

AutoUpgrade 2.0 - New Features and Best Practices

Questions and Answers

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Purpose statement

This document provides answers to questions asked during webinar
“AutoUpgrade 2.0 – New Features and Best Practices”.

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Introduction

This technical brief comprises the questions and answers from the audience who attended the Webinar, AutoUpgrade 2.0 – New Features and Best Practices on May 5, 2022.

Get the slides:

https://dohdatabase.files.wordpress.com/2022/05/2022_05_05_emea14_a_utoupgrade_2_0-1.pdf.

The recording is on our YouTube channel:

<https://www.youtube.com/c/OracleDatabaseUpgradesandMigrations>.

More technical training videos can be found at:

<https://MikeDietrichDE.com/videos>.

The documentation is found at:

<https://docs.oracle.com/en/database/oracle/oracle-database/19/upgrd/index.html>.

“The AutoUpgrade utility identifies issues before upgrades, performs pre- and postupgrade actions, deploys upgrades, performs postupgrade actions, and starts the upgraded Oracle Database.”

Oracle Database Upgrade Guide 19c

Clone

General

Q: Do we still need to do file_name_convert on ASM?

A: No, you set it to NONE - but you need to use the parameter please.

Q: What kind of activities would the fixups include on the source pls?

A: This would include for instance:

- generate dictionary stats beforehand
- clean up leftover Data Pump jobs

In fact, there are over 100 checks autoupgrade does - and 98% of them have auto fixups.

Q: In config file there is 12c home location: what if it's new server without 12c home/or db. will it still work?

A: If the home is not there and not needed for the process, then it is like a placeholder. Though, AutoUpgrade expects source_home and target_home parameters to be used. For a dummy value, you can use /tmp.

Q: In case I don't have enough space to do a datafile copy, Can I do a 'move' datafile in autoupgrade? In this case my fallback will be a restore to the source version

A: Even in the MOVE you need the space twice for the entire MOVE process, don't you? You have two options:

- COPY => this is what we show to have a rollback
- NOCOPY => this will use the source

Then you could do an ALTER DATABASE DATAFILE MOVE ONLINE afterwards by yourself. But even then, you need dual space.

Q: Does autoupgrade copy all datatypes to the new PDB? Including deprecated ones?

A: Upgrade is just upgrading the dictionary. If you have datatypes in your database, we don't change them. Also, note that "deprecated" is just sort of a warning that something might be unsupported in the future. If you have unsupported components or objects in the database, those would be flagged upon database open. Some datatypes have been deprecated for over a decade now (e.g., LONG, LONG RAW) and are still widely used.

Q: Is autoupgrade capable to upgrade 11.2.0.4 db across servers because in most cases the new 19c database is located on another server?

A: Yes, it is. See here:

- <https://mikedietrichde.com/2020/08/03/oracle-autoupgrade-between-two-servers/>
- <https://mikedietrichde.com/2020/08/04/oracle-autoupgrade-between-two-servers-and-plugin/>

Q: We still need space for cloning data files and downtime for all the upgrade, right?

A: Downtime for the upgrade, yes. And cloning only if you are cloning the database/PDB. You could use the NO_COPY as your pdb_copy_option if disk space is a concern. But then you must determine what your fallback option is if you are not copying your data files.

Q: Is there a way to configure autoupgrade to run the plugin operation as "create pluggable database "&dbName" as clone"? I found the string "create pluggable database "&dbName" &asClone using '&xmlFilePath' &fileNameConvertOption tempfile reuse &standbyClause;" in the temp/createpdb_*.sql and therefore it looks like it's possible. In my configurations it is defined like this "define asClone = ""

A: AutoUpgrade will check the GUID of the PDB / non-CDB - if that GUID is used already in the CDB, it will add the "as clone" clause automatically. You can't toggle that automatically. Is there a use case for that? Then please mail me on daniel.overby.hansen@oracle.com and we can look at it.

Refreshable Clone PDB

Q: For refreshable PDB on the source don't need to put in read only?

A: No - it stays read-write. Only if you have a standby, then this read-only part is still a requirement. In this case, we'd recommend that you create the refreshable clone from an Active Data Guard standby instead, so you don't interrupt production.

Q: Can I specify an absolute (start) time instead of relative?

A: Yes

Q: What options do we have to optimize and speed the transfer of the datafiles to the new CDB? Parallel, compress, section size.... others.

A: Cloning a PDB can use parallelism. See the "parallel_pdb_creation_clause" here

<https://docs.oracle.com/en/database/oracle/oracle-database/19/sqlrf/CREATE-PLUGGABLE-DATABASE.html#GUID-F2DBA8DD-EA8-4BB7-A07F-78DC04DB1FFC>

Q: Database cloned over DB Link to 19c CDB? Does this happen in parallel, in case of big DB?

A: Yes, it happens in parallel. Under the hood, AutoUpgrade uses a CREATE PLUGGABLE DATABASE statement which by default add the PARALLEL clause. The database will find an appropriate value for the parallel degree.

Q: How can I use refresh PDB steps being shown if my target PDB is under different CDB on diff machine. What will be the process then?

A: Process will be the same - exactly. The database link is the secret. It must connect to your source on the other server.

Q: What about clone over https

A: Nope - but as far as I am aware, SQL Net can be encrypted as well and has a level of protection already. Not sure anymore 100% whether it needs licensing or whether it is included per se since the RAC interconnect issue a few years ago.

Q: For upgrade using refreshable clones I am guessing the minimum source version needs to be 12.2?

A: That's correct.

Q: Does this autoupgrade migration refresh work on 11g non-CDB to 19c PDB?

A: Sorry, the minimum version requires a PDB version 12.2 or higher. That's when refreshable clones were introduced.

Q: Is there any way to stop post initial clone to plan actual upgrade?

A: Actually, yes, that is possible. Stop autoupgrade with "abort -job 100" and then exit it. From there on you need to refresh manually.

Q: Do I have to specify a start time - or can I start the last upgrade step on demand? We had man situations where a start time must be moved in the future.

A: In this case, it is better to have no start_time - and then end autoupgrade with "abort -job xxx". Hopefully, a newer version of AutoUpgrade will support this.

Q: Is the clone feature available only when we have PDB as target or can we do non-CDB to non-CDB?

A: Refreshable clones are a feature of the multitenant architecture. You can clone a non-CDB into a PDB, but you can't do a REFRESHABLE clone of a non-CDB.

Q: Can I do a refreshable autoupgrade from a nonCDB@host1 to a new PDB at CDB@host2? Do I have to run all java commands at host2?

A: Yes, this is possible, and you need to run AutoUpgrade on the target host.

Q: Is it possible with new autoupgrade relocate a DB no CDB from Exadata to ExaCC?

A: Technically, yes, it is possible. But extra work is needed. When you'd do this, the new PDB would not be known to the tooling on the ExaCC. So, the best would be:

- provision the new PDB with the tooling with the exact same name you'd like to have
- drop this PDB on the command line (not in tooling)
- then let AU do the job

We haven't tried it - but we think this could work fine.

TDE

General

Q: What about TDE with the keys in Key Vault?

A: AutoUpgrade can't connect to key vault and extract passwords. You must use the AutoUpgrade keystore.

Q: Configuring TDE using WALLET_ROOT requires an instance restart. Is it something that will change with some RU?

A: You're right. The WALLET_ROOT feature is developed by another team. I don't know if any changes are planned. But you can switch to wallet root as part of an upgrade and AutoUpgrade can make it happen for you automatically.

Q: Can the Autoupgrade change the encryption from AES128 to AES256?

A: No

Support

Q: Can I use autoupgrade to upgrade / patch a TDE PDB on a CDB to another TDE CDB on another server?

A: Patch will come later in case you refer to for instance, 19.13.0 to 19.14.0 - but if you refer to upgrade such as 12.2.0.1 to 19.15.0, then the answer is clearly YES.

Q: Does Autoupgrade support a CDB with TDE at 12.1.0.2?

A: Yes, the TDE functionality works on all database releases supported by AutoUpgrade => 11.2.0.4 and later

Usage

Q: Where does AU create the keystore?

A: In the location specified by global.keystore.

Q: Can passwords be entered into the AU keystore automatically, or is it a CLI option only?

A: No, there is no command line option for adding passwords. For security reasons that is not supported. For a fully automated solution, you should look at Secure External Password Store.

Q: Do you need to know the passwords of those DBs you added to the keystore?

A: You need to know the keystore passwords for these databases, yes. Or you need to ask the people who have the keystore password to type it into the TDE console of AutoUpgrade. We've had such cases already.

Q: We had a Problem with a _NOT_ TDE encrypted DB failing with "TDE_PASSWORDS_REQUIRED". Could there be a problem that we are using a wallet for our ZDLRA connection and have an entry in V\$ENCRYPTION_WALLET?

A: Yes, the first version had a problem with sqlnet.ora parameter "wallet_override". It is fixed and a new version was released a few days ago.

Q: For non-CDB encrypted tablespace steps are same as it shown in demo now.

A: Yes

Q: In keystore - add is case sensitive, and should be equal to DBNAME configured in AU config file?

A: You should type:

add <ORACLE_SID>

where <ORACLE_SID> is the value from the config file: upg1.sid

Q: Can autoupgrade handle 19c non-CDB to 21c CDB using TDE?

A: Yes, it can.

Secure External Password Store

Does SEPS work for 12.1.0.2? No, for TDE keystore passwords to fit into SEPS; you must be on 12.2.0.1

REST API

General

Q: The port you use for this API is special, or the one open from Firewall side, did I have to define it somewhere?

A: You define this when you start ORDS. It will ask for the port number. By default, ORDS will suggest using 8443 but you may change it. Don't forget to protect this port as you would with any other service running.

Security

Q: With ORDS, you basically have a Java-based HTTP server running. For many, this would be considered a security risk, especially for a database server. Is there a way to use REST-based autoupgrade where ORDS is deployed to a system other than the DB - for example deployed to a WebLogic server or running in standalone mode in a separate system?

A: You can use a certificate on the HTTP server and use HTTPS instead. The ORDS architecture dictates that the webserver is running on the database host. If configured properly, security should not be a problem. We have ORDS running on our databases in OCI as well.

Q: It isn't a matter of HTTP vs HTTPS it is the fact that a webserver and database are running on the same system. Many security policies dictate that a database and web server cannot co-locate on the same box. ORDS architecture doesn't dictate that it runs on the database host - it can run in a standalone mode or

deployed to a compatible Java EE application server (Tomcat or WebLogic). Perhaps you are trying to say ORDS architecture for REST-based upgrades requires it to be on the DB host; if so, that would answer my question.

A: Yes, you're right. Perhaps I didn't make myself clear enough. AutoUpgrade currently upgrades only on the local node. Perhaps you are looking for something like Fleet Patching and Provisioning

RAC

General

Q: Can autoupgrade be used for RAC Exadata (on-prem or C@C)? I used it in non-engineered platform but never on Exadata. Any best practice or blog post from the AutoUpgrade team?

A: Yes, for Exadata upgrades, it is even the recommended way:

<https://mikedietrichde.com/2021/06/16/upgrade-to-oracle-19c-on-exadata-with-autoupgrade/>

For ExaCC it is differently since the tooling uses "dbua -silent". We are working to get this changed as well. You could use AU by yourself, but the tooling uses DBUA.

Distributed Upgrade

Q: Can you specify yourself which PDBs will be upgraded on which node?

A: No.

Q: Distributed upgrade is divided in between all RAC NODES. Can we specify and use specific nodes only for Upgrade and rest nodes for some other tasks?

A: You can't specify specific nodes, but you can specify a count of nodes to use

Q: Assuming CDB contains just PDB\$SEED and 1 other PDB. Can PDB\$SEED and the other PDB be upgraded on separate nodes?

A: Yes, but it won't give you any benefit. Mostly, one instance alone can upgrade just as fast.

Q: Am I able to define which nodes in my cluster will be used for distributed upgrade or only how many?

A: A workaround is to only enable the database on the desired nodes that you want to perform the database before the upgrade

CDB

General

Q: Is autoupgrade 2.0 able to upgrade 19c non-CDB to 21c (which is only multitenant)? I tested autoupgrade (with previous version) and failed (database component in 21c already superset). It worked when migrating/converting 19c non-CDB to PDB manually first, then autoupgrade to 21c.

A: The recent version of AutoUpgrade can upgrade to 21c as well. And convert to PDB as necessary. Have you tried with the latest version? If you find a problem, please zip all the logfile (autoupgrade.jar -zip), and open an SR. You can forward the SR number to me, and I will check.

Q: How long is the typical -deploy step in downtime?

A: The answer is...it depends. So many things in your database and hardware affect upgrade downtime: dictionary complexity, number of components, CPU/RAM/Storage speed, other things running on the system, etc.

For a single DB it will usually run 20-60 minutes, but that is a very rough estimate and could range widely. See <https://mikedietrichde.com/2020/03/17/how-long-will-my-database-upgrade-take-revisited/>.

Data Guard

General

Q: Guess you can still revert to holding off on the standby if you prefer, i.e., using the old behaviour?

A: Yes, this was just a change to the default value of the config file parameter. You can set the parameter as you like.

Usability

Fast Deploy

Q: Will the upgrade mode perform post-fixups?

A: Yes, when on the same server it will.

Q: If we run separate the analyze, fixup and upgrade, will the upgrade mode perform post upgrade as well?

A: Yes, if on the same server. Everything will be run. Only when you change server is some things excluded with - mode upgrade.

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