

Initialization parameters – what about them?

Initialisierungsparameter – wieso, weshalb, warum?

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Agenda

- Who am I?
- What are initialization parameters needed for?
- How are initialization parameters stored?
- Dependencies of initialization parameters
- What are "hidden" or "underscore" parameters?
- What are "double underscore" parameters?
- Invalid values in the SPFILE – what should I do?
- Which are the most important parameters?
- Backup and recovery of SPFILE
- Conclusions

Who am I?

- Started with Oracle V6 in 1991
 - DBA, Forms/Reports Developer
- Oracle Germany 1995
 - RDBMS, Forms, Reports, Designer
- Quest (Dell Software for a while) since 2005
 - Oracle and SQL Server Tools – Toad, Spotlight, SQL Optimizer
 - Database Replication – SharePlex
 - Performance Monitoring – Foglight

What are initialization parameters needed for?

- Limits for database and instance wide resources
- Limits for sessions, processes
- Regional settings
- Special purposes (ASM, RAC, replication etc.)
- Performance optimization

What are initialization parameters needed for?

(2)

- All parameters are optional – default specified for each
- Currently ~380 documented parameters in V\$PARAMETER
- "Hidden" or "underscore" parameters (more about them later)
- "Double underscore" parameters (more about them later)

How are initialization parameters stored?

- Up to Oracle8i: Init.ora (initSID.ora)
 - Text file
 - Manual maintenance – fault-prone
 - Multiple files possible – fault-prone
 - Still there, but not recommended for initialization

How are initialization parameters stored?

(2)

- Since Oracle9i: SPFILE
 - Binary file
 - No manual maintenance
 - Default location
 - Unix/Linux: ORACLE_HOME/dbs
 - Windows: ORACLE_HOME\database
- Recommendation: Only use SPFILE
 - Use PFILE (=init.ora)
 - for backup and recovery of SPFILE
 - testing

How are initialization parameters stored?

(3)

PFILE from SPFILE

- `create pfile[=' /<path>/<filename>'] from spfile[=' /<path>/<filename>'] ;`

SPFILE from PFILE

- `create spfile[=' /<path>/<filename>'] from pfile[=' /<path>/<filename>'] ;`

If path and filename are not specified, Oracle uses default location and file name (spfileSID.ora, initSID.ora)

If a running instance was started with SPFILE, need to specify a different location!

How are initialization parameters stored?

(4)

Change parameters with SPFILE:

- `ALTER SYSTEM SET <parameter>=<value> SCOPE=SPFILE|BOTH;`
 - BOTH changes SPFILE and running Instance
- Create PFILE from SPFILE, edit SPFILE, create SPFILE from PFILE

Reset parameter to default value:

- `ALTER SYSTEM RESET <parameter>;`

View current value of parameters:

- `show parameter <parameter> | <part of parameter name>`

How are initialization parameters stored?

(5)

View current value of one parameter:

- `show parameter <parameter> | <part of parameter name>`

View current values of all parameters:

- `show parameter (without any arguments)`
- `create pfile[='<path>/<filename>'] from memory;`
 - Lists also all "underscore" parameters

Dependencies of initialization parameters

- Some parameters are derived of the values of others
 - SESSIONS is derived of PROCESSES
 - If PROCESSES is changed, SESSIONS will be changed automatically, if it was set to default
- Some parameters depend on the OS
 - Default size and max number of block buffers

Dependencies of initialization parameters

(2)

Sometimes, parameters change their meaning!

With manual SGA configuration, you set buffer cache, shared pool, large pool, java pool, streams pool and result cache to ***explicit*** values.

With ASMM and AMM you set ***minimum*** values with the same parameters.

- And you should! - We'll get back to that in a minute...

What are "hidden" or "underscore" parameters?

- About 3,600 hidden parameters in Oracle12c currently
- E.g. `_db_block_hash_buckets` – hence "underscore" parameter
- Often useful for performance improvement – **BUT:**
- **Changing without Oracle's consent may lead to loss of support!**
- May protect from license violation
 - Accidental `alter database open (or startup without mount)` of Data Guard physical standby constitutes an Active Data Guard
 - Can be prevented by setting `_QUERY_ON_PHYSICAL=FALSE`

What are "double underscore" parameters?

Example of a PFILE from SPFILE or MEMORY:

- DOAG. __data_transfer_cache_size=0
- DOAG. __db_cache_size=226492416
- DOAG. __large_pool_size=20971520
- DOAG. __pga_aggregate_target=83886080
- DOAG. __sga_target=440401920
- DOAG. __shared_io_pool_size=12582912
- DOAG. __shared_pool_size=167772160

- Current sizes of SGA and PGA components when using AMM or ASMM
- Stored automatically by Oracle in SPFILE

Invalid values in the SPFILE – what should I do?

- Invalid values may or may not make a difference
 - `ORA-32004: obsolete or deprecated parameter(s) specified for RDBMS instance.`
 - Instance will still start
 - Which parameter? Logged in alert.log

```
Deprecated system parameters with specified values:
  sec_case_sensitive_logon
End of deprecated system parameter listing
```
 - Parameter still works, but may not work in future releases.

Invalid values in the SPFILE – what should I do?

(2)

- Invalid values make a difference

- `ORA-00845: MEMORY_TARGET not supported on this system`
- Instance will not start
- `MEMORY_TARGET not supported?!?`
- Check `alert.log`

```
WARNING: You are trying to use the MEMORY_TARGET feature. This feature
requires the /dev/shm file system to be mounted for at least 10737418240
bytes. /dev/shm is either not mounted or is mounted with available space
less than this size. Please fix this so that MEMORY_TARGET can work as
expected. Current available is 1333780480 and used is 675536896 bytes.
Ensure that the mount point is /dev/shm for this directory.
```

- `create PFILE from SPFILE`
- **correct the value**
- `create SPFILE from PFILE`
- `startup`

Which are the most important parameters?

- Out of the 380 documented parameters, 30 are basic
 - Get to know them -> Oracle documentation
- Ask three experts, and you'll get three different answers
 - Focus on performance, security, special features, what have you
- Let's look at two examples
 - CURSOR_SHARING – focus on performance and security
 - MEMORY_TARGET – focus on performance and ease of administration

Which are the most important parameters?

(2)

- **CURSOR_SHARING**

- Possible values EXACT (default), FORCE -- SIMILAR deprecated in 12c
- EXACT: only identical statements can share a cursor
- FORCE: statements that only differ by literals can share a cursor

- FORCE may seem tempting, because it might boost the performance - BUT
- FORCE will open your database for SQL injection!

- Only use FORCE on session or statement level, if you absolutely have to
- Correct the application – make it use bind variables

- <http://tkyte.blogspot.de/2012/02/all-about-security-sql-injection.html>

Which are the most important parameters?

(3)

- MEMORY_TARGET
 - Enables Automatic Memory Management (AMM)
 - Oracle will automagically take care of SGA and PGA sizing
 - Depending on application, tends to give PGA more memory than SGA
 - Make sure to define minimum values for buffer cache (DB_CACHE_SIZE), shared pool (SHARED_POOL_SIZE), potentially also for large pool and others
 - Does not support Linux huge pages
- Consider Automatic Shared Memory Management (ASMM)
 - However, still define minimums as above!

Backup and recovery of SPFILE

- Create PFILE from SPFILE and vice versa
- Use RMAN
 - CONFIGURE CONTROLFILE AUTOBACKUP
 - Will also backup SPFILE at the end of each backup and after structural changes of database
 - Unfortunately, non-default!
- Test and practise recovery!
 - Instance running or down?
 - Various RMAN configurations
 - Refer to Oracle documentation

```
1. set dbid <DBID> -- get DBID from controlfile backup name
2. startup nomount
3. restore spfile from autobackup;
4. shutdown immediate
5. startup
```

Conclusions

- There are defaults for all parameters
- Defaults may not be the best choice
 - Get to know the different parameters!
- Hidden (underscore) parameters may be helpful
 - **Ask Oracle Support first!**
- There are no "most important" or "optimal" parameters for everyone
 - But some choices are worse than others 😊
- Backup your parameter file – PFILE and RMAN
- Test and practise the recovery!

Thank you!

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