

Oracle® Database

Readme

12c Release 1 (12.1)

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Describes important last-minute features and changes not included in the Oracle Database Documentation Library for 12c Release 1 (12.1)

Oracle Database Readme, 12c Release 1 (12.1)

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Preface

This document describes important last-minute features and changes not included in the Oracle Database Documentation Library for 12c Release 1 (12.1.0.1 and 12.1.0.2).

Audience

This Readme documents differences between the server and its integral parts and its documented functionality, as well as known problems and workarounds.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Access to Oracle Support

Oracle customers that have purchased support 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.

Related Documents

Each platform release, such as Linux and Windows, provides release notes specific to that platform. Additional product Readme files may also exist. This Readme is provided instead of system bulletins or similar publications.

For licensing information, refer to the *Oracle Database Licensing Information*.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Purpose of this Readme

This Readme file is relevant only to the delivered Oracle Database 12c Release 1 (12.1) product and its integral parts, such as SQL, PL/SQL, the Oracle Call Interface (OCI), SQL*Loader, Import/Export utilities, and so on.

This Readme documents differences between the server and its integral parts and its documented functionality, as well as known problems and workarounds.

Operating system releases, such as Linux, UNIX and Windows, often provide readme documents specific to that operating system. Additional Readme files may also exist. This Readme file is provided instead of system bulletins or similar publications.

For licensing information, refer to the Oracle Database Licensing Information.

The major sections of this Readme file are:

[Chapter 2, "Readme Information for Oracle Database 12c Release 1 \(12.1.0.2\)"](#)

[Chapter 3, "Readme Information for Oracle Database 12c Release 1 \(12.1.0.1\)"](#)

[Chapter 4, "Documentation Addendum"](#)

Readme Information for Oracle Database 12c Release 1 (12.1.0.2)

This chapter describes important last-minute features and changes not included in Oracle Database Documentation Library for this release of Oracle Database 12c Release 1 (12.1.0.2).

This chapter contains the following sections:

Section 2.1, "Compatibility, Upgrading, Downgrading, and Installation"

Section 2.2, "Features Not Available or Restricted in This Release of Oracle Database 12.1.0.2"

Section 2.3, "Deprecated and Desupported Features for Oracle Database"

Section 2.4, "Data Analytics Accelerators on SPARC for Oracle Database Overview"

Section 2.5, "Database Security"

Section 2.6, "Multitenant Container Database"

Section 2.7, "Application Continuity"

Section 2.8, "Oracle Application Express"

Section 2.9, "Oracle Automatic Storage Management (Oracle ASM)"

Section 2.10, "Oracle Database Vault"

Section 2.11, "Oracle Enterprise Manager Database Express (EM Express)"

Section 2.12, "Oracle Grid Infrastructure for a Cluster"

Section 2.13, "Oracle Multimedia"

Section 2.14, "Oracle ODBC Driver"

Section 2.15, "Oracle SQL Developer"

Section 2.16, "Oracle Spatial and Graph"

Section 2.17, "Oracle Text"

Section 2.18, "Oracle XML DB"

Section 2.19, "Pro*C"

Section 2.20, "Pro*COBOL"

Section 2.21, "SQL*Plus"

Section 2.22, "Open Bugs"

2.1 Compatibility, Upgrading, Downgrading, and Installation

For late-breaking updates and best practices about pre-upgrade, post-upgrade, compatibility, and interoperability discussions, see Note 1462240.1 on My Oracle Support (at <https://support.oracle.com>) that links to the "Upgrade Companion" web site.

Caution: After installation is complete, do not manually remove or run cron jobs that remove `/tmp/.oracle` or `/var/tmp/.oracle` directories or their files while Oracle software is running. If you remove these files, then Oracle software can encounter intermittent hangs. Oracle Grid Infrastructure for a cluster installations fail with the following error:

```
CRS-0184: Cannot communicate with the CRS daemon.
```

2.1.1 Pre-Upgrade Fails When Upgrading From 12.1.0.1 SE or SE1 to 12.1.0.2 SE2

Pre-upgrade fails when upgrading from 12.1.0.1 SE or SE1 to 12.1.0.2 SE2 (reference Bug 21390522).

Workaround: Apply the one-off patch for bug 18718327 prior to upgrade.

2.1.2 Downgrade From 12.1.0.2 SE2 to 12.1.0.1 SE or SE1 Fails Due to Missing OLS Scripts

Oracle Label Security (OLS) upgrade and downgrade scripts are not shipped in 12.1.0.1 SE or SE1 database (reference Bug 21497495). As a result, OLS packages are not correctly recompiled while executing `catrelod.sql` after the downgrade process back to 12.1.0.1 SE or SE1. The OLS packages still refer to objects introduced as part of the upgrade to 12.1.0.2 SE2.

This can result in the `ORA-06508` error when executing `utlrp.sql` after `catrelod.sql` in 12.1.0.1 SE or SE1.

Workaround: Apply patch 21076681 to the 12.1.0.1 SE or SE Oracle home prior to downgrading back from 12.1.0.2 SE2.

2.1.3 Upgrade From 12.1.0.1 to 12.1.0.2 Using DBUA Results in an Error

During upgrade of Oracle Database from release 12.1.0.1 to release 12.1.0.2 using Oracle Database Upgrade Assistant (DBUA), the following error is returned (reference Bug 21449004):

```
ORA-39701: database must be mounted EXCLUSIVE for UPGRADE or DOWNGRADE
```

Workaround: Click Ignore and proceed.

2.1.4 Oracle Multimedia Becomes Invalid After Upgrade From 12.1.0.1 SE or SE1 to 12.1.0.2 SE2

If you upgrade from release 12.1.0.1 SE or SE1 to release 12.1.0.2 SE2 and then downgrade from 12.1.0.2 SE2 back to 12.1.0.1 SE or SE1, Oracle Multimedia may become invalid (reference Bug 21445944).

Workaround: Invoke `md/admin/loce121.sql` from the 12.1.0.2 ORACLE_HOME as part of the downgrade process before executing the reload scripts.

2.1.5 Downgrade CDB or PDB From Release 12.1.0.2 to 12.1.0.1

Release 12.1.0.1 Patch Set Update PSU4 is required in order to downgrade a multitenant container database (CDB) or pluggable database (PDB). Patch Set Updates are available for download on My Oracle Support (MOS) at <https://support.oracle.com/>. See MOS Note 756671.1 to obtain the latest Patch Set Update and any required set of additional fixes (reference Bug 18826367).

2.1.6 Opening a Newly Cloned PDB, After Upgrading From 12.1.0.1 May Result in "Sync Failure" Error

A problem can be encountered after upgrading a multitenant container database (CDB) from 12.1.0.1 to 12.1.0.2, if there exists a common user in the CDB that was altered to have a default tablespace in `ROOT`, and if there is no tablespace with that name in a given pluggable database (for example, P1) (reference Bug 19174942). When a new pluggable database (for example, P2) is cloned from the pluggable database (PDB) P1, it causes PDB P2 to open with a warning and in restricted mode, which is not expected behavior. There is at least one row when issuing the following query on the `PDB_PLUG_IN_VIOLATIONS` view in `ROOT`:

```
SELECT MESSAGE, ACTION FROM PDB_PLUG_IN_VIOLATIONS WHERE NAME = 'P2' AND TYPE =
'ERROR' AND STATUS = 'PENDING' AND CAUSE = 'Sync Failure';
```

Determine the default tablespace for each common user by querying the `DBA_USERS` view in `ROOT`, and ensure that each of the tablespaces exists in the PDB. If a particular tablespace does not exist in the PDB, execute the following steps:

1. Open the PDB.
2. Determine the default tablespace for the common user in the PDB by querying the `DBA_USERS` view in the PDB (this is needed later in Step 5).
3. Create the missing tablespaces in the PDB.
4. Close and reopen the PDB.
5. In the PDB, issue the `ALTER USER` command to change the default tablespace of the common user in the PDB back to the original tablespace as noted in Step 2.
6. Drop the tablespaces from the PDB.

2.1.7 Oracle Enterprise Manager Rolling Upgrade

Oracle Enterprise Manager rolling upgrade requires that the RDBMS pre-upgrade tool checks be performed on the physical standby database, which is upgraded before the primary database (reference Bug 19195895). However, these tool checks are prevented on a physical standby database that is opened in read-only mode.

Prior to running the upgrade, download the latest 12.1.0.2 pre-upgrade tool in MOS Note 884522.1 from My Oracle Support (MOS) at <https://support.oracle.com/>.

2.1.8 Data Type Versioning Could Cause Cross-Version Replication to Fail

As part of release 12.1.0.2, versioning of data types that could be attributes of Oracle object types have been introduced. Because of this feature, cross-version replication

between release 12.1.0.1 and release 12.1.0.2 databases might be affected resulting in the ORA-26656 error.

If any user-defined object types contain attributes of DATE, TIMESTAMP, TIMESTAMP WITH TIME ZONE, TIMESTAMP WITH LOCAL TIME ZONE, BINARY_FLOAT, BINARY_DOUBLE, NCHAR, NVARCHAR2, NCLOB, ANYDATA, etc., you must apply the mandatory Patch Set Update for Bug 18038108 to all release 12.1.0.1 instances.

2.1.9 Downgrade Release 12.1.0.2 to Release 12.1.0.1 May Invalidate the MDSYS.SDO_COORD_OPS_TRIGGER

After release 12.1.0.2 is downgraded to release 12.1.0.1 and the `utlrp.sql` script is executed, it is possible for the `MDSYS.SDO_COORD_OPS_TRIGGER` trigger to be invalid (reference Bug 18900492). This has no known side effects. The `MDSYS.SDO_COORD_OPS_TRIGGER` trigger becomes valid on the first use of the trigger. Or, you can execute the `ALTER TRIGGER MDSYS.SDO_COORD_OPS_TRIGGER COMPILE` statement as DBA to make it valid.

2.1.10 Upgrade Oracle ASM From Release 11.1.0.7 to Release 12.1.0.x

If you upgrade an Oracle ASM instance from release 11.1.0.7 to release 12.1.0.x, then downgrade to release 11.1.0.7, and then try to upgrade to release 12.1.0.x again, Oracle ASM may not get upgraded (reference Bug 14756008). Follow the manual steps to upgrade the Oracle ASM instance found in the *Oracle Grid Infrastructure Installation Guide for Linux*.

2.1.11 Performing -force Upgrade Results in an Incorrect Grid Home Node List in Inventory

When a node crash occurs during an upgrade, a `-force` upgrade can be performed to upgrade a partial cluster minus the unavailable node (reference Bug 12933798).

After performing a `-force` upgrade, the node list of the Grid home in inventory is not in sync with the actual Oracle Grid Infrastructure deployment. The node list still contains the unavailable node. Because the node list in inventory is incorrect, the next upgrade or node addition, and any other Oracle Grid Infrastructure deployment, fails.

After performing a `-force` upgrade, manually invoke the following command as a CRS user:

```
$GRID_HOME/oui/bin/runInstaller -updateNodeList "CLUSTER_NODES={comma_separated_
alive_node_list}" ORACLE_HOME=$GRID_HOME CRS=true
```

2.1.12 Downgrading Release Oracle Database 12c to 11.2.0.2 Results in an Error When You Run `catrelod.sql`

When downgrading from release Oracle Database 12c to 11.2.0.2, you must apply patch 11811073 for release 11.2.0.2 which provides an updated version of `catrelod.sql`. This patch can be applied to the 11.2.0.2 home anytime before attempting to reload the PL/SQL packages from the 11.2.0.2 home by running the `catrelod.sql`.

2.1.13 Downgrading Release Oracle Database 12c to 11.2.0.3 or 11.2.0.2 May Result in an Error When You Run utlrp.sql

When downgrading from release Oracle Database 12c to 11.2.0.3 or 11.2.0.2 and if SQLJ types are present, the following ORA-00600 error may occur when running `utlrp.sql` to recompile invalid objects after `catrelod.sql` is run (reference Bug 16230705):

```
ORA-00600: internal error code, arguments: [16211]
```

You must apply the fix in the original release (11.2.0.2 or 11.2.0.3) before executing `utlrp.sql` (after `@catrelod.sql`) in order to avoid this error.

2.2 Features Not Available or Restricted in This Release of Oracle Database 12.1.0.2

The following is a list of components that are not available or are restricted in this release of Oracle Database 12c Release 1 (12.1.0.2):

- Interval partitioning is not supported with XMLIndex. XMLIndex only supports range, list and hash partitioning schemes.
- Only rolling upgrades to Oracle Grid Infrastructure release 12.1.0.2 are supported when upgrading Oracle Grid Infrastructure clusters that are operating in Oracle Flex Cluster mode. The Oracle Clusterware stack on all nodes in the cluster (Hub Node and Leaf Node) needs to be up and running prior to the upgrade. For environments operating in Standard cluster mode, rolling and non-rolling upgrades are supported.
- Database Resident Connection Pooling (DRCP) is not supported with Transaction Guard.
- XStream does not support LONG columns in databases with varying width multibyte character sets.
- Java Database Connectivity (JDBC) thin driver Database Change Notification (DCN) is not supported by PDB.
- Oracle Automatic Storage Management Cluster File System (Oracle ACFS) does not currently support Hybrid Columnar Compression (HCC).

2.2.1 Features Restricted or Not Available for a Multitenant Container Database in Oracle Database 12c

The following is a list of features that are not available or are restricted for a multitenant container database (CDB) in this release of Oracle Database 12c Release 1 (12.1.0.2):

- DBVERIFY
- Data Recovery Advisor
- Flashback Pluggable Database
- Flashback Transaction Query
- Flashback Transaction Backout
- Database Change Notification
- Continuous Query Notification (CQN)
- Client Side Cache

- Heat map
- Automatic Data Optimization
- Oracle Streams

2.2.2 Materialized View Restrictions on NLS Parameters

When using or refreshing certain materialized views, you must ensure that your NLS parameters are the same as when you created the materialized view. Materialized views that fall under this restriction contain Expressions that may return different values, depending on NLS parameter settings.

Oracle recommends writing such expressions in the NLS-independent way. For example, one of the following:

```
(date > DATE '2003-01-02')
(rate <= 2.150)
```

Write the expression as a equijoin where one side of the join is character data. The result of this equijoin depends on collation which can change on a session by session basis, giving an incorrect result in the case of query rewrite or an inconsistent materialized view after a refresh operation.

Expressions generate internal conversion to character data in the select list of a materialized view, or inside an aggregate of a materialized aggregate view.

This restriction does not apply to expressions that involve only numeric data. For example, $a+b$ where a and b are numeric values.

2.3 Deprecated and Desupported Features for Oracle Database

Oracle Database 12c Release 1 (12.1) introduces behavior changes for your database in addition to new features. Changes in behavior include deprecated and desupported initialization parameters, options, syntax, and the deprecation and desupport of features and components. For more information, see the *Oracle Database Upgrade Guide*.

2.3.1 Deprecation of JPublisher

Oracle JPublisher is deprecated in Oracle Database 12c Release 1, as of October 2014, and all JPublisher features are desupported and unavailable in Oracle Database 12c Release 2. Oracle recommends that you use the alternatives listed here:

- To continue to use Web service callouts, Oracle recommends that you use the OJVM Web Services Callout utility, which is a replacement for the Web Services Callout utility.
- To create Java client applications for PL/SQL programs and SQL objects, Oracle recommends that developers use other JDK development tools that assist you to create java STRUCT classes, and other prestructured options.

See Also: My Oracle Support Note 1937939.1 for more information about JPublisher deprecation and desupport:

<https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=1937939.1>

Also, see JDK Tools and Utilities on Oracle Technology Network:

<http://docs.oracle.com/javase/8/docs/technotes/tools/>

2.3.2 Deprecation of SQLJ Inside the Server

SQLJ usage inside the database server is deprecated in this release. The capability of translating and running SQLJ applications inside the database will not be available in later releases. SQLJ can only be used as a client tool to translate the applications that can connect to Oracle Database and run as a client. SQLJ cannot be used inside stored procedures, functions, or triggers.

2.3.3 Desupport for Raw Storage Devices

Starting with Oracle Database 12c, Oracle Database and related technologies, such as Oracle Clusterware, no longer support the direct use of raw (block) storage devices (reference Bug 13503952). This means that files must be moved to Oracle ASM or a supported shared file system (cluster file system or Network File System (NFS)) prior to upgrading to Oracle Clusterware release 12c.

2.4 Data Analytics Accelerators on SPARC for Oracle Database Overview

The microprocessors for the SPARC M7 and T7 series servers include Data Analytics Accelerator (DAX) coprocessors. These coprocessors perform query-related operations directly through the hardware, which improves Oracle Database performance. With the minimum versions of Oracle Database Enterprise Edition and Oracle Solaris listed below, you can use DAX hardware acceleration for Oracle Database 12c in-memory database operations.

To use the DAX hardware, you must install patch 21744410 for Engineered Systems and Database In-Memory 12.1.0.2.13 (October 2015), install one-off patch 21249747, and enable the in-memory feature for your application.

For information about configuring the Oracle Database 12c in-memory feature, see "Using the In-Memory Column Store" in *Oracle Database Administrator's Guide*.

Note: The DAX feature is not supported for use with Kernel Zones at this time.

2.5 Database Security

Note the following changes in Database Security.

2.5.1 New SQLNET.HTTPS_SSL_VERSION Parameter

In release 12.1.0.2, a new parameter `SQLNET.HTTPS_SSL_VERSION` has been introduced. This parameter defaults to 1.1 or 1.2, meaning TLSv1.1 or TLSv1.2. As a result, you can now control the Secure Sockets Layer (SSL) version used by HTTPS separately. In particular, the `SSL_VERSION` parameter no longer controls the SSL version used by HTTPS. You can set this parameter to any valid `SSL_VERSION` values.

2.5.2 Configure and Use SSL Certificates to Setup Authentication

Note: This affects the security in the connection between the Oracle Clusterware and the mid-tier or JDBC client.

JDBC or Oracle Universal Connection Pool's (UCP) Oracle RAC features like Fast Connection Failover (FCF) subscribe to notifications from the Oracle Notification Service (ONS) running on the Oracle RAC nodes. The connections between the ONS server in the database tier and the notification client in the mid-tier are usually not authenticated. It is possible to configure and use SSL certificates to setup the authentication but the steps are not clearly documented.

The workaround is as follows:

1. Create an Oracle Wallet to store the SSL certificate using the `orapki` interface:

- a. `cd $ORA_CRS_HOME/opmn/conf`
- b. `mkdir sslwallet`
- c. `orapki wallet create -wallet sslwallet -auto_login`

When prompted, provide `ONS_Wallet` as the password.

- d. `orapki wallet add -wallet sslwallet -dn "CN=ons_test,C=US" -keysize 1024 -self_signed -validity 9999 -pwd ONS_Wallet`
- e. `orapki wallet export -wallet sslwallet -dn "CN=ons_test,C=US" -cert sslwallet/cert.txt -pwd ONS_Wallet`
- f. Copy the wallet created in Step c to all other cluster nodes at the same location.

2. Stop the ONS server on all nodes in the cluster:

```
srvctl stop nodeapps
```

3. Update the ONS configuration file on all nodes in the database tier to specify the location of the wallet created in Step 1:

- a. Open the file `ORA_CRS_HOME/opmn/conf/ons.config`
- b. Add the `walletfile` parameter to the `ons.config` file:

```
walletfile=ORA_CRS_HOME/opmn/conf/sslwallet
```

- c. Restart the ONS servers with the `srvctl`:

```
srvctl start nodeapps
```

4. If you are running a client-side ONS daemon on the mid-tier, there are two possible configurations:

- ONS started from OPMN (like in Oracle AS 10.1.3.x) which uses `opmn.xml` for its configuration.
- ONS started standalone (like using `onsctl`), which uses `ons.config` for its configuration.

For case (1), refer to the *OPMN Administrator's Guide* for the Oracle Application Server release. This involves modifying the `opmn.xml` file to specify the wallet location.

For case (2), refer to the section titled *Configuration of ONS* in *Appendix B* of the *Oracle Database JDBC Developer's Guide*. The client-side ONS daemon can potentially run on different machines. Copy the wallet created in Step 1 to those client-side machines and specify the path on that client-side machine in the `ons.config` file or in the `opmn.xml` file.

5. If you are running remote ONS configuration without a client-side ONS daemon, refer to the "Remote ONS Subscription" subsection of the "Configuring ONS for

Fast Connection Failover" subsection of the "Using Fast Connection Failover" section of the "Fast Connection Failover" chapter in the *Oracle Database JDBC Developer's Guide*. Copy the wallet created in Step 1 to those client-side machines and specify the path on that client-side machine in the `ons.config` file or in the `opmn.xml` file.

Alternatively, you can specify the following string as the `setONSConfiguration` argument:

```
propertiesfile=location_of_a_Java_properties_file
```

The Java properties file should contain one or more of the ONS Java properties listed below, but at least the `oracle.ons.nodes` property. The values for these Java properties would be similar to those specified in the "Remote ONS Subscription" subsection previously noted in this step:

```
oracle.ons.nodes
oracle.ons.walletfile
oracle.ons.walletpassword
```

2.5.3 JDWP Access Control List Privilege for PL/SQL and Java Debugging

An additional access control list (ACL) privilege called `JDWP` is required to connect a database session to a JDWP debugger running at a host and port. The privilege can be granted by the database administrator using the following call:

```
begin
  dbms_network_acl_admin.append_host_ace(
    host => '<debugger-host>',
    lower_port => <JDWP-port>,
    upper_port => <JDWP-port>,
    ace => xs$ace_type(privilege_list => xs$name_list('jdpw'),
                      principal_name => '<debugging-user>',
                      principal_type => xs_acl.p_type_db));
end;
```

The host parameter can be a host name, an IP address, a domain name, or an IP subnet. The `lower_port` and `upper_port` values can be omitted to allow the connection at any port number. For additional details, refer to the *Oracle Database Security Guide*.

2.6 Multitenant Container Database

Note the following when working with multitenant container databases (CDBs):

- Flashback Data Archive (FDA) is supported for multitenant container databases (CDBs) in this release.

2.7 Application Continuity

If a statement cache at the application server level is enabled (for example, the WebLogic or third-party application server statement cache), this must be disabled when the replay is used. Instead, configure the JDBC statement cache, which performs better because it is optimized for JDBC and Oracle and because it supports Application Continuity. Use `oracle.jdbc.implicitstatementcachesize=nnn`.

2.8 Oracle Application Express

To learn more about Oracle Application Express, refer to the *Oracle Application Express Release Notes* and the *Oracle Application Express Installation Guide*.

2.9 Oracle Automatic Storage Management (Oracle ASM)

When using Security-Enhanced Linux (SELinux) in enforcing mode with Oracle ACFS, ensure that the Oracle ACFS file systems are mounted with an SELinux default context. Refer to your Linux vendor documentation for information about the context mount option.

2.10 Oracle Database Vault

While downgrading an Oracle Database 12c database with Oracle Database Vault installed to 11.2.0.3, the following error is seen (reference Bug 14217829):

```
ERROR at line 1:
ORA-31011: XML parsing failed
ORA-19202: Error occurred in XML processing
LPX-00222: error received from SAX callback function
ORA-00001: unique constraint (DVSYS.REALM_T$_UK1) violated
ORA-06512: at "DVSYS.DBMS_MACADM", line 114
ORA-06512: at line 2
```

This error is expected and can be ignored. It does not affect Oracle Database Vault functionality in any way.

2.11 Oracle Enterprise Manager Database Express (EM Express)

The following browsers have been certified for use with Oracle Enterprise Manager Database Express (EM Express), database release 12.1.0.2:

Microsoft Internet Explorer 9.0, 10.0 and 11.0
Google Chrome 26 or later
Mozilla Firefox 24 or later
Apple Safari 6 or later (only on the Mac operating system)

Note: For these browsers, the minimum Transport Layer Security (TLS) version required to access EM Express is TLS 1.1.

2.12 Oracle Grid Infrastructure for a Cluster

Note the following when working with Oracle Clusterware and Oracle Automatic Storage Management (Oracle ASM), which are installed with an Oracle Grid Infrastructure for a cluster installation.

2.12.1 Oracle ACFS and Oracle Clusterware Stack Shut Down

Some non-Oracle Grid Infrastructure usage of mount points prevents unmounts and volume disables in the kernel (reference Bug 8651848). Examples include:

- Network File System (NFS)
- Samba/Common Internet File System (CIFS)

If this reflects your situation, ensure that you discontinue usage of these features before trying to initiate a stack shutdown, file system unmount, or volume disable.

Additionally, certain user space processes and system processes may use the file system or volume device in a way that prevents the Oracle Grid Infrastructure stack from shutting down during a patch or upgrade.

If this occurs, use the `lssof` and `fuser` commands (Linux and UNIX) or the `handle` and `wmic` commands (Windows) to identify processes which are active on the Oracle ACFS file systems and Oracle ADVM volumes. To ensure that these processes are no longer active, dismount all Oracle ACFS file systems or Oracle ADVM volumes and issue an Oracle Clusterware shutdown. Otherwise, errors may be issued during Oracle Clusterware shutdown relating to activity on Oracle ACFS file systems or Oracle ADVM volumes which will stop the successful shutdown of Oracle Clusterware.

2.13 Oracle Multimedia

For additional information, refer to the Oracle Multimedia Readme file located at:

`ORACLE_HOME/ord/im/admin/README.txt`

2.14 Oracle ODBC Driver

For additional information about Oracle ODBC Driver, see the *Oracle ODBC Driver Release Notes*.

2.15 Oracle SQL Developer

The Oracle SQL Developer readme file is located at:

`ORACLE_HOME/sqldeveloper/readme.html`

2.16 Oracle Spatial and Graph

Note the following when working with Oracle Spatial and Graph RDF Semantic Graph.

2.16.1 RDF Semantic Graph: Trigger Must Be Created in Some Cases

For Release 12.1.0.2, to use Oracle Spatial and Graph RDF Semantic Graph with new Oracle Database installations and databases that have been upgraded to Release 12.1.0.2.0, if you have not already enabled the Oracle Spatial and Graph GeoRaster feature, you must connect as the SYS user with SYSDBA privileges (`SYS AS SYSDBA`) and execute the `mdsys.enableGeoRaster` procedure. This procedure creates a system trigger that is required for RDF Semantic Graph operations.

For more information, see "Enabling RDF Semantic Graph Support" in *Oracle Spatial and Graph RDF Semantic Graph Developer's Guide*.

2.17 Oracle Text

Note the following when working with Oracle Text. You should also check entries for the *Oracle Text Application Developer's Guide* in the Documentation Addendum.

2.17.1 Oracle Text Supplied Knowledge Bases

An Oracle Text knowledge base is a hierarchical tree of concepts used for theme indexing, ABOUT queries, and deriving themes for document services. The following Oracle Text services require that a knowledge base be installed:

- Index creation using a BASIC_LEXER preference where INDEX_THEMES=YES
- SYNCing of an index where INDEX_THEMES=YES
- CTX_DOC.THEMES
- CTX_DOC.POLICY_THEMES
- CTX_DOC.GIST
- CTX_DOC.POLICY_GIST
- CTX_QUERY.HFEEDBACK
- CTX_QUERY.EXPLAIN, if using ABOUT or THEMES with TRANSFORM
- CTX_DOC.SNIPPET (if using the ABOUT operator)
- CTX_DOC.POLICY_SNIPPET (if using the ABOUT operator)
- CONTAINS queries that use ABOUT or THEMES with TRANSFORM
- The Knowledge Base Extension Compiler, `ctxkbtc`
- Clustering and classification services, if themes are specified

If you plan to use any of these Oracle Text features, then you should install the supplied knowledge bases, English and French, from the Oracle Database Examples media, available for download on OTN.

Note that you can extend the supplied knowledge bases, or create your own knowledge bases, possibly in languages other than English and French. For more information about creating and extending knowledge bases, refer to the *Oracle Text Reference*.

For information about how to install products from the Oracle Database Examples media, refer to the *Oracle Database Examples Installation Guide* that is specific to your platform.

2.17.2 Oracle Text Limitations for Oracle Database 12c

Note the following Oracle Text limitations for Oracle Database 12c:

- BIG_IO and SEPARATE_OFFSETS preferences are not supported in the following scenarios:
 - If the database session is restricted (for example, ALTER SYSTEM ENABLE RESTRICTED SESSION)
 - Running ALTER TABLE MODIFY PARTITION on an index created with these preferences
 - Trying to create an index with a quoted index name with mixed case characters
 - Using CTX_DDL.RECREATE_INDEX_ONLINE
- STAGE_ITAB preference is not supported in the following scenarios:
 - Trying to issue ALTER INDEX REBUILD PARAMETERS ('resume')
 - Trying to create or alter an index to use SYNC ON COMMIT

- Using `CTX_DDL.RECREATE_INDEX_ONLINE`
- Using `CTX_DDL.REMOVE_MDATA`
- Trying to alter an index with the clause `MIGRATE FIELD SECTION`
- `FORWARD_INDEX` preference is not supported in the following scenarios:
 - Concurrently running `CTX_DDL.SYNC_INDEX` and `CTX_DDL.OPTIMIZE_INDEX` on an index with this preference
 - Having `SDATA` sections in the same index
- Marking an Oracle Text index to be invisible is not supported.

2.18 Oracle XML DB

The following features are not supported with Oracle XML DB:

- Flashback Data Archive
- Editioning Views
- SecureFiles LOB Encryption
- Oracle Label Security (OLS) with a hybrid structured and unstructured XMLIndex on the same XML document.

2.18.1 Incorrect Output From View `*_XML_OUT_OF_LINE_TABLES` for Certain Cases

For tables created prior to 11.2.0.2, the view `ALL|DBA|USER_XML_OUT_OF_LINE_TABLES` may not return an out-of-line table in the case where `xdb:defaultTable` annotation was used but `xdb:SQLInline` was not specified for that table while registering the Oracle XML DB schema (reference Bug 7646934).

2.19 Pro*C

For additional information about Pro*C, see the *Pro*C/C++ Release Notes*.

2.20 Pro*COBOL

For additional information about Pro*COBOL, see the *Pro*COBOL Release Notes*.

2.21 SQL*Plus

For additional information about SQL*Plus, see the *SQL*Plus Release Notes*.

2.22 Open Bugs

This section lists known bugs for this release. A supplemental list of bugs may be found as part of the release documentation specific for your platform.

This section of the Readme contains the following sub-sections:

[Section 2.22.1, "12.1.0.2 Standard Edition Release Known Bugs"](#)

[Section 2.22.2, "Database Upgrade Assistant \(DBUA\) Known Bugs"](#)

[Section 2.22.3, "Deinstallation Tool Known Bugs"](#)

Section 2.22.4, "Multitenant Container Database (CDB) and Pluggable Database (PDB) Known Bugs"

Section 2.22.5, "Oracle ASM Cluster File System (Oracle ACFS) Known Bugs"

Section 2.22.6, "Oracle Automatic Storage Management (Oracle ASM) Known Bugs"

Section 2.22.7, "Oracle Clusterware Known Bugs"

Section 2.22.8, "Oracle Database Enterprise Edition Known Bugs"

Section 2.22.9, "Oracle Database In-Memory Known Bugs"

Section 2.22.10, "Oracle Database Quality of Service (QoS) Management Known Bugs"

Section 2.22.11, "Oracle Data Guard Logical Standby Database Known Bugs"

Section 2.22.12, "Oracle Grid Infrastructure Known Bugs"

Section 2.22.13, "Oracle Real Application Clusters (Oracle RAC) Known Bugs"

Section 2.22.14, "Oracle Text Known Bugs"

Section 2.22.15, "Oracle Universal Installer Known Bugs"

Section 2.22.16, "Oracle XML DB Known Bugs"

Section 2.22.17, "Vendor and Operating System Known Bugs"

2.22.1 12.1.0.2 Standard Edition Release Known Bugs

The following section describes known bugs for the Oracle Database 12c Release 1 (12.1.0.2) Standard Edition release.

2.22.1.1 Bug 21353871

Starting in release 12.1.0.1, Oracle introduced XML search index for XQuery full text queries. One of the internal tables created for XML search index is created with medium compression which relies on the Oracle Advanced Compression option. On Oracle Database Standard Edition, where advanced compression is not available, the index creation raises the following error:

```
ORA-00439: feature not enabled: Advanced Compression
```

Workaround: Apply the patch containing the fix for this bug (21353871). The patch creates the internal table without compression if the Oracle Advanced Compression option is not available.

2.22.2 Database Upgrade Assistant (DBUA) Known Bugs

This sections describe known bugs for Database Upgrade Assistant (DBUA).

2.22.2.1 Bug 19060613

When trying to restore the database using the restore script, it is possible to run out of sessions and the restore script displays the ORA-00018 error.

Workaround: Increase the sessions initialization parameter to a higher value, run the `utlrp.sql` script, and execute the following command:

```
ALTER SYSTEM SET SESSIONS=<new_number> SCOPE=BOTH;
```

2.22.2.2 Bug 18994910

Depending on the upgrade options selected during the Oracle Database Upgrade Assistant (DBUA) interview process, DBUA may provide an option to users to recover the database in case of upgrade failure.

If the source database is owned by a different user than the current user invoking DBUA, the restore operation may fail as it may not be able to access the backup files owned by the source database user. This is typically the case while upgrading an Oracle Database Express Edition database, where the database is owned by the user `oracle`.

Workaround: Before confirming to restore the database, change the permissions of the backup location directory to allow user access to the current user.

2.22.3 Deinstallation Tool Known Bugs

This section describes known bugs for the deinstallation tool.

2.22.3.1 Bug 8644344

When running the deinstallation tool to deinstall the database, you will be prompted to expand the Oracle home and to select a component. If you select the top level component, `Oracle Database Server`, and do not select the Oracle home, OUI does not show the message to run the deinstall utility and proceeds with the deinstallation of the database.

Workaround: Run the deinstallation tool to deinstall the Oracle home.

2.22.4 Multitenant Container Database (CDB) and Pluggable Database (PDB) Known Bugs

This section describes known bugs for multitenant container database (CDB) and pluggable database (PDB).

2.22.4.1 Bug 18073696

When creating a multitenant container database (CDB) with many pluggable databases (PDB) with default process parameters, the `ORA-12516` error is returned.

Workaround: Change the process number to `80*<number_of_CPU_cores>` when using DBCA to create a multitenant container database.

2.22.5 Oracle ASM Cluster File System (Oracle ACFS) Known Bugs

This section describes known bugs for Oracle ASM Cluster File System (Oracle ACFS).

2.22.5.1 Bug 18936197

When creating a target working copy as part of the Rapid Home Provisioning move operation, the `rhpctl move` command does not have `-ignoreprereq` option needed to ignore the failures of the CVU pre-requisite checks for the target working copy creation.

Workaround: Create the target working copy first specifying the `rhpctl add workingcopy` command with the `-ignoreprereq` option and then perform the move operation to the created working copy.

2.22.5.2 Bug 18922784

When provisioning a working copy for Oracle Database 10g Release 2 (10.2.0.5), if `-path` is not specified on the command line, the command fails while attempting to create an Oracle home on Oracle ACFS storage.

Workaround: Specify the option `-storagetype LOCAL` on the `rhpcctl add workingcopy` command to indicate that the local file system storage should be used instead of Oracle ACFS.

2.22.5.3 Bug 16044275

When upgrading 11.1 CRS to 12c Oracle Grid Infrastructure for a cluster and after Oracle ASM Configuration Assistant (ASMCA) upgrades Oracle ASM, some database instances may not be started. This problem is not reflected in the Oracle Universal Installer (OUI) as an error or warning.

Workaround: Manually check the database instance after upgrading to detect the state of the database instances. For example:

```
srvctl status database -db <db_name>
```

Then, manually start the database instance. For example:

```
srvctl start database -db <db_name>
```

2.22.5.4 Bug 10069735

In a cluster with a password-protected key store, when an Oracle ACFS file system using encryption is mounted through the Oracle ACFS mount registry, the administrator is not prompted to enter the key store password. Although the process of mounting the file system succeeds, not all information required for Oracle ACFS encryption to work correctly is made available to the file system. In this case, encryption is not operational on this file system and any encrypted files in the file system are not available for read or write.

Workaround: In a cluster with a password-protected key store, do not use the Oracle ACFS mount registry for mounting any file systems that are using encryption. If some file systems are already mounted through the Oracle ACFS mount registry, unmount them and remove any such file systems from the mount registry to avoid possible unavailability of encrypted data in the future. Then, remount these file systems without using the Oracle ACFS mount registry, providing the correct password when requested.

2.22.5.5 Bug 14739783

Removal of an Oracle ADVM volume should trigger removal of its corresponding CRS volume resource. In the rare event that this does not occur, the CRS resource can be removed using the following command:

```
srvctl remove volume
```

Workaround: Remove the resource.

2.22.5.6 Bug 14139048

If you register an Oracle ACFS file system using `acfsutil registry`, and if you also have Network File System (NFS) export or database resources which have Cluster Ready Services (CRS) dependencies on this Oracle ACFS file system, and then if you subsequently modify the registered Oracle ACFS file system using `acfsutil`

registry, the Oracle ACFS file system resource is modified despite the existence of the CRS dependencies. For example, if the Oracle ACFS file system resource is clusterwide and you modify it to be 'node local,' this could result in an unsupported configuration.

Workaround: None.

2.22.6 Oracle Automatic Storage Management (Oracle ASM) Known Bugs

This section describes known bugs for Oracle Automatic Storage Management (Oracle ASM).

2.22.6.1 Bug 12332603

Oracle Automatic Storage Management (Oracle ASM) loses the rolling migration state if Cluster Ready Services (CRS) shuts down on all nodes.

Workaround: Consider the following scenario of 4 nodes (node1, node2, node3, and node4) that are at release 11.2.0.2 and being upgraded to Oracle Database release 12.1.0.2:

- node1 and node2 are upgraded to 12.1.0.2 and running.
- node3 and node4 are still at 11.2.0.2 and running.

Now consider that there is an outage where all CRS stacks are down which leaves the cluster in a heterogeneous state (that is, two nodes at 11.2.0.2 and two nodes at 12.1.0.2).

To proceed with the upgrade, only nodes at 11.2.0.2 (that is, node3 and node4 or both) should be started and the following command needs to be executed on the Oracle ASM instance on node3 and node4 before starting any 12.1.0.2 node:

```
ALTER SYSTEM START ROLLING MIGRATION TO '12.1.0.2'
```

Continue the upgrade procedure as already documented from this point forward.

Note that before executing the preceding step to bring the Oracle ASM cluster back into rolling migration, you cannot start two nodes of different versions in the cluster. If you do so, one of the Oracle ASM versions fail with either the ORA-15153 or ORA-15163 error message.

2.22.7 Oracle Clusterware Known Bugs

This section describes known bugs for Oracle Clusterware.

2.22.7.1 Bug 19156657

The Oracle Clusterware installation may list the prerequisite check `Task DHCP Configuration check` with a warning when a user selects the `root automation` option and later decides against it.

Workaround: This check failure can be ignored in this situation.

2.22.7.2 Bug 19125908

If you use a path to the `-savedir` option which is non-existent, or a path to which write permissions have not been granted to the user running the command `cluvfy comp baseline -savedir`, the command fails without reporting a proper error message.

Workaround: Specify a valid directory that can be written to by the user for the `-savedir` option.

2.22.7.3 Bug 18999195

If the Oracle Cluster Synchronization Services daemon (CSSD) restarts without the Oracle High Availability Services daemon (OHASD) Oracle Agent (oraagent) restarting, the `orasmd ora.asm` resource will continue to be in the `INTERMEDIATE` state.

Workaround: Run the following commands:

```
crsctl stop res ora.asm -init
crsctl start res ora.asm -init
```

2.22.7.4 Bug 18765697

The Grid Infrastructure Management Repository is configured to use Huge Pages. Since this database comes up before all of the other customer's databases, it may cause one or more of the customer's databases System Global Areas (SGAs) to be mapped to regular pages (instead of Huge Pages). The size of the Grid Infrastructure Management Repository's SGA is 750 MB. Hence the Huge Pages setting needs to be increased to accommodate the sum of the SGA sizes of all the intended customer databases plus Grid Infrastructure Management Repository.

Workaround: Increase the allocated Huge Pages to accommodate the SGA of the Grid Infrastructure Management Repository.

2.22.7.5 Bug 18756989

The `STATIC SCAN` address may be lost after converting network `nettype` from `autoconfig` to `mixed`. If this happens, the `srvctl config scan` command will not show the `STATIC` address of `SCAN`.

Workaround: Restart `SCAN` after converting network `nettype` from `autoconfig` to `mixed`.

2.22.7.6 Bug 18708150

During an Oracle RAC installation with a database creation, an option to save the `DBSNMP` password into the `CVUDB` cluster wallet is not provided to the user. Therefore, the `DBSNMP` users password will not be saved. When the Cluster Verification Utility (CVU) resource runs again, it will try to perform database related checks but, because the wallet is not available, CVU will not be able to perform the checks. This results in an error begin written to the Oracle Clusterware alert log. Errors could also occur when the `cluvfy` commands that perform database related operations are executed.

Workaround: As either the Oracle RAC owner or as root, manually create the `CVUDB` wallet by running the following command:

```
crsctl add wallet -type CVUDB -name <dbsid> -user dbsnmp -passwd
```

2.22.7.7 Bug 18457727

Size changes to the Oracle Grid Infrastructure Management Repository prior to the upgrade are not persisted after the upgrade to release 12.1.0.2.

Workaround: Reassert the repository size changes using the `ocluomon manage -reposit changerespossize` command after the upgrade to release 12.1.0.2.

2.22.7.8 Bug 18407530

The problem could be one of two scenarios. In the first scenario, when more than one interface in the network has the same IP address, it creates routing conflicts. In the second scenario, when there are multiple entries (generally .BAK files) in the network scripts with the same IP address, this also creates routing conflicts.

Both of these scenarios are verified by the Cluster Verification Utility (CVU) and the CVU complains if one of the stated scenarios is true.

If the first scenario is the case, then it is actually an issue and CVU reporting this as verification failure is correct.

If the second scenario is the case, either there is a backup file created automatically or someone might have created a copy of an interface and not deleted the copy at a later time. In this case, CVU reports this as multiple interfaces having the same IP address.

Workaround for Scenario 1: Make sure no two interfaces have same IP address.

Workaround for Scenario 2: If there are .BAK files or duplicate entries under network scripts at `/etc/sysconfig/network -scripts` (for example, `ifcfg-eth0` and `ifcfg-eth0.BAK`) and if they have same IP address, remove `ifcfg-eth0.BAK` or modify the IP address of `ifcfg-eth0.BAK`.

2.22.7.9 Bug 17745766

The database client may fail to connect to the database with dynamic IPv6 SCAN name after the network type is converted from `autoconfig` to `mixed`.

Workaround: Restart SCAN after converting the network type from `autoconfig` to `mixed`.

2.22.7.10 Bug 16407903

Oracle resources for release 10.2 and release 11.1 Oracle RAC databases may not operate properly after upgrading Oracle Clusterware to Release 12.1.

Workaround: After installing Oracle Clusterware 12g Release 1 (12.1), contact Oracle Support Services to obtain the patches for the following bugs:

- 8373758 - TB-CMP: 11107 SERVICE CAN'T BE BROUGHT UP BY 11107 SRVCTL WHEN WITH 11.2 CRS
- 8441769 - TB_UD: INCORRECT SERVICE INFO REGISTER TO DB, UPGRADE CRS_HOME 11.1.0.7 -> 11.2
- 8406545 - TB-CMP: RESTART OF 11.2 HAS STACK FAILED TO BRING UP 11.1 ORACLE RAC INSTANCE
- 8262786 - TB-CMP: FAIL TO START 11106 DB INSTANCE WITH 11.2 CRS

Note: Apply the patches to the Oracle Database home.

2.22.7.11 Bug 16003413

Interrupting or killing the installation script on the first cluster node may result in the following errors when the script is run again on the first node or is subsequently run on other cluster nodes:

```
CLSRSC-46: Error: '$ORA_CRS_HOME/gpnp/wallets/pa/cwallet.sso' does not exist
CLSRSC-153: Could not set permissions on
```

```
'$ORA_CRS_HOME/gpnp/wallets/pa/cwallet.sso'
CLSRSC-148: Errors occurred while setting GPnP wallets ownership/permissions
```

These errors are caused by a missing copy of a non-essential file which is not detected when the existing configuration revalidated on subsequent runs.

Workaround: These errors may be safely ignored, the script will continue to run, and the product installation will not be affected.

However, if a clean run is desired, delete the files in following directories on all cluster nodes before the script restarts on the first node:

```
rm $ORA_CRS_HOME/gpnp/profiles/peer/*
rm $ORA_CRS_HOME/gpnp/wallets/peer/*
```

2.22.7.12 Bug 14497206

Service resources for pre-11.2 releases may be OFFLINE after Oracle Grid Infrastructure is upgraded to release 12.1.

Workaround: Use `srvctl start service -d <dbname> -s <srvname> -i <instname>` to start the OFFLINE service resources manually.

2.22.8 Oracle Database Enterprise Edition Known Bugs

This section describes known bugs for Oracle Database Enterprise Edition.

2.22.8.1 Bug 19559050

The Oracle OLAP option is only available with Oracle Database Enterprise Edition. An error occurs if you attempt to use Oracle OLAP with Oracle Database Standard Edition (SE). For example, if you try to export using Oracle OLAP with SE, you see the following errors:

```
EXP-00008: ORACLE error 29280 encountered
ORA-29280: invalid directory path
ORA-06512: at "SYS.UTL_FILE", line 41
ORA-06512: at "SYS.UTL_FILE", line 478
ORA-06512: at "SYS.DBMS_AW_EXP", line 89
ORA-06512: at "SYS.DBMS_AW_EXP", line 1177
ORA-06512: at line 1
EXP-00085: The previous problem occurred when calling
SYS.DBMS_AW_EXP.instance_extended_info_exp for object 85676
```

Workaround: Use Oracle OLAP with Oracle Database Enterprise Edition.

2.22.8.2 Bug 19245900

If a query uses the PARTITION clause in the FROM clause to access table partitions, query rewrite does not occur.

Workaround: Users should convert the PARTITION clause into an equivalent selection predicate in the WHERE clause.

2.22.8.3 Bug 19245856

If fine-grained auditing is enabled on a table in the query, then Query Rewrite will not occur for this query.

Workaround: None.

2.22.8.4 Bug 18999009

In a cluster that has IPv4 and IPv6 addresses for the host name, the automatic execution of the root script using the root password fails on all nodes other than the node where the installer is running. This applies to both installation and upgrade.

Workaround: If the installation or upgrade fails in such an environment, the workaround is to run the `root.sh` or the `rootupgrade.sh` script manually on all of the cluster nodes.

2.22.8.5 Bug 18909599

It is possible that you may see inconsistencies with `DBMS_QOPATCH` directory objects and inventory in `ORACLE_HOME` after you have applied a patch out-of-place. You can check this by selecting the `OPATCH_SCRIPT_DIR`, `OPATCH_LOG_DIR`, or `OPATCH_INST_DIR` from `DBA_DIRECTORIES` (for example, `SELECT DIRECTORY_NAME, DIRECTORY_PATH DBA_DIRECTORIES WHERE DIRECTORY_NAME= 'OPATCH_SCRIPT_DIR'`) and see if these are pointing to the correct `ORACLE_HOME` location where you applying or querying the patch details.

Workaround: Manually correct the directory objects or execute `DBMS_QOPATCH.REPLACE_LOGSCRPT_DIRS()` manually. Once the directory objects are corrected, run the failing query or data patch again.

2.22.8.6 Bug 18764101

After plugging a release 12.1.0.1 pluggable database (PDB) into a release 12.1.0.2 multitenant container database (CDB), users may encounter issues when trying to use some common types with system-generated names. Those common types are created by registering some Oracle XML DB schema with object-relational storage. Since those type names are system generated, their names in release 12.1.0.1 could be different from those in release 12.1.0.2 and, therefore, they may not have matching common types in release 12.1.0.2 CDB root.

Workaround: Execute the following steps:

1. Query view `PDB_PLUG_IN_VIOLATIONS` in the target CDB root for any action containing `GetTypeDDL` which indicates that the upgraded PDB has the issue stated in the preceding paragraph.
2. Execute `set serveroutput on` and `exec xdb.DBMS_XMLSTORAGE_MANAGE.GetTypeDDL` in the target PDB to generate a user-named SQL script (for example, `script1.sql`).
3. Run `script1.sql` in the original source 12.1.0.1 CDB to get the type creation script for all those common types and generate another user-name SQL script (for example, `script2.sql`).
4. Run `script2.sql` in the target PDB to create all those types locally.

2.22.8.7 Bug 18718327

For pluggable database (PDB) maintenance operations, parallel tasks need to be allocated on all active instances to perform the operation on each instance regardless of the setting of the `PARALLEL_MAX_SERVERS` initialization parameter. If an instance had `PARALLEL_MAX_SERVERS=0` set, the parallel task was not allocated on the instance and the operation was not performed there.

Workaround: Do not set the value of the `PARALLEL_MAX_SERVERS` initialization parameter to 0. Not setting the `PARALLEL_MAX_SERVERS` initialization parameter at all is sufficient.

2.22.8.8 Bug 18419520

An `ORA-00600` internal error appears during a shutdown of the database after you have selected from the `V$ENCRYPTION_KEYS` or `V$CLIENT_SECRETS` Transparent Data Encryption (TDE) view when using TDE in an hardware security module (HSM) configuration.

Workaround: This problem occurs when you try to clean up the system global area (SGA) cache for `V$ENCRYPTION_KEYS` or `V$CLIENT_SECRETS` views after the database shutdown has been initiated. Closing the wallet also cleans up the SGA cache for these views.

Before shutting down the database, explicitly close the keystore by executing the following syntax:

```
ADMINISTER KEY MANAGEMENT SET KEYSTORE CLOSE IDENTIFIED BY "user_id:password"
[CONTAINER = ALL | CURRENT];
```

2.22.8.9 Bug 18300549

If LOB operations are issued in distributed transactions or if the underlying LOB is stored as a SecureFile, the `ORA-00600` error is returned.

Workaround: Turn off the SecureFile space cache by setting `_kdli_space_cache_limit=0` in the initialization parameter file and bounce the instances.

Note: Setting `_kdli_space_cache_limit=0` in the initialization parameter file can degrade performance.

2.22.8.10 Bug 17443352 and Bug 14851837

Tables containing `TIMESTAMP WITH LOCAL TIME ZONE` data cannot be moved between databases using transportable tablespace technology when the time zones of the source and target databases are different. Each affected table will be flagged during import with the following error:

```
ORA-39360, Table "<owner>".<table name>" skipped due to transportable import and
TSLTZ issues.
```

Workaround: Convert the target database to the same time zone as the source database or move the affected tables with the conventional Data Pump Export and Import.

2.22.8.11 Bug 17189758

During transportable imports, tablespaces are temporarily made read/write and then set back to read-only. This is new behavior introduced as of Oracle Database 12c Release 1 (12.1.0.2) to improve performance. However, this behavior also causes the SCNs of the data files of the import job to change, which can cause issues during future transportable imports of those files.

For example, if a transportable tablespace import fails at any point after the tablespaces have been made read/write (even if they are now read-only again), then the data files become corrupt. They cannot be recovered.

Workaround: Since transportable jobs are not restartable, the failed job needs to be restarted from the beginning. The corrupt data files must be deleted and fresh versions must be copied to the target destination.

When transportable jobs are performed, it is best practice to keep a copy of the data files on the source system until the import job has successfully completed on the target system. If the import job should fail for some reason, you will still have uncorrupted copies of the data files.

2.22.8.12 Bug 16089104

When converting a cluster from classic Oracle ASM to Oracle Flex ASM, one or more occurrences of the following error message sequences are observed in the output of the script that is executed as root by the user:

```
CRS-2672: Attempting to start 'ora.proxy_advm' on '<node-name>'
CRS-5017: The resource action "ora.proxy_advm start" encountered the
following error: ^M
ORA-03113: end-of-file on communication channel^M
Process ID: 0^M
Session ID: 0 Serial number: 0^M
```

For details, refer to (:CLSN00107:) in
<CRS-Home>/log/<node-name>/agent/crsd/oraagent_crsusr/oraagent_crsusr.log.

Workaround: These errors may be ignored. At the end of the conversion, the ora.proxy_advm correctly goes to an ONLINE state on all of the nodes.

2.22.8.13 Bug 16047938

Concurrent UNION ALL is automatically invoked for qualifying statements only when the UNION ALL statement is in a subsequent SELECT statement. For example, the following command will enable execution of all branches concurrently:

```
SELECT * FROM (SELECT FROM ... UNION ALL ... UNION ALL)
```

However, the exact same UNION ALL statement not executed as a subsequent SELECT statement will not.

Workaround: Either embed the UNION ALL construct as a subsequent SELECT statement or use the following statement to disable legacy code constraints:

```
ALTER SESSION SET "_fix_control"='6748058:0';
```

2.22.8.14 Bug 16027608

If you have an AL32UTF8 or UTF8 database, and if SQL*Loader is used with external tables as the load method and the table name contains non-ASCII characters, SQL*Loader may fail and report one of the following errors:

```
SQL*Loader-350: Syntax error at line n.
Illegal combination of non-alphanumeric characters
```

Where *n* represents the line in the SQL*Loader control file. Or,

```
SQL*Loader-810: error creating external table: "*"
ORA-03001: unimplemented feature
```

Where "*" represents the external table name generated by SQL*Loader.

This can occur either with a control file if `external_table=execute` is specified or when using express mode if the default load method of external tables is used or is forced using the `external_table=execute` command line parameter.

Workaround: The load may work correctly using the SQL*Loader conventional path load method if quotation marks surround the table name.

2.22.8.15 Bug 13790316

Starting Oracle Database 12c Release 1 (12.1), temporary LOBs sized up to 256K live in program global area (PGA) memory. This can lead to increased PGA memory consumption. Some workloads may encounter the ORA-4030 error depending on the number of temporary LOBs created.

Workaround: Set event 32761, level 16 to turn off in-memory temporary LOBs. Setting this event spills temporary LOBs to temporary segments on disk. Even though this brings the memory consumption to pre-12.1 levels, users will not see the performance benefits of in-memory temporary LOBs.

2.22.9 Oracle Database In-Memory Known Bugs

This section describes known bugs for Oracle Database In-Memory.

2.22.9.1 Bug 19189762

The default value for the `INMEMORY_MAX_POPULATE_SERVERS` parameter is derived from the `PGA_AGGREGATE_LIMIT` parameter at instance startup. The estimation of the `PGA_AGGREGATE_LIMIT` can be off at instance startup before knowing the physical memory. When calculating the number of In-Memory population servers, only 50% of `PGA_AGGREGATE_LIMIT` is used. Each population server requires 500 MB of PGA memory, so the `PGA_AGGREGATE_LIMIT` parameter (defaults to $2 * \text{PGA_AGGREGATE_TARGET}$) is divided by 1 GB to determine the number of population servers, which may not be enough to populate the In-Memory column store in a timely fashion.

Workaround: Specify the value of the `PGA_AGGREGATE_LIMIT` or `PGA_AGGREGATE_TARGET` parameter to a proper value which can be supported by your system in the initialization parameter file. For example, `PGA_AGGREGATE_LIMIT` can be set to a value equal to or greater than $1 \text{ GB} * \text{\#POPULATE_SERVERS}$.

2.22.9.2 Bug 19183813

It is possible for queries that require a median function to return wrong results when executed against the In-Memory column store.

Workaround: Disable the use of the In-Memory column store at a session level by setting the `INMEMORY_QUERY` parameter to `DISABLE` or use the `NO_INMEMORY` hint to disable the In-Memory column store at the statement level.

2.22.9.3 Bug 18943905

In a multitenant environment, only one chunk of memory and one set of background processes are allocated for the multitenant container database (CDB). All of the pluggable databases (PDBs) in that CDB share the memory and, therefore, share the In-Memory (IM) column store. The `GV$INMEMORY_AREA` view indicates how much memory is used and available in the IM column store across the PDBs. The `GV$INMEMORY_AREA` view incorrectly indicates that space used by one PDB is used by all of the PDBs.

Workaround: To calculate the total amount of space used in the IM column store in a multitenant environment, look at the value for only one PDB in the `GV$INMEMORY_AREA` view, rather than adding all of the values per PDB.

2.22.10 Oracle Database Quality of Service (QoS) Management Known Bugs

This section describes known bugs for Oracle Database Quality of Service (QoS) Management.

2.22.10.1 Bug 16992360

Resource Manager changed the way CPU resources are managed for CDB or PDB database deployments in a manner that was incompatible with Oracle Database QoS Management 11.2 plan and models. These changes resulted in the need for two plans and different resource modeling with associated workload validation. These models need to be developed, tested, and calibrated on production Resource Manager code. Therefore, in this initial release, Oracle Database QoS Management is only able to measure and monitor CDB or PDB database deployments and cannot make recommendations to help CDB or PDB performance classes that are violating their performance objectives.

Workaround: None.

2.22.10.2 Bug 12792222

This bug applies to recommendations for CPU resources managed by Oracle Database QoS Management. If the number of configured CPUs for all instances on a server is less than the number of physical CPUs for that server, then the nonallocated, or "free", CPUs are not detected by Oracle Database QoS Management and no recommendation is made to increase the number of configured CPUs. Only those "slices" that host databases are considered as donors for the target slice. Adding one of the non-allocated CPUs should be the first-ranked Move CPU action.

Workaround: Make sure the sum of CPU counts configured for each database instance on each server is the same as the number of physical CPUs.

2.22.11 Oracle Data Guard Logical Standby Database Known Bugs

This section describes known bugs for Oracle Data Guard logical standby database.

2.22.11.1 Bug 16055604

Piecewise LOB updates on typed index-organized tables (IOT) are not replicated on a logical standby database. SQL Apply will stop with `ORA-1403` when it encounters such a change in the redo stream.

Workaround: Use the `DBMS_LOGSTDBY.SKIP` procedure at the logical standby to skip the table from being replicated.

2.22.11.2 Bug 14530359

SQL Apply does not support replication of a table with `SYS.ANYDATA` column, if the `SYS.ANYDATA` column contains multibyte characters.

Workaround: None.

2.22.11.3 Bug 12911818

For Oracle Text, indexes created with the `FILTER BY` or `ORDER BY` clause of the `SQL CREATE INDEX` statement, DML statements on the columns specified in the `FILTER BY` or `ORDER BY` clause are not replicated at the logical standby. However, the indexes may not be properly maintained at the logical standby.

Workaround: Synchronize the indexes manually at the logical standby database.

2.22.12 Oracle Grid Infrastructure Known Bugs

This section describes known bugs for Oracle Grid Infrastructure.

2.22.12.1 Bug 19049721

There is no way to specify Rapid Home Provisioning managed storage type in the `add workingcopy` command using the `-storagetype` option.

Workaround: In order to use Rapid Home Provisioning managed storage type for both Grid Home Server and Grid Home Client, execute one of the following while executing the `rhctl add workingcopy` command:

- To provision a working copy for the Grid Home Server, the `rhctl add workingcopy` command should be specified without the `-storagetype` option.
- To provision a working copy for the Grid Home Client, the `rhctl add workingcopy` command should be specified without the `-storagetype` and `-path` options.

2.22.12.2 Bug 19008750

There are some prerequisite steps to be followed in order to provision a release 10.2.0.5 database with Rapid Home Provisioning.

Workaround: Ensure the following prior to provisioning a release 10.2.0.5 database with Rapid Home Provisioning:

1. The cluster nodes where the release 10.2.0.5 database needs to be provisioned must be pinned. Use the `crsctl pin css` command to pin the cluster nodes.
2. Set `SQLNET.ALLOWED_LOGON_VERSION=8` in the `$crs_home/network/admin/sqlnet.ora` file.

2.22.12.3 Bug 18935528

When provisioning an 11.2.0.2 version working copy with Rapid Home Provisioning in a role-separated environment, the operation might fail during the clone stage due to insufficient permissions to access the file `install.platform` in the central inventory location.

Workaround: Rerun the `oraInstRoot.sh` script as `root` user from the central inventory location on all the cluster nodes and retry the provisioning operation.

2.22.12.4 Bug 18912255

The Rapid Home Provisioning runtime environment needs to be reset due to potential catastrophic failure situations such as loss of the disk group associated with gold images and working copies.

Workaround: Follow these steps:

1. Stop the Rapid Home Provisioning Server using the following command:


```
$ srvctl stop rhpserver
```
2. Execute the `srvctl status mgmtdb` command and note the node on which the management database is running.
3. Login to the node reported in Step 2 as the Oracle Grid Infrastructure user.
4. Setup the environment variable using the following commands:


```
$ setenv ORACLE_HOME <GI_home>
$ setenv ORACLE_SID -MGMTDB
```
5. Connect to the management database using the following command:


```
$ <GI_home>/bin/sqlplus / as sysdba
```
6. Execute the following SQL statements:


```
SQL> DROP USER ghsuser CASCADE;
SQL> CREATE USER ghsuser IDENTIFIED BY "ghsuser" DEFAULT TABLESPACE
sysgridhomedata QUOTA UNLIMITED ON sysgridhomedata ACCOUNT LOCK PASSWORD
EXPIRE;
SQL> GRANT CREATE SESSION, ALTER SESSION, RESOURCE to GHSUSER;
```
7. Execute the following command:


```
$ mgmtca setpassword -user gridhome
```

Note: The above actions remove the metadata of the Rapid Home Provisioning Server for all images, working copies, clients, users, etc. Be absolutely sure this is the intended objective before proceeding with above actions.

2.22.12.5 Bug 17386404

The password to `SYS` and `SYSTEM` schemas are not known for a database that has been provisioned by the Rapid Home Provisioning feature.

Workaround: When creating a database, the Rapid Home Provisioning feature uses random passwords for both the `SYS` and `SYSTEM` schemas in the database. These passwords cannot be retrieved. The user with the DBA or operator role should connect to the database locally on the node where it is running and reset the passwords to these two accounts to the desired values.

2.22.13 Oracle Real Application Clusters (Oracle RAC) Known Bugs

This section describes known bugs for Oracle Real Application Clusters (Oracle RAC).

2.22.13.1 Bug 14575666

In 12.1, the default value for the `SQLNET.ALLOWED_LOGON_VERSION` parameter has been updated to 11. This means that database clients using pre-11g JDBC thin drivers cannot authenticate to 12.1 database servers unless the `SQLNET.ALLOWED_LOGON_VERSION` parameter is set to the old default of 8.

This will cause a 10.2.0.5 Oracle RAC database creation using DBCA to fail with the `ORA-28040: No matching authentication protocol error` in 12.1 Oracle ASM and Oracle Grid Infrastructure environments.

Workaround: Set `SQLNET.ALLOWED_LOGON_VERSION=8` in the `$crs_home/network/admin/sqlnet.ora` file.

Use the workaround before running 10.2.0.5 DBCA to create a database using 12.1 Oracle ASM and Oracle Grid Infrastructure.

2.22.13.2 Bug 14148942

If you are using Oracle Grid Infrastructure and you want to create an Oracle RAC release 11.1.0.7 database, then you may need to increase the DBCA default for session processes. For Oracle Database 12c, DBCA sets the default value for processes to 300. In earlier releases, DBCA set the default value to 150.

Workaround: If you see the error message `ORA-00018:maximum number of session exceeded`, then change the default value for session processes in DBCA to 300. DBCA will then successfully create the release 11.1.0.7 database to use with Oracle Grid Infrastructure release 12.1.

2.22.13.3 Bug 13479980

For installer invocation, DBCA in silent mode will display the following message and execution will stop after a validation warning. The default DBCA behavior is to stop after the following warning:

```
There are not enough servers available to allocate to this server pool,
Database instances may not come up on specified cardinality. Do you want to
continue?
```

If you click `Yes`, the DBCA fails.

Workaround: Before starting the installer, ensure that there are a sufficient number of servers in the free server pool. The number of free servers should be more than or equal to the cardinality specified in the installer for configuring the policy-managed Real Application Clusters database. The status and membership details of server pools can be checked using the following command:

```
Grid_home/bin/crsctl status serverpool
```

2.22.14 Oracle Text Known Bugs

This section describes known bugs for Oracle Text.

2.22.14.1 Bug 18825547

The operations using `CTX_ENTITY` fail with the following error when the database runs out of system global area (SGA) memory:

```
DRG-13710: Syntax Error in Dictionary
ORA-20000: Oracle Text error:
DRG-50611: Third party lexer internal error: ANL code internal error
```

You can see `ORA-04031` in the alert log.

Workaround: Increase SGA memory or flush shared pool using `ALTER SYSTEM FLUSH SHARED_POOL`.

2.22.15 Oracle Universal Installer Known Bugs

This section describes known bugs for Oracle Universal Installer (OUI).

You should also review [Section 3.1, "Compatibility, Upgrading, Downgrading, and Installation"](#) for other issues related to installation and upgrades.

2.22.15.1 Bug 19172408

GSM in-place upgrade fails with the INS-32025 error. The chosen installation conflicts with software already installed in the given Oracle home.

Workaround: Perform the following steps to upgrade GSM software from version 12.1.0.1 to 12.1.0.2:

1. Stop all the processes and services being started by the existing 12.1.0.1 GSM.
2. Set environment variables ORACLE_HOME and ORACLE_BASE to the existing 12.1.0.1 GSM home and base, respectively.
3. Execute: `cd $ORACLE_HOME`
4. Execute: `mv jdk jdk.bkp`
5. Execute: `mv QOpatch/qopiprep.bat QOpatch/qopiprep.bat.bkp`
6. Invoke the 12.1.0.2 GSM installer to upgrade software in the existing GSM home.

2.22.15.2 Bug 19047978

When deinstalling Oracle Grid Infrastructure for standalone server home with Oracle Management Server configuration, the `emConfig.txt` file in `ORACLE_BASE/admin/emca` may not get deleted.

Workaround: To remove the `emConfig.txt`, execute the following command:

```
rm -rf $ORACLE_BASE/admin/emca/emConfig.txt
```

During the last `ORACLE_HOME` deinstallation, to remove `ORACLE_BASE`, execute the following command after the deinstallation tool exits:

```
rm -rf $ORACLE_BASE
```

2.22.15.3 Bug 18768597

When using automation scripts to install Oracle Grid Infrastructure and to create the first Oracle ASM Dynamic Volume Manager (Oracle ADVM) volume, the Oracle ADVM proxy may not start in time to service the volume creation request on the first node.

Workaround: Before creating the first volume, execute the following commands:

```
srvctl add asm -proxy
srvctl start asm -proxy
```

2.22.15.4 Bug 18533251

When performing an Oracle RAC installation, `runInstaller` may occasionally fail when performing an `AttachHome` operation because of a connectivity problem with the indicated node. In this case, you receive a message indicating the node that failed and a reference to the central inventory log that contains more detailed information.

Workaround: To correct the issue, execute the following command:

```
<oracle_home>/oui/bin/runInstaller -attachHome -noClusterEnabled
ORACLE_HOME=<oracle_home> ORACLE_HOME_NAME=<oracle_home_name>
CLUSTER_NODES=<node_1, node_2, ...> -force
```

```
"INVENTORY_LOCATION=<central_inventory_location>" LOCAL_NODE=<node_on_which_the_
command_is_targeted_to_run>
```

2.22.15.5 Bug 18336219

Oracle Database installer does not check if the password specified for `ASMSNMP` on the Specify Management Options screen is correct or not. If you proceed with the configuration and specify an incorrect password, then Oracle Enterprise Manager Cloud Control cannot discover details and monitor the Oracle ASM instance.

Workaround #1: Ensure that the correct password (the same password that was specified earlier during the Oracle Grid Infrastructure for a cluster installation) is specified in Specify Management Options screen of Oracle Database installer.

Workaround #2: On the Oracle Enterprise Manager Cloud Control portal, navigate to the Oracle ASM credentials screen and update the correct password for `ASMSNMP`. Once the correct password is saved on Oracle Enterprise Manager Cloud Control, the Oracle ASM monitoring starts working.

2.22.15.6 Bug 18065956

The installer fails with the following error when the server pool name specified for the policy-managed database already exists on the cluster:

```
[INS-20802] Oracle Database Configuration Assistant failed.
```

Workaround: Specify a unique name for the server pool when configuring a new policy-managed database on a cluster using the installer.

2.22.15.7 Bug 17008903

When installing 12.1.0.2 Oracle Grid Infrastructure for a cluster, the Oracle Universal Installer (OUI) does not verify and report if Oracle ASM disks with insufficient permission on remote nodes are selected due to the `root.sh` script failing on the nodes where the Oracle ASM disks have insufficient permission.

Workaround: Ensure that the Oracle ASM disks with insufficient permission on remote nodes are not selected. The Cluster Verification Utility tool (CVU) can be used to verify that disks on remote nodes have sufficient permission.

2.22.15.8 Bug 12930328

If the central inventory location is different on different nodes of a cluster, `addnode.sh` does not update the inventory correctly on remote nodes of the cluster.

Workaround: Adding nodes to a cluster requires the central inventory location to be the same on all the nodes of the cluster. Please ensure that this is the case prior to running `addnode.sh`.

2.22.15.9 Bug 12885716

If you install a 32-bit Oracle database and a 64-bit Oracle database in the same `ORACLE_BASE`, it may lead to unexpected results when using the deinstallation tool to remove one of the databases. The deinstallation tool removes all of the Oracle homes under the `ORACLE_BASE` if these Oracle homes do not use the same central inventory.

Workaround: Avoid using multiple central inventories. Do not use the same `ORACLE_BASE` for 32-bit and 64-bit database installations or always perform the deinstallation from a 64 bit home.

2.22.15.10 Bug 8666656

The Oracle Universal Installer (OUI) `runInstaller` script that resides in the Oracle home (`ORACLE_HOME/oui/bin/runInstaller`) cannot be used to install the Oracle Database 12c releases, Oracle Grid Infrastructure for a cluster, and Oracle Database Client.

Workaround: Use Oracle Universal Installer on the respective Oracle Database 12c product media to install each product.

2.22.16 Oracle XML DB Known Bugs

This section describes known bugs for Oracle XML DB.

2.22.16.1 Bug 19008291

Simplified JSON syntax does not support large (over 4K) `VARCHAR` data type.

Workaround: Use `JSON_VALUE` or `JSON_QUERY` with the `RETURNING` clause.

2.22.16.2 Bug 16069266

Using Transportable Tablespaces (TTS) to export or import tables with Binary XML data is not supported.

Workaround: Use the Oracle Data Pump conventional path to move data.

2.22.16.3 Bug 18532960

During an upgrade to release 12.1, a client application that is linked against the `libc1ntsh.so.11.1` file might fail to run on Oracle Solaris, HP-UX Itanium or IBM AIX platforms with an error message similar to the following:

```
referenced symbol count is undefined
```

Workaround: Relink the client application against the new `libc1ntsh.so.12.1` file.

2.22.16.4 Bug 14578945

Prior to Oracle Database 12c Release 1 (12.1), when inserting an XML element without a name space into an XML document, the newly inserted element is assigned to the name space of the parent element if the default name space is defined in the parent element, which is not correct.

In Oracle Database 12c, the new element will be inserted with `xmlns=""`.

Workaround: None.

2.22.16.5 Bug 12868171

Supplemental logging is unsupported for an XMLQuery update with variables bound to a REF cursor.

Workaround: Before updating XMLType columns or attributes that need replicating, store the evaluation of REF cursors in non-cursor variables, and then update the columns or attributes with these variables instead of the REF cursors.

2.22.16.6 Bug 8687128

An Oracle RAC system allows multiple concurrent database instances to share a single physical database. However, dispatches for Oracle XML DB in an Oracle RAC database do not listen on the virtual IPs.

Workaround: To enable Oracle XML DB to use TCP(S) on an Oracle RAC system, you must configure the TCP(S) dispatchers for each database instance of the cluster as follows (where `SID` is the SID of the instance and `HOST` is the host name for the physical database):

```
SID.dispatchers=" (address=(protocol=tcps) (host=HOST-vip) (service=SIDxdb) ) "
```

For non-secure dispatchers (TCP, not TCPS), use `tcp` in the command instead of `tcps`.

2.22.17 Vendor and Operating System Known Bugs

This section describes vendor and operating system known bugs.

2.22.17.1 Bug 8256753

A connect using `SCAN` and `EZCONNECT` on one client machine can be requested to use a specific `SCAN` listener. Therefore, load balancing by round-robin DNS is not possible.

Workaround: Connect to a database using the following configuration specifying `LOAD_BALANCE=on` in `tnsnames.ora`:

```
ORCL =
  (DESCRIPTION =
    (LOAD_BALANCE=on)
    (ADDRESS = (PROTOCOL = TCP) (HOST = stscan1) (PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = srv.world)
    )
  )
```

Readme Information for Oracle Database 12c Release 1 (12.1.0.1)

This chapter describes important last-minute features and changes not included in Oracle Database Documentation Library for Oracle Database 12c Release 1 (12.1.0.1).

This chapter contains the following sections:

- Section 3.1, "Compatibility, Upgrading, Downgrading, and Installation"
- Section 3.2, "Features Not Available or Restricted in Oracle Database 12.1.0.1"
- Section 3.3, "Database Security"
- Section 3.4, "Deprecated and Desupported Features for Oracle Database 12c"
- Section 3.5, "Default Behavior Changes"
- Section 3.6, "Oracle Automatic Storage Management (Oracle ASM)"
- Section 3.7, "Oracle Application Express"
- Section 3.8, "Oracle Data Mining"
- Section 3.9, "Oracle Database Vault"
- Section 3.10, "Oracle Enterprise Manager"
- Section 3.11, "Oracle Exadata Database Machine and SPARC SuperCluster"
- Section 3.12, "Oracle Grid Infrastructure for a Cluster"
- Section 3.13, "Oracle Multimedia"
- Section 3.14, "Oracle ODBC Driver"
- Section 3.15, "Oracle SQL Developer"
- Section 3.16, "Oracle Text"
- Section 3.17, "Oracle Warehouse Builder"
- Section 3.18, "Oracle XML DB"
- Section 3.19, "Pro*C"
- Section 3.20, "Pro*COBOL"
- Section 3.21, "SQL*Plus"
- Section 3.22, "Summary Management"
- Section 3.23, "Transparent Data Encryption"
- Section 3.24, "Open Bugs"

3.1 Compatibility, Upgrading, Downgrading, and Installation

For late-breaking updates and best practices about pre-upgrade, post-upgrade, compatibility, and interoperability discussions, see Note 1462240.1 on My Oracle Support (at <https://support.oracle.com>) that links to the "Upgrade Companion" web site.

Caution: After installation is complete, do not manually remove or run cron jobs that remove `/tmp/.oracle` or `/var/tmp/.oracle` directories or their files while Oracle software is running. If you remove these files, then Oracle software can encounter intermittent hangs. Oracle Grid Infrastructure for a cluster and Oracle Restart installations fail with the following error:

```
CRS-0184: Cannot communicate with the CRS daemon.
```

3.1.1 Use the Deinstallation Tool From the Same Release to Remove Oracle Software

Caution:

You must use the installation media from the same release to remove Oracle software. Do not use the installation media from a later release to remove Oracle software from an earlier release. For example, do not run the `deinstall` from the 12.1.0.1 installation media to remove Oracle software from an existing 11.2.0.4 Oracle home.

3.1.2 Upgrading to Release 12.1.0.1 Generates Suboptimal Plans for CHAR or NCHAR Data Type Columns

After upgrading to Oracle Database 12c Release 1 (12.1.0.1), the optimizer generates suboptimal plans for CHAR or NCHAR data type columns that have histogram statistics and when the `OPTIMIZER_FEATURES_ENABLE` parameter is set to a value of 11.2.0.4 or higher. 12.1.0.1 is the default value for the `OPTIMIZER_FEATURES_ENABLE` parameter in Oracle Database 12c Release 1 (12.1.0.1).

One workaround for this issue is to apply the patch for bug 18255105. For CHAR or NCHAR data type columns that have histogram statistics, this patch marks them as stale. This patch also helps if you are using automatic statistics gathering or if you are using manual statistics gathering (with either the `GATHER AUTO` or `GATHER STALE` option) to gather statistics on the problematic tables.

Another workaround is to find the tables that have CHAR or NCHAR data type columns that have histogram statistics (using the `DBA_TAB_COL_STATISTICS` view) and execute the `GATHER_TABLE_STATS` procedure on the tables. Instead of using the `GATHER_TABLE_STATS` procedure on the production system, gather statistics on a test system, export the statistics to a user statistics table, and then import the statistics into the production system. This workaround eliminates the need for the patch for bug 18255105.

When you collect statistics, set the `NO_INVALIDATE` parameter to `FALSE` so that the existing cursors (with suboptimal plans) are not shared when SQL statements are executed again.

Gathering statistics for tables that have all of the following scenarios can also cause suboptimal plans:

- The tables have CHAR or NCHAR data type columns.
- The `OPTIMIZER_FEATURES_ENABLE` parameter is set to a value of 11.2.0.4 or higher.

- The tables have histograms.
- Later, you change the `OPTIMIZER_FEATURES_ENABLE` parameter value to less than 11.2.0.4 (for example, you downgraded Oracle Database and set the `OPTIMIZER_FEATURES_ENABLE` parameter to a smaller value).

In this scenario, you need to regather the statistics for those tables after changing the `OPTIMIZER_FEATURES_ENABLE` parameter.

3.1.3 Invalid Oracle Spatial Objects After Downgrade Back to 11.2.0.4

After a downgrade to 11.2.0.4 from 12.1.0.1, the status of the simple spatial (SDO) network component in `DBA_REGISTRY` and the following two spatial objects are invalid (reference Bug 16757980):

- Function `MDSYS.SDO_OWM_INSTALLED`
- Public Synonym `SDO_OWM_INSTALLED`

In 12.1.0.1, after executing the downgrade (that is, `@catdwgrd.sql`), drop the invalid spatial objects using the following commands:

```
drop function mdsys.SDO_OWM_INSTALLED;
drop public synonym SDO_OWM_INSTALLED;
```

Then, follow the steps for `@catrelod.sql` and `@utl1rp`.

3.1.4 Pre-Upgrade Tool Does Not Generate Output Logs

The pre-upgrade tool, `preupgrd.sql`, is not able to create a directory to store the output files if the `JAVAVM` component either does not exist in the database registry or is set to `INVALID` or `OPTION OFF`. For example:

```
SQL> @/tmp/preupgrd
Loading Pre-Upgrade Package ...
WARNING: Failed to open preupgrade.log for write access
        script will generate terminal output only
WARNING: Failed to open preupgrade_fixups.sql for write access
        script will not generate fixup scripts.
```

```
Results of the checks are located at:
*** Scripts/Logs are not being Generated *** preupgrade.log
```

The workaround is to manually create the output directory before running `preupgrd.sql` by executing the following steps:

1. If `ORACLE_BASE` is defined in the environment settings, either create a directory `$ORACLE_BASE/cfgtoollogs/<db-unique-name>/preupgrade` or create a directory `$ORACLE_HOME/cfgtoollogs/<db-unique-name>/preupgrade`.
2. To get `<db-unique-name>`, use the following query:


```
SELECT value FROM V$PARAMETER WHERE NAME = 'db_unique_name';
```

 Note that `<db-unique-name>` used in the directory path is case sensitive.
3. Rerun the `preupgrd.sql` tool.

3.1.5 Root Configuration Script Fails During Database Upgrade

If the root configuration script is run from a directory for which the user running the script does not have write permission or the file system does not have enough space to

create the file containing the exported contents of the Oracle Local Registry, then the script will fail with the following error (reference Bug 16626394):

```
PROTL-3: Failed to create export file 'OLRUPGRADEFILE'  
CLSRSC-169: Failed to create or upgrade OLR
```

To workaroud this problem, run the configuration script from a directory to which the installing user has write permission. The file system must also have sufficient space to write the exported file.

3.1.6 DBUA Removes the SEC_CASE_SENSITIVE_LOGON System Parameter During Upgrade

In Oracle Database 12c, the Database Upgrade Assistant (DBUA) removes the SEC_CASE_SENSITIVE_LOGON system parameter during the upgrade process if it exists in the parameter file (reference Bug 16238456).

If the SEC_CASE_SENSITIVE_LOGON system parameter was set to FALSE prior to upgrade, then after the upgrade, the SEC_CASE_SENSITIVE_LOGON system parameter's default value would be set to TRUE, which means that the correct case would need to be used when logging on.

Set SEC_CASE_SENSITIVE_LOGON system parameter back to FALSE in the parameter file after the DBUA upgrade process or log on using the case sensitive version of the password.

3.1.7 Start Up Service May Fail If There is a Large Number of Data Files

In an Oracle Exadata environment, if the database being upgraded has a large number of tablespaces (for example, 64,000) and corresponding data files and if each tablespace has one data file stored on Oracle ASM, when the Database Upgrade Assistant (DBUA) starts up the service it may fail or take a long time to start due to the large number of data files (reference Bug 16738865).

3.1.8 Global Data Services Installation and Configuration

For Global Data Services installation and configuration information, refer to Chapter 2 of the *Oracle Database Global Data Services Concepts and Administration Guide*, Oracle Database 12c Release 1 (12.1). This book is part number E22100-01.

3.1.9 Downgrading Release Oracle Database 12c to 11.2.0.2 Results in an Error When You Run catrelod.sql

When downgrading from release Oracle Database 12c to 11.2.0.2, you must apply patch 11811073 for release 11.2.0.2 which provides an updated version of catrelod.sql. This patch can be applied to the 11.2.0.2 home anytime before attempting to reload the PL/SQL packages from the 11.2.0.2 home by running the catrelod.sql.

3.1.10 Downgrading Release Oracle Database 12c to 11.2.0.3 or 11.2.0.2 May Result in an Error When You Run utlrp.sql

When downgrading from release Oracle Database 12c to 11.2.0.3 or 11.2.0.2 and if SQLJ types are present, the following ORA-00600 error may occur when running utlrp.sql to recompile invalid objects after catrelod.sql is run (reference Bug 16230705):

```
ORA-00600: internal error code, arguments: [16211]
```

You must apply the fix in the original release (11.2.0.2 or 11.2.0.3) before executing @utlrp.sql (after @catrelod.sql) in order to avoid this error.

3.1.11 Performing -force Upgrade Results in an Incorrect Grid Home Node List in Inventory

When a node crash occurs during an upgrade, a `-force` upgrade can be performed to upgrade a partial cluster minus the unavailable node (reference Bug 12933798).

After performing a `-force` upgrade, the node list of the Grid home in inventory is not in sync with the actual Oracle Grid Infrastructure deployment. The node list still contains the unavailable node. Because the node list in inventory is incorrect, the next upgrade or node addition, and any other Oracle Grid Infrastructure deployment, fails.

After performing a `-force` upgrade, manually invoke the following command as a CRS user:

```
$GRID_HOME/oui/bin/runInstaller -updateNodeList "CLUSTER_NODES={comma_separated_
alive_node_list}" ORACLE_HOME=$GRID_HOME CRS=true
```

3.1.12 Upgrading Release 11.1 to Oracle Database 12c May Result in an Error After Running CVU Prerequisite Checks

When upgrading from release Oracle Database 11g Release 1 (11.1) to Oracle Database 12c, the following error may occur after the installer runs the Cluster Verification Utility (CVU) prerequisite checks:

```
Verify that default ASM disk discovery string is used - This is a prerequisite
check to warn users that permission must be granted to devices so that all ASM
devices visible with the pre-Version 12 default discovery string "/dev/raw/*"
are also visible with the Version 12 default discovery string "/dev/sd*"
```

You may ignore this error. However, ensure that the Oracle ASM disks are visible using the default discovery string.

To set the Oracle ASM disk discovery string, use the following SQL statement:

```
ALTER SYSTEM SET ASM_DISKSTRING=<usr_string> SCOPE=SPFILE;
```

3.2 Features Not Available or Restricted in Oracle Database 12.1.0.1

The following sections discuss components that are not available or are restricted in this release of Oracle Database 12c Release 1 (12.1.0.1).

3.2.1 Features Restricted or Not Available for a Multitenant Container Database in Oracle Database 12c

The following is a list of features that are not available or are restricted for a multitenant container database (CDB) in this release of Oracle Database 12c Release 1 (12.1.0.1):

- Database Change Notification
- Continuous Query Notification (CQN)
- Client Side Cache
- Flashback Data Archive (FDA)

- Flashback Transaction Query
- Flashback Transaction Backout
- Heat map
- Automatic Data Optimization
- Oracle Streams
- Database Migration Assistant for Unicode (DMU)

3.2.2 Features Restricted or Not Available for Other Oracle Database 12c Components

The following is a list of components that are not available or are restricted in this release of Oracle Database 12c Release 1 (12.1):

- Interval partitioning is not supported with XMLIndex. XMLIndex only supports range, list and hash partitioning schemes.
- Shared servers and Oracle XML DB are not supported for registration with the LISTENER_NETWORKS initialization parameter (reference Bug 16051343). Use LOCAL_LISTENER and REMOTE_LISTENER instead for shared server connections.
- Application Continuity does not support Database Resident Connection Pool (DRCP) in Oracle Database 12c (reference Bug 14792095).
- In the initial release of Oracle Database 12c, replay is not supported for Application Continuity when using proxy authentication.

3.3 Database Security

Note the following changes in Database Security.

3.3.1 Configure and Use SSL Certificates to Setup Authentication

Note: This affects the security in the connection between the Oracle Clusterware and the mid-tier or JDBC client.

JDBC or Oracle Universal Connection Pool's (UCP) Oracle RAC features like Fast Connection Failover (FCF) subscribe to notifications from the Oracle Notification Service (ONS) running on the Oracle RAC nodes. The connections between the ONS server in the database tier and the notification client in the mid-tier are usually not authenticated. It is possible to configure and use SSL certificates to setup the authentication but the steps are not clearly documented.

The workaround is as follows:

1. Create an Oracle Wallet to store the SSL certificate using the `orapki` interface:

- a. `cd $ORA_CRS_HOME/opmn/conf`
- b. `mkdir sslwallet`
- c. `orapki wallet create -wallet sslwallet -auto_login`

When prompted, provide `ONS_Wallet` as the password.

- d. `orapki wallet add -wallet sslwallet -dn "CN=ons_test,C=US" -keysize 1024 -self_signed -validity 9999 -pwd ONS_Wallet`

- e. `orapki wallet export -wallet sslwallet -dn "CN=ons_test,C=US" -cert sslwallet/cert.txt -pwd ONS_Wallet`
 - f. Copy the wallet created in Step c to all other cluster nodes at the same location.
2. Stop the ONS server on all nodes in the cluster:


```
srvctl stop nodeapps
```
 3. Update the ONS configuration file on all nodes in the database tier to specify the location of the wallet created in Step 1:
 - a. Open the file `ORA_CRS_HOME/opmn/conf/ons.config`
 - b. Add the `walletfile` parameter to the `ons.config` file:


```
walletfile=ORA_CRS_HOME/opmn/conf/sslwallet
```
 - c. Restart the ONS servers with the `srvctl`:


```
srvctl start nodeapps
```
 4. If you are running a client-side ONS daemon on the mid-tier, there are two possible configurations:
 - ONS started from OPMN (like in Oracle AS 10.1.3.x) which uses `opmn.xml` for its configuration.
 - ONS started standalone (like using `onsctl`), which uses `ons.config` for its configuration.

For case (1), refer to the *OPMN Administrator's Guide* for the Oracle Application Server release. This involves modifying the `opmn.xml` file to specify the wallet location.

For case (2), refer to the section titled *Configuration of ONS* in *Appendix B* of the *Oracle Database JDBC Developer's Guide*. The client-side ONS daemon can potentially run on different machines. Copy the wallet created in Step 1 to those client-side machines and specify the path on that client-side machine in the `ons.config` file or in the `opmn.xml` file.

5. If you are running remote ONS configuration without a client-side ONS daemon, refer to the "Remote ONS Subscription" subsection of the "Configuring ONS for Fast Connection Failover" subsection of the "Using Fast Connection Failover" section of the "Fast Connection Failover" chapter in the *Oracle Database JDBC Developer's Guide*. Copy the wallet created in Step 1 to those client-side machines and specify the path on that client-side machine in the `ons.config` file or in the `opmn.xml` file.

Alternatively, you can specify the following string as the `setONSConfiguration` argument:

```
propertiesfile=location_of_a_Java_properties_file
```

The Java properties file should contain one or more of the ONS Java properties listed below, but at least the `oracle.ons.nodes` property. The values for these Java properties would be similar to those specified in the "Remote ONS Subscription" subsection previously noted in this step:

```
oracle.ons.nodes
oracle.ons.walletfile
oracle.ons.walletpassword
```

3.3.2 JDWP Access Control List Privilege for PL/SQL and Java Debugging

An additional access control list (ACL) privilege called JDWP is required to connect a database session to a JDWP debugger running at a host and port. The privilege can be granted by the database administrator using the following call:

```
begin
  dbms_network_acl_admin.append_host_ace(
    host => '<debugger-host>',
    lower_port => <JDWP-port>,
    upper_port => <JDWP-port>,
    ace => xs$ace_type(privilege_list => xs$name_list('jdpw'),
                      principal_name => '<debugging-user>',
                      principal_type => xs_acl.ptype_db));
end;
```

The host parameter can be a host name, an IP address, a domain name, or an IP subnet. The lower_port and upper_port values can be omitted to allow the connection at any port number. For additional details, refer to the *Oracle Database Security Guide*.

3.4 Deprecated and Desupported Features for Oracle Database 12c

Oracle Database 12c introduces behavior changes for your database in addition to new features. Changes in behavior include deprecated and desupported initialization parameters, options, syntax, and the deprecation and desupport of features and components. For more information, see the *Oracle Database Upgrade Guide*.

3.5 Default Behavior Changes

This section describes some of the differences in behavior between Oracle Database 12c Release 1 (12.1) and previous releases. The majority of the information about upgrading and downgrading is already included in the *Oracle Database Upgrade Guide*.

3.5.1 Object Type Translator

The file name for Object Type Translator (OTT) on windows has changed from ott.exe to ott.bat. If OTT is invoked inside Windows batch scripts, they may exit immediately after running OTT. To avoid this, OTT has to be invoked, as shown below, in the Windows batch scripts.

```
call ott <args>
```

3.6 Oracle Automatic Storage Management (Oracle ASM)

The following sections describe information pertinent to Oracle Automatic Storage Management (Oracle ASM) in Oracle Database 12c Release 1 (12.1).

3.6.1 Oracle Database Data Files and Oracle ACFS

Oracle ACFS supports all database files and recovery files for Oracle Database 12c Release 1 (12.1) on selected Oracle ACFS platforms. See platform-specific release notes for details. Note however that data files and redo logs are not supported on Oracle ACFS in an Oracle Restart configuration on any platform.

3.6.2 Oracle Homes on Oracle ACFS Supported Starting With Release 11.2

Placing Oracle homes on Oracle ACFS is supported starting with Oracle Database 11g Release 2 (11.2) (reference Bug 10144982). Oracle ACFS can result in unexpected and inconsistent behavior if you attempt to place Oracle homes on Oracle ACFS on database versions prior to 11.2.

3.7 Oracle Application Express

To learn more about Oracle Application Express, refer to the *Oracle Application Express Release Notes* and the *Oracle Application Express Installation Guide*.

3.8 Oracle Data Mining

Note the following when working with Oracle Data Mining.

3.8.1 Data Mining Features Desupported in Oracle Database 12c

The following Data Mining features are desupported in this release:

- Oracle Data Mining Java API
- Adaptive Bayes Network (ABN) algorithm

3.8.2 Demo Programs for the Data Mining APIs

Demo programs that illustrate the Data Mining APIs are installed with Oracle Database Examples. Instructions for installing and configuring the Data Mining demo programs are in the *Oracle Data Mining User's Guide*.

3.8.3 Scoring Capabilities in Oracle Exadata Storage Server Layer

Oracle Data Mining scoring functions are also available in Oracle Exadata Storage Server software. Scoring capabilities in the storage layer permit very large data sets to be mined quickly, thus further increasing the competitive advantage already gained from Oracle in-database analytics. For information about Oracle Exadata Storage Server software, see

<http://www.oracle.com/technetwork/server-storage/engineered-systems/exadata/>.

3.9 Oracle Database Vault

Note the following when working with Oracle Database Vault.

3.9.1 Error Encountered During Oracle Database Vault Downgrade From Oracle Database 12c to 11.2.0.3

While downgrading an Oracle Database 12c database with Oracle Database Vault installed to 11.2.0.3, the following error is seen (reference Bug 14217829):

```
ERROR at line 1:
ORA-31011: XML parsing failed
ORA-19202: Error occurred in XML processing
LPX-00222: error received from SAX callback function
ORA-00001: unique constraint (DVSYS.REALM_T$_UK1) violated
ORA-06512: at "DVSYS.DBMS_MACADM", line 114
ORA-06512: at line 2
```

This error is expected and can be ignored. It does not affect Oracle Database Vault functionality in any way.

3.9.2 Invalid Objects After Installing Oracle Database Vault

There may be invalid objects in the database after you run the `DVSYS.CONFIGURE_DV` procedure to register Oracle Database Vault with a database (reference Bug 7631281).

To work around this problem, take the following steps:

1. Log into SQL*Plus as a user who has been granted the `SYSDBA` administrative privilege. For example:

```
sqlplus sys as sysdba
Enter password: password
```

2. In SQL*Plus, perform the following query to find invalid objects.

```
SELECT COUNT(*) FROM ALL_OBJECTS WHERE STATUS = 'INVALID';
```

3. If there are invalid objects, then run the `utlrp.sql` script, which by default is located in the `$ORACLE_HOME/rdbms/admin` directory, to recompile the invalid objects.

```
@?/rdbms/admin/utlrp.sql
```

4. If the `utlrp.sql` script provides any instructions, follow them, and then run the script again. If the script terminates abnormally without giving any instructions, then run it again.

3.10 Oracle Enterprise Manager

Note the following supported items for Oracle Enterprise Manager Cloud Control 12c Release 2 (12.1.0.2) or later with Database Plug-in version 12.1.0.3 or later and unsupported items for Oracle Enterprise Manager Grid Control version 10g, 11g, and Oracle Enterprise Manager Cloud Control 12c Release 1 (12.1.0.1) (reference Bug 16605386).

3.10.1 Supported for Oracle Enterprise Manager Cloud Control 12c Release 2 (12.1.0.2)

The following are supported for Oracle Enterprise Manager Cloud Control 12c Release 2 (12.1.0.2) or later with Database Plug-in version 12.1.0.3 or later:

- The creation of a 12c database using either Database Configuration Assistant (DBCA) or Oracle Universal Installer (OUI).
- If a pre-12c database is being monitored by Oracle Enterprise Manager Cloud Control 12c Release 2 (12.1.0.2) or later with Database Plug-in version 12.1.0.3 or later, the database `ORACLE_HOME` property will be updated in Enterprise Manager if chosen in the **Management Option** screen during upgrade using either Database Upgrade Configuration Assistant (DBUA) or Oracle Universal Installer (OUI).

3.10.2 Older Versions of Oracle Enterprise Manager Do Not Support Creating a 12c Database

Oracle Enterprise Manager Grid Control version 10g, 11g, and Oracle Enterprise Manager Cloud Control 12c Release 1 (12.1.0.1) do not support the creation of a 12c database using Cloud Control console.

Workaround 1:

Upgrade to Oracle Enterprise Manager to 12c Release 2 (12.1.0.2) or later before creating the database. Provide details of the same in the **Management Option** screen while creating the database using either the Database Configuration Assistant (DBCA) or Oracle Universal Installer (OUI).

Workaround 2:

Run discovery or manually add the target to Oracle Enterprise Manager after creating the database using the Grid Control or Cloud Control console. Note that if you do not upgrade to Oracle Enterprise Manager to 12c Release 2 (12.1.0.2) and run discovery, you may lose some monitoring features.

3.10.3 DB Control is No Longer Supported After Upgrading a Pre-12c Database

Oracle Enterprise Manager Database Control (DB Control) is no longer supported after upgrading a pre-12c database that had DB Control configured to 12c Release 2 (12.1.0.2) or later using either the Database Configuration Assistant (DBCA) or Oracle Universal Installer (OUI).

Workaround:

Use Oracle Enterprise Manager Cloud Control 12c Release 2 (12.1.0.2) or later for future monitoring.

3.10.4 ORACLE_HOME Variable Cannot Be Updated After Upgrading a Pre-12c Database

The ORACLE_HOME variable can no longer be updated after upgrading a pre-12c database that was monitored by Oracle Enterprise Manager Grid Control version 10g, 11g or by Oracle Enterprise Manager Cloud Control 12c Release 1 (12.1.0.1) to 12c Release 2 (12.1.0.2) or later using either the Database Configuration Assistant (DBCA) or Oracle Universal Installer (OUI).

Workaround 1:

Upgrade to Oracle Enterprise Manager Cloud Control 12c Release 2 (12.1.0.2) or later before upgrading the database. Provide details of the same in the **Management Option** screen while using either the Database Configuration Assistant (DBCA) or Oracle Universal Installer (OUI).

Workaround 2:

Update the ORACLE_HOME variable of the database and related targets in the **Monitoring Configuration** using the Grid Control or Cloud Control console.

Take the following steps to modify target properties in Oracle Enterprise Manager Grid Control or Oracle Enterprise Manager Cloud Control:

1. Go to the **Targets** page and click **All Targets**.
2. Select a target.
3. Select a menu item, click **Target Setup**, and then click **Monitoring Configuration**.
4. On the **Monitoring Configuration** page, set the **Oracle Home Path** to the upgraded Oracle home.

3.10.5 ORACLE_HOME Variable Cannot Be Updated for Targets

When Cluster Ready Services (CRS) and related targets are monitored by Oracle Enterprise Manager Grid Control or Oracle Enterprise Manager Cloud Control, the `ORACLE_HOME` variable cannot be updated for targets such as Oracle Clusterware, Oracle Database High Availability services, Oracle Net listener, and Oracle Automatic Storage Management (Oracle ASM) when upgrading pre-12c Oracle Clusterware or Single-Instance High Availability (SIHA) database to 12c using the Oracle Universal Installer (OUI).

Workaround:

Manually modify the `ORACLE_HOME` variable for targets such as Oracle Clusterware, Oracle Database High Availability services, Oracle Net listener, and Oracle Automatic Storage Management (Oracle ASM) using the Oracle Enterprise Manager Grid Control or Cloud Control console.

After which, on Windows, change the Management Agent service to the Automatic startup type.

Take the following steps to modify target properties in Oracle Enterprise Manager Grid Control or Oracle Enterprise Manager Cloud Control:

1. Go to the **Targets** page and click **All Targets**.
2. Select a target.
3. Select a menu item, click **Target Setup**, and then click **Monitoring Configuration**.
4. On the **Monitoring Configuration** page, set the **Oracle Home Path** to the upgraded Oracle home.

3.10.6 ORACLE_HOME Variable Cannot Be Updated in DB Control

When Cluster Ready Services (CRS) and related targets are monitored by Oracle Enterprise Manager Database Control (DB Control), the `ORACLE_HOME` variable cannot be updated in DB Control for related targets such as Oracle Clusterware, Oracle Database High Availability services, Oracle Net listener, and Oracle Automatic Storage Management (Oracle ASM) when upgrading pre-12c Oracle Clusterware or Single-Instance High Availability (SIHA) database to 12c using the Oracle Universal Installer (OUI).

Workaround:

Manually modify the `ORACLE_HOME` variable for targets such as Oracle Clusterware, Oracle Database High Availability services, Oracle Net listener, and Oracle Automatic Storage Management (Oracle ASM) using the Database Control user interface.

To modify the target properties in Oracle Enterprise Manager Database Control (DB Control), take the following steps:

1. Go to the **Agents** page and click on an agent.
2. Select the target and click **Configure**.
3. On the **Monitoring Configuration** page, set the **Oracle Home Path** to the upgraded Oracle home.

3.11 Oracle Exadata Database Machine and SPARC SuperCluster

Oracle Exadata Database Machine and SPARC SuperCluster support databases running Oracle Database 12c on systems running Oracle Exadata Storage Server

software version 11.2.3.2.1 or higher. Oracle Database 12c Release 1 (12.1) databases can run alongside other databases running Oracle Database 11g Release 2 (11.2) in the same cluster. The normal rule applies for upgrading Oracle Clusterware and Oracle Automatic Storage Management (Oracle ASM) to an equal or higher version than any database.

The following restrictions are known:

- Oracle Database 12c offload libraries are present only in the Oracle Exadata Storage Server software version 12.1.1.1.0 or higher. Therefore, smart scan offload for Oracle Database 12c is available only with Exadata Storage Server software version 12.1.1.1.0 or higher and is disabled with earlier versions of the Exadata Storage Server software.
- The I/O resource management plans for the Oracle Database 12c databases are enforced only with Exadata Storage Server software version 12.1.1.1.0 or higher.
- The cell metrics for the Oracle Database 12c databases are reported under `OTHER_DATABASE`.

Minimum software requirements and patches needed to run Oracle Database 12c on Oracle Exadata or SPARC SuperCluster can be found at <https://support.oracle.com>. You must register online before using My Oracle Support. Contact your Oracle Sales Representative if you do not have a My Oracle Support account.

3.12 Oracle Grid Infrastructure for a Cluster

Note the following when working with Oracle Clusterware and Oracle Automatic Storage Management (Oracle ASM), which are installed with an Oracle Grid Infrastructure for a cluster installation.

3.12.1 Oracle ACFS and Oracle Clusterware Stack Shut Down

Some non-Oracle Grid Infrastructure usage of mount points prevents unmounts and volume disables in the kernel (reference Bug 8651848). Examples include:

- Network File System (NFS)
- Samba/Common Internet File System (CIFS)

If this reflects your situation, ensure that you discontinue usage of these features before trying to initiate a stack shutdown, file system unmount, or volume disable.

Additionally, certain user space processes and system processes may use the file system or volume device in a way that prevents the Oracle Grid Infrastructure stack from shutting down during a patch or upgrade.

If this occurs, use the `lsOf` and `fuser` commands (Linux and UNIX) or the `handle` and `wmic` commands (Windows) to identify processes which are active on the Oracle ACFS file systems and Oracle ADVM volumes. To ensure that these processes are no longer active, dismount all Oracle ACFS file systems or Oracle ADVM volumes and issue an Oracle Clusterware shutdown. Otherwise, errors may be issued during Oracle Clusterware shutdown relating to activity on Oracle ACFS file systems or Oracle ADVM volumes which will stop the successful shutdown of Oracle Clusterware.

3.13 Oracle Multimedia

The name Oracle *interMedia* was changed to Oracle Multimedia in Oracle Database 11g Release 1 (11.1). The feature remains the same, only the name has changed. References to Oracle *interMedia* were replaced with Oracle Multimedia, however some

references to Oracle *interMedia* or *interMedia* may still appear in graphical user interfaces, code examples, and related documents in the Oracle Database 12c Release 1 (12.1) documentation library.

For additional information, refer to the Oracle Multimedia Readme file located at:

`ORACLE_HOME/ord/im/admin/README.txt`

3.14 Oracle ODBC Driver

For additional information about Oracle ODBC Driver, see the *Oracle ODBC Driver Release Notes*.

3.15 Oracle SQL Developer

The Oracle SQL Developer readme file is located at:

`ORACLE_HOME/sqldeveloper/readme.html`

3.16 Oracle Text

Note the following when working with Oracle Text. You should also check entries for the *Oracle Text Application Developer's Guide* in the Documentation Addendum.

3.16.1 Oracle Text Supplied Knowledge Bases

An Oracle Text knowledge base is a hierarchical tree of concepts used for theme indexing, ABOUT queries, and deriving themes for document services. The following Oracle Text services require that a knowledge base be installed:

- Index creation using a BASIC_LEXER preference where INDEX_THEMES=YES
- SYNCing of an index where INDEX_THEMES=YES
- CTX_DOC.THEMES
- CTX_DOC.POLICY_THEMES
- CTX_DOC.GIST
- CTX_DOC.POLICY_GIST
- CTX_QUERY.HFEEDBACK
- CTX_QUERY.EXPLAIN, if using ABOUT or THEMES with TRANSFORM
- CTX_DOC.SNIPPET (if using the ABOUT operator)
- CTX_DOC.POLICY_SNIPPET (if using the ABOUT operator)
- CONTAINS queries that use ABOUT or THEMES with TRANSFORM
- The Knowledge Base Extension Compiler, `ctxkbtc`
- Clustering and classification services, if themes are specified

If you plan to use any of these Oracle Text features, then you should install the supplied knowledge bases, English and French, from the Oracle Database Examples media, available for download on OTN.

Note that you can extend the supplied knowledge bases, or create your own knowledge bases, possibly in languages other than English and French. For more

information about creating and extending knowledge bases, refer to the *Oracle Text Reference*.

For information about how to install products from the Oracle Database Examples media, refer to the *Oracle Database Examples Installation Guide* that is specific to your platform.

3.16.2 Oracle Text Limitations for Oracle Database 12c

Note the following Oracle Text limitations for Oracle Database 12c:

- `BIG_IO` and `SEPARATE_OFFSETS` preferences are not supported in the following scenarios:
 - If the database session is restricted (for example, `ALTER SYSTEM ENABLE RESTRICTED SESSION`)
 - Running `ALTER TABLE MODIFY PARTITION` on an index created with these preferences
 - Trying to create an index with a quoted index name with mixed case characters
 - Using `CTX_DDL.RECREATE_INDEX_ONLINE`
- `STAGE_ITAB` preference is not supported in the following scenarios:
 - Trying to issue `ALTER INDEX REBUILD PARAMETERS ('resume')`
 - Trying to create or alter an index to use `SYNC ON COMMIT`
 - Using `CTX_DDL.RECREATE_INDEX_ONLINE`
 - Using `CTX_DDL.REMOVE_MDATA`
 - Trying to alter an index with the clause `MIGRATE FIELD SECTION`
- `FORWARD_INDEX` preference is not supported in the following scenarios:
 - Concurrently running `CTX_DDL.SYNC_INDEX` and `CTX_DDL.OPTIMIZE_INDEX` on an index with this preference
 - Having `SDATA` sections in the same index
- Marking an Oracle Text index to be invisible is not supported.

3.17 Oracle Warehouse Builder

For additional information about Oracle Warehouse Builder (OWB) in Oracle Database 12c Release 1 (12.1), refer to the *Oracle Warehouse Builder Release Notes*.

3.18 Oracle XML DB

The following features are not supported with Oracle XML DB:

- Flashback Data Archive
- Editioning Views
- SecureFiles LOB Encryption
- Oracle Label Security (OLS) with a hybrid structured and unstructured XMLIndex on the same XML document.

3.18.1 Incorrect Output From View *_XML_OUT_OF_LINE_TABLES for Certain Cases

For tables created prior to 11.2.0.2, the view ALL|DBA|USER_XML_OUT_OF_LINE_TABLES may not return an out-of-line table in the case where `xdb:defaultTable` annotation was used but `xdb:SQLInline` was not specified for that table while registering the Oracle XML DB schema (reference Bug 7646934).

3.19 Pro*C

For additional information about Pro*C, see the *Pro*C/C++ Release Notes*.

3.20 Pro*COBOL

For additional information about Pro*COBOL, see the *Pro*COBOL Release Notes*.

3.21 SQL*Plus

For additional information about SQL*Plus, see the *SQL*Plus Release Notes*.

3.22 Summary Management

Note the following items when working with Summary Management.

3.22.1 Query Rewrite

The following items apply to Query Rewrite.

3.22.1.1 Fine Grained Auditing (FGA)

If Fine Grained Auditing (FGA) is enabled on a table in the query, then Query Rewrite will not occur for this query.

3.22.1.2 Use of PARTITION Clause

Query rewrite does not occur for queries that use the `PARTITION` clause in the `FROM` clause to access table partitions. In order for query rewrite to rewrite such queries, the `PARTITION` clauses must first be converted into equivalent selection predicates and added to the `WHERE` clause.

3.22.2 Feature Availability

The following are available in Enterprise Edition:

- Creation and refresh features of materialized views.
- Query rewrite and materialized view advice from the SQL Access Advisor.

3.22.3 NLS Parameters

When using or refreshing certain materialized views, you must ensure that your NLS parameters are the same as when you created the materialized view. Materialized views that fall under this restriction contain the following constructs:

1. Expressions that may return different values, depending on NLS parameter settings

It is recommended to write such expressions in the NLS-independent way. For example:

```
(date > DATE '2003-01-02')
```

Or:

```
(rate <= 2.150)
```

2. Equijoins where one side of the join is character data

The result of this equijoin depends on collation which can change on a session basis, giving an incorrect result in the case of query rewrite or an inconsistent materialized view after a refresh operation.

3. Expressions that generate internal conversion to character data in the select list of a materialized view, or inside an aggregate of a materialized aggregate view

This restriction does not apply to expressions that involve only numeric data; for example, $a+b$ where a and b are numeric values.

3.23 Transparent Data Encryption

Note the following when working with Transparent Data Encryption (TDE).

3.23.1 Execute a Master Rekey After Upgrading to Oracle Database 12c from Oracle Database 11g

Databases that enabled tablespace encryption in Oracle Database 11g Release 1 (11.1) should execute a master rekey after upgrading to Oracle Database 12c Release 1 (12.1) before converting the database to a pluggable database (PDB) (reference Bug 16219806). This ensures that a unified TDE tablespace and column encryption key is available for use if a rekey command was not previously executed.

In Oracle Database 12c, this can be done with the following commands:

```
ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN IDENTIFIED BY <password>;
ADMINISTER KEY MANAGEMENT SET KEY IDENTIFIED BY <password> WITH BACKUP;
```

3.24 Open Bugs

This section lists known bugs for this release. A supplemental list of bugs may be found as part of the release documentation specific for your platform.

This section of the Readme contains the following sub-sections:

[Section 3.24.1, "Multitenant Container Database \(CDB\) and Pluggable Database \(PDB\) Known Bugs"](#)

[Section 3.24.2, "Database Configuration Assistant Known Bugs"](#)

[Section 3.24.3, "Deinstallation Tool Known Bugs"](#)

[Section 3.24.4, "Java Database Connectivity \(JDBC\) Known Bugs"](#)

[Section 3.24.5, "Oracle Automatic Storage Management \(Oracle ASM\) Known Bugs"](#)

[Section 3.24.6, "Oracle ASM Dynamic Volume Manager \(Oracle ADVM\) Known Bugs"](#)

[Section 3.24.7, "Oracle ASM Cluster File System \(Oracle ACFS\) Known Bugs"](#)

[Section 3.24.8, "Oracle Database Quality of Service \(QoS\) Management Known Bugs"](#)

Section 3.24.9, "Oracle Clusterware Known Bugs"

Section 3.24.10, "Oracle Database Enterprise Edition Known Bugs"

Section 3.24.12, "Oracle Data Guard Logical Standby Database Known Bugs"

Section 3.24.13, "Oracle Enterprise Manager Known Bugs"

Section 3.24.14, "Oracle OLAP Known Bugs"

Section 3.24.15, "Oracle Real Application Clusters (Oracle RAC) Known Bugs"

Section 3.24.16, "Oracle SQLJ Known Bugs"

Section 3.24.17, "Oracle Text Known Bugs"

Section 3.24.18, "Oracle Universal Installer Known Bugs"

Section 3.24.19, "Oracle XML DB Known Bugs"

Section 3.24.20, "RMAN Known Bugs"

Section 3.24.21, "Vendor and Operating System Known Bugs"

3.24.1 Multitenant Container Database (CDB) and Pluggable Database (PDB) Known Bugs

This section describes known bugs for multitenant container database (CDB) and pluggable database (PDB).

3.24.1.1 Bug 16993778

Any time that you unlock an account (`ANONYMOUS`, in particular) in the `ROOT` database, you must then explicitly lock that account in any pluggable database (PDB) to which you do not want it to have access.

Workaround: None.

3.24.1.2 Bug 16682595

When a PDB is unplugged from a CDB, the values of the initialization parameters that were specified for the PDB with `SCOPE=BOTH` or `SCOPE=SPFILE` are added to the PDB's XML metadata file. However, these values are not restored for the PDB when it is plugged in to a CDB.

Workaround: None.

3.24.1.3 Bug 16660797

The failover DDL operation `ALTER DATABASE FAILOVER TO <target_standby_db_unique_name>` may fail to terminate all sessions connected to the standby database in a reasonable period of time. In such cases, the failover fails with the `ORA-3113` error.

Workaround: Shut down all nodes at the standby database; then mount one node and rerun the failover DDL. If the failover operation continues to fail, then refer to steps 8 and 9 in Section 9.2.2 "Performing a Failover to Physical Standby" of *Oracle Data Guard Concepts and Administration*.

3.24.1.4 Bug 16654392

If you upgrade your database to Oracle Database 12c Release 1 (12.1) and then plug it into a CDB, the automatic SQL Tuning Advisor generates the following error:

ORA-65040: operation not allowed from within a pluggable database

This occurs because, in a 12.1 CDB, the automatic SQL Tuning Advisor is supposed to run at CDB\$ROOT and not within a PDB. The error occurs because the PDB is automatically executing an old program which comes from the upgraded database. The problem does not exist for a brand new PDB.

Workaround: Connect to the PDB where you see the ORA-65040 error for the automatic SQL Tuning Advisor, use the `DBMS_SCHEDULER.DROP_PROGRAM('AUTO_SQL_TUNING_PROG')` procedure to delete the existing old `AUTO_SQL_TUNING_PROG` program, and then run the `execsqlt.sql` script to re-create it. You can find the script in the `ORACLE_HOME/admin` directory.

Automatic SQL Tuning Advisor can be configured at the CDB level only.

You can configure the following automated maintenance tasks at the CDB or PDB level:

- Optimizer Statistics gathering
- Segment Advisor

3.24.1.5 Bug 16624893

Shared servers cannot be enabled or disabled at the pluggable database (PDB) level. Therefore, either all PDBs or none of the PDBs must use shared servers unless one of the following workarounds is used.

Workaround: Any of the following workarounds can be used if only some PDBs in a multitenant container database (CDB) should use shared servers:

- Modify the connect alias for the connections that should be dedicated to include `(SERVER=DEDICATED)` in the `CONNECT_DATA` section.
- If the connections that should be dedicated share a `sqlnet.ora` initialization parameter file, set `USE_DEDICATED_SERVER=on`.
- In the dispatcher configuration, use the `SERVICE=` field to specify the list of PDB services that should use shared servers.

3.24.1.6 Bug 16618942

Pluggable database (PDB) cloning using a snapshot copy fails on Oracle ASM Cluster File System (ACFS) if schema files are present.

Workaround: None.

3.24.1.7 Bug 16274018

In a Standard Edition multitenant container database, unplugging PDB using the RMAN option in Database Configuration Assistant (DBCA) fails with the following error:

```
Error while while creating backup piece
```

Workaround: Use the PDB archive (TAR format) option or manually unplug the PDB using `SQL*Plus`.

3.24.1.8 Bug 16244949

In a CDB where the `CURSOR_SHARING=FORCE` parameter is set and a PDB is plugged in with a character set that is incompatible to the CDB, an attempt to open the PDB fails with the `ORA-41400` error and the PDB is implicitly closed again. The incompatible character set violation is recorded in the `PDB_PLUG_IN_VIOLATIONS` view.

Workaround: None.

3.24.1.9 Bug 16074818

The default memory allocated to Oracle from DBCA is 40% of the total RAM. This may not be sufficient when creating a multitenant container database (CDB) with a higher number of pluggable databases (PDBs). With the default memory parameters, you may run into the `ORA-4031` error while creating PDBs.

Workaround: Change the system global area (SGA) target to a larger value when using DBCA to create a CDB. Oracle recommends an increase to the default SGA of 24 megabytes multiplied by the number of PDBs. Higher values may be necessary depending on the workload.

3.24.1.10 Bug 16074307

After flashback CDB across PDB point-in-time recovery, temporary files may get deleted.

Workaround: Re-create the temporary files.

3.24.1.11 Bug 16049373

When creating a CDB with 252 PDBs using the default parameters, the `ORA-00020` error is returned.

Workaround: Change the process number to a larger value when using DBCA to create a CDB.

3.24.1.12 Bug 15974047

Per-PDB session counts or limits are not sent to the listener. Thus, it is possible for a listener to direct a connection to an instance where the PDB is at the limit while the PDB on a different instance is not at the limit.

Note that this only matters if the PDB is at its session limit. If it is not, there is no impact from this bug.

Workaround: Do not use per-PDB session limits.

3.24.1.13 Bug 15965021

In Oracle Database 12c, you should choose between standalone Oracle Label Security (OLS) and OLS-OID (Oracle Label Security-Oracle Internet Directory) configuration for an Oracle Database 12c CDB while creating a CDB using DBCA. The OLS-OID configuration can be chosen by selecting the OLS-OID option while configuring Label Security in the Custom Install option. Once chosen, you cannot change the option for the lifetime of the CDB.

Also, you should not plug a standalone OLS-enabled PDB into a CDB which has OLS-OID enabled or vice versa. If done, warnings will be logged in the `PDB_PLUG_IN_`

VIOLATIONS view. The incompatibility could be resolved by running `rdbms/admin/catolsrecomp.sql`.

Workaround: To remove the warnings in the `PDB_PLUG_IN_VIOLATIONS` view, refer to the *Oracle Database Administrator's Guide*.

3.24.1.14 Bug 15865494

When a PDB with an offline tablespace is plugged into a CDB, the tablespace cannot be brought online after the plug in is done. Currently, a warning is raised during plug in time to indicate this limitation.

Workaround: Before plugging in a PDB make sure there are no offline tablespaces. If there are any offline tablespaces make sure they are brought online before doing the plug in.

3.24.1.15 Bug 14246380

Using the `ALTER SESSION SET CONTAINER` statement in the definer's rights procedures can result in some session states not getting set up correctly.

Workaround: Use the `DBMS_SQL` package to execute a SQL statement in a given container, or use the `ALTER SESSION SET CONTAINER` statement outside of the definer's rights procedures.

3.24.1.16 Bug 14058913

If the primary database is a CDB and the control file is re-created such that it does not have all of the data file names, it will crash or interrupt the recovery process on the standby databases.

Workaround: Take the following steps on the primary database:

1. Shut down the primary database.
2. Delete the control file.
3. Start the primary database without mounting the database.
4. Re-create the control file including the missing data files.
5. Execute database recovery for the missing files on the primary database and open the database and the PDBs.

Then, continue with the following steps on the standby database:

1. Shut down the standby database.
2. On the primary database, create a new standby control file.
3. Replace the previous standby control file with the newly created standby control file.
4. Mount the standby database.
5. Create the standby redo logs.
6. Open the standby database and all of its PDBs.
7. Start the managed recovery process (MRP).

3.24.2 Database Configuration Assistant Known Bugs

This section describes known bugs for Oracle Database Configuration Assistant (DBCA).

3.24.2.1 Bug 15845247

If you change the `MAX_STRING_SIZE` initialization parameter while creating a database using DBCA with a template that includes data files, the database creation fails with the following error:

```
ORA-14694: database must in UPGRADE mode to begin MAX_STRING_SIZE migration
```

Workaround: Leave the `MAX_STRING_SIZE` initialization parameter set to the default (STANDARD) or whatever it was set to in the template during DBCA. If you need to create a database with `MAX_STRING_SIZE=EXTENDED`, use the custom database template in DBCA. In a multitenant container database (CDB), the `MAX_STRING_SIZE` initialization parameter is a per-PDB parameter. The root CDB always uses STANDARD semantics, regardless of the parameter. You can change the `MAX_STRING_SIZE` initialization parameter for PDBs as needed after the CDB is created.

3.24.3 Deinstallation Tool Known Bugs

This section describes known bugs for the deinstallation tool.

3.24.3.1 Bug 8644344

When running the deinstallation tool to deinstall the database, you will be prompted to expand the Oracle home and to select a component. If you select the top level component, *Oracle Database Server*, and do not select the Oracle home, OUI does not show the message to run the deinstall utility and proceeds with the deinstallation of the database.

Workaround: Run the deinstallation tool to deinstall the Oracle home.

3.24.4 Java Database Connectivity (JDBC) Known Bugs

This section describes known bugs for Java Database Connectivity (JDBC).

3.24.4.1 Bug 16714677

When using Oracle Application Express Application Migration (Application Migration) with Java Database Connectivity (JDBC), the standard parameter markers (?) are converted to Oracle style in the format "`:<n>`". That is, each consecutive "?" is converted to "`:1`", "`:2`", and so on, before the query goes to the server for translation. However, due to an existing bug (also reference Bug 16182805), the conversion is not working reliably and converts the markers to the format "`:b<n>`" thus causing unreliable behavior. This incorrect format can cause inconsistent behavior during query translation. Unfortunately, this inconsistent behavior is documented in the *Oracle Database SQL Translation and Migration Guide*.

Workaround: The incorrectly documented behavior will be fixed in a future release. Any translation with parameters working in Oracle Database 12c is a coincidence and is not consistent.

3.24.4.2 Bug 16182805

When using Oracle Application Express Application Migration (Application Migration) with Java Database Connectivity (JDBC) driver, binds will not be translated correctly. This impacts the Oracle Sybase Translator which cannot work with bind variables in a JDBC program but is not limited to the Oracle Sybase Translator. Any translator relying on binds may be impacted.

Workaround: None.

3.24.4.3 Bug 16063217

Several changes were made to local transaction processing for compliance with the JDBC spec 4.1. If `setAutoCommit(true)` is called and a local transaction exists, the transaction is automatically committed (in earlier releases, no action was taken). If `commit` or `rollback` is called while in `AUTOCOMMIT` mode, the driver will throw an exception (again, in earlier releases, no action was taken). It is possible that your application will have these situations and it may be difficult to immediately change the software.

Workaround: By adding the `-Doracle.jdbc.autoCommitSpecCompliant=false` system property to the command line, the old behavior of no action will be preserved.

3.24.4.4 Bug 16062511

To use Oracle WebLogic Server (WLS) Active GridLink 10.3.6 or 12.1.1 with the new Oracle Database 12c Release 1 (12.1) driver, the `-Doracle.ucp.PreWLS1212Compatible=true` system property must be specified for compatibility.

Workaround: None.

3.24.4.5 Bug 15874495

Transaction Guard and Application Continuity do not support global (XA) transactions.

Workaround: None.

3.24.4.6 Bug 14069709

Oracle proxy authentication does not work with Application Continuity.

Workaround: None.

3.24.5 Oracle Automatic Storage Management (Oracle ASM) Known Bugs

This section describes known bugs for Oracle Automatic Storage Management (Oracle ASM).

3.24.5.1 Bug 16891982

When upgrading Oracle Grid Infrastructure from 10.2.x.x to Oracle Database 12c Release 1 (12.1) and when the 10.2.x.x Oracle ASM home owner is different than the 12.1 Oracle Grid Infrastructure home owner, the upgrade will fail.

Workaround: Take the following steps:

1. After the failure, exit the Oracle Universal Installer (OUI).

2. As the Oracle Grid Infrastructure user, set the `ORACLE_BASE` environment variable to the Oracle base of the 12.1 Oracle Grid Infrastructure home.
3. Run the following command to finish the Oracle ASM upgrade:

```
GRIDHOME/bin/asmca -silent -upgradeASM
```

3.24.5.2 Bug 16227068

When creating a disk group for use in Oracle Flex ASM mode that will use Oracle ASM Dynamic Volume Manager (Oracle ADVM) volumes, `COMPATIBLE.ASM` must be set to either 12.1 or 12.1.0.0.0 but not 12.1.0.1.0. Oracle ADVM volumes will not be able to be used in Oracle Flex ASM mode if `COMPATIBLE.ASM` is set to 12.1.0.1.0 during disk group creation. This issue does not exist if `COMPATIBLE.ASM` is set to 12.1.0.1.0 after disk group creation.

Workaround: Set `COMPATIBLE.ASM` to either 12.1 or 12.1.0.0.0.

3.24.5.3 Bug 16094980

After installing an Oracle Flex ASM cluster or upon completion of the conversion process from a classic Oracle ASM cluster to an Oracle Flex ASM cluster, enabling an Oracle ADVM volume experiences a timeout when the Cluster Ready Services (CRS) stack starts up in Oracle Flex ASM mode and the following error message may appear on the console:

```
CRS-5000: Expected resource ora.C3DBFRA.dg does not exist in agent process.  
For details refer to "(:CLSN00107:)" in  
"/TB/12.1.0/grid/log/hi07-3d/agent/crsd/orarootagent_root/orarootagent_root.log".
```

Workaround: This condition is benign and may be ignored. Enabling the volume should succeed within a few minutes and the CRS volume resource will transition to an `ONLINE` state.

3.24.5.4 Bug 13503952

Starting in Oracle Database 12c, the default discovery string for Oracle ASM has changed to `/dev/sd*` on Linux.

Workaround: Explicitly set the discovery string appropriate for your system, in order to continue to use the `/dev/raw/*` disks.

3.24.5.5 Bug 12332603

Oracle Automatic Storage Management (Oracle ASM) loses the rolling migration state if Cluster Ready Services (CRS) shuts down on all nodes.

Workaround: Consider the following scenario of 4 nodes (`node1`, `node2`, `node3`, and `node4`) that are at release 11.2.0.2 and being upgraded to Oracle Database release 12.1.0.1:

- `node1` and `node2` are upgraded to 12.1.0.1 and running.
- `node3` and `node4` are still at 11.2.0.2 and running.

Now consider that there is an outage where all CRS stacks are down which leaves the cluster in a heterogeneous state (that is, two nodes at 11.2.0.2 and two nodes at 12.1.0.1).

To proceed with the upgrade, only nodes at 11.2.0.2 (that is, node3 and node4 or both) should be started and the following command needs to be executed on the Oracle ASM instance on node3 and node4 before starting any 12.1.0.1 node:

```
ALTER SYSTEM START ROLLING MIGRATION TO '12.1.0.1'
```

Continue the upgrade procedure as already documented from this point forward.

Note that before executing the preceding step to bring the Oracle ASM cluster back into rolling migration, you cannot start two nodes of different versions in the cluster. If you do so, one of the Oracle ASM versions fail with either the ORA-15153 or ORA-15163 error message.

3.24.5.6 Bug 9181675

The `asmgidwrap` script needs to be called if you are creating a database manually on Oracle ASM to avoid a permission error.

Workaround: For a role-separated installation (that is, there is a different user and group for grid and RDBMS), use DBCA to create the database that automatically calls `asmgidwrap` script while creating a database on Oracle ASM. If you choose to create a database manually, the script needs to be called explicitly so the proper group can be set to avoid a permission error.

3.24.6 Oracle ASM Dynamic Volume Manager (Oracle ADVM) Known Bugs

This section describes known bugs for Oracle ASM Dynamic Volume Manager (Oracle ADVM).

3.24.6.1 Bug 9683229

Oracle ADVM does not support mounting ext3 or ext4 file systems over Oracle ADVM with the mount barrier option enabled. The mount barrier option is enabled by default on SLES11.

Workaround: Mount the ext3 or ext4 file system with `-o barrier=1`. For example:

```
mount -o barrier=0 /dev/asm/myvol-131 /mnt
```

3.24.7 Oracle ASM Cluster File System (Oracle ACFS) Known Bugs

This section describes known bugs for Oracle ASM Cluster File System (Oracle ACFS).

3.24.7.1 Bug 16300127

Inactive volumes may prevent the Oracle Grid Infrastructure upgrade from completing.

Workaround: If Oracle Universal Installer (OUI) reports a failure during the grid upgrade, take the following steps:

1. Ensure that all Oracle Automatic Storage Management Cluster File System (Oracle ACFS) file system resources are stopped by using `crsctl stat res -t -w "TYPE == ora.acfs.type and crsctl stop res <resource name> -f`.
2. Ensure that all volumes are enabled by using SQL or ASMCA to enable them.
3. Rerun the `crs\config\gridconfig.bat` script.
4. Continue the upgrade from OUI.

3.24.7.2 Bug 16170117

When upgrading from 11.2.x.x to Oracle Database 12c Release 1 (12.1), the `rootupgrade` script may fail to stop the 11.2 Cluster Ready Services (CRS) stack on a node if the Oracle ACFS resource was not stopped first.

Workaround: Reboot one of 11.2.x.x nodes and then rerun the `rootupgrade` script.

3.24.7.3 Bug 16089462

During an upgrade from Oracle Database 11g to Oracle Database 12c, the Oracle Automatic Storage Management Cluster File System (Oracle ACFS) registry CRS resource is replaced with individual CRS Oracle ACFS file system resources corresponding with each registered Oracle ACFS file system.

As a part of this process, any Oracle ASM Dynamic Volume Manager (Oracle ADVM) volumes in the Oracle ACFS registry which no longer exist or are offline during the upgrade will result in errors during the conversion. For example:

```
PRCA-1089 : Unable to retrieve volume and disk group for volume device path <path>
```

Workaround: This situation can be avoided by using the `acfsutil registry -d` command to remove volumes and mount points from the Oracle ACFS registry that are no longer valid.

Alternatively, if a volume cannot be enabled as part of the upgrade process, the upgrade will succeed but Oracle ACFS file systems associated with offline volumes will need to be manually re-added to the CRS namespace. This can be done with the following steps:

1. Enable the volume using SQL, Oracle ASM Configuration Assistant (ASMCA), or the `srvctl start volume` command.
2. Use the `acfsutil registry -a` command or the `srvctl add filesystem` command to re-add the Oracle ACFS file system to the CRS namespace.

3.24.7.4 Bug 16040501

When enabling Oracle ACFS plug-in for the first time on a particular node, the `acfsutil plugin enable` command may fail with the following error:

```
ACFS-3613: Unable to write plug-in config file.
```

Workaround: List the contents of the Oracle ACFS root directory and then reissue the `acfsutil plugin enable` command.

3.24.7.5 Bug 14739783

In the rare event of a transparent high availability failure where dropping the volume does not trigger the removal of its corresponding volume resource, the resource can be removed using the following command:

```
srvctl remove volume
```

Workaround: Remove the resource.

3.24.7.6 Bug 14513630

The High Availability NFS for Grid Home Clusters (HANFS) feature does not support IPv6 addresses in this release.

Workaround: Configure the High Availability Virtual Internet Protocol (HAVIP) using a name that resolves only to an IPv4 address.

3.24.7.7 Bug 14139048

When modifying a registered file system using `acfsutil registry` and if there are exports or databases dependent on the file system, the file system will still be modified. For instance, this could result in a non-supported configuration if you have changed a file system from a cluster-wide system to a 'node local' file system.

Workaround: None.

3.24.7.8 Bug 10069735

In a cluster with a password-protected key store, when an Oracle ACFS file system using encryption is mounted through the Oracle ACFS mount registry, the administrator is not prompted to enter the key store password. Although the process of mounting the file system succeeds, not all information required for Oracle ACFS encryption to work correctly is made available to the file system. In this case, encryption is not operational on this file system and any encrypted files in the file system are not available for read or write.

Workaround: In a cluster with a password-protected key store, do not use the Oracle ACFS mount registry for mounting any file systems that are using encryption. If some file systems are already mounted through the Oracle ACFS mount registry, unmount them and remove these file systems from the mount registry to avoid possible unavailability of encrypted data in the future. Then, remount these file systems without using the Oracle ACFS mount registry, providing the correct password when requested. Alternatively, if you want to continue to use the mount registry with encrypted file systems, migrate the encryption keystore using `acfsutil keystore migrate` command to the type that does not require a password during file system mounting.

3.24.8 Oracle Database Quality of Service (QoS) Management Known Bugs

This section describes known bugs for Oracle Database Quality of Service (QoS) Management.

3.24.8.1 Bug 16992360

Resource Manager changed the way CPU resources are managed for CDB or PDB database deployments in a manner that was incompatible with Oracle Database QoS Management 11.2 plan and models. These changes resulted in the need for two plans and different resource modeling with associated workload validation. These models need to be developed, tested, and calibrated on production Resource Manager code. Therefore, in this initial release, Oracle Database QoS Management is only able to measure and monitor CDB or PDB database deployments and cannot make recommendations to help CDB or PDB performance classes that are violating their performance objectives.

Workaround: None.

3.24.8.2 Bug 12792222

This bug applies to recommendations for CPU resources managed by Oracle Database QoS Management. If the number of configured CPUs for all instances on a server is less than the number of physical CPUs for that server, then the nonallocated, or "free",

CPUs are not detected by Oracle Database QoS Management and no recommendation is made to increase the number of configured CPUs. Only those "slices" that host databases are considered as donors for the target slice. Adding one of the non-allocated CPUs should be the first-ranked Move CPU action.

Workaround: Make sure the sum of CPU counts configured for each database instance on each server is the same as the number of physical CPUs.

3.24.8.3 Bug 10019209

This bug applies to platforms that support the Cluster Health Monitor (CHM). If an Oracle Clusterware-managed database service is in a stopped but not disabled state, it will be started by Oracle Database QoS Management if the server hosting that service is not detected to be in a memory overcommitted state. If memory is overcommitted, then all enabled services will be stopped even if they were manually started. The desired behavior is to only start services on the transition from a memory overcommitted state (red) to a normal state (green). If a service is manually started when the server is in the red state, that service should not be shut down.

Workaround: Stop and disable services that you want to remain in the stopped state or disable Oracle Database QoS Management from the Oracle Enterprise Manager Console.

3.24.9 Oracle Clusterware Known Bugs

This section describes known bugs for Oracle Clusterware.

3.24.9.1 Bug 16914379

Upgrading the Oracle Grid Infrastructure from Oracle Database 11g Release 2 (11.2.0.4) to Oracle Database 12c Release 1 (12.1) fails due to Oracle ACFS or Oracle ADVN resources being unable to stop.

Workaround: Manually stop the resources using SRVCTL or CRSCTL, and retry the upgrade.

3.24.9.2 Bug 16904822

In an Oracle Flex ASM cluster configuration with a pre-11.2 database setting, the pre-11.2 database's `CLUSTER_INTERCONNECTS` initialization parameter uses a public network instead of a private network if the Oracle Cluster Synchronization Services (CSS) private network and Oracle ASM network are classified to be the same network.

Workaround: Select a different network for the cluster interconnect and Oracle ASM.

3.24.9.3 Bug 16899080 and Bug 14693336

The Oracle Cluster Synchronization Services (CSS) or Oracle ASM instances cannot rejoin the cluster after a failure in all of the private networks.

As a prerequisite, ensure that at least one private network has been restored on the failed node.

Check the cluster state. The follow commands can be used to determine if instances cannot rejoin the cluster:

```
crsctl stat res ora.cssd -init
crsctl stat res ora.asm -init
crsctl check cluster -all
```

Workaround: Reboot the rejoining node. If rebooting the node is not acceptable, then the following sequence may be followed:

1. Stop the clusterware on the node that cannot rejoin the cluster using the following command:

```
crsctl stop crs -f
```

2. Stop any remaining Highly Available IP Addresses (HAIP) if HAIP is in use on the system. HAIP addresses are in the 169.254.0.0 subnet by default. Use operating system-specific commands to stop the interfaces. For example, on Linux use:

```
ifconfig eth0:1 down
```

On Solaris use:

```
ifconfig net2:1 unplumb
```

On AIX use:

```
ifconfig en4 169.254.180.68 delete
```

3. Check that at least 10 minutes have passed from the point at which it was noticed that the node failed to join the cluster. Restart the clusterware using the following command:

```
crsctl start crs
```

4. If the node still does not rejoin the cluster, reboot the node.

3.24.9.4 Bug 16734478

If you upgrade an 11.2 Oracle Clusterware having a large number of services to Oracle Database 12c Release 1 (12.1), the `rootupgrade.sh` script that runs on the last cluster node aborts because the `ora.crsd` startup initialized but failed to complete during the upgrade.

Workaround: Rerun the `rootupgrade.sh` script on the last node.

3.24.9.5 Bug 16684285

Upgrading from 11.2.x.x to Oracle Database 12c, when there are more than 1,000 database service resources registered, the root script will fail on the first node while trying to upgrade the Server Management (SRVM) model. This problem may prevent the Cluster Ready Services (CRS) upgrade from 11.2.x.x to Oracle Database 12c from completing when there are more than 1,000 database service resources.

Workaround: Patch the 11.2 home to the version with the fix or remove database service resources, complete the upgrade, and re-register the database service resources.

3.24.9.6 Bug 16543421

Oracle Universal Installer returns the INS-41112 error when `/usr/sbin/ping6` does not have `setuid` set.

Workaround: Run the following command as `root` to set the `setuid` and rerun the installer:

```
chmod +s /usr/sbin/ping6
```

3.24.9.7 Bug 16539062

In some cases in an Oracle Restart environment, the Oracle Clusterware stack generates a connection to the Oracle ASM instance every second which results in producing many audit files under `Grid_Home/rdbms/audit` that may fill up the disk over time.

Workaround: The following command will immediately stop these audit files from being generated:

```
/u01/app/oracle/product/12.1.0/grid/bin/crsctl modify resource ora.asm  
-attr START_DEPENDENCIES="hard(ora.cssd) "
```

3.24.9.8 Bug 16468516

In an environment with 5 or more voting files, if a node is shut down abruptly, it is possible that the Oracle Cluster Synchronization Services (CSS) daemon will write its last disk heartbeat to only a subset of voting files for that node. This would result in a situation where two voting files have different disk heartbeat timestamps for the node. In this situation, if you attempt to shut down an entire cluster and start another node (other than the one that was shut down abruptly) in `EXCLUSIVE MODE`, the `EXCLUSIVE MODE` start could fail as it might incorrectly perceive the abruptly shut down node to be up.

Workaround: Use the following steps to recover from this problem:

1. Either physically remove all of the voting files or make them offline.
2. Bring up the stack in `EXCLUSIVE MODE`.
3. Delete all the voting files from the configuration using the `crsctl delete css votedisk` command.
4. Add new voting files using the `crsctl add css votedisk` command.

The stack can now be brought up in Oracle Flex Cluster mode.

3.24.9.9 Bug 16435381

Creation of an 11.2-based database on a newly installed 12.1 Oracle Grid Infrastructure fails.

An upgraded Oracle Grid Infrastructure from a pre-12.1 release to 12.1 will not have a problem running an 11.2-based database.

Workaround: None.

3.24.9.10 Bug 16407903

Oracle resources for release 10.2 and release 11.1 Oracle RAC databases may not operate properly after upgrading Oracle Clusterware to Release 12.1.

Workaround: After installing Oracle Clusterware 12g Release 1 (12.1), contact Oracle Support Services to obtain the patches for the following bugs:

- 8373758 - TB-CMP: 11107 SERVICE CAN'T BE BROUGHT UP BY 11107 SRVCTL WHEN WITH 11.2 CRS
- 8441769 - TB_UD: INCORRECT SERVICE INFO REGISTER TO DB, UPGRADE CRS_HOME 11.1.0.7 -> 11.2
- 8406545 - TB-CMP: RESTART OF 11.2 HAS STACK FAILED TO BRING UP 11.1 ORACLE RAC INSTANCE

- 8262786 - TB-CMP: FAIL TO START 11106 DB INSTANCE WITH 11.2 CRS

Note: Apply the patches to the Oracle Database home.

3.24.9.11 Bug 16324841

When opening an instance of an Oracle Real Application Clusters (Oracle RAC) multitenant container database (CDB), the open may hang. This is because the pluggable databases (PDBs) were not opened uniformly across all instances.

Consider PDB1 of a CDB being opened on Instance 1 but not on Instance 2. Also, consider that there was a dead transaction that originated on Instance 2 that modified PDB1 sometime in the past. Since PDB1 is open on Instance 1, it is possible for processes to try and modify data already modified by that dead transaction. However since the undo segment belongs to Instance 2, Instance 1 cannot recover the dead transaction. This dead transaction, however, cannot be recovered on Instance 2 either since PDB1 is closed on Instance 2. This leads to the hang.

Workaround: Start PDB1 on all of the instances that are open.

3.24.9.12 Bug 16246278

In Oracle Grid Infrastructure release 12.1 on the Linux platform, the default Oracle ASM discovery string has been modified from `/dev/raw/raw*` to `/dev/sd*`. If the default Oracle ASM discovery string is being used for selecting the devices managed by Oracle ASM and if the existing character device does not map to their respective block devices which are identified by pattern `/dev/sd*`, then these devices will not be visible to Oracle ASM. This results in disk groups not being mounted after the upgrade causing the upgrade to fail. The Cluster Verification Utility (CVU) prerequisite check for these devices will also be skipped.

Workaround: Set the Oracle ASM disk discovery string by using the following command before the upgrade:

```
ALTER SYSTEM SET ASM_DISKSTRING=<ASM_disk_discovery_string> SCOPE=SPFILE;
```

3.24.9.13 Bug 16168869

In the IPv6 environment only, some SCAN virtual IP addresses (VIPs) are not registered in the Grid Naming Service (GNS).

Workaround: If GNS is running in the cluster, use the `srvctl relocate gns -node <node_name>` command to relocate GNS to the node on which SCAN VIP is running. This allows SCAN VIP to be registered to GNS. Afterward, GNS can be relocated to other nodes.

3.24.9.14 Bug 16095676

When you have provided the `sudo` or `root` user in the Oracle Universal Installer (OUI) GUI pages in order to use the Oracle Grid Infrastructure script automation feature, the root script runs using this automation feature but may fail with the following error:

```
Exception in thread "main" java.lang.NullPointerException
```

This happens because IPv6 addresses could not be resolved through one of the named servers defined in the `/etc/resolve.conf` file.

Workaround: Open the `/etc/resolve.conf` file and collect all of the named servers defined in this file. Usually, the following are defined:

```
nameserver x1.y1.z1.k1
nameserver x2.y2.z2.k2
nameserver x3.y3.z3.k3
```

For each of the named servers, run the following command to determine if the IP addresses are resolved:

```
nslookup -querytype=AAAA <IPv6_address> <named_server>
```

If you see error messages similar to the following, it means that the particular named server cannot resolve the IPv6 addresses:

```
;; connection timed out; trying next origin
```

You need to remove or comment the named servers which cannot resolve the IPv6 addresses.

3.24.9.15 Bug 16095320

In a Grid Naming Service (GNS) enabled configuration, the client cannot connect to the database using the SCAN name. This is because the SCAN name in the REMOTE_LISTENER value of the database is not domain-qualified.

Workaround: Using SQL*Plus, manually modify REMOTE_LISTENER to be a domain-qualified SCAN name. For example:

```
SQL> ALTER SYSTEM SET REMOTE_LISTENER
='myscan.mycluster.example.com:1521' SCOPE=BOTH;
```

3.24.9.16 Bug 16088332

When upgrading Oracle Grid Infrastructure to 12.1, you may see following error message on output stream:

```
PRCR-1154 : Failed to create file output stream with file name:
GI Home/cfgtoollogs/crsconfig/srvmcfg0.log
```

Workaround: None. You can ignore this error message. The upgrade completes irrespective of this warning.

3.24.9.17 Bug 16083544

After upgrading the Oracle Grid Infrastructure from 11.2.0.3 to 12.1, the 11.2.0.3 database (administrator managed) does not come up.

Workaround: After the upgrade is finished, bounce Cluster Ready Services (CRS) by running `crsctl stop crs` followed by `crsctl start crs`.

3.24.9.18 Bug 16082183

The SCAN listener rejects service registration from nodes in the same cluster. The rejections are logged in the SCAN listener log file.

Workaround: Use `srvctl modify scan_listener -update -invitednodes` or `srvctl modify scan_listener -update -invitedsubnets` to specify the nodes or subnet information which the SCAN listener should accept for service registration.

3.24.9.19 Bug 16044275

When upgrading 11.1 CRS to 12c Oracle Grid Infrastructure for a cluster and after Oracle ASM Configuration Assistant (ASMCA) upgrades Oracle ASM, some database instances may not be started. This problem is not reflected in the Oracle Universal Installer as an error or warning.

Workaround: Manually check the database instance after upgrading to detect the state of the database instances. For example:

```
srvctl status database -db <db_name>
```

Then, manually start the database instance. For example:

```
srvctl start database -db <db_name>
```

3.24.9.20 Bug 16039546

The Grid Naming Service (GNS) integrity check may fail while running `cluvfy` commands if the GNS virtual IP address (VIP) is resolved to IPv4 and IPv6 addresses in a pure IPv6 environment.

Workaround: Query the IPv6 address of the GNS VIP. If the query is successful, you may ignore the GNS integrity failures.

3.24.9.21 Bug 16008999

The Grid Infrastructure Management Repository's (GIMR) security policy requires its users' password to be changed every 180 days. In this release, the GIMR clients do not perform this function and thus OLOGGERD and OCLUMON will log connection exceptions.

Workaround: A CRS administrator needs to run (manually or otherwise) the `GRID_HOME/bin/mgmtca` command from the node running the GIMR. That node can be found by running the `GRID_HOME/bin/srvctl status mgmtldb` command.

3.24.9.22 Bug 16003413

Interrupting or killing the installation script on the first cluster node may result in the following errors when the script is run again on the first node or is subsequently run on other cluster nodes:

```
CLSRSC-46: Error: '$ORA_CRS_HOME/gpnp/wallets/pa/cwallet.sso' does not exist
CLSRSC-153: Could not set permissions on
'$ORA_CRS_HOME/gpnp/wallets/pa/cwallet.sso'
CLSRSC-148: Errors occurred while setting GPnP wallets ownership/permissions
```

These errors are caused by a missing copy of a non-essential file which is not detected when the existing configuration is revalidated on subsequent runs.

Workaround: These errors may be safely ignored, the script will continue to run, and the product installation will not be affected.

However, if a clean run is desired, delete the files in following directories on all cluster nodes before the script restarts on the first node:

```
rm $ORA_CRS_HOME/gpnp/profiles/peer/*
rm $ORA_CRS_HOME/gpnp/wallets/peer/*
```

3.24.9.23 Bug 15894162

When multiple clusters use the same directory on a shared file system to place the Oracle Cluster Registry (OCR) and voting disks, installation and upgrade with `mgmtclsb` fails.

Workaround: Use different storage locations for OCR or make sure that the `mgmtclsb` option is disabled for all of the clusters except one.

3.24.9.24 Bug 15882236

When a node joins a cluster after a force upgrade, the database instances and services do not start automatically.

Workaround: Manually start the database instances and the services on this node using the `SRVCTL` located in that database home.

3.24.9.25 Bug 14634152

In a Chinese environment (that is, a locale other than `zh_CN.utf8` or `zh_TW.utf8`), during the Oracle Grid Infrastructure installation, if you enable the "Use "root" user credential" option, the GUI will hang and the `INS-32128` error is returned.

Workaround: There are two workarounds for this bug:

- Workaround 1: Set the locale to `zh_CN.utf8` or `zh_TW.utf8`.
- Workaround 2: Do not enable this option. Manually execute `root.sh`.

3.24.9.26 Bug 14497206

Service resources for pre-11.2 releases may be `OFFLINE` after Oracle Grid Infrastructure is upgraded to release 12.1.

Workaround: Use `srvctl start service -d <dbname> -s <srvname> -i <instname>` to start the `OFFLINE` service resources manually.

3.24.9.27 Bug 13993872

On rare occasions, when upgrading Oracle Clusterware from 11.1.0.7.7 to 12.1, node reboot issues may be encountered while executing `rootupgrade.sh`, which only occurs in the following conditions:

- The 11.1.0.7.0 release was installed on the cluster and the clusterware was started on a node before patch 7483779 was applied (which is a BLR fix for Bug 7374972).
- A full clusterware restart has not occurred since patch 7483779 was applied. A full clusterware restart is a clusterware start after being down on all nodes in the cluster.

If the initial install was 11.1.0.7.1 (that is, 11.1.0.7 CRS Bundle 1 or later), patch 7374972 was included in the initial install, so this problem will not be observed.

Workaround: Perform a full restart of the clusterware on all nodes before upgrading to 12.1.

3.24.10 Oracle Database Enterprise Edition Known Bugs

This section describes known bugs for Oracle Database Enterprise Edition.

3.24.10.1 Bug 19559050

The Oracle OLAP option is only available with Oracle Database Enterprise Edition. An error occurs if you attempt to use Oracle OLAP with Oracle Database Standard Edition (SE). For example, if you try to export using Oracle OLAP with SE, you see the following errors:

```
EXP-00008: ORACLE error 29280 encountered
ORA-29280: invalid directory path
ORA-06512: at "SYS.UTL_FILE", line 41
ORA-06512: at "SYS.UTL_FILE", line 478
ORA-06512: at "SYS.DBMS_AW_EXP", line 89
ORA-06512: at "SYS.DBMS_AW_EXP", line 1177
ORA-06512: at line 1
EXP-00085: The previous problem occurred when calling
SYS.DBMS_AW_EXP.instance_extended_info_exp for object 85676
```

Workaround: Use Oracle OLAP with Oracle Database Enterprise Edition.

3.24.10.2 Bug 18718327

For pluggable database (PDB) maintenance operations, parallel tasks need to be allocated on all active instances to perform the operation on each instance regardless of the setting of the `PARALLEL_MAX_SERVERS` initialization parameter. If an instance had `PARALLEL_MAX_SERVERS=0` set, the parallel task was not allocated on the instance and the operation was not performed there.

Workaround: Do not set the value of the `PARALLEL_MAX_SERVERS` initialization parameter to 0. Not setting the `PARALLEL_MAX_SERVERS` initialization parameter at all is sufficient.

3.24.10.3 Bug 16933305

Adding a nullable column with a default value and then later unsetting the default value in an Oracle Database 12c Release 1 (12.1) environment will not unset the default (back to NULL) despite the data dictionary reflecting the change to a default value of NULL. The statements that are impacted are `ALTER TABLE x ADD (y NUMBER DEFAULT 99)` followed by a subsequent `ALTER TABLE x MODIFY (y DEFAULT NULL)` where `y` is a nullable column.

Workaround: Unset the default by using the `ALTER TABLE x MODIFY (y DEFAULT TRIM(' '))` statement which has the same semantic result as unsetting the default.

3.24.10.4 Bug 16916434

If Oracle RAC database files are located on Network File Storage (NFS) or Oracle Cluster File System 2 (OCFS2), set the `FILESYSTEMIO_OPTIONS=DIRECTIO` or `FILESYSTEMIO_OPTIONS=SETALL` initialization parameter to avoid data corruption. This issue does not apply to Direct NFS. A patch will be available in the future. Monitor Bug 16865261 for the latest status and patch availability.

Workaround: Set the `FILESYSTEMIO_OPTIONS` initialization parameter to either the `DIRECTIO` or `SETALL` value. Note that this setting is not required if the database files are located on NFS and Direct NFS is enabled.

3.24.10.5 Bug 16873173

It is possible for an index fast full scan of a prefix compressed index to fail with `ORA-600[6033]` error.

Workaround: Retry the query or force an alternative access path with an appropriate hint.

3.24.10.6 Bug 16788520 and Bug 15968058

If shared server is enabled, queries on object link views in a PDB may crash. Object link views are all Oracle supplied and are mostly DBA_HIST views. A full list can be found using the following command:

```
SELECT OWNER, OBJECT_NAME FROM ALL_OBJECTS WHERE SHARING='OBJECT LINK' AND OBJECT_TYPE='VIEW'
```

Workaround: Disable shared server when querying these views.

3.24.10.7 Bug 16571451

SQL plan directives are not used when the OPTIMIZER_DYNAMIC_SAMPLING initialization parameter is set to the default value of 2.

Workaround: Set the OPTIMIZER_DYNAMIC_SAMPLING initialization parameter to a value greater than 2.

3.24.10.8 Bug 16527374

If a common user queries certain Oracle-supplied views in the root and the common user is restricted by the CONTAINER_DATA attribute to see only the data from certain containers, the query may result in an ORA-7445 error.

Workaround: Switch to the root and set the CONTAINER_DATA attribute of the common user to be ALL.

Execute the following ALTER USER statement:

```
ALTER USER <common_user> SET CONTAINER_DATA=ALL CONTAINER=CURRENT;
```

3.24.10.9 Bug 16525931

Oracle RAC Load Balancing (RLB) events for pluggable database (PDB) services are missing from the Oracle Notification Service (ONS) event stream. Code that relies on these events will not receive them.

Workaround: None.

3.24.10.10 Bug 16309162

When the DBMS_AUDIT_MGMT.CONTAINER_ALL value is used in DBMS_AUDIT_MGMT routines that contain the CONTAINER parameter, the execution fails with the following error:

```
ORA-46273: DBMS_AUDIT_MGMT operation failed in one of the PDB
```

Workaround: Run the required routine after connecting to the respective PDB and use the DBMS_AUDIT_MGMT.CONTAINER_CURRENT value for the CONTAINER parameter.

3.24.10.11 Bug 16213407

Pre-11.2 Oracle instance resources may not be started automatically when the 12.1 Oracle Grid Infrastructure stack together with an Oracle Flex ASM configuration starts.

Workaround: Manually start the pre-11.2 Oracle instance resource.

3.24.10.12 Bug 16089104

When converting a cluster from classic Oracle ASM to Oracle Flex ASM, one or more occurrences of the following error message sequences are observed in the output of the script that is executed as root by the user:

```
CRS-2672: Attempting to start 'ora.proxy_advm' on '<node-name>'
CRS-5017: The resource action "ora.proxy_advm start" encountered the
following error:
ORA-03113: end-of-file on communication channel
Process ID: 0
Session ID: 0 Serial number: 0
```

For details, refer to (:CLSN00107:) in
<CRS-Home>/log/<node-name>/agent/crsd/oraagent_crsusr/oraagent_crsusr.log.

Workaround: These errors may be ignored. At the end of the conversion, the ora.proxy_advm correctly goes to an ONLINE state on all of the nodes.

3.24.10.13 Bug 16047938

Concurrent UNION ALL is automatically invoked for qualifying statements only when the UNION ALL statement is in a subsequent SELECT statement. For example, the following command will enable execution of all branches concurrently:

```
SELECT * FROM (SELECT FROM ... UNION ALL ... UNION ALL)
```

However, the exact same UNION ALL statement not executed as a subsequent SELECT statement will not.

Workaround: Either embed the UNION ALL construct as a subsequent SELECT statement or use the following statement to disable legacy code constraints:

```
ALTER SESSION SET "_fix_control"='6748058:0';
```

3.24.10.14 Bug 16027608

If you have an AL32UTF8 database, and if SQL*Loader is used with external tables as the load method and the table name contains non-ASCII characters, SQL*Loader may exit without an error and not load any data into the target database. This can occur either:

- With a control file if external_table=execute is specified.
- When using express mode if the default load method of external tables is used or is forced using the external_table=execute command line parameter.

Workaround: None.

3.24.10.15 Bug 15971421

The soft limit of nproc is not adjusted at runtime by the database. As a result, if that limit is reached, the database may become unstable since it will fail to fork additional processes.

Workaround: Ensure that the soft limit for nproc in /etc/security/limits.conf is set high enough to accommodate the maximum number of concurrent threads on the system for the given workload. If in doubt, set it to the hard limit. For example:

```
oracle soft nproc 16384
oracle hard nproc 16384
```

3.24.10.16 Bug 15881592

While enabling Oracle Flex ASM, there is a requirement to do a rolling restart of all the nodes in the cluster. When a node with management database instance (or database instances managed by Oracle Restart) is restarted, that instance might get relocated to another node which has not been restarted yet. In this case, the database instance will fail to start with the following error:

```
ORA-15343: Feature Flex ASM is not enabled
```

This will happen until the database instance is started on a node that has been restarted. When that happens, the database instance will behave normally.

Workaround: None. Once all the nodes are restarted, the database instance will behave normally.

3.24.10.17 Bug 15851422

The `PQ_CONCURRENT_UNION` hint currently does not work as a statement-level hint but requires the explicit specification of a query block. For example, the following command works and does concurrent `UNION ALL` processing:

```
SELECT /*+ PQ_CONCURRENT_UNION (@SET$1) */ ... UNION ALL ... UNION ALL ...
```

However, the following command does not work:

```
SELECT /*+ PQ_CONCURRENT_UNION */ ... UNION ALL ... UNION ALL ... UNION ALL ...
```

Refer to the *Oracle Database SQL Tuning Guide* for information on how to identify and name a query block.

Workaround: Explicitly specify a query block.

3.24.10.18 Bug 14851837

Tables containing `TIMESTAMP WITH LOCAL TIME ZONE` data cannot be moved between databases using transportable tablespace technology when the time zones of the source and target databases are different. Each affected table will be flagged during import with the following error:

```
ORA-39360, Table "<owner>". "<table name>" skipped due to transportable import and TSLTZ issues.
```

Workaround: Convert the target database to the same time zone as the source database or move the affected tables with the conventional Data Pump Export and Import.

3.24.10.19 Bug 14734707

The Oracle interval data type, `INTERVAL YEAR TO MONTH`, does not work properly with the Ethiopian calendar across all components such as SQL, PL/SQL, OCI, Pro*C, and so on.

Workaround: None.

3.24.10.20 Bug 14621745

Certain errors raised while using the `ALTER TABLE MOVE ONLINE` statement can be ignored.

Workaround: None.

3.24.10.21 Bug 14558315

Using indexes for indexed partitions or a full table scan for partitions with no indexing is necessary to leverage partial indexing to its fullest extent. Oracle Database 12c Release 1 (12.1) currently does not support table expansion for interval partitioned tables, the functionality to internally rewrite a statement into a UNION ALL to leverage indexes whenever possible.

Workaround: Either manually rewrite a statement into a UNION ALL operator to separate partitions with and without indexing or to disable the interval partition functionality.

3.24.10.22 Bug 13790316

Starting Oracle Database 12c Release 1 (12.1), temporary LOBs sized up to 256K live in program global area (PGA) memory. This can lead to increased PGA memory consumption. Some workloads may encounter the ORA-4030 error depending on the number of temporary LOBs created.

Workaround: Set event 32761, level 16 to turn off in-memory temporary LOBs. Setting this event spills temporary LOBs to temporary segments on disk. Even though this brings the memory consumption to pre-12.1 levels, users will not see the performance benefits of in-memory temporary LOBs.

3.24.11 Oracle Database Vault Known Bugs

This section describes known bugs for Oracle Database Vault.

3.24.11.1 Bug 16765611

During an upgrade from Oracle Database 11g Release 2 (11.2.0.4) to Oracle Database 12c Release 1 (12.1) with Oracle Database Vault already installed in 11.2.0.4, you get the following two ORA-00001 errors in the upgrade log:

```
ORA-00001: unique constraint (DVSYS.CODE$_PK1) violated
ORA-00001: unique constraint (DVSYS.CODE_T$_UK1) violated
```

Also, you will see the same errors from the post-upgrade status utility (utlusts.sql).

Workaround: These errors are not harmful and can safely be ignored.

3.24.12 Oracle Data Guard Logical Standby Database Known Bugs

This section describes known bugs for Oracle Data Guard logical standby database.

3.24.12.1 Bug 16063508

LogMiner background processes may encounter ORA-54013 error after downgrading the database to a pre-12.1 release.

Workaround: Modify the table to remove the virtual column. If it was added using the DBMS_STATS.CREATE_EXTENDED_STATS() function, then the DBMS_STATS.DROP_EXTENDED_STATS() function can be used to remove the virtual column. If it is supporting a descending index, then drop the descending index.

3.24.12.2 Bug 16055604

Piecewise LOB updates on typed index-organized tables (IOT) are not replicated on a logical standby database. SQL Apply will stop with ORA-1403 when it encounters such a change in the redo stream.

Workaround: Use the `DBMS_LOGSTDBY.SKIP` procedure at the logical standby to skip the table from being replicated.

3.24.12.3 Bug 15847339

Supplemental logging is unsupported for updates of Abstract Data Type (ADT) attributes with a bind value of more than 4,000 bytes.

Workaround: To update ADT attributes that need replicating, use direct bind only if the bound value is smaller than 4,000 bytes (32,767 bytes if `max_string_size=extended`). To bind variables with values beyond this limit, either bind a LOB data type or update the entire ADT.

3.24.12.4 Bug 14675706

SQL Apply may stop with the following error while an Oracle Data Guard configuration is in the middle of a rolling change operation initiated by the `DBMS_ROLLING` package:

```
ORA-00600: internal error code, arguments: [kwqicarsm: rs obj #], []
```

Workaround: The `DBMS_RULE_ADM` package is not supported in the context of the `DBMS_ROLLING` package and should not be used to create or alter rules for Oracle Advanced Queuing (AQ) subscribers at the primary database while `DBMS_ROLLING` is active.

Use `DBMS_ROLLING.ROLLBACK` to roll back the rolling change operation in the Oracle Data Guard configuration. Retry the rolling change operation once you have ensured that DBAs or applications are not going to add or change rules associated with AQ subscribers for the duration of `DBMS_ROLLING` operations.

3.24.12.5 Bug 14530359

SQL Apply does not support replication of a table with `SYS.ANYDATA` column, if the `SYS.ANYDATA` column contains multibyte characters.

Workaround: None.

3.24.12.6 Bug 14538279

SQL Apply aborts with the following error on a table with a Securefile LOB column:

```
ORA-600 [curr loc with no gather] [0x2B6D75918]
```

Workaround: Skip the table using `DBMS_LOGSTDBY.SKIP` and restart SQL Apply.

3.24.12.7 Bug 14529358

SQL Apply does not support replication of a table with Abstract Data Type (ADT) columns when the type names (or the associated attributes) contain multibyte characters.

Workaround: None.

3.24.12.8 Bug 14400003

DBMS_LOGSTDBY.INSTANTIATE_TABLE does not support tables with invisible columns.

Workaround: None.

3.24.12.9 Bug 12911818

For Oracle Text, indexes created with the `FILTER BY` or `ORDER BY` clause of the SQL `CREATE INDEX` statement, DML statements on the columns specified in the `FILTER BY` or `ORDER BY` clause are not replicated at the logical standby. However, the indexes may not be properly maintained at the logical standby.

Workaround: Synchronize the indexes manually at the logical standby database.

3.24.13 Oracle Enterprise Manager Known Bugs

This section describes known bugs for Oracle Enterprise Manager.

3.24.13.1 Bug 16783586

The Enterprise Manager Agent should use a dedicated server connection to connect to a CDB for monitoring.

Workaround: This can be configured by setting `(SERVER=dedicated)` in the `CONNECT_DATA` of the connect string for the Enterprise Manager Agent connection.

3.24.13.2 Bug 15990064

Oracle home is not updated in Enterprise Manager after a database upgrade to Oracle Database 12g Release 1 (12.1) with an older version of Enterprise Manager.

Workaround: Upgrade Enterprise Manager to 12cPS1 or above with Database Plugin 12.1.0.3.0 or above to support target upgrade OOB on database creation or deletion. And, upgrade or modify the target properties manually by editing the monitoring property (`Oracle_home`) for the database and Listener target and change the Oracle home value from the old database home to the new 12.1 database home.

3.24.13.3 Bug 15990057

Database target addition, deletion, and upgrade are not supported with Enterprise Manager releases prior to 12cPS1 because these older releases of Enterprise Manager do not support web services.

Workaround: Upgrade Enterprise Manager to release 12cPS1 or above with Database Plugin 12.1.0.3.0 or above to support target addition and modification OOB on database creation, deletion and upgrade.

3.24.13.4 Bug 13029141

After parallel DML is done on a SecureFile LOB column from a relational table, a parallel `SELECT` query accessing the same SecureFile LOB column data intermittently shows the `ORA-08103` error message.

Workaround: None.

3.24.14 Oracle OLAP Known Bugs

This section describes known bugs for Oracle OLAP.

3.24.14.1 Bug 9917299

If the database is installed using the seed provided in the installation kit, and the OLAP option is not selected, then either at the end of the installation or some time later, the OLAP Analytic Workspace and OLAP API components will be reported as invalid.

This will not affect the running of the instance in any way, other than the error messages.

Workaround: Do one of the following as a workaround:

- Ignore the error.
- Enable OLAP (or the offending option).
- Create and use your own seed database that does not include OLAP.

3.24.15 Oracle Real Application Clusters (Oracle RAC) Known Bugs

This section describes known bugs for Oracle Real Application Clusters (Oracle RAC).

3.24.15.1 Bug 16233295

When upgrading from 11.2.x.x to 12.1.0.1, if any customized listener configuration is set (such as a remote listener), Database Upgrade Assistant (DBUA) will set it back to the default.

Workaround: Execute `ALTER SYSTEM SET REMOTE_LISTENER=<user_remote_listener_setting>, ... SCOPE=BOTH` from SQL*Plus after the database upgrade.

3.24.15.2 Bug 16219867

When an Oracle RAC policy-managed database is created by the Database Configuration Assistant (DBCA), the EM Express URL displayed by the DBCA summary may not work. This can happen if the local node is not part of the server pool hosting the database. This issue happens only for policy-managed Oracle RAC databases.

EM Express is configured and accessible from nodes where database instances are running. It can also be accessed using the scan name.

Workaround: Use the scan name for the host name in the EM Express URL. For example, consider the following EM Express URL (where `racnode1` is the node name):

```
https://racnode1.oracle.com:5500/em
```

You can specify the following (where `scan1` is the scan name of the cluster):

```
https://scan1.oracle.com:5500/em
```

3.24.15.3 Bug 16102371

The Oracle Enterprise Manager Database Express (EM Express) URL may not work on an Oracle RAC node.

Workaround: This bug may be encountered during Oracle RAC installation. If the EM Express URL does not work on an Oracle RAC node, restart the Node Listener on that machine.

3.24.15.4 Bug 16094984

If an Oracle RAC Node Listener rejects the service registration from an instance on the same node, the rejection gets logged in the listener log file with TNS-01182 error.

Workaround: Use `lsnrctl RELOAD` command from the operating system or restart the listener.

3.24.15.5 Bug 16089419

Using `lsnrctl` on Grid home cannot connect to the Node Listener even it is running.

Workaround: Use the `srvctl getenv listener` command to check the setting of `TNS_ADMIN` of the corresponding listener resource. Usually, it is similar to the following:

```
<GIHOME>/network/admin/<listener_user_id>
```

Then, set the `TNS_ADMIN` environment to that same value and rerun `lsnrctl` after which `lsnrctl` should be able to connect to that listener.

3.24.15.6 Bug 16033089

When installing 12.1 Oracle Grid Infrastructure stack in IPv6 environments, there may be an issue in detecting the IPv6 network interfaces. This happens if there are no IPv4 interfaces or network interfaces which support both IPv4 or IPv6. This may cause the installer to fail to deploy Oracle Grid Infrastructure.

Workaround: Make sure to use network interfaces which support both IPv4 and IPv6 or activate a virtual IPv4 network interface. You can do this by performing the following command where `net0` is the name of IPv4 network interface:

```
/sbin/ifconfig net0 up
```

3.24.15.7 Bug 16020794

When issuing the command `srvctl stop listener -force` to stop an Oracle ASM listener on a node where an Oracle ASM instance is running, a failure may be encountered with the following message:

```
PRCR-1014 : Failed to stop resource ora.ASMNET1LSNR_ASM.lsnr
PRCR-1065 : Failed to stop resource ora.ASMNET1LSNR_ASM.lsnr
Cannot communicate with crsd
```

Workaround: If, as part of removing an Oracle ASM network, it is no longer required to run an Oracle ASM listener on the specific subnet. Use the following command:

```
srvctl update listener -listener <listener_name> -asm -remove
```

This command stops the Oracle ASM listener on all nodes it is running and also removes the Oracle ASM listener configuration.

3.24.15.8 Bug 14842114

Pre-11.2 listeners fail to start after an Oracle Grid Infrastructure downgrade.

Workaround: Manually backup `listener.ora` from `$db_home/network/admin` before you upgrade and restore it after you downgrade.

3.24.15.9 Bug 14742343

After CRS is restarted, disk group resources may be `OFFLINE` even though they were mounted in Oracle ASM.

Workaround: Modify the disk group resource `AUTO_START` attribute to `always`. For example:

```
crsctl modify resource ora.<dgname>.dg -attr AUTO_START=always
```

Alternatively, you can accomplish the same thing by dismounting and mounting the disk group in Oracle ASM using `SQLPLUS`. For example:

```
ALTER DISKGROUP <dgname> DISMOUNT;  
ALTER DISKGROUP <dgname> MOUNT;
```

3.24.15.10 Bug 14575666

In 12.1, the default value for the `SQLNET.ALLOWED_LOGON_VERSION` parameter has been updated to 11. This means that database clients using pre-11g JDBC thin drivers cannot authenticate to 12.1 database servers unless the `SQLNET.ALLOWED_LOGON_VERSION` parameter is set to the old default of 8.

This will cause a 10.2.0.5 Oracle RAC database creation using DBCA to fail with the `ORA-28040: No matching authentication protocol error in 12.1 Oracle ASM and Oracle Grid Infrastructure environments`.

Workaround: Set `SQLNET.ALLOWED_LOGON_VERSION=8` in the `$crs_home/network/admin/sqlnet.ora` file.

Use the workaround before running 10.2.0.5 DBCA to create a database using 12.1 Oracle ASM and Oracle Grid Infrastructure.

3.24.15.11 Bug 14148942

If you are using Oracle Grid Infrastructure and you want to create an Oracle RAC release 11.1.0.7 database, then you may need to increase the DBCA default for session processes. For Oracle Database 12c, DBCA sets the default value for processes to 300. In earlier releases, DBCA set the default value to 150.

Workaround: If you see the error message `ORA-00018:maximum number of session exceeded`, then change the default value for session processes in DBCA to 300. DBCA will then successfully create the release 11.1.0.7 database to use with Oracle Grid Infrastructure release 12.1.

3.24.15.12 Bug 13479980

For installer invocation, DBCA in silent mode will display the following message and execution will stop after a validation warning. The default DBCA behavior is to stop after the following warning:

```
There are not enough servers available to allocate to this server pool,  
Database instances may not come up on specified cardinality. Do you want to  
continue?
```

If you click `Yes`, the DBCA fails.

Workaround: Before starting the installer, ensure that there are a sufficient number of servers in the free server pool. The number of free servers should be more than or equal to the cardinality specified in the installer for configuring the policy-managed Real Application Clusters database. The status and membership details of server pools can be checked using the following command:

```
Grid_home/bin/crsctl status serverpool
```

3.24.15.13 Bug 8288940

Creating pre-11.2 Oracle RAC database in 12.1 Oracle Grid Infrastructure for a cluster environment using DBCA may fail with following messages.

When using a cluster file system as storage, you see the following message:

```
ORA-00119: invalid specification for system parameter REMOTE_LISTENER
```

When using Oracle ASM as storage, you see the following message:

```
DBCA could not startup the ASM instance configured on this node
```

Workaround: Apply the patch for this bug in pre-11.2 database home. This patch is needed for 10.2.0.4, 11.1.0.6 and 11.1.0.7 database releases. No patch is needed for release 10.2.0.5.

3.24.16 Oracle SQLJ Known Bugs

This section describes known bugs for Oracle SQLJ.

3.24.16.1 Bug 15904575

When connected to pluggable databases, online translation may give unexpected errors or warnings if the application contains calls to Oracle-specific packages and procedures.

Workaround: Perform the translation by connecting to the root database of the multitenant container database (CDB).

3.24.17 Oracle Text Known Bugs

This section describes known bugs for Oracle Text.

3.24.17.1 Bug 16532807

The ORA-4036 error message is a known issue that affects customers in the very specific use-case scenario of creating a global `CONTEXT` index in parallel with a local `CONTEXT` index. Dropping and re-creating these indexes multiple times as well as enabling the `BIG_IO` option are known to manifest the problem. The symptoms of the problem include increased use of handle leaks.

Workaround: None.

3.24.17.2 Bug 15904575

The `BIG_IO` option of a `CONTEXT` index uses SecureFiles for the `TOKEN_INFO` column. When a `CONTEXT` index is created with the `BIG_IO` option, there is no check in place to make sure that the tablespace is Automatic Segment Space Management (ASSM). The `TOKEN_INFO` column of the `$I` table in the index is silently created with BasicFile.

Workaround: Ensure that the tablespace is set as ASSM before trying out the BIG_IO option.

3.24.17.3 Bug 14747404

With the CURSOR_SHARING parameter set to FORCE, queries using the ctxfiltercache operator involving *save_score* and *topN* will throw error DRG-10886.

Workaround: None.

3.24.17.4 Bug 14743270

When the BIG_IO option is specified and the AUTO_LEXER type with the MIXED_CASE attribute is set to YES, the following error might be returned during index creation:

```
ORA-00060: deadlock detected while waiting for resource
```

Workaround: Either do not use the MIXED_CASE attribute set for AUTO_LEXER or, if it is required, BIG_IO should not be specified.

3.24.17.5 Bug 14464880

Creating an index on a CTXSYS.CONTEXT index using the preference BIG_IO does not scale linearly with data size.

Workaround: Do not use the BIG_IO option.

3.24.17.6 Bug 14396559

The LONG VARCHAR2 (VARCHAR2 > 4K) feature is not supported with the CTXSYS.CONTEXT index.

Workaround: None.

3.24.17.7 Bug 14381004

Using the STAGE_ITAB and FORWARD_INDEX attributes on the same CTXSYS.CONTEXT index may cause internal errors.

Workaround: Try creating the index again.

3.24.17.8 Bug 14371181

DBMS_REDEFINITION.COPY_TABLE returns an internal error if used on a table which has a CTXSYS.CONTEXT index with BIG_IO and SEPARATE_OFFSETS attributes set.

Workaround: None.

3.24.17.9 Bug 13990319

In this release, the LONG VARCHAR2 (VARCHAR2 > 4K) feature is not supported with the CTXSYS.CTXCAT index.

Workaround: None.

3.24.18 Oracle Universal Installer Known Bugs

This section describes known bugs for Oracle Universal Installer (OUI).

You should also review [Section 3.1, "Compatibility, Upgrading, Downgrading, and Installation"](#) for other issues related to installation and upgrades.

3.24.18.1 Bug 17399376

Users are not stopped from installing Oracle Database Client 12c Release 1 (12.1.0.1.0) or Oracle Database Examples 12c Release 1 (12.1.0.1.0) software, using the respective installers, into an existing Oracle home that is of a different version.

Workaround: Before installing release 12.1.0.1.0 Client and release 12.1.0.1.0 Examples software into an existing Oracle home, verify that the version of the Oracle Database server is also release 12.1.0.1.0.

3.24.18.2 Bug 16217171

When installing Oracle Grid Infrastructure, the Oracle Universal Installer (OUI) may hang and following error can be seen in log file:

```
Exception in thread "AWT-EventQueue-0" java.lang.OutOfMemoryError: PermGen space
```

Workaround: Rerun the installation.

3.24.18.3 Bug 1620062

Oracle Grid Infrastructure 12c Release 1 (12.1) eliminates the need to allocate local storage space on each node for the Cluster Health Monitor (CHM) repository. In 12.1, this repository, now known as the Grid Infrastructure Management Repository (GIMR), resides in the same disk group as the Oracle Cluster Registry (OCR) and voting disk files. The required space for the GIMR depends upon the current and maximum size of the cluster as well as on the level of redundancy for this disk group. The required space available needs to be manually checked as explained in the "Requirements for Oracle Grid Infrastructure Shared File System Volume Sizes" section of the *Oracle Grid Infrastructure Installation Guide*. This space availability is not checked automatically as part of the Oracle Universal Installer (OUI) upgrade installation. If insufficient space is found, the upgrade will fail when trying to create the GIMR.

Workaround: The solution is to add additional disks to the disk group and retry the OUI step that creates the GIMR.

3.24.18.4 Bug 16177073

Mixed case host names are not supported by the Oracle Universal Installer (OUI) for Oracle RAC or Cluster Ready Services (CRS) homes.

Workaround: Do not use mixed case host names.

3.24.18.5 Bug 16076425

The pound sign character (#) should not be specified in the PDB name field in the installer.

Workaround: None.

3.24.18.6 Bug 15957211

Deinstalling the database may fail with the following error message if Oracle Grid Infrastructure and the database are installed with different users:

```
./runInstaller[192]: /tmp/deinstall_bootstrap/deinstallbootstrap.log:
```

cannot create [Permission denied]

Workaround: Manually remove `deinstall_bootstrap` and rerun the deinstallation to remove the Grid home.

3.24.18.7 Bug 15907640

During upgrade, when `ignore unreachable nodes` is selected in the OUI and there are some nodes down, a force upgrade cannot be done if the nodes that were down come back up before the force upgrade command (for example, `rootupgrade.sh -force`) completes.

Workaround: Make sure the nodes that were down remain down until the upgrade completes.

3.24.18.8 Bug 13874267

The Oracle Universal Installer (OUI) may fail to install Oracle Grid Infrastructure due to the allocation of too many shared memory segments. This problem is likely to occur only on the first start of the OUI after a server is started.

Workaround: Before finalizing the Oracle Grid Infrastructure installation (before clicking the **Install** button on the last page of the OUI dialog), issue an `ipcs -m | wc -l` command on another terminal to check the number of allocated shared memory segments at this moment in time.

If the returned number of allocated shared memory segments significantly exceeds 500, cancel the current OUI installation and restart `runInstaller`, because the installation is likely to fail. You can save the response file in order to resume the installation using a response file. Otherwise, you will have to reenter all of the required information during the dialog again. Since the problem is likely to occur only on the first start of the OUI after a server was started, restarting the OUI without restarting the server should solve the problem.

3.24.18.9 Bug 12930328

If the central inventory location is different on different nodes of a cluster, `addnode.sh` does not update the inventory correctly on remote nodes of the cluster.

Workaround: Adding nodes to a cluster requires the central inventory location to be the same on all the nodes of the cluster. Please ensure that this is the case prior to running `addnode.sh`.

3.24.18.10 Bug 12885716

If you install a 32-bit Oracle database and a 64-bit Oracle database in the same `ORACLE_BASE`, it may lead to unexpected results when using the deinstallation tool to remove one of the databases. The deinstallation tool removes all of the Oracle homes under the `ORACLE_BASE` if these Oracle homes do not use the same central inventory.

Workaround: Avoid using multiple central inventories. Do not use the same `ORACLE_BASE` for 32-bit and 64-bit database installations or always perform the deinstallation from a 64 bit home.

3.24.18.11 Bug 866656

The Oracle Universal Installer (OUI) `runInstaller` script that resides in the Oracle home (`ORACLE_HOME/oui/bin/runInstaller`) cannot be used to install the Oracle

Database 12c releases, Oracle Grid Infrastructure for a cluster, and Oracle Database Client.

Workaround: Use Oracle Universal Installer on the respective Oracle Database 12c product media to install each product.

3.24.19 Oracle XML DB Known Bugs

This section describes known bugs for Oracle XML DB.

3.24.19.1 Bug 16069266

Using Transportable Tablespaces (TTS) to export or import tables with Binary XML data is not supported.

Workaround: Use the Oracle Data Pump conventional path to move data.

3.24.19.2 Bug 16055386

If you plug an Oracle Database 12c non-CDB database, which has an XMLType table with an XMLIndex defined, into an Oracle Database 12c CDB database and run the noncdb_to_pdb.sql script, the XMLIndex could become disabled.

Workaround: Manually enable the XMLIndex by issuing the following DDL:

```
ALTER INDEX <index_name> ENABLE;
```

3.24.19.3 Bug 15858259

Consider the following scenario:

On an 11.2.0.2 database, you create an XMLType table or a table with an XMLType column that is partitioned and then create a structured XMLIndex on the table. Next, you upgrade the 11.2.0.2 database to Oracle Database 12c or above. If you execute the ALTER TABLE EXCHANGE PARTITION statement on one of the base table partitions with another partition or table that is created in the Oracle Database 12c database with the same structure and similar XMLIndex, then it will fail with the following error:

```
ORA-64123: XMLIndex DDL: failure of a recursive DDL
ORA-14097: column type or size mismatch in ALTER TABLE EXCHANGE PARTITION
```

This is not an issue if your index was created on a non-11.2.0.2 database. 11.2.0.2 is the only version with this issue. Other versions like 11.2.0.1 and 11.2.0.3 do not have this issue.

Workaround: After upgrading to Oracle Database 12c or above, drop and re-create the structured XMLIndex on the table where the index was upgraded from 11.2.0.2.

3.24.19.4 Bug 14675056

When 32K VARCHAR data type is enabled and XML storage is object-relational, UPDATEXML or equivalent XQuery Update operation may run into a parser issue.

Workaround: None.

3.24.19.5 Bug 14675052

When 32K VARCHAR data type is enabled and XML storage is object-relational, selecting the XMLType column directly may return incorrect data. For example:

```
SELECT xml_col FROM some_table p;
```

Workaround: Call the `GETCLOBVAL()` function. For example:

```
SELECT p.xml_col.getclobval() FROM some_table p;
```

3.24.19.6 Bug 14578945

Prior to Oracle Database 12c Release 1 (12.1), when inserting an XML element without a name space into an XML document, the newly inserted element is assigned to the name space of the parent element if the default name space is defined in the parent element, which is not correct.

In Oracle Database 12c, the new element will be inserted with `xmlns=""`.

Workaround: None.

3.24.19.7 Bug 14243273

An XML Query containing `CLOB`, `BLOB` or `NCLOB` data types as bind variables is not supported for logical standby, Oracle GoldenGate and XStream replication.

Workaround: Run the query using data types other than `CLOB`, `BLOB` or `NCLOB`.

3.24.19.8 Bug 12991540

For logical standby based schema registration replication, compatibility should be set to Oracle Database 12c or above. For XStream and Oracle GoldenGate, the schema has to be individually registered on each instance and replication is not supported. All of the procedures in `DBMS_XMLSCHEMA` package are supported except `COPYEVOLVE` and `COMPILESCHEMA`.

Workaround: None.

3.24.19.9 Bug 12868171

Supplemental logging is unsupported for an XMLQuery update with variables bound to a REF cursor.

Workaround: Before updating XMLType columns or attributes that need replicating, store the evaluation of REF cursors in non-cursor variables, and then update the columns or attributes with these variables instead of the REF cursors.

3.24.19.10 Bug 9648042

The `EXCHANGE PARTITION` operation does not work for XMLType tables that have an XMLIndex structured component.

Workaround: To workaroud this problem, take the following steps:

1. Before executing the `EXCHANGE PARTITION` operation, issue the following call:

```
EXEC DBMS_XMLSTORAGE_MANAGE.EXCHANGEPREPROC(user, 'partitioned_myxml');
```

`partitioned_myxml` is your partitioned XMLType table.

2. Execute the `EXCHANGE PARTITION` operation. For example:

```
ALTER TABLE partitioned_myxml EXCHANGE PARTITION p1 WITH TABLE myxml;
```

3. After executing the `EXCHANGE PARTITION` operation, call the following procedure:

```
EXEC DBMS_XMLSTORAGE_MANAGE.EXCHANGEPOSTPROC(user, 'partitioned_myxml');
```

If the `myxml` table also has a structured XMLIndex on it, you also need to execute the `DBMS_XMLSTORAGE_MANAGE.EXCHANGEPREPROC` and `DBMS_XMLSTORAGE_MANAGE.EXCHANGEPOSTPROC` procedures on `myxml` table. For example:

1. Before executing the `EXCHANGE PARTITION` operation, execute the following:

```
EXEC DBMS_XMLSTORAGE_MANAGE.EXCHANGEPREPROC(user, 'myxml');
```

2. After executing the `EXCHANGE PARTITION` operation, execute the following:

```
DBMS_XMLSTORAGE_MANAGE.EXCHANGEPOSTPROC(user, 'myxml');
```

3.24.19.11 Bug 8687128

An Oracle RAC system allows multiple concurrent database instances to share a single physical database. However, dispatches for Oracle XML DB in an Oracle RAC database do not listen on the virtual IPs.

Workaround: To enable Oracle XML DB to use TCP(S) on an Oracle RAC system, you must configure the TCP(S) dispatchers for each database instance of the cluster as follows (where `SID` is the SID of the instance and `HOST` is the host name for the physical database):

```
SID.dispatchers="(address=(protocol=tcps)(host=HOST-vip)(service=SIDxdb))"
```

For non-secure dispatchers (TCP, not TCPS), use `tcp` in the command instead of `tcps`.

3.24.20 RMAN Known Bugs

This section describes known bugs for Oracle Recovery Manager (RMAN).

3.24.20.1 Bug 16903140

A new feature was added in Oracle Database 12c Release 1 (12.1) to support change tracking across resetlogs during the execution of an `ALTER DATABASE OPEN RESETLOGS` statement. This is achieved by deleting bitmaps that are not required because they cover changes that were made after the specified resetlogs point-in-time. There is an issue with the bitmap deleting that can cause error `ORA-600 [krccchs_1]` during `OPEN RESETLOGS`.

Workaround: Disable and reenable change tracking. You must disable change tracking before executing the `ALTER DATABASE OPEN RESETLOGS` statement, and then re-enable change tracking after the open resetlogs operation is complete.

3.24.20.2 Bug 16187090

In order to backup a database in `NOARCHIVELOG` mode, the database must be cleanly shutdown and then started in a mounted state.

When a multitenant container database (CDB) is in `NOARCHIVELOG` mode and the root is open, an RMAN backup will fail (as expected), but will still generate backup pieces. These backup pieces are not usable for CDB or PDB recovery because they were generated while the CDB was in `NOARCHIVELOG` mode and open.

Workaround: Use one of the following as a workaround to this situation:

- Ensure CDB is cleanly shutdown and then started in a mounted state before taking a backup.

- Ensure CDB is in ARCHIVELOG mode before taking backup.

Note that the unusable backups originally created should be manually deleted using RMAN.

3.24.21 Vendor and Operating System Known Bugs

This section describes vendor and operating system known bugs.

3.24.21.1 Bug 8256753

A connect using SCAN and EZCONNECT on one client machine can be requested to use a specific SCAN listener. Therefore, load balancing by round-robin DNS is not possible.

Workaround: Connect to a database using the following configuration specifying `LOAD_BALANCE=on` in `tnsnames.ora`:

```
ORCL =
  (DESCRIPTION =
    (LOAD_BALANCE=on)
    (ADDRESS = (PROTOCOL = TCP)(HOST = stscan1)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = srv.world)
    )
  )
```

Documentation Addendum

This section contains corrections to the following Oracle Documentation for this release:

Section 4.1, "Oracle Automatic Storage Management Administrator's Guide"

Section 4.2, "Oracle Clusterware Administration and Deployment Guide"

Section 4.3, "Oracle Database Administrator's Guide"

Section 4.4, "Oracle Database JDBC Java API Reference"

Section 4.5, "Oracle Database New Features Guide"

Section 4.6, "Oracle Database PL/SQL Packages and Types Reference"

Section 4.7, "Oracle Database VLDB and Partitioning Guide"

Section 4.8, "Oracle Real Application Clusters Administration and Deployment Guide"

Section 4.9, "Oracle Text Reference"

4.1 Oracle Automatic Storage Management Administrator's Guide

In *Oracle Automatic Storage Management Administrator's Guide*, in the section "volcreate" under "ASMCMD Volume Management Commands," the following warning applies:

WARNING: Specifying `--redundancy unprotected` means that Oracle ASM mirroring is not available for data recovery with the Oracle ADVM volume. The redundancy setting (normal) of the disk group does not provide mirroring for an unprotected Oracle ADVM volume. The unprotected configuration is not recommended for production environments as intermittent storage access failures can result in the loss of data. Backups are strongly recommended.

4.2 Oracle Clusterware Administration and Deployment Guide

Note the following changes with regard to the *Oracle Clusterware Administration and Deployment Guide*.

4.2.1 Deleting a Rapid Home Provisioning Client

In the Chapter titled "Rapid Home Provisioning," a section with the following text describing how to delete a Rapid Home Provisioning Client should be added:

To delete a Rapid Home Provisioning Client, execute the following steps:

1. On the Rapid Home Provisioning Server:
 - a. To query the list of working copies that have been provisioned on the Rapid Home Provisioning Client cluster, execute the following command:

```
$ rhpctl query workingcopy -client <client_name>
```
 - b. For each of the working copies listed in the output of the command in Step 1.a, execute the following command:

```
$ rhpctl delete workingcopy -workingcopy <workingcopy_name>
```
 - c. To query the list of users from the Rapid Home Provisioning Client cluster, execute the following command:

```
$ rhpctl query user -client <client_name>
```
 - d. To delete the user listed in the output of the command in Step 1.c, execute the following command:

```
$ rhpctl delete user -user <username> -client <client_name>
```
2. On the Rapid Home Provisioning Client cluster, execute the following:
 - a. Stop the Rapid Home Provisioning Client daemon with the following command:

```
$ srvctl stop rhpclient
```
 - b. Delete the Rapid Home Provisioning Client configuration using the following command:

```
$ srvctl remove rhpclient
```
3. On the Rapid Home Provisioning Server cluster, execute the following command to delete the client site configuration:

```
$ rhpctl delete client -client <client_name>
```

4.2.2 cluvfy comp cfs Command is Deprecated

The `cluvfy comp cfs` command is deprecated in release 12.1.0.2. In previous releases, you used `cluvfy comp cfs` component verification command to check the integrity of a clustered file system (OCFS2).

4.3 Oracle Database Administrator's Guide

Note the following changes with regard to the *Oracle Database Administrator's Guide*.

4.3.1 -force Option is Not Implemented With the remove service Command

You can ignore references to the `-force` option with regard to the `SRVCTL remove service` command. The `-force` option is not implemented with the `remove service` command.

4.4 Oracle Database JDBC Java API Reference

Starting Oracle Database 11gR2, JDBC clients can use `OracleDriver` to establish connections to a database from a java application.

Registering the JDBC drivers is no longer a prerequisite.

4.5 Oracle Database New Features Guide

In the *Oracle Database New Features Guide*, part number E17906-16, the section titled "New Predefined PL/SQL Inquiry Directives" incorrectly documented the name of two inquiry directives available in Oracle Database 12c Release 1 (12.1). The `$$PLSQL_OWNER` and `$$PLSQL_TYPE` inquiry directives should be `$$PLSQL_UNIT_OWNER` and `$$PLSQL_UNIT_TYPE`.

4.6 Oracle Database PL/SQL Packages and Types Reference

The `listno` parameter of the `DBMS_UTILITY` was inadvertently excluded from the *Oracle Database PL/SQL Packages and Types Reference*. For example, the `GET_PARAMETER_VALUE` function should read as follows:

GET_PARAMETER_VALUE Function

This function gets the value of specified initialization parameter.

Syntax

```
DBMS_UTILITY.GET_PARAMETER_VALUE (
    parnam      IN      VARCHAR2,
    intval     IN OUT  BINARY_INTEGER,
    strval     IN OUT  VARCHAR2,
    listno     IN      BINARY_INTEGER DEFAULT 1)
RETURN BINARY_INTEGER;
```

Parameters

Parameter	Description
<code>parnam</code>	Parameter name.
<code>intval</code>	Value of an integer parameter or the value length of a string parameter.
<code>strval</code>	Value of a string parameter.
<code>listno</code>	List item number. If retrieving parameter values for a parameter that can be specified multiple times to accumulate values, use this parameter to get each individual parameter.

4.7 Oracle Database VLDB and Partitioning Guide

In *Oracle Database VLDB and Partitioning Guide*, it was incorrectly documented that interval partitioning was supported with XMLIndex. XMLIndex only supports range, list and hash partitioning with schemes.

4.8 Oracle Real Application Clusters Administration and Deployment Guide

Note the following changes with regard to the *Oracle Real Application Clusters Administration and Deployment Guide*.

4.8.1 Overview of In-Memory Column Store with Oracle RAC

In the section titled "Overview of In-Memory Column Store with Oracle RAC" in the *Oracle Real Application Clusters Administration and Deployment Guide*, the paragraph that

begins with "On an Engineered System an object ..." needs to be changed to read as follows:

On an Engineered System, it is possible to duplicate or mirror objects populated in memory across the In-Memory Column Store (IM column store) in the cluster. This provides the highest level of redundancy. The `DUPLICATE` clause is used to control how an object should be duplicated across the IM column stores in the cluster. If you specify just `DUPLICATE`, then one mirrored copy of the data is distributed across the IM column stores in the cluster. If you want to duplicate the entire object in each IM column store in the cluster, specify `DUPLICATE ALL`.

4.9 Oracle Text Reference

Note the following changes with regard to the *Oracle Text Reference*.

4.9.1 Chapter: Oracle Text SQL Statements and Operators

In the sub-section titled "Notes" under the main section titled "ALTER INDEX" in the *Oracle Text Reference*, the following item should be documented in the bulleted list:

- You cannot have embedded blanks in section and field names.

According to Bug 21330358, field names cannot use embedded blanks. For example, `my section` is an invalid section name since there is a blank just after `my`. This applies to field names that are defined using "".

4.9.2 Appendix B Section: Oracle Text Supported Document Formats

In Appendix B titled "Oracle Text Supported Document Formats" of the *Oracle Text Reference* Oracle Text does not extract text for the following file formats:

- IBM Lotus Notes NSF (File ID) 7.x, 8.x
- IBM Lotus Notes NSF (Windows, Linux x86-32 and Oracle Solaris 32-bit only with Notes Client or Domino Server) 8.x