dbarc: Ausarbeitung Backup & Recovery

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Inhaltsverzeichnis

1 Vorbereitung

1.1 Kontrolle Dateien

Die genannten Files liegen bei uns im korrekten Pfad:

```
1  oracle_stud@hades:/> ls /app/oracle_stud/oradata/${ORACLE_SID}/data/
2  control01.ctl  control02.ctl  control03.ctl  redo01.log  redo02.log  redo03.log  sysaux01.dbf
       system01.dbf  temp01.dbf  undotbs01.dbf  users01.dbf
```

1.2 Noarchivelog Modus

Wir wechseln gemäss den Angaben in der Aufgabenstellung den Modus unserer Oracle-Instanz:

```
1  oracle_stud@hades:/> sqlplus sys as sysdba
2
3  SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 07:02:06 2013
4  Copyright (c) 1982, 2009, Oracle.  All rights reserved.
5
6  Enter password:
7  Connected to an idle instance.
8
9  SQL> STARTUP MOUNT
10 ORACLE instance started.
11
12 Total System Global Area  417546240 bytes
13 Fixed Size                  2213936 bytes
14 Variable Size             339740624 bytes
15 Database Buffers           67108864 bytes
16 Redo Buffers                8482816 bytes
17 Database mounted.
18
19 SQL> ALTER DATABASE NOARCHIVELOG;
20 Database altered.
21
22 SQL> ALTER DATABASE OPEN;
23 Database altered.
```

1.3 System entlasten

Bei unserer Instanz liegen die Trace-Files im angegebenen Verzeichnis in einem Unterordner *trace*. Wie die Ausgabe von *find ... — wc -l* zeigt, ist eine grosse Zahl dieser Dateien vorhanden:

```
1  oracle_stud@hades:/app/oracle_stud/diag/rdbms/dbarc02/dbarc02/trace> find -iname '*.trc' | wc -l
2  3787
3  oracle_stud@hades:/app/oracle_stud/diag/rdbms/dbarc02/dbarc02/trace> rm *.trc
```

Unser Alert-Log ist mit ca. 100k noch recht kompakt, wir leeren es trotzdem.

```
1  oracle_stud@hades:...dbarc02/trace> ls -lh alert_dbarc02.log
2  -rw-r------ 1 oracle_stud oinstall 103K 2013-06-21 07:08 alert_dbarc02.log
3  oracle_stud@hades:...dbarc02/dbarc02/trace> echo -n "" > alert_dbarc02.log
4  oracle_stud@hades:...dbarc02/trace> ls -lh alert_dbarc02.log
5  -rw-r------ 1 oracle_stud oinstall 0 2013-06-21 07:17 alert_dbarc02.log
```

Wie der folgende Befehl zeigt, existiert auf dem Server Hades nirgends ein Verzeichnis *bdump*:

```
1  oracle_stud@hades:/app/oracle_stud/admin/dbarc02> find / -type d -iname 'bdump' 2>/dev/null
2  oracle_stud@hades:/app/oracle_stud/admin/dbarc02>
```

2 Export / Import einer Tabelle

2.1 Export

Nach der Anmeldung führen wir gemäss Aufgabenstellung den Export-Befehl im entsprechenden Verzeichnis aus und überprüfen mittels ls, dass die Files erzeugt wurden (da der Datenbank-Name mit unserer SID übereinstimmt, verwenden wir gleich diese exportierte Variable):

```
 1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> exp scott/tiger FILE=${ORACLE_SID}
        LOG=${ORACLE_SID}
 2
 3  Export: Release 11.2.0.1.0 − Production on Fri Jun 21 07:23:10 2013
 4
 5  Copyright (c) 1982, 2009, Oracle and/or its affiliates.  All rights reserved.
 6
 7
 8  Connected to: Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 − 64bit Production
 9  With the Partitioning, OLAP, Data Mining and Real Application Testing options
10  Export done in US7ASCII character set and AL16UTF16 NCHAR character set
11  server uses AL32UTF8 character set (possible charset conversion)
12  . exporting pre−schema procedural objects and actions
13  . exporting foreign function library names for user SCOTT
14  . exporting PUBLIC type synonyms
15  . exporting private type synonyms
16  . exporting object type definitions for user SCOTT
17  About to export SCOTT's objects ...
18  . exporting database links
19  . exporting sequence numbers
20  . exporting cluster definitions
21  . about to export SCOTT's tables via Conventional Path ...
22  . . exporting table                        DEPT            4 rows exported
23  EXP−00091: Exporting questionable statistics.
24  EXP−00091: Exporting questionable statistics.
25  . . exporting table                         EMP           14 rows exported
26  EXP−00091: Exporting questionable statistics.
27  EXP−00091: Exporting questionable statistics.
28  . . exporting table                      SALGRADE          5 rows exported
29  EXP−00091: Exporting questionable statistics.
30  . exporting synonyms
31  . exporting views
32  . exporting stored procedures
33  . exporting operators
34  . exporting referential integrity constraints
35  . exporting triggers
36  . exporting indextypes
37  . exporting bitmap, functional and extensible indexes
38  . exporting posttables actions
39  . exporting materialized views
40  . exporting snapshot logs
41  . exporting job queues
42  . exporting refresh groups and children
43  . exporting dimensions
44  . exporting post−schema procedural objects and actions
45  . exporting statistics
46  Export terminated successfully with warnings.
47
48
49  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> ls −lh
50  total 28K
51  −rw−r−−r−− 1 oracle_stud oinstall  24K 2013−06−21 07:23 dbarc02.dmp
52  −rw−r−−r−− 1 oracle_stud oinstall 1.7K 2013−06−21 07:23 dbarc02.log
```

2.2 Tabelle löschen

Das folgende Listing zeigt das Löschen der *emp*-Tabelle.

```
 1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> sqlplus scott/tiger
 2
 3  SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 07:30:04 2013
 4  Copyright (c) 1982, 2009, Oracle.  All rights reserved.
 5
 6  Error accessing PRODUCT_USER_PROFILE
 7  Warning:  Product user profile information not loaded!
 8  You may need to run PUPBLD.SQL as SYSTEM
 9
10  Connected to:
11  Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 − 64bit Production
12  With the Partitioning, OLAP, Data Mining and Real Application Testing options
13
```

```
14  SQL> DESC emp;
15   Name                                        Null?     Type
16   ——————————————————————————————————— ———————— ——————————————————————
17   EMPNO                                       NOT NULL  NUMBER(4)
18   ENAME                                                 VARCHAR2(10)
19   JOB                                                   VARCHAR2(9)
20   MGR                                                   NUMBER(4)
21   HIREDATE                                              DATE
22   SAL                                                   NUMBER(7,2)
23   COMM                                                  NUMBER(7,2)
24   DEPTNO                                                NUMBER(2)
25
26  SQL> DROP TABLE emp;
27  Table dropped.
28
29  SQL> DESC emp;
30  ERROR:
31  ORA−04043: object emp does not exist
```

2.3 Tabelle zurückladen

Wir führen den Import-Befehl wiederum gemäss Aufgabenstellung aus. Bei der ersten Frage („Import Data Only?"), deren Antwort nicht in der Aufgabe vorgegeben ist, haben wir mit „Yes" geantwortet.

Die Beantwortung mit „No" führt dazu, dass der Import-Befehl die Tabelle nicht erstellt und legiglich versucht, Datensätze einzufügen. Da die Tabelle zuvor aber entfernt wurde, schlägt dies fehl.

```
1   oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> imp scott/tiger
2
3   Import: Release 11.2.0.1.0 − Production on Fri Jun 21 07:43:07 2013
4   Copyright (c) 1982, 2009, Oracle and/or its affiliates.  All rights reserved.
5   Connected to: Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 − 64bit Production
6   With the Partitioning, OLAP, Data Mining and Real Application Testing options
7
8   Import data only (yes/no): no >
9   Import file: expdat.dmp > dbarc02.dmp
10  Enter insert buffer size (minimum is 8192) 30720>
11
12  Export file created by EXPORT:V11.02.00 via conventional path
13  import done in US7ASCII character set and AL16UTF16 NCHAR character set
14  import server uses AL32UTF8 character set (possible charset conversion)
15
16  List contents of import file only (yes/no): no >
17  Ignore create error due to object existence (yes/no): no >
18  Import grants (yes/no): yes >
19  Import table data (yes/no): yes >
20  Import entire export file (yes/no): no >
21  Username: scott
22  Enter table(T) or partition(T:P) names. Null list means all tables for user
23  Enter table(T) or partition(T:P) name or . if done: emp
24  Enter table(T) or partition(T:P) name or . if done: .
25
26  . importing SCOTT's objects into SCOTT
27  . importing SCOTT's objects into SCOTT
28  . . importing table                        "EMP"          14 rows imported
29  About to enable constraints...
30  Import terminated successfully without warnings.
```

2.4 Tabelle prüfen

Die Tabelle konnte erfolgreich wiederhergestellt werden:

```
1   oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> sqlplus scott/tiger
2
3   SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 07:45:46 2013
4   Copyright (c) 1982, 2009, Oracle.  All rights reserved.
5   Error accessing PRODUCT_USER_PROFILE
6   Warning:  Product user profile information not loaded!
7   You may need to run PUPBLD.SQL as SYSTEM
8
9   Connected to:
10  Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 − 64bit Production
11  With the Partitioning, OLAP, Data Mining and Real Application Testing options
12
```

```
13   SQL> DESC emp;
14     Name                                              Null?      Type
15     ――――――――――――――――――――――――――――――――――――――  ―――――――  ――――――――――――――――――――――――――
16     EMPNO                                           NOT NULL   NUMBER(4)
17     ENAME                                                      VARCHAR2(10)
18     JOB                                                        VARCHAR2(9)
19     MGR                                                        NUMBER(4)
20     HIREDATE                                                   DATE
21     SAL                                                        NUMBER(7,2)
22     COMM                                                       NUMBER(7,2)
23     DEPTNO                                                     NUMBER(2)
```

3 Export / Import einer Datenbank

3.1 Export der Datenbank

Den Export der gesamtem Datenkbank haben wir mit dem exp-Befehl durchgeführt. Der Output umfasste ingesamt ca. 1300 Zeilen, daher haben wir hier einiges rausgeschnitten. Wir sehen, dass unter Anderem auch die Tabellen „dep" und „emp" des Benuzters scott exportiert wurden.

```
 1   oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> exp system/manager
         file=${ORACLE_SID}_full full=y log=${ORACLE_SID}_full
 2
 3   Export: Release 11.2.0.1.0 - Production on Fri Jun 21 08:25:03 2013
 4   Copyright (c) 1982, 2009, Oracle and/or its affiliates.  All rights reserved.
 5   Connected to: Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
 6   With the Partitioning, OLAP, Data Mining and Real Application Testing options
 7   Export done in US7ASCII character set and AL16UTF16 NCHAR character set
 8   server uses AL32UTF8 character set (possible charset conversion)
 9
10   About to export the entire database ...
11   . exporting tablespace definitions
12   . exporting profiles
13   . exporting user definitions
14   . exporting roles
15   . exporting resource costs
16   . exporting rollback segment definitions
17   . exporting database links
18   . exporting sequence numbers
19   . exporting directory aliases
20   . exporting context namespaces
21   . exporting foreign function library names
22   . exporting PUBLIC type synonyms
23   . exporting private type synonyms
24   . exporting object type definitions
25   . exporting system procedural objects and actions
26   . exporting pre-schema procedural objects and actions
27   . exporting cluster definitions
28   . about to export SYSTEM's tables via Conventional Path ...
29   . . exporting table                      DEF$_AQCALL          0 rows exported
30   . . exporting table                      DEF$_AQERROR         0 rows exported
31   . . exporting table                      DEF$_CALLDEST        0 rows exported
32   EXP-00091: Exporting questionable statistics.
33   EXP-00091: Exporting questionable statistics.
34   EXP-00091: Exporting questionable statistics.
35   . . exporting table                      DEF$_DEFAULTDEST     0 rows exported
36   EXP-00091: Exporting questionable statistics.
37   EXP-00091: Exporting questionable statistics.
38   . . exporting table                      DEF$_DESTINATION     0 rows exported
39
40   [... output gekuerzt ...]
41
42   EXP-00091: Exporting questionable statistics.
43   EXP-00091: Exporting questionable statistics.
44   EXP-00091: Exporting questionable statistics.
45   . . exporting table                          OL$HINTS         0 rows exported
46   EXP-00091: Exporting questionable statistics.
47   EXP-00091: Exporting questionable statistics.
48   . . exporting table                          OL$NODES         0 rows exported
49   EXP-00091: Exporting questionable statistics.
50   EXP-00091: Exporting questionable statistics.
51   . about to export SCOTT's tables via Conventional Path ...
52   . . exporting table                              DEPT         4 rows exported
53   EXP-00091: Exporting questionable statistics.
54   EXP-00091: Exporting questionable statistics.
55   . . exporting table                               EMP        14 rows exported
56   EXP-00091: Exporting questionable statistics.
57
58   [... output gekuerzt ...]
59
```

```
60  . . exporting table                    MGMT_VIOLATIONS                 2119 rows exported
61  . . exporting table                MGMT_VIOLATION_CONTEXT                 80 rows exported
62  EXP−00091: Exporting questionable statistics .
63  EXP−00091: Exporting questionable statistics .
64  . . exporting table          MGMT_V_CLUSTER_MEMBER_LIST
65  . . exporting table       MGMT_V_CLUSTER_RAC_POL_DETAIL
66  . . exporting table       MGMT_V_RAC_ASSOC_MEMBER_LIST
67  . . exporting table             MGMT_V_RAC_MEMBER_LIST
68  . about to export MGMT_VIEW's tables via Conventional Path ...
69  . exporting synonyms
70  . exporting views
71  . exporting referential integrity constraints
72  . exporting stored procedures
73  . exporting operators
74  . exporting indextypes
75  . exporting bitmap, functional and extensible indexes
76  . exporting posttables actions
77  . exporting triggers
78  . exporting materialized views
79  . exporting snapshot logs
80  . exporting job queues
81  . exporting refresh groups and children
82  . exporting dimensions
83  . exporting post−schema procedural objects and actions
84  . exporting user history table
85  . exporting default and system auditing options
86  . exporting statistics
87  Export terminated successfully with warnings.
```

Wir prüfen auch hier, ob die Export-Files gemäss unseren Vorstellungen erstellt wurden. Der Full-Dump ist um ein Vielfaches grösser als der zuvor erstellte Tabellenexport.

```
1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> ls −lh
2  total 42M
3  −rw−r−−r−− 1 oracle_stud oinstall  24K 2013−06−21 07:23 dbarc02.dmp
4  −rw−r−−r−− 1 oracle_stud oinstall  41M 2013−06−21 08:25 dbarc02_full.dmp
5  −rw−r−−r−− 1 oracle_stud oinstall  70K 2013−06−21 08:25 dbarc02_full.log
6  −rw−r−−r−− 1 oracle_stud oinstall 1.7K 2013−06−21 07:23 dbarc02.log
7  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export>
```

3.2 User Scott samt Objekten löschen

Nach dem Entfernen des Benutzers überprüfen wir mit Hilfe von *all_users*, ob der Benutzer auch tatsächlich entfernt wurde.

```
1   oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> sqlplus system/manager
2
3   SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 08:45:10 2013
4   Copyright (c) 1982, 2009, Oracle.  All rights reserved .
5
6   Connected to:
7   Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 − 64bit Production
8   With the Partitioning , OLAP, Data Mining and Real Application Testing options
9
10  SQL> DROP USER scott CASCADE;
11  User dropped.
12
13  SQL> select * from all_users ;
14
15  USERNAME                         USER_ID CREATED
16  −−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−− −−−−−−−−−− −−−−−−−−−
17  MGMT_VIEW                             35 08−MAR−13
18  SYSMAN                                33 08−MAR−13
19  APPQOSSYS                             31 08−MAR−13
20  DBSNMP                                30 08−MAR−13
21  ORACLE_OCM                            21 08−MAR−13
22  DIP                                   14 08−MAR−13
23  OUTLN                                  9 08−MAR−13
24  SYSTEM                                 5 08−MAR−13
25  SYS                                    0 08−MAR−13
26
27  9 rows selected .
```

3.3 User Scott wieder erstellen

Mit den folgenden Statements haben wir den User Scott neu erstellt und geprüft, ob die Erstellung erfolgreich war:

```
 1  SQL> CREATE USER scott IDENTIFIED BY tiger
 2     2   DEFAULT TABLESPACE users
 3     3   QUOTA UNLIMITED ON users;
 4  User created.
 5
 6  SQL> GRANT CONNECT TO scott;
 7  Grant succeeded.
 8
 9  SQL> ALTER USER scott DEFAULT ROLE all;
10  User altered.
11
12  SQL> select * from all_users;
13  USERNAME                              USER_ID CREATED
14  ——————————————————————————— —————————— ———————————
15  MGMT_VIEW                                  35 08-MAR-13
16  SYSMAN                                     33 08-MAR-13
17  SCOTT                                      36 21-JUN-13
18  APPQOSSYS                                  31 08-MAR-13
19  DBSNMP                                     30 08-MAR-13
20  ORACLE_OCM                                 21 08-MAR-13
21  DIP                                        14 08-MAR-13
22  OUTLN                                       9 08-MAR-13
23  SYSTEM                                      5 08-MAR-13
24  SYS                                         0 08-MAR-13
25  10 rows selected.
```

3.4 Daten importieren

Die in folgendem Listing enthaltenen Fehlermeldungen resp. Warnungen (bzgl. dem System-Tablespace) zeigen, dass die Erstellung des Benutzers zuvor noch nicht korrekt war. Mit diesen Warnungen werden zwar die Tabellen erstellt, allerdings fehlen danach die Datensätze.

```
 1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> imp system/manager
        file=${ORACLE_SID}_full fromuser=scott touser=scott
 2
 3  Import: Release 11.2.0.1.0 - Production on Fri Jun 21 09:17:32 2013
 4
 5  Copyright (c) 1982, 2009, Oracle and/or its affiliates.  All rights reserved.
 6
 7
 8  Connected to: Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
 9  With the Partitioning, OLAP, Data Mining and Real Application Testing options
10
11  Export file created by EXPORT:V11.02.00 via conventional path
12  import done in US7ASCII character set and AL16UTF16 NCHAR character set
13  import server uses AL32UTF8 character set (possible charset conversion)
14  . importing SCOTT's objects into SCOTT
15  . . importing table                    "DEPT"
16  IMP-00058: ORACLE error 1950 encountered
17  ORA-01950: no privileges on tablespace 'SYSTEM'
18  . . importing table                    "EMP"
19  IMP-00058: ORACLE error 1950 encountered
20  ORA-01950: no privileges on tablespace 'SYSTEM'
21  . . importing table                  "SALGRADE"
22  IMP-00058: ORACLE error 1950 encountered
23  ORA-01950: no privileges on tablespace 'SYSTEM'
24  About to enable constraints...
25  Import terminated successfully with warnings
```

Eine Analyse des Problems und des Dump-Files (einfaches anschauen mittels *less*) ergab, dass die Tabellen *dept* und *emp* vor dem Export nicht im Users-Tablespace, sondern im System-Tablespace lagen. Da es ohne Umwege mit dem Utility *imp* nicht möglich ist, die Tabellen des Benutzers in einen anderen Tablespace zu importieren, haben wir dem User Scott ebenfalls Platz auf dem System-Tablespace gegeben:

```
 1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> sqlplus system/manager
 2
 3  SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 10:04:14 2013
 4  Copyright (c) 1982, 2009, Oracle.  All rights reserved.
 5
 6  Connected to:
 7  Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
 8  With the Partitioning, OLAP, Data Mining and Real Application Testing options
 9
10  SQL> ALTER USER scott QUOTA UNLIMITED ON system;
11
12  User altered.
```

Diese Anpassung haben wir nach einem erneuten Entfernen und Neu-Erstellung des Benutzers scott vorgenommen. Der Import läuft nun ordnungsgemäss durch:

```
1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> imp system/manager
       file=${ORACLE_SID}_full fromuser=scott touser=scott
2
3  Import: Release 11.2.0.1.0 - Production on Fri Jun 21 10:13:12 2013
4
5  Copyright (c) 1982, 2009, Oracle and/or its affiliates.  All rights reserved.
6
7
8  Connected to: Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
9  With the Partitioning, OLAP, Data Mining and Real Application Testing options
10
11 Export file created by EXPORT:V11.02.00 via conventional path
12 import done in US7ASCII character set and AL16UTF16 NCHAR character set
13 import server uses AL32UTF8 character set (possible charset conversion)
14 . importing SCOTT's objects into SCOTT
15 . . importing table                    "DEPT"          4 rows imported
16 . . importing table                    "EMP"          14 rows imported
17 . . importing table                    "SALGRADE"      5 rows imported
18 About to enable constraints...
19 Import terminated successfully without warnings.
```

3.5 User Scott testen

Nach dem Zurückladen der Daten melden wir uns an und prüfen das Vorhandensein der Tabellen von Scott:

```
1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> sqlplus scott/tiger
2
3  SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 10:15:08 2013
4
5  Copyright (c) 1982, 2009, Oracle.  All rights reserved.
6
7  Error accessing PRODUCT_USER_PROFILE
8  Warning:  Product user profile information not loaded!
9  You may need to run PUPBLD.SQL as SYSTEM
10
11 Connected to:
12 Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
13 With the Partitioning, OLAP, Data Mining and Real Application Testing options
14
15 SQL> desc emp;
16  Name                                    Null?    Type
17  --------------------------------------- -------- -----------------------
18  EMPNO                                   NOT NULL NUMBER(4)
19  ENAME                                            VARCHAR2(10)
20  JOB                                              VARCHAR2(9)
21  MGR                                              NUMBER(4)
22  HIREDATE                                         DATE
23  SAL                                              NUMBER(7,2)
24  COMM                                             NUMBER(7,2)
25  DEPTNO                                           NUMBER(2)
26
27 SQL> select * from dept;
28
29     DEPTNO DNAME          LOC
30  --------- -------------- -------------
31         10 ACCOUNTING     NEW YORK
32         20 RESEARCH       DALLAS
33         30 SALES          CHICAGO
34         40 OPERATIONS     BOSTON
```

4 Cold Backup

4.1 DB Stop

Wir fahren die DB gemäss Anleitung in der Aufgabenstellung herunter:

```
1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/export> sqlplus /nolog
2
3  SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 10:20:36 2013
4
5  Copyright (c) 1982, 2009, Oracle.  All rights reserved.
```

```
 6
 7   SQL> CONNECT / as sysdba
 8   Connected .
 9   SQL> SHUTDOWN IMMEDIATE
10   Database closed .
11   Database dismounted .
12   ORACLE instance shut down .
```

Die Kontrolle mittels des ps-Befehls zeigt, dass unsere Instanz (dbarc02) erfolgreich beendet wurde:

```
 1   oracle_stud@hades :/app/oracle_stud/oradata/dbarc02/export> ps −ef | grep smon
 2   1001         641    1   0 Jun14 ?        00:00:14 ora_smon_dbarc01
 3   1001        2907    1   0 May30 ?        00:01:34 ora_smon_dbarc04
 4   1001        2957    1   0 Jun18 ?        00:00:06 ora_smon_dbarc07
 5   1001       12380    1   0 May01 ?        00:01:43 ora_smon_dbarc08
 6   oracle     12826    1   0 Mar01 ?        00:05:11 ora_smon_hades11g
 7   1001       14183    1   0 Mar15 ?        00:02:18 ora_smon_dbarc06
 8   1001       20249    1   0 Mar08 ?        00:06:40 ora_smon_mydb
 9   1001       26856 20395  0 10:22 pts/0    00:00:00 grep smon
10   oracle     29737    1   0 Mar01 ?        00:04:15 ora_smon_ananke
11   1001       30687    1   0 Jun07 ?        00:00:39 ora_smon_dbarc05
```

4.2 Sicherung

Die Sicherung besteht nun aus einem einfachen Datei-Kopiervorgang. Da die Datenbank-Instanz zuvor gestoppt wurde, sind die Dateien in einem konsistenten Zustand.

```
 1   oracle_stud@hades :/app/oracle_stud/oradata/dbarc02/data> cp −v ∗ ../cold_backup/
 2   'control01.ctl ' −> '../cold_backup/control01.ctl '
 3   'control02.ctl ' −> '../cold_backup/control02.ctl '
 4   'control03.ctl ' −> '../cold_backup/control03.ctl '
 5   'redo01.log ' −> '../cold_backup/redo01.log '
 6   'redo02.log ' −> '../cold_backup/redo02.log '
 7   'redo03.log ' −> '../cold_backup/redo03.log '
 8   'sysaux01.dbf ' −> '../cold_backup/sysaux01.dbf '
 9   'system01.dbf ' −> '../cold_backup/system01.dbf '
10   'temp01.dbf ' −> '../cold_backup/temp01.dbf '
11   'undotbs01.dbf ' −> '../cold_backup/undotbs01.dbf '
12   'users01.dbf ' −> '../cold_backup/users01.dbf '
```

4.3 Neustart, Test, Modifikation

Da auf der Tabelle ein Primary-Key definiert ist, funktioniert das angegebene Insert-Statement nicht. Wir haben stattdessen mit dem folgenden Statement eine neue Zeile hinzugefügt und die Anzahl Zeilen geprüft.

```
 1   SQL> INSERT INTO "SCOTT"."EMP" (EMPNO, ENAME, JOB, HIREDATE, SAL, DEPTNO) VALUES ('1337', 'TEST',
         'BOSS', TO_DATE('23−JAN−82', 'DD−MON−RR') , '1337', '10')
 2
 3   SQL> select count(∗) from emp;
 4
 5     COUNT(∗)
 6   −−−−−−−−−−
 7           15
```

4.4 Fehler provozieren

Die Tabelle *emp* liegt im *System*-Tablespace, daher benennen wir dieses File um.

Danach tritt beim angegebenen Statement wie erwartet ein Fehler auf (INSERT INTO und SELECT * FROM funktionierten hingegen noch, da die Informationen wohl noch im Cache vorhanden waren).

```
 1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/data> sqlplus scott/tiger
 2
 3  SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 10:49:21 2013
 4  Copyright (c) 1982, 2009, Oracle.  All rights reserved.
 5  Error accessing PRODUCT_USER_PROFILE
 6  Warning:  Product user profile information not loaded!
 7  You may need to run PUPBLD.SQL as SYSTEM
 8
 9  Connected to:
10  Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
11  With the Partitioning, OLAP, Data Mining and Real Application Testing options
12
13  SQL> CREATE TABLE aaa AS SELECT * FROM emp;
14  CREATE TABLE aaa AS SELECT * FROM emp
15                                      *
16  ERROR at line 1:
17  ORA-00604: error occurred at recursive SQL level 2
18  ORA-01116: error in opening database file 1
19  ORA-01110: data file 1: '/app/oracle_stud/oradata/dbarc02/data/system01.dbf'
20  ORA-27041: unable to open file
21  Linux-x86_64 Error: 2: No such file or directory
22  Additional information: 3
```

4.5 Reparatur

Wir konnten uns aufgrund der folgenden Fehlermeldung nicht mehr normal auf die Instanz verbinden:

```
 1  SQL> CONNECT / AS sysdba
 2  ERROR:
 3  ORA-01075: you are currently logged on
```

Informationen von `http://bit.ly/btEuNm` haben uns dann allerdings weitergeholfen, so dass wir die Instanz doch noch abwürgen konnten:

```
 1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/data> sqlplus -prelim "/as sysdba"
 2
 3  SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 11:00:44 2013
 4
 5  Copyright (c) 1982, 2009, Oracle.  All rights reserved.
 6
 7  SQL> SHUTDOWN ABORT;
 8  ORACLE instance shut down.
```

Nach dem Stop der Instanz haben wir alle Files unter Beibehaltung der Berechtigungen (Option -p von cp) aus dem erstellten Cold-Backup zurückkopiert und die Datenbank neu gestartet:

```
 1  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/data> rm -v * && cp -pv ../cold_backup/* .
 2  removed 'control01.ctl'
 3  removed 'control02.ctl'
 4  removed 'control03.ctl'
 5  removed 'redo01.log'
 6  removed 'redo02.log'
 7  removed 'redo03.log'
 8  removed 'sysaux01.dbf'
 9  removed 'system01.dbf_'
10  removed 'temp01.dbf'
11  removed 'undotbs01.dbf'
12  removed 'users01.dbf'
13  '../cold_backup/control01.ctl' -> './control01.ctl'
14  '../cold_backup/control02.ctl' -> './control02.ctl'
15  '../cold_backup/control03.ctl' -> './control03.ctl'
16  '../cold_backup/redo01.log' -> './redo01.log'
17  '../cold_backup/redo02.log' -> './redo02.log'
18  '../cold_backup/redo03.log' -> './redo03.log'
19  '../cold_backup/sysaux01.dbf' -> './sysaux01.dbf'
20  '../cold_backup/system01.dbf' -> './system01.dbf'
21  '../cold_backup/temp01.dbf' -> './temp01.dbf'
22  '../cold_backup/undotbs01.dbf' -> './undotbs01.dbf'
23  '../cold_backup/users01.dbf' -> './users01.dbf'
24
25  oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/data> sqlplus /nolog
26
27  SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 11:14:46 2013
28
29  Copyright (c) 1982, 2009, Oracle.  All rights reserved.
30
```

```
31  SQL> CONNECT / as sysdba
32  Connected to an idle instance.
33  SQL> STARTUP
34  ORACLE instance started.
35
36  Total System Global Area   417546240 bytes
37  Fixed Size                   2213936 bytes
38  Variable Size              339740624 bytes
39  Database Buffers            67108864 bytes
40  Redo Buffers                 8482816 bytes
41  Database mounted.
42  Database opened.
```

4.6 Test Benutzer scott

Wir können uns nun wieder als Scott verbinden und stellen fest, dass die Tabelle im Zustand zum Zeitpunkt des Cold-Backups wieder verfügbar ist.

```
1   oracle_stud@hades:/app/oracle_stud/oradata/dbarc02/data> sqlplus scott/tiger
2
3   SQL*Plus: Release 11.2.0.1.0 Production on Fri Jun 21 11:16:47 2013
4
5   Copyright (c) 1982, 2009, Oracle.  All rights reserved.
6
7   Error accessing PRODUCT_USER_PROFILE
8   Warning:  Product user profile information not loaded!
9   You may need to run PUPBLD.SQL as SYSTEM
10
11  Connected to:
12  Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
13  With the Partitioning, OLAP, Data Mining and Real Application Testing options
14
15  SQL> select count(*) from emp;
16
17    COUNT(*)
18  ----------
19          14
```

5 Archive Mode

yay, eberle

6 Hot Backup

yay, eberle

7 Reflexion

oh noez, schwarz?