What’s New in Upgrade for Oracle Database 12c?

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Database Upgrade & Utilities
Oracle Corporation

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What’s New in Upgrade for Oracle Database 12c?

- Enhanced Pre-Upgrade Automation
- Parallel Upgrade Script
- DBUA Enhancements
- EM Cloud Control Lifecycle Management
- Upgrade and Migration Methods
- Migrate into Multitenant
Direct Upgrade to Oracle Database 12c

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<th>Oracle 9.2.0.8</th>
<th>Oracle 10.1.0.5</th>
<th>Oracle 10.2.0.5</th>
<th>Oracle 11.1.0.7</th>
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Please note: This graph will apply to database upgrades only!
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Enhanced Pre-Upgrade Automation
Parallel Upgrade Script
DBUA Enhancements
EM Cloud Control Lifecycle Management
Upgrade and Migration Methods
Migrate into Multitenant
Upgrade SQL Automation

New Pre-Upgrade Script

- preupgrd.sql
- Executes pre-upgrade checks
- Runs in source environment
- Generates fixup scripts
  - preupgrade_fixups.sql
  - postupgrade_fixups.sql
- MOS Note:884522.1

Fixup: PURGE_RECYCLEBIN
Description: Check that recycle bin is empty

Fixup Succeeded

[Pre-Upgrade Recommendations]

Please gather dictionary statistics 24 hours prior to upgrading the database.
To gather dictionary statistics execute the following command while connected as SYSDBA:

EXECUTE dbms_stats.gather_dictionary_stats;
40%

Faster Upgrades in Oracle Database 12c
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Faster Upgrade – Less Downtime

**New Parallel Upgrade**

- **catctl.pl**
- Runs database upgrade in parallel
- Up to 40% faster upgrade
- Used and proven by selected Oracle Database 11g global customers
  - Telco billing
  - >100 SAP systems
  - Large DWH
“The new parallel upgrade script promises to drastically reduce downtime due to planned maintenance. We saw a 37% improvement over the previous upgrade process in our environment.”

Harald Stefan
Leiter Datenbanken
Payback GmbH
Faster Upgrade – Less Downtime

New Parallel Upgrade

$> $ORACLE_HOME/perl/bin/perl catctl.pl -n 8 catupgrd.sql

```
Serial    Phase #:70 Files: 1    Time: 90s
Serial    Phase #:71 Files: 1    Time: 0s
Serial    Phase #:72 Files: 1    Time: 0s
Serial    Phase #:73 Files: 1    Time: 34s

Grand Total Time: 1588s
LOG FILES: (catupgrd*.log)

Upgrade Summary Report Located in:
/u01/app/oracle/product/12.1.0.2/cfgtoollogs/UPGR/upgrade/upg_summary.log

Grand Total Upgrade Time:     [0d:0h:26m:28s]
```
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Simplified Upgrade

Database Upgrade Assistant

- Pre-Upgrade Automation
- Parallel Upgrade
- RMAN Integration
- Guaranteed Restore Points
- Activity and Alert Log
“We experienced very few problems and in general the upgrades were very fast.

We were able to upgrade almost all of our 200+ database instances to Database 12c with a downtime of only 30-40 minutes (and that includes some of the pre- and post-tasks).

I have been upgrading Oracle databases since 9i to 10g, and this has been the best release (measured on how easy upgrading is) so far.”

Daniel Overby Hansen
Chief Software Developer, Environment Operation
SimCorp A/S - Denmark
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Enterprise Manager **Mass and RAC Upgrades**

- Mass Upgrades
- Grid Infrastructure Upgrades
- RAC Database Upgrades
- Standby Database Upgrades
What Customers Are Saying…

...about Oracle Database 12c

- "Go-live migration was flawless."
  - Brian Pawlik, Technology Manager, Pulte Group

- “Having been running a 12c production system since GA with no outages, we can attest to the robustness and reliability of this release”
  - James Anthony, Technology Director, e-DBA

- "Our experience with upgrade has been very positive, and we have been very impressed with the robustness of 12c."
  - Nick Salem, Distinguished Engineer, Neustar, Inc.
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Upgrade Options to Oracle Database 12c

- Oracle 10.2
- Oracle 11.1
- Oracle 11.2.0.2
- Oracle 11.2.0.3/4

**Less Downtime?**
- expdp/impdp
- DBUA
- catctl.pl

**Near-Zero Downtime?**
- Transient Standby
- Transportable Tablespaces
- Full Transportable Export/Import

+ Golden Gate
+ RMAN Inc + Bck
Migration Options to Oracle Database 12c

- Oracle 10.2
- Oracle 11.1
- Oracle 11.2.0.1/2
- Oracle 11.2.0.3/4

Less Downtime?

- expdp/impdp
- CTAS, COPY
- SQL*Loader
- TDB

Near-Zero Downtime?

- Golden Gate
- RMAN Inc + Bck

Transportable Tablespaces

Full Transportable Export/Import

Only same Endianness
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Creation of a New Pluggable Database

- Fast provisioning from PDB$SEED
  ```sql
  create pluggable database PDB1
  admin user adm1 identified by pwd
  file_name_convert=(
    '/oradata/CDB2/pdbseed',
    '/oradata/CDB2/pdb1')
  ```
  - PDB_FILE_NAME_CONVERT

- Transport with TTS or FTEX
- Import data with impdp
  - Dump file or NETWORK_LINK
  - imp for ≤ Oracle 9i
Cloning of a Pluggable Database

- Fast cloning of a PDB
  - Local*: create pluggable database PDB2 from PDB1;
    * not available with Single Tenant
  - Remote: create pluggable database PDB1 from PDB1@CDB1;
    - @CDB1 specifies a database link!!!
    - In Oracle 12.1 the source PDB must be quiesced
Cloning of a Pluggable Database

- Also supported:
  - Snapshot cloning with ACFS, ZFS and NetApp
    - `CREATE PLUGGABLE DATABASE pdb2 FROM pdb1
      SNAPSHOT COPY;`

- Since Oracle Database 12.1.0.2
  - Subset Cloning
    - `CREATE PLUGGABLE DATABASE pdb2 FROM pdb1
      FILE_NAME_CONVERT=('..','/..')
      USER_TABLESPACES=('data1', 'data2');`
  - Metadata Cloning
    - `CREATE PLUGGABLE DATABASE pdb2 FROM pdb1
      FILE_NAME_CONVERT=('..','/..')
      NO DATA;`
**Upgrade and Plugin as PDB**

- Database upgrade
- Start database read-only
- Create XML description file
  ```sql
  exec DBMS_PDB.DESCRIBE ('PDB1.xml');
  ```
- Shutdown database
- Plugin database
  ```sql
  create pluggable database PDB1
  using ('PDB1.xml') nocopy tempfile reuse;
  ```
- Sanity operations
  ```sql
  start ?/rdbms/admin/noncdb_to_pdb.sql
  ```
noncddb_to_pdb.sql

- Sanity script when plugging in a stand-alone database
- Irreversible
- Runs only once in the life of a database
- Runtime depends ...
Full Transportable Export/Import

- Create a fresh database/PDB
- Create database link to source
- Tablespaces read-only – *downtime!*
- Copy datafiles to destination
- Run `impdp` on `NETWORK_LINK`

```sql
impdp oow/passwd@PDB1
  NETWORK_LINK=DB1  VERSION=12  FULL=Y
  TRANSPORTABLE=ALWAYS  METRICS=Y
  LOGFILE=oow_dir:srcl12fullimp.log
  TRANSPORT_DATAFILES=’/oradata/ts1.dbf’ ...
```
Resources

- Download slides from:
Q+A
Hardware and Software
Engineered to Work Together