



Oracle学习与 Oracle Database 11g新特性

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Who am i

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Itpub技术丛书



2004



2005



2006



2007



Subject

- Oracle学习之路
- 循序渐进探索数据库的创建
- Oracle的可传输表空间技术
- 数据库跨平台迁移的深入探索
- Oracle11g的新特性介绍



Oracle学习之路

□ 兴趣 + 勤奋 + 坚持 + 方法 \approx 成功

很遗憾我不能给以上公式画上“=”，但是无关紧要，只要具备了以上因素，我想我们每个人都会离成功不远了。

不只是对于Oracle学习，对于整个人生，也许都是如此。

我们祝愿大家离成功越来越近。



Oracle学习之路

- ❑ 基础重于一切
- ❑ 独立思考才能提高
- ❑ 严谨是一种素质
- ❑ 通过实践检验知识



DBA四大守则

- 备份重于一切

系统总是要崩溃的，没有有效的备份只是等哪一天死!

- 三思而后行

think thrice before you act

任何时候都要清楚你所做的一切，否则宁可不做!

- rm是危险的

要知道在Unix/Linux下，这个操作意味着你可能永远失去后面的东西，所以，确认你的操作!!!

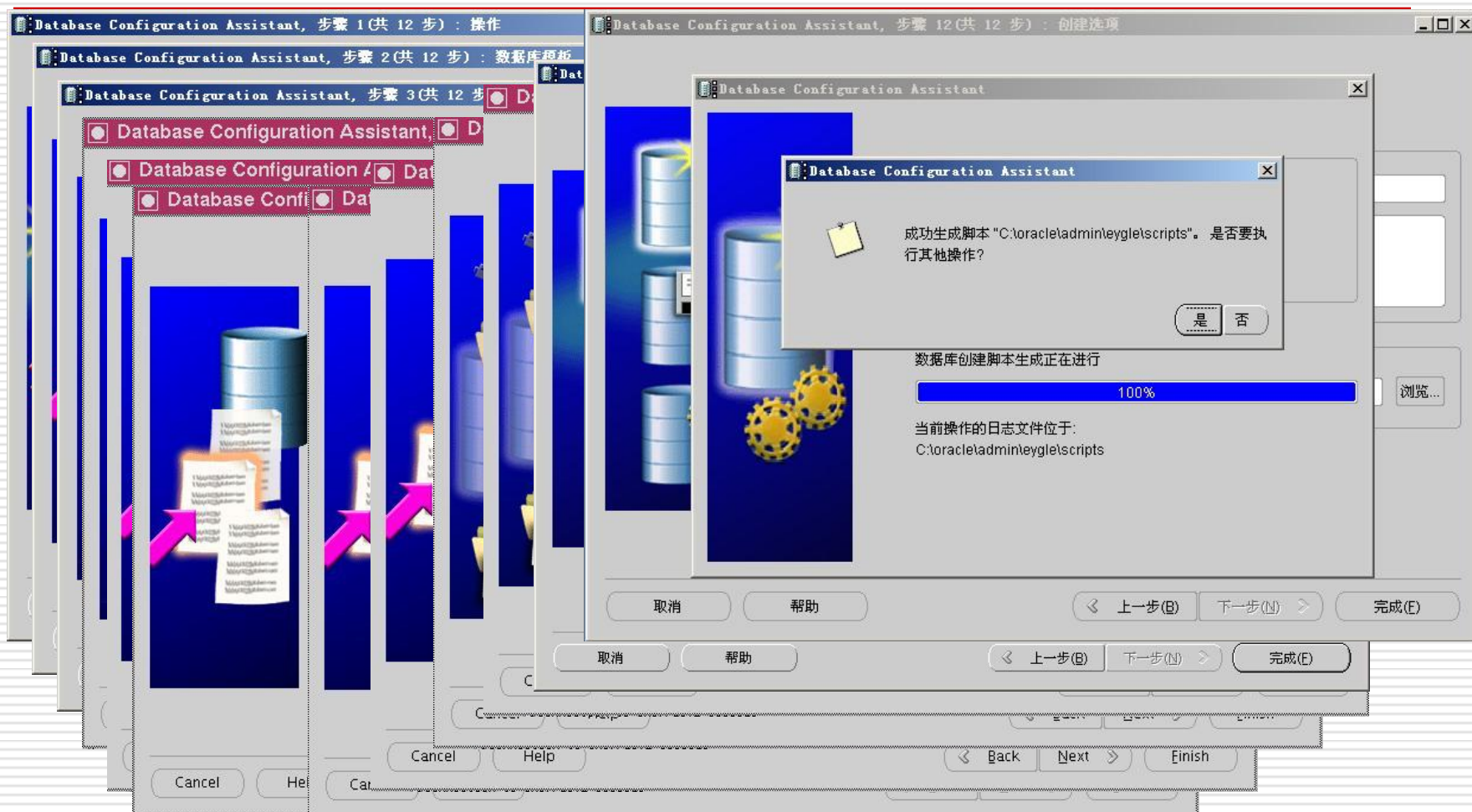
一知半解比无知更可怕.

- 你来制定规范

不以规矩,不成方圆



数据库的创建





数据库的创建脚本

eygle.bat 开始数据库创建:

```
C:\oracle\10.2.0\bin\oradim.exe -new -sid EYGLE -startmode manual -spfile  
C:\oracle\10.2.0\bin\oradim.exe -edit -sid EYGLE -startmode auto -srvstart system  
C:\oracle\10.2.0\bin\sqlplus /nolog @C:\oracle\admin\eygle\scripts\eygle.sql
```

eygle.sql 脚本调用:

```
@C:\oracle\admin\eygle\scripts\CreateDB.sql  
@C:\oracle\admin\eygle\scripts\CreateDBFiles.sql  
@C:\oracle\admin\eygle\scripts\CreateDBCatalog.sql  
@C:\oracle\admin\eygle\scripts\xdb_protocol.sql  
@C:\oracle\admin\eygle\scripts\postDBCcreation.sql
```

```
C:\D:\WINDOWS\system32\CMD.EXE  
E:\Oracle\admin\eygle\scripts>dir  
驱动器 E 中的卷没有标签。  
卷的序列号是 EC20-2008  
  
E:\Oracle\admin\eygle\scripts 的目录  
2007-05-10 10:07 <DIR> .  
2007-05-10 10:07 <DIR> ..  
2006-08-17 19:41 1,139 CreateDB.sql  
2006-08-17 19:41 600 CreateDBCatalog.sql  
2006-08-17 19:41 326 CreateDBFiles.sql  
2006-08-17 19:41 608 eygle.bat  
2006-08-17 19:41 534 eygle.sql  
2006-08-17 19:41 3,365 init.ora  
2006-08-17 19:39 2,580 init.ora.717200619413  
2006-08-17 19:41 584 postDBCcreation.sql  
2006-08-17 19:41 191 xdb_protocol.sql  
9 个文件 9,927 字节  
2 个目录 1,440,227,328 可用字节
```



数据库的初始化

□ 数据库创建脚本

```
startup nomount pfile="C:\oracle\admin\eygle\scripts\init.ora";
```

```
CREATE DATABASE "eygle"
```

```
MAXINSTANCES 8
```

```
MAXLOGHISTORY 1
```

```
MAXLOGFILES 16
```

```
MAXLOGMEMBERS 3
```

```
MAXDATAFILES 100
```

```
DATAFILE SIZE 300M AUTOEXTEND ON NEXT 10240K MAXSIZE UNLIMITED EXTENT MANAGEMENT LOCAL
```

```
SYSAUX DATAFILE SIZE 120M AUTOEXTEND ON NEXT 10240K MAXSIZE UNLIMITED
```

```
SMALLFILE DEFAULT TEMPORARY TABLESPACE TEMP TEMPFILE SIZE 20M AUTOEXTEND ON NEXT 640K  
MAXSIZE UNLIMITED
```

```
SMALLFILE UNDO TABLESPACE "UNDOTBS1" DATAFILE SIZE 200M AUTOEXTEND ON NEXT 5120K MAXSIZE  
UNLIMITED
```

```
CHARACTER SET ZHS16GBK
```

```
NATIONAL CHARACTER SET AL16UTF16
```

```
LOGFILE GROUP 1 SIZE 51200K,
```

```
GROUP 2 SIZE 51200K,
```

```
GROUP 3 SIZE 51200K
```

```
USER SYS IDENTIFIED BY "&&sysPassword" USER SYSTEM IDENTIFIED BY "&&systemPassword";
```



sql.bsqa文件与数据库创建

□ 数据库初始化文件

```
SQL> @GetParDescrb.sql
Enter value for par: init_sql
old 6:  AND x.ksppinm LIKE '%&par%'
new 6:  AND x.ksppinm LIKE '%init_sql%'
```

NAME	VALUE	DESCRIB
_____	_____	_____
_init_sql_file	~/rdbms/admin/sql.bsqa	File containing SQL statements to execute upon database creation

```
Fri Aug 18 15:45:49 2006
Errors in file /opt/oracle/admin/eygle/udump/eygle_ora_3632.trc:
ORA-01501: CREATE DATABASE failed
ORA-01526: error in opening file '?/rdbms/admin/sql.bsqa'
ORA-07391: sftopn: fopen error, unable to open text file.
Error 1526 happened during db open, shutting down database
USER: terminating instance due to error 1526
```



bootstrap\$与数据库启动

□ Sql.bsq文件的内容

```
create table bootstrap$
( line#          number not null,                                /* statement order id */
  obj#           number not null,                                /* object number */
  sql_text       varchar2("M_VCSZ") not null)                    /* statement */
  storage (initial 50K)      /* to avoid space management during IOR I */
//                          /* "/" required for bootstrap */
```

□ sql_trace 和 10046 事件

```
SQL> alter session set events='10046 trace name context forever,level 12';
Session altered.
SQL> alter database mount;
Database altered.
SQL> alter database open;
Database altered.
```



从跟踪文件获得信息

```
WAIT #1: nam='direct path read' ela= 43 p1=1 p2=1 p3=1
WAIT #1: nam='direct path read' ela= 4 p1=2 p2=1 p3=1
WAIT #1: nam='direct path read' ela= 3 p1=3 p2=1 p3=1
WAIT #1: nam='direct path read' ela= 2 p1=4 p2=1 p3=1
WAIT #1: nam='direct path read' ela= 2 p1=201 p2=1 p3=1
.....
WAIT #1: nam='db file sequential read' ela= 88 p1=1 p2=417 p3=1
WAIT #1: nam='db file sequential read' ela= 91 p1=1 p2=377 p3=1
=====
PARSING IN CURSOR #2 len=188 dep=1 uid=0 oct=1 lid=0 tim=1149404325230977 hv=0 ad='b700de24'
create table bootstrap$ ( line#  number not null,
                        obj#          number not null,    sql_text  varchar2(4000) not null)
storage (initial 50K objno 56 extents (file 1 block 377))
END OF STMT
PARSE #2:c=0,e=1173,p=0,cr=0,cu=0,mis=1,r=0,dep=1,og=4,tim=1149404325230943
BINDS #2:
EXEC #2:c=0,e=473,p=0,cr=0,cu=0,mis=0,r=0,dep=1,og=4,tim=1149404325231638
```



控制文件及数据文件信息

❑ 分析控制文件的内容

```
alter session set events 'immediate trace name CONTROLF level 10'
```

❑ 分析所有数据文件头

```
alter session set events 'immediate trace name FILE_HDRS level 10'
```

```
Tablespace #0 - SYSTEM rel_fn:1  
Creation at scn: 0x0000.00000007 04/24/2006 11:34:39  
Backup taken at scn: 0x0004.6c2d657e 02/12/2007 15:54:52 thread:1  
reset logs count:0x24dc1f7d scn: 0x0004.6c432ec0 recovered at 04/07/2007 21:04:11  
status:0x4 root dba:0x004001a1 chkpt cnt: 6933 ctl cnt:6932
```

❑ 获得地址信息

```
SQL> select getbfno('0x004001a1') from dual;  
GETBFNO('0X004001A1')
```

```
-----  
datafile# is:1  
datablock is:417
```



Oracle独一无二的Cache对象

```
SQL> select segment_name, segment_type, header_file, header_block
       2 from dba_segments where segment_type='CACHE';
```

SEGMENT_NAME	SEGMENT_TYPE	HEADER_FILE	HEADER_BLOCK
1.417	CACHE	1	417

```
Start dump data blocks tsn: 0 file#: 1 minblk 417 maxblk 419
buffer tsn: 0 rdba: 0x004001a1 (1/417)
```

.....

Compatibility entry for 'BOOTSTRP':

Size: 24 Release 0x134217728 By 0x153092096

Dump of memory from 0x0AA84E4C to 0x0AA84E50

AA84E40

00400179

[y. @.]

```
SQL> select getbfno('00400179') from dual;
GETBFNO('00400179')
```

datafile# is:1

datablock is:377

```
SQL> select segment_name from dba_extents
       2 where block_id between 377 and blocks + 377 -1;
```

SEGMENT_NAME

BOOTSTRAP\$



使用模板创建数据库

□ 数据文件从何处来?





RMAN的Clone

□ 克隆数据库

```
@C:\oracle\admin\eygle\scripts\CloneRmanRestore.sql  
@C:\oracle\admin\eygle\scripts\cloneDBCreation.sql  
@C:\oracle\admin\eygle\scripts\postScripts.sql
```

□ dbms_backup_restore

```
dbms_backup_restore.restoreSetDataFile;  
  dbms_backup_restore.restoreDataFileTo(1,  
'C:\oracle\oradata\eygle\SYSTEM01.DBF', 0, 'SYSTEM');  
  dbms_backup_restore.restoreDataFileTo(2,  
'C:\oracle\oradata\eygle\UNDOTBS01.DBF', 0, 'UNDOTBS1');
```



表空间传输

@C:\oracle\10.2.0\demo\schema\mkplug.sql

C:\oracle\10.2.0\assistants\dbca\templates\example.dmp

C:\oracle\10.2.0\assistants\dbca\templates\example01.dfb

C:\oracle\oradata\eygle\example01.dbf

C:\oracle\admin\eygle\scripts\ "'SYS/ &&sysPassword as SYSDBA'";

```
exp username/passwd  
tablespaces=users  
transport_tablespace=y  
file=exp_users.dmp
```





平台与字节序

□ Big-Endian与Little-Endian

```
SQL> select * from v$transportable_platform;
```

PLATFORM_ID	PLATFORM_NAME	ENDIAN_FORMAT
1	Solaris[tm] OE (32-bit)	Big
2	Solaris[tm] OE (64-bit)	Big
7	Microsoft Windows IA (32-bit)	Little
10	Linux IA (32-bit)	Little
6	AIX-Based Systems (64-bit)	Big
3	HP-UX (64-bit)	Big

.....





跨平台传输

□ Oracle9i 参考

```
[oracle@jumper oracle]$ imp \"/ as sysdba\" file=trans.dmp  
transport_tablespace=Y tablespaces=trans datafiles=/opt/oracle/TRANS.DBF
```

```
.....  
IMP-00003: ORACLE error 1565 encountered  
ORA-01565: error in identifying file '/opt/oracle/TRANS.DBF'  
ORA-27047: unable to read the header block of file  
Linux Error: 2: No such file or directory  
Additional information: 2  
ORA-06512: at "SYS.DBMS_PLUGTS", line 1500
```

□ Oracle10g

```
C:\oracle\oradata\EYGLE\DATAFILE>imp '/ as sysdba'  
tablespaces=trans transport_tablespace=y file=exp_trans.dmp  
datafiles=C:\oracle\oradata\EYGLE\DATAFILE\trans.dbf
```

```
.....  
. 正在将 TRANS 的对象导入到 TRANS  
. . 正在导入表 "TEST"  
. 正在将 SYS 的对象导入到 SYS  
成功终止导入, 没有出现警告。
```



RMAN的Convert

□ 从Solaris平台迁移至Windows平台

```
RMAN> convert tablespace trans
2> to platform 'Microsoft Windows IA (32-bit)'
3> format '/tmp/%N_%f';

Starting backup at 22-MAR-07
.....
channel ORA_DISK_1: starting datafile conversion
input datafile fno=00005 name=/data2/ora10g/oradata/mars/trans.dbf
converted datafile=/tmp/TRANS_5
channel ORA_DISK_1: datafile conversion complete, elapsed time: 00:00:01
Finished backup at 22-MAR-07
```

□ Oracle10g同字节序平台迁移不需要转换

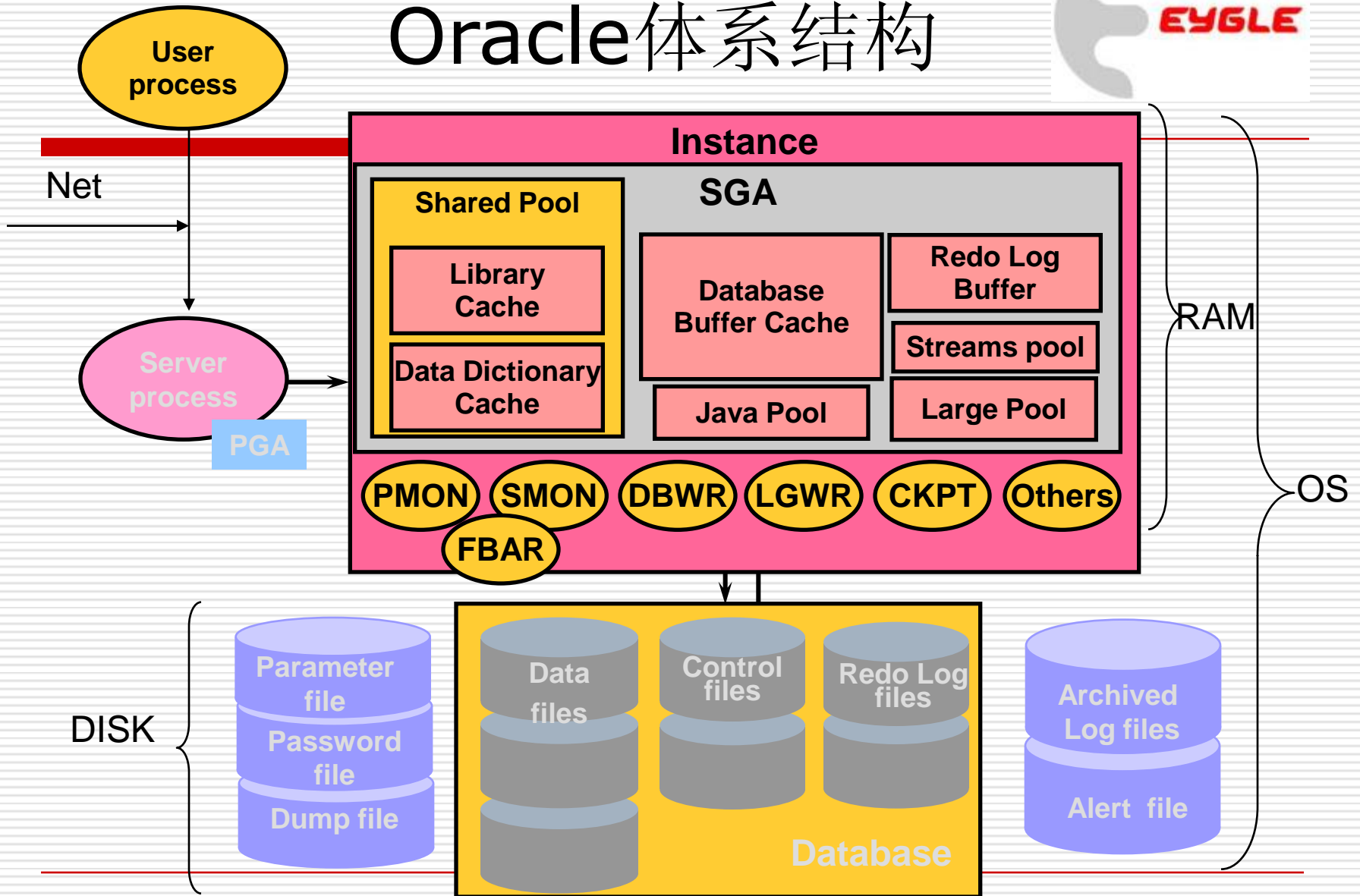


使用传输表空间进行数据库迁移

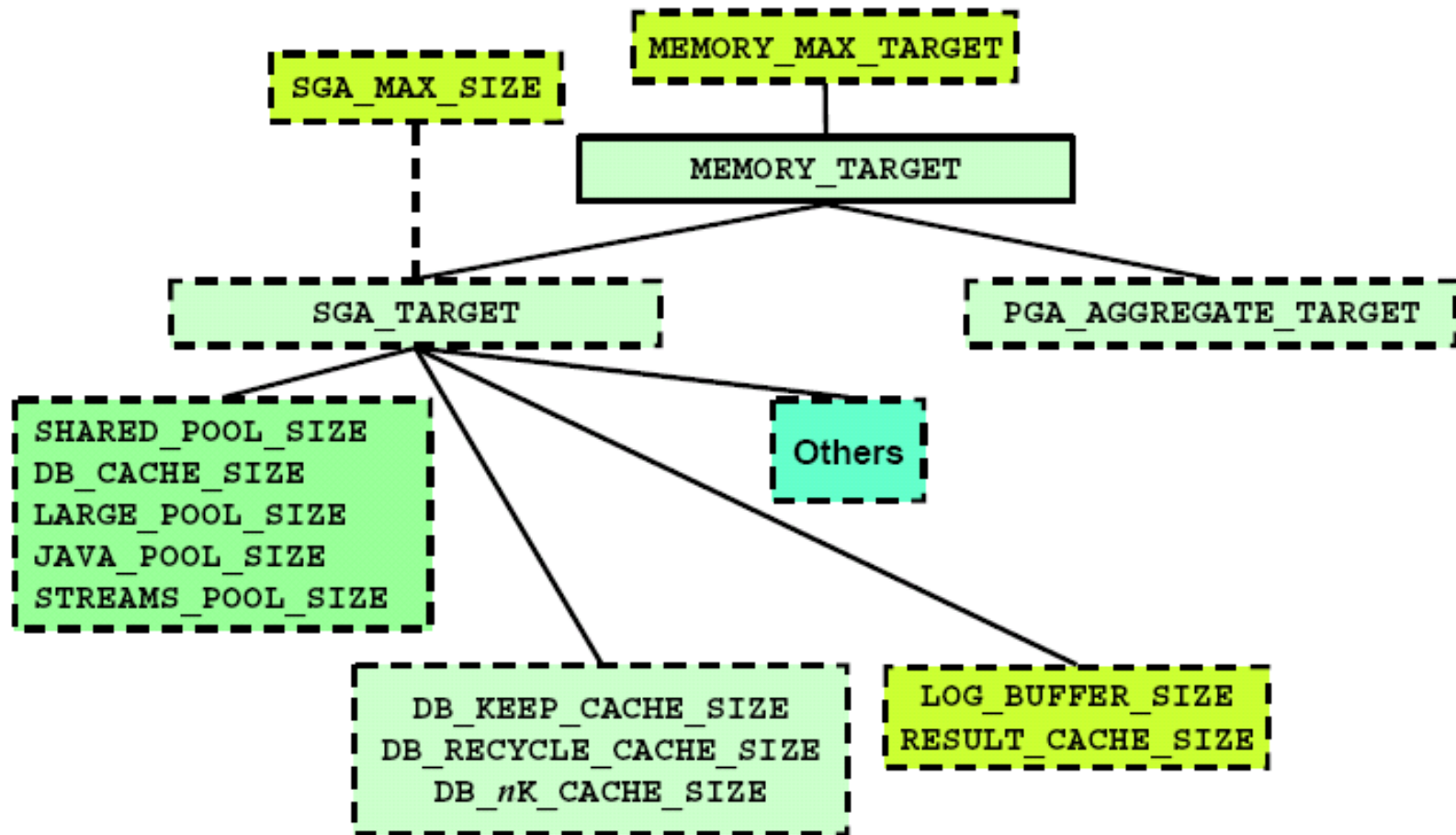
- **Expected Downtime** dependent on data file conversion time + file transfer time
- If migrating to same endian format and Oracle 10g Release 2
 - Use Transportable Database
- If migrating to different endian format
 - Use Transportable Tablespace
- **Best Practices**
 - Avoid network transfer time by using shared network storage to rezone the volumes from source to target for some platforms
 - If migrating a large database to new platform (but same OS & hardware architecture) at another data center, Data Guard can be leveraged to eliminate WAN data file transfer during outage
 - Reduce conversion time by running data file converts in parallel and on system with ample I/O bandwidth
 - Use Data Pump network transfer to reduce steps and time for transportable tablespace only



Oracle体系结构



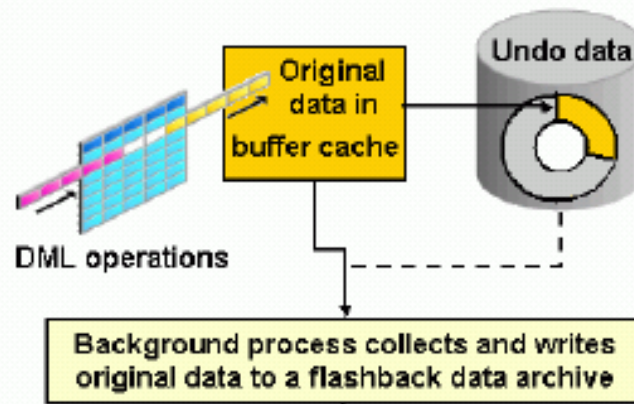
Oracle11g-Automatic Memory Management



Oracle11g-Flashback data archive

□ Flashback Data Archive

```
oracle 12256 1 0 14:26 ? 00:00:00 ora_fbar_eygle
```



```
SELECT last_name, first_name, salary
FROM EMPLOYEES AS OF TIMESTAMP TO_TIMESTAMP ('2007-06-
01 00:00:00', 'YYYY-MM-DD HH24:MI:SS')
WHERE employee_id=193;
```

Flashback Data Archive



Oracle11g-参数文件的增强

- ❑ SPFILE 'new' and 'old' values printed to alert log file
- ❑ Basic parameters cannot contain any invalid values
- ❑ SPFILE location specified via an environment variable
 - ORA_CONFIG_DEST environment variable
 - Set by oraenv or coraenv on UNIX
 - Set by Registry on Windows



Easy Recovery of SPFILE:

```
CREATE PFILE [= 'pfile_name' ]  
FROM { { SPFILE [= 'spfile_name'] } | MEMORY } ;
```

```
CREATE SPFILE [= 'spfile_name' ]  
FROM { { PFILE [= 'pfile_name' ] } | MEMORY } ;
```



Oracle11g Alert文件的变化

- ❑ Automatic Diagnostic Repository (ADR)的引入
- ❑ XML + TXT Version Alert File



```
adrci>>help show alert
Usage: SHOW ALERT [-p <predicate_string>] [-tail [num]]
[-v]
               [-file <alert_file_name>]
```

.....

Examples:

```
show alert
```

```
show alert -p "message_text like '%incident%'"
```

```
show alert -tail 20
```



Oracle11g高级压缩特性

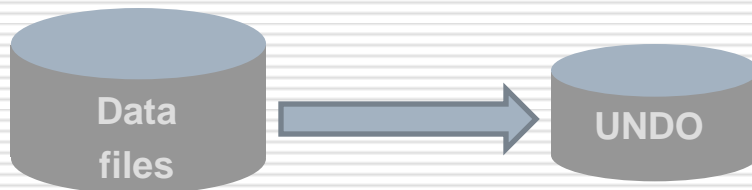
- ❑ 支持普通表压缩
 - Oracle9iR2 bulk load Compression
 - OLTP Table Compression
- ❑ 非结构化数据压缩（SecureFile数据压缩）
 - documents, spreadsheets and XML files
 - email
- ❑ Data Pump数据压缩
 - OE and SH schemas
 - dump file size was reduced by 74.67%.
- ❑ RMAN备份压缩
 - Based on ZLIB compression algorithm
 - 40% faster than compressed backups in Oracle 10g
 - reducing the compression ratio by less than 20%.
- ❑ 归档日志压缩
 - Compression for Network Traffic
 - Dataguard get faster





Oracle11g Undo backup Bypass

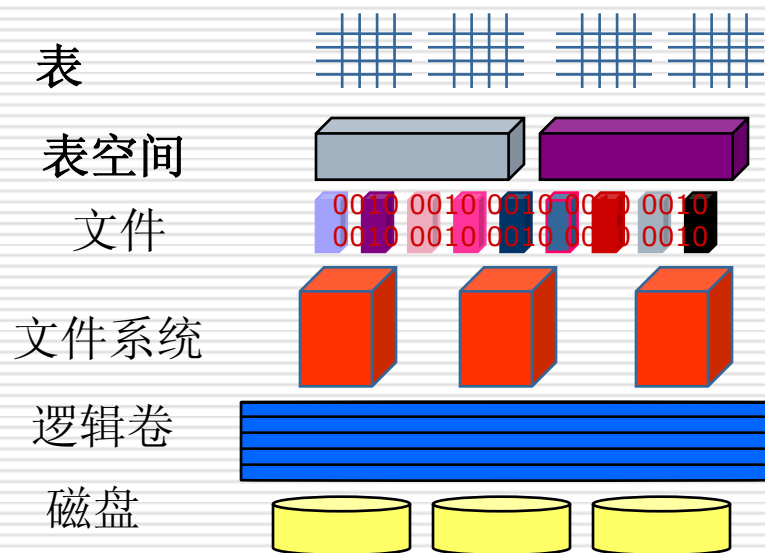
- ❑ UNDO记录前镜像信息
- ❑ 在RMAN备份UNDO表空间时，提交事务的UNDO信息将不再备份



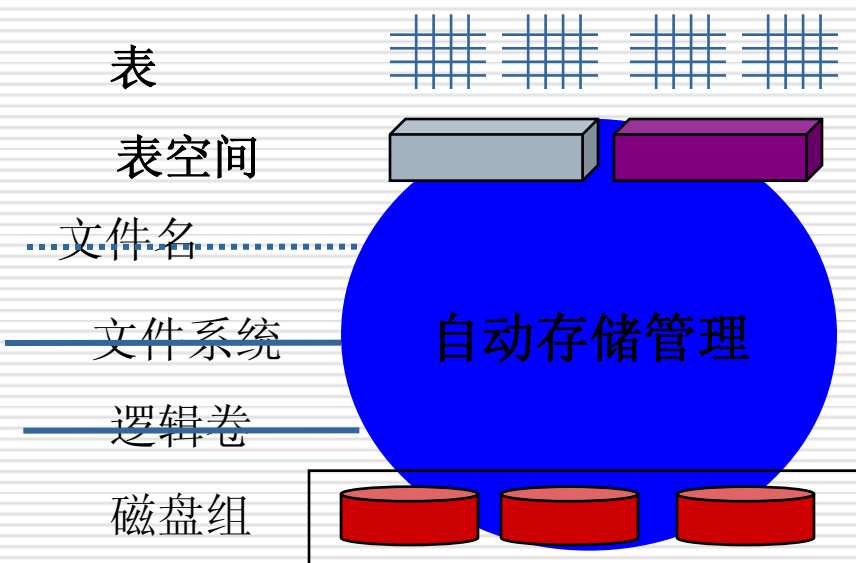


Automatic Storage Management

ASM 之前

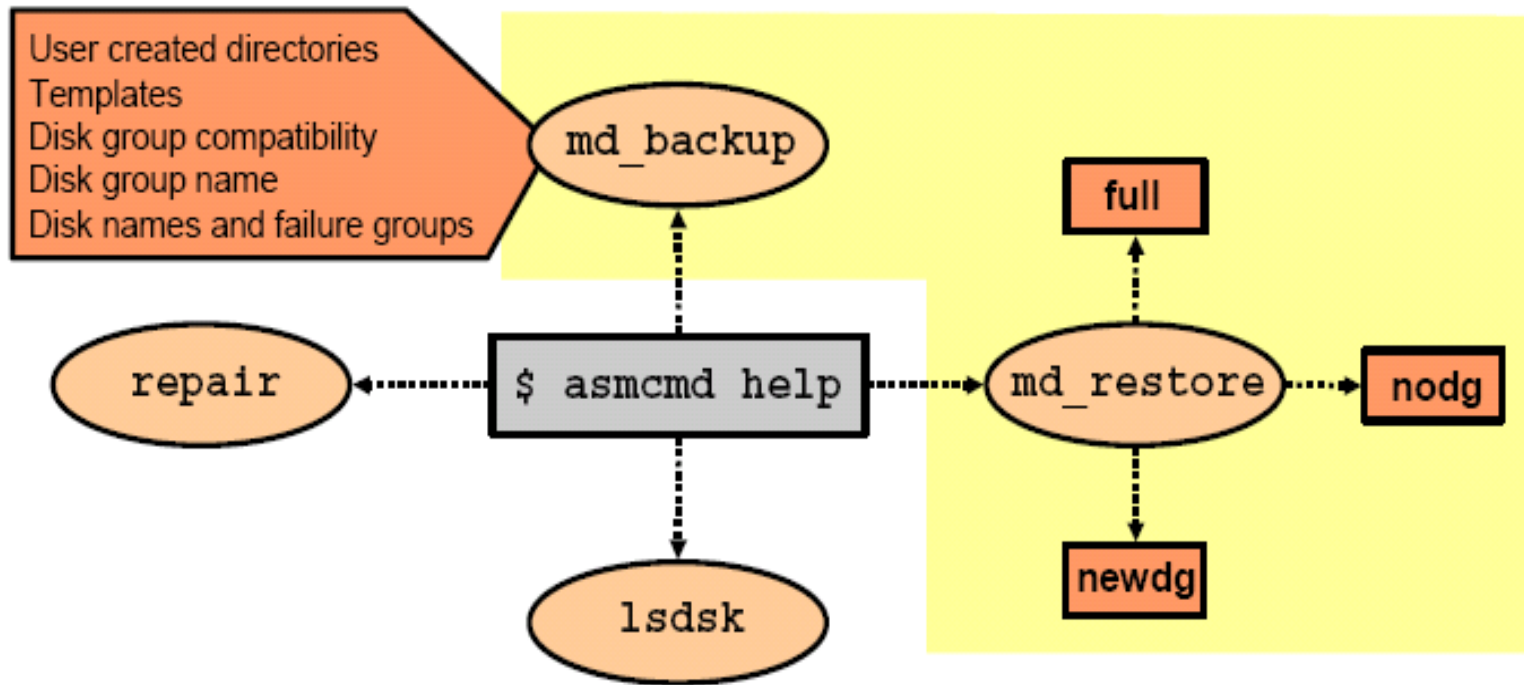


ASM



网络存储
(SAN、NAS、DAS)

Oracle11g-Fast Disk Resync

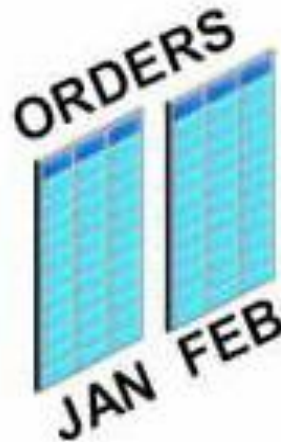


Oracle的分区技术



Large Table

Difficult to Manage

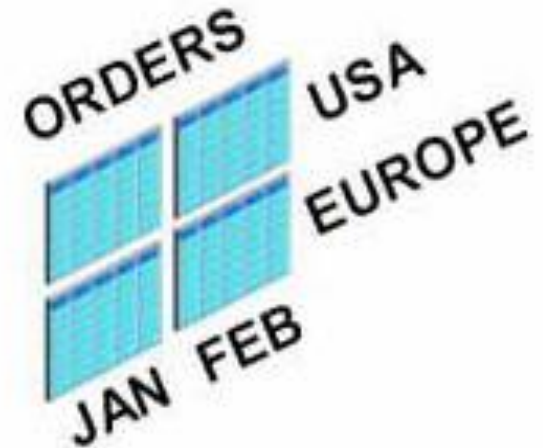


Partition

Divide and Conquer

Easier to Manage

Improve Performance

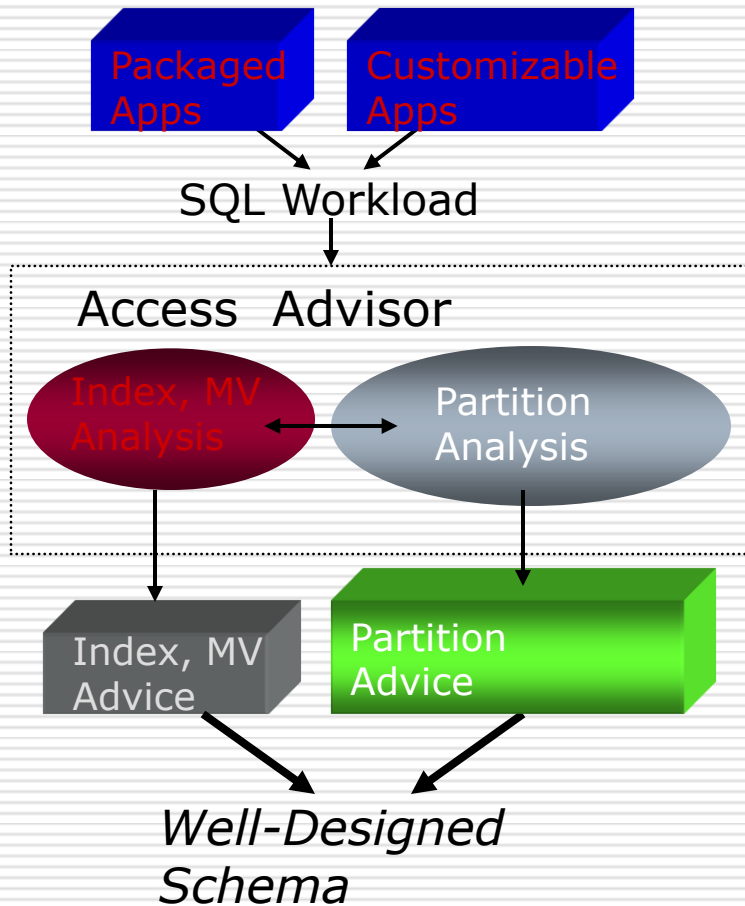


Composite Partition

Higher Performance

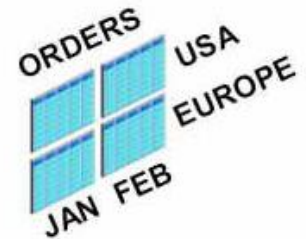
More flexibility to match
business needs

Oracle11g分区建议



Partition Advice from Access Advisor

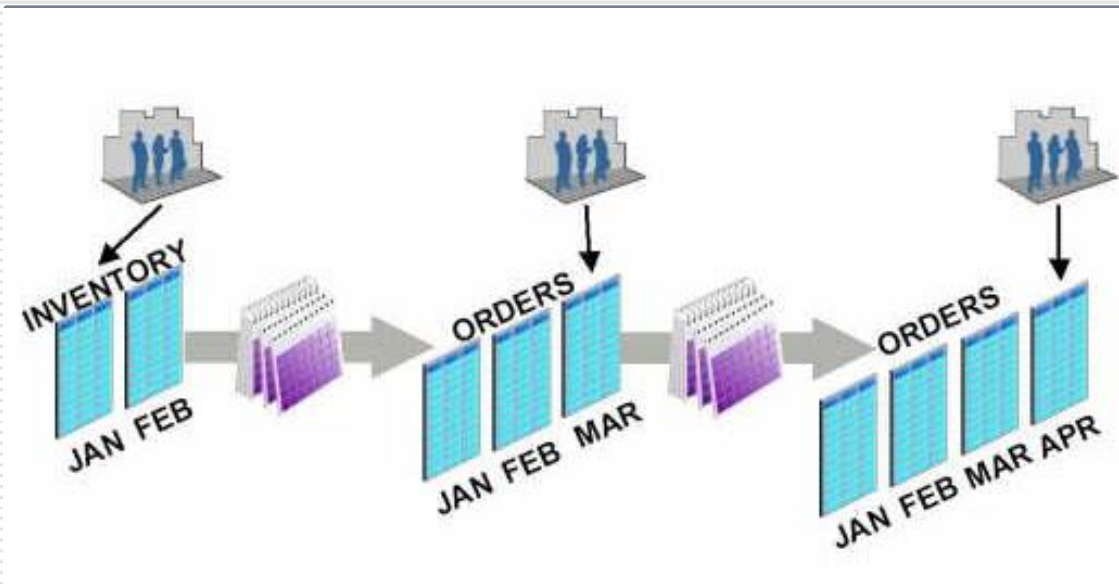
- ☐ Provide advice on Partitioning methods
- ☐ Partitioning advice for tables, indexes, MVs
- ☐ Consider entire query & DML workload to improve query performance
- ☐ Integrated, non-conflicting advice with Indexes, MVs



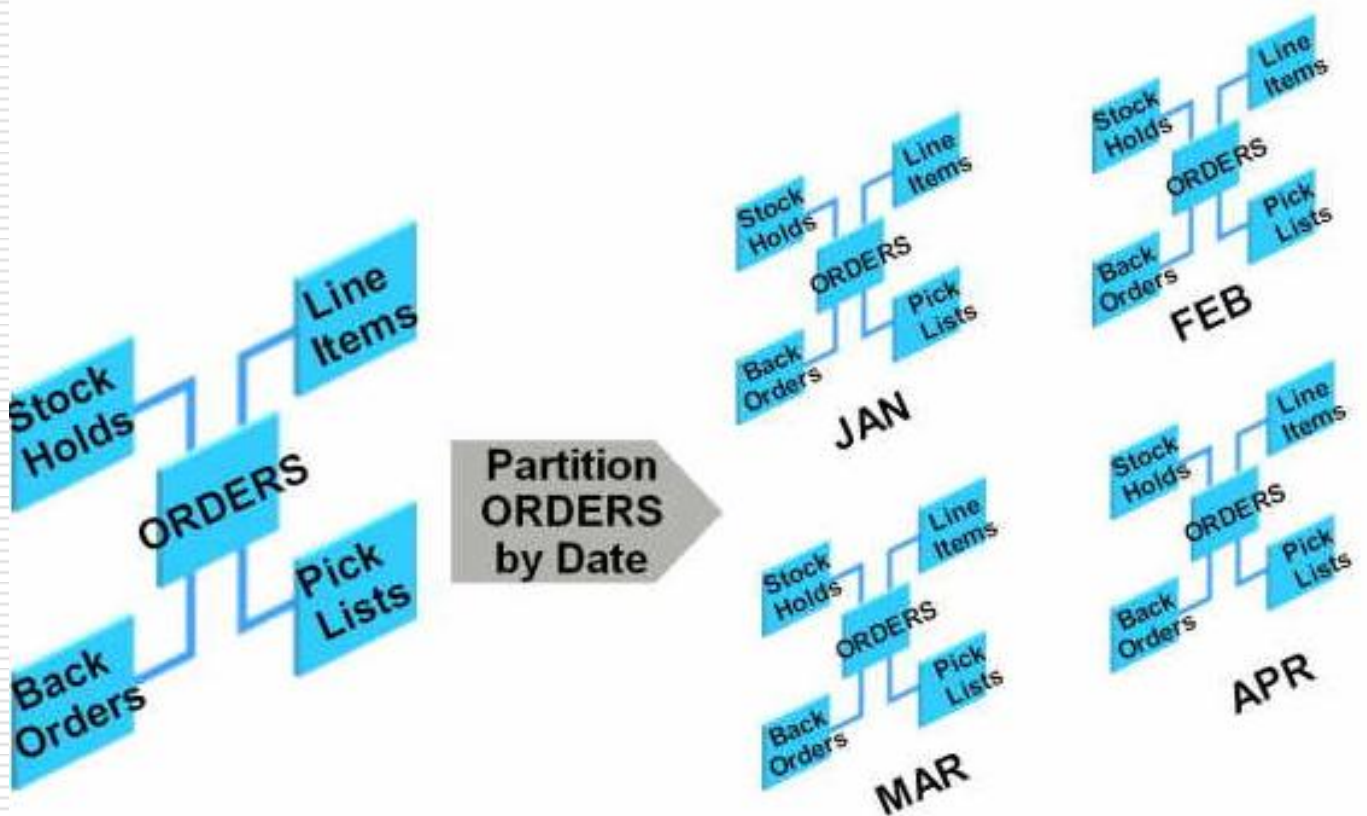
Oracle11g 自动分区创建

Automatic Interval Partition Creation

- ❑ On first insert
- ❑ With constant width intervals for dates and numbers
- ❑ Existing RANGE partitioned tables can be converted to INTERVAL
- ❑ RANGE and INTERVAL can coexist in a single table



Oracle11g自动分区示意



Oracle11g复合分区的增强

- ❑ 在11g之前，复合分区只支持Range-List和Range-Hash
- ❑ 在11g中，符合分区支持(range,list,interval)/
(range,list,hash)随意组合





Workload Capture and Replay -Database Replay

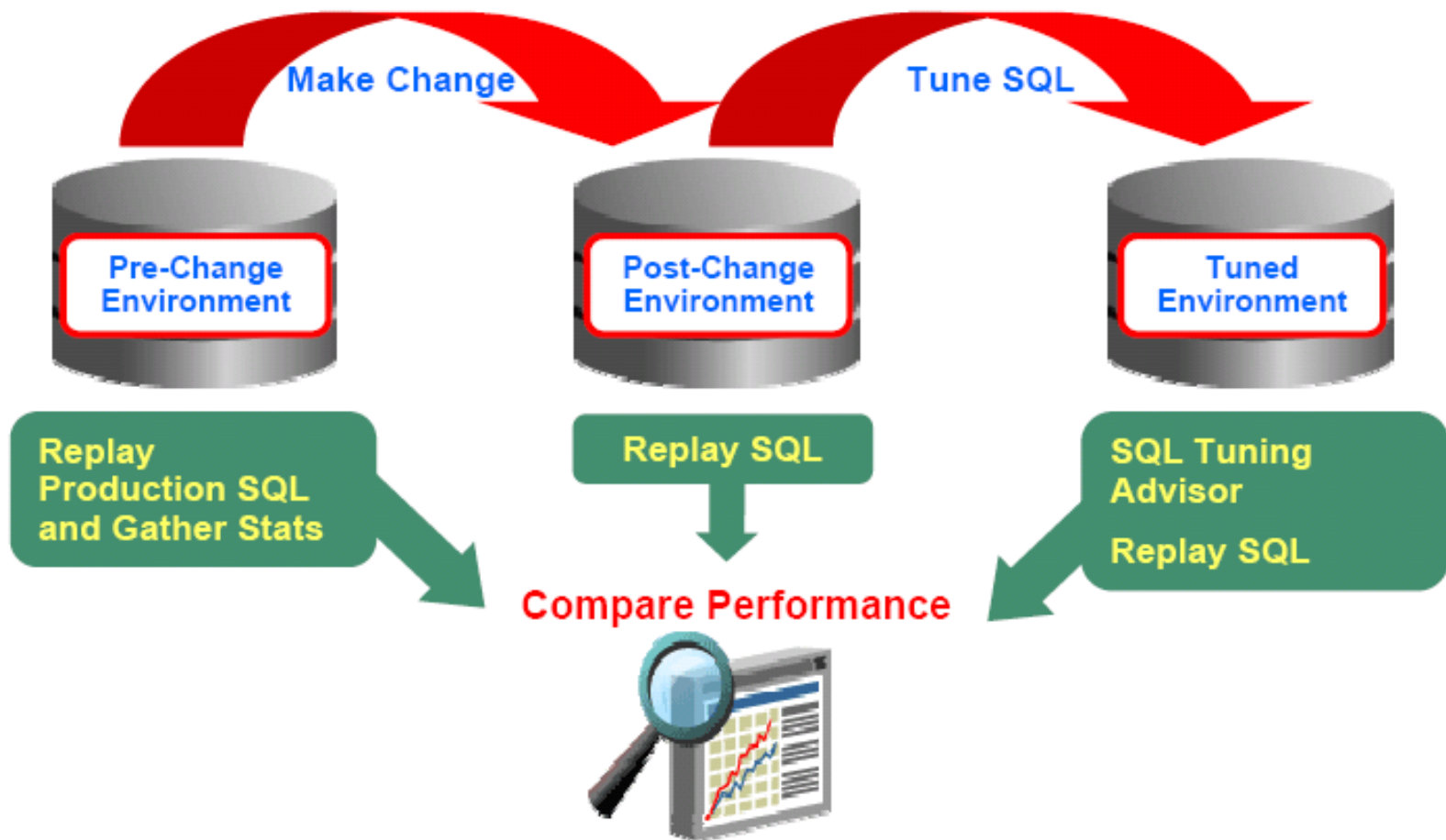
- 数据库捕获
 - 记录**DB** 生产负载（包括关键的并发特征）
- 数据库回放
 - 实时回放负载
- 分析并报告
 - 错误报告
 - 数据发散
 - 性能发散
 - 使用**ADDM** 做进一步的性能分



Workload Capture and Replay –SQL Replay

- 主要关注对**SQL** 查询负载的影响
 - 对各个**SQL** 进行细粒度的性能分析
- 在生产中捕获**SQL** 负载
 - 捕获**SQL** 文本、计划、绑定变量、执行统计信息
- 在指定的时间段
 - 可以捕获**Oracle** 数据库**10g** 第**2** 版**SQL** 负载
 - 在测试中回放**SQL** 负载
 - 在测试系统上测试**SQL** 的执行
 - 识别具有不同计划的**SQL** 和性能较慢的**SQL**
 - 对于性能减弱的**SQL**，使用**SQL Tuning Advisor (10g)** 进行优化
 - 生成分析和报告

Works with Standby Databases





Oracle11g Data Guard enhance

□ 物理(Physical)standby

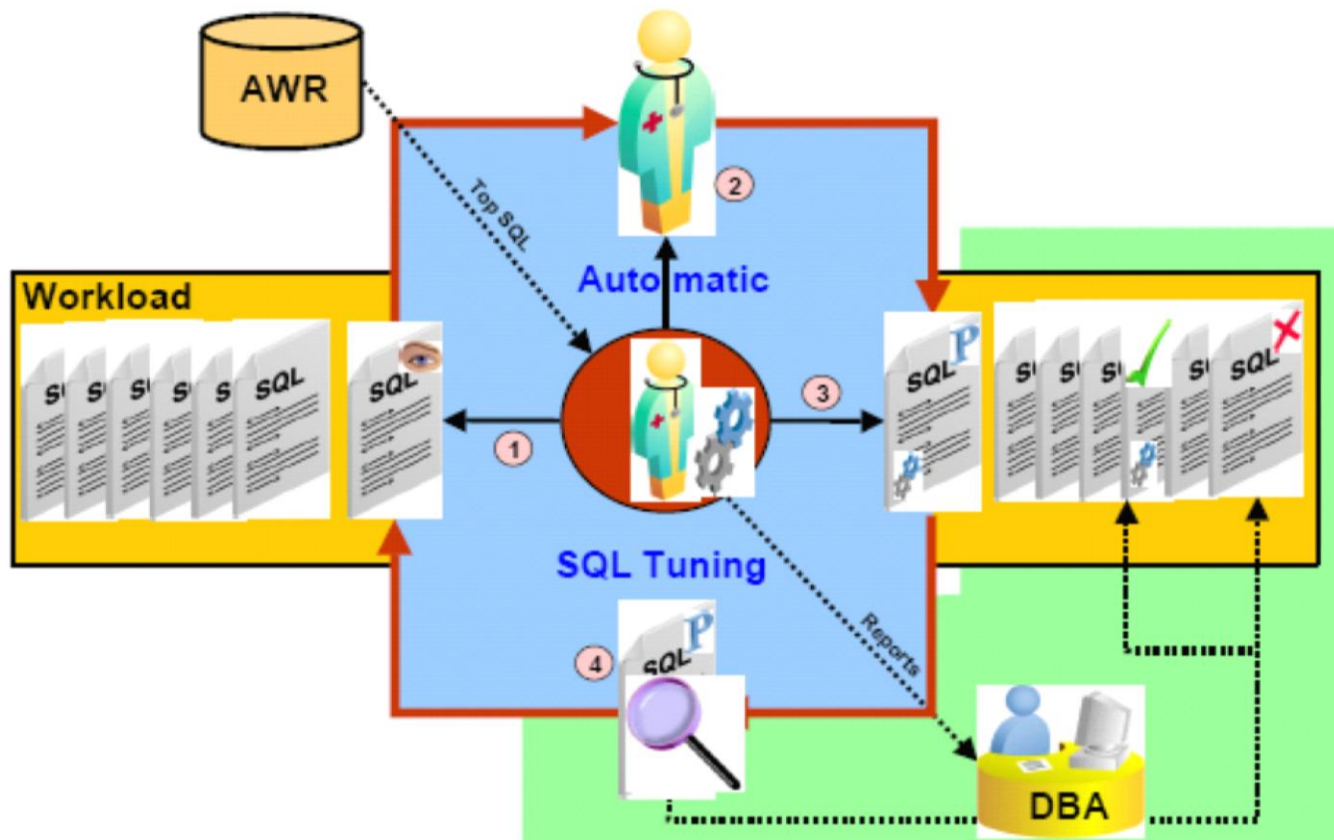
- Physical standby with Real Time Query
- 加快standby数据库备份的速度
- Snapshot Standby
- 提高Redo Apply的性能

□ 逻辑 (Logical) standby

- 支持更多的数据类型
- 支持更多的包和数据加密
- Fast-Start Failover

Oracle11g Automatic SQL Tuning

Oracle Database 11g SQL Tuning Loop



Questions & Answer

