



Standard Edition Two 12.2

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DOAG
Deutsche ORACLE-Anwendergruppe e.V.

... über mich

- Oracle Spezialist seit 1992
 - 1992: Presales bei Oracle in Düsseldorf
 - 1999: Projektleiter bei Herrmann & Lenz Services GmbH
 - 2005: Technischer Direktor ADM Presales bei Quest Software GmbH
 - 2011: Geschäftsführer CarajanDB GmbH
- 2011 → Ernennung zum Oracle ACE
- Autor der Bücher:
 - Oracle9i für den DBA, Oracle10g für den DBA, Oracle 11g Release 2 für den DBA
- DOAG Themenverantwortlicher Datenbankadministration, Standard Edition
- Hobbies:
 - Drachen steigen lassen (Kiting) draußen wie drinnen (Indoorkiting)
 - Motorradfahren (nur draußen)





Standard Edition Two

- Verfügbar seit dem 01. September 2015
- Maximal 2 Sockets
 - Dabei darf der Server nicht mehr als 2 Sockets haben (egal ob belegt oder leer)
- Maximal 16 CPU Threads
 - Hyperthreading wird mitgezählt
- Oracle RAC enthalten (allerdings auch nur bis gesamt max. 2 Sockets)

Oracle Database Standard Edition 2 may only be licensed on servers that have a maximum capacity of 2 sockets. When used with Oracle Real Application Clusters, Oracle Database Standard Edition 2 may only be licensed on a maximum of 2 one-socket servers. In addition, notwithstanding any provision in Your Oracle license agreement to the contrary, each Oracle Database Standard Edition 2 database may use a maximum of 16 CPU threads at any time. When used with Oracle Real Application Clusters, each Oracle Database Standard Edition 2 database may use a maximum of 8 CPU threads per instance at any time. The minimums when licensing by Named User Plus (NUP) metric are 10 NUP licenses per server. (<http://www.oracle.com/us/corporate/pricing/databaselicensing-070584.pdf>)

Vergleich

	Standard Edition Two	Standard Edition	Standard Edition One
Named User Plus	\$ 350,00	\$ 350,00	\$ 180,00
Anzahl NUPs pro Server	10	5	5
Prozessorpreis	\$ 17.500,00	\$ 17.500,00	\$ 5.800,00
Max. Anzahl Sockets	2	4	2
Max. Anzahl Threads	16*	unbegrenzt	unbegrenzt
Max. RAM	unbegrenzt	unbegrenzt	unbegrenzt
Max. Datenbankgröße	unbegrenzt	unbegrenzt	unbegrenzt
RAC	Ja	Ja	Nein
RAC One Node	Nein	Nein	Nein
Support bis	Unlimitiert	31.08.2016	31.08.2016
Version	Ab 12.1.0.2	Bis 12.1.0.1	Bis 12.1.0.1

*Pro Datenbank



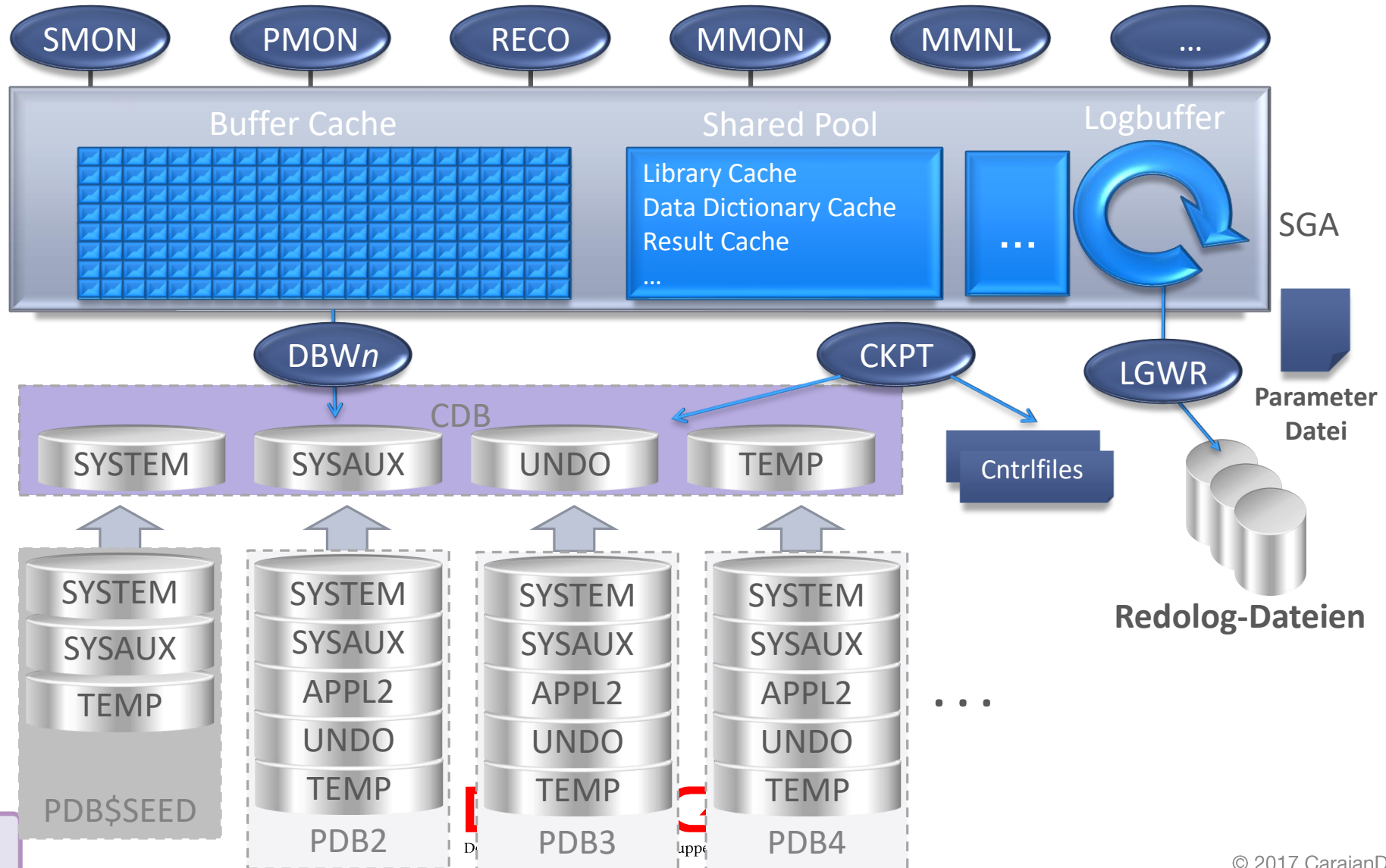
Multitenant Database

„Klassische Datenbankarchitektur“

- NON-CDB
 - Architektur bis Oracle 11.2
- Multitenant Architektur
 - Alternative Architektur ab Version 12.1.1 für alle Editionen
- Multitenant Option
 - Kostenpflichtig für die Enterprise Edition
 - Bis zu 253 PDBs pro CDB (Exadata ab 12.2 4096 PDBs)

The non-CDB architecture was deprecated in Oracle Database 12c. It can be desupported and unavailable in a release after Oracle Database 12c Release 2. Oracle recommends use of the CDB architecture.

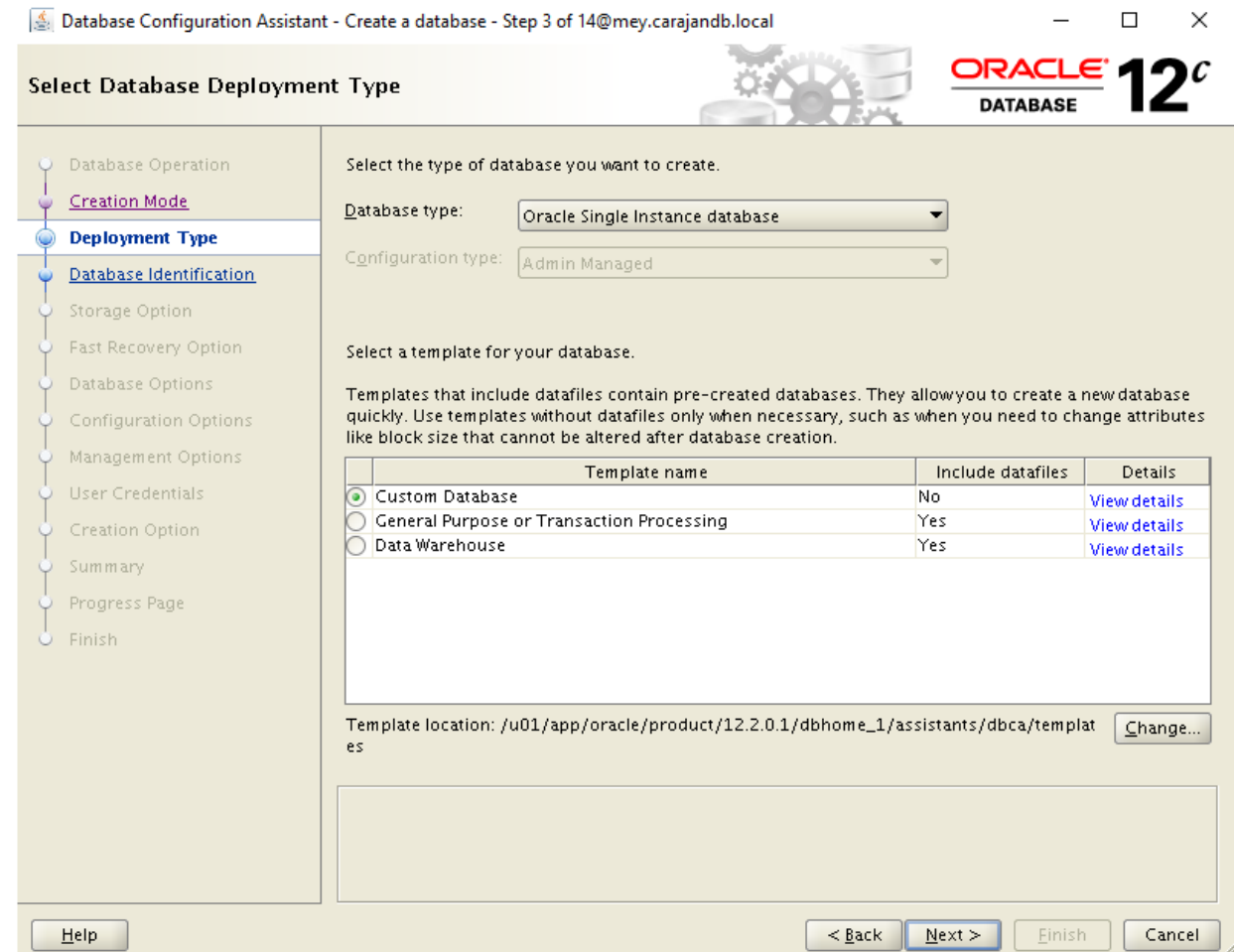
Multitenant Database 12.2



- Eigener Undo-Tablespace möglich
 - Flashback Pluggable Database
- Unterschiedliche Zeichensätze in einer CDB
 - CDB muss aber AL32UTF8 sein
- Ressourcenbegrenzung
- Clonen von PDBs im laufenden Betrieb
- Application Container und PDBs
- Relocate PDB
- Refreshable PDB
- Proxy PDB
- 4096 PDBs pro CDB (Nur Exadata!)
- MAX_PDBS Parameter

Installation (1)

- Immer Custom Database auswählen!



Database Configuration Assistant - Create a database - Step 3 of 14@mey.carajandb.local

Select Database Deployment Type

Select the type of database you want to create.

Database type: Oracle Single Instance database

Configuration type: Admin Managed

Select a template for your database.

Templates that include datafiles contain pre-created databases. They allow you to create a new database quickly. Use templates without datafiles only when necessary, such as when you need to change attributes like block size that cannot be altered after database creation.

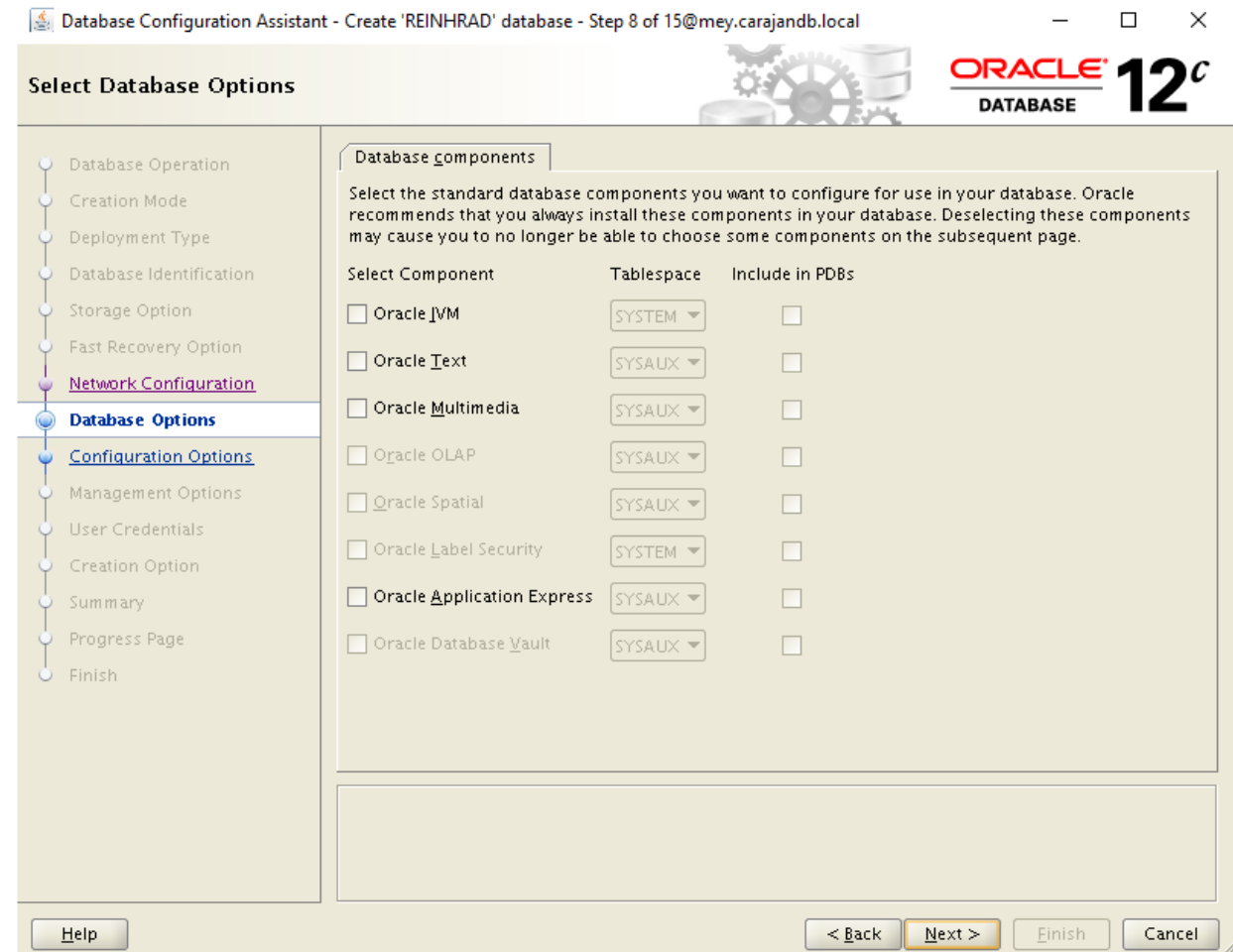
Template name	Include datafiles	Details
☒ Custom Database	No	View details
☐ General Purpose or Transaction Processing	Yes	View details
☐ Data Warehouse	Yes	View details

Template location: /u01/app/oracle/product/12.2.0.1/dbhome_1/assistants/dbca/templates [Change...](#)

[Help](#) [< Back](#) [Next >](#) [Finish](#) [Cancel](#)

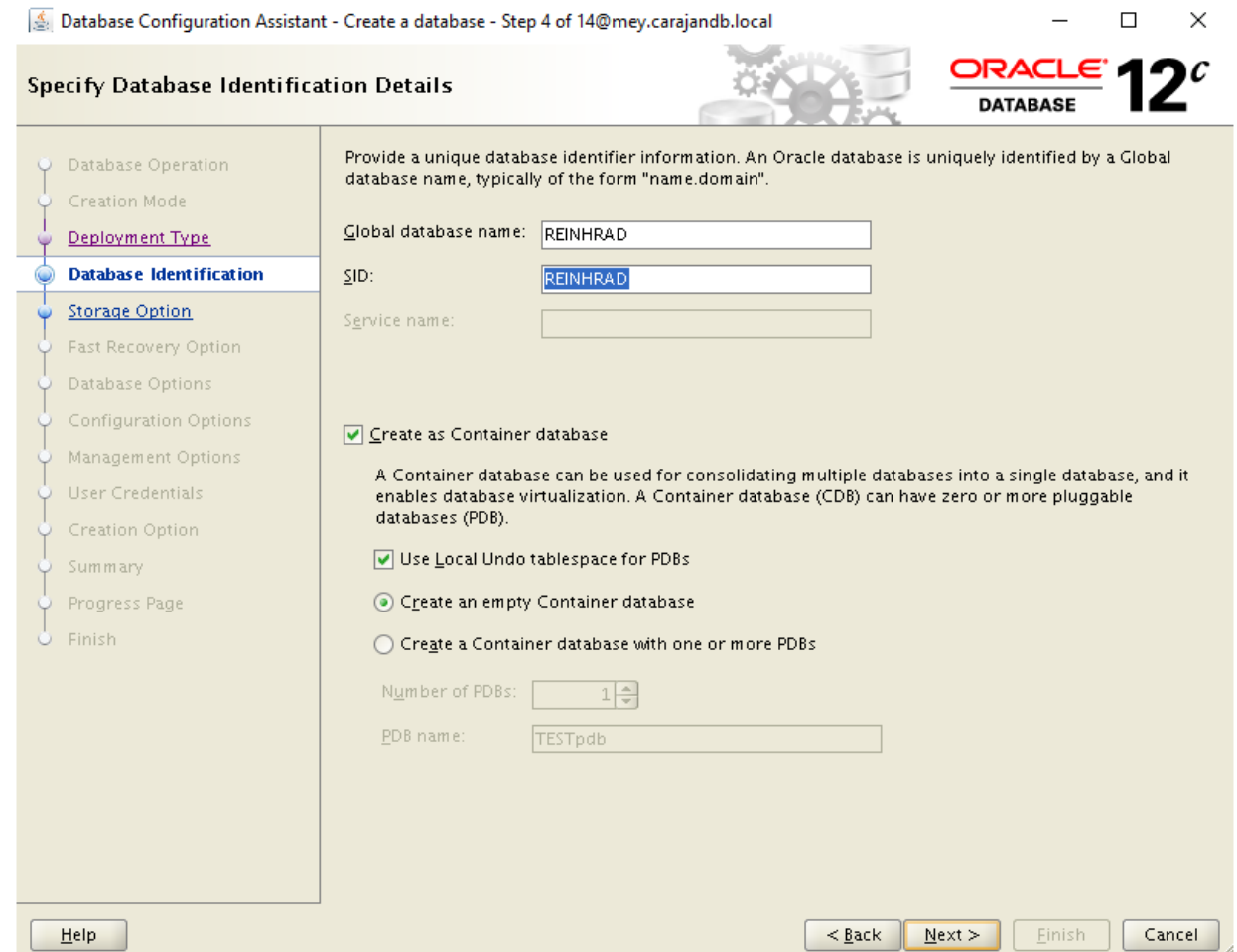
Warum Custom?

- Weil sonst unnötige Komponenten installiert werden (z.B. APEX)



Lokales Undo-Management

- Wichtig bei der Standard Edition:
„Create an empty Container Database“



Database Configuration Assistant - Create a database - Step 4 of 14@mey.carajandb.local

Specify Database Identification Details

Provide a unique database identifier information. An Oracle database is uniquely identified by a Global database name, typically of the form "name.domain".

Global database name:

SID:

Service name:

☒ Create as Container database

A Container database can be used for consolidating multiple databases into a single database, and it enables database virtualization. A Container database (CDB) can have zero or more pluggable databases (PDB).

☒ Use Local Undo tablespace for PDBs

☒ Create an empty Container database

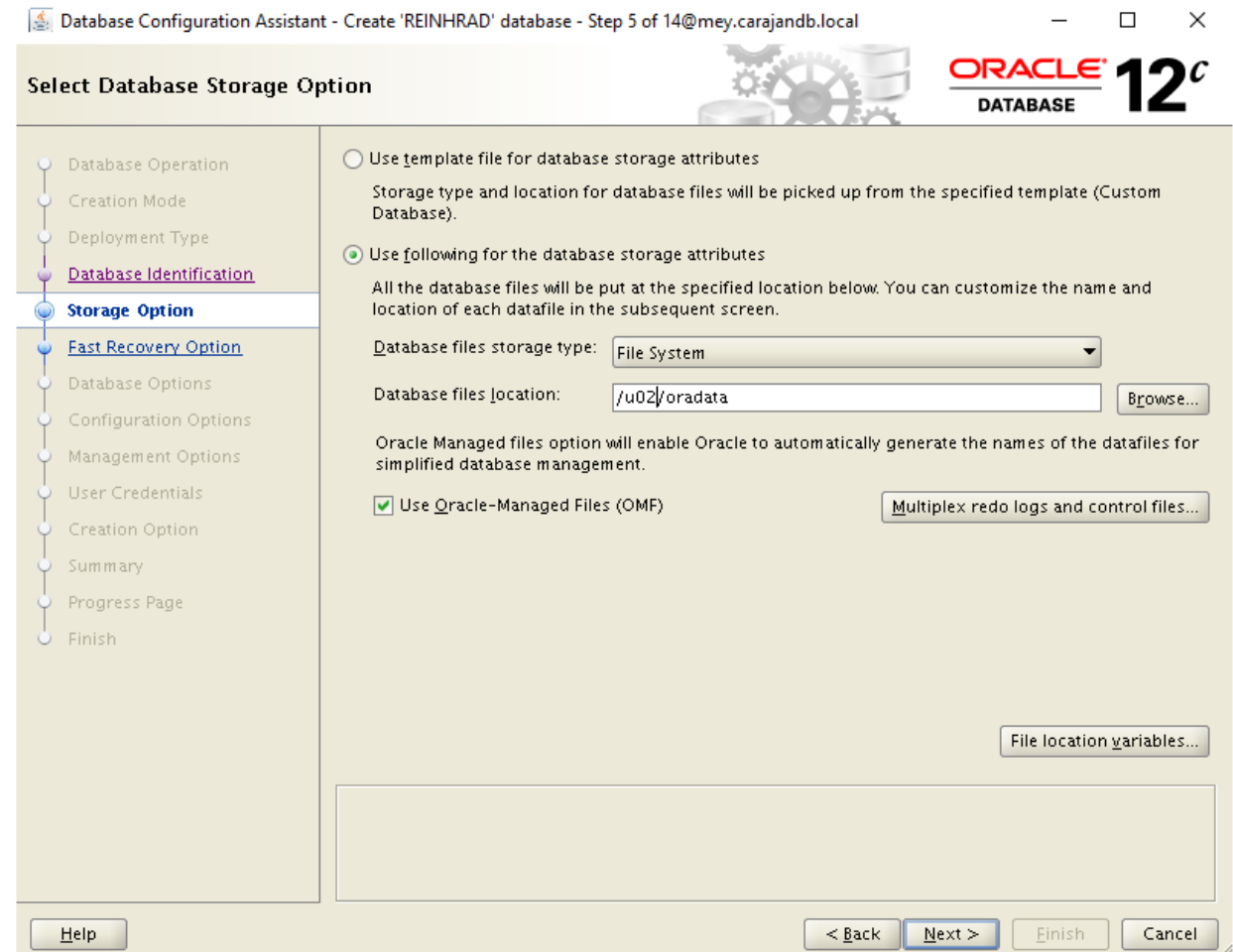
☐ Create a Container database with one or more PDBs

Number of PDBs:

PDB name:

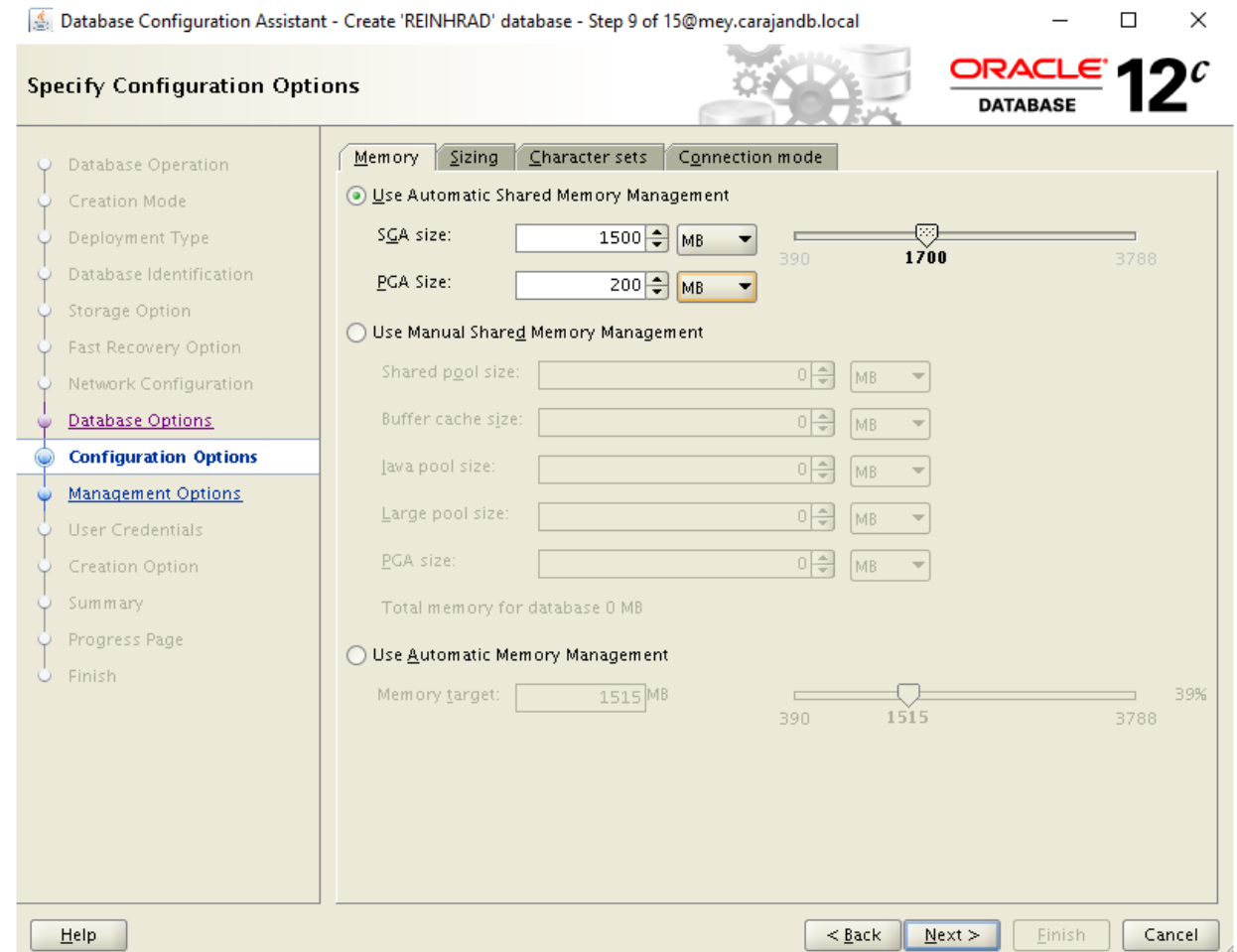
Help < Back Next > Finish Cancel

- Oracle Managed Files sind für Multitenant Database optimal
 - Allerdings nicht, wenn man Data Guard verwendet!



Memory Sizing

- Immer ASMM verwenden
 - SGA_TARGET
 - PGA_AGGREGATE_TARGET
 - Kann / sollte mit Hugepages kombiniert werden
 - Ggf. zusätzlich db_cache_size setzen



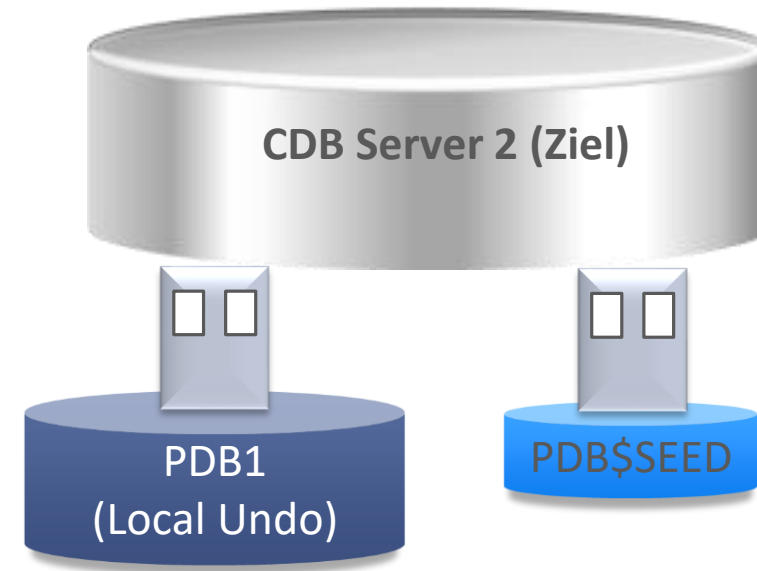
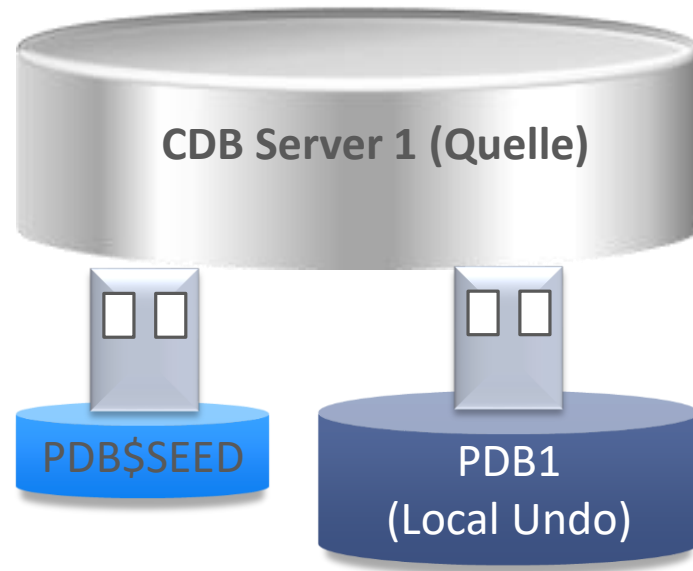
The screenshot shows the 'Specify Configuration Options' window in the Oracle Database Configuration Assistant (DBCA). The window title is 'Database Configuration Assistant - Create 'REINHRAD' database - Step 9 of 15@mey.carajandb.local'. The 'Memory' tab is selected, showing options for memory management. The 'Use Automatic Shared Memory Management' (ASMM) radio button is selected. The SGA size is set to 1500 MB, and the PGA size is set to 200 MB. A slider for the total memory target is visible, ranging from 390 to 3788 MB, with a current value of 1700 MB. Below the ASMM section, there are input fields for Shared pool size, Buffer cache size, Java pool size, Large pool size, and PGA size, all currently set to 0 MB. The 'Total memory for database' is shown as 0 MB. At the bottom, there are buttons for '< Back', 'Next >', 'Finish', and 'Cancel'.



Refreshable PDB

Refreshable PDB

- Automatische Synchronisation zwischen Quell- und Ziel-PDB
- Gedacht für Test und Entwicklung
- Refreshmodes:
 - None
 - Manual
 - Every n Minutes
- Ziel-PDB bleibt geschlossen



Erstellen der PDB

```
SQL> CREATE PLUGGABLE DATABASE cello  
      ADMIN USER pdb_admin IDENTIFIED BY manager  
      DEFAULT TABLESPACE users  
      DATAFILE size 100M AUTOEXTEND ON NEXT 10M MAXSIZE 1000M;  
  
SQL> ALTER PLUGGABLE DATABASE cello OPEN;  
  
SQL> ALTER PLUGGABLE DATABASE cello SAVE STATE;
```

Erstellen eines Services

```
SQL> ALTER SESSION SET CONTAINER=cello;  
  
SQL> execute dbms_service.create_service('erfurt','erfurt');  
  
SQL> execute dbms_service.start_service('erfurt');
```

Anlegen eines Common Users

- Wird für den Datenbank Link benötigt (Quelldatenbank)

```
SQL> CREATE USER c##johannes IDENTIFIED BY manager CONTAINER=ALL;
```

User created.

```
SQL> GRANT create session, sysoper, sysdba TO c##johannes CONTAINER=ALL;
```

Grant succeeded.

- Derzeit muss explizit sysoper Privileg vergeben werden, sonst funktioniert der Refresh nicht!

Anlegen eines Datenbank Links

- Datenbank Link auf die CDB (nicht auf die PDB!)

```
SQL> CREATE DATABASE LINK UDO
      2  CONNECT TO c##johannes IDENTIFIED BY manager
      3  USING 'UDO';
```

Database link created.

- Beispiel: Refresh jede Minute

```
SQL> CREATE PLUGGABLE DATABASE cello
      2 FROM cello@udo
      3 REFRESH MODE EVERY 1 MINUTES;
```

Pluggable database created.

```
SQL> show pdbs
```

CON_ID	CON_NAME	OPEN MODE	RESTRICTED
2	PDB\$SEED	READ ONLY	NO
3	CELLO	MOUNTED	

- VORSICHT: die Ziel-PDB darf nur Read-Only geöffnet werden!

```
SQL> ALTER PLUGGABLE DATABASE cello OPEN READ ONLY;
```

```
Pluggable database altered.
```

```
SQL> ALTER SESSION SET CONTAINER=cello;
```

```
Session altered.
```

```
SQL> SELECT count(*) FROM demo.personen;
```

```
      COUNT (*)  
-----  
          1000
```


Refresh Mode überprüfen

```
SQL> SELECT pdb_name, con_id ,refresh_mode, refresh_interval  
2      FROM cdb_pdbs
```

PDB_NAME	CON_ID	REFRES	REFRESH_INTERVAL
-----	-----	-----	-----
PDB\$SEED	2	NONE	
CELLO	3	AUTO	1

- Alert-File auf der Zieldatenbank

```
Applying media recovery for pdb-4099 from SCN 637092 to SCN 637401
Remote log information: count-1
thr-1, seq-11, logfile-
/u03/orabackup/UDO/foreign_archivelog/CELLO/2017_11_18/o1_mf_1_11_1911113739_.arc, los-590304, nxs-
18446744073709551615
CELLO(3):Media Recovery Start
2017-11-18T13:16:09.454723+01:00
CELLO(3):Serial Media Recovery started
2017-11-18T13:16:09.501618+01:00
CELLO(3):Media Recovery Log
/u03/orabackup/UDO/foreign_archivelog/CELLO/2017_11_18/o1_mf_1_11_1911113739_.arc
2017-11-18T13:16:10.656324+01:00
CELLO(3):Incomplete Recovery applied until change 637401 time 11/18/2017 13:16:07
2017-11-18T13:16:10.662316+01:00
CELLO(3):Media Recovery Complete (REINHARD)
CELLO(3):Completed: alter pluggable database refresh
```

Job Scheduler

SYS

CELLO_336717380_REFRESH: Created: 18.11.2017 13:27:01 Last DDL: 18.11.2017 13:32:02

Info Scheduled Run Times Arguments Notifications Grants Script Run Log

Log ID	Log Date	Operation	Status	User Name	Client ID	Global UID	Required Start Date	Actual Start Date
220	18.11.2017 13:32:02.438906 +01:00	RUN	FAILED				18.11.2017 13:32:01.689836 +01:00	18.11.2017 13:32:01.8451
218	18.11.2017 13:31:02.347983 +01:00	RUN	FAILED				18.11.2017 13:31:01.626236 +01:00	18.11.2017 13:31:01.6861
216	18.11.2017 13:30:02.229707 +01:00	RUN	FAILED				18.11.2017 13:30:01.570091 +01:00	18.11.2017 13:30:01.6241
214	18.11.2017 13:29:02.186985 +01:00	RUN	FAILED				18.11.2017 13:29:01.457477 +01:00	18.11.2017 13:29:01.5681
212	18.11.2017 13:28:01.614353 +01:00	RUN	SUCCEEDED				18.11.2017 13:28:01.267025 +01:00	18.11.2017 13:28:01.4541
206	18.11.2017 13:27:01.873567 +01:00	RUN	FAILED				18.11.2017 13:27:01.254490 +01:00	18.11.2017 13:27:01.2651
200	18.11.2017 13:21:08.187336 +01:00	RUN	SUCCEEDED				18.11.2017 13:21:06.576502 +01:00	18.11.2017 13:21:06.7831
198	18.11.2017 13:20:08.077258 +01:00	RUN	SUCCEEDED				18.11.2017 13:20:06.400356 +01:00	18.11.2017 13:20:06.5741
196	18.11.2017 13:19:07.924366 +01:00	RUN	SUCCEEDED				18.11.2017 13:19:06.215976 +01:00	18.11.2017 13:19:06.3951
194	18.11.2017 13:18:06.414453 +01:00	RUN	SUCCEEDED				18.11.2017 13:18:06.000035 +01:00	18.11.2017 13:18:06.2091
192	18.11.2017 13:17:10.560881 +01:00	RUN	SUCCEEDED				18.11.2017 13:17:06.795548 +01:00	18.11.2017 13:17:06.9951
190	18.11.2017 13:16:10.682062 +01:00	RUN	SUCCEEDED				18.11.2017 13:16:06.559745 +01:00	18.11.2017 13:16:06.7901
188	18.11.2017 13:15:10.319977 +01:00	RUN	SUCCEEDED				18.11.2017 13:15:06.375836 +01:00	18.11.2017 13:15:06.5571
186	18.11.2017 13:14:10.325315 +01:00	RUN	SUCCEEDED				18.11.2017 13:14:06.193626 +01:00	18.11.2017 13:14:06.3721
184	18.11.2017 13:13:10.030328 +01:00	RUN	SUCCEEDED				18.11.2017 13:13:06.000251 +01:00	18.11.2017 13:13:06.1861
182	18.11.2017 13:12:09.914326 +01:00	RUN	SUCCEEDED				18.11.2017 13:12:06.784226 +01:00	18.11.2017 13:12:06.9901
180	18.11.2017 13:11:09.763654 +01:00	RUN	SUCCEEDED				18.11.2017 13:11:06.564265 +01:00	18.11.2017 13:11:06.7801
178	18.11.2017 13:10:09.680585 +01:00	RUN	SUCCEEDED				18.11.2017 13:10:06.366370 +01:00	18.11.2017 13:10:06.5621
176	18.11.2017 13:09:09.767130 +01:00	RUN	SUCCEEDED				18.11.2017 13:09:06.166431 +01:00	18.11.2017 13:09:06.3631
174	18.11.2017 13:08:09.522744 +01:00	RUN	SUCCEEDED				18.11.2017 13:08:06.974794 +01:00	18.11.2017 13:08:07.1641
172	18.11.2017 13:07:09.486466 +01:00	RUN	SUCCEEDED				18.11.2017 13:07:06.768905 +01:00	18.11.2017 13:07:06.9711
170	18.11.2017 13:06:09.429284 +01:00	RUN	SUCCEEDED				18.11.2017 13:06:06.574725 +01:00	18.11.2017 13:06:06.7661
168	18.11.2017 13:05:09.182321 +01:00	RUN	SUCCEEDED				18.11.2017 13:05:06.363575 +01:00	18.11.2017 13:05:06.5721
166	18.11.2017 13:04:08.983860 +01:00	RUN	SUCCEEDED				18.11.2017 13:04:06.170529 +01:00	18.11.2017 13:04:06.3611
164	18.11.2017 13:03:08.937160 +01:00	RUN	SUCCEEDED				18.11.2017 13:03:06.969410 +01:00	18.11.2017 13:03:07.1671
162	18.11.2017 13:02:08.798756 +01:00	RUN	SUCCEEDED				18.11.2017 13:02:06.784373 +01:00	18.11.2017 13:02:06.9671

Cnt: 21; Sel: 1 SYS@REINHARD

```
Begin
execute immediate 'alter session set container = CELLO';
execute immediate 'alter pluggable database refresh';
end;
```

```
SQL> ALTER PLUGGABLE DATABASE OPEN;
ALTER PLUGGABLE DATABASE OPEN
*
ERROR at line 1:
ORA-65341: cannot open pluggable database in read/write mode

SQL> ALTER SESSION SET CONTAINER=cello;

Session altered.

SQL> ALTER PLUGGABLE DATABASE REFRESH MODE NONE;

Pluggable database altered.

SQL> ALTER PLUGGABLE DATABASE OPEN;

Pluggable database altered.
```



Oracle XE 18c Ausblick

Oracle XE 18c

- Verfügbarkeit wahrscheinlich Q2 2018 (zwischen März und August)
- Jedes Jahr ein neues Release
- Linux und Windows
- Kostenlos für Entwicklung und Produktion
- Kein Support
- Keine Bugfixes

Oracle XE 18c Features

- 2 GB RAM
- 12 GB Storage (Benutzerdaten)
- 2 CPUs
- 4 Pluggable Databases
- (Fast) alle Enterprise Edition Optionen integriert
 - Advanced Compression
 - Advanced Security
 - Multitenant
 - OVJM
 - Partitioning

- DOAG Konferenz und Ausstellung
 - Don't Panic DBA
 - Open Mic Session
 - Battle Virtualisierung
 - Flashback Database
- DOAG Schulungstag
 - Oracle 12.2 New Features (ausgebucht)
- IT-Tage 2017
 - Oracle 12.2 New Features & Best Practices
 - Muss es unbedingt die Enterprise Edition sein?

21. bis 23. November 2017

21. November 17:00 Uhr

21. November 18:00 Uhr

22. November 10:00 Uhr

22. November 13:00 Uhr

24. November 2017

11. bis 14. Dezember 2017

11. Dezember

14. Dezember 10:00 Uhr

- DOAG Webinar Data Guard Best Practices 12. Januar 2018 10:00 Uhr
- Toad User Konferenz 2018 25. Januar 2018 in Köln
- DOAG SIG Database Virtualisierung 07. März 2018 in Hannover
- Call For Papers für die DOAG Datenbank 2018 ab dem 20. November
- DOAG Datenbank 2018 14. bis 15. Mai 2018

- Experten mit über 25 Jahren Datenbank Erfahrung
 - Firmensitz in Erftstadt bei Köln
- Spezialisten für Oracle und PostgreSQL Datenbank Administration
 - Hochverfügbarkeit
 - Optimaler Einsatz der Datenbank (z.B. Standard Edition)
 - Migrationen
 - Replikation
 - Performance Optimierung
 - Datenbank Cloning (Delphix, Actifio)
- Fernwartung
- Schulung und Workshops (Oracle, Toad, Replikation)

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- Facebook: johannes.ahrends
- Blog: blog.carajandb.com

Weihnachtsgeschichten

- 2013 Die Multitannen Datenbank
- 2014 Der Stapelweihnachtsbaum
- 2015 Weihnachten as a Service
- 2016 Weihnachten 12.2
- 2017 ???

blog.carajandb.com
ab dem 01.12.2017





Fragen