

Questions from Move to Oracle Database 23ai – Everything you need to know about Oracle Multitenant Part 2

Virtual Classroom 20

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Migration

Do I need to convert my database to a PDB before I upgrade to Oracle Database 23ai?

No. You can do it as part of the upgrade to Oracle Database 23ai. It is easiest to use AutoUpgrade for the process.

I get ORA-65076 when plugging in my non-CDB database, which was originally created on Oracle v7. What can I do?

We recommend a dictionary check (formerly known as health check) before you migrate on your most important databases. If the error is caused by a dictionary corruption, a dictionary check might find it and instruct you how to fix it. Otherwise, it is time to call in Oracle Support. Alternatively, try to migrate using Data Pump or Transportable Tablespaces.

I want to change the database character set from WE8MSWIN1252 to AL32UTF8 as part of the migration. How do I do that?

You can't change the database character set when plugging in. You need to complete a character set migration in a separate project. Remember, if the CDB is AL32UTF8 you can plug in PDBs with any character set. This gives you time to handle the character set migration afterward.

Always use Database Migration Assistance for Unicode (DMU) when approaching such projects, even if you migrate with Data Pump.

Cloning

What is the fastest way to duplicate between two CDBs?

It depends on many factors. Usually you get really good results by cloning over a database link from a remote CDB.

I usually duplicate PDBs using RMAN from active database. Is there a way to use RMAN to duplicate a PDB using existing backups?

Yes, but it appears to require an auxiliary destination instance. Then you can unplug and plug into the real destination CDB.

I want to clone two PDBs from different CDBs into one CDB in a benchmarking environment. I need to use backups stored in a ZDLRA. What's the best approach?

You probably need to restore the two CDBs and just the relevant PDBs. Then you unplug one of the PDBs and plug it into the other CDB.

Operations

Is "save state" the best approach when using Data Guard?

In a Data Guard or RAC environment it is better to use services. Let the services auto-start the PDB instead of saving state.

Does DBMS_SERVICE work on Windows?

Yes.

Does catcon.pl parallelism require Enterprise Edition like many other parallel options?

No. You can use parallel threads in catcon.pl on a Standard Edition 2 database.

How does update using CONTAINERS clause work since a transaction can't span multiple containers?

Read this blog post: <https://connor-mcdonald.com/2021/05/10/sqlnet-and-the-containers-clause/>

Is there a way to identify the CPU utilization of a CDB and a PDB?

Using OS tools or Enterprise Manager you can see which CDB are using CPU resources. For specific information on a PDB you must use Enterprise Manager or dictionary views or ASH.

In your example, you set `SHARED_POOL_SIZE` in a PDB. I thought it was best practice to avoid that and let the database automatically manage it?

First, it appears in an example, so it is ... an example. Having said that, the best/easiest is to allow the database to automatically grow/shrink memory pools in the SGA. However, we've seen many databases where it was vital to set minimum sizes for the SGA pools based on the vast knowledge of the DBAs managing the database.

How many CDBs can I have on a server without a license for the Multitenant option?

The multitenant license doesn't govern the number of CDBs on a server. It is about the number of PDBs per CDB. The number of CDBs is governed by your overall Oracle Database license. And for that it will depend on whether you have a ULA, a CPU based license, or a Named User license of some sort. For details please consult your account representative.

Any good idea on how to avoid service name collision on a server when two CDBs tries to create a PDB with the same name?

We've seen several customers implement procedures that create unique names for each PDB. The name of the PDB should not include information about the server or CDB because you often move PDBs around, and then it is impractical to update the PDB name.

One customer we worked with created a small PL/SQL function backed by a simple table. When called, the function returned a unique PDB name. The customer used ORDS to expose the function as a web service.

How can I fix a query execution plan?

This is not different in the multitenant architecture. Check out our [Virtual Classroom #3 Performance Stability, Tips and Tricks and Underscores](#).

AWR

Is there a CDB_HIST_SNAPSHOT view?

Yes, there is. It is the "CDB-equivalent" of `DBA_HIST_SNAPSHOT`.

Do I need to clear out old snapshots when migrating a database?

No. You can keep old snapshots in the database. This is a powerful feature of AWR.

Is it possible to set different snapshot retention in CDB and PDBs?

Yes. You can define several AWR settings, including retention time, individually.

DBA_HIST_SNAPSHOT shows snapshots collected at both root and PDB level. All other DBA_HIST_ views shows only the information from the current container (just like any other DBA view). Why this difference?

We don't know the underlying reason for this change. However, `DBA_HIST_SNAPSHOT` has a `CON_ID` column that you can filter on.

Why AWR_ROOT|PDB_SNAPSHOT instead of CDB_HIST_SNAPSHOT?

Because if you query `cdb_hist_snapshot`, it will filter `con_id=X`, where X is your PDB number. It would only show you the snapshots taken on that PDB that are also stored on that PDB. The `awr_root` shows you snapshots from that PDB stored on the CDB level.

Security

Does a PDB lockdown profile on network access restrict only SYS?

No. Any user in the database may get access to packages or functionality that enables network access. If you create a lockdown profile it applies to any session in the database.

Are PDB lockdown profiles applicable to PDBs only?

Yes.

Upgrade

During upgrade on an entire CDB imagine a PDB fails. How does AutoUpgrade handle that? Can it flashback just that PDB and will the CDB operate in this mixed mode?

If a PDB error occurs, AutoUpgrade, by default, flashes back the entire CDB. A parameter (`make_pdb_available`) changes this behavior. But then you need different means of restoring the PDB with an error (or fix the situation and retry the upgrade of that PDB only).

It is not possible for a CDB to operate in mixed mode with PDBs running on different versions. All containers must be fully upgraded in order to function properly.

I experienced issues previously on Windows when AutoUpgrade had to change the Windows service registration. How does AutoUpgrade handle this?

In the latest version of AutoUpgrade, creation of Windows services is now much easier. You can supply credentials to AutoUpgrade, and the tool now handles fully the creation and deletion of Windows services.

Patching

Can I patch a PDB individually?

The CDB runs out of the Oracle home. The Oracle home has a set of patches. You must apply all those patches to the CDB and all PDBs using Datapatch. If you forget it, the PDB will start in RESTRICTED mode the next time it restarts.

But you can have two CDBs running on different patch levels. Then, you can unplug and plug the PDB into the higher patch level CDB. Thus, you are patching a PDB individually. But it requires two CDBs and you don't get the benefit on handling all PDBs in a single patch operation.

If a PDB is down while I run Datapatch, does it mean that the PDB starts in RESTRICTED mode?

Yes. The PDB will open in RESTRICTED mode. You can then run Datapatch and restart the database into normal mode. You can change this behaviour with an [underscore parameter](#). Use it with caution.

If I don't have downtime for all the PDBs at the same time, can I apply patches to the Oracle home and run datapatch when downtime allows?

No. Applying patches to the Oracle home is the part that takes downtime. You must do this on the CDB which includes all the PDBs. If you use [out-of-place patching](#), you can minimize downtime to just the time it takes to restart the database. But you should immediately patch all PDBs in the CDB using Datapatch. You can [run Datapatch while the database is online](#) and busy, so there is no reason to postpone it.

If you want to patch PDBs individually, you must provision two CDBs on different patch levels and move the PDBs into the higher patch level CDB during the maintenance window.

Do you recommend Oracle Fleet Patching and Provisioning (FPP) in a small, but complex, environment?

The bigger the environment, the more benefit you get from FPP. Especially if you are using Exadata Database Machine as well. AutoUpgrade is our preferred tool for smaller environments, but the complexity talks towards FPP. FPP comes with a license cost that you must take into consideration as well.

Where can I find more information about Oracle Fleet Patching and Provisioning?

The [documentation](#) has a chapter on getting started. In addition, the product manager for FPP, Philippe Fierens, wrote a [blog post series](#) that we recommend.

Data Pump

I use Data Pump to refresh data on schema level. Can I use the multitenant architecture to duplicate on schema level instead of Data Pump?

No. Multitenant works on database level. For schema level Data Pump is still the better choice.

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