Oracle® Zero Downtime Migration

Release Notes

Release 21c (21.3)

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Zero Downtime Migration 21.3 Release Notes

These release notes provide downloading instructions for the latest product software and documentation, and describe new features, fixed bugs, known issues, and troubleshooting information for Zero Downtime Migration Release 21c (21.3).

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What's New in This Release

Zero Downtime Migration Release 21c (21.3) enhances the existing functionality by adding the following new features.

- **Physical Online Migration Support for Source Standby Databases**

  To reduce the load on your primary database system, Zero Downtime Migration can use an existing standby database to instantiate the database in the target environment. Other operations of the migration work flow continue using the source primary databases for synchronization and switchover purposes.

  New response file (RSP) parameters `ZDM_USE_EXISTING_STANDBY`, `ZDM_STANDBY_DB_NAME`, and `ZDM_STANDBY_DB_CONNECT_STRING` support this feature.

  See Using an Existing Standby to Instantiate the Target Database

- **Oracle Data Guard Broker Support for Physical Online Migration**

You can use a Data Guard broker configuration in online physical migrations to manage database role transitions after data migration. Oracle's Data Guard Broker usage is adjustable for various scenarios.

A new physical migration response file parameter, `ZDM_USE_DG_BROKER`, is available to enable Zero Downtime Migration's use of the broker.

See Using Oracle Data Guard Broker Role Switchover

- **Migration Enhancements from Amazon Web Services Oracle RDS Sources**

Migration target support for source Oracle Databases in Amazon Web Services (AWS) RDS has expanded from only Autonomous Database. You can now use logical online migration to migrate to new targets such as DBCS and Exadata Cloud Services, and you can now leverage Oracle's Cloud Pre-Migration Advisor tool (CPAT).

See Migrating from Amazon Web Services RDS Oracle to Oracle Cloud and Configuring Migrations for Remote CPAT Invocation

- **Online Migration from Solaris and AIX Source Platforms**

Zero Downtime Migration enhances support for cross-platform cloud migration for source Oracle Databases hosted on Oracle Solaris or IBM AIX operating systems. You can now leverage the logical online work flow and Oracle Autonomous Database and Co-managed Cloud Oracle Databases as targets.

See Supported Platforms

- **Logical Online Migration to Exadata On-Premises**

You can now use logical online migration to migrate to on-premises Exadata Database Machine targets. This method provides a platform for in-flight upgrades, hardware refresh, and cross-platform migration. Using Oracle GoldenGate in this work flow requires an on-premises GoldenGate Hub with a customer-provided GoldenGate license.

See Supported Logical Migration Targets

- **Logical Migration Job Suspension and Update Enhancements**

The logical migration work flow now allows you to pause a migration job, in-flight. In addition, you can now update an Oracle GoldenGate Extract or Replicat configuration while the migration job runs.

The new `ZDMCLI - suspend job` command supports this feature.

See Suspend a Migration Job and Modify Oracle GoldenGate Processes During a Migration Job

- **Migrate Multiple Schemas in Parallel**

You can now specify multiple schemas, and Zero Downtime Migration will perform the migration in parallel; different or all schemas of the same database can be selected simultaneously.

See Migrating Schemas in Parallel Using Batches

- **Auto-Retry Logical Data Pump Errors**

Zero Downtime Migration 21.3 introduces the capability to auto-retry specific Data Pump jobs in case of failure. Previously, in the case of Data Pump failure, the

migration would fail altogether. This functionality is handled by Zero Downtime Migration and does not require user interaction.

- **Customization Enhancements and other Fixes**

  Zero Downtime Migration now registers with the source database feature usage tracking API. You can directly query the source database to track all features, including Zero Downtime Migration, used during the migration.

  Before release 21.3, Zero Downtime Migration required the target database in Exadata Cloud@Customer migrations to be registered with the OCI Database Service, prompting API calls to OCI. You can now perform logical migration to ExaC@C without OCI rest API OCID calls.

Bugs Fixed

Zero Downtime Migration Release 21.3 incudes the bug fixes listed in the following table.

Table   Bugs Fixed In Zero Downtime Migration Release 21.3

Bug Number	Description
33851812	ZDM: NONCDB TO PDB PFILE REQUIRES SGA_TARGET PARAMETER
33308423	ZDM 21.2 PRGZ-1306 : -SOURCEDB OR -SOURCESID OPTION MISSING FOR PHYSICAL MIGRATION
33440085	ZDM: PHASE ZDM_NONCDBTOPDB_CONVERSION FAILED WITH ORA-28407: HARDWARE SECURITY MODULE FAILED WITH PKCS#11 ERROR
33507393	ZDM: PRE-CHECK PDB/DB OPEN MODE "RESTRICTED"
33522861	ZDM: NONCDB TO PDB CONVERSION FLOW RESTOREINIT IS FAILING
33536405	ZDM LOGICAL COPY TRANSFER DUMP FILES FROM ZDM NODE WITH ERROR PRGZ-1219 PRCZ-4001 PRCZ-2103
33338593	ZDM:MIGRATION FROM RAC TO EXCS FAILING AT MANIFEST TO CLOUD PHASE WITH "DB UNIQUE NAME MISMATCH & DB INSTANCE MISMATCH"
33730988	MIGRATION FROM 2 NODE RAC TO EXACC FAILS AT ZDM_MANIFEST_TO_CLOUD PHASE , PASSING DB NAME INSTEAD OF UNIQUE_NAME
33522880	ZDM: RESTORE CONTROL FILE IS FAILING WITH ORA-01678: PARAMETER DB_FILE_NAME_CONVERT MUST BE PAIRS OF PATTERN AND REPLACEMENT STRINGS
33391815	ZDM PHYSICAL ONLINE MIGRATION PHASE ZDM_CLONE_TGT FAILS WITH PRCD-1035 : DATABASE IS NOT A CLUSTER DATABASE
33871857	NON-CDB TO PDB CONVERSION WITH DIRECT DATA TRANSFER - CONTROL FILE RESTORE FAILURE WITH TNS ERROR

Downloading the Zero Downtime Migration Installation Software

For a fresh installation of the latest Zero Downtime Migration software version, go to https://www.oracle.com/database/technologies/rac/zdm-downloads.html.

Downloading the Zero Downtime Migration Documentation

You can browse and download Zero Downtime Migration documentation at https://docs.oracle.com/en/database/oracle/zero-downtime-migration/

General Information

At the time of this release, there are some details and considerations about Zero Downtime Migration behavior that you should take note of.

Running RHP and Zero Downtime Migration Service on the Same Host

If the Zero Downtime Migration service is installed on the same host where RHP server is deployed, note that there are some workarounds.

If you have has started an RHP server/client on the same node as the Zero Downtime Migration service, using the default port, you must either

- Stop RHPS/RHPC
- Modify the port for RHPS/RHPC

This is to avoid port collision between RHP and Zero Downtime Migration. If you don't want to change RHP configuration, you can also modify the port for Zero Downtime Migration before starting the Zero Downtime Migration service.

To identify the ports being used by Zero Downtime Migration:

```
ZDMinstallation/home/bin/zdmservice status
```

To stop the Zero Downtime Migration service:

```
ZDMinstallation/home/bin/zdmservice stop
```

To modify the ports:

```
ZDMinstallation/home/bin/zdmservice modify -help
Modifies configuration values.
```

```
USAGE: zdmservice modify
Optional parameters:
                    transferPortRange=<Range_of_ports>
                    rmiPort=<rmi_port>
                    httpPort=<http_port>
                    mysqlPort=<mysql_port>
```

For example:

```
ZDMinstallation/home/bin/zdmservice modify mysqlPort=8899
Editing MySQL port...
Successfully edited port=.* in file my.cnf
Successfully edited ^\(CONN_DESC=\).* in file rhp.pref
Successfully edited ^\(MYSQL_PORT=\).* in file rhp.pref
```

Cloud Premigration Advisor Tool Support

Cloud Premigration Advisor Tool (CPAT) is supported with Zero Downtime Migration for the following use cases:

- CPAT is run automatically on the source database environment during logical migration jobs from Oracle Cloud and on-premises Oracle Database sources (default behavior)

- CPAT is run manually from a remote server against an Amazon Web Services RDS Oracle Database source; in other words, CPAT is not run by `ZDMCLI migrate database` (see Running CPAT with a Remote Connection)

CPAT is not supported in the following use cases:

- Physical migration jobs

- Generating fixup scripts for Amazon Web Services RDS Oracle Database sources

UNDO Tablespaces Added to the Source Database

Zero Downtime Migration adds UNDO tablespaces to the production database to match the target instance count if the production database has fewer instances.

To prevent Zero Downtime Migration from adding UNDO tablespaces to the source database, you can match the target database nodes count to that of the source database until the switchover, then you can add additional nodes to the target database after the switchover.

Cross-Edition Migration

Zero Downtime Migration cannot be used to migrate an Enterprise Edition database to a Standard Edition database. In the converse case, Standard Edition databases can be migrated to Enterprise Edition databases, but only using the logical migration work flow.

EXT3 File System Support

There is a known issue which prevents Zero Downtime Migration from being installed in EXT3 file systems. The root cause is MySQL bug 102384. This is not a limitation of Zero Downtime Migration, but a constraint from MySQL. When that bug is resolved, Zero Downtime Migration is expected to work on EXT3 file systems.

Known Issues

At the time of this release, the following are known issues with Zero Downtime Migration that could occur in rare circumstances. For each issue, a workaround is provided.

Warnings shown when running zdminstall

Issue: If home and base directories are not precreated, a warning similar to the following is shown when running the zdminstall.sh script.

```
/bin/df: '/ [...] /zdm21.3.1/home/..': No such file or directory
/ [...] /zdm3rdparty/zdminstall.sh: line 2092: [: -lt: unary operator
expected
```

Solution: This warning message can be ignored because the Zero Downtime Migration installer creates the home and base directories if they are not present. The warning does not affect the outcome of the installation or cause any issues for migration.

Warnings shown when running zdmservice operations

Issue: A warning similar to the following is shown when running zdmservice operations `start`, `stop`, `status`, or `deinstall`.

```
Use of uninitialized value in concatenation (.) or string at / [...]
 /zdm21.3.1/home/lib/jwcctl_lib.pm line 571.
CRS_ERROR: Invalid data ALWAYS_ON= in _USR_ORA_ENV
```

Note that the line number in the output may vary.

Solution: This warning message can be ignored. It does not affect the use of the `zdmservice` operations or cause any issues for migration.

Logical Migration Using DBLINK Fails with PRGZ-1177

Issue: "PRGZ-1177 : Database link "dblink_name" is invalid and unusable" error causes failure in a logical migration using a database link in a PDB or multitenant database in version 12.1.0.x.

Solution: See 12c PDB or Multitenant Only: ORA-02085: Database Link "LINK_NAME_HERE" Connects To "TARGET_DB" (Doc ID 2344831.1)

PRGZ-1161 : Predefined database service "TP" does not exist

Issue: PRGZ-1161 : Predefined database service "TP" does not exist for Autonomous Database *ocid* is a known issue for fractional OCPU configuration

If you choose to configure 'Fractional ADB' (Fraction of OCPU per DB instead of integer OCPU) – this flavor does not provide standard service alias HIGH and

Solution: Set the RSP parameter `TARGETDATABASE_CONNECTIONDETAILS_SERVICENAME` to **LOW_TLS** or **TP_TLS**

The available services are - 'low' or 'low_tls' for Autonomous Data Warehouse with fractional OCPU, and 'tp' or 'tp_tls' for Autonomous Transaction Processing with fractional OCPU.

PRGG-1043 : No heartbeat table entries were found for Oracle GoldenGate Replicat process

Issue: An online logical migration job can report error PRGG-1043: No heartbeat table entries were found for Oracle GoldenGate Replicat process *process_name* due to one of the following causes:

1. Initialization parameter `job_queue_processes` was set to zero in the source or target database.

   Solution: Run the following statements on the database:

   ```
   show parameter job_queue_processes;
   alter system set job_queue_processes=100 scope=both;
   exec
   dbms_scheduler.set_scheduler_attribute('SCHEDULER_DISABLED','FALSE')
   ;
   ```

2. Scheduled job `GG_UPDATE_HEARTBEATS` is not active in the source database.

3. The server hosting Oracle GoldenGate deployments has a different time zone than the source database.

   Solution: First, do one of the following solutions:

   • Modify the time zone for the server hosting Oracle GoldenGate deployments, OR

   • Use the web UI for the Oracle GoldenGate deployment to add Extract parameter `TRANLOGOPTIONS SOURCE_OS_TIMEZONE` and restart Extract.

     For example, if the source database time zone is UTC-5, then set parameter `TRANLOGOPTIONS SOURCE_OS_TIMEZONE -5`. For more information, see TRANLOGOPTIONS in *Reference for Oracle GoldenGate*.

Then, ensure that the `DST_PRIMARY_TT_VERSION` property in the source database is up to date.

Restore Fails When Source Uses WALLET_ROOT

Issue: Zero Downtime Migration does not currently handle the migration of the TDE wallet from the source database to the target when the source database is using the `wallet_root` initialization parameter. Without the wallets available on the target database, the restore phase fails with an error similar to the following:

```
RMAN-00571: ===========================================================
RMAN-00569: =============== ERROR MESSAGE STACK FOLLOWS ===============
RMAN-00571: ===========================================================
RMAN-03002: failure of restore command at 06/15/2021 07:35:11
ORA-19870: error while restoring backup piece
/rman_PRD1/ZDM/IQPCZDM/c-3999816841-20210614-00
ORA-19913: unable to decrypt backup
```

Solution: Manually copy the wallet to the target and resume the job.

PRCZ-4026 Thrown During Migration to Oracle Database 19.10 Target

Issue: When attempting to migrate to an Oracle Database 19.10 home at target, the migration job fails at phase `ZDM_FINALIZE_TGT` with error PRCZ-4026, because of Oracle Clusterware (OCW) Bug 31070231.

```
PRCZ-4026 : Resource ora.db_unique_name.db is already running on nodes node.
```

Solution: Apply the Backport Label Request (BLR) for Bug#32646135 to the target 19.10 dbhome to avoid the reported issue. Once the BLR is applied, you can resume the failed migration job to completion.

Precaution: For physical migrations, you can avoid this issue by ensuring that your target database home is not on Oracle Database 19.10.

Environments With Oracle 11.2.0.4 Must Apply Perl Patch

Issue: Before using Zero Downtime Migration, you must apply a PERL patch if your source database environment meets either of the following conditions.

• Clusterware environment with Oracle Grid Infrastructure 11.2.0.4

• Single instance environment with Oracle Database 11.2.0.4

Solution: Download and apply Perl patch version 5.28.2 or later. Ensure that both the source and target Oracle Database 11g home include the patch for BUG 30508206 - UPDATE PERL IN 11.2.0.4 DATABASE ORACLE HOME TO V5.28.2.

ORA-39006 Thrown During Logical Migration to Autonomous Database Dedicated Infrastructure Over Database Link

Issue: When attempting to migrate a database to an Autonomous Database Dedicated Infrastructure target over a database link, the migration job fails with error ORA-39006.

```
ORA-39006: internal error
```

Solution: This is a Data Pump issue that is being tracked with Bug 31830685. Do not perform logical migrations over a database link to Autonomous Database Dedicated Infrastructure targets until the bug is fixed and the fix is applied to the Autonomous target database.

Zero Downtime Migration Service Fails To Start After Upgrade

Issue: The following scenario occurs:

1. Perform migration jobs with Zero Downtime Migration 19.7

2. Response files used in those jobs are removed

3. Upgrade to Zero Downtime Migration 21.1

4. Attempt to run a migration

The following errors are seen.

```
CRS_ERROR:TCC-0004: The container was not able to start.

CRS_ERROR:One or more listeners failed to start. Full details will be
found in the appropriate container log fileContext [/rhp] startup failed
due to previous errors sync_start failed with exit code 1.
```

A similar error is found in the log files located in *zdm_installation_location*/base/crsdata/*hostname*/rhp/logs/.

```
Caused by: oracle.gridhome.container.GHException: Internal
error:PRGO-3003 : Zero downtime migration (ZDM) template file /home/jdoe/
zdm_mydb.rsp does not exist.
```

Solution: To recover, manually recreate the response files listed in the log, and place them in the location specified in the log.

Troubleshooting

If you run into issues, check here in case a solution is published. For each issue, a workaround is provided.

Installation Issues

INS-42505 Warning Shown During Installation

Issue: The following warning is shown during installation.

```
/stage/user/ZDM_KIT_relnumber>./zdminstall.sh setup
oraclehome=/stage/user/grid oraclebase=/stage/user/base
ziploc=/stage/user/ZDM_KIT_relnumber/rhp_home.zip -zdm
--------------------------------------
Unzipping shiphome to gridhome
--------------------------------------
Unzipping shiphome...
Shiphome unzipped successfully..
--------------------------------------
##### Starting GridHome Software Only Installation #####
--------------------------------------
Launching Oracle Grid Infrastructure Setup Wizard...

[WARNING] [INS-42505] The installer has detected that the Oracle Grid
Infrastructure home software at (/stage/user/grid) is not complete.
   CAUSE: Following files are missing:
...
```

Solution: This warning message can be ignored. It does not affect the installation or cause any issues for migration.

Connectivity Issues

General Connectivity Issues

Issue: If connectivity issues occur between the Zero Downtime Migration service host and the source or target environments, or between source and target environments, check the following areas.

Solution: Verify that the SSH configuration file (`/root/.ssh/config`) has the appropriate entries:

```
Host *
  ServerAliveInterval 10
  ServerAliveCountMax 2

Host ocidb1
  HostName 192.0.2.1
  IdentityFile ~/.ssh/ocidb1.ppk
```

```
User opc
ProxyCommand /usr/bin/nc -X connect -x www-proxy.example.com:80 %h %p
```

Note that the proxy setup might not be required when you are not using a proxy server for connectivity. For example, when the source database server is on Oracle Cloud Infrastructure Classic, you can remove or comment the line starting with `ProxyCommand`.

If the source is an Oracle RAC database, then make sure you copy the `~/.ssh/config` file to all of the source Oracle RAC servers. The SSH configuration file refers to the first Oracle RAC server host name, public IP address, and private key attributes.

Communications Link Failure

Issue: If the MySQL server crashes you will see errors such as this one for the ZDM operations:

```
$ ./zdmcli query job -jobid 6
Exception [EclipseLink-4002] (Eclipse Persistence Services -
2.7.7.qualifier): org.eclipse.persistence.exceptions.DatabaseException
Internal Exception:
com.mysql.cj.jdbc.exceptions.CommunicationsException:
Communications link failure
The last packet sent successfully to the server was 0 milliseconds
ago. The
driver has not received any packets from the server.
Error Code: 0
Query: ReadAllQuery(referenceClass=JobSchedulerImpl sql="SELECT
JOB_IDENTIFIER, M_ACELIST, ARGUMENTS, ATTRIBUTES, CLIENT_NAME,
COMMAND_PROVIDED, COMPARTMENT, CONTAINER_TYPE, CREATEDATE, CREATOR,
CURRENT_STATUS, DB_OCID, DBNAME, DEPLOYMENT_OCID,
DISABLE_JOB_EXECUTION,
ELAPSED_TIME, END_TIME, EXECUTE_PHASES, EXECUTION_TIME, IS_EVAL,
IS_PAUSED,
JOB_TYPE, METHOD_NAME, METRICS_LOCATION, OPERATION, PARAMETERS,
PARENT_JOB_ID, PAUSE_AFTER_PHASE, RESULT, PHASE, JOB_SCHEDULER_PHASES,
REGION, REST_USER_NAME, RESULT_LOCATION, SCHEDULED_TIME, SITE,
SOURCEDB,
SOURCENODE, SOURCESID, SPARE1, SPARE2, SPARE3, SPARE_A, SPARE_B,
SPARE_C,
START_TIME, STOP_AFTER_PHASE, TARGETNODE, JOB_THREAD_ID, UPD_DATE,
USER_NAME,
ENTITY_VERSION, CUSTOMER FROM JOBSCHEDULER WHERE (PARENT_JOB_ID = ?)")
```

Solution: If such Communications errors are seen, restart the Zero Downtime Migration service so that the MySQL server is restarted, after which the pending jobs will resume automatically.

Stop the Zero Downtime Migration service:

```
zdmuser> $ZDM_HOME/bin/zdmservice stop
```

Start the Zero Downtime Migration service:

```
zdmuser> $ZDM_HOME/bin/zdmservice start
```

Evaluation Fails in Phase ZDM_GET_TGT_INFO

Issue: During the evaluation (`-eval`) phase of the migration process, the evaluation fails in the `ZDM_GET_TGT_INFO` phase with the following error for the Oracle RAC instance migration.

```
Executing phase ZDM_GET_TGT_INFO
Retrieving information from target node "trac11" ...
PRGZ-3130 : failed to establish connection to target listener from
nodes [srac11, srac12]
PRCC-1021 : One or more of the submitted commands did not execute
successfully.
PRCC-1025 : Command submitted on node srac11 timed out after 15
seconds.
PRCC-1025 : Command submitted on node srac12 timed out after 15
seconds.
```

Solution:

1. Get the SCAN name of source database and add it to the `/etc/hosts` file on both target database servers, with the public IP address of the source database server and the source database SCAN name. For example:

   ```
   192.0.2.3 source-scan
   ```

2. Get the SCAN name of the target database and add it to the `/etc/hosts` file on both source database servers, with the public IP address of the target database server and target database SCAN name. For example:

   ```
   192.0.2.1  target-scan
   ```

> **✏ Note:**
>
> This issue, where the SCAN IP address is not added to `/etc/hosts` file, might occur because in some cases the SCAN IP address is assigned as a private IP address, so it might not be resolvable.

Object Storage Is Not Accessible

Issue: When Object Storage is accessed from the source or target database server, it may fail with the following error.

```
About to connect() to swiftobjectstorage.xx-region-1.oraclecloud.com
port 443 (#0)
Trying 192.0.2.1... No route to host
Trying 192.0.2.2... No route to host
Trying 192.0.2.3... No route to host
couldn't connect to host
Closing connection #0
curl: (7) couldn't connect to host
```

Solution: On the Zero Downtime Migration service host, in the response file template (`$ZDM_HOME/rhp/zdm/template/zdm_template.rsp`), set the Object Storage Service proxy host and port parameters listed below, if a proxy is required to connect to Object Storage from the source database server. For example:

```
SRC_OSS_PROXY_HOST=www-proxy-source.example.com
SRC_OSS_PROXY_PORT=80
```

In the response file template (`$ZDM_HOME/rhp/zdm/template/zdm_template.rsp`), set the Object Storage Service proxy host and port parameters listed below, if a proxy is required to connect to Object Storage from the target database server. For example:

```
TGT_OSS_PROXY_HOST=www-proxy-target.example.com
TGT_OSS_PROXY_PORT=80
```

SSH Error "EdDSA provider not supported"

Issue: The following error messages appear in `$ZDM_BASE/crsdata/`*zdm service hostname*`/rhp/zdmserver.log.0`.

```
[sshd-SshClient[3051eb49]-nio2-thread-1] [ 2020-04-04 00:26:24.142
GMT ]
 [JSChChannel$LogOutputStream.flush:1520]  2020-04-04: WARNING:
org.apache.sshd.client.session.C:
 globalRequest(ClientConnectionService[ClientSessionImpl[opc@samidb-db/
140.238.254.80:22]])[hostkeys-00@openssh.com,
 want-reply=false] failed (SshException) to process: EdDSA provider
not supported

[sshd-SshClient[3051eb49]-nio2-thread-1] [ 2020-04-04 00:26:24.142
GMT ]
 [JSChChannel$LogOutputStream.flush:1520]  2020-04-04: FINE    :
org.apache.sshd.client.session.C:
 globalRequest(ClientConnectionService[ClientSessionImpl[opc@samidb-db/
140.238.254.80:22]])[hostkeys-00@openssh.com,
 want-reply=false] failure details
org.apache.sshd.common.SshException: EdDSA provider not supported
```

```
        at
org.apache.sshd.common.util.buffer.Buffer.getRawPublicKey(Buffer.java:4
46)
        at
org.apache.sshd.common.util.buffer.Buffer.getPublicKey(Buffer.java:420)
        at
org.apache.sshd.common.global.AbstractOpenSshHostKeysHandler.process(Ab
stractOpenSshHostKeysHandler.java:71)
        at
org.apache.sshd.common.global.AbstractOpenSshHostKeysHandler.process(Ab
stractOpenSshHostKeysHandler.java:38)
        at
org.apache.sshd.common.session.helpers.AbstractConnectionService.global
Request(AbstractConnectionService.java:723)
        at
org.apache.sshd.common.session.helpers.AbstractConnectionService.proces
s(AbstractConnectionService.java:363)
        at
org.apache.sshd.common.session.helpers.AbstractSession.doHandleMessage(
AbstractSession.java:400)
        at
org.apache.sshd.common.session.helpers.AbstractSession.handleMessage(Ab
stractSession.java:333)
        at
org.apache.sshd.common.session.helpers.AbstractSession.decode(AbstractS
ession.java:1097)
        at
org.apache.sshd.common.session.helpers.AbstractSession.messageReceived(
AbstractSession.java:294)
        at
org.apache.sshd.common.session.helpers.AbstractSessionIoHandler.message
Received(AbstractSessionIoHandler.java:63)
        at
org.apache.sshd.common.io.nio2.Nio2Session.handleReadCycleCompletion(Ni
o2Session.java:357)
        at
org.apache.sshd.common.io.nio2.Nio2Session$1.onCompleted(Nio2Session.ja
va:335)
        at
org.apache.sshd.common.io.nio2.Nio2Session$1.onCompleted(Nio2Session.ja
va:332)
        at
org.apache.sshd.common.io.nio2.Nio2CompletionHandler.lambda$completed$
0(Nio2CompletionHandler.java:38)
        at java.security.AccessController.doPrivileged(Native Method)
        at
org.apache.sshd.common.io.nio2.Nio2CompletionHandler.completed(Nio2Comp
letionHandler.java:37)
        at sun.nio.ch.Invoker.invokeUnchecked(Invoker.java:126)
        at sun.nio.ch.Invoker$2.run(Invoker.java:218)
        at
sun.nio.ch.AsynchronousChannelGroupImpl$1.run(AsynchronousChannelGroupI
```

```
mpl.java:112)
    at
java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.ja
va:1149)
    at
java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.j
ava:624)
    at java.lang.Thread.run(Thread.java:748)
Caused by: java.security.NoSuchAlgorithmException: EdDSA provider not
supported
    at
org.apache.sshd.common.util.security.SecurityUtils.generateEDDSAPublicK
ey(SecurityUtils.java:596)
    at
org.apache.sshd.common.util.buffer.keys.ED25519BufferPublicKeyParser.ge
tRawPublicKey(ED25519BufferPublicKeyParser.java:45)
    at
org.apache.sshd.common.util.buffer.keys.BufferPublicKeyParser$2.getRawP
ublicKey(BufferPublicKeyParser.java:98)
    at
org.apache.sshd.common.util.buffer.Buffer.getRawPublicKey(Buffer.java:4
44)
    ... 22 more
[sshd-SshClient[3051eb49]-nio2-thread-1] [ 2020-04-04 00:26:24.142
GMT ]
 [JSChChannel$LogOutputStream.flush:1520]  2020-04-04: FINE   :
org.apache.sshd.client.session.C:

sendGlobalResponse(ClientConnectionService[ClientSessionImpl[opc@samidb
-db/140.238.254.80:22]])[hostkeys-00@openssh.com]
 result=ReplyFailure, want-reply=false

[sshd-SshClient[3051eb49]-nio2-thread-2] [ 2020-04-04 00:26:24.182
GMT ]
 [JSChChannel$LogOutputStream.flush:1520]  2020-04-04: FINE   :
org.apache.sshd.common.io.nio2.N:
 handleReadCycleCompletion(Nio2Session[local=/192.168.0.2:41198,
remote=samidb-db/140.238.254.80:22])
 read 52 bytes
```

Solution: Zero Downtime Migration uses the RSA format.

Transparent Data Encryption Related Issues

Transparent Data Encryption General Information

Depending on your source database release, Transparent Data Encryption (TDE)
wallet configuration may be required.

• **Oracle Database 12c Release 2 and later**

For Oracle Database 12c Release 2 and later releases, TDE wallet configuration is mandatory and must be enabled on the source database before migration begins.

If TDE is not enabled, the database migration will fail.

Upon restore, the database tablespaces are encrypted using the wallet.

- **Oracle Database 12c Release 1 and earlier**
  On Oracle Database 12c Release 1 and Oracle Database 11g Release 2 (11.2.0.4), TDE configuration is not required.

For information about the behavior of TDE in an Oracle Cloud environment, see My Oracle Support document Oracle Database Tablespace Encryption Behavior in Oracle Cloud (Doc ID 2359020.1).

Job Fails in Phase ZDM_SETUP_TDE_TGT

Issue: The phase ZDM_SETUP_TDE_TGT fails with one of the following errors.

```
Executing phase ZDM_SETUP_TDE_TGT
Setting up Oracle Transparent Data Encryption (TDE) keystore on the
target node oci1121 ...
oci1121: <ERR_FILE><Facility>PRGZ</
Facility><ID>ZDM_KEYSTORE_NOT_SETUP_ERR</ID><ARGS><ARG>oci112_phx1z3</
ARG></ARGS></ERR_FILE>
PRGO-3007 : failed to migrate database "db11204" with zero downtime
PRCZ-4002 : failed to execute command "/u01/app/18.0.0.0/grid/perl/bin/
perl" using the privileged execution plugin "zdmauth" on nodes
"oci1121"
PRCZ-2103 : Failed to execute command "/u01/app/18.0.0.0/grid/perl/bin/
perl" on node "oci1121" as user "root". Detailed error:
<ERR_FILE><Facility>PRGZ</Facility><ID>ZDM_KEYSTORE_NOT_SETUP_ERR</
ID><ARGS><ARG>oci112_phx1z3</ARG></ARGS></ERR_FILE>


Error at target server in /tmp/zdm749527725/zdm/log/
mZDM_oss_standby_setup_tde_tgt_71939.log
2019-06-13 10:00:20: Keystore location /opt/oracle/dcs/commonstore/
wallets/tde/$ORACLE_UNQNAME does not exists for database
'oci112_region'
2019-06-13 10:00:20: Reporting error:
<ERR_FILE><Facility>PRGZ</Facility><ID>ZDM_KEYSTORE_NOT_SETUP_ERR</
ID><ARGS><ARG>oci112_region</ARG></ARGS></ERR_FILE>
```

Solution:

- **Oracle Database 12c Release 1 and later**

On the target database, make sure that `$ORACLE_HOME/network/admin/sqlnet.ora` points to the correct location of the TDE wallet. For exmaple:

```
ENCRYPTION_WALLET_LOCATION=(SOURCE=(METHOD=FILE)
(METHOD_DATA=(DIRECTORY=/opt/oracle/dcs/commonstore/
wallets/tde/$ORACLE_UNQNAME)
```

- **Oracle Database 11g Release 2 (11.2.0.4) only**
  On the target database, make sure that `$ORACLE_HOME/network/admin/sqlnet.ora` points to the correct location of the TDE wallet, and replace the `$ORACLE_UNQNAME` variable with the value obtained from the `SHOW PARAMETER DB_UNIQUE_NAME` SQL command.

  For example, run

  ```
  SQL> show parameter db_unique_name
  db_unique_name          string      oci112_region
  ```

  and replace

  ```
  ENCRYPTION_WALLET_LOCATION=(SOURCE=(METHOD=FILE)
  (METHOD_DATA=(DIRECTORY=/opt/oracle/dcs/commonstore/
  wallets/tde/$ORACLE_UNQNAME)))
  ```

  with

  ```
  ENCRYPTION_WALLET_LOCATION=(SOURCE=(METHOD=FILE)
  (METHOD_DATA=(DIRECTORY=/opt/oracle/dcs/commonstore/wallets/tde/
  oci112_region)))
  ```

Full Backup Phase (ZDM_BACKUP_FULL_SRC) Issues

Backup Fails with ORA-19836

Issue: Source database full backup fails with one of the following errors.

```
</ERRLINE><ERRLINE>ORA-19836: cannot use passphrase encryption for
this backup
</ERRLINE><ERRLINE>RMAN-03009: failure of backup command on C8 channel
at 04/29/2019
     20:42:16


</ERRLINE><ERRLINE>ORA-19836: cannot use passphrase encryption for
this backup
</ERRLINE><ERRLINE>RMAN-03009: continuing other job steps, job failed
```

```
will not be
      re-run
```

Solution 1: This issue can occur if you specify the `-sourcedb` value in the wrong case. For example, if the value obtained from SQL command `SHOW PARAMETER DB_UNIQUE_NAME` is `zdmsdb`, then you need to specify it as `zdmsdb` in lower case, and not as `ZDMSDB` in upper case, as shown in the following example.

```
zdmuser> $ZDM_HOME/bin/zdmcli migrate database -sourcedb zdmsdb -
sourcenode ocicdb1 -srcroot
-targetnode ocidb1 -targethome /u01/app/oracle/product/12.1.0.2/
dbhome_1
-backupuser backup_user@example.com -rsp /u01/app/zdmhome/rhp/zdm/
template/zdm_template_zdmsdb.rsp
-tgtauth zdmauth -tgtarg1 user:opc
-tgtarg2 identity_file:/home/zdmuser/.ssh/zdm_service_host.ppk
-tgtarg3 sudo_location:/usr/bin/sudo
```

Solution 2: For Oracle Database 12c Release 1 and later, ensure that `$ORACLE_HOME/network/admin/sqlnet.ora` points to the correct location of the TDE wallet, as shown here.

```
ENCRYPTION_WALLET_LOCATION=(SOURCE=(METHOD=FILE)
(METHOD_DATA=(DIRECTORY=/opt/oracle/dcs/commonstore/
wallets/tde/$ORACLE_UNQNAME)))
```

For Oracle Database 11g Release 2 (11.2.0.4) only, ensure that `$ORACLE_HOME/network/admin/sqlnet.ora` points to the correct location of the TDE wallet as shown below, and replace the variable `$ORACLE_UNQNAME` with the value obtained with the SQL statement `SHOW PARAMETER DB_UNIQUE_NAME`.

```
ENCRYPTION_WALLET_LOCATION=(SOURCE=(METHOD=FILE)
(METHOD_DATA=(DIRECTORY=/opt/oracle/dcs/commonstore/
wallets/tde/$ORACLE_UNQNAME)))
```

For example:

```
SQL> show parameter db_unique_name
db_unique_name     string      oci112_region


ENCRYPTION_WALLET_LOCATION=(SOURCE=(METHOD=FILE)
(METHOD_DATA=(DIRECTORY=/opt/oracle/dcs/commonstore/wallets/tde/
oci112_region)))
```

Solution 3: Run the following query and make sure that the wallet status is `OPEN`.

```
SQL> select * from v$encryption_wallet
WRL_TYPE
-------------
WRL_PARAMETER
-------------
STATUS
-------------
file
/opt/oracle/dcs/commonstore/wallets/tde/abc_test
OPEN
```

Backup Fails with ORA-19914 and ORA-28365

Issue: Source database full backup fails with the following errors.

```
channel ORA_SBT_TAPE_3: backup set complete, elapsed time: 00:00:15
channel ORA_SBT_TAPE_3: starting compressed full datafile backup set
channel ORA_SBT_TAPE_3: specifying datafile(s) in backup set
input datafile file number=00005 name=+DATA/
ODA122/7312FA75F2B202E5E053050011AC5977/DATAFILE/system.382.1003858429
channel ORA_SBT_TAPE_3: starting piece 1 at 25-MAR-19
RMAN-03009: failure of backup command on ORA_SBT_TAPE_3 channel at
03/25/2019 19:09:30
ORA-19914: unable to encrypt backup
ORA-28365: wallet is not open
continuing other job steps, job failed will not be re-run
channel ORA_SBT_TAPE_3: starting compressed full datafile backup set
channel ORA_SBT_TAPE_3: specifying datafile(s) in backup set
```

Solution: Ensure that the wallet is opened in the database, and in case of CDB, ensure that the wallet is opened in the CDB, all PDBs, and PDB$SEED. See Setting Up the Transparent Data Encryption Wallet in the Zero Downtime Migration documentation for information about setting up TDE.

Either the Bucket Named *Object Storage Bucket Name* Does Not Exist in the Namespace *Namespace* or You Are Not Authorized to Access It

See Oracle Support Knowledge Base article "Either the Bucket Named '<Object Storage Bucket Name>' Does not Exist in the Namespace '<Namespace>' or You are not Authorized to Access it (Doc ID 2605518.1)" for the desciption and workarounds for this issue.

https://support.oracle.com/rs?type=doc&id=2605518.1

Restore Phase (ZDT_CLONE_TGT) Issues

Restore Database Fails With Assert [KCBTSE_ENCDEC_TBSBLK_1]

Issue: Due to RDBMS Bugs 31048741, 32697431, and 32117834 you may see assert [kcbtse_encdec_tbsblk_1] in the alert log during restore phase of a physical migration.

Solution: Apply patches for RDBMS Bugs 31048741 and 32697431 to any Oracle Database 19c migration target previous to the 19.13 update.

Restore Database Fails With AUTOBACKUP does not contain an SPFILE

Issue: During the execution of phase `ZDT_CLONE_TGT`, restore database fails with the following error.

```
channel C1: looking for AUTOBACKUP on day: 20200427
channel C1: AUTOBACKUP found: c-1482198272-20200427-12
channel C1: restoring spfile from AUTOBACKUP c-1482198272-20200427-12
channel C1: the AUTOBACKUP does not contain an SPFILE
```

The source database is running using `init.ora` file, but during the restore target phase, the database is trying to restore the server parameter file (SPFILE) from autobackup, therefore it fails.

Solution: Start the source database using an SPFILE and resubmit the migration job.

Restore Database Fails With ORA-01565

Issue: During the execution of phase `ZDT_CLONE_TGT`, restore database fails with the following error.

```
</ERRLINE><ERRLINE>With the Partitioning, Real Application Clusters,
Automatic Storage Management, OLAP
</ERRLINE><ERRLINE>and Real Application Testing options
</ERRLINE><ERRLINE>
</ERRLINE><ERRLINE>CREATE PFILE='/tmp/zdm833428275/zdm/PFILE/
zdm_tgt_mclone_nrt139.pfile' FROM SPFILE
</ERRLINE><ERRLINE>*
</ERRLINE><ERRLINE>ERROR at line 1:
</ERRLINE><ERRLINE>ORA-01565: error in identifying file '?/dbs/
spfile@.ora'
</ERRLINE><ERRLINE>ORA-27037: unable to obtain file status
</ERRLINE><ERRLINE>Linux-x86_64 Error: 2: No such file or directory
</ERRLINE><ERRLINE>Additional information: 3
</ERRLINE><ERRLINE>
</ERRLINE><ERRLINE>
</ERRLINE><ERRLINE>Disconnected from Oracle Database 11g Enterprise
Edition Release 11.2.0.4.0 - 64bit Production
```

```
</ERRLINE><ERRLINE>With the Partitioning, Real Application Clusters,
Automatic Storage Management, OLAP
```

Solution: Start the target database using an SPFILE and resume the migration job.

Post Migration Automatic Backup Issues

Troubleshooting Post Migration Automatic Backup Failures

Issue: Post migration, on the target database, Automatic Backup might fail.

You can verify the failure using the console in **Bare Metal, VM and Exadata > DB Systems > DB System Details > Database Details > Backups**.

Solution: Get the RMAN configuration settings from one of the following places.

- Zero Downtime Migration documentation in Target Database Prerequisites, if captured

- The log files at `/opt/oracle/dcs/log/`*hostname*`/rman/bkup/`*db_unique_name*`/`

- `/tmp/zdmXXX/zdm/zdm_`*TDBNAME*`_rman.dat`

For example, using the second option, you can get the RMAN configuration settings from `/opt/oracle/dcs/log/ocidb1/rman/bkup/ocidb1_abc127/ rman_configure*.log`, then reset any changed RMAN configuration settings for the target database to ensure that automatic backup works without any issues.

If this workaround does not help, then debug further by getting the RMAN job ID by running the DBCLI command, `list-jobs`, and describe the job details for more error details by running the DBCLI command `describe-job -i `*JOB ID* from the database server as the root user.

For example, during the test, the following highlighted settings were modified to make Automatic Backup work.

```
rman target /
Recovery Manager: Release 12.2.0.1.0 - Production on Mon Jul 8
11:00:18 2019
Copyright (c) 1982, 2017, Oracle and/or its affiliates.  All rights
reserved.
connected to target database: ORCL (DBID=1540292788)
RMAN> show all;
using target database control file instead of recovery catalog
RMAN configuration parameters for database with db_unique_name
OCIDB1_ABC127 are:
CONFIGURE RETENTION POLICY TO RECOVERY WINDOW OF 30 DAYS;
CONFIGURE BACKUP OPTIMIZATION OFF;
CONFIGURE DEFAULT DEVICE TYPE TO DISK; # default
CONFIGURE CONTROLFILE AUTOBACKUP ON;
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE SBT_TAPE TO
'%F'; # default
```

```
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F';
# default
CONFIGURE DEVICE TYPE 'SBT_TAPE' PARALLELISM 4 BACKUP TYPE TO
COMPRESSED BACKUPSET;
CONFIGURE DEVICE TYPE DISK PARALLELISM 1 BACKUP TYPE TO BACKUPSET; #
default
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE SBT_TAPE TO 1; #
default
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE SBT_TAPE TO 1; #
default
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
CONFIGURE CHANNEL DEVICE TYPE DISK MAXPIECESIZE 2 G;
CONFIGURE CHANNEL DEVICE TYPE 'SBT_TAPE' MAXPIECESIZE 2 G FORMAT
'%d_%I_%U_%T_%t' PARMS
 'SBT_LIBRARY=/opt/oracle/dcs/commonstore/pkgrepos/oss/odbcs/libopc.so
ENV=(OPC_PFILE=/opt/oracle/dcs/commonstore/objectstore/opc_pfile/
1245080042/opc_OCIDB1_ABC127.ora)';
CONFIGURE MAXSETSIZE TO UNLIMITED; # default
CONFIGURE ENCRYPTION FOR DATABASE ON;
CONFIGURE ENCRYPTION ALGORITHM 'AES128'; # default
CONFIGURE COMPRESSION ALGORITHM 'MEDIUM' AS OF RELEASE 'DEFAULT'
OPTIMIZE FOR LOAD TRUE;
CONFIGURE RMAN OUTPUT TO KEEP FOR 7 DAYS; # default
CONFIGURE ARCHIVELOG DELETION POLICY TO BACKED UP 1 TIMES TO
'SBT_TAPE';
CONFIGURE SNAPSHOT CONTROLFILE NAME TO '+RECO/ OCIDB1_ABC127/
controlfile/snapcf_ocidb1_abc127.f';
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK clear;
RMAN>
```

Post Migration Automatic Backup Fails With DCS-10045

Issue: Post migration, Automatic Backup fails with the following error for non-TDE enabled migrated Oracle Database releases 11.2.0.4 and 12.1.0.2.

```
DCS-10045: Validation error encountered: Backup password is mandatory
to take OSS backup for non-tde enabled database...
```

You can verify this error by getting the RMAN job ID by running DBCLI command `list-jobs`, and describe the job details to get the error details by running DBCLI command `describe-job -i` *JOB ID* from the database server as the root user.

Solution:

1. Find the TDE wallet location.

The Oracle Cloud Infrastructure provisioned database instance will have following entry in `sqlnet.ora`.

```
ENCRYPTION_WALLET_LOCATION=(SOURCE=(METHOD=FILE)
(METHOD_DATA=(DIRECTORY=/opt/oracle/dcs/commonstore/
wallets/tde/$ORACLE_UNQNAME)))
```

2. Remove the `cwallet.sso` file from the wallet location.
    For example, `/opt/oracle/dcs/commonstore/wallets/tde/$ORACLE_UNQNAME`.

3. For Oracle Database 11g Release 2, do the folowing steps.

    a. Connect to database using SQL*Plus as sysdba and verify the current wallet location.

    ```
    SQL> select * from v$encryption_wallet;
    WRL_TYPE
    WRL_PARAMETER                                              STATUS
    file        /opt/oracle/dcs/commonstore/wallets/tde/
    ocise112_region   OPEN
    ```

    b. Close the wallet in the database.

    ```
    SQL> alter system set wallet close;
    ```

    c. Open the wallet using the wallet password.

    ```
    SQL> alter system SET WALLET open IDENTIFIED BY "walletpassword"
    ```

    d. Set the master encryption key.

    ```
    SQL> alter system set encryption key identified by
    "walletpassword"
    ```

    e. Recreate the autologin SSO file.

    ```
    /home/oracle>orapki wallet create -wallet /opt/oracle/dcs/
    commonstore/wallets/tde/$ORACLE_UNQNAME -auto_login
    Oracle PKI Tool : Version 11.2.0.4.0 - Production
    Copyright (c) 2004, 2013, Oracle and/or its affiliates. All
    rights reserved.
    Enter wallet password:            #
    ```

    f. Retry Automatic Backup.

4. For Oracle Database 12c, do the folowing steps.

    a. Connect to database using SQL*Plus as sysdba and verify the current wallet location and status.

    ```
    SQL> SELECT wrl_parameter, status, wallet_type FROM
    v$encryption_wallet;
    WRL_PARAMETER
    ```

```
STATUS                WALLET_TYPE
/opt/oracle/dcs/commonstore/wallets/tde/ocise112_region
OPEN_NO_MASTER_KEY   OPEN
```

If the STATUS column contains a value of OPEN_NO_MASTER_KEY, you must create and activate the master encryption key.

b. Close the wallet in the database.

```
SQL> alter system set wallet close;
```

c. Open the wallet-using password.

```
SQL> ADMINISTER KEY MANAGEMENT SET KEYSTORE open IDENTIFIED BY
"walletpassword" CONTAINER=all;
```

d. Set the master encryption key.

```
SQL> ADMINISTER KEY MANAGEMENT SET KEY IDENTIFIED BY
"walletpassword" with backup;
```

Log in to each PDB and run

```
SQL> ALTER SESSION SET CONTAINER = PDB_NAME;
SQL> ADMINISTER KEY MANAGEMENT SET KEY IDENTIFIED BY
"walletpassword" with backup;
```

e. Create the auto login keystore.

```
SQL> ADMINISTER KEY MANAGEMENT CREATE AUTO_LOGIN KEYSTORE FROM
KEYSTORE 'path to wallet directory' IDENTIFIED BY
"walletpassword";
```

f. Retry Automatic Backup.

Post Migration Automatic Backup Fails With DCS-10096

Issue: Post migration, Automatic Backup fails with the following error.

```
DCS-10096:RMAN configuration 'Retention policy' must be configured as
'configure retentio n
      policy to recovery window of 30 days'
```

You can verify this error by getting the RMAN job ID by running DBCLI command list-jobs, and describe the job details for more error details by running DBCLI command describe-job -i *JOB ID* from the database server as the root user.

Solution: Log in into RMAN prompt and configure the retention policy.

```
[oracle@racoci1 ~]$ rman target /
Recovery Manager: Release 12.2.0.1.0 - Production on Wed Jul 17
11:04:35 2019
Copyright (c) 1982, 2017, Oracle and/or its affiliates.  All rights
reserved.
connected to target database: SIODA (DBID=2489657199)
RMAN> CONFIGURE RETENTION POLICY TO RECOVERY WINDOW OF 30 DAYS;

old RMAN configuration parameters:
CONFIGURE RETENTION POLICY TO RECOVERY WINDOW OF 7 DAYS;

new RMAN configuration parameters:
CONFIGURE RETENTION POLICY TO RECOVERY WINDOW OF 30 DAYS;

new RMAN configuration parameters are successfully stored
```

Retry Automatic Backup.

Miscellaneous Issues

Migration from Existing Data Guard Standby Fails

Issue: Using an existing standby, Zero Downtime Migration job fails when Data Guard broker configuration uses TNS aliases.

In a Data Guard broker configuration, every database needs to be reachable from every other database in the configuration. When Zero Downtime Migration creates a new standby at the target and adds it to the existing Data Guard broker configuration, Zero Downtime Migration adds the target with connect identifier specified in the form of the connect string. Zero Downtime Migration does not update the tnsnames.ora on the target with other databases is in the configuration. Because the tnsnames.ora entries are missing, other databases may not be reachable if the configuration was created with TNS aliases.

Solution: Ensure that all TNS aliases in the broker configuration corresponding to the primary and any existing standby databases are defined in the target tnsnames.ora file.

Alternatively, ensure that the broker configuration is made up of connect strings instead of TNS aliases. The connect identifier string can be identified using the command below:

```
show database db_name dgconnectidentifier;
```

If the connect identifier is a TNS alias, the identifier can be updated using the command below and specifying the connect string in the form of EZconnect string.

For cluster databases:

```
edit database db_name set property
 dgconnectidentifier='scan_name:scan_port/service_name';
```

For non cluster database:

```
edit database db_name set property
dgconnectidentifier='listener_host:listener_port/service_name';
```

The TNS aliases are not required once the connect identifiers are specified as connect strings that are reachable from every database instance in the broker configuration. This is because the broker needs to be able to manage the primary/standby relationship in case any standby switches roles and becomes the primary.

PDB in Failed State After Migration to ExaCS or ExaCC

Issue: ExaCS and ExaCC recently added functionality to display the PDBs of the CDB. When the target database is provisioned with the same PDB name as the source before the migration, then after the migration, the PDB names report status as failed.

This is because when the target is provisioned the PDBID of the PDB is different. During the migration, Zero Downtime Migration drops the target and recreates it. So if the PDB names were the same but now have different internal PDBIDs, the control plane reports the PDB as failed.

Solutions: To avoid this problem, when provisioning the target:

1. If the source is non-CDB, provision a non-CDB target through dbaascli

2. If the source is a CDB with PDBs, provision the target without any PDBs

If the PDB is reported in the failed state post migration, the resolution would be to follow Pluggable Database(PDB) Resource Shows Failed Status In Cloud Console while it is Available in VM (Doc ID 2855062.1).

Oracle GoldenGate Hub Certificate Known Issues

Issue: Oracle Zero Downtime Migration leverages Oracle GoldenGate for its logical online migration work flow; an Oracle GoldenGate hub is set up on OCI compute for this purpose.

The Oracle GoldenGate hub NginX Reverse Proxy uses a self-signed certificate which will cause the following error:

```
SunCertPathBuilderException: unable to find valid certification path to
requested target when ZDM Server makes a REST API call.
```

Solution: See My Oracle Support document Zero Downtime Migration - GoldenGate Hub Certificate Known Issues (Doc ID 2768483.1)

Source Discovery Does Not Find 'cut' in Default Location

Issue: Discovery at the source database server fails to find `cut` in the standard location.

The source database deployment's standard `cut` location is `/bin/cut`. If `cut` is not in the location, Zero Downtime Migration cannot discover the source database information correctly, and the migration fails in its initial phases.

Solution: To resolve the issue, ensure that `cut` is installed in the standard `/bin/cut` path or create a symbolic link to the installed location, for example:

```
ln -sf <installed_location_of_the_cut> /bin/cut
```

Evaluation Fails in Phase ZDM_GET_SRC_INFO

Issue: During the evaluation (`-eval`) phase of the migration process, the evaluation fails in the `ZDM_GET_SRC_INFO` phase with the following error for the source single instance deployed without Grid infrastructure.

```
Executing phase ZDM_GET_SRC_INFO
retrieving information about database "zdmsidb" ...
PRCF-2056 : The copy operation failed on node: "zdmsidb".
Details: {1}
PRCZ-4002 : failed to execute command "/bin/cp" using the privileged
execution plugin "zdmauth" on nodes "zdmsidb"
scp: /etc/oratab: No such file or directory
```

Solution: Make an `ORACLE_HOME` value entry in file `/etc/oratab` with value *db_name*:*$ORACLE_HOME*:N, as shown in this example.

```
zdmsidb:/u01/app/oracle/product/12.2.0.1/dbhome_1:N
```

Migration Evaluation Failure with Java Exception Invalid Key Format

Issue: The following conditions are seen:

*   Zero Downtime Migration `migration -eval` command fails with the following error.

    ```
    Result file path contents:
    "/u01/app/zdmbase/chkbase/scheduled/job-19-2019-12-02-03:46:19.log"
    zdm-server.ocitoolingsn.ocitooling.oraclevcn.com: Processing
    response
    file ...
    null
    ```

- The file `$ZDM_BASE/<zdm service host>/rhp/rhpserver.log.0` contains the following entry.

  ```
  Verify below error message observed in file $ZDM_BASE/<zdm service
  host>/rhp/rhpserver.log.0
  rhpserver.log.7:[pool-58-thread-1] [ 2019-12-02 02:08:15.178 GMT ]
  [JSChChannel.getKeyPair:1603]  Exception :
  java.security.spec.InvalidKeySpecException:
  java.security.InvalidKeyException: invalid key format
  ```

- The Zero Downtime Migration installed user (For example: zdmuser) private key (id_rsa) file has the following entries.

  ```
  -----BEGIN OPENSSH PRIVATE KEY----------
  MIIEogIBAAKCAQEAuPcjftR6vC98fAbU4FhYVKPqc0CSgibtMSouo1DtQ06ROPN0
  XpIEL4r8nGp+c5GSDONyhf0hiltBzg0fyqyurSw3XfGJq2Q6EQ61aL95Rt9CZh6b
  JSUwc69T4rHjvRnK824k4UpfUIqafOXb2mRgGVUkldo4yy+pLoGq1GwbsIYbS4tk
  uaYPKZ3A3H9ZA7MtZ5M0sNqnk/4Qy0d8VONWozxOLFC2A8zbbe7GdQw9khVqDb/x
  END OPENSSH PRIVATE KEY-----
  ```

Solution: Authentication key pairs (private and public key) are not generated using the `ssh-keygen` utility, so you must generate authentication key pairs using steps in Generating a Private SSH Key Without a Passphrase.

After generating authentication key pairs, the private key file content looks like the following.

```
-----BEGIN RSA PRIVATE KEY-----
MIIEogIBAAKCAQEAuPcjftR6vC98fAbU4FhYVKPqc0CSgibtMSouo1DtQ06ROPN0
XpIEL4r8nGp+c5GSDONyhf0hiltBzg0fyqyurSw3XfGJq2Q6EQ61aL95Rt9CZh6b
JSUwc69T4rHjvRnK824k4UpfUIqafOXb2mRgGVUkldo4yy+pLoGq1GwbsIYbS4tk
uaYPKZ3A3H9ZA7MtZ5M0sNqnk/4Qy0d8VONWozxOLFC2A8zbbe7GdQw9khVqDb/x
-----END RSA PRIVATE KEY-----
```

Set up connectivity with the newly generated authentication key pairs and resume the migration job.

Migration Evaluation Fails with Error PRCG-1022

Issue: The following conditions are seen:

```
$ZDM_HOME/bin/zdmcli migrate database -sourcedb zdmsdb -sourcenode
ocicdb1
-srcauth zdmauth -srcarg1 user:opc
-srcarg2 identity_file:/home/zdmuser/.ssh/zdm_service_host.ppk
-srcarg3 sudo_location:/usr/bin/sudo -targetnode ocidb1 -backupuser
backup_user@example.com
-rsp /u01/app/zdmhome/rhp/zdm/template/zdm_template_zdmsdb.rsp -
tgtauth zdmauth
-tgtarg1 user:opc -tgtarg2 identity_file:/home/zdmuser/.ssh/
```

```
zdm_service_host.ppk
-tgtarg3 sudo_location:/usr/bin/sudo -eval
```

**PRCG-1238 : failed to execute the Rapid Home Provisioning action for
command 'migrate database'**
**PRCG-1022 : failed to connect to the Rapid Home Provisioning daemon
for cluster anandutest**
```
Failed to retrieve RMIServer stub:
javax.naming.ServiceUnavailableException
[Root exception is java.rmi.ConnectException: Connection refused to
host:
anandutest; nested exception is: java.net.ConnectException: Connection
refused (Connection refused)]
```

Solution: Start the Zero Downtime Migration service using the `$ZDM_HOME/bin/`
`zdmservice START` command, then run any `ZDMCLI` commands.

ORA-01031 on Full Export from an Oracle 12.1 Source

Issue: When performing a full database export with Export Data Pump from an Oracle
Database 12c (12.1) source database, the following errors occur:

```
05-AUG-21 10:36:12.483: ORA-31693: Table data object "SYS"."TABLE" failed
to load/unload and is being skipped due to error: ORA-01031: insufficient
privileges
```

Solution: See My Oracle Support document EXPDP - ORA-31693 ORA-01031
(Insufficient Privileges) On Some Tables When Exporting from 12cR1 (Doc ID
1676411.1)

Data Transfer Medium COPY Issues

Issue: Migrating data using logical migration with `DATA_TRANSFER_MEDIUM=COPY` set in
the Zero Downtime Migration response file fails.

Solution: When you specify `DATA_TRANSFER_MEDIUM=COPY` you must also specify the
following `DUMPTRANSFERDETAILS_SOURCE_*` parameters.

```
DUMPTRANSFERDETAILS_TRANSFERTARGET_DUMPDIRPATH=<Target path to
transferthe dumps to >
DUMPTRANSFERDETAILS_TRANSFERTARGET_HOST=<Target Db server or Target
sidetransfer node >
DUMPTRANSFERDETAILS_TRANSFERTARGET_USER=<user having write access to
specified path>
DUMPTRANSFERDETAILS_TRANSFERTARGET_USERKEY=<user authentication
keypath on zdm node>
```

Unable to Rerun MIGRATE DATABASE Command

Issue: Zero Downtime Migration blocks attempts to rerun the `MIGRATE DATABASE` command for a specified database if that database is already part of an ongoing migration job.

Workaround: If you want to resubmit a database migration, you can stop the ongoing migration job in either `EXECUTING` or `PAUSED` state using the ZDMCLI `ABORT JOB` command as follows.

```
-bash-4.2$ ./zdmcli abort job -jobid 70
server.example.com: Audit ID: 189
```

Unable to Resume a Migration Job

Issue: Zero Downtime Migration writes the source and target log files to the `/tmp/zdm-unique id` directory in the respective source and target database servers.

If you pause a migration job and and then resume the job after several (sometimes 15-20 days), the `/tmp/zdm-unique id` directory might be deleted or purged as part of a clean up or server reboot that also cleans up /tmp.

Solution: After pausing a migration job, back up the `/tmp/zdm-unique id` directory. Before resuming the migration job, check the `/tmp` directory for `/zdm-unique id`, and if it is missing, restore the directory and its contents with your backup.

Migration Job Fails at ZDM_GET_SRC_INFO

Issue: A migration job fails with the following error.

```
[opc@zdm-server rhp]$ cat /home/opc/zdm_base/chkbase/scheduled/
job-34-2021-01-23-14:10:32.log
zdm-server: 2021-01-23T14:10:32.155Z : Processing response file ...
zdm-server: 2021-01-23T14:10:32.262Z : Starting zero downtime migrate
operation ...
PRCZ-4002 : failed to execute command "/bin/cp" using the privileged
execution plugin "zdmauth" on nodes "PROD.compute-
usconnectoneb95657.oraclecloud.internal"
```

Solution: You must set up SSH connectivity without a passphrase for the oracle user.

Migration Job Fails at ZDM_SWITCHOVER_SRC

Issue: A migration job fails at `ZDM_SWITCHOVER_SRC` phase.

Solutions:

1. Ensure that there is connectivity from PRIMARY database nodes to STANDBY database nodes so the redo log are shipped as expected.

2. A job will fail at `ZDM_SWITCHOVER_SRC` if the recovery process (MRP0) is not running at the target. The recovery process reason for failure should be corrected if MRP0 is not running at Oracle Cloud Database Standby Instance, and then the process

should be started manually at Oracle Cloud Database Standby Instance before the migration job can be resumed.

Additional Information for Migrating to Exadata Cloud Service

Read the following for general information, considerations, and links to more information about using Zero Downtime Migration to migrate your database to Exadata Cloud Service.

Considerations for Migrating to Exadata Cloud Service

For this release of Zero Downtime Migration be aware of the following considerations.

- If the source database is release 18c, then the target home should be at release 18.6 or later to avoid issues such as Bug 29445548 Opening Database In Cloud Environment Fails With ORA-600.

- If a backup was performed when one of the configured instances is down, you will encounter Bug 29863717 - DUPLICATING SOURCE DATABASE FAILED BECAUSE INSTANCE 1 WAS DOWN.

- The TDE keystore password must be set in the credential wallet. To set the password as part of the Zero Downtime Migration workflow, specify the -`tdekeystorewallet` *tde_wallet_path* or -`tdekeystorepasswd` argument irrespective of whether the wallet uses `AUTOLOGIN` or `PASSWORD`. In either case the password is stored in the credential wallet. If the -`tdekeystorepasswd` argument is not supplied, then Zero Downtime Migration skips the setting `tde_ks_passwd` key in the credential wallet, and no error is thrown.

- The target environment must be installed with latest DBaaS Tooling RPM with `db_unique_name` change support to be installed.

- Provision a target database from the console without enabling auto-backups. In the **Configure database backups** section do not select the **Enable automatic backups** option.

Exadata Cloud Service Database Registration

Post migration, register the Exadata Cloud Service database, and make sure its meets all of the requirements.

Run the following commands on the Exadata Cloud Service database server as the root user.

```
/root>dbaascli registerdb prereqs --dbname db_name --db_unique_name
db_unique_name

/root>dbaascli registerdb begin  --dbname db_name --db_unique_name
db_unique_name
```

For example

```
/root>dbaascli registerdb prereqs --dbname ZDM122 --db_unique_name
ZDM122_phx16n
DBAAS CLI version 18.2.3.2.0
Executing command registerdb prereqs --db_unique_name ZDM122_phx16n
INFO: Logfile Location: /var/opt/oracle/log/ZDM122/registerdb/
registerdb_2019-08-14_05:35:31.157978280334.log
INFO: Prereqs completed successfully
/root>

/root>dbaascli registerdb begin --dbname ZDM122 --db_unique_name
ZDM122_phx16n
DBAAS CLI version 18.2.3.2.0
Executing command registerdb begin --db_unique_name ZDM122_phx16n
Logfile Location: /var/opt/oracle/log/ZDM122/registerdb/
registerdb_2019-08-14_05:45:27.264851309165.log
Running prereqs
DBAAS CLI version 18.2.3.2.0
Executing command registerdb prereqs --db_unique_name ZDM122_phx16n
INFO: Logfile Location: /var/opt/oracle/log/ZDM122/registerdb/
registerdb_2019-08-14_05:45:29.000432309894.log
INFO: Prereqs completed successfully
Prereqs completed
Running OCDE .. will take time ..
OCDE Completed successfully.
INFO: Database ZDM122 registered as Cloud database
/root>
```

Exadata Cloud Service Automatic Backup Issues

Check the backup configuration before you enable automatic backup from the console. You can use the `get config` command as shown in the first step below. You should see `bkup_oss=no` before you enable automatic backup.

You might see the error message in the console, "A backup configuration exists for this database. You must remove the existing configuration to use Oracle Cloud Infrastructure's managed backup feature."

To fix this error, remove the existing configuration.

First, make sure the automatic backup is disabled from the UI, then follow these steps to remove the existing backup configuration.

1. Generate a backup configuration file.

   ```
   /var/opt/oracle/bkup_api/bkup_api get config --file=/tmp/db_name.bk
   --dbname=db_name
   ```

For example:

```
/var/opt/oracle/bkup_api/bkup_api get config --file=/tmp/zdmdb.bk --
dbname=zdmdb
```

2. Open the /tmp/*db_name*.bk file you created in the previous step.
   For example: Open /tmp/zdmdb.bk

   change bkup_oss=yes from bkup_oss=no

3. Disable OSS backup by setting `bkup_oss=no`.

```
/var/opt/oracle/bkup_api/bkup_api set config --file=/tmp/db_name.bk
--dbname=db_name
```

For example:

```
/var/opt/oracle/bkup_api/bkup_api set config --file=/tmp/zdmdb.bk --
dbname=zdmdb
```

4. Check reconfigure status.

```
/var/opt/oracle/bkup_api/bkup_api configure_status --dbname=db_name
```

For example:

```
/var/opt/oracle/bkup_api/bkup_api configure_status --dbname=zdmdb
```

Now enable automatic backup from console.

Verify the backups from the console. Click **Create Backup** to create a manual backup, and a backup should be created without any issues. and also Automatic Backup should be successful.

Additional Information for Migrating to Exadata Cloud at Customer

Read the following for general information, considerations, and links to more information about using Zero Downtime Migration to migrate your database to Exadata Cloud at Customer.

Considerations for Migrating to Exadata Cloud at Customer

For this release of Zero Downtime Migration be aware of the following considerations.

• You must apply the regDB patch for Bug 29715950 - "modify regdb to handle db_unique_name not same as db_name" on all Exadata Cloud at Customer

nodes. This is required for the `ZDM_MANIFEST_TO_CLOUD` phase. Please note that the regDB tool is part of DBaaS Tooling.

- If the source database is release 18c, then the target home should be at release 18.6 or later to avoid issues such as Bug 29445548 Opening Database In Cloud Environment Fails With ORA-600.

- PDB conversion related phases are listed in `-listphases` and can be ignored. Those are no-op phases.

- If the backup medium is Zero Data Loss Recovery Appliance, then all configured instances should be up at the source when a `FULL` or `INCREMENTAL` backup is performed.

- If a backup was performed when one of the configured instances is down, you will encounter Bug 29863717 - DUPLICATING SOURCE DATABASE FAILED BECAUSE INSTANCE 1 WAS DOWN.

- The TDE keystore password must be set in the credential wallet. To set the password as part of the Zero Downtime Migration workflow, specify the `-tdekeystorewallet` *tde_wallet_path* or `-tdekeystorepasswd` argument irrespective of whether the wallet uses `AUTOLOGIN` or `PASSWORD`. In either case the password is stored in the credential wallet. If the `-tdekeystorepasswd` argument is not supplied, then Zero Downtime Migration skips the setting `tde_ks_passwd` key in the credential wallet, and no error is thrown.

- The target environment must be installed with latest DBaaS Tooling RPM with `db_unique_name` change support to be installed.

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