active connection will be forcibly terminated causing a socket exception on the client side.

The new server parameter `srv.lostExecSweep` may be used to specify the frequency of the sweeper thread execution.

See your *Oracle JDBC for Rdb User Guide* for more information on the server parameter `srv.lostExecSweep`.

5.2.2 MP Executor process terminates unexpectedly.

Fixed in Instance Build 20111111

A problem in the server viability checking carried out by the executor process may cause the executor process to self-terminate unexpectedly.

If an executor is associated with an active connection and has remained idle for a predefined amount of time as detailed below, it may incorrectly determine that the parent server is no longer running and self-terminate.

The amount of time the executor will remain in an idle state before termination depends on the MP server attribute `srv.MPMaxTries`.

If the executor is idle for more than `srv.MPMaxTries * 3` seconds, it may self-terminate, thus if the MP Server is using the default `srv.MPMaxTries` of 500 then the executor will self-terminate after 25 minutes of idle time if it still holds an active connection.

This problem only effect executors associated with active connections and not executors within the MP Server free executor pool.

A work-around is to set the `srv.MPMaxTries` to a very large number to delay this termination.

This problem was introduced in release 7.3.0.0 and is now fixed.

5.2.3 Pooled server AutoRestart problem

Fixed in Instance Build 20111117

A problem introduced in release 7.3.0.2 (V7.3-02) may cause the Pool server to incorrectly flag its children pooled servers as unavailable and prevent new connections from being made to these servers.

If a pooled server has “Autorestart” enabled, the Pool server will periodically check to see if the server is viable and if it determines that the server is no longer responding, the Pool server will mark the pooled server as unavailable and then attempt to restart it.

A problem in how the Pool server determines the viability of the child server causes the Pool server to incorrectly mark the child as unavailable. The attempted restart will fail as the original pooled server is still present and connected to the socket that the new instance is trying to allocate. Thus the pooled server will then remain marked as unavailable and will no longer participate in the pool.

This problem will prevent all pooled servers marked as “Autorestart” from participating in the server pool.

A work-around is to set `Autorestart="FALSE"` for each of the pooled servers in the server XML configuration file. This will prevent the Pool server from checking and incorrectly marking as invalid.

5.2.4 `getGeneratedKeys()` and `OutOfBounds` Exception

Fixed in Instance Build 20111219

The call to `ResultSet.getNext()` on a resultset returned by the `Statement.getGeneratedKeys()` may throw the following exception:

```
java.lang.ArrayIndexOutOfBoundsException: -1
```

This exception only occurs when the `getNext()` method is called on the resultset after a prior `getNext()` returned false indicating an end of recordstream.

The following code example will show this problem:

```
.  
. .  
. .  
ps2.execute();  
rs = ps2.getGeneratedKeys();  
if (rs == null)  
    log ("No resultset from execute");  
else  
{  
    while (rs.next())  
    {  
. .  
. .  
    }  
    rs.next(); // this will throw an array exception  
}  
. .  
. .
```

This has now been fixed.

5.2.5 MultiProcess Server fails when Persona used

Fixed in Instance Build 20111221

A problem introduced in 7.3.0.2 (V7.3-02) may cause the MultiProcess server to terminate while attempting to start an executor process.

This problem only occurs if the server has the Persona attribute set.

If the Persona attribute is designated for the server, executor processes will be created using the correct Persona however a problem in determining the process identifier of the executor process may cause a Access Violation within the server process which will terminate the Server image.

The following is an example of the type of exception raised:

```
#
# An unexpected error has been detected by HotSpot Virtual Machine:
#
# %SYSTEM-F-ACCVIO (0xc) at pc=35C5481, pid=564797798, tid=2070302400
#
# Java VM: Java HotSpot(TM) Server VM (1.5.0.20 08/30/2010-13:43 IA64 mixed
mode)
# Problematic frame:
# C [RDBJDBCMPSHR73+0xfffffb2]
#
# An error report file with more information is saved as
hs_err_pid564797798.log
%SYSTEM-F-ACCVIO, access violation, reason mask=00, virtual
address=0000000000000000, PC=000000000113DC30, PS=0000001B
%TRACE-F-TRACEBACK, symbolic stack dump follows
image      module      routine          line      rel PC          abs PC
JAVA$HOTSPOT_SHR  OS      print_hex_dump  133224  00000000000001EF0
000000000113DC30
.
.
.
----- Above condition handler called with exception 0000000C
%SYSTEM-F-ACCVIO, access violation, reason mask=00, virtual
address=0000000000000010, PC=00000000035C5481, PS=0000001B
----- End of Exception message
                                0 FFFFFFFF80393F42
FFFFFFFF80393F42
RDBJDBCMPSHR73  RJDBC_PROC  rjdbc_proc_GetPid
                                42606 000000000000029A1
00000000035C5481
RDBJDBCMPSHR73  RDBJDBC    Java_rdb_JNI_StartProcess
```

The only work-around is to not use Persona for MultiProcess servers.

This has now been fixed.

5.2.6 RestrictAccess being Applied even when Disabled.

Fixed in Instance Build 20120201

The JDBC user guide specifies that if the server attribute `restrictAccess` is not defined or is set to `false` then database and user restrictions will not be carried out.

A problem in how server restriction policy was applied may cause restrictions to be applied even if the server attribute `restrictAccess` is not defined or is set to `false`.

If there is at least one `allowDatabase` element in the server specification then database restrictions were applied to the server. Similarly, the presence of `allowUser` entries would cause the appropriate restrictions to be applied irrespective of the `restrictAccess` settings.

This has now been fixed.

5.2.7 MultiProcess problem in the Native Driver.

Fixed in Instance Build 20120208

Due to changes in thread interleaving introduced in Java JDK6.0 it is possible that applications using the `multiProcess` option of the `rdbNative` driver connections may no longer work correctly when run in a JDK6.0 environment

Interference may occur between simultaneously running threads accessing JDBC connections within the same application object instance which may cause Access Violations within the application.

The nature of the problem depend very much on where the interference occurs and what each thread was trying to do at the time, however more generally the problems may be seen during connection startup.

Various Access Violations, problems with OpenVMS Event Flags and Pthread mutex problems have been noted during connection, with the subsequent prevention of JDBC connections being made correctly or resulting in the hanging or the termination of the running application.

The JDBC `rdbNative` driver has now been changed to carry out more aggressive thread locking at the initial handshake phase of the JDBC connection with the `MultiProcess` executor, to prevent these inter-thread problems.

This problem affects the `rdbNative` driver only, applications using the `rdbThin` driver connecting to `MultiProcess` servers are not affected.

▲ [contents](#)

5.3 New Features for Release 7.3.0.2.

This section describes new and changed features in Oracle JDBC for Rdb 7.3.0.2.

5.3.1 Server Network Keep Alive

The ability to set `SO_KEEPPALIVE` on the socket used on client-side to communicate with a server has been available for a number of releases. This release introduces the same feature on the server-side socket used to communicate back to the client.

See `srv.networkKeepAlive` in the *Server Configuration Options* section of your *Oracle JDBC for Rdb User Guide* for more information.

5.4 Corrections in Release 7.3.0.2.

This section describes software errors corrected in Oracle JDBC for Rdb 7.3.0.2.

5.4.1 Null pointer Exception during Server viability check by Pool Server

Fixed in Instance Build 20110223

When the Pool server checks to see if a pooled server is available and has a free client slot, it is possible that a problem in a disconnect code feature that was added for the Oracle JDBC for Rdb 7.3.0.0 (V7.3) upgrade may cause a `NullPointerException` to be raised by the pooled server.

The pooled server recovers from this exception, but an entry showing the exception is written to the server log.

This has now been fixed.

5.4.2 MINUS and INTERSECT problem

Fixed in Instance Build 20110303

The use of the set operators MINUS and INTERSECT may cause the JDBC SQL parser to incorrectly allocate dbkey and alias variables within the compound statement which may raise SQL syntax errors when the statement is compiled by Rdb.

For example, an SQL syntax error will be raised by the following simple query:

```
select * from employees MINUS select * from employees;
```

```
SQLException: in <rdbjdbcdrv:prepare_stmt>  
F-RELNOTDEF, Table MINUS is not defined in database or schema:42000
```

This has now been fixed.

5.4.3 Memory Leak when Executor Process fails to Run

Fixed in Instance Build 20110419

A small memory leak has been found in the MultiProcess(MP) Server when the server attempts to start a new executor process but fails due to a System or a resource problem. An example of a resource limitation may be insufficient process slots for the additional executor process.

The MP Server correctly signals the exception however it then fails to recover a small amount of memory (157 bytes) which may cause process memory depletion if this situation is repeated many times within the life-time of the server.

This has now been fixed.

5.4.4 Lost Executor not caught by MultiProcess Server

Fixed in Instance Build 20110623

If an executor process terminates unexpectedly while still connected to an active connection, it is possible that the MultiProcess server parent process may not get notification of the terminations and will wait indefinitely for the executor process to respond.

This has now been fixed.

5.4.5 MultiProcess Native driver problem

Fixed in Instance Build 20110623

During the creation of connection contexts when using the MultiProcess feature of the Native driver , the driver did not adequately synchronize the connect operation.

This may result in unexpected and incorrect behaviour during connection if multiple threads are concurrently trying to connect to databases within the same process.

This has now been fixed.

5.4.6 PreparedStatement.getGeneratedKeys() problem.

Fixed in Instance Build 20110712

On the second or subsequent execution of a PreparedStatement, the call to the method getGeneratedKeys() will fail with the following exception:

```
oracle.rdb.jdbc.common.RdbException: Closed Resultset
```

This has now been fixed.

5.4.7 Excessive IOs during Metadata Retrieval.

Fixed in Instance Build 20111002 (PATCH2)

Several SQL queries used by JDBC to retrieve metadata associated with compiled queries may cause excessive IOs on database systems where the column or table definitions are volatile and have had many revision during the life of the database.

This problem was introduced in 7.3.0.2 (first release) and has now been fixed.

5.4.8 Syntax error SQL-F-CONVARUND

Fixed in Instance Build 20111005(PATCH3)

A problem in the determination of the correct table or alias name to use for dbkey references in the additional SQL syntax added by JDBC to allow correct record identification may produce SQL syntax exceptions to be raised.

This problem prevents the query from executing correctly, for example:

```
select * from employees e left join degrees on
      (degrees.employee_id = e.employee_id)
```

will raise the following error:

```
SQLException: SQLState(RR000) vendor code(-1)
@ oracle.rdb.jdbc.common.RdbException: in <rdbjdbcsrv:prepare_stmt>
@ %SQL-F-CONVARUND, Column qualifier EMPLOYEES is not defined
```

This problem only occurs in queries that reference two or more tables.

This problem was introduced in 7.3.0.2 (first release) and has now been fixed.

5.4.9 MultiProcess Server hang

Fixed in Instance Build 20111006(PATCH4)

The MultiProcess (MP) server may hang during Resultset close operations.

A problem introduced in 7.3.0.2 (first release) may cause the server to try to execute code outside the standard application space and cause either a hang in the server process or an Access Violation.

The MP server may encounter this problem at any time while trying to close ResultSets , however in the majority of cases the ResultSet close will operate correctly without problem.

The problem may be seen more readily in very active MP server processes.

Spurious Rdb Dispatcher errors have also been noted due to this problem.

This problem was introduced in 7.3.0.2 (first release) and has now been fixed.

5.4.10 SSL Socket Intrusion problem

Fixed in Instance Build 20111102(PATCH5)

Data injection into an existing open SSL sockets may cause problems with SSL-enabled Thin Servers.

Socket and Port security scanning software may inject data into exiting open SSL socket channels that may cause SSLExceptions on that socket. Depending on the state of the Thin Server at the time of the injection, this intrusion may be handled incorrectly causing the server process to use excessive CPU.

The SSL connection is not compromised by the intrusion attempt, and the underlying database connection is not affected.

This has now been fixed.

▲ [contents](#)

5.5 New Features for Release 7.3.0.1.

This section describes new and changed features in Oracle JDBC for Rdb 7.3.0.1.

5.5.1 Reopen Server Log files using Poll subcommand.

The thincontroller now has the capability to request servers to re-open their log files allowing the previous version of the log file to be examined or copied.

Due to a restriction within Java on OpenVMS, log files opened by a Oracle JDBC for Rdb server cannot be be read or copied while the log files are currently being used by the server.

The thincontroller from Oracle JDBC for Rdb 7.3.0.1 (V7.3-01) , or later from later releases, used in conjunction with Oracle JDBC for Rdb servers from 7.3.0.1 and later releases will allow a control user to request that the server re-open its log file by using the POLL REOPENLOGS subcommand.

See the *POLL Sub-commands* section of the *Oracle JDBC for Rdb User Guide* for more information.

▲ [contents](#)

5.6 Corrections in Release 7.3.0.1.

This section describes software errors corrected in Oracle JDBC for Rdb release 7.3.0.1.

5.6.1 Show Clients not Showing Column Names.

Fixed in Instance Build 20100315

The *Show Clients* command within the Controller displays information about clients currently using JDBC servers.

A problem introduced in Oracle JDBC for Rdb 7.3.0.0 prevents the column header information from being displayed correctly.

The data for each client is still displayed correctly but without column identification.

```
rdbthincontrol> show active clients

Server rdbthnsrv3 (//192.168.1.3:1706/)

00000004*
<CONTROL CONNECTION>
jdbc_user
192.168.1.3:1459
0x16A0 (5792)
0x16A0 (5792)

2010-03-15 09:59:59.296 : INIT_CONTROL

0 00:00
0
1970-01-01 10:00:00.0
rdbthincontrol>
```

The following shows how the display should look:

```
rdbthincontrol> show active clients

Server rdbthnsrv3 (//192.168.1.3:1706/)

RDB$CLIENT_ID           : 00000006*
RDB$URL                  : <CONTROL CONNECTION>
RDB$USER                 : jdbc_user
RDB$IP                   : 192.168.1.3:1665
RDB$PID                  : 0x16A0 (5792)
RDB$PID_AT_EXECUTOR     : 0x16A0 (5792)
RDB$LAST_SQL             :
RDB$LAST_ACTION         : 2010-03-15 10:55:01.312 : INIT_CONTROL
RDB$LAST_EXCEPTION      :
RDB$TIME_SINCE_LAST_ACTION : 0 00:00
RDB$MINUTES_SINCE_LAST_ACTION : 0
RDB$LAST_OPEN           : 1970-01-01 10:00:00.0
rdbthincontrol>
```

5.6.2 Batched Statement Fails with MULTIPLE_RECORDS Exception.

Fixed in Instance Build 20100611.

To provide additional JDBC driver functionality in Oracle JDBC for Rdb 7.3.0.0, during the preliminary parsing of SQL update or insert statements, the Oracle JDBC for Rdb drivers may append extra SQL syntax to the query to deliver the dbkey of the updated or inserted record back to the driver for later processing.

If during the execution of that query, Rdb raises a `MULTIPLE_RECORDS` exception, the JDBC drivers will re-issue the statement again without the dbkey retrieval clause, allowing the update statement to complete successfully.

If however, the update statement is issued as a batched statement by using the `Statement.addBatch()` method, the additional dbkey retrieval code may cause that batch statement to fail. In which case Oracle JDBC for Rdb does not re-issue the query and the update will not be done.

The Rdb JDBC drivers have been changed to not add the extra dbkey retrieval code if the statement is being processed as a batched statement.

5.6.3 Incompatibility between 7.3.0.0 Thin Driver and Prior Release Servers.

Fixed in Instance Build 20100611.

Ideally, when upgrading Oracle JDBC for Rdb, all components on both the server systems and all client systems should be updated to the same version at the same time.

Although not documented nor supported as a feature, Oracle JDBC for Rdb attempts to maintain upward and downward compatibility between its servers and the Rdb Thin drivers.

However a change in the initial connection hand-shake between the Thin driver and server introduced in 7.3.0.0 (V7.3) may prevent applications using the 7.3.0.0 Thin driver from connecting correctly to Oracle JDBC for Rdb servers from earlier Oracle JDBC for Rdb versions.

The connection of applications using Thin drivers from release prior to 7.3.0.0 to a 7.3.0.0 server should still work correctly.

These incompatibility issues have now been resolved.

5.6.4 Global Memory leak when Executors are run-down.

Fixed in Instance Build 20100611

Bug 9787051

A problem in the release of global shared memory when an executor process is run-down by a MultiProcess (MP) server may cause the server to eventually run out of global memory.

If this happens the following exception will be raised:

```
System Error : Insufficient global memory
```

When a MP server runs out of global memory it cannot start-up new executor processes.

As this problem occurs when an executor is run-down when it is no longer required, a work-around for this problem is to increase the `maxFreeExecutor` count for the server to a number that will be sufficient to handle the peak load of the server and to increase the server `sharedMem` appropriately.

This has now been fixed.

5.6.5 Autorestart on Pooled Servers not Working.

Fixed in Instance Build 20100611

BUG 9656632

When a Pool server starts a child server that is marked for autorestart, the child server information is placed on a queue that is periodically checked by the Pool server to ensure the child server is still viable.

If the Pool server finds that the child is not available and that child server is marked for autorestart, the Pool server will try to restart that server.

A problem was introduced in Oracle JDBC for Rdb 7.3.0.0 (V7.3) within the Pool server code that caused the Pool server to incorrectly mark a newly started child server as “failed in startup”.

If the pool server thinks that the child server did not start correctly the server will not be placed in the check queue used to determine if the child server is still available.

This in turn means that the pool server will not automatically restart the child server if the child server process subsequently dies.

This has been fixed.

5.6.6 setFetchSize() hint ignored by PreparedStatement

Fixed in Instance Build 20100623

In prior versions of Oracle JDBC for Rdb, the execution of `setFetchSize()` method on a `PreparedStatement` would be silently ignored.

The connected server process would determine the fetch size of subsequent operations on the `PreparedStatement` and ignore the fetch size hint provided.

This behavior has now been changed. The fetch size hint provided by the execution of the `setFetchSize()` method on a `PreparedStatement` prior to the execution of the statement may now be taken into account by the server when determining the number of records that should be sent in one network IO operation.

As this is only a hint, the connected server may still choose to ignore it.

5.6.7 Missing Stmt Exception on Subsequent Execution of PreparedStatement

Fixed in Instance Build 20100623

The second or subsequent execution of a `PreparedStatement` may raise the following exception:

```
java.sql.SQLException: Missing Stmt in rdbSelect
@rdb.Client.SELECT
```

This exception may be raised on any subsequent executions of the same `PreparedStatement` object if the prior execution of the same statement retrieved a greater number of records than the connected server's fetch size.

The following example will show this errant behavior if the `fetchSize` specified for the connected server is less than 10 rows:

```
.
.
.
try
{
    ps = conn.prepareStatement(
        "select last_name from employees limit to 10 row");
```

```

        ResultSet rs = ps.executeQuery();
        while (rs.next())
        {
            System.out.println("  result1 <" + rs.getString(1) + ">");
        }
        rs = ps.executeQuery(); //<<<<<< this would fail
        while (rs.next())
        {
            System.out.println("  result2 <" + rs.getString(1) + ">");
        }
    }
    finally
    {
        if ( ps != null ) ps.close();
    }
    .
    .
    .

```

This problem was introduced in 7.3.0.0 (V7.3) JDBC and only occurs when using the Oracle JDBC for Rdb thin driver.

5.6.8 EOFException on READ_ROW with nested statements

Fixed in Instance Build 20100629

A problem in statement context handling may cause the following exception to be raised:

```
java.io.EOFException @rdb.Client.READ_ROW
```

This problem may occur when the following conditions are met.

1. A select query is executed as the outer query
2. An update statement is executed as an inner statement
3. The fetch size of the select query is less than the total number of records returned by the query
4. Fetch Size number of record have already been returned by the outer query

An example of code which may show this problem is shown below:

```

.
.
.
Statement stmt = conn.createStatement();
stmt.setFetchSize(10); // less than the total number of records
PreparedStatement ps = conn.prepareStatement (
    "update job_history set supervisor_id = '00245' where "+
    "employee_id= ?");
ResultSet rset = stmt.executeQuery(
    "select employee_id from employees limit to 20 rows");
int i = 0;

```

```

try
{
    while (rset.next())
    {
        i = i + 1;
        System.out.println(i + "      " +
                           rset.getString("employee_id"));
        ps.setString(1, rset.getString("employee_id"));
        ps.executeUpdate();
    }
}
catch (SQLException sqle)
{
    sqle.printStackTrace();
}
.
.
.

```

5.6.9 DatabaseMetaData.getUDTs()

Fixed in Instance Build 20100702

Although Rdb does not currently support UDTs you may still retrieve the column descriptions from the empty `ResultSet` produced when the method `DatabaseMetaData.getUDTs()` is called.

However a problem in the retrieval of the last column from the `ResultSetMetaData` may result in a Null Pointer exception.

```
java.lang.NullPointerException
```

This has now been fixed.

5.6.10 Using MultiProcess with the JDBC Native Driver

Fixed in Instance Build 20100718

A problem was introduced in Oracle JDBC for Rdb 7.3.0.0 (V7.3) preventing the use of the `multiProcess` option within JDBC Native driver connections.

When a connection is attempted using the JDBC Native driver with a connection URL that contains the `@multiprocess=true` switch the following exception was raised:

```
INFO: server version needs to be V7.3 or later
```

This has now been fixed.

5.6.11 Prepared Statement not Closing underlying Cursor.

Fixed in Instance Build 20100721

A problem introduced in Oracle JDBC for Rdb 7.3.0.0 (V7.3) prevents PreparedStatements containing select statements from correctly closing cursors when the statement is re-executed but no results set read was issued on the previous execution of the same prepared statement instance.

The following exception may be raised:

```
%SQL-F-CURALROPE, Cursor C_XXXXXXXXXX was already open
```

The following code snippet show an example of the type of code that may show this problem:

```
.  
. .  
String sql = "select dbkey from employees";  
ResultSet rs;  
int maxi = 10;  
PreparedStatement st=conn.prepareStatement(sql);  
for(int j=0;j<maxi;j++)  
{  
    rs=st.executeQuery();  
    rs.close(); // note: no read on the resultset  
                // issued within the iterating block  
}
```

The problem would be seen on the second and subsequent iterations of the `executeQuery`.

This has now been fixed.

5.6.12 Release Statement synchronization problem

Fixed in Instance Build 20100802

Oracle JDBC for Rdb release 7.3.0.0 (V7.3) introduced improvements in the network handling of selection statements. A problem in the optimization of network IOs introduce in 7.3.0.0 may produce the following exception during statement release:

```
oracle.rdb.jdbc.common.RdbException: received 503316549 (0x4500001E)
: expected 1 @rdb.Client.RELEASE_STMT
```

This problem may occur only when the following conditions have been met:

1. A select statement has been executed.
2. Statement select optimization has not been turned off.
3. The total size of a FetchSize number of records is greater than 9600 bytes.
4. The statement is closed before any records have been read from the associated resultset.

This has now been fixed.

5.6.13 Unitialized SQLCA block in MP server

Fixed in Instance Build 20100906

A problem in how internal SQLCA blocks were initialized by the MultiProcess server may cause a nested exception to be raised during exception handling.

The SQLCA block failed to initialize correctly which may cause incorrect message size information to be used when the server tries to dump out the underlying error message, which in turn may cause the server to try to access incorrect memory addresses.

This problem may lead to various access violation exceptions including :

```
%CXXL-F-TERMINATE, terminate() or unexpected() called
Improperly handled condition, image exit forced by last chance
handler.
```

This has now been fixed.

5.6.14 Controller SHOW CLIENTS and MP Server problem

Fixed in Instance Build 20100315.

Note

This problem was reported fixed in Oracle JDBC for Rdb 7.3.0.0 but unfortunately, the fix was incomplete.

When the command SHOW CLIENTS or SHOW ALL CLIENTS is issued within the Controller, if the recipient server is a MultiProcess server (MP Server), an executor process may be started up by the server to execute the request.

A problem in the executor code prevents the executor from closing down correctly if the maximum number of free executors has already been reached for the MP Server. This new executor process will not be added to the free executor pool, but will not be shutdown and thus will remain active on the system.

If the controller SHOW CLIENTS command is issued again, the number of executor processes may increase until an Open VMS quota or process quota is exceeded.

This problem has now been fixed.

5.6.15 Documentation Error – Record Streaming

In the Oracle JDBC for Rdb 7.3.0.0 release notes the Performance Enhancements subsection of the New Features section mentions that Record Streaming is available from 7.3.0.0 onwards.

Unfortunately a number of problems required the removal of this feature prior to the 7.3.0.0 release, but the 7.3.0.0 releases notes were not correctly updated to remove reference to the feature prior to product shipment.

This feature may be made available in a later release of Oracle JDBC for Rdb.

5.6.16 ResultSet.updateRow() and ResultSet.deleteRow() problem

Fixed in Instance Build 20110127.

Bug 9668574

A problem introduced in the Oracle JDBC for Rdb 7.3.0.0 release prevents ResultSet.updateRow() and ResultSet.deleteRow() from working correctly.

During the execution of the update one of the following errors may be raised:

```
Internal Error
```

or

```
SQL-F-SYNTAX_ERR, SYNTAX ERROR
```

This has now been fixed.

5.6.17 Problem using column renaming with dbkey.

Fixed in Instance Build 20110127.

Changes to SQL statement parsing introduced in Oracle JDBC for Rdb 7.3.0.0 inadvertently introduced a problem in queries that access the dbkey of records directly.

For example the following query:

```
select dbkey as ID, last_name from employees;
```

may cause the following exception to be raised:

```
Exception: Unhandled exception@Statement.execute :  
java.lang.ArrayIndexOutOfBoundsException:S1000
```

This problem only occurs when the dbkey is retrieved as the first named column of the selection expression and the column name is changed by using the 'AS' clause.

Some simple work-arounds are:

1. move the dbkey clause to the second or subsequent column reference:

```
select last_name, dbkey as ID from employees;
```

2. Remove the column renaming:

```
select dbkey, last_name from employees;
```

This has now been fixed.

5.6.18 Class cast error on Scaled integer Retrieval after ResultSet.insertRow()

Fixed in Instance Build 20110128.

During the conversion of a scaled integer invoked by a ResultSet object retrieval the following error may be raised:

```
oracle.rdb.jdbc.common.RdbException: Connection lost
: java.lang.Long
@rdb.Client.GET_INT_VAL
```

This problem occurs when:

- The object retrieved is a scaled integer
- Immediately prior to the retrieval a ResultSet.insertRow() was carried out on the same ResultSet

The following code example will show this problem during the call to the getInt() method:

```
.
.
.
Statement stmt = conn.createStatement();
ResultSet rset = stmt.executeQuery("select * from JOBS");
rset.moveToInsertRow();
rset.updateString("JOB_CODE", "JAVA");
rset.updateString("WAGE_CLASS", "1");
rset.updateString("JOB_TITLE", "Java Tester");
rset.updateInt("MINIMUM_SALARY", 90000);
rset.updateInt("MAXIMUM_SALARY", 250000);
rset.insertRow();

while (rset.next())
{
    System.out.println(rset.getString("JOB_TITLE"));
    System.out.println("min salary = " +
        rset.getInt("MINIMUM_SALARY"));
}
.
.
.
```

This has now been fixed.

5.6.19 ResultSet.deleteRow() behaviour change.

Fixed in Instance Build 20110201.

Prior to the V4.0 JDBC specification, the current row positioning after resultset-based record deletion was not clearly defined in the JDBC specification.

In prior releases of Oracle JDBC for Rdb the row position would remain at the same absolute position after the row has been removed. Thus, for example, if the deletion row was the 10th row, then after removing the record, the current row position would still be the 10th record within the resultset, effectively moving the remaining records down one position.

This may cause unexpected behaviour while traversing the resultset. For example, the following code will delete every second record in the resultset as after each deletion the remaining rows would be shifted down one position:

```
.  
. .  
. .  
Statement stmt = conn.createStatement(  
    ResultSet.TYPE_SCROLL_INSENSITIVE,ResultSet.CONCUR_UPDATABLE);  
  
ResultSet rset = stmt.executeQuery ("SELECT * FROM employees");  
while (rset.next ())  
{  
    System.out.println("Select: " + rset.getString (1) );  
    rset.deleteRow();  
}  
. .  
. .  
. .
```

To remove each row the row position would have to be reset each time back to the prior row:

```
.  
. .  
. .  
Statement stmt = conn.createStatement(  
    ResultSet.TYPE_SCROLL_INSENSITIVE,ResultSet.CONCUR_UPDATABLE);  
  
ResultSet rset = stmt.executeQuery ("SELECT * FROM employees");  
while (rset.next ())  
{  
    System.out.println("Select: " + rset.getString (1) );  
    rset.deleteRow();  
    rset.previous ();  
}  
. .  
. .  
. .
```

In V4.0 of the JDBC specification, the row position after deletion using the `ResultSet.deleteRow()` is now specified:

After the method `deleteRow` has been called, the cursor will be positioned before the next valid row. If the deleted row is the last row, the cursor will be positioned after the last row.

Oracle JDBC for Rdb drivers have now been changed to comply with this behaviour. The resetting of the row position using `rset.previous()` as shown in the example above is no longer required.

5.6.20 Underlying Blob handles not released when using `ResultSet.getBlob()`

Fixed in Instance Build 20110201.

The `ResultSet.getBlob()` method may be used to return the contents of a Rdb segmented string column to your application as a Blob object.

A problem in the underlying Rdb statements associated with the retrieval of segmented strings prevented the handles from being released correctly.

This may lead to memory problems in the Oracle JDBC for Rdb server or the Java application if many Blobs are being retrieved.

In addition as these statements are compiled and not released, operations such as `DROP TABLE` may be blocked if attempted subsequent to and within the same connection as Blob operations.

The following exception may be raised:

```
%RDB-E-NO_META_UPDATE, metadata update failed
-RDMS-F-ACTQUERY, there are queries compiled that reference relation
...
```

This has now been fixed.

5.6.21 Sequence values not visible to `ResultSet` get methods using column name.

Fixed in Instance Build 20110204.

Bug 9659036

The retrieval of data from ResultSet columns using any of the 'by name' methods fail when the column is one of the special sequence operations such as nextval or currval.

The following code will raise an exception when the second println statement is called:

```
.
.
.
ResultSet rs = s.executeQuery(
    "select reportseq.nextval from rdb$database" );
if (rs.next())
{
    System.out.println(" by id    = " + rs.getBigDecimal(1) );
    System.out.println(" by name="+
        rs.getBigDecimal("reportseq.nextval"));
}
.
.
.
```

The following exception will be raised:

```
Invalid column name
```

A similar problem may be seen when trying to retrieve column names using the `ResultSetMetaData.getColumnname()` method:

```
.
.
.
ResultSet rs = s.executeQuery(
    "select reportseq.nextval from rdb$database" );
ResultSetMetaData rsMetaData = rs.getMetaData();
String columnName = rsMetaData.getColumnname(1);
while (rs.next ())
{
    System.out.println("Select: " + rs.getBigDecimal(columnName));
}
rs.close();
.
.
.
```

The column name returned by the `ResultSetMetaData` method will be an empty string and subsequent use of this value will fail to retrieve any column information.

As the first example shows, a work-around for the first problem is to use the column index instead of the name in the get method.

An alternate work-around is to use a column alias in the query.

```
.  
. .  
ResultSet rs = s.executeQuery(  
    "select reportseq.nextval as NEXT_ID from rdb$database" );  
if (rs.next())  
{  
    System.out.println("by name = " +rs.getBigDecimal("NEXT_ID"));  
}
```

There is no work-around for the `ResultSetMetaData.getColumnName()` problem.

These problems have now been fixed.

5.6.22 Scaled integer problem.

Fixed in Instance Build 20110208.

The Oracle JDBC for Rdb native driver may fail to return the values of scaled integer columns correctly.

If the column size is less than 4 octets and has a scaling factor other than 0 the native driver may return wrong values.

Columns with the following datatypes are affected:

- SMALLINT(n)
- TINYINT(n)

This problem only occurs when using the native driver; the thin driver will return the values correctly.

SMALLINT and TINYINT columns not using scaling are not affected.

This has now been fixed.

5.6.23 Server Matching Exception may Stop Poll handling

Fixed in Instance Build 20110210.

If a server finds an exception during the handling of a server control function such as a POLL request, the server will log the exception and then close down asynchronous broadcast request handling.

This means that from that point onwards, operations such as ThinController POLLing will no longer be acknowledged by the server.

Standard client and control function are not affected and the server will keep on handling client requests correctly, however it will no longer respond to control requests such as POLL.

A simple example of this behavior can be shown by issuing a server name matched POLL request containing an invalid pattern string:

```
rdbthincontrol> poll #name:*srv*.
```

The server will log the following exception:

```
Dangling meta character '*' near index 0
 *srv*.
  ^
```

The server will not respond to further POLL request until it has been restarted.

This behaviour has now been changed. The server will still log the exception but unless the problem is a network IO problem or the server is in the process of shutting down, the asynchronous broadcast request handling will still be enabled. Thus operations such as POLL request handling will still be carried out by the server.

The only workaround is to restart the server again.

This has now been fixed.

▲ [contents](#)

5.7 New Features for Release 7.3.0.0.

This section describes new and changed features in Oracle JDBC for Rdb 7.3.0.0.

5.7.1 Shutdown Thread

Starting with Oracle JDBC for Rdb release 7.3.0.0 (V7.3) the JDBC drivers will create a shutdown thread when they are initially invoked. The purpose of this thread is to use the shutdown-hook feature provided by OpenVMS that will execute the

thread at shutdown. The shutdown thread will ensure that any connection left open by the application will be correctly disconnected prior to the application shutdown proceeding, thus preventing application hangs at shutdown.

The application developer does not need to change any code for this shutdown feature to be enabled, as long as the application is using Oracle JDBC for Rdb 7.3.0.0 driver libraries (or later versions) the shutdown hook will be in place.

See the section *Shutdown Thread* in the *Oracle JDBC for Rdb User Guide* for details.

5.7.2 Driver.attach()

A new method has been added to the Oracle JDBC for Rdb drivers, that will allow second and subsequent databases to be attached to an existing database connection.

See the *Oracle JDBC for Rdb User Guide* for details.

5.7.3 Returning List of Known Databases

The Oracle JDBC for Rdb Thin Driver will now allow client applications to obtain a list of databases known to Oracle JDBC for Rdb servers.

See the *Oracle JDBC for Rdb User Guide* for details.

5.7.4 Controller Enhancements

Several enhancements have been made to the Oracle JDBC for Rdb Thin Controller application including:

- Obfuscate command
- Server matching patterns for the POLL command

See the *Oracle JDBC for Rdb User Guide* for details.

5.7.5 RDB_EXT.JAR file

Oracle JDBC for Rdb 7.3.0.0 installation now includes the RDB_EXT.JAR file that contains classes and Java source for extensions to Oracle JDBC for Rdb.

The following extensions are include:

- Hibernate RdbDialect.java source
- Oracle UCP enabling classes

Details of these extensions follow.

5.7.5.1 Hibernate RdbDialect.java source

Hibernate by Red Hat is a persistence engine that provides an alternative to standard entity beans.

To allow Oracle JDBC for Rdb drivers to be used in conjunction with Hibernate the RdbDialect.java source file is provided. You will find this source file in the top-level folder of the RDB_EXT.jar.

See your Hibernate documentation for details on using third party JDBC drivers and Dialects.

5.7.5.2 Oracle UCP enabling classes

UCP or, Universal Connection Pool, is a new database feature included in Oracle database 11g 11.1.0.7, Oracle database 11.2.0.x and Oracle AS 11g R1. UCP works with any Java based connections, e.g., JDBC, JCA, LDAP.

The RDB_EXT.JAR file installed with Oracle JDBC for Rdb, provides the necessary classes to enable Oracle JDBC for Rdb drivers to be used in the connection pools created by UCP.

The class:

```
oracle.rdb.jdbc.rdbExt.RdbDataSource
```

found in the RDB_EXT.JAR may be used as a Connection Factory class for UCP, for example:

```
import oracle.ucp.jdbc.PoolDataSource;
import oracle.ucp.jdbc.PoolDataSourceFactory;
.
.
.
    PoolDataSource pds = PoolDataSourceFactory.getPoolDataSource();
    pds.setConnectionFactoryClassName(
        "oracle.rdb.jdbc.rdbExt.RdbDataSource");
    pds.setURL("jdbc:rdbThin://localhost:1701/my_dir:mf_personnel");
    pds.setUser("jdbc_user");
    pds.setPassword("jdbc_user");
    pds.setInitialPoolSize(0);
    Connection conn2 = null;

    for (int i = 0; i < 5 ; i++ )
    {
        conn2 = pds.getConnection();
        Statement sc = conn2.createStatement();
    }
.
```



```
.  
.    rs.close();  
    sc.close();  
    conn2.close();  
}  
.    .  
.
```

For more details, see the UCP Users Guide at

<http://www.oracle.com/technetwork/database/features/jdbc/index-091264.html>

5.7.6 Performance Enhancements

Several enhancements have been made to the client/server connectivity and to server/executor communications to improve performance including:

- Internal client/server message protocol changes
- Enhanced SQL Statement caching
- Results caching
- Server/executor synchronization

Details of these enhancements may be found in the following sub-sections.

5.7.6.1 Internal client/server message protocol changes

Network round-trip times for communication between client applications and JDBC servers may constitute a large portion of wait time for applications. To help reduce this wait time Oracle JDBC for Rdb has changed its client/server message protocol in order to reduce the number of round-trips taken to:

- Attach to the database
- Compile and execute a SQL statement.

These enhancements are enabled automatically from V7.3 onwards.

5.7.6.2 Enhanced SQL Statement caching

As well as caching of certain statement information on the client-side, reducing the number of network IOs required for statement compilation, 7.3.0.0 allows the caching of statement handles. See the sections *SQL Statement Cache* and *Caching Statement Handles* in the *Oracle JDBC for Rdb User Guide* for more details.

5.7.6.3 Results Caching

7.3.0.0 will allow limited caching of resultSets on the client side. This is particularly useful in multi-tiered environments for statements that are repeatedly executed giving the same results each time, especially in a pooled connection environment. See the section *Results Cache* in the *Oracle JDBC for Rdb User Guide* for more details.

5.7.6.4 Server/Executor Synchronization

Starting with release 7.3.0.0, the method used to synchronize operations between a MultiProcess server and its sibling executors has been improved to reduce the amount of CPU required and to speed-up operations.

▲ [contents](#)

5.8 Corrections in Release 7.3.0.0.

This section describes software errors corrected in Oracle JDBC for Rdb 7.3.0.0.

5.8.1 Server startup failure when using CFG file

Fixed in Instance Build 20090201

A problem in parsing the configuration file during server startup may cause the server to fail to startup correctly.

The following is an example of the error message seen:

```
$ java "-jar" "rdb$jjdbc_home:rdbthinsrvpool.jar" -  
  "-cfg" rdbjdbc_cfg.cfg "-srv.mcGroupIP" "239.8.124.3"  
Configuration file problem at line 1  
Content is not allowed in prolog.
```

This problem only occurs when using JDK 1.5-0 and above and using a Properties file (*.cfg) to hold the server configuration properties.

A work-around for this problem is to use an XML-based configuration file instead.

5.8.2 AccessViolation on disconnect when Inserting Blobs

Fixed in Instance Build 20090301

A problem in determining the memory allocation for Blob variables may result in a memory Access Violation during disconnect.

The problem only occurs if during the connection, data was inserted into Blob variables and subsequently inserted into a segmented string column in the database.

This has now been fixed.

5.8.3 PreparedStatement and Parameter Markers Known Problem now Resolved

Fixed in Instance Build 20090702

In previous version of Oracle JDBC for Rdb the following known problem was noted:

Using PreparedStatement and Parameter Markers

During the creation of a prepared statement using the `Connection.prepareStatement()` method, the Oracle JDBC for Rdb drivers call Oracle Rdb SQL to compile the SQL statement and describe its select fields and parameter markers. At this time SQL builds internal message representations of the parameter markers that may be passed to Oracle Rdb when the prepared statement is executed.

The maximum size of character values that may be passed using each parameter marker is fixed by SQL at this stage. This may cause inconsistent results when the application attempts to use character string values that are longer than the maximum size determined by SQL for that parameter.

If the input value is longer, the value will be truncated by SQL prior to being sent to Oracle Rdb for processing.

This does not pose any problems if the query selection is equality, however, other Boolean comparisons may cause unexpected results. For example, this query will return the record:

```
.  
. Statement stmt = conn.createStatement();  
. stmt.execute("create table tab (f1 char(3))");
```

```

stmt.execute("insert into tab values ('123')");
PreparedStatement ps;
ps = conn.prepareStatement( "select f1 from tab where f1 like ?");
ps.setString(1, "123");
ps.execute();
.
.
.

```

This query will not return the record:

```

.
.
.
ps.setString(1, "%123");
ps.execute();
.
.
.

```

The reason the above query fails is that SQL will set the maximum size of the parameter text string to 3 characters (the size of field F1). The input value will be truncated to %12 before being sent to Oracle Rdb and will not match the record.

In conjunction with changes made to Oracle Rdb 7.2.4.0 (V7.2-4), this problem has now been resolved and queries similar to the ones shown above should now deliver the correct results.

This fix will only work with Oracle Rdb versions 7.2.4.0 and higher.

5.8.4 Controller SHOW CLIENTS and MP Server problem

Fixed in Instance Build 20090821.

When the command SHOW CLIENTS or SHOW ALL CLIENTS is issued within the Controller, if the recipient server is a MultiProcess server (MP Server), an executor process may be started up by the server to execute the request.

A problem in the executor code prevents the executor from closing down correctly if the maximum number of free executors has already been reached for the MP Server. This new executor process will not be added to the free executor pool, but will not be shutdown and thus will remain active on the system.

If the controller SHOW CLIENTS command is issued again, the number of executor processes may increase until an Open VMS quota or process quota is exceeded.

Note

This problem was not completely fixed in the 7.3.0.0 release. This has subsequently been rectified in the 7.3.0.1 release.

5.8.5 Possible memory leak when updating Blob columns

Fixed in Instance Build 20090827

During the processing of update statements containing references to Blobs (list of byte varying) columns, the JDBC drivers incorrectly compile the statement twice.

Only the second statement handle is released when the statement is closed which will lead to Rdb statement handles still being active within the current connection.

These active handles use memory and resources within the drivers and the Rdb system which may eventually lead to problems due to insufficient resources in long running connections.

In addition these compiled queries may prevent metadata operations from occurring on the affected tables within the current connection.

5.8.6 Access Violation with trace and Network Dump

Fixed in Instance Build 20090904

When the following trace flags are set together in TraceLevel, it is possible that an access violation may occur if the size of the data being flushed to the network is very large:

| Bit | Hexadecimal Value | Decimal Value | Traces |
|------------|--------------------------|----------------------|---|
| 9 | 0x00000200 | 512 | Network sends |
| 30 | 0x40000000 | 1073741824 | Full provides more details on certain flags |

For example, when inserting a Blob with more than 3MB of data the dump of the network buffer may overflow memory and cause memory problems that will terminate the server unexpectedly.

This problem only occurs with RdbThin connections using either a standard or a MultiProcess server.

5.8.7 Named Input Parameters not working with CallableStatements

Fixed in Instance Build 20100210.

Using named parameters to set input parameter values of CallableStatements may fail with the following exception:

```
oracle.rdb.jdbc.common.RdbException: Invalid column name :
```

The JDBC code fails to locate input parameters by name correctly.

An example of the type of code statement that may be affected:

```
.  
. .  
stmt.executeUpdate("create module myproc " +  
    "LANGUAGE SQL " +  
    "procedure myproc(IN :val_in integer; OUT :val_out" +  
    "BEGIN " +  
    "    SET :val_out = :val_in; " +  
    "END; END MODULE");  
  
CallableStatement proc = conn.prepareCall(  
    "{ call myproc(?,?) }");  
  
proc.setInt("val_in", 999);  
. . .
```

Exception raised when executing the proc.setInt() method:

```
oracle.rdb.jdbc.common.RdbException: Invalid column name : val_in
```

Input parameters are marked as IN in the procedure definition.

Parameters marked as OUT or INOUT will be located correctly by the JDBC code.

A work-around for the problem is to specify the parameter index value instead of the name.

5.9 New Features for Release 7.2.5.5.

This chapter describes new and changed features in Oracle JDBC for Rdb release 7.2.5.5.

None.

▲ [contents](#)

5.10 Corrections in Release 7.2.5.5.

This section describes software errors corrected in Oracle JDBC for Rdb release 7.2.5.5.

5.10.1 Long-running Query Holds up New Connections in MP Server

Fixed in Instance Build 20091202.

A problem in retrieving the Process Id of the current thread during the creation of a new connection by the MP Server may cause the connection to hang.

This problem may be seen when an existing connection using the same MP Server is concurrently preparing a very large SQL statement or is executing a query that is taking substantial time within Rdb to fetch the very first record.

Any concurrent new connection requests will hang until the long-running query returns the query compilation results or returns the first record back to the MP Server.

All other pre-established connections using the same MP Server will execute queries normally and will not hang, only new connection requests are affected.

This has now been fixed.

▲ [contents](#)

5.11 New Features for Release 7.2.5.4.

This chapter describes new and changed features in Oracle JDBC for Rdb release 7.2.5.4.

None.

▲[contents](#)

5.12 Corrections in Release 7.2.5.4.

This section describes software errors corrected in Oracle JDBC for Rdb release 7.2.5.4.

5.12.1 Access Violation at Java_rdb_JNI_SetStrVal.

Fixed in Instance Build 20080720.

A problem in a memory copy used within the JNI routine SetStrVal() may cause an access violation similar to the following:

```
SYSTEM-F-ACCVIO, access violation, reason mask=00
.
.
.
%TRACE-F-TRACEBACK, symbolic stack dump follows
image      module      routine  line rel PC abs PC
.
.
.
RDBJDBCshr72  RDBJDBC  Java_rdb_JNI_SetStrVal
.
.
.
```

This problem is infrequent as it depends on how memory is allocated during the native code execution, and is usually only associated with JDBC code executing the **setString()** method of a **PreparedStatement** or **CallableStatement**.

This has now been fixed.

5.12.2 DCL Command Line Too Long

Fixed in Instance Build 20080826.

During the startup of a server either by a Pool Server or by using the Controller, DCL command procedures are used to build the DCL command to invoke the server image.

It is possible that long directory names or deep directory structures associated with the log file or the configuration files for the server may cause the size of the DCL command created to exceed the length limits set for a command line by OpenVMS.

In this case the startup of the server will fail and the following exception may be noted in the output of the server startup process:

```
%DCL-W-TKNOVF, command element is too long - shorten
```

The RDBJDBC_STARTSRV.COM has now been changed to reduce the number of options that need to present on the command line by introducing another configuration file that will be built each time the RDBJDBC_STATSRV.COM command procedure is executed. This new command procedure will contain the required configuration information necessary to correctly start the server.

5.12.3 Access Violation during DriverManager.getConnection() when Database Specification is Missing

Fixed in Instance Build 20080826.

If during a call to DriverManager.getConnection() the specified connection string does not contain a database file specification a problem in the building of the connection string to be sent to Rdb may force an unexpected termination of the connecting server with the following exception:

```
An unexpected exception has been detected in native code outside the VM.
Unexpected Signal : EXCEPTION_ACCESS_VIOLATION (0xc0000005) occurred at
PC=0x18965EEB
Function=[Unknown.]Library= ... \rdbjdbcshr.dll
```

```
NOTE: We are unable to locate the function name symbol for the error
just occurred. Please refer to release documentation for possible
reason and solutions.
```

```
Current Java thread:
    at rdb.JNI.Connect(Native Method)
    at
oracle.rdb.jdbc.common.AbstractNativeRdb.Connect(AbstractNativeRdb.java:301)
```

```
at
oracle.rdb.jdbc.srv.DBActionHandler.handleConnect(DBActionHandler.java:3844)
```

The actual exception raised depends on the platform and Java VM and may include:

```
#
# An unexpected error has been detected by HotSpot Virtual Machine:
#
# %SYSTEM-F-ACCVIO (0xc) at pc=84C1A4A0, pid=543163880, tid=63640192
```

and

```
SIGBUS    10*  bus error
.
.
.
%SYSTEM-F-OPCCUS, opcode reserved to customer fault at PC=FFFFFFFF80B6EF14,
PS=0000001B
.
.
.
%SYSTEM-F-ACCVIO, access violation, reason mask=00, virtual address
=000000000000
0000, PC=FFFFFFFF80A708E8, PS=0000001B
```

and similar variants of the Access Violation messages.

This has now been fixed.

5.12.4 Unaligned memory faults on IA64

Fixed in Instance Build 20090826.

Several unaligned memory faults have been located and fixed in the shared images associated with Oracle JDBC for Rdb on IA64.

5.12.5 Read-Only Transactions not Enforced on Connection Switch

Fixed in Instance Build 20090902.

When the connection switch:

```
Transaction=readonly
```

is used, all transactions started by the Oracle JDBC for Rdb drivers should be forced to READ-ONLY. However this is not correctly enforced if AUTOCOMMIT is subsequently turned OFF and it is possible that READ-WRITE transactions may be started on subsequent select statements.

This has now been fixed.

5.12.6 Sockets not Correctly Closing on OpenVMS Clients causing Accumulation of Mailboxes

Fixed in Instance Build 20091002.

During the `Close()` of `Connections` using the Thin driver, sockets connecting the client to the server will be closed and resources released. However a problem with the release of data streams associated with these sockets prevents the sockets from closing down completely.

The failure for the sockets to completely close down may cause problems on clients running on OpenVMS. The mailboxes associated with TCP/IP sockets on OpenVMS will not be closed and will accumulate for processes that do multiple connects and disconnects using the JDBC Thin driver.

This problem only happens with clients running on OpenVMS and may depend on the Java version and type of VM used.

The associated data streams are correctly closed down when the `Connection` class is disposed, however unless explicitly disposed by the client application, the `Connection` class object will continue to exist after the connection is closed and until the JAVA garbage collection causes it to be disposed.

It is possible that the process may run out of TCP/IP ports or OpenVMS resources due to this accumulation of mailbox channels, but this depends on how often the Java garbage collection is run and whether or not the objects are collected.

This problem has now been fixed.

5.12.7 Cast problem when Converting String to Date/Time

Fixed in Instance Build 20091007.

A problem in the JDBC driver code that converts `String` to the internal data format required for storing to an Rdb date/time column may cause the following exception to be raised.

```
java.lang.ClassCastException: java.util.Date
```

This problem occurs when a date/time value stored in its text form is used to set a parameter in a `PreparedStatement` or `CallableStatement` that is associated with an Rdb column or variable that has one of the following SQL datatypes:

- DATE ANSI
- DATE VMS
- TIME
- TIMESTAMP

For following code example will raise the exception described above.

```
.  
. .  
. .  
// SQL : create table tabx (f1 date vms);  
PreparedStatement ps = conn.prepareStatement  
("insert into TABX values (?)");  
  
String dtStr = "2003-11-07 12:34:56.780";  
ps.setString(1, dtStr);  
. .  
. .  
. .
```

A workaround for this problem is to use a Java date/time conversion method to convert from the `String` to a Java timestamp and then use the `setTimestamp` method instead of the `setString` method.

```
String dtStr = "2003-11-07 12:34:56.780";  
Timestamp dt = Timestamp.valueOf(dtStr);  
ps.setTimestamp(1, dt);
```

This problem has now been fixed.

▲ [contents](#)

5.13 New Features for Release 7.2.5.3.

This chapter describes new and changed features in Oracle JDBC for Rdb release 7.2.5.3.

None.

▲ [contents](#)

5.14 Corrections in Release 7.2.5.3.

This section describes software errors corrected in Oracle JDBC for Rdb release 7.2.5.3

5.14.1 Interaction of DatabaseMetaData methods with Blobs may Crash the Thin Server

Fixed in Instance Build 20080327

During the retrieval of RDB\$DESCRIPTION data from Rdb System relations for the inclusion into the resultSets returned by various methods within the DatabaseMetaData class, the Oracle JDBC for Rdb Thin Server must create and execute List Cursors.

A problem in the synchronization of access during List Cursor operations during metadata retrieval meant that windows of opportunity exist where the thread currently accessing the List Cursor may interfere with other concurrent threads accessing the database from the same Thin Server.

This may result in variety of exceptions and/or bugchecks being raised. In some cases the Thin Server may terminate unexpectedly with or without log or bugcheck messages.

This problem only occurs within Thin Servers and only during DatabaseMetaData method calls where description or comment data is being returned for the database object, and only if there is another concurrent connection executing SQL statements.

For example, drilling-down Rdb database connection metadata within JDeveloper using an Oracle JDBC for Rdb thin driver connection to a Thin Server may interfere with concurrent clients on that same server.

This has now been fixed.

5.14.2 BigDecimal scaling Incorrect when used with PreparedStatement setObject() Methods.

Fixed in Instance Build 20080623

The scaling of BigDecimal objects may be incorrect when used as the source data objects for `PreparedStatement.setObject()` methods.

During the conversion of the BigDecimal to the underlying database datatype, scaling information is lost which may result in the wrong values being applied.

A work-around for this problem is to use the `PreparedStatement.setBigDecimal()` methods instead.

This problem has now been fixed.

5.14.3 Connection.nativeSQL() method throws Null Pointer Exception.

Fixed in Instance Build 20080623

Calling the `Connection.nativeSQL()` method will result in a `NullPointerException` exception being raised.

This has now been fixed.

5.14.4 Calling Resultset.isLast() method May Change Transaction Behavior

Fixed in Instance Build 20080625

This problem affects the Oracle JDBC for Rdb Native driver only. Applications using the Oracle JDBC for Rdb Thin driver will not see this problem.

When the native driver is used, calling the `ResultSet.isLast()` method will cause the driver to fetch all the records of the `resultSet` to determine which is the last record.

During this processing the internal transaction status is set incorrectly. If a SQL statement requiring a read-write transaction is executed subsequent to this but prior to the `resultSet`'s statement being closed, the update statement may fail with the following exception:

```
%RDB-E-READ_ONLY_TRANS, attempt to update during a read-only
```

```
transaction
```

This has now been fixed.

▲ [contents](#)

5.15 New Features for Release 7.2.5.2.

This chapter describes new and changed features in Oracle JDBC for Rdb release 7.2.5.2.

5.15.1 DEC_KANJI and DEC_HANZI Support Enabled

Support was added to V7.1.3 Oracle JDBC for Rdb Drivers for accessing DEC_KANJI and DEC_HANZI data from Oracle Rdb databases but until now had not been adequately tested, so Oracle advised against using Oracle JDBC for Rdb drivers to access DEC_KANJI and DEC_HANZI data from Oracle Rdb databases.

Testing of Oracle JDBC for Rdb drivers using these character sets in conjunction with SHIFT_JIS on PC platforms has now been completed and the prior limitation of use of these characters sets has now been removed.

▲ [contents](#)

5.16 Corrections in Release 7.2.5.2.

This section describes software errors corrected in Oracle JDBC for Rdb release 7.2.5.2

5.16.1 ResultSet.getBigDecimal() not working with system ResultSets

Fixed in Instance Build 20070714

Calling the getBigDecimal() methods on a column in a resultset returned by DatabaseMetaData methods may fail with the following exception:

```
java.lang.ArrayIndexOutOfBoundsException: 2
```

This has now been fixed.

5.16.2 Setting TraceLevel fails when using Hexadecimal Notation.

Fixed in Instance Build 20070731

A problem in parsing hexadecimal values for trace level may cause an exception to be raised when trace level values greater than 0x7FFFFFFF are used:

```
java.lang.NullPointerException
```

This has now been fixed.

5.16.3 Delimited Identifier Problem in AS clause of Select Statement.

Fixed in Instance Build 20070731

A problem introduced in 7.2.5.1 in parsing delimited identifiers used in the AS clause of a select statement may cause an exception to be raised:

```
select last_name as "name 1", first_name from employees
```

```
SQLException: in <rdbjdbcsrv:prepare_stmt>  
%SQL-F-RELNOTDEF, Table FIRST_NAME is not defined in database  
or schema:42000
```

A work-around is to not use delimited identifiers in the AS clause:

```
select last_name as name1, first_name from employees
```

This problem has now been fixed.

5.16.4 Configuration file problem in "DEFAULT" Server definition.

Fixed in Instance Build 20080122

A problem in how properties were copied from the "DEFAULT" server definition during the instantiation of server information may cause servers to have inappropriate configuration settings.

This problem may only arise if the "DEFAULT" server definition in the server configuration file contains any of the following properties:

```
ssl.default
ssl.context
ssl.keyManagerFactory
ssl.keyStoreType
ssl.keyStore
ssl.keyStorePassword
ssl.trustStore
ssl.trustStorePassword
<allowPrivUser>
<allowUser>
<allowDatabase>
<allowPrivUser>
```

If any of the above properties are used in the "DEFAULT" server definition it is possible that server configuration properties such as Allowed Databases, or Allowed Users may be incorrectly propagated from the server they were specified for, to all other servers described in the same configuration file.

A work around for this problem is to not use any of the above properties in the "DEFAULT" server definition and instead place the property in each of the server definitions that require it.

Note that the examples of configurations files used in the Oracle JDBC for Rdb documentation may be susceptible to this problem as they do show the use of the following property in the "DEFAULT" server definition:

```
ssl.default="true"
```

The problem has now been fixed.

5.16.5 Pool Server May choose Incompatible Pooled Server when User Restriction Enabled.

Fixed in Instance Build 20080122.

If a server taking part in a pool of servers controlled by a Pool Server has restricted access enabled and one or more AllowedUser entries are present for that server, the Pool Server may choose the server as a possible candidate server for the connection request, even if the connection username is not one of the specified AllowedUsers.

If this happens, the connection request will be redirected to that chosen server but the connection attempt will be immediately terminated with the following exception:

```
SQLException: Access to server denied
```

Changes have now been made to ensure that information is passed correctly to the Pool Server during the initial connection request to allow it to correctly determine if a candidate pooled server will accept the user requesting the connection prior to redirecting the connection request to that server.

5.16.6 Potential problem when dumping SQLDA in trace.

Fixed in Instance Build 20080125

A problem in allocation of an internal buffer for the dumping of a SQLVAR data area may cause unexpected and unusual problems during the execution of the server that may result in the server terminating unexpectedly.

This problem may only be seen if the traceLevel DUMP SQLDA flag bit is set for the connection or set server-wide and the data area of the SQLVAR being dump is greater than 512 octets in length.

| Bit | Hexadecimal Value | Decimal Value | Traces |
|-----|-------------------|---------------|------------------------|
| 14 | 0x00004000 | 16384 | Dump SQLDA information |

A workaround for this problem is to not set the tracelevel DUMP SQLDA trace flag bit.

This has now been fixed.

5.16.7 Connection.getCatalog() returns wrong value for single Schema Databases

Fixed in Instance Build 20080212

The Connection.getCatalog() method incorrectly returns a single quote delimited string instead of a NULL object when connected to a single schema database. When used in conjunction with a multi-schema database the correct catalog value is returned.

This problem prevents JDeveloper 10.x from correctly displaying table and views within the Database branch in the Connections Navigator.

A similar problem may occur when using the Connection.getSchema() method.

5.16.8 Potential memory leak with Views

Fixed in Instance Build 20080227

A problem in the handling of statement preparation for SQL statements that contain views where the view result tuples cannot have a dbkey associated with them, caused a memory leak in the Oracle JDBC for Rdb drivers and servers.

The problem may manifest itself in a number of ways including access violations and exceptions stating that shared memory has been used up.

The following example shows a typical view that may cause this problem:

```
create view view1 (c1 integer, c2 integer) as select c1,c2 from t1
union select c3,c4 from t2;
```

Queries on this view will execute correctly, however during the internal preparation of each query, memory may be allocated that may stay allocated until the connection is closed. In addition the underlying SQL statement may not be released correctly, which in turn may prevent metadata updates from being carried out on the referred tables.

▲ [contents](#)

5.17 New Features for Release 7.2.5.1.

This chapter describes new and changed features in Oracle JDBC for Rdb release 7.2.5.1.

5.17.1 SQLDA dumping

Setting the tracelevel to 0x00004000 (Decimal 16384) will provide information about the SQLDA information passed to and from SQL.

See the *Oracle JDBC for Rdb User Guide* for details.

5.17.2 failSAFE IP with Pool Servers

Pool servers may be configured to ensure that redirected connection requests will still correctly redirect during failSAFE IP fail over.

See the *Oracle JDBC for Rdb User Guide* for details.

5.17.3 HandshakeTries and HandshakeWait on MultiProcess Native Connections

The `multiprocess` option on native connections allows the use of executor sub-processes to carry out Rdb connections on behalf of your application using the `RdbNative` driver. You now have the capability of specifying handshake options during the initial communication handshake protocol used by the main and associated sub-processes.

See the *Oracle JDBC for Rdb User Guide* for details.

5.17.4 Server Access Security Enhancements

Servers may be configured to restrict the access of their served databases to a list of allowed usernames. The server configuration `allowUser` has been added to the server section of the configuration files restricting access to databases via that server to only those users specified.

In addition a server password can be specified using the `srv.password` configuration option which forces all users of that server to provide an additional password before access via the server will be granted.

See the *Oracle JDBC for Rdb User Guide* for details.

5.17.5 Restriction on using Multiple Blob fields in Join now removed.

In previous version the following limitation was specified:

Blobs will only be returned correctly from a SQL join statements for the first table mentioned in the join set. For example, given the SQL statement:

```
Select ta.blob, tb.blob from table1 ta, table2 tb
where ta.name = tb.name
```

`ta.blob` will be returned correctly as it is from the first table referenced in the join set. Trying to access `tb.blob` may result in the following SQL error:

```
%SQL-F-BADPREPARE, Cannot use DESCRIBE or EXECUTE on a statement
that is not prepared
```

This restriction has now been lifted, the Oracle JDBC for Rdb drivers now handle blob fields from multiple tables within a single join statement.

However due to the nature of the parsing carried out by the Oracle JDBC for Rdb drivers it is required that all blob columns referenced from the second and subsequent tables in the join must be qualified using correlation names as shown in the above example of select.

Failure to use a correlation name in conjunction with the blob column name may result in SQL parsing errors when data is retrieved from the blob field as the drivers do not have enough information to determine the correct table to access the blob data from.

```
SQL-F-FLDNOTCRS, Column <blob col> was not found in the tables in
current scope
```

This limitation also means that the use of "*" in the select clause for a join across two or more tables that include blob fields may also cause a similar SQL error.

▲ [contents](#)

5.18 Corrections in Release 7.2.5.1.

This section describes software errors corrected in Oracle JDBC for Rdb release 7.2.5.1.

5.18.1 Incorrect row number returned after ResultSet.getLast() call.

Fixed in Instance Build 20060906

A problem in the determination of the current row number when using Scrolling ResultSets caused the ResultSet.getRow() method to return an incorrect row number after absolute positioning of cursor after the end of stream.

The problem is only in the Oracle JDBC for Rdb Native Driver and does not show up in when using the Oracle JDBC for Rdb Thin driver.

The problem may be seen only after a call has been made to ResultSet.afterLast() method followed by a call to ResultSet.last().

The call to ResultSet.afterLast() incorrectly sets an internal record counter to one greater than the actual count .

The following is an example of this problem.

```

.
.
.
Statement s2 = conn.createStatement(
    ResultSet.TYPE_SCROLL_INSENSITIVE,
    ResultSet.CONCUR_UPDATABLE);

ResultSet rs = s2.executeQuery("select * from employees");
rs.afterLast();
rs.last();
System.out.println("row number : " + rs.getRow());
System.out.println("employee_id : " + rs.getString(1));
rs.close();
s2.close();
.
.
.

```

May return the following information when used with the Employees table in the PERSONNEL or MF_PERSONNEL databases provided as sample database in the Oracle Rdb installation (the row number of the last record should be 100) :

```

row number :101
employee_id :00471

```

5.18.2 Pool Server startup of Pooled Servers may fail when Persona is used.

Fixed in Instance Build 20061011

A problem in the naming of the subordinate processes used to create a server process during the automatic startup of servers by the Pool Server may cause the following exception:

```

%RUN-F-CREPRC, process creation failed
-SYSTEM-F-DUPLNAM, duplicate name

```

The following related exception might also be seen during the attempted startup of the pooled server process:

```

java.sql.SQLException: Unable to start process, status: 0x164 :
substatus -4

```

These problems may be seen only if PERSONA is used to change the server authorization characteristics of the started servers.

5.18.3 Last Column in Select List may be Inaccessible in Some Queries.

Fixed in Instance Build 20061124

A problem in the handling of internal dbkey information may prevent the application access to the last column in a select list. This problem only occurs if the select query used cannot provide unique Dbkeys for the resultant tuples. Queries containing derived tables or views from multiple tables may show this problem.

For example:

```
select c1.last_name from (select * from employees c where
c.employee_id='00170') c1
```

may fail to return the last_name correctly when the Resultset.GetString(String columnName) method is used.

```
select c1.last_name, c1.first_name from (select * from employees c
where c.employee_id='00170') c1
```

may correctly return the last name but not the first name as the problem only affects the last column in the outermost select list.

This problem was introduced in code changes made for release 7.1.3.0 of the Oracle JDBC for Rdb drivers.

5.18.4 Abnormal Client Termination may Prevent Executor Re-use.

Fixed in Instance Build 20061221

If a client application using a MP Server terminates abnormally or the client socket is lost, the associated database connection will be disconnected by the server however due to an internal problem, the executor process associated with the terminated client may remain present on the system in LEF state.

The handling of abnormal termination did not correctly terminate the executor process, nor did it place the free executor back in the free list for re-use. This results in orphaned executor processes that will remain on the system in LEF waiting state but will never be re-used.

If the client abnormal terminations occur frequently, the number of inactive executor processes will grow and may eventually cause system resource problems and excessive swapping.

5.18.5 Decimal Column Problem with Native Driver

Fixed in Instance Build 20061221

A problem in the nativeRdb driver caused Decimal columns to be returned incorrectly. This problem only affects applications using the rdbNative driver.

The Decimal datatype may be used by SQL when scaled integers are returned after manipulation by an internal function or aggregate operation, for example the following query may return incorrect values when executed through the rdbNative driver.

```
select distinct salary_amount from salary_history
```

Application using the rdbThin driver should not encounter this problem.

5.18.6 'EFN xx is not available' Message on Executor startup.

Changed in Instance Build 20070302

In earlier versions of Oracle JDBC for Rdb, if the MP Server found that the common event flag number it was using to start the handshake process with a newly created executor, was not available after trying to obtain it for reasonable length of time, the server would abort the client connection attempt with the following exception:

```
'EFN xx is not available'
```

In such a case the event flag used by the server was probably left set by a previous attempt by the server to create an executor process but failed during the process startup due to resource problems.

The server code has now been changed to correctly clean up its event flags usage if an executor process fails to start up correctly. In addition the server now does not abort when it finds the event flags already in use, but now assumes that as the amount of time the event flag is unavailable is much longer than the amount of time it might take the executor process to be created and executor image run-up, that the flag may be reset and the current executor start-up may proceed.

5.18.7 Extraneous log message during Auto-restart check by Pool Server.

Changed in Instance Build 20070306

A problem in how the Pool Server checked the availability of its pooled servers when carrying out AutoRestart checking meant that an extraneous CLIENT LOST message would be logged by the pooled server every time it was checked. The following message would be logged:

```
srv.DBActionHandler <idle> Connection to Client lost
```

This has now been fixed.

5.18.8 Logfile not correctly set for servers started using the Controller.

Fixed in Instance Build 20070412

The logfile used by the server to record trace message and other output may be set in the server specification section of the configuration file used in conjunction with the servers and the Controller.

A problem in how the logfile information was passed to the newly started server process prevented the correct logfile specification to be used by the server when the server was started using the Controller Start Server command.

This has now been fixed.

▲ [contents](#)

5.19 New Features for Release 7.2.5.0.

5.19.1 Persona

When a Thin or Pool server starts up, it automatically inherits the rights identifiers, quotas, and authorization attributes of the process under which it was started. You may now override this default behavior by specifying a persona to use on the startup of the server. This persona will then be used by both the server and the underlying OpenVMS operating system to determine the rights and authorities of the server process and any executor processes that the server may start up.

This feature was introduced in release 7.1.4.0, but was omitted from the release notes.

5.20 Corrections in Release 7.2.5.0.

This section describes software errors corrected in Oracle JDBC for Rdb release 7.2.5.0.

5.20.1 Incorrect SQLSRV_JDBC_SERVER_STARTUP72 Installed with V7.2-41 Oracle JDBC for Rdb kit

Fixed in Instance Build 20060505

An incorrect version of the SQLSRV_JDBC_SERVER_STARTUP72.COM file was inadvertently placed in the installation kit for Oracle JDBC for Rdb 7.2.4.1.

This version of the file does not set up the RDB\$JDBC_SQSNAM_* logical name properly and may cause problems when you try to use this file with SQL/Service Thin server startup.

The following line of DCL command in this file is incorrect:

```
$ nam      := 'f$logical("RDB$JDBC_SQSNAM_'port'")
```

It should read:

```
$ nam      = f$logical("RDB$JDBC_SQSNAM_'port'")
```

This has now been fixed.

5.20.2 MultiProcess Server May Show Continuous DIO Activity Even When Idle

Fixed in Instance Build 20060505

A problem with the way error and output channels are assigned during the creation of the executor subprocess by a detached MultiProcess server may cause the server process to continually issue direct I/Os to the associated mailboxes. This can be seen as a continuous rise in the "Direct I/O" count for that process even when the server is idle.

Although this does not interfere with the correct functionality of the server, it could incorrectly show up as activity on a quiet server.

A workaround is to start up the MultiProcess server directly in a login session rather than detached.

This has now been fixed.

5.20.3 Client idleTimeout Does Not Work for Prestarted and Reused Executors

Fixed in Instance Build 20060505

The amount of time that a client connection may be idle can be limited by using the `cli.idleTimeout` parameter for the Thin server.

However, the client idle timeout value set for the server will be ignored when a MultiProcess server is used with prestarted executors.

If the client gets a prestarted executor on connection, the client idle timeout for the server does not get properly transferred to the client context and no timeout will be issued.

Additionally even if an executor was not prestarted, if it is reused then a similar problem will occur and the inactivity timer will not be set.

The client idle timeout set for a server is now correctly observed by prestarted and re-used executors.

5.20.4 Syntax Error in Query Generated for DatabaseMetaData.getTables

Fixed in Instance Build 20060620

The JDBC `DatabaseMetaData.getTables()` method allows the caller to obtain information about the tables and views found in a connected database. When you call this method, you can supply a list of table types to search for.

Currently the Oracle JDBC for Rdb drivers recognize the following types of tables for this method:

- TABLE
- VIEW
- SYSTEM
- SYSTEM TABLE
- SYSTEM VIEW
- LOCAL TEMPORARY
- LOCAL TEMPORARY TABLE
- GLOBAL TEMPORARY

- GLOBAL TEMPORARY TABLE
- INFORMATION
- INFORMATION TABLE

The drivers should ignore any table type not in the above list.

However, due to a problem in the driver code, if the list of table types starts with a type that is not recognized by the driver, a SQL syntax exception will be generated. For example, the following example will result in a SQL syntax error:

```
String types[] = {DERIVED, "TABLE", "VIEW", "GLOBAL TEMPORARY"};
ResultSet rs = dbmd.getTables("", "", "%", types);
```

One possible workaround for this problem is to re-order the types so that the first type specified is one from the list of recognized table types, for example:

```
String types[] = ("TABLE", DERIVED, "VIEW", "GLOBAL TEMPORARY");
ResultSet rs = dbmd.getTables("", "", "%", types);
```

This example does not generate a SQL error.

This problem has now been fixed.

5.20.5 Show Clients in Controller may Crash Connected Thin Server

Fixed in Instance Build 20060620

A change in handshake protocol in Oracle JDBC for Rdb 7.1.4.1 (V7.1-41) drivers introduced a problem in how thin servers respond to requests for client information.

Issuing a SHOW CLIENT command in the Oracle JDBC for Rdb Controller command line may cause the connected thin server to access violate and consequently terminate the server process.

This problem has now been fixed.

▲ [contents](#)

5.21 New Features for Release 7.2.4.1.

This section contains new features and technical changes for Oracle JDBC for Rdb release 7.2.4.1.

5.21.1 Client and Server Timeout Feature

You can now specify the amount of time a server or a client connection may remain inactive before the connection will be terminated or the server closed down.

See the *Oracle JDBC for Rdb User Guide* for details.

5.21.2 Executor Name Prefix

You can now specify the name prefix for executors started up by the MultiProcess server. This can help in identifying executor processes on your system.

See the *Oracle JDBC for Rdb User Guide* for details.

▲ [contents](#)

5.22 Corrections in Release 7.2.4.1.

This section describes software errors corrected in Oracle JDBC for Rdb release 7.2.4.1.

5.22.1 Release Notes Specify Incorrect Installation Directory for RDBJDBCCFG.XML

Fixed in Instance Build 20060130

The release notes for Oracle JDBC for Rdb release 7.1.2.0 incorrectly specified that the RDBJDBCCFG.XML file would be copied to SYSS\$COMMON:[RDB\$JDBC] directory. The RDBJDBCCFG.XML is actually copied to two directories during product installation:

- The product installation directory found under the main JDBC directory, for example,

```
SYS$COMMON:[RDB$JDBC.0701-4V0614]
```

- The SYSS\$COMMON:[RDB\$JDBC.COM] directory

In addition, the installation procedure incorrectly replaced the RDBJDBCCFG.XML file in the SYSS\$COMMON:[RDB\$JDBC.COM] directory, overwriting any already existing file of the same name.

The release notes have been fixed, and the installation procedure will only copy the RDBJDBCCFG.XML file to the SYS\$COMMON:[RDB\$JDBC.COM] directory if the file does not already exist in that directory.

5.22.2 Persona Not Handled Correctly by the MultiProcess and Pool Servers

Fixed in Instance Build 20060130

When the Persona feature is used in conjunction with a MultiProcess or Pool server, a problem in the way either the executor processes or the pooled server processes are created prevented the correct Persona identification from being passed to the created processes. This problem may result in the following error being raised:

```
java.io.IOException: Child creation error: not owner
```

Due to a restriction in the use of the Java System.exec() method that was used by the JDBC servers to start executor sub-processes and pooled servers, the security information and Persona details were not copied across to the newly created process.

The JDBC servers now use the OpenVMS system service CREPRC to start processes. CREPRC correctly transfers the security information to the new process.

5.22.3 MultiProcess Server / Executor Handshake Timeout May Be Too Short on Heavily Loaded Systems

Fixed in Instance Build 20060130

When a MultiProcess server talks to an executor it uses a handshake protocol to check that the executor is still alive and accepting direction. By default, if the executor has not responded to the server's synchronization request within five seconds it will raise the following exception and terminate the connection :

```
Lost connection to executor
```

This synchronization handshake is done after the executor has replied to the server that it has completed the task requested and is waiting for the next operation to carry out. This synchronization failure will not be raised while the executor is busy within the database and thus is unaffected by such things as database locks or the duration required to compile or execute queries. It will only occur when the executor is known to be waiting for the next action to carry out.

In heavily loaded systems, especially on single-cpu systems, it is possible that the executor process may not be scheduled for execution within the window of this synchronization handshake and the exception may be raised.

In order to carry out this synchronization, in previous version of the drivers the server polls the executor up to 500 times with a 10 millisecond delay between each poll request. If no response is found after 500 tries, the server raises the above exception.

This version of the Oracle JDBC for Rdb drivers now allows you to specify, at the server level, the maximum number of poll tries and the delay between each try. If you know that the system on which the server is executing could possibly have extended process scheduling delays, you can ensure that the server will not time out on the synchronization handshake. Two new switches have been added to the server definition and startup.

- `Srv.MPmaxTries`---Use to specify the maximum number of poll tries
- `Srv.MPtryWait`---Use to specify the delay between each try

See the *Oracle JDBC for Rdb User Guide* for more information.

5.22.4 Problems with `srv.idleTimeout` and `srv.bindTimeout` Configuration Variables and Their Use with SSL servers

Fixed in Instance Build 20060208)

The *Oracle JDBC for Rdb User Guide* for release 7.1.3.0 (V7.1-3) incorrectly referred to the `srv.idleTimeout` as affecting the inactivity timeout for a connection. This switch actually refers to the timeout period for server inactivity. In addition, this feature was not fully functional in previous versions.

The `srv.bindTimeout` configuration variable was meant to limit the time the server will wait for an acknowledgement from the client that the database attach should proceed. The default value is 0, which means that the server will wait indefinitely.

This timeout is useful when dealing with SSL communication, as the server uses it to limit the time it will wait for the client to send down an attach request after a new socket connection has been requested. If the client fails to use an SSL secure socket when trying to communicate with a server that has SSL enabled, the client thread within the server will hang as the connection cannot complete. The `srv.bindTimeout` value specifies how long this wait should be before giving up.

Unfortunately the default for the value was incorrectly set to 1 second, and the `srv.bindTimeout` server attribute was ignored in the XML configuration file. This meant that on CPU-bound systems it was possible that the initial SSL negotiation could take longer than one second and thus cause a TIMEOUT failure on the new connection request.

These problems have now been fixed. See the *Oracle JDBC for Rdb User Guide* for more information.

5.22.5 IA64 Problem Causes Array Out of Bounds Exception When Handling String Indexing

Fixed in Instance Build 20060208

A problem in the way Java on IA64 carries out string index operations in association with static final string constants may infrequently cause the following type of exception to be raised:

```
Caused by: java.lang.ArrayIndexOutOfBoundsException: 1054649176 at
java.lang.String.indexOf(String.java:1266) at
java.lang.String.indexOf(String.java:1236) at
java.lang.String.indexOf(String.java:1218) at
oracle.rdb.jdbc.common.Statement.getTableName(Statement.java:3148)
```

In all cases, the index value shown after the exception name is very large, in the same order of magnitude as seen above.

The *getTableName* method has now been changed to a mechanism other than *indexOf* to carry out its operation. This problem should no longer be seen.

5.22.6 Comments within SQL Text Not Handled Correctly

Fixed in Instance Build 20060301)

Executing or preparing a statement that has SQL text containing leading or embedded comments may cause errors during parsing of the statement.

Some third-party products may use comments such as */* comment */* in the text they send down to the JDBC drivers for compilation. Although handled correctly by Oracle Rdb, comments of this style caused a problem in the determination of statement types during the preliminary parsing of the statement by the JDBC driver.

For example the following SQL text:

```
stmt.Execute(/* This is a comment */ select * from jobs);
```

would cause an `SQLException`:

```
SQLException: in <rdbjdbcsrv:execute_immediate> %SQL-F-EXESELSTA,
```



```
Attempted to EXECUTE a SELECT statement:RR000
```

The JDBC driver could not correctly determine the type of statement and used the wrong underlying SQL operation to attempt to execute it.

The drivers now extract out comments prior to determining the statement type and sending the native SQL down to Oracle Rdb. The drivers will now correctly parse out C and SQL type comments, for example:

```
/* comment */  
! this comment will be terminated at the next line break  
-- this comment will be terminated at the next line break  
// this comment will be terminated at the next line break
```

5.22.7 Prepared Statements May Cause a Memory Leak with MultiProcess Servers

Fixed in Instance Build 20060301

During the preparation of PreparedStatements, the MultiProcess server has to allocate memory from the servers' global shared memory pool that will hold some information about columns and parameter markers in the statement that is being prepared.

Due to a coding problem, some of this memory was incorrectly allocated each time the prepared statement was executed, instead of only once at statement compilation time. This wrongly allocated memory was never freed after use. Executing the same prepared statement multiple times will slowly diminish the shared memory available to the server, eventually causing a problem when the shared memory allocation is all used up.

This has now been fixed.

▲ [contents](#)

5.23 Corrections in Release 7.2.4.0.

This section describes software errors corrected in Oracle JDBC for Rdb 7.2.4.0.

5.23.1 Maximum Size of Single Data Row Increased to 65,272 Octets

Fixed in Instance Build 20051114

During copying rows of data from Oracle Rdb, the Oracle JDBC for Rdb drivers incorrectly limited the number of octets copied to 36863 octets. This can cause problems when there are more than 36863 octets in the row.

The following exception is a symptom of this data row truncation:

```
Statement creation failed: java.sql.SQLException: Connection lost :  
java.lang.NegativeArraySizeException @rdb.Client.fillCache
```

The maximum size of a data row supported by the drivers has now been increased to 65,272 octets in keeping with the maximum row size supported by Oracle Rdb.

5.23.2 Another Connection Overlap Window Found with Pool Servers

Fixed in Instance Build 20051209

Another potential overlap of connections between the connection made by the Oracle JDBC for Rdb Pool server and its pooled servers has been found which may cause the incorrect rejection of a client connection even when a free connection slot is available.

This is similar to the problem referred to in the Oracle JDBC for Rdb 7.1.3.3 release notes as *Spurious Maximum Number of Clients Exceeded Exception*.

The handshake protocol during server check by the Pool server has now been changed to prevent this overlap of connections.

5.23.3 SSL Server Information Not Correctly Set from XML-Formatted Configuration File

Fixed in Instance Build 20051220

A problem in the parsing of XML configuration file data prevented the correct port and node information from being assigned to named servers of the type "RdbThinSrvSSL", "RdbThinSrvMPSSL" and "RdbThinSrvPoolSSL".

Any URL specification provided for the individual server would be ignored, and the default port and node used instead.

This has now been fixed.

▲ [contents](#)