



9i New features

An overview

- We will discuss about various new features that may be of interest to DBAs as well as developers.
- Depth of coverage
- Insights in to details.

Prepared by : Riyaj Shamsudeen



Administration features

- Dynamic SGA
- Multiple Block size
- Desupport of connect internal
- Oracle managed files
- Resumable transactions
- Export/import features
- Online operations



Administration Features ..(2)

- Automatic undo management (AUM)
- Flashback query
- Default temporary tablespace



Tuning features

- New partitioning method
- Cursor sharing enhancements
- Shared pool enhancements
(implemented partly in 8i)
- Index monitoring
- CPU Cost estimation for CBO.



Ses #2: Recovery and logminer

- Block Media recovery
- Data Guard



Ses #2: New Datatypes and SQL features

- Multi table insert
- Merge SQL statement
- Quisce database feature
- Forget Analyze.. Here is the new way



Ses #2:OEM features



Sess #2: Oracle text features

- Intermedia is now known as Oracle text.
- Ctxrule indextype



Dynamic SGA

- Traditionally SGA is static after the startup. 9i is dynamic.
- SGA_MAX_SIZE init.ora parameter.
- Various areas of SGA can be increased or decreased.
alter system set shared_pool_size=128M;
- Granules ?
 - Size of 1 granule=4MB if SGA max size is <128M
=16MB else



Dynamic SGA

..(2)

- Example setup in init.ora
 - SGA_MAX_SIZE=64M
 - db_cache_size=10m
 - db_keep_cache_size=1M
 - db_recycle_cache_size=1M
 - shared_pool_size=20M

After DB startup resulted sizes

db_cache_size=12M
db_keep_cache_size=4M
db_recycle_cache_size=4M

WHY ?

Hint : Granule



Dynamic SGA ..(3)

- To increase shared pool to 50M
alter system set shared_pool_size=50M;
- Useful to measure the performance impact
- Large pool size, shared_pool_reserved_size can not be altered.
- If you try to alter the shared pool beyond the sga_max_size results in ORA-4033.
- Script : dynamic_sga.sql



Dynamic SGA ..(4)

- `Db_block_buffers` => `db_cache_size`
- `Buffer_pool_keep` => `db_keep_cache_size`
- `Buffer_pool_recycle` => `db_recycle_cache_size`

Note:

New parameters are declared in units of memory such as MB, Kb etc.. Not as an unit of `db_block_size`..

What can you change dynamically?

`db_cache_size` (and other cache sizes discussed later)

`db_keep_cache_size`

`db_recycle_cache_size`

`shared_pool`



Dynamic SGA ..(5)

- What can you not change dynamically?
 - Log buffer
 - Shared_pool_reserved_size
 - Large_pool_size
 - Sga_max_size
 - Java_pool_size



Multiple DB BLOCK SIZE (1)

- Previous versions
 - Only one db_block_size per database
 - Not possible to use multiple db_block_sizes
- 9i
 - Multiple db_block_sizes possible
 - 2k,4k,8k,16k and 32k.
 - Few platform does not support 32k
 - Sun does not support 32k.



Multiple DB_BLOCK_SIZE (2)

- Advantage

- = > Improved performance.

- = > Ability to match the application needs

- = > OLTP and DSS in the same DB.

- = > Granular control



Multiple DB_BLOCK_SIZE (3)

- System TS is always created with the `db_block_size` parameter.
- Tablespaces can be created specifying a different block size.

```
create tablespace ts_16k_data datafile  
'/dba/u01/oradata/mydb/ts_16k_data_01.dbf' size  
10M reuse blocksize 16k
```

- Buffer pool should exist with the same block size before creating the tablespace.



Multiple DB BLOCK SIZE (4)

- Dynamic cache size changes.
alter system set db_16k_cache_size=1M;
- Script : multi_db_block.sql



Desupport of connect internal

- Connect internal is not available in 9i.
- Connect as :
sqlplus /NOLOG
connect / as sysdba
- Expect script changes.



Oracle managed files

- Oracle could manage the files instead of DBA.
- Previously, DBA has to specify the file names.
- In 9i, set `db_create_file_dest=<directory>`
alter system set
db_create_file_dest="/dba/u01/oradata/mydb"
create tablespace test_omf datafile size 1M;
- File name conventions:
ora_<ts name>_uniqueid.dbf



Oracle Managed Files ..(2)

- Dropping a omf tablespace deletes the files from the Os.
- Files created with non-omf tablespaces can be dropped using the syntax:
drop tablespace test_omf including contents and datafiles;

Script: omf_test.sql



Oracle Managed Files ..(3)

- Default extent management LOCAL
- Default Auto extend is ON.



Resumable transactions

- Transactions can be suspended until the problem is resolved.
- Very useful for space errors.
- Need to grant resumable privilege
- DBA_RESUMABLE view
- Export has a new keyword
resumable=Y



Resumable transactions ..(2)

- When the session is suspended, an alert message is written to alert.log
- Session waits for an event in the v\$session_wait view:
 - ' Session suspended, wait...'
- DBA_RESUMABLE view shows the actual error.
- Script : resumables.sql



Resumable transactions ..(3)

- All of the space errors will suspend the transaction.
- Once the space error has been resolved,
 - Sessions resumes automatically
 - `Db*_resumable` view shows that the session is not waiting anymore.
- Timeout can be set. Default 7200 sec or 2hours.



Resumable transactions ..(4)

- Imp ..RESUME=y
RESUMABLE_TIMEOUT=3600
 - Suspends the export session for 1 hour if encountered with space errors.



Export/Import features ..(1)

- Imp has new statistics parameter:
values: always, none, safe, recalculate
- Compile=Y
Invalid objects can be recompiled after the import.



Online operations

- Online index rebuild of normal indices – in 8i.
- Online index rebuild of following:
 - Reverse key indices
 - Function based index
 - Key compressed index
 - Many index types on IOTs.
- Analyze index validate structure online
- DBMS_REDEFINITION



Automatic Undo management

- Rollback segments managed by system.
- System managed undo enabled by:
 - `undo_management=auto`
 - `undo_tablespace=undo1, undo2`
 - `compatible=9.0.0`
- No mixing old and new undo methods
 - Either Automatic undo or manual rollback segments.
- V\$undostat- Holds for every 10 minutes



Automatic Undo manage ..(2)

- Create undo tablespace
create undo tablespace undo_ts_01
datafile 'filename' size *size*
- Extent size similar to other bitmapped tablespaces.
If segment size < 1M, extent size 64k
else extent size 1M
- Minimum 2 extents as previous
- Initial # of undo segments = ~
 $1.1 * \text{sessions}/5$



Automatic Undo manage ..(3)

- Reduced space errors:
 - Oracle attempts to reclaim space from tablespace free space.
 - Tries to reclaim space from other undo segments.
- No 'set transaction use rollback segment'
- More segments created dynamically: Depends upon the transaction volume.
- Undo_suppress_Errors=True/FALSE
- Script aum.sql and aum_2.sql



Flashback query

- User can query the data as of “n” minutes before.
- Undo_retention=n seconds. Dynamic.
 - Default 900 seconds (15 minutes)
- Pertains to undo extents not individual blocks.
- Less ORA-1555 errors.



Flashback query ..(2)

- Granularity 5 minutes.
 - Create table at 11AM
 - Deleted rows at 11:03AM
 - Tried to recover at 11:10
 - May not be possible to do so.
- Maximum 5 days of flashback retention.
- Script: Flashback and flashback_2



Default temporary tablespace

- Database_properties
- Temporary tablespace is at the database level. Default: system
 - alter database default temporary tablespace temp;
- Temporary tablespace should be of type 'temporary' or system.
- Script: def_tempts.sql



Default temporary tablespace

- Restrictions:
 - a. Default temp tablespace should be of type temporary.
 - b. Default temp ts can not be converted to permanent.
 - c. Before dropping one temporary ts create another.
- Script : `def_tempts`



List partitioning

- Range and hash partitions.
- List partitioning

```
create table us_residents
  (first_name varchar2(256), last_name...
   state_code varchar2,
   state_full_name varchar2(20)...)
partition by LIST(state_code)
(partition p1 values ('CA') tablespace ca_ts,
 partition p2 values ('TX') tablespace tx_ts,
 partition p3 values('AR','MI'...) tablespace others_ts)
```



List partitioning ... (2)

- Only one column can be a partition key.
- Same values for different partitions not allowed.
- Partition can not be empty
- Partition pruning supported for these:
 - State_code = 'TX'
 - State_code in ('CA', 'AR')
 - State_code <= 'AB'
- Script : list_part



Cursor sharing enhancements

- Introduced in 8i
- Improves SQL reusability.
- New hint in 9i

```
/* + cursor_sharing_exact */
```



Index monitoring

- To identify unused indexes
- Alter index `index_name` monitoring usage
- Check `v$object_usage`.
- Script : `monitor_test`



CBO cost

- 8 and 8i uses only IO cost
- CBO costing now can use CPU cost also.
- Estimates #of CPU cycles needed, not just IOs needed.
- System statistics can be calculated and activated.



CBO cost ... (2)

- It is possible to change different statistics for different workloads.
- Use `dbms_stats.<..>_system_stats`
- Steps to populate the statistics:
 1. Create a stats table.
 2. `Dbms_stats.gather_system_stats`
 3. `Dbms_stats.import_system_stats`



CBO costing ..(3)

- Select * from sys.aux_stats\$ to check whether the stats are imported or not..
- This applies only to future newly parsed sql statements, unlike analyze.
- Parse locks are not broken.
- SQL> select pname, pval1 from sys.aux_stats\$ where sname = 'SYSSTATS_MAIN';

PNAME	PVAL1
CPUSPEED	156
MBRC	7
MREADTIM	2.386
SREADTIM	1.15



CBO costing ... (4)

- sreadtim : wait time to read single block, in milliseconds
- mreadtim : wait time to read a multiblock, in milliseconds
- cpuspeed : cycles per second, in millions

- Plan table has new columns cpu_cost and io_cost.

```
select operation, options, object_name, cpu_cost, io_cost 2 from plan_table;
```

```
OPERATION OPTIONS OBJECT_NAME CPU_COST IO_COST
```

```
-----
```

SELECT STATEMENT			10500	1
INDEX UNIQUE SCAN	SYS_C002218		10500	1