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A DBA's pick of Differences between SQL Server and Oracle

Jason Wong
http://dbace.us
Sr. Database Administrator
IT Applications Manager
Consultant, DBA Developer
Programmer, App Admin
M.S. Mech. Eng. Rice '88, MBA U.H. '94 (MIS)

A DBA's pick of Differences between SQL Server and Oracle

Jason Wong has 25+ years experiences working as programmer, apps admin, IT Applications Manager, Sr. DBA in greater Houston area.

Other interests includes: tennis, car repairs, taking photos in National Parks, cholesterol and Vitamin K2, D and Calcium

His career profile, education, publication, travel experiences, along with other interests can be found on his web site.

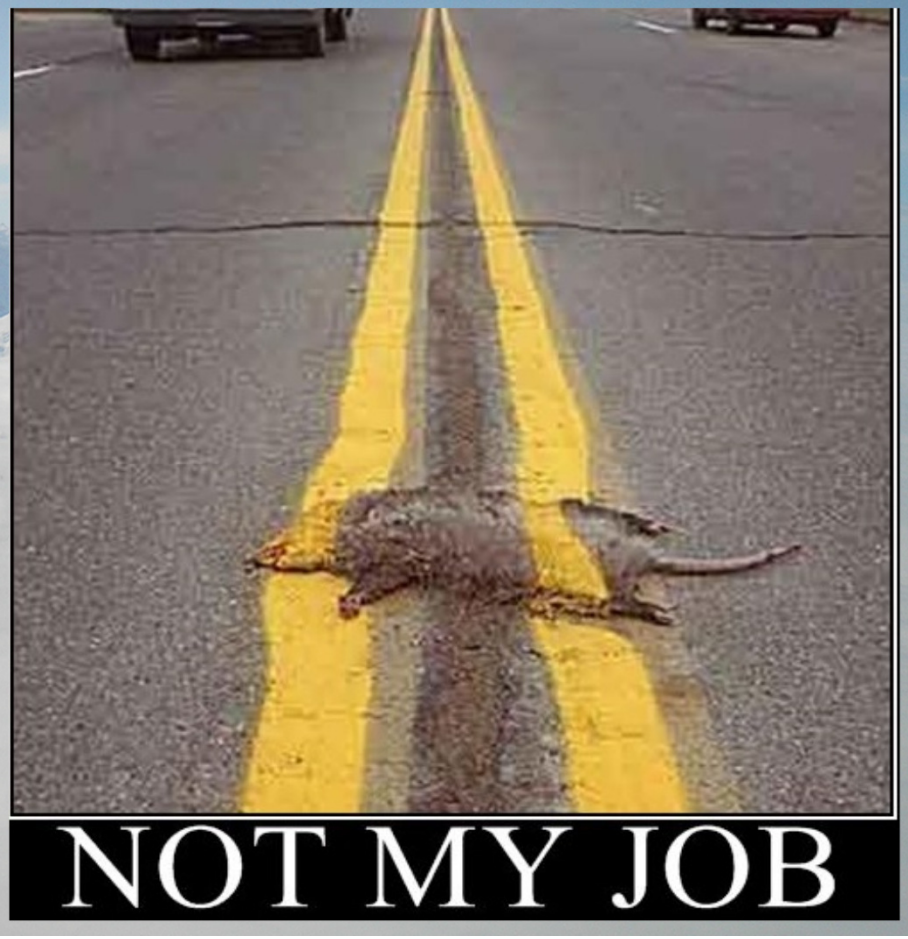
(no commercials, no tracking)

http://dbace.us

A DBA's pick for Differences of SQL Server and Oracle

Just for a laugh, in case you are seeing this on recording, you don't know how I look.

My stunt double speaking
or just dangerous behavior

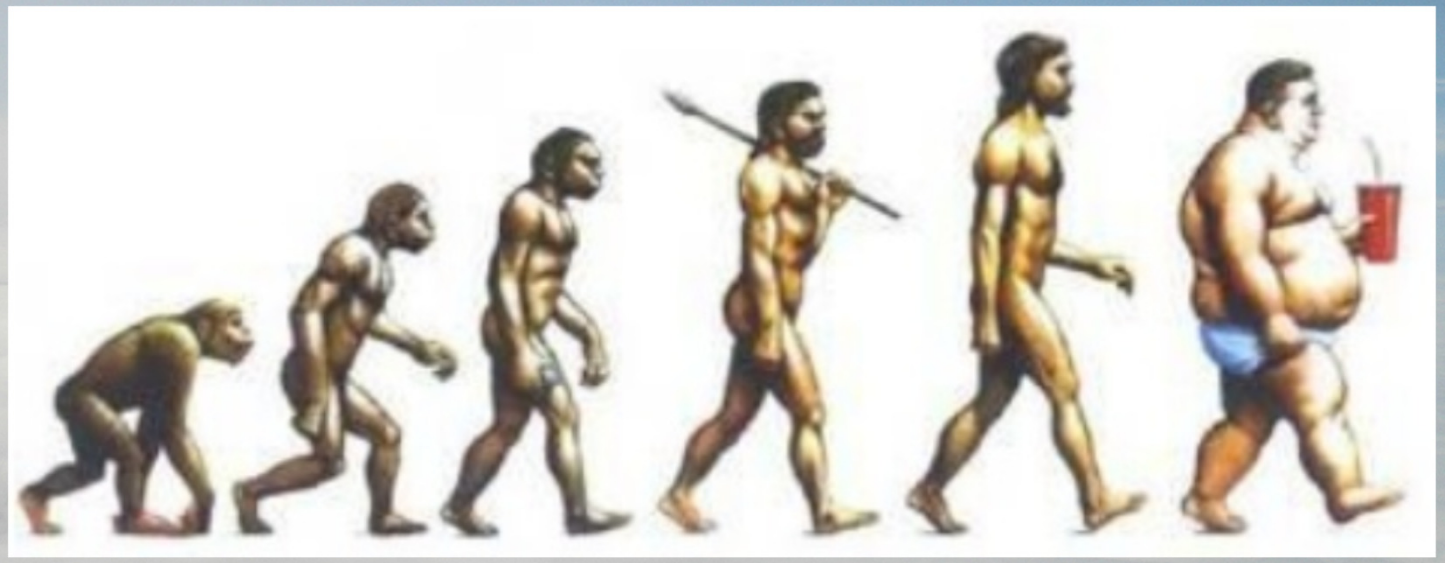


know enough to be dangerous

"It's a good thing you've got rubber-soled shoes on. That could have gone all the way through you."

Benjamin Franklin

A DBA's pick of Differences between SQL Server and Oracle



The software is evolving, so are we.
The only constant is update.

A DBA's pick of Differences between SQL Server and Oracle

For consistent grammar, we should say: Good, Gooder, Goodest

- Oracle license is more expensive.
- SQL Server is easier to learn.
- SQL Server has hot patch version upgrade.
- Windows service can automatic start.
- Oracle has more features and licenses.
- Oracle handles locking better.
- SQL Server implicit commit.
- Oracle trainings cost a lot of money.
- Documentation issues

```
....
SQL> startup;
ORACLE instance started.
Total System Global Area 3307048960 bytes
Fixed Size                  2217872 bytes
Variable Size            1862273136 bytes
Database Buffers         1426063360 bytes
Redo Buffers               16494592 bytes
Database mounted.
Database opened.
SQL>
$ mv /home/oracle/app/oracle/oradata/PRI/datafile/o1_mf_sysaux_bk8t7xnl_.dbf \
            /home/oracle/app/oracle/oradata/PRI/datafile/o1_mf_sysaux_bk8t7xnl_.dbf_bak
$ cd /home/oracle/app/oracle/oradata/PRI/datafile/
$ ls -altr
total 1585216

drwxr-x---. 5 oracle oracle      4096 Mar 26 16:16 ..
-rw-r-----. 1 oracle oracle  20979712 Apr 20 09:42 o1_mf_temp_bk8t9ywt_.tmp
-rw-r-----. 1 oracle oracle   5251072 Apr 20 15:29 o1_mf_users_bk8t7xp6_.dbf
-rw-r-----. 1 oracle oracle 104865792 Apr 20 15:29 o1_mf_example_bk8tb22z_.dbf
drwxr-x---. 2 oracle oracle      4096 Apr 20 15:39 .
-rw-r-----. 1 oracle oracle 723525632 Apr 20 15:40 o1_mf_system_bk8t7xls_.dbf
-rw-r-----. 1 oracle oracle  57679872 Apr 20 15:40 o1_mf_undotbs1_bk8t7xo8_.dbf
-rw-r-----. 1 oracle oracle 723525632 Apr 20 15:40 o1_mf_sysaux_bk8t7xnl_.dbf_bak
[oracle@myhost datafile]$
SQL> select dbid, name, open_mode from v$database;

      DBID NAME      OPEN_MODE
---------- --------- --------------------
3372087648 ORCL9     READ WRITE
SQL>
```

A DBA's pick of Differences between SQL Server and Oracle

```
IF NOT EXISTS(SELECT *
          FROM   INFORMATION_SCHEMA.COLUMNS
          WHERE  TABLE_NAME = 'SomeQLogTable'
                 AND COLUMN_NAME = 'Starttime')
BEGIN
        --add new Starttime column
        ALTER TABLE [dbo].[SomeQLogTable]
        ADD  Starttime datetime

        --update  UTCStartTime  to Starttime
        UPDATE [dbo].[SomeQLogTable]
        SET Starttime = GETDATE() ;

END
GO
```

A DBA's pick of Differences between SQL Server and Oracle

1. Backup, Restore, Recovery (RMAN vs T-SQL/Powershell)
2. Schema (Single vs Multi tenants)
3. Alter Index Rebuild (fragmentation)
4. AWR, ASH vs DMV/DMF (Performance Trouble-shooting)
5. Data Guard (modes) vs AO Availability-Group (synchronous, asynchronous)

Differences of SQL Server and Oracle Backup

Oracle RMAN Hot, Cold Backup + file copy

Backup database ….

SQL Server Hot Backup + file copy

Backup Database To Disk = '….'

* See my SQL Saturday #308 for automated backup script

Differences of SQL Server and Oracle Backup

Cold backup (not open and in noarchivelog mode):

RMAN>shutdown immediate;

RMAN>startup mount;

RMAN>backup database;

RMAN>alter database open;

(* RMAN cannot backup database while open in noarchivelog mode)

Hot backup (open in archivelog mode):

RMAN> backup database;

RMAN>backup database plus archivelog;

RMAN>backup archivelog all;

RMAN>backup archivelog all delete input;

RMAN>backup archivelog all delete all input;

Differences of SQL Server and Oracle Backup Retention Cleanup

Oracle RMAN

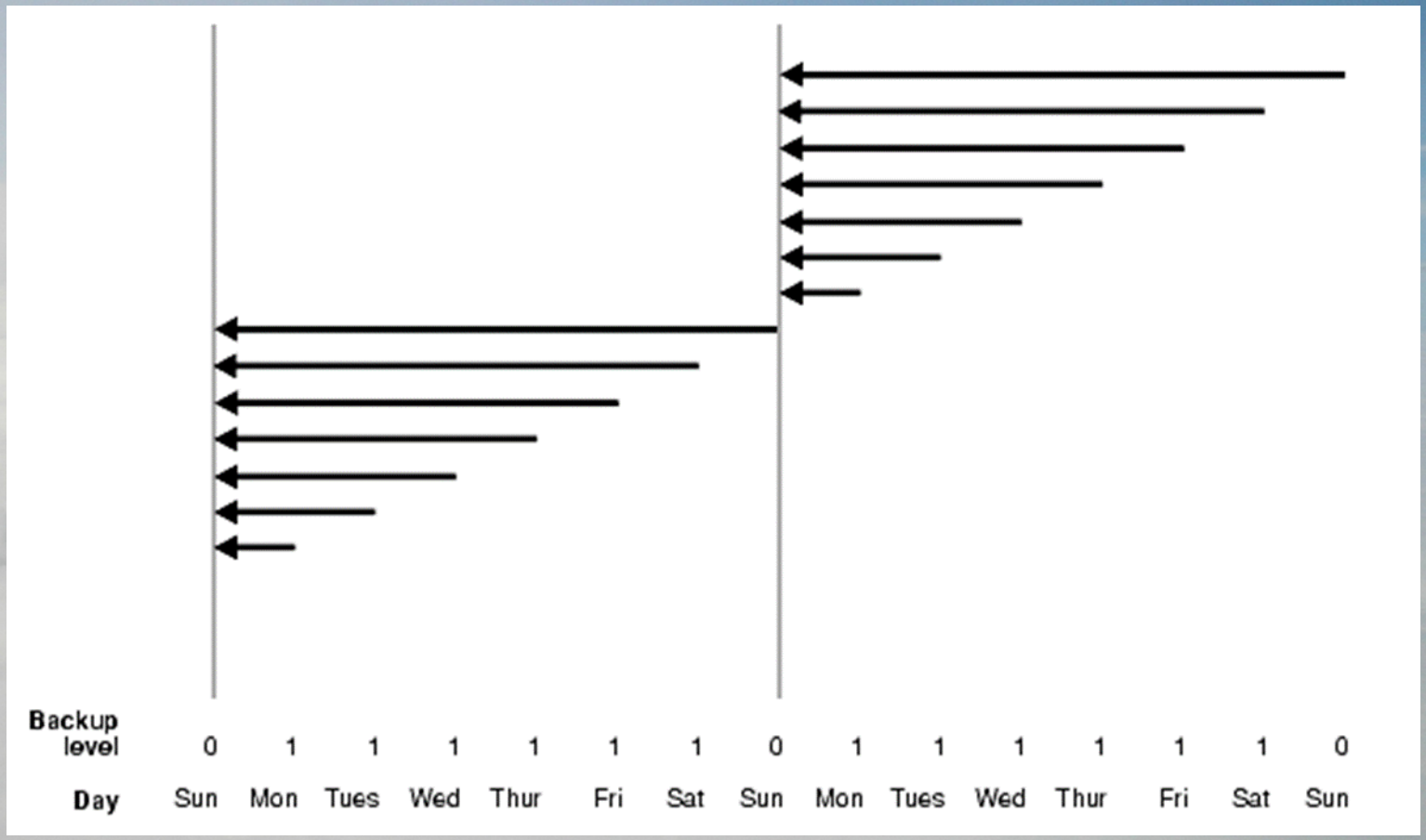
- Show all configurable settings:
  RMAN> show all;
- Cleanup per retention settings.
  RMAN> configure retention policy to recovery window of 7 days;
  RMAN> configure retention policy to redundancy 1; #default
- RMAN catalog.

SQL Server

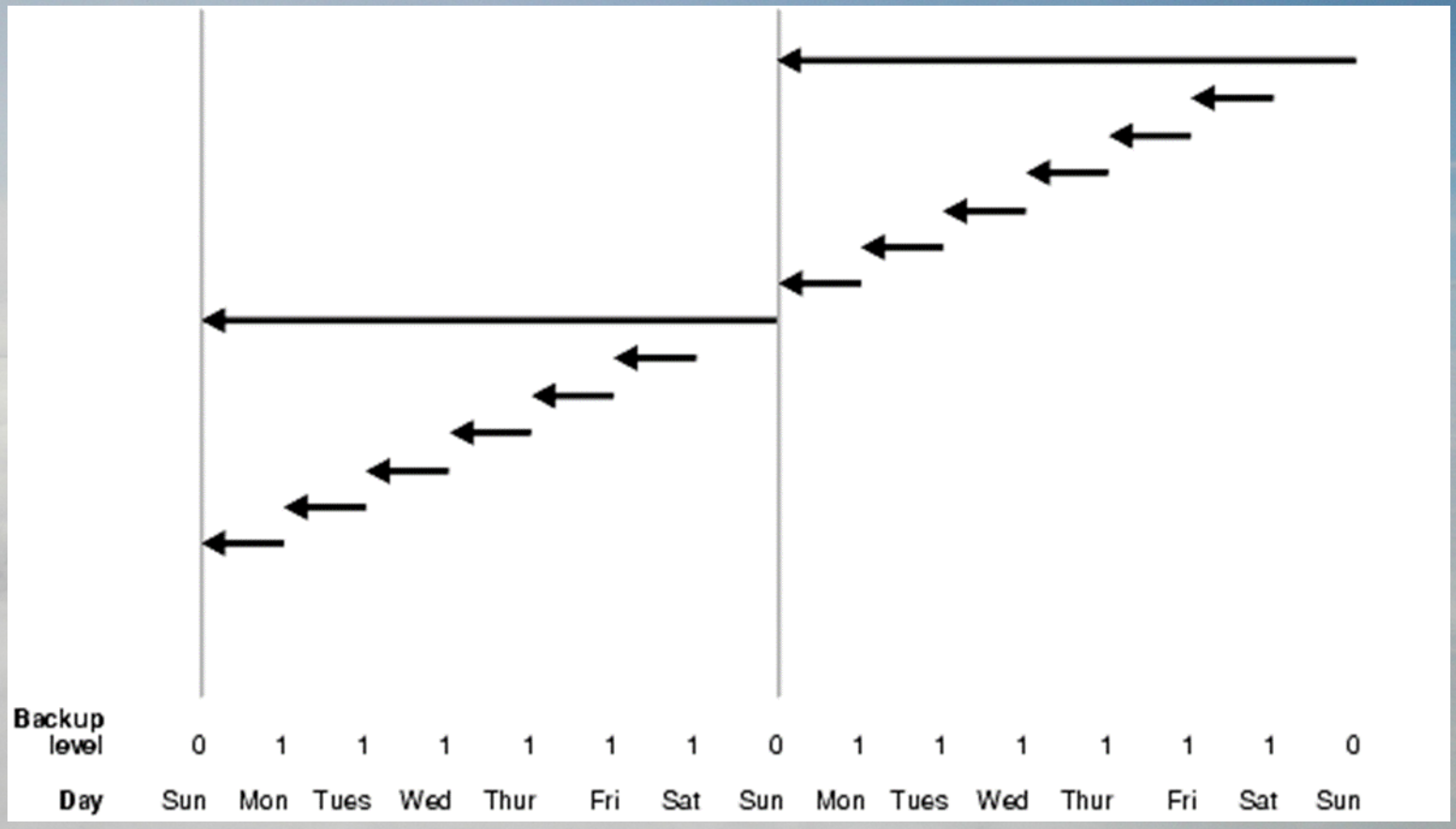
Cleanup manually.

* See my SQL Saturday #308 for automatic backup and cleanup scripts

Backup Incremental Cumulative

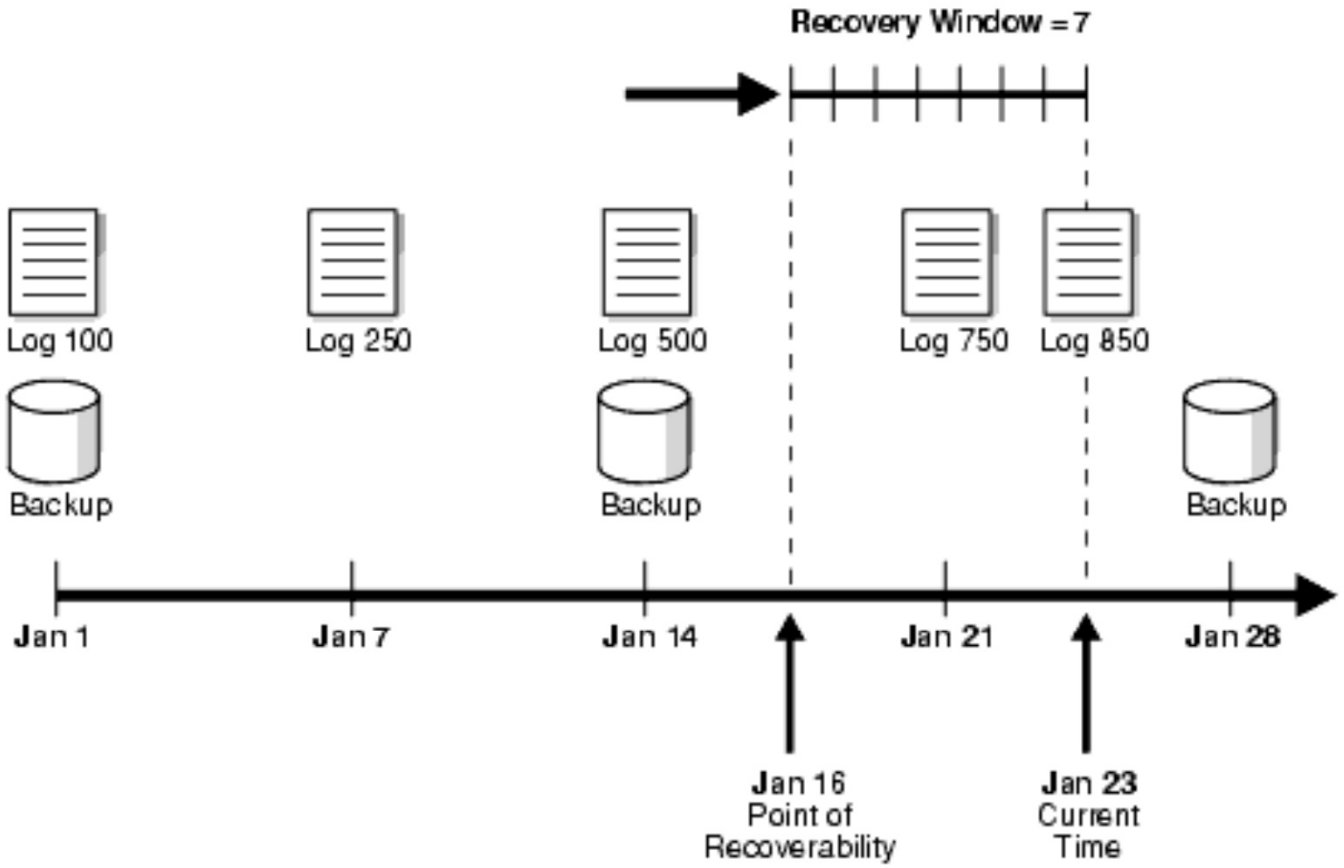


Backup Incremental Differential



Oracle Backup Retention Cleanup

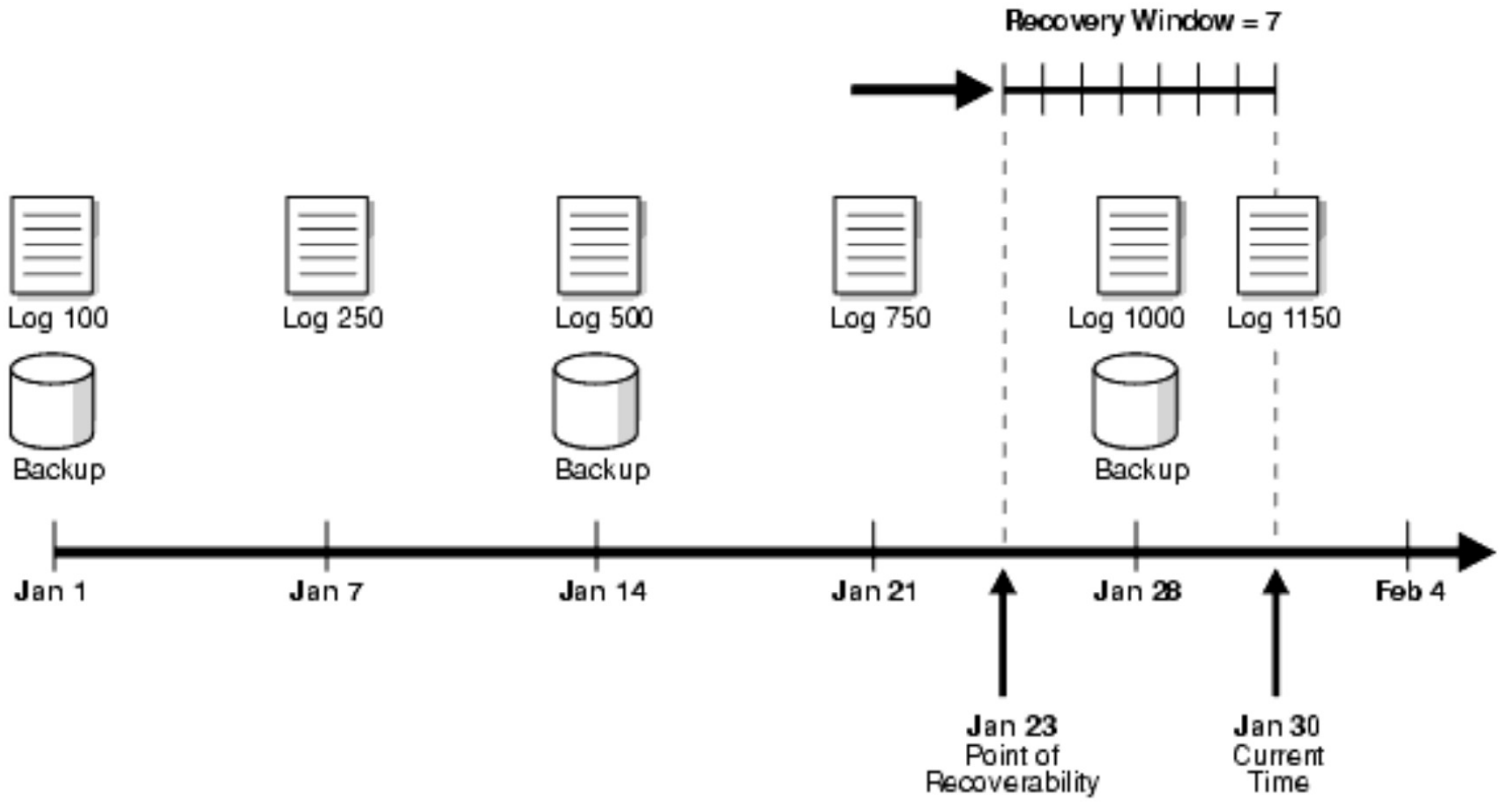
Figure 8-4 Recovery Window, Part 1



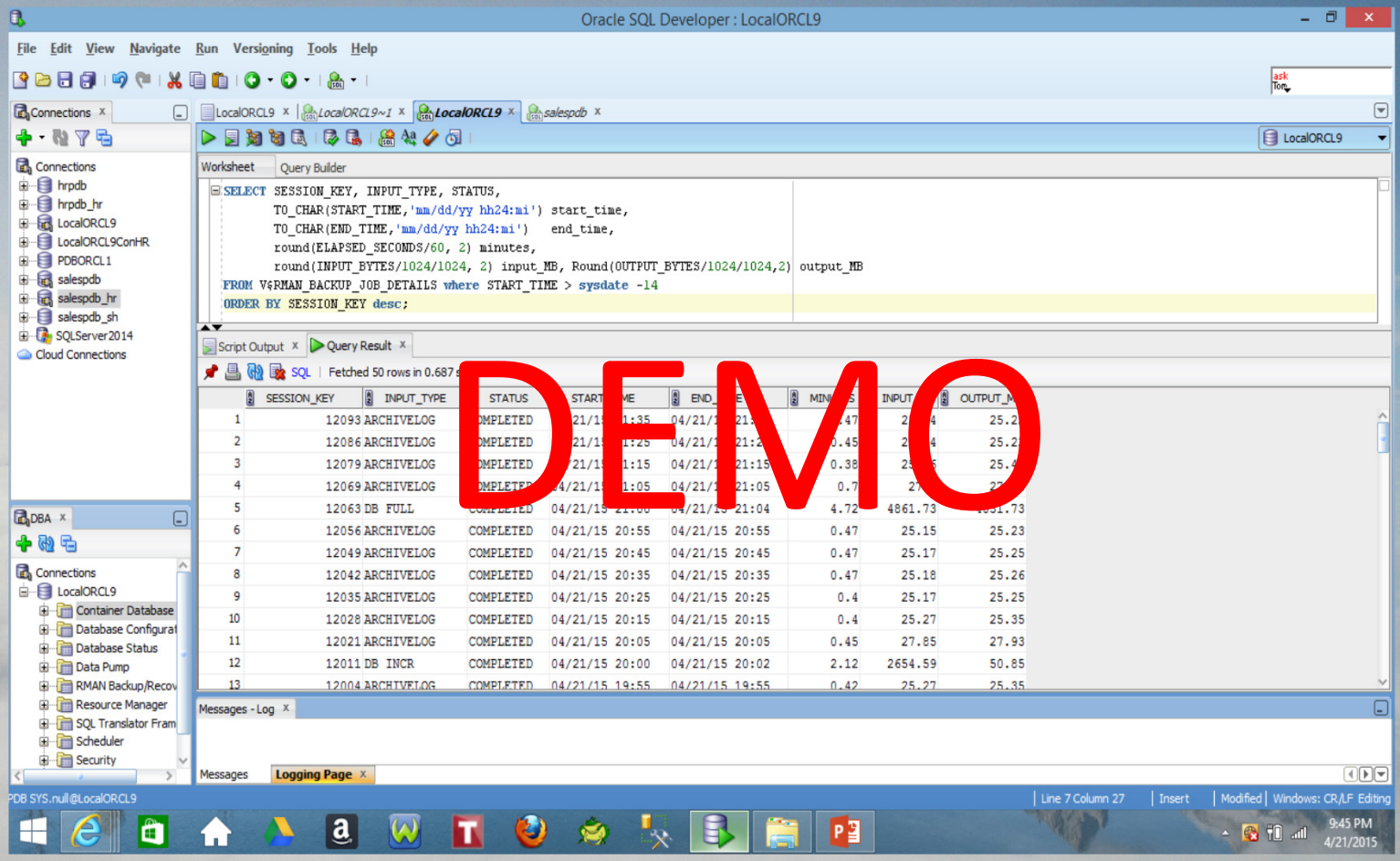
Description of "Figure 8-4 Recovery Window, Part 1"

Oracle Backup Retention Cleanup

Figure 8-5 Recovery Window, Part 2



Description of "Figure 8-5 Recovery Window, Part 2"


Oracle SQL Developer : LocalORCL9
File Edit View Navigate Run Versioning Tools Help
Connections
Connections
hrpdb
hrpdb_hr
LocalORCL9
LocalORCL9ConHR
PDBORCL1
salespdb
salespdb_hr
salespdb_sh
SQLServer2014
Cloud Connections
LocalORCL9
LocalORCL9~1
LocalORCL9
salespdb
Worksheet
Query Builder
SELECT SESSION_KEY, INPUT_TYPE, STATUS,
TO_CHAR(START_TIME,'mm/dd/yy hh24:mi') start_time,
TO_CHAR(END_TIME,'mm/dd/yy hh24:mi') end_time,
round(ELAPSED_SECONDS/60, 2) minutes,
round(INPUT_BYTES/1024/1024, 2) input_MB, Round(OUTPUT_BYTES/1024/1024,2) output_MB
FROM V$RMAN_BACKUP_JOB_DETAILS where START_TIME > sysdate -14
ORDER BY SESSION_KEY desc;
Script Output
Query Result
SQL | Fetched 50 rows in 0.687
SESSION_KEY INPUT_TYPE STATUS
1 12093 ARCHIVELOG
2 12086 ARCHIVELOG
3 12079 ARCHIVELOG
4 12069 ARCHIVELOG
5 12063 DB FULL
6 12056 ARCHIVELOG COMPLETED 04/21/15 20:55 04/21/15 20:55 0.47 25.15 25.23
7 12049 ARCHIVELOG COMPLETED 04/21/15 20:45 04/21/15 20:45 0.47 25.17 25.25
8 12042 ARCHIVELOG COMPLETED 04/21/15 20:35 04/21/15 20:35 0.47 25.18 25.26
9 12035 ARCHIVELOG COMPLETED 04/21/15 20:25 04/21/15 20:25 0.4 25.17 25.25
10 12028 ARCHIVELOG COMPLETED 04/21/15 20:15 04/21/15 20:15 0.4 25.27 25.35
11 12021 ARCHIVELOG COMPLETED 04/21/15 20:05 04/21/15 20:05 0.45 27.85 27.93
12 12011 DB INCR COMPLETED 04/21/15 20:00 04/21/15 20:02 2.12 2654.59 50.85
DEMO
DBA
Connections
LocalORCL9
Container Database
Database Configurat
Database Status
Data Pump
RMAN Backup/Recov
Resource Manager
SQL Translator Fram
Scheduler
Security
Messages - Log
Messages
Logging Page
PDB SYS.null@LocalORCL9
Line 7 Column 27
Insert
Modified
Windows: CR/LF
Editing
9:45 PM
4/21/2015

SQL Server and Oracle Recovery

Oracle RMAN Restore Recovery

- RESTORE DATABASE UNTIL TIME “time";
- RECOVER DATABASE UNTIL TIME “time";

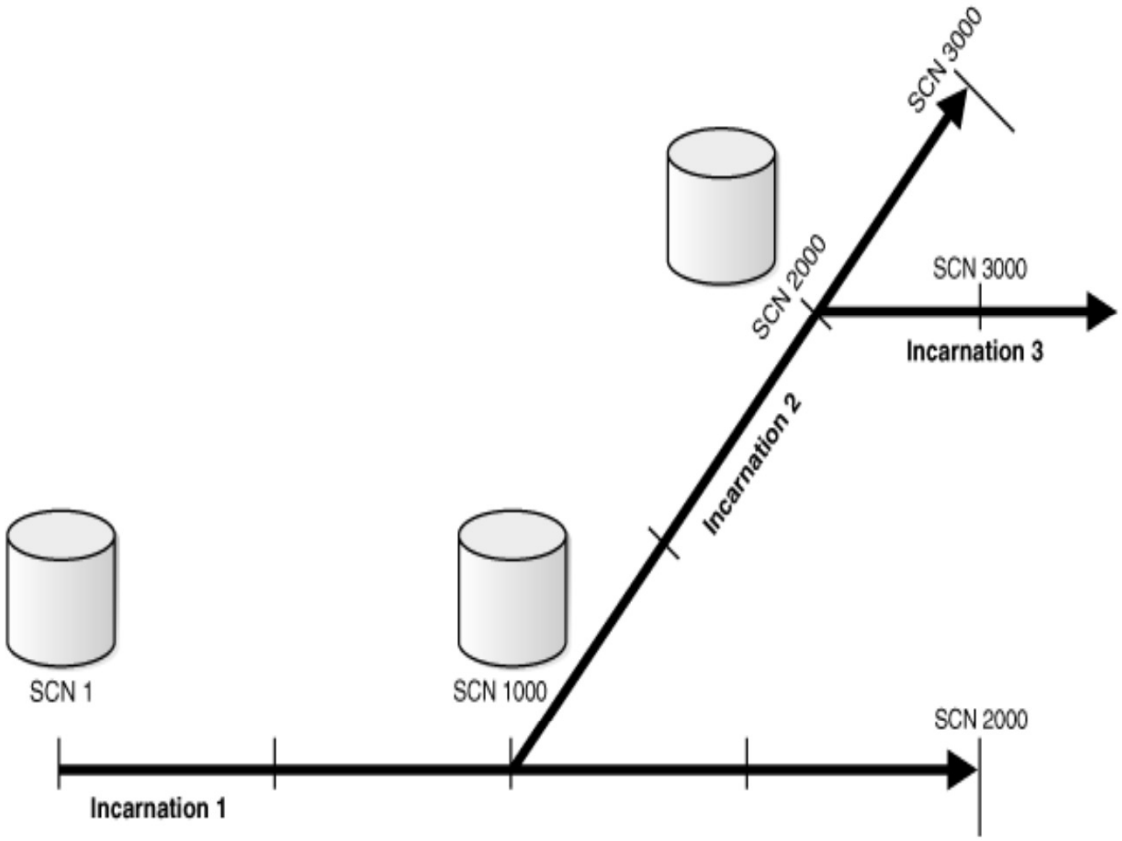
SQL Server Restore Recovery

- Restore Database From Disk = ‘….’ STOPAT time WITH RECOVERY;

* See my SQL Saturday #308 for automatic generated recovery script

Oracle Recovery

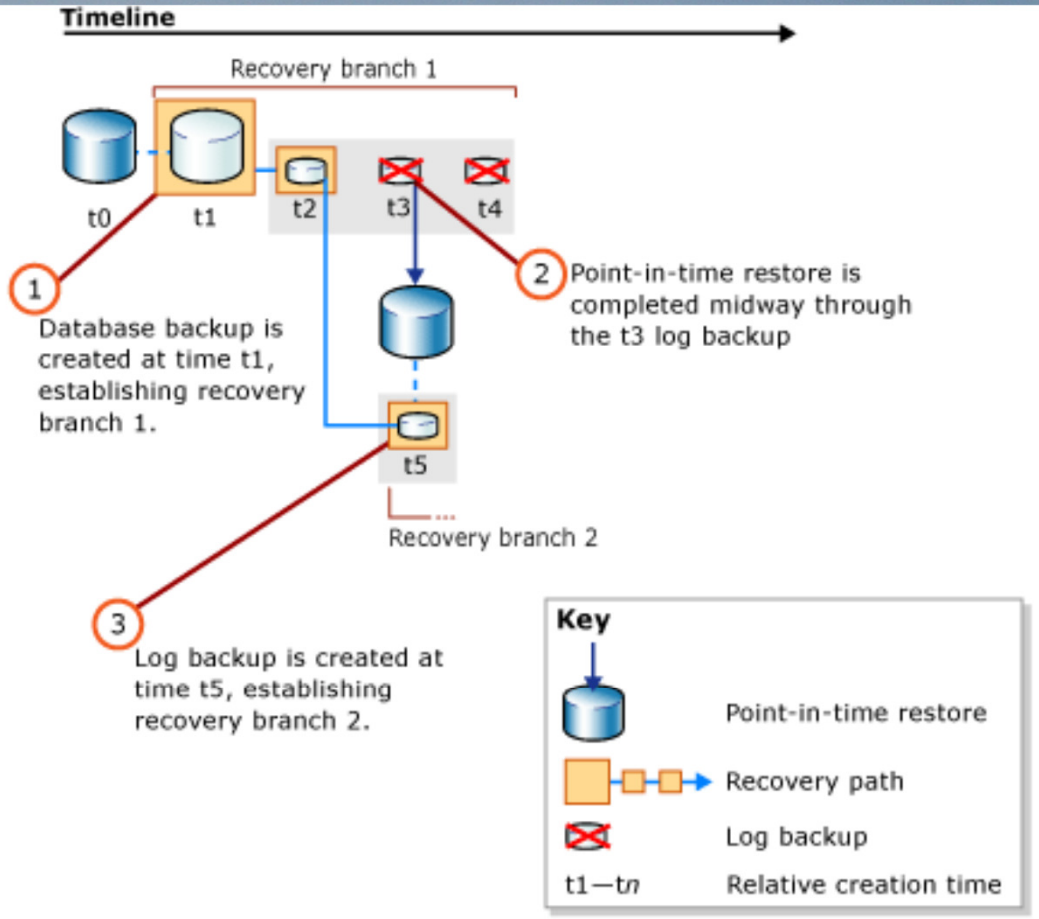
Figure 7-1 Database Incarnation History With Multiple Resetlogs



Description of "Figure 7-1 Database Incarnation History With Multiple Resetlogs"

Incarnation 1 of the database starts at SCN 1, and continues through SCN 1000 to SCN 2000. At SCN 2000 in incarnation 1, you perform a point-in-time recovery back to SCN 1000, and open the datbase with a `RESETLOGS` operation. This creates incarnation 2, which begins at SCN 1000 and contines to SCN 3000. At SCN 3000 in incarnation 2, you perform another point-in-time recovery and `RESETLOGS` operation. This creates incarnation 3, starting at SCN 2000.

SQL Server Recovery



To restore backups on this new recovery path, the restore sequence is: t1, t2, and t5. As future backups are taken on recovery branch 2, they will be incorporated in the new recovery path.

https://technet.microsoft.com/en-us/library/ms175078(v=sql.105).aspx

Differences of SQL Server and Oracle Schema

- In the ANSI SQL-92 standard, a schema is defined as a collection of database objects that are owned by a single user and form a single namespace. A namespace is a set of objects that cannot have duplicate names.

Differences of SQL Server and Oracle Schema

- Oracle – (An USER is a login).
  - Single-tenant database instance.
  - Segregation by schema. (until 12C)

SQL Server – (An USER is associated to a login).

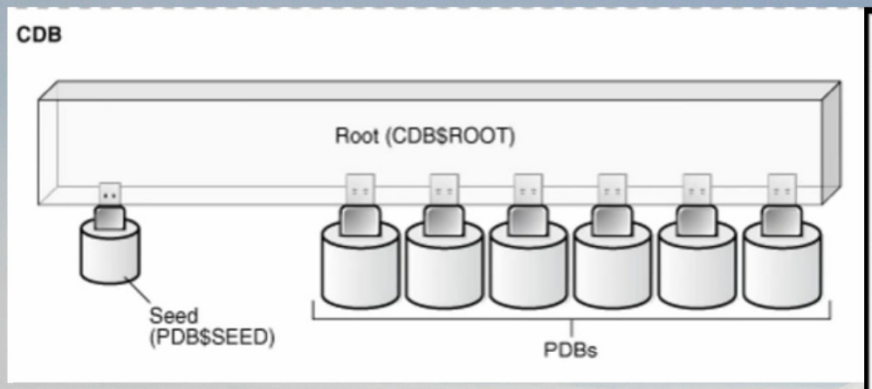
- Multi-tenant database instance.
- Segregation by database.
- Mixed Windows and SQL Server authentication.

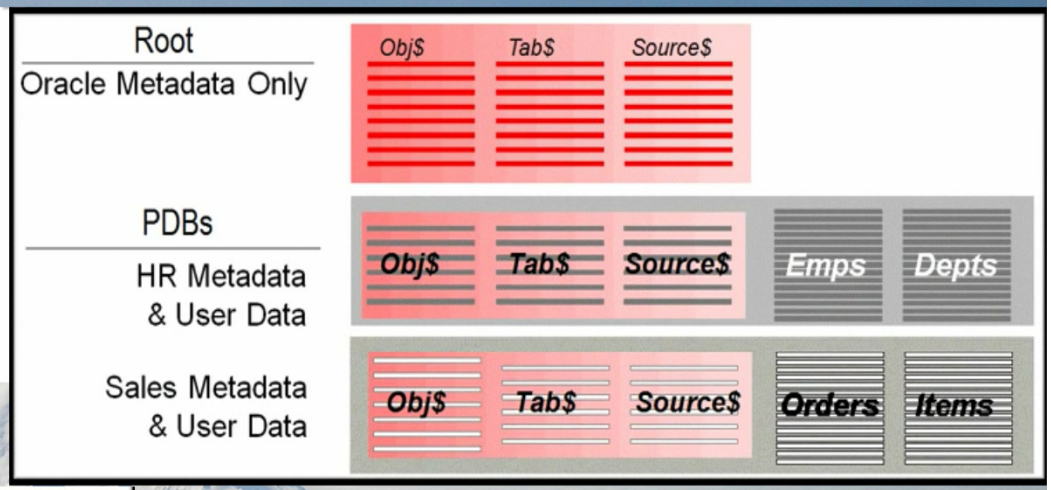
Differences of SQL Server and Oracle Schema

- Oracle
  - Export-import (refresh) schema
  - RMAN refresh database
  - Pluggable database (12C)
- SQL Server
  - Refresh database
  - Contained database (2012)

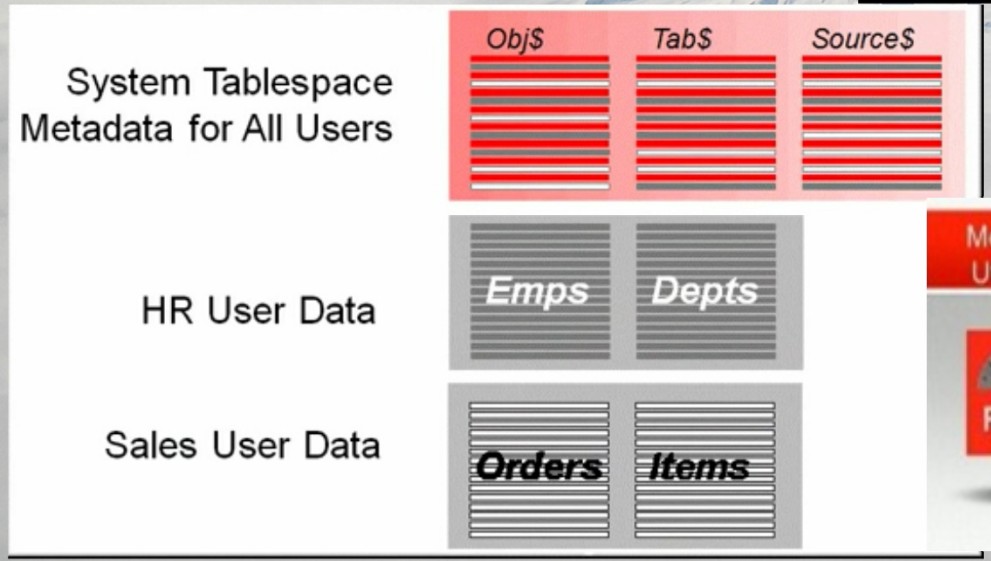
https://www.youtube.com/watch?v=2MrouEW9j88

Differences of SQL Server and Oracle Schema





PDB

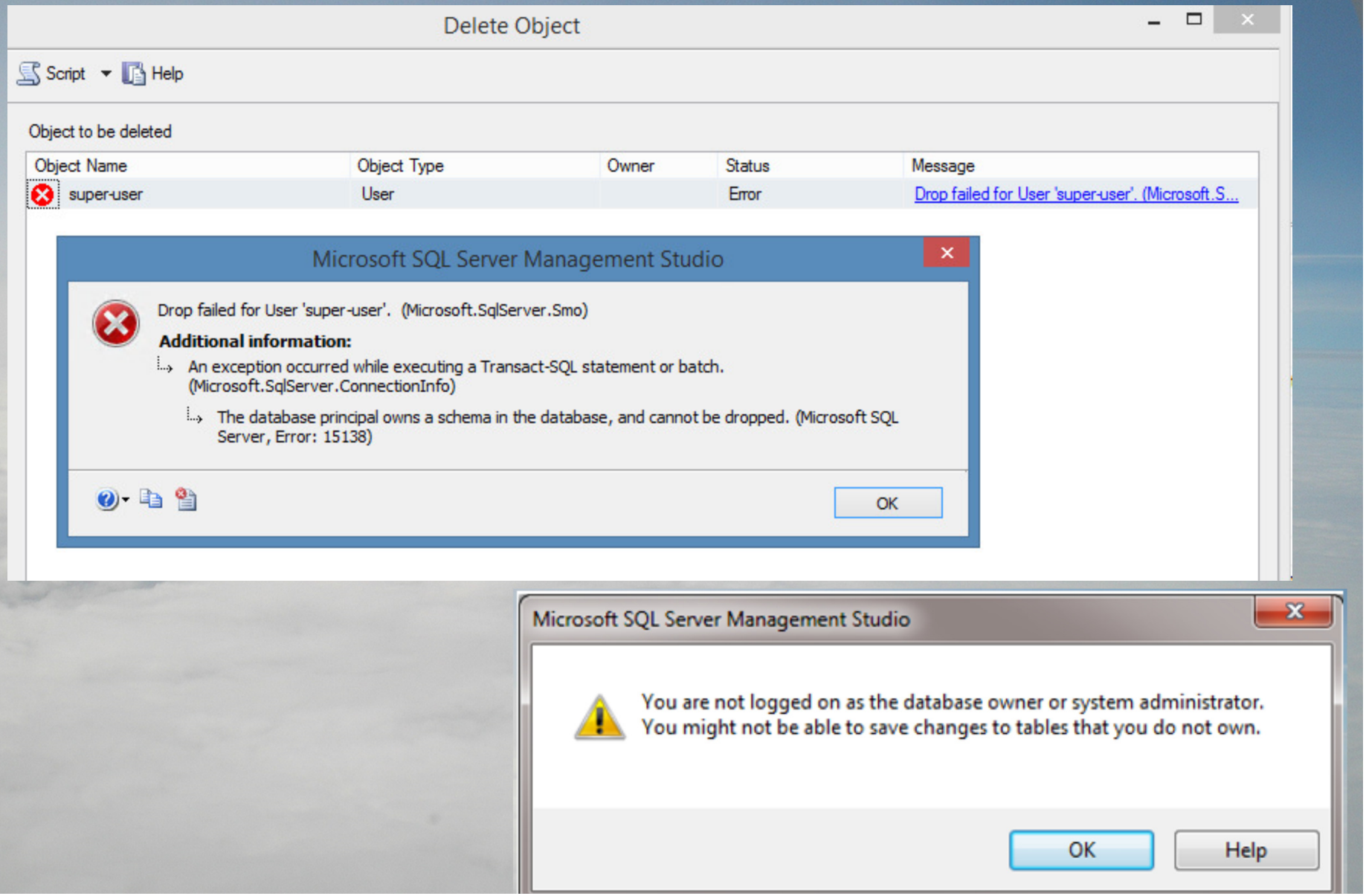


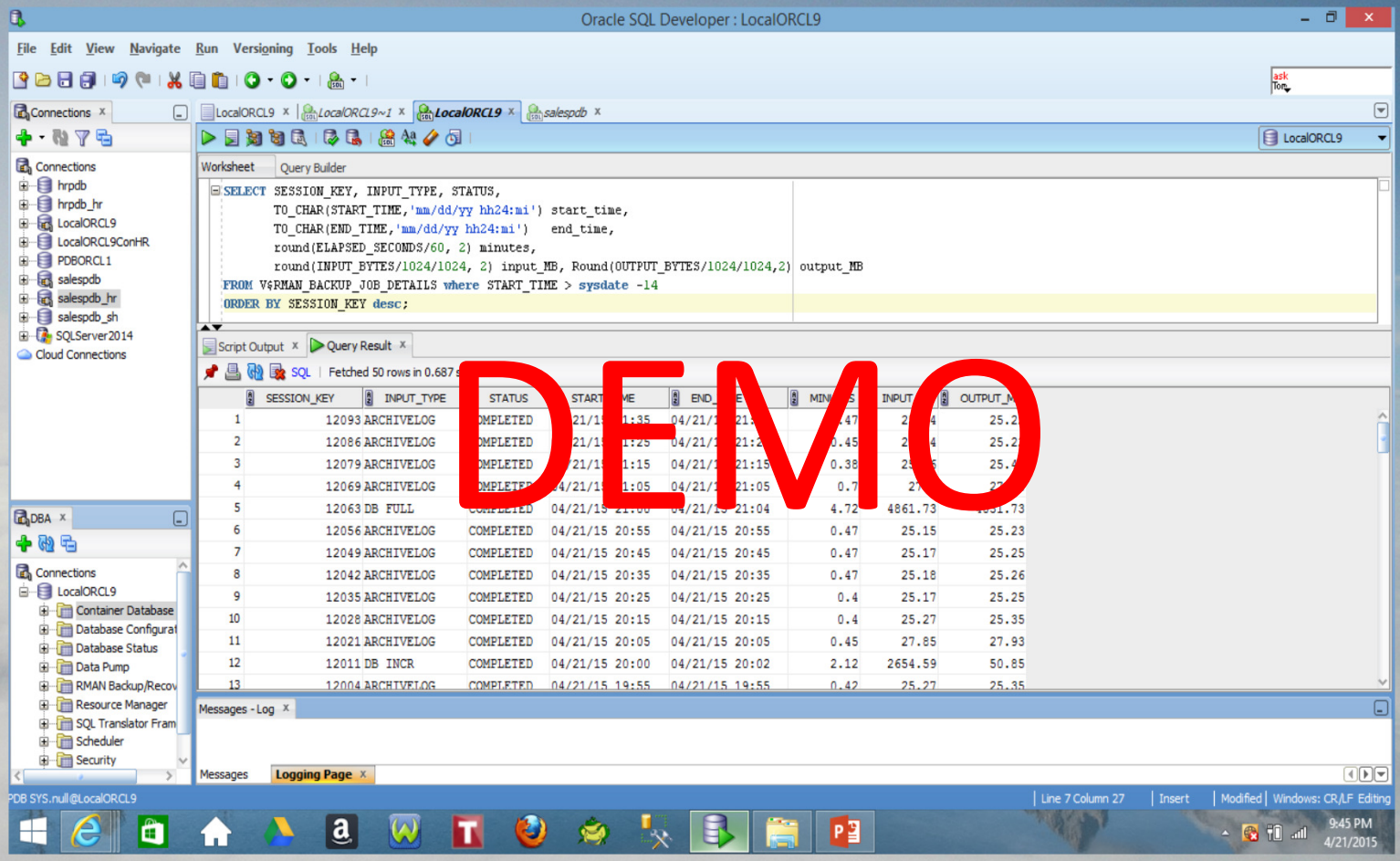
CDB

Differences of SQL Server and Oracle Schema

- Oracle – Drop user cascade;
- SQL Server – Delete user when schema exists, re-assign schema to another user or delete schema first. If schema has objects, re-assign objects first. Create user default schema on ….

Differences of SQL Server and Oracle




Oracle SQL Developer : LocalORCL9
File Edit View Navigate Run Versioning Tools Help
Connections
Connections
hrpdb
hrpdb_hr
LocalORCL9
LocalORCL9ConHR
PDBORCL1
salespdb
salespdb_hr
salespdb_sh
SQLServer2014
Cloud Connections
LocalORCL9
LocalORCL9~1
LocalORCL9
salespdb
Worksheet
Query Builder
SELECT SESSION_KEY, INPUT_TYPE, STATUS,
TO_CHAR(START_TIME,'mm/dd/yy hh24:mi') start_time,
TO_CHAR(END_TIME,'mm/dd/yy hh24:mi') end_time,
round(ELAPSED_SECONDS/60, 2) minutes,
round(INPUT_BYTES/1024/1024, 2) input_MB, Round(OUTPUT_BYTES/1024/1024,2) output_MB
FROM V$RMAN_BACKUP_JOB_DETAILS where START_TIME > sysdate -14
ORDER BY SESSION_KEY desc;
Script Output
Query Result
SQL | Fetched 50 rows in 0.687
SESSION_KEY INPUT_TYPE STATUS
1 12093 ARCHIVELOG
2 12086 ARCHIVELOG
3 12079 ARCHIVELOG
4 12069 ARCHIVELOG
5 12063 DB FULL
6 12056 ARCHIVELOG COMPLETED 04/21/15 20:55 04/21/15 20:55 0.47 25.15 25.23
7 12049 ARCHIVELOG COMPLETED 04/21/15 20:45 04/21/15 20:45 0.47 25.17 25.25
8 12042 ARCHIVELOG COMPLETED 04/21/15 20:35 04/21/15 20:35 0.47 25.18 25.26
9 12035 ARCHIVELOG COMPLETED 04/21/15 20:25 04/21/15 20:25 0.4 25.17 25.25
10 12028 ARCHIVELOG COMPLETED 04/21/15 20:15 04/21/15 20:15 0.4 25.27 25.35
11 12021 ARCHIVELOG COMPLETED 04/21/15 20:05 04/21/15 20:05 0.45 27.85 27.93
12 12011 DB INCR COMPLETED 04/21/15 20:00 04/21/15 20:02 2.12 2654.59 50.85
DEMO
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Connections
LocalORCL9
Container Database
Database Configurat
Database Status
Data Pump
RMAN Backup/Recov
Resource Manager
SQL Translator Fram
Scheduler
Security
Messages - Log
Messages
Logging Page
PDB SYS.null@LocalORCL9
Line 7 Column 27
Insert
Modified
Windows: CR/LF
Editing
9:45 PM
4/21/2015

Differences of SQL Server and Oracle Alter Index Rebuild

- Oracle – Alter Index Rebuild (recommended never by Tom Kyte)
  - row-chaining, row-migration, 'un-migrated', High Water Mark
  - freelists, PCTUSED,
  - PCTFREE (the only one parameter to control in ASSM; IOT uses differently)

- SQL Server – Alter Index Rebuild/Reorganize (necessary)
  - page-split, fillfactor, pad_index

https://asktom.oracle.com/pls/apex/f?p=100:11:102652686874750::::P11_QUESTION_ID:2913600659112
https://asktom.oracle.com/pls/asktom/f?p=100:11:0::::P11_QUESTION_ID:35336203098853
https://asktom.oracle.com/pls/apex/f?p=100:11:0::::P11_QUESTION_ID:54178027703899

* See my SQL Saturday #308 for automatic defrag script

Differences of SQL Server and Oracle Row Migration

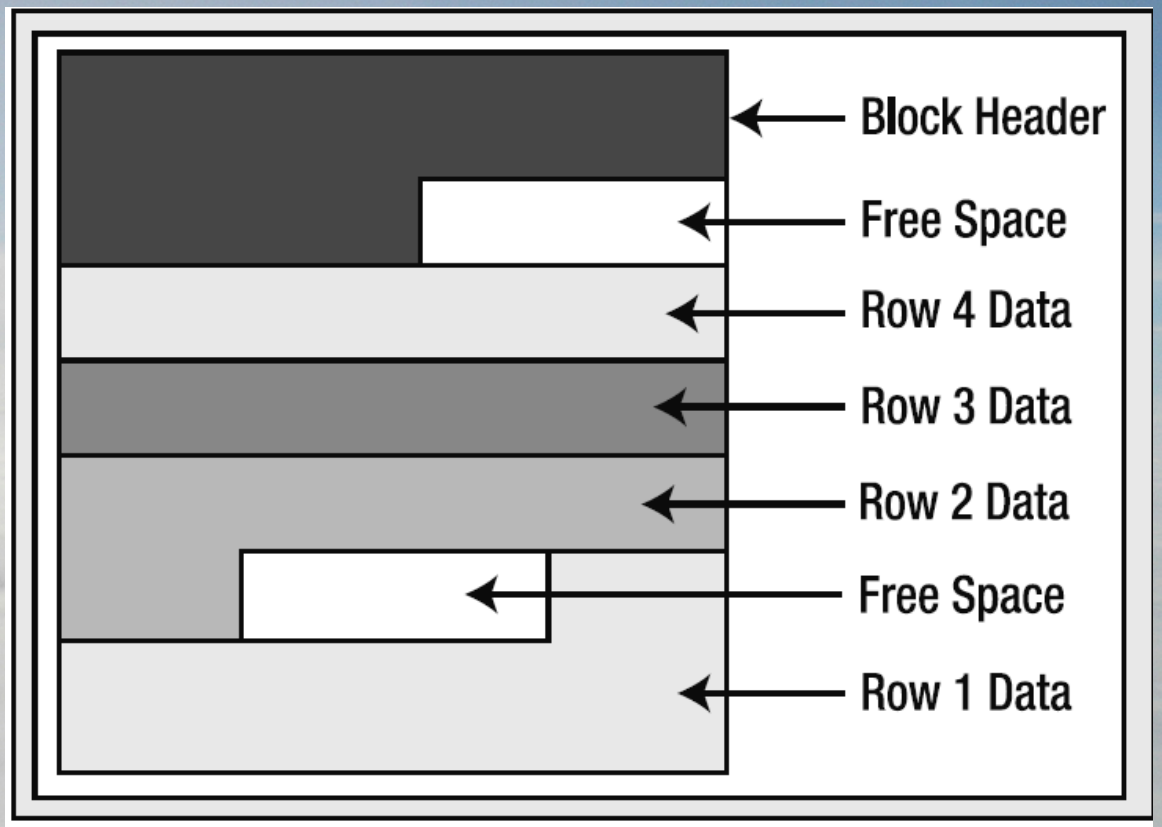


Figure 10-3. Data block before update

Differences of SQL Server and Oracle Row Migration

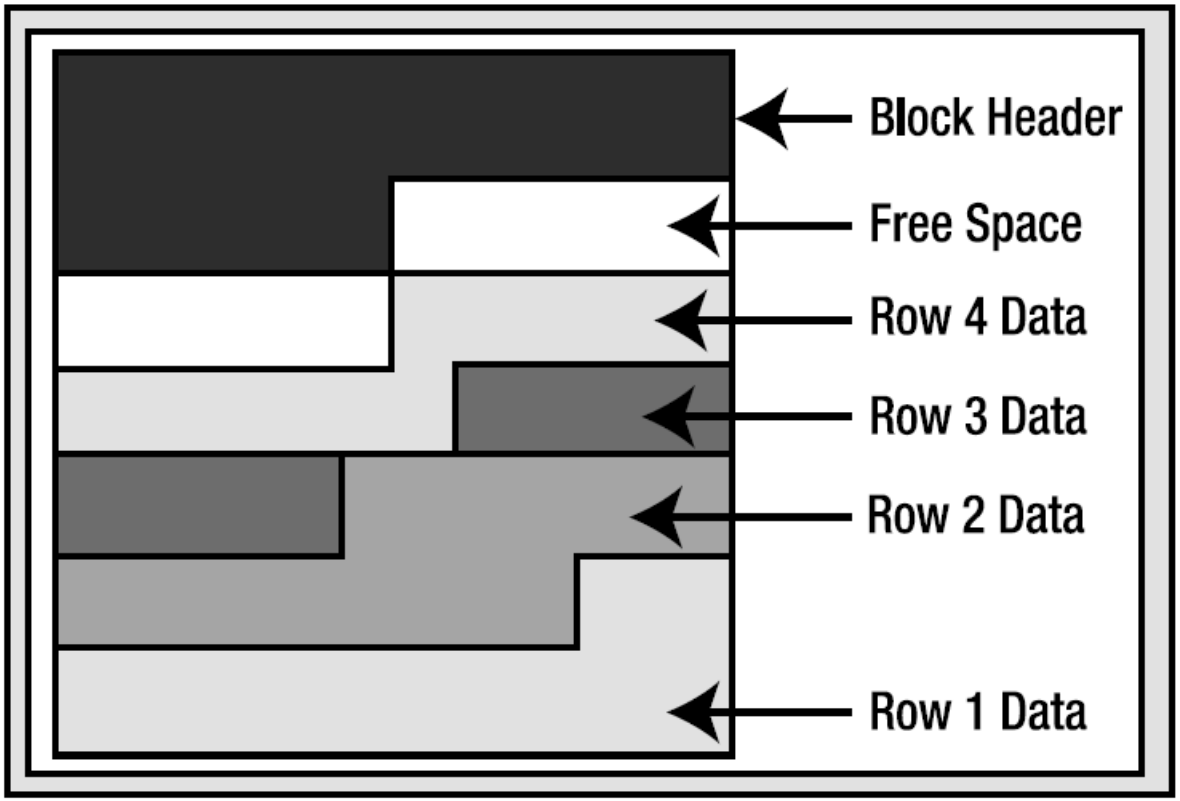


Figure 10-4. *Data block as it would appear after coalescing free space*

Differences of SQL Server and Oracle Row Migration

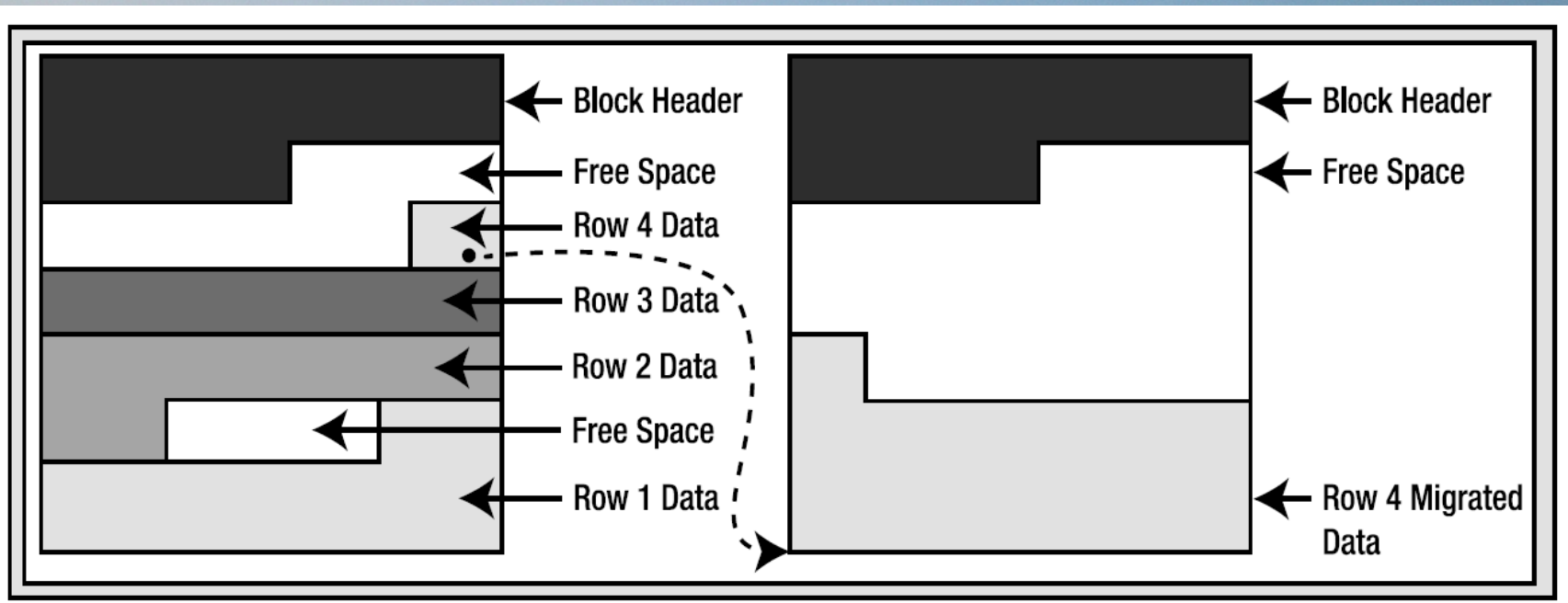


Figure 10-5. *Migrated row depiction*

Differences of SQL Server and Oracle High Water Mark

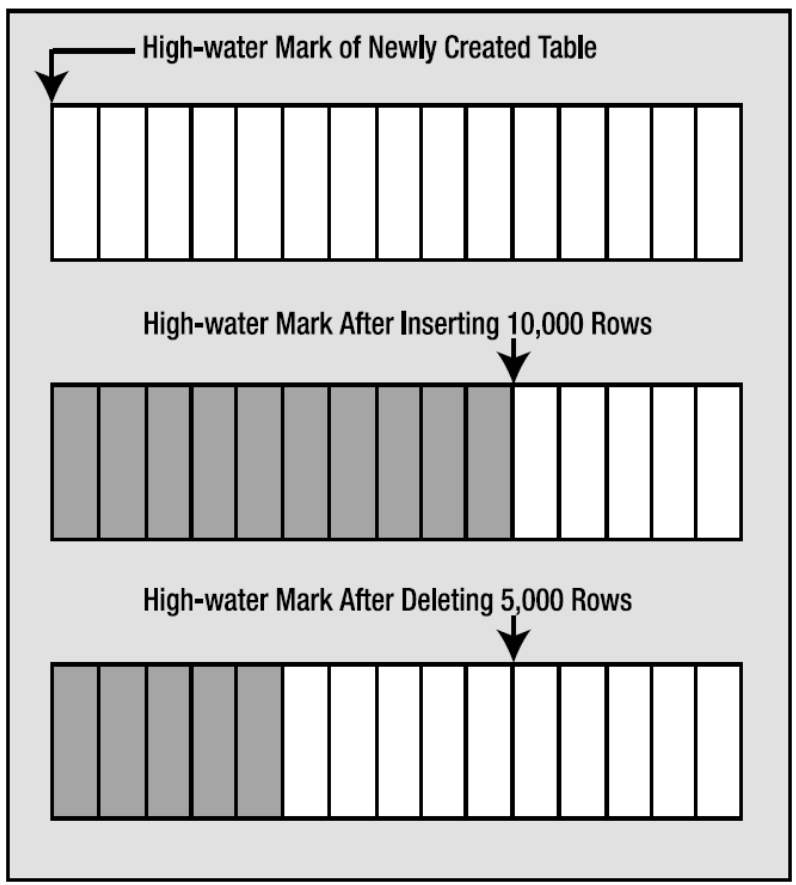


Figure 10-1. Depiction of an HWM

https://asktom.oracle.com/pls/asktom/f?p=100:11:0::::P11_QUESTION_ID:492636200346818072

Differences of SQL Server and Oracle Performance Tuning and Monitoring

- Oracle – AWR, ADDM, ASH, Grid Control
  - Wait stats, session history, monitoring ….
- SQL Server – DMV/F, MDW, Xevent, CMS
  - DBA DIY calculating wait stats, recording session history ….
  - Or 3rd party tools like Idera DM (still missing some aspects)

- * See my SQLPASS user group presentation of trouble-shooting with ASH
- Oracle White Paper, Sep., 2010, "Advanced Uses of Oracle Enterprise Manager 11g"
- http://docs.oracle.com/cd/E11882_01/server.112/e10822/tdppt_realtime.htm#TDPPT033
- http://www.nyoug.org/Presentations/2008/Sep/Ault_AWR.pdf
- http://www.oracle.com/pls/em121/homepage

Differences of SQL Server and Oracle Performance Tuning and Monitoring

Figure 3-4 Overview of System Performance

Differences of SQL Server and Oracle

Figure 4-1 Database Performance Page

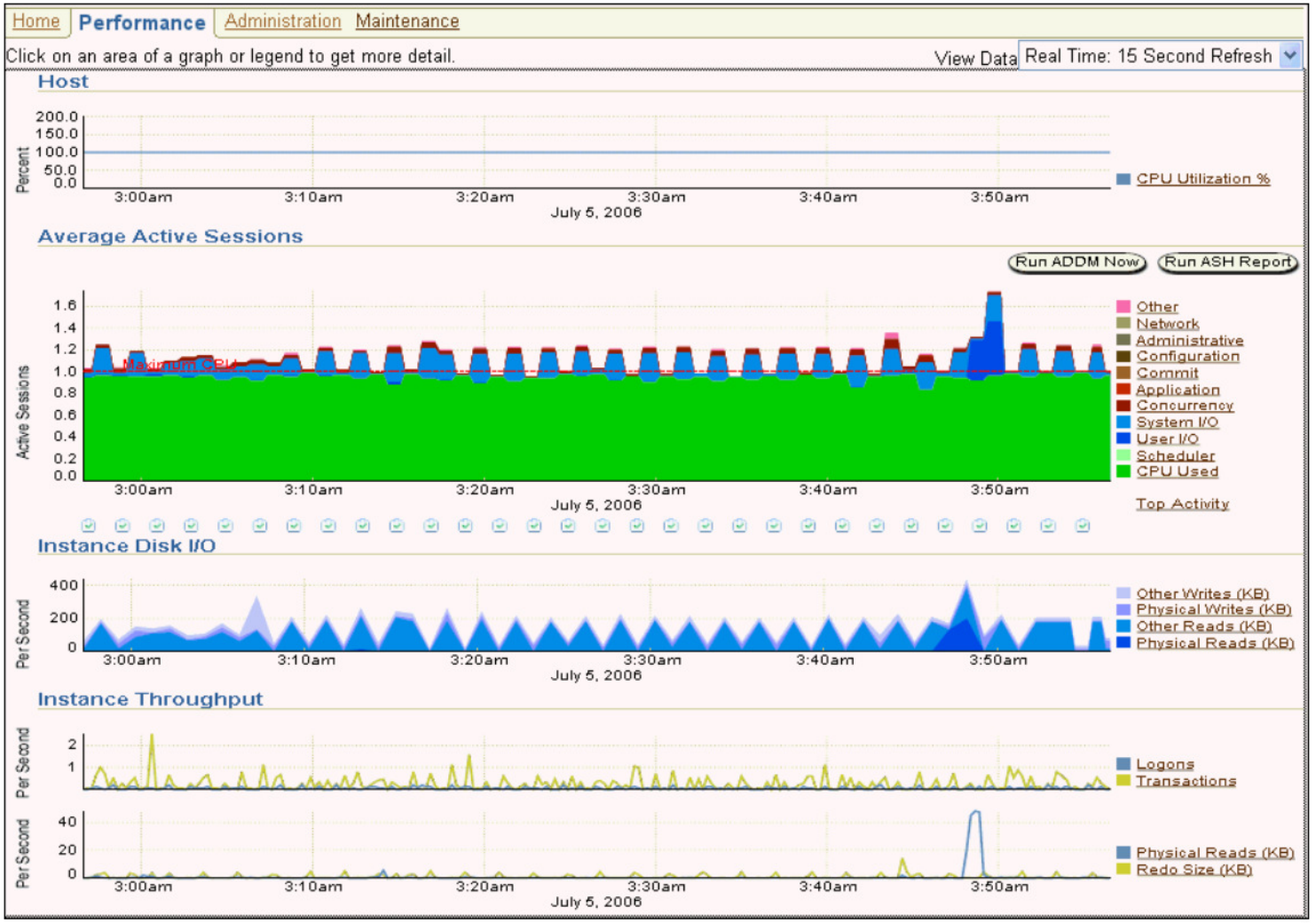
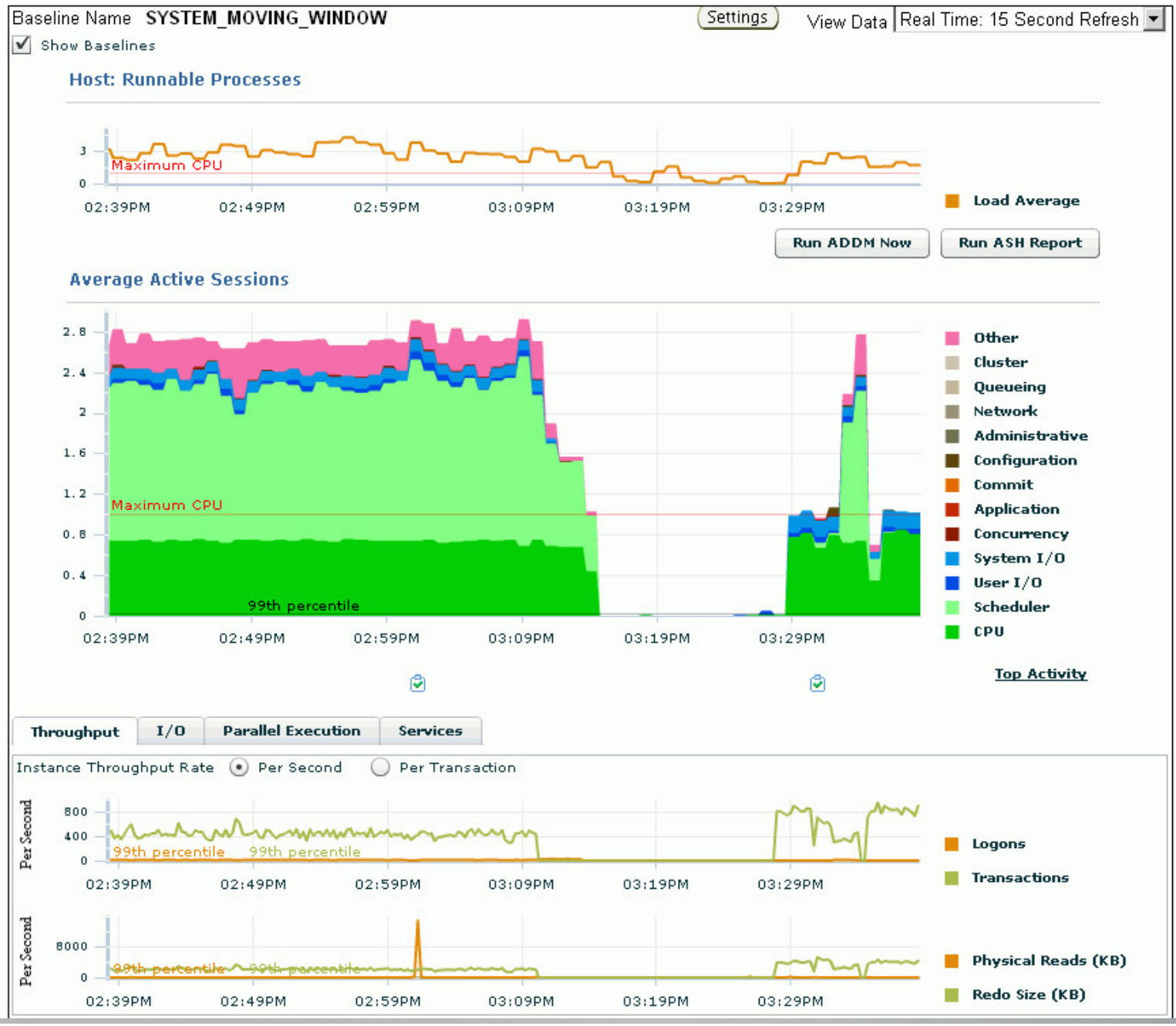
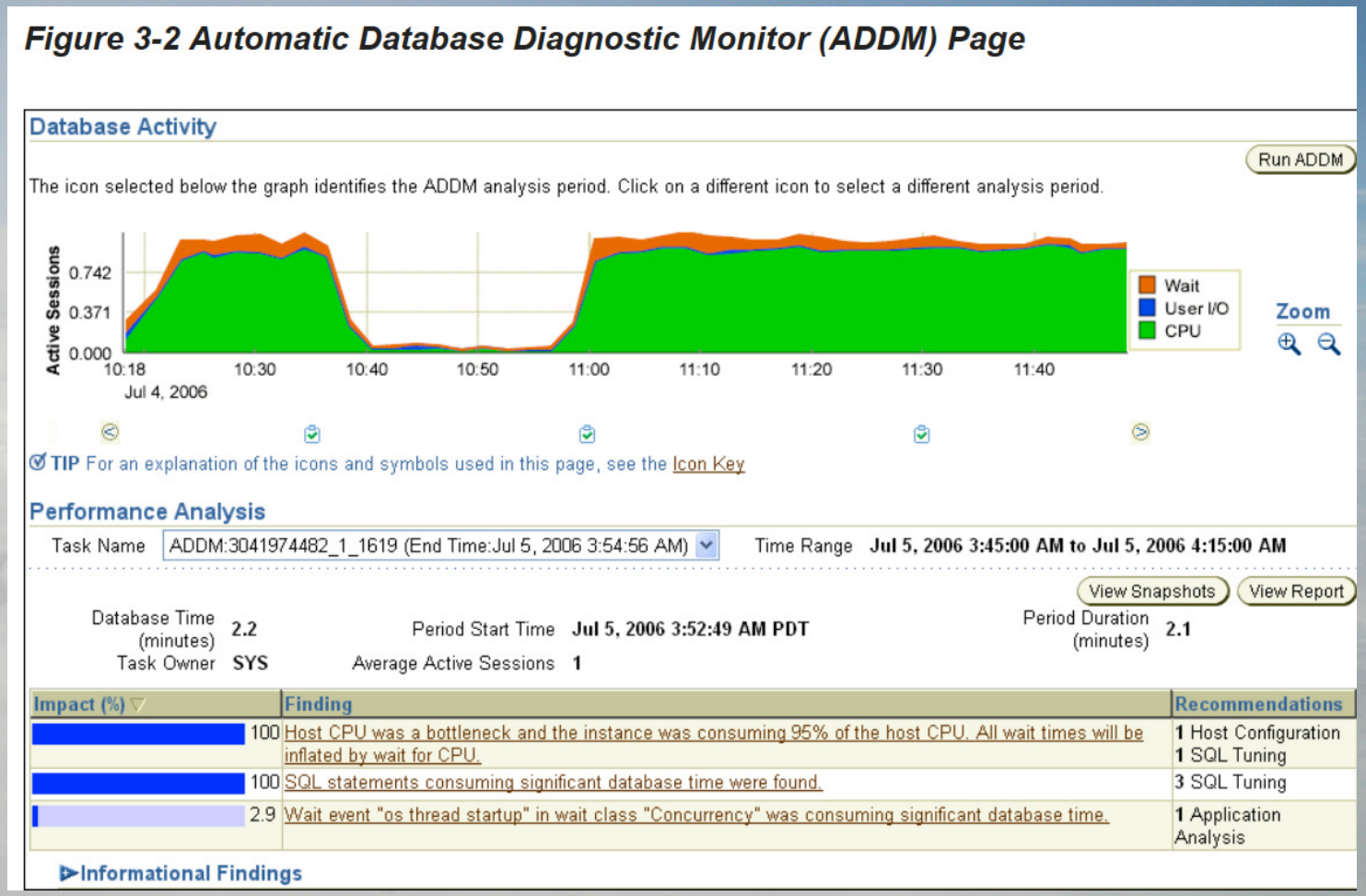


Figure 4-1 Performance Page

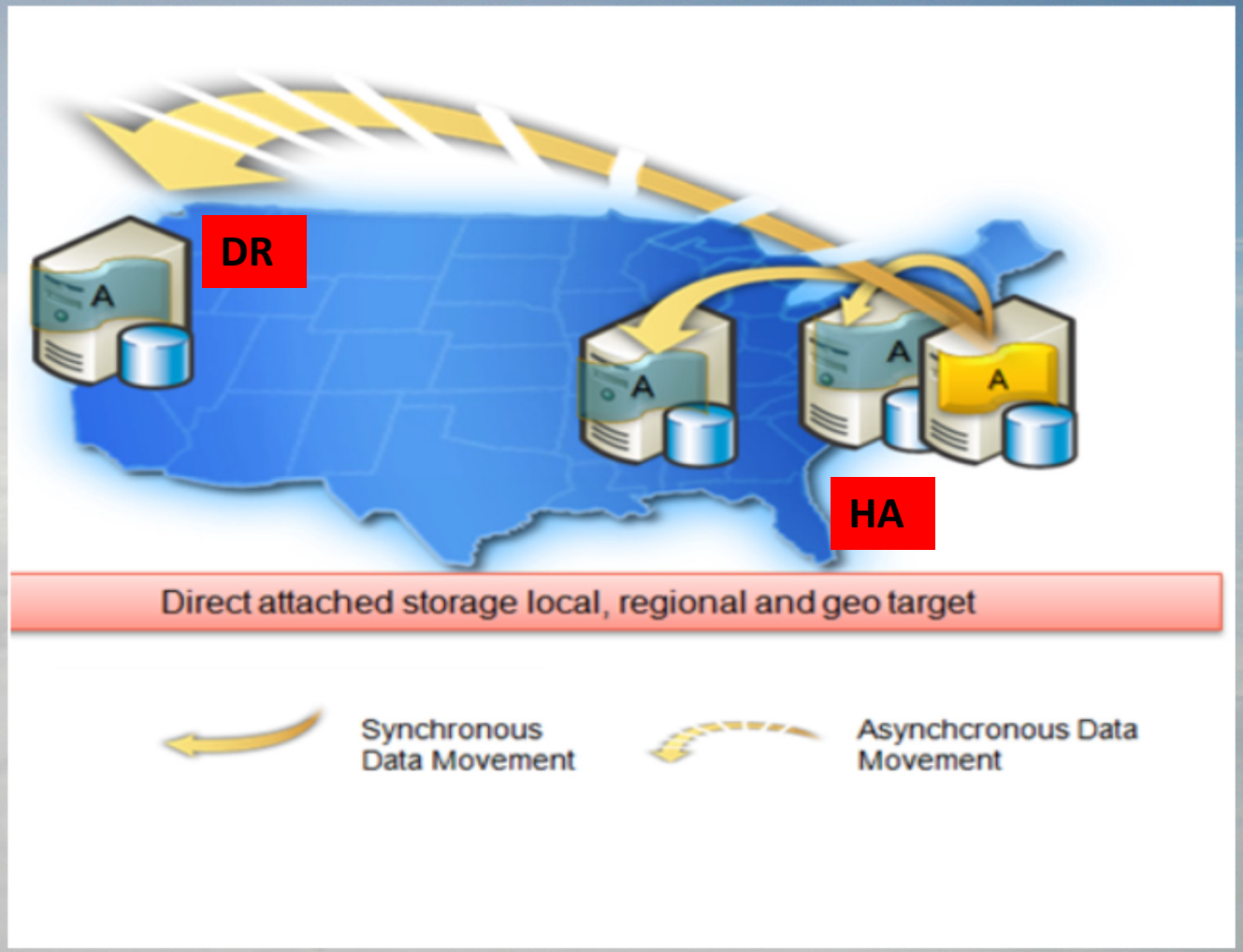


Differences of SQL Server and Oracle Performance Tuning and Monitoring

Figure 3-2 Automatic Database Diagnostic Monitor (ADDM) Page



Differences of SQL Server and Oracle High Availability Disaster Recovery



Differences of SQL Server and Oracle High Availability Disaster Recovery

- Oracle – Data Guard
  - Maximum Protection, Maximum Availability, Maximum Performance
  - Redo log, Archivelog (archived redo log)
  - Physical standby, Snapshot standby, ~~Logical standby~~, Active Data Guard

- SQL Server – Always On Availability Group (HADR)
  - Not including system databases
  - Synchronous, Asynchronous mode
  - Transaction log
  - Read-only secondary

- http://oracle-base.com/articles/11g/data-guard-setup-11gr2.php#start_apply_process
- Data Guard book: ISBN 978-1-84968-790-4
- https://msdn.microsoft.com/en-us/library/hh510230.aspx

Differences of SQL Server and Oracle

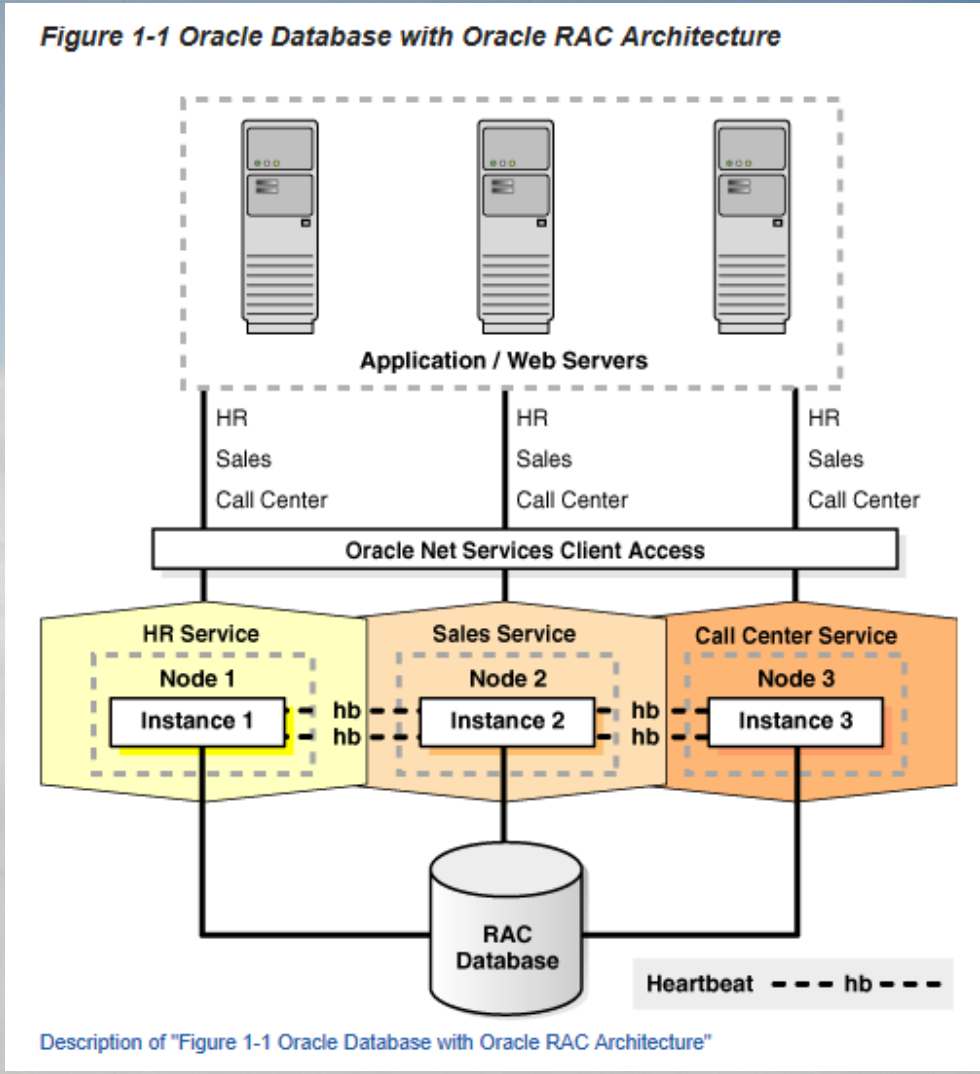
Protection modes

Data Guard offers three data protection modes, which serve different business needs in terms of data protection and performance. You can find the properties of these modes in the following comparison table:

Mode	Redo transport	Action with no standby database connection	Risk of data loss
Maximum Protection	SYNC and LGWR	The primary database needs to write redo to at least one standby database. Otherwise it will shut down.	Zero data loss is guaranteed.
Maximum Availability	SYNC and LGWR	Normally works with SYNC redo transport. If the primary database cannot write redo to any of its standby databases, it continues processing transactions as in ASYNC mode.	Zero data loss in normal operation, but not guaranteed.
Maximum Performance	ASYNC and LGWR/ARCH	Never expects acknowledgment from the standby database.	Potential for minimal data loss in a normal operation.

* By default, the standby database writes received redo data into the standby redo logfiles and apply services do not apply redo until the standby redo log is archived as an archived redo log (unless use real-time apply).

Oracle RAC – High Availability



http://tcoug.org/presentations/winter-2012/Understanding-Oracle-RAC-Internals.pdf

Differences of SQL Server and Oracle Conclusion

Which one is gooder?

- Questions?
- Thank you for coming.

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