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Questions from
Move to Oracle Database 23ai –
Everything you need to know
about Oracle Multitenant
Part 1

Virtual Classroom 19

Architecture

The redo logs are shared in a CDB. Is it possible to disable archive log mode for a specific PDB?

No. You turn off archive log mode at the CDB level.

If I unplug a PDB and move it to another CDB, do the PDB-specific initialization parameters follow the PDB?

Yes. The database stores the PDB-specific parameters in the PDB data dictionary. However, on plug-in, some parameters might be adjusted automatically (like `compatible` and memory parameters).

Can a PDB have a different character set than the CDB?

Yes, but only if the CDB is using AL32UTF8. If the CDB uses any other character set, then all PDBs are bound to the same character set.

I see that there are still LONG columns in the multitenant dictionary. When will you remove those?

To our knowledge, there are no plans to remove those columns. It's a risky operation to make fundamental changes to the data dictionary. However, most (if not all) LONG columns in the dictionary now have a corresponding VARCHAR2 column that you can easily query. They are suffixed "_VC". If you find a LONG column in the dictionary without a "_VC" column, please file an enhancement request through Oracle Support.

In Oracle Database 19c it took a long time to create a CDB. Has that improved in Oracle Database 23ai?

It should have. However, even in Oracle Database 19c you can use the DBCA to provision an empty database from an oracle-supplied template. This will restore an RMAN backup of an empty database, rather than starting from scratch with `CREATE DATABASE` and so forth. Provisioning from a template is usually a lot faster.

I have an application that pulls data from two or more databases. Would it make sense to put those databases into the same CDB?

Yes. Look at the `CONTAINERS` clause which we cover in part 2 of the webinar.

Can I set `compatible` to the patch level when I upgrade, e.g., 23.4.0?

Yes, but it makes little sense to do so. Nevertheless, if you do that, please be sure to have the same `compatible` setting throughout your environment as discussed in the webinar. We recommend setting compatible to *23.0.0*.

Do you need to save state for a PDB managed by Grid Infrastructure?

In such a situation, the Maximum Availability Architecture guidelines state that you should not save state. Rather let Grid Infrastructure handle which services/PDBs to bring up.

I use a template PDB to create new PDBs instead of PDB$SEED. Should I use the `AS CLONE` keyword to generate new GUID and DBID?

When you clone existing PDBs this is not necessary. Only in certain cloning situations or when you come from non-CDB is the `AS CLONE` keyword needed on the `CREATE PLUGGABLE DATABASE` statement. Generally, only use the `AS CLONE` keyword if cloning fails.

License

You can create three PDBs without having a license for the Multitenant Option. Does that include CDB$ROOT and PDB$SEED?

No. Only user-created PDBs count. We recommend setting the initialization parameter `max_pdbs=3`.

Can I create up to three user-created PDBs in Standard Edition 2 as well?

Yes. We recommend setting the initialization parameter `max_pdbs=3`.

Do we get three user-created PDBs on Exadata Cloud@Customer as well?

Yes. However, in many cases, the Multitenant Option is included in the offer on Exadata Cloud@Customer. Please consult your sales rep.

If I don't use a licensable option in my PDBs, does it affect my license deal?

Normally not. However, we are not in sales or licensing. Please contact your local sales rep.

Migration

Since Oracle Database 23ai supports the multitenant architecture, does it mean that I must convert before the upgrade?

In 23ai you can only use the multitenant architecture. You can migrate to multitenant before the upgrade or do it as part of the upgrade. You can plug in a 19c non-CDB into a 23ai CDB. But before you can open it, you must upgrade and convert. AutoUpgrade can fully automate the process.

Can I upgrade directly from Oracle Database 12.2 to 23ai?

No. Only Oracle Database 19c and 21c allow direct upgrades to 23ai. Either perform a double-hop upgrade (take care on platform certifications) or use Data Pump or transportable tablespaces.

How do you migrate a 19c non-CDB from AIX to Oracle Database 23ai?

If you remain on the same platform, then use AutoUpgrade and the techniques described in the webinar. If you go cross-platform, then take a look at our previous webinar, Cross Platform Migration – Transportable Tablespaces to the Extreme.

How do you migrate from Solaris 11g and 12.1 to 19c on Linux?

Cross-platform transportable tablespaces is a good option. Take a look at our previous webinar, Cross Platform Migration – Transportable Tablespaces to the Extreme.

Does AutoUpgrade handle cross-endian migrations?

No. Such migrations are typically handled with cross-platform transportable tablespaces with incremental RMAN backups. Take a look at our previous webinar, Cross Platform Migration – Transportable Tablespaces to the Extreme.

If my non-CDB has a name that collides with an existing PDB in the CDB, what do I do?

The PDB name must be unique in a CDB. But you can change the name on the plug-in.

What about existing service names in my non-CDB?

The manifest XML file shows the services from the non-CDB, which are registered in the CDB on the plug-in.

Does DBMS_PDB exist in my Oracle Database 19c?

Yes. The package has been installed automatically since Oracle Database 12.1.

How can I get the latest version of AutoUpgrade?

It's on My Oracle Support, doc id 2485457.1.

Can I use AutoUpgrade to migrate a non-CDB to a PDB and upgrade the time zone file as well?

Yes.

Can I use Data Guard Rolling Upgrades to migrate a 19c non-CDB to 23ai PDB?

No. Using a transient logical standby database works only for upgrades, not non-CDB to PDB migration.

Can I use Data Pump to migrate a 19c non-CDB to a 23ai PDB?

Yes, you can do that. You can use a full export (`full=yes`), which includes everything in the database and is designed for use cases like this. You can also do a schema mode migration, although it is slightly more complex. Check our previous Data Pump webinars.

Refreshable Clone PDBs

Can I use refreshable clone PDBs on the same host?

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Yes. The target CDB may be placed on the same or different host.

Can I use refreshable clone PDBs cross-platform and cross-endian?

It works cross-platform if the endian format is the same. It doesn't work for cross-endian migrations.

Can I use refreshable clone PDBs from 12.1 non-CDB to 23ai PDB?

No. Source must be 12.2 or higher.

Can I use refreshable clone PDBs from 19c non-CDB to 23ai PDB?

Yes.

Where do I start AutoUpgrade?

You run AutoUpgrade in analyze and fixups mode on the source host. You run in deploy mode on the target host.

Can I stay in the refresh phase for over a week?

Yes. In theory there is no limitation on how long you can refresh the clone.

Does refreshable clone PDBs work in Standard Edition 2?

Yes.

Can I create a refreshable clone PDB from an existing L0 backup?

No. The clone must be created from the source database directly.

What is the overhead on the source during refresh?

Very little, and more of less comparable to the overhead generated by a standby database. A standby database gets the redo on a continuous basis where it happens at regular intervals with refreshable clone PDBs. If the refresh interval is very long, more redo must be transferred.

You used refreshable clone PDBs for cloning, upgrading, and conversion to PDB. Can I skip the upgrade part?

If the source non-CDB and target CDB are on different versions, then the PDB must be upgraded before you can open it. AutoUpgrade handles everything for you, and there is no way to interrupt the process. If you perform the migration manually using refreshable clone PDBs, you can interrupt midway and skip the upgrade. However, the PDB won't open since it's not upgraded.

If the source non-CDB and target CDB are on the same version, no upgrade is needed. AutoUpgrade skips the upgrade in that case.

Are there any recommendations on the refresh interval?

No. During a refresh, all redo since the last refresh is transferred over the network to the target CDB. The longer the refresh interval, the more data is sent in one chunk. On the other hand, if you set the interval very low, the source database must work with this more often. Also, be sure to check your RMAN archive log deletion policy. The archive logs since the last refresh must be on disk on the source database when a new refresh starts.

I don't know how long it takes to create the clone PDB. How do I know what `start_time` to use?

If you omit `start_time`, AutoUpgrade will perform a final refresh and disconnect immediately after building the clone PDB. If you need to have a defined start time, you must test the process and see how long it takes. But the refresh can go on for days and days, so just start AutoUpgrade in due time.

Is it possible to postpone the start time after starting AutoUpgrade?

There is no command that can postpone the start time after you start in deploy mode. However, you can entirely quit AutoUpgrade. Then, when you want to start again, you can restart AutoUpgrade. It will resume the previous operation.

Can I use refreshable clone PDBs to upgrade an existing PDB?

Yes, the procedure works for unplug-plug upgrades as well. AutoUpgrade supports this use case.

Does refreshable clone PDBs support parallel?
Yes, the target CDB automatically applies parallel based on available resources in the target CDB. If the target CDB

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is much more powerful than the source non-CDB, you can control the parallel degree using `parallel_pdb_creation_clause`.

How can I use this procedure for test migrations? Does it shut down the source database after cloning?

No. The source database remains untouched during the procedure. If the source and target database are on the same host, you can optionally shut down the source database after cloning. See `close_source`.

Can I set the source database in read-only mode before the final refresh?

Yes. At any time during the refresh phase, you can restart the source database in read-only mode. For a migration you can use that to your advantage. In due time before the migration starts (as defined by `start_time`), restart the database in read-only mode. This ensures that no one by mistake enters data into the source database when the migration starts.

Does it work on Amazon RDS for Oracle?

Technically, there is nothing preventing the use of refreshable clone PDBs on other cloud platforms. However, you should consult Amazon for details.

Performance

Let's say I need to investigate a performance problem. Do I do that from CDB$ROOT or the PDB?

Some figures are available in the root container. You can get an overview and, for instance, create CDB-wide AWR reports. Once you narrow down which PDB is causing problems, you can switch to that PDB and continue investigations there using the tools available. You can even do a PDB AWR report.

Is it possible to call <u>one</u> command that creates an AWR snapshot in the CDB and all PDBs?

Not to our knowledge. If you believe it should exist, you can file an enhancement request through Oracle Support.

Should I use `optimizer_features_enable` to stabilize performance after an upgrade?

No, never use `optimizer_features_enable` except under specific guidance by support. If you are worried about performance, please see our webinar Performance Stability, Tips and Tricks and Underscores.

Backup

After plugging in a non-CDB can you use the non-CDB RMAN backups for restore/recovery in the CDB?

Yes. This concept is called pre-plugin backups. Also, check `DBMS_PDB.EXPORTRMANBACKUP`. However, we strongly recommend that you start a level 0 of the newly plugged-in data files immediately.

Can I backup a PDB in 19c and restore it into 23ai?

Yes. This is out-of-the-box RMAN functionality. Any newer version of RMAN can restore backups from a previous version. However, before being able to open the PDB, you must upgrade it after the restore in 23ai.

Can I backup a non-CDB in 11g or 12.2 and restore it into a 19c Oracle home?

Yes. This is out-of-the-box RMAN functionality. Any newer version of RMAN can restore backups from a previous version. However, before being able to open the PDB, you must upgrade it after the restore in 19c.

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