

10 Behavior Changes in 12c / 18c

Christian Gohmann



@CGohmannDE # doagdb2018



■ About me...


Christian Gohmann

- **Senior Consultant at Trivadis GmbH, Düsseldorf**
- **Instructor** since 2014
 - O-AI (Oracle Architecture and Internals)
 - O-AI-DBA (Oracle Architecture and Internals for DBAs)
- **Tool Owner** of TVD-Backup

- **Experiences with Oracle** since 2006 (8i – 18c)
 - Architecture, Installation & Configuration
 - High Availability Solutions (RAC, Data Guard)
 - Migration Projects
 - Backup & Recovery (RMAN, Data Pump)
- **Blog:** <http://www.christian-gohmann.de>



■ Our company.

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■ Agenda

1. Infrastructure
2. Management Tools
3. Database
4. General

Infrastructure

■ OCR Backups in ASM Diskgroup 1/3

- **OCR Backups** are written to the first ASM Diskgroup, instead of the usually used filesystem location `$ORACLE_HOME/cdata`

```
$> ocrconfig -showbackuploc  
The Oracle Cluster Registry backup location is [+MGMT].
```

- Changing the location to a non-ASM location fails with PROT-42

```
$> ocrconfig -backuploc /ocr  
PROT-42: The specified backup location '/ocr' is not an ASM disk group.
```

- Behavior change was introduced with 12.2.0.1



The backup location of the Oracle Local Registry (OLR) is still `$ORACLE_HOME/cdata`.

■ OCR Backups in ASM Diskgroup 2/3

- If the **ASM Diskgroup cannot be mounted**, you have to use **amdu (ASM Metadata Dump Utility)** to extract the OCR Backups

```
# Run as Grid Infrastructure owner
$> amdu -diskstring="AFD:*" -extract MGMT.283
amdu_2018_05_10_12_35_57/

$> ls amdu_2018_05_10_12_35_57
MGMT_283.f  report.txt
```

- **But, if the LUNs are damaged, there is no way to get back the OCR Backup**



If ASM is your preferred backup location, use at least a Diskgroup with normal redundancy.

■ OCR Backups in ASM Diskgroup 3/3

- Copy the backup to the local file system

```
$> asmcmd cp +MGMT/*/OCRBACKUP/day.ocr* /ocr/day.ocr_$(date "+%Y%m%d")  
copying +MGMT/db18c-ol7-r1/OCRBACKUP/day.ocr.283.975471195 -> /ocr/day.ocr_20180510
```

- Or you can use the copy command of ocrconfig
 - Must be executed as root user
 - Unfortunately no wildcards can be used

```
$> ocrconfig -copy +MGMT/db18c-ol7-r1/OCRBACKUP/day.ocr.283.975471195 \  
/ocr/day.ocr_$(date "+%Y%m%d")  
PROT-60: The Oracle Cluster Registry backup is copied to '/ocr/day.ocr_20180510'.
```

■ Oratab Entries are removed 1/3

- For each Database or ASM Instance, an **entry in the oratab** (e.g. /etc/oratab) file is added by the **oraagent process**

```
+ASM1:/app/grid/product/12.2.0.1:N # line added by Agent  
-MGMTDB:/app/grid/product/12.2.0.1:N  
TESTDB:/app/oracle/product/12.1.0.2:N # line added by Agent
```

- Starting with the **October 2017 Release Update** every entry belonging to an Oracle 12c Release 2 Instance are deleted
 - Entries for older versions remain in the oratab file
 - Only entries with a comment "**# line added by Agent**" are considered for deletion



For non-RAC Databases the old mechanism is still in use.

■ Oratab Entries are removed 2/3

■ Executed operations can be found in the ohasd_oraagent_grid.trc logfile

```
ConfigFile::parse mmap name:+asm1 nameWithCase:+ASM1 value:/app/grid/product/12.2.0.1:N comment:line added by Agent
ConfigFile::parse mmap name:-mgmtdb nameWithCase:-MGMTDB value:/app/grid/product/12.2.0.1:N comment:
sclsnInstAgent::sCleanEntry - delete alt(sid) entry
AsmAgent:getOracleSidAttrib 3 getResAttrib GEN_USR_ORA_INST_NAME oracle_sid:+ASM1
AsmAgent:getOracleSidAttrib oracleSid:+ASM1
sclsnInstAgent::sCleanEntry - key = +ASM1
ConfigFile::parse parseLine name: value: comment:
ConfigFile::parse mmap name:-mgmtdb nameWithCase:-MGMTDB value:/app/grid/product/12.2.0.1:N comment:
ConfigFile::updateInPlace copy configfile:/etc/oratab to
backup:/app/grid/product/12.2.0.1/srvm/admin/oratab.bak.kn01p3db306

...
ConfigFile::parse parseLine name: value: comment:
ConfigFile::parse mmap name:-mgmtdb nameWithCase:-MGMTDB value:/app/grid/product/12.2.0.1:N comment:
ConfigFile::updateInPlace file /etc/oratab is updated
sclsnInstAgent::sCleanEntry - key[+ASM1] is cleaned
```

■ Oratab Entries are removed 3/3

- Without these entries, the Oracle Home cannot be identified automatically by **oraenv**

```
$> . oraenv
ORACLE_SID = [oracle] ? +ASM1
ORACLE_HOME = [/home/oracle] ? /u00/app/grid/product/18.0.0.0
The Oracle base has been set to /u00/app/oracle
```

■ Solutions

- Remove the comment "# line added by Agent" (before applying the Release Update)
- Create the required entries manually and without the comment



Before each change, a backup of the oratab file is created under `$ORACLE_HOME/srvm/admin/oratab.bak.<Hostname>`

Management Tools

■ Password Complexity Rules for orapwd 1/3

- Starting with Oracle 12c Release 2 orapwd **enforces Password Complexity Rules** while creating Password File
 - Password must contain at least 8 characters
 - Password must not contain double quotes
 - Password must contain at least 1 letter
 - Password must contain at least 1 digit
 - Password must contain at least 1 special character
 - Password must not contain the username
 - Password must not contain username reversed
- **Format** of the Password File has to be **set to 12.2** (FORMAT=12.2) (default)



DBCA creates Password File with FORMAT=12 – even with 18c (there is no new 18c format)

■ Password Complexity Rules for orapwd 2/3

- **OPW-00029** is raised, when one of the rules are not fulfilled

```
$> orapwd file=$ORACLE_HOME/dbs/orapwDB01 password=oracle force=y
```

```
OPW-00029: Password complexity failed for SYS user : Password must contain at least 8 characters.
```

■ Solutions

- Use a strong Password (recommended)
- Create the Password File with **FORMAT=12**
- Migrate an existing Password File to the new format



During migration of an existing Password File, no Password Complexity Rules are enforced

■ Password Complexity Rules for orapwd 3/3

■ Migration of an existing Password File

```
# Create a dummy Password File
$> orapwd file=$ORACLE_HOME/dbs/orapwDB01.tmp password=oracle force=y format=12
# Migrate (copy) the dummy Password File
$> orapwd file=$ORACLE_HOME/dbs/orapwDB01 input_file=$ORACLE_HOME/dbs/orapwDB01.tmp
```

■ To check the version of an existing Password File use describe parameter

```
$> orapwd describe file=$ORACLE_HOME/dbs/orapwDB01
Password file Description : format=12.2
```



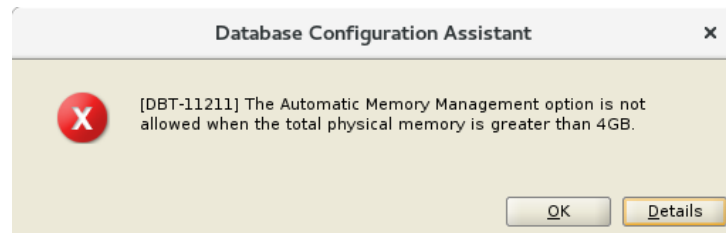
Starting with Oracle 12c, the Password File can be created in ASM

■ DBCA

- Starting with Oracle 12c Release 2 **Datapatch is automatically executed**
 - Part of the `postDBCreation.sql` script
 - Datapatch is executed only, if the template **Custom Database** is used

```
host /u00/app/oracle/product/12.2.0.1-EE/OPatch/datapatch -skip_upgrade_check \  
-db L122EEC1;
```

- Automatic Memory Management (AMM) cannot be used, if the server has more than **4 GB physical memory**



To use Huge Pages, AMM is not supported at all.

Database

■ New Timestamp Format for Alert Log Entries

- Oracle 12c Release 2 changes the **timestamp format** in the alert log from **weekday-month-day-time-year** to **year-month-day-time**

- Old: Thu May 03 14:50:34 2018
- New: 2018-05-03T14:44:28.273034+02:00

- Controlled by the **new parameter** UNIFORM_LOG_TIMESTAMP_FORMAT

```
SQL> ALTER SYSTEM SET uniform_log_timestamp_format = FALSE SCOPE=BOTH;
```

- Logfiles belonging to the Clusterware and Listener (< 12c R2) still use the old format
 - The internally used format differs from the above formats



Since the beginning of the Automatic Diagnostic Repository (ADR) the XML version of the Alert Log uses the Uniform Timestamp Format

■ READ Privilege 1/2

- The **READ privilege** was introduced with Oracle 12c Release 1
 - User with this privilege can **query objects** (tables, materialized views, views, synonym), but **cannot lock rows**
 - SELECT privileges are still required if SQL92_SECURITY parameter is set to TRUE
- In Oracle 12c Release 2 granting SELECT privileges as SYSTEM fails
 - SYSTEM still has GRANT ANY OBJECT PRIVILEGE privilege

```
SQL> GRANT SELECT ON all_objects TO demo WITH GRANT OPTION;  
ORA-01031: insufficient privileges
```



For security reasons, only SYS can grant privileges on its objects to other users.

■ READ Privilege 2/2

- The reason for this are different default privileges for PUBLIC on SYS objects
 - < Oracle 12c R1: **SELECT**
 - >= Oracle 12c R2: **READ**
- Only READ privileges can be granted without an ORA- exception

```
SQL> GRANT READ ON all_objects TO demo WITH GRANT OPTION;
```

- Workarounds
 - Execute the grant operation as SYS user
 - Grant SELECT privileges to PUBLIC using SYS user
 - Set O7_DICTIONARY_ACCESSIBILITY to TRUE (**not recommended**)

■ Unlimited Tablespace

- Until Oracle 12c Release 1 the RESOURCE role contains the hardcoded UNLIMITED TABLESPACE privilege
 - It is not visible by selecting DBA_SYS_PRIVS – but in SESSION_PRIVS
 - But it is part of a Data Pump dump – good for migrations!
- If a new user is created with the RESOURCE role only, an INSERT fails

```
SQL> INSERT INTO t1 VALUES (1);  
ORA-01950: no privileges on tablespace 'USERS'
```

- Solutions
 - Grant the UNLIMITED TABLESPACE privilege
 - Add quotas for the required tablespace (recommended)

General

■ New Default Authentication Protocol

■ **Default authentication protocol** in Oracle 12c Release 2 is **12 (exclusive mode)**

- This requires case-sensitive password for authentication
- Only user with password versions 11g and 12c can still be authenticated

■ Connections to the database fail with an **ORA-01017 error**

```
ORA-01017: invalid username/password; logon denied
```

■ Workarounds

- Update password versions by setting the user passwords again
- Switch default authentication protocol to 11 in `sqlnet.ora`

```
SQLNET.ALLOWED_LOGON_VERSION_SERVER=11
```


■ User Profile (login.sql) 1/2

- With a **User Profile** users can **customize** their **SQL*Plus session**
 - You can put SQL commands, PL/SQL blocks or SQL*Plus commands in it
- It is immediately **executed after the Site Profile**
 - Location: `$ORACLE_HOME/sqlplus/admin/glogin.sql`
- Starting with Oracle 12c Release 2 the `login.sql` in the **current working directory is ignored**
 - This change is **backported** for older releases with **April 2017 PSU** (including 11g Release 2)
 - Only the directories specified in environment variable `ORACLE_PATH` are considered



On Windows you should use `SQLPATH` variable.

■ User Profile (login.sql) 2/2

```
$> sqlplus /nolog

SQL*Plus: Release 12.2.0.1.0 Production on Fri May 11 09:53:02 2018

SQL>

$> export ORACLE_PATH=.
$> sqlplus /nolog

SQL*Plus: Release 12.2.0.1.0 Production on Fri May 11 09:53:02 2018

USER_PROFILE_PROMPT>

$> export SQLPATH=.
$> sqlplus /nolog

SQL*Plus: Release 12.2.0.1.0 Production on Fri May 11 09:53:02 2018

SQL>
```



For security reasons, it is not advisable to add the current working directory to the `ORACLE_PATH` / `SQLPATH` variable.



Behavior Changes, Deprecated and Desupported Features for Oracle Database 12c Release 2 (12.2)

<https://docs.oracle.com/en/database/oracle/oracle-database/12.2/upgrd/behavior-change-deprecate-desupport-oracle-12c-rel-2.html#GUID-3BAFD95E-4D00-4F0F-BC80-6064F497F878>

Behavior Changes, Deprecated and Desupported Features for Oracle Database 18c

<https://docs.oracle.com/en/database/oracle/oracle-database/18/upgrd/behavior-change-deprecate-desupport-oracle-12c-rel-2.html#GUID-3BAFD95E-4D00-4F0F-BC80-6064F497F878>

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<https://support.oracle.com>



Christian Gohmann
Senior Consultant

Tel. +49-211-58 6664 702
christian.gohmann@trivadis.com

