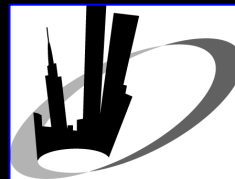


March 9th, 2010



Oracle Total Recall



Agenda – Flashback Data Archive

- Why we need Historical Data
- Pre-11g methods for Historical data
- Oracle Total Recall overview
- FDA Architecture
- Creating and Enabling FDA
- Managing FDA
- DDL Restrictions
- FDA Monitoring Views
- Q&A

Why we need to Historical Data ?

- Laws and regulations mandate data for long retention periods - SOX, HIPAA. PCI...
- Non compliance can results
 - ✓ Fines
 - ✓ Loss of investor and customer confidence
 - ✓ Business reputation
- Historical data helps
 - ✓ Analysing Market Trends
 - ✓ Customer Behaviour like Month of Travel, Month of Shopping....

Historical Data Requirement?

- Should be Secure
- Should be Tamper proof
- Ease of Use - with no Application Code/Interface changes
- Should be captured with least performance overhead
- Efficient Storage Utilization like Compressed
- Should be easily manageable
 - ✓ Accessibility
 - ✓ Retention
 - ✓ Purging

Managing Historical Data - Options

- Application or Mid-tier level
 - Combines business logic and archive policies
 - Increases complexity
 - No centralized management
 - Data integrity issues if underlying data is updated directly
- Database level
 - Enabled using Triggers
 - Significant performance and maintenance overhead
- External or Third-party
 - Mine redo logs
 - History stored in separate database
 - Cannot seamlessly query OLTP and history data
- None of the above approaches meet all customer requirements
 - Customers are therefore forced to make significant compromises

Flashback Issue before Total Recall

```
SQL> SELECT ... AS OF TIMESTAMP ...
```

```
ORA-01466: unable to read data - table definition has changed
```

OR

```
ORA-08180: no snapshot found based on specified time
```

OR

```
ORA-01555: snapshot too old: rollback segment number 7 with  
name "_SYSSMU7$" too small
```

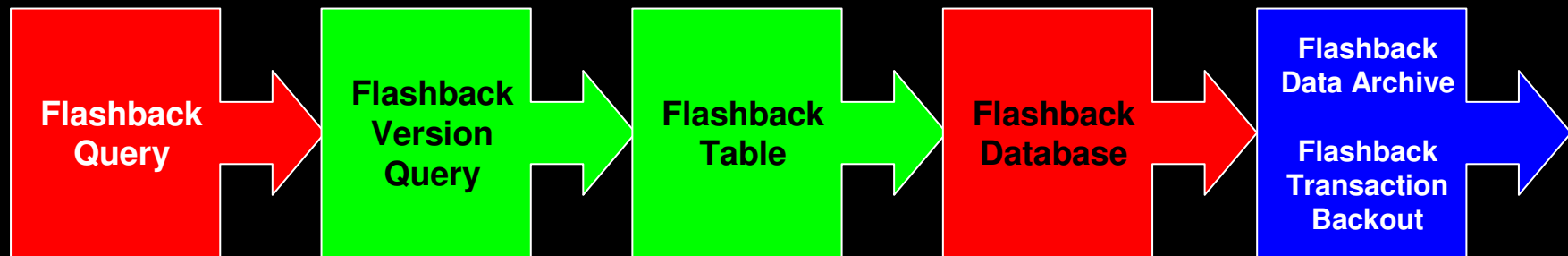
Depends on Various parameters for UNDO and FLASHBACK

UNDO_RETENTION

DB_RECOVERY_FILE_DEST_SIZE

DB_RECOVERY_FILE_DEST

Oracle Flashback Enhancements



http://www.datasoftech.com/library/NJOUG_flashback.pdf

What is Oracle Total Recall ?

- Utilizing Flashback Data Archive (FDA) to retrieve historical data
- FDA is Repository created on top of Tablespace
- Tracks and Stores all transactional changes to a “tracked”
- Separate Licensed option in 11g

Flexible - Retention Time

Logical Container - Stored in the Database

Automated data management - No Application Code Change and easy to configure

Secure - Tamper proof from update/Delete

Historical Data - Access using “AS OF” queries

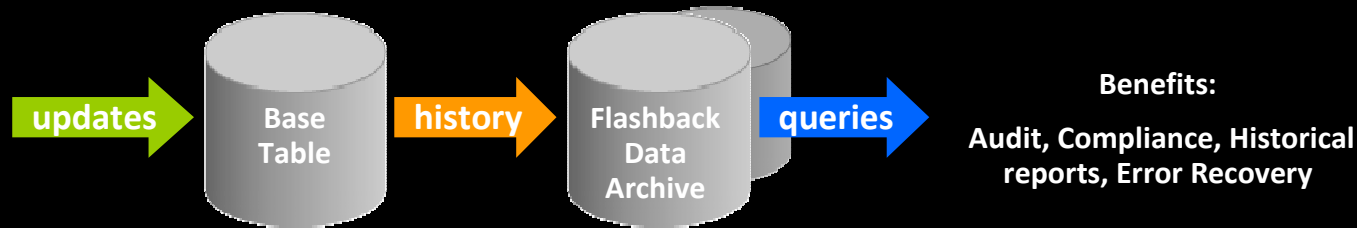
Background process - Flashback Data Archive [`ora_fbda_SID`]

Apply to one or group of tables with simple ENABLE ARCHIVE Clause

Capture data asynchronously - Low Performance overhead

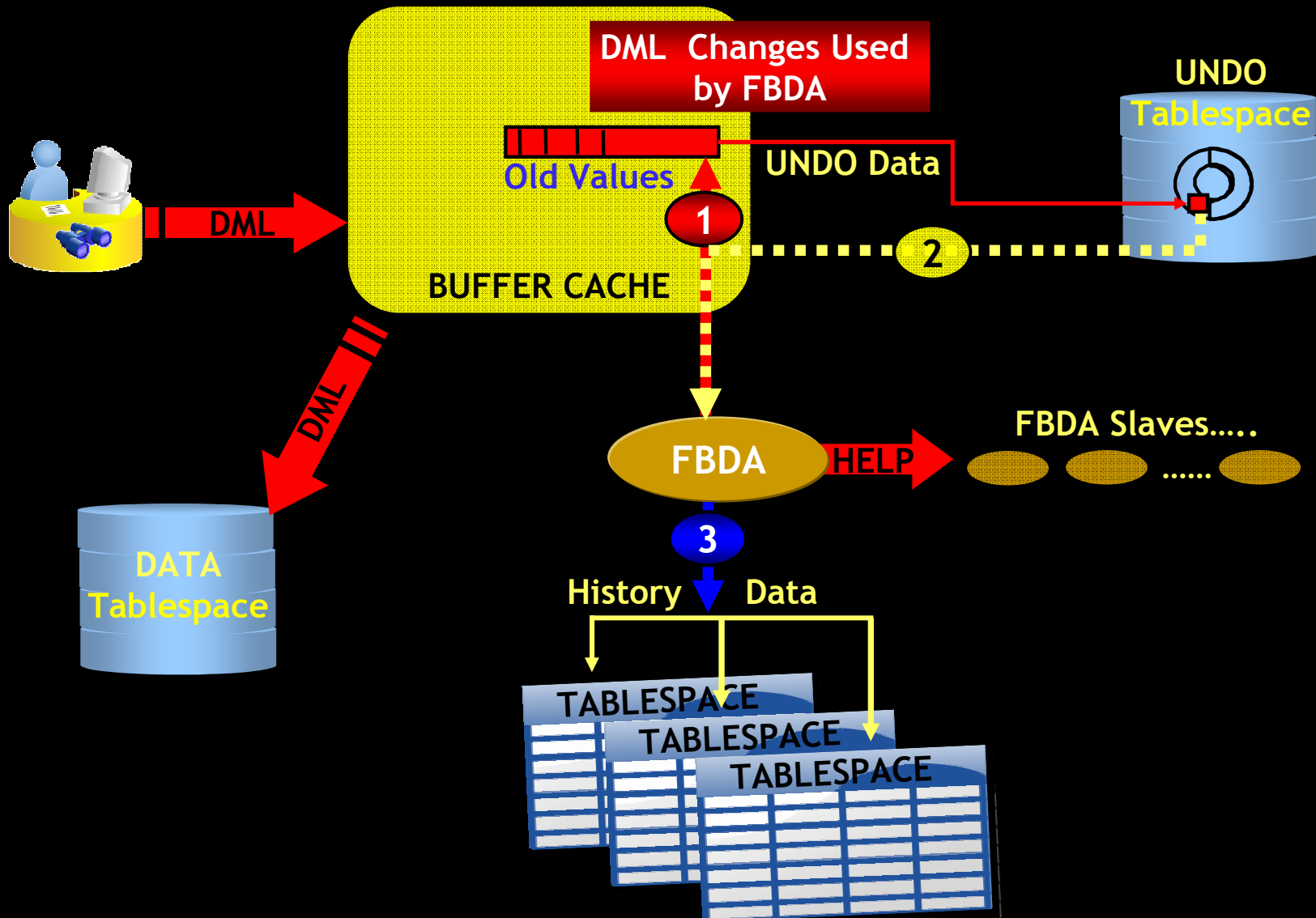
Keep the data Partitioned and Compressed

Flashback Data Archive - Benefits



- Compliance
- Audit Reports
- Data Analysis
- Decision Support Systems
- Retention Policy Enforcement - Purge Older Records automatically
- Error Recovery

Flashback Data Archive - Architecture



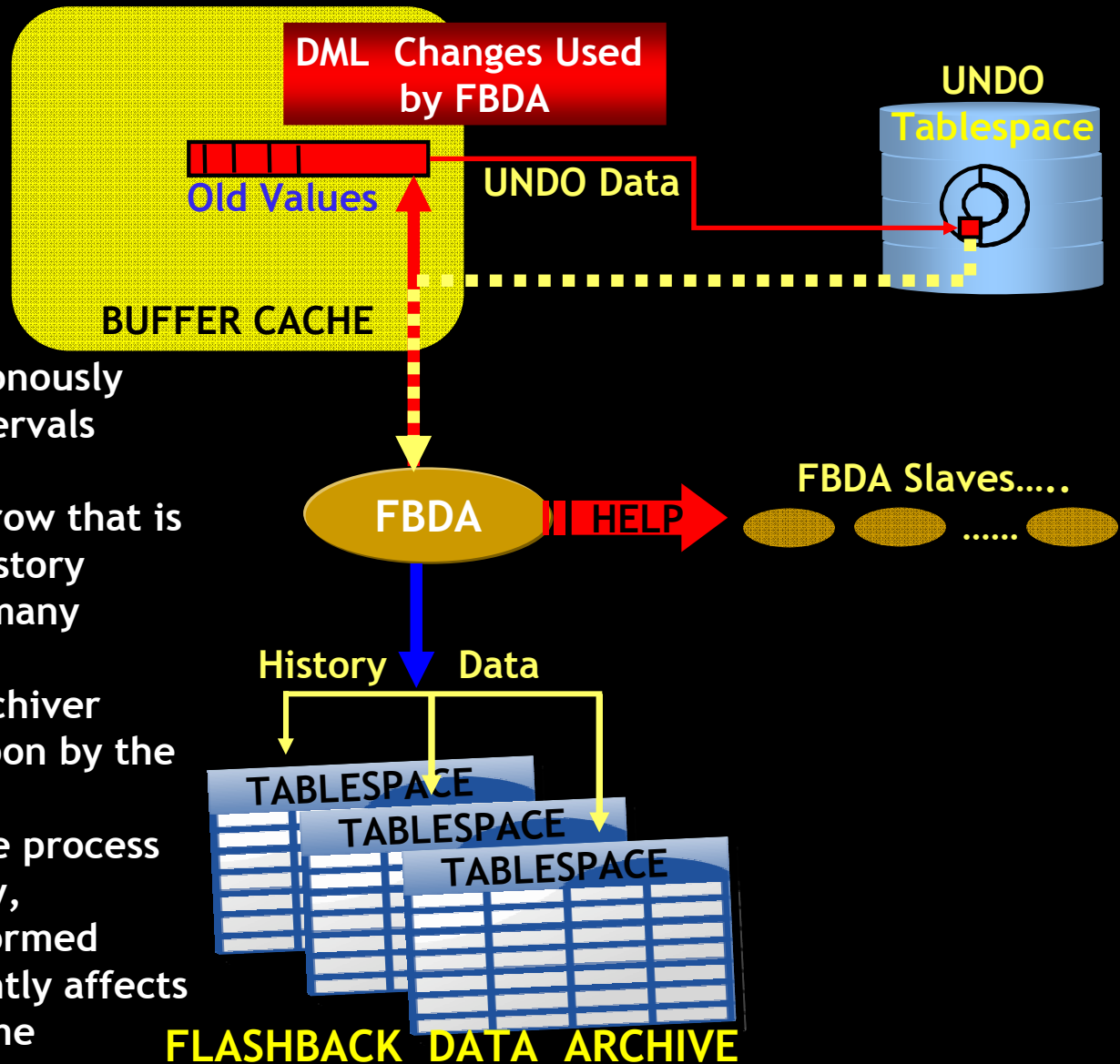
FLASHBACK DATA ARCHIVE



Fbda – New background process

FBDA Process

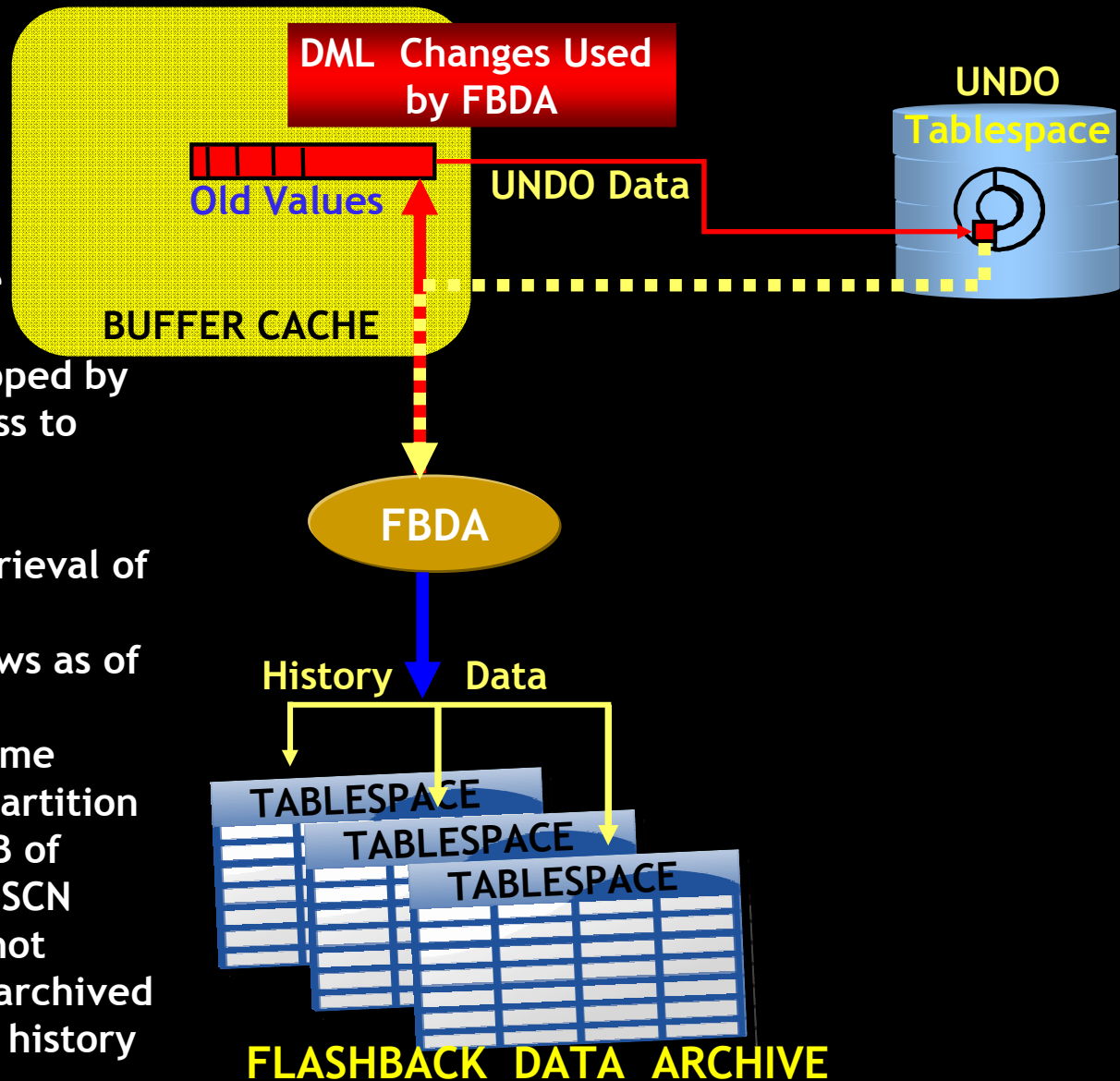
1. Captured row asynchronously
2. Run at Self - tuned Intervals
3. Default is every 5 Min
4. The entire base table row that is updated is stored in history table, no matter how many Columns are updated
5. Up to ten flashback archiver slaves can be called upon by the fbda process
6. If the flashback archive process and slaves are too busy, archiving may be performed inline, which significantly affects the user's response time



History Tables

History or archive tables:

1. Compressed storage
2. Automatic Partitioned based on Time & Volume
3. Automatic Purging
4. Unrelated partitions skipped by Queries and so fast access to data
5. Tamper Proof
6. Efficient storage and retrieval of UNDO
7. View Data, Version of rows as of any time
8. Control data retention time
9. Each flashback archive partition is at least 1 day and 1 MB of data, partitioned on ENDSCN
10. Undo on tracked tables not recycled until history is archived
11. INSERTs do not generate history records



FDA Preparation Workflow

- Create Tablespace to Store the FDA history data - ASSM [Default]
- Assign Privileges
- Create Flashback Data Archive with
- Enable FDA at Table Level [Default is DISABLED]
- Monitor FDA

FDA Workflow - Privileges

Create the Tablespace to be used by FDA history data

```
SQL> CREATE TABLESPACE fbda  
      DATAFILE '/u01/oradata/TEST/tbsp_fdba01.dbf' SIZE 100M;
```

Grant **SYSTEM** Privileges to allow to create FDA

```
SQL> GRANT FLASHBACK ARCHIVE ADMINISTER TO FDA_ADMIN;
```

Or

SYSDBA is required

Grant **OBJECT** Privileges to allow to create FDA

```
SQL> GRANT FLASHBACK ARCHIVE ON <FBDA_FDA> TO <SCOTT>;
```

FDA Workflow - Privileges

FLASHBACK ARCHIVE ADMINISTER

- New SYSTEM Privilege to manage FDA
- It allows
 - ✓ Create New FDA
 - ✓ Modify Existing FDA
 - ✓ Making a specific FDA as DEFAULT
 - ✓ Set the RETENTION time
 - ✓ Add/Remove Tablespaces
 - ✓ Ad-Hoc Purge of history Data
- Disable tracking for Tracked Tables
- Drop FDA

FLASHBACK ARCHIVE

- New OBJECT Privilege for enabling tracking on Tables for FDA

FDA Workflow – Creation

Create the FDA

```
SQL> CREATE FLASHBACK ARCHIVE fbda_1
      TABLESPACE fbda
      QUOTA 1M          -- Can specify M | G | T | P
      RETENTION 5 DAY; -- Can specify DAY | MONTH | YEAR
```

You can optionally specify the default Flashback Data Archive for the system

```
SQL> ALTER FLASHBACK ARCHIVE fbda_1
      SET DEFAULT;
```

```
SQL> CREATE FLASHBACK ARCHIVE DEFAULT fbda_2
      TABLESPACE fbda
      RETENTION 5 YEAR;
```

```
SQL> SELECT FLASHBACK_ARCHIVE_NAME, STATUS FROM
      DBA_FLASHBACK_ARCHIVE;
```

```
FLASHBACK_ARCHIVE_NAME Status
```

```
-----
FBDA_1                DEFAULT
```


FDA Workflow – Enable FDA

Grant FDA to Database user

```
SQL> GRANT FLASHBACK ARCHIVE ON fbda_1 TO SCOTT;
```

Identify the user who has Flashback data Archive privileges

```
SQL> SELECT FA#,USER# FROM SYS_FBA_USERS;
```

FA#	USER#
1	86
1	87

```
SQL> SELECT a.username,b.flashback_archive_name
FROM dba_users a,dba_flashback_archive b,SYS_FBA_USERS c
WHERE a.user_id=c.USER# AND
b.FLASHBACK_ARCHIVE#=c.fa#;
```

USERNAME	FLASHBACK_ARCHIVE_NAME
INDY	FBDA_1
FDA_USER	FBDA_1

FDA Workflow – Enable FDA

Create Table syntax to enable the Flashback Data Archive

```
SQL> CREATE TABLE TEST_TBL1  
  (  
    Ename VARCHAR2(20)  
  )  
FLASHBACK ARCHIVE;
```

ALTER CREATE Table syntax to enable the Flashback Data Archive

```
SQL> ALTER TABLE TEST_TBL2  
FLASHBACK ARCHIVE fbda_1;
```

Default Flashback Data Archive is used if it is not Specified

```
SQL> ALTER TABLE TEST_TBL3  
FLASHBACK ARCHIVE;
```

If there is no Default Flashback Data Archive

```
SQL> ALTER TABLE TEST_TBL3 FLASHBACK ARCHIVE;  
ORA-55608: Default Flashback Archive does not exist
```

FDA Workflow – INTERNALS

History Table assigned for FDA Enable Tables

```
SQL> SELECT  TABLE_NAME,  
            FLASHBACK_ARCHIVE_NAME,  
            ARCHIVE_TABLE_NAME  
FROM USER_FLASHBACK_ARCHIVE_TABLES  
WHERE TABLE_NAME='TEST_TBL1';
```

TABLE_NAME	FLASHBACK_ARCHIVE_NAME	ARCHIVE_TABLE_NAME
TEST_TBL1	FBDA_2	SYS_FBA_HIST_73535

```
SQL> SELECT TABLE_NAME FROM USER_TABLES;  
TABLE_NAME  
-----  
TEST_TBL1
```

FDA Workflow – INTERNALS

Perform DML on Table until Flashback Archive tables are Created

After the UNDO is pushed to flashback archive, or after you issue a command do query past data, Oracle will create all the physical objects shown in next page

History Tables/Indexes create for FDA Enable Tables

```
SQL> SELECT OBJECT_NAME.OBJECT_TYPE,OBJECT_ID FROM USER_OBJECTS
OBJECT_NAME                OBJECT_TYPE                OBJECT_ID
-----
TEST_TBL1                 TABLE                    73414
SYS_FBA_DDL_COLMAP_73414   TABLE                    73415
SYS_FBA_HIST_73414        TABLE PARTITION          73417
SYS_FBA_HIST_73414        TABLE                    73416
SYS_FBA_TCRV_73414        TABLE                    73420
SYS_FBA_TCRV_IDX_73414    INDEX                    73421
```

FDA – INTERNALS

```
SQL> SELECT owner, tablespace_name, table_name, temporary
       FROM dba_tables WHERE table_name LIKE '%FBA%'
```

OWNER	TABLESPACE	TABLE_NAME	TEMPORARY
SYS	SYSTEM	SYS_FBA_FA	N
SYS	SYSTEM	SYS_FBA_TSFA	N
SYS	SYSTEM	SYS_FBA_BARRIERSCN	N
SYS	SYSTEM	SYS_FBA_TRACKEDTABLES	N
SYS	SYSTEM	SYS_FBA_PARTITIONS	N
SYS	SYSTEM	SYS_FBA_USERS	N
SYS	SYSTEM	SYS_FBA_DL	N
INDY	FBDA	SYS_FBA_DDL_COLMAP_73519	N
INDY	FBDA	SYS_FBA_TCRV_73519	N
INDY		SYS_FBA_HIST_73519	N
SYS		SYS_MFBA_NHIST_73519	Y
SYS		SYS_MFBA_STAGE_RID	Y
SYS		SYS_MFBA_TRACKED_TXN	Y
SYS		SYS_MFBA_NROW	Y
SYS		SYS_MFBA_NCHANGE	Y
SYS		SYS_MFBA_NTCRV	Y

```
SQL> SELECT message FROM V$SESSION_LONGOPS
```

```
Table Scan: SYS.SYS_MFBA_STAGE_RID: 346365 out of 393834 Blocks done
```

FDA – INTERNALS

```
SQL> SELECT TABLE_NAME FROM USER_TABLES  
2 WHERE TABLE_NAME LIKE '%FBA%';
```

```
TABLE_NAME  
-----
```

```
SYS_FBA_DDL_COLMAP_73527  
SYS_FBA_TCRV_73527  
SYS_FBA_HIST_73527
```

```
SQL> SELECT TABLE_NAME, PARTITION_NAME, COMPRESSION  
FROM USER_TAB_PARTITIONS;
```

```
TABLE_NAME          PARTITION_NAME          COMPRESS  
-----  
SYS_FBA_HIST_73527  HIGH_PART                ENABLED
```

```
SQL> SELECT TABLE_NAME , PARTITIONING_TYPE, PARTITION_COUNT  
FROM USER_PART_TABLES;
```

```
TABLE_NAME          PARTITION PARTITION_COUNT  
-----  
SYS_FBA_HIST_73527  RANGE                1
```

FDA Workflow – Viewing

Monitoring the FDA Data

```
SQL> SELECT ... AS OF TIMESTAMP .....
```

```
SQL> SELECT ... AS OF SCN ...
```

```
SQL> SELECT ... VERSIONS BETWEEN TIMESTAMP and TIMESTAMP.....
```

```
SQL> SELECT count(*) FROM TEST_TBL  
      AS OF TIMESTAMP  
      to_timestamp ('2009-12-17 11:10:00', 'yyyy-mm-dd hh24:mi:ss');
```

```
SQL> SELECT * FROM TEST_TBL2  
      VERSIONS BETWEEN TIMESTAMP  
      TO_TIMESTAMP('2010-01-01 01:08', 'yyyy-mm-dd h24:mi')  
      AND  
      TO_TIMESTAMP('2010-02-27 01:08', 'yyyy-mm-dd hh24:mi')
```

FDA – Space Management

Adding Space

```
SQL> ALTER FLASHBACK ARCHIVE fla1  
      ADD TABLESPACE tbs3 QUOTA 5G;
```

Removing Space

```
SQL> ALTER FLASHBACK ARCHIVE fla1 REMOVE TABLESPACE tbs3;  
- Cannot Remove Last Tablespace  
- If contains any History Table within Retention  
  period, then data will be dropped as well
```

```
SQL> ALTER FLASHBACK ARCHIVE fba1  
      MODIFY TABLESPACE his_data_1  
      QUOTA 250M;
```

Flashback archive altered.

```
SQL> ALTER FLASHBACK ARCHIVE fba1 MODIFY RETENTION 1 DAY;  
Flashback archive altered.
```

```
SQL> DROP FLASHBACK ARCHIVE fba1;  
Flashback archive dropped.
```


FDA – Purging

- Automatic purging happens one day after retention expiry
 - Manual purging can also be performed by a user with FLASHBACK ADMINISTER privilege
 - Purge all historical data from Flashback Data Archive fda1:

```
SQL> ALTER FLASHBACK ARCHIVE fda1 PURGE ALL;
```
 - Purge all historical data older than one day from Flashback Data Archive fda1:

```
SQL> ALTER FLASHBACK ARCHIVE fda1  
PURGE BEFORE TIMESTAMP (SYSTIMESTAMP - INTERVAL '1' DAY);
```
- PURGE ALL | PURGE BEFORE SCN | PURGE BEFORE TIMESTAMP
- Purge all historical data older than SCN 528967 from Flashback Data Archive fda1:

```
SQL> ALTER FLASHBACK ARCHIVE fda1 PURGE BEFORE SCN 528967
```
- ```
SQL> SELECT COUNT(*) FROM sys_fba_hist_70537;
```

# FBDA – Space Management

## What happens when your flashback data archive gets full?

- Raise either an `ORA-55617` or `ORA-55623` error

```
55623, 00000, "Flashback Archive \"%s\" is blocking and tracking on all tables is suspended"
```

```
 // *Cause: Flashback archive tablespace has run out of space.
```

```
 // *Action: Add tablespace or increase tablespace quota for the flashback archive.
```

```
55617, 00000, "Flashback Archive \"%s\" runs out of space and tracking on \"%s\" is suspended"
```

```
 // *Cause: Flashback archive tablespace quota is running out.
```

```
 // *Action: Add tablespace or increase tablespace quota for the flashback archive.
```

- An alert log entry is added, stating that “Flashback archive XXX is full, and Archiving/Tracking is suspended
- Tracking suspended when 90% of the assigned space has been used

## Resolution

- Increase the FBDA’s QUOTA for underlying tablespace
- Increase the tablespace with RESIZE or ADD DATAFILE

# DDL on FDA enabled Tables

## Supported DDL Statements

- *Adds | Drops | Renames | Modifies* a Column
- *Adds | Drops | Renames* a Constraint
- *Drops | Truncates* a Partition or Subpartition
- *TRUNCATE TABLE* statement
- *RENAME TABLE* statement
- *Performs* a **PARTITION** or **SUBPARTITION** operation

## UN-Supported DDL Statements

- *ALTER TABLE* statement that moves or exchanges a partition or subpartition
- *DROP TABLE* statement

# Comparing DDL on 11g R1 vs R2

```
SQL> TRUNCATE TABLE test_tbl;
ORA-55610: Invalid DDL statement on history-tracked table
```

```
SQL> TRUNCATE TABLE test_tbl;
Table truncated.
```

```
SQL> ALTER TABLE test_tbl MODIFY (name VARCHAR2(10));
ORA-55610: Invalid DDL statement on history-tracked table
```

```
SQL> ALTER TABLE test_tbl MODIFY (name VARCHAR2(20));
Table altered.
```

Same on Both Version

```
SQL> DROP TABLE ht_emp;
ORA-55610: Invalid DDL statement on history-tracked table
```

# FDA - DBMS\_FLASHBACK\_ARCHIVE



- Use `DISASSOCIATE_FBA` procedure - To disable FDA to allow complex DDL like split tables
- Execute changes to both the base table and the corresponding archive.
- User `REASSOCIATE_FBA` procedure - To reassociate the Flashback Data Archive with the base table
- Make sure the schemas must be the same for the base and the history table
- Require `FLASHBACK_ARCHIVE_ADMINISTER` privilege
- Used with care as re-enabling FDA can no longer be immutable as history could have been altered during the time of disassociation

# FDA – DBMS\_FLASHBACK\_ARCHIVE

```
SQL> desc dbms_flashback_archive
```

```
PROCEDURE DISASSOCIATE_FBA
```

| Argument Name | Type     | In/Out | Default |
|---------------|----------|--------|---------|
| OWNER_NAME    | VARCHAR2 | IN     |         |
| TABLE_NAME    | VARCHAR2 | IN     |         |

```
PROCEDURE REASSOCIATE_FBA
```

| Argument Name | Type     | In/Out | Default? |
|---------------|----------|--------|----------|
| OWNER_NAME    | VARCHAR2 | IN     |          |
| TABLE_NAME    | VARCHAR2 | IN     |          |

```
SQL> exec dbms_flashback_archive.disassociate_fba('HR','TEST_TBL1');
```

```
SQL> << make the change to the fba table not currently Supported >>
```

```
SQL> exec dbms_flashback_archive.reassociate_fba('HR','TEST_TBL1');
```

# FDA – Monitoring views

```
SQL> desc DBA_FLASHBACK_ARCHIVE_TS
```

| Name                   | Null?    | Type           |
|------------------------|----------|----------------|
| FLASHBACK_ARCHIVE_NAME | NOT NULL | VARCHAR2 (255) |
| FLASHBACK_ARCHIVE#     | NOT NULL | NUMBER         |
| TABLESPACE_NAME        | NOT NULL | VARCHAR2 (30)  |
| QUOTA_IN_MB            |          | VARCHAR2 (40)  |

```
SQL> desc DBA_FLASHBACK_ARCHIVE
```

| Name                   | Null?    | Type           |
|------------------------|----------|----------------|
| OWNER_NAME             |          | VARCHAR2 (30)  |
| FLASHBACK_ARCHIVE_NAME | NOT NULL | VARCHAR2 (255) |
| FLASHBACK_ARCHIVE#     | NOT NULL | NUMBER         |
| RETENTION_IN_DAYS      | NOT NULL | NUMBER         |
| CREATE_TIME            |          | TIMESTAMP (9)  |
| LAST_PURGE_TIME        |          | TIMESTAMP (9)  |
| STATUS                 |          | VARCHAR2 (7)   |

```
SQL> desc DBA_FLASHBACK_ARCHIVE_TABLES
```

| Name                   | Null?    | Type           |
|------------------------|----------|----------------|
| TABLE_NAME             | NOT NULL | VARCHAR2 (30)  |
| OWNER_NAME             | NOT NULL | VARCHAR2 (30)  |
| FLASHBACK_ARCHIVE_NAME | NOT NULL | VARCHAR2 (255) |
| ARCHIVE_TABLE_NAME     |          | VARCHAR2 (53)  |
| STATUS                 |          | VARCHAR2 (8)   |

# FDA – Monitoring views

```
SQL> SELECT FLASHBACK_ARCHIVE_NAME, TABLESPACE_NAME, QUOTA_IN_MB
2 FROM DBA_FLASHBACK_ARCHIVE_TS;
```

| FLASHBACK_ | TABLESPACE_NAME | QUOTA_IN_MB |
|------------|-----------------|-------------|
| FBDA1      | FBDA_1          |             |
| FBDA2      | FBDA_1          | 200         |

```
SQL> SELECT FLASHBACK_ARCHIVE_NAME, to_char(CREATE_TIME, 'dd-mon-yyyy')
Created, RETENTION_IN_DAYS, STATUS FROM DBA_FLASHBACK_ARCHIVE;
```

| FLASHBACK_ARCHIVE_NA | CREATED     | RETENTION_IN_DAYS | STATUS  |
|----------------------|-------------|-------------------|---------|
| FBDA1                | 12-feb-2009 | 7                 | DEFAULT |
| FBDA2                | 12-feb-2009 | 10                |         |

```
SQL> SELECT TABLE_NAME, FLASHBACK_ARCHIVE_NAME, ARCHIVE_TABLE_NAME, STATUS
2 FROM DBA_FLASHBACK_ARCHIVE_TABLES;
```

| TABLE_NAME | FLASHBACK_ARCHIVE_NA | ARCHIVE_TABLE_NAME | STATUS  |
|------------|----------------------|--------------------|---------|
| EMP        | FBDA1                | SYS_FBA_HIST_72413 | ENABLED |
| SALES      | FBDA2                | SYS_FBA_HIST_71341 | ENABLED |



# FDA – INTERNALS - Warning

## DROPPING HISTORY TABLES

```
SQL> ALTER TABLE TEST_TBL2 NO FLASHBACK ARCHIVE;
```

```
SQL> SELECT table_name, archive_table_name, status
 FROM USER_FLASHBACK_ARCHIVE_TABLES
 WHERE TABLE_NAME='TEST_TBL2';
```

| TABLE_NAME | ARCHIVE_TABLE_NAME | STATUS          |
|------------|--------------------|-----------------|
| TEST_TBL_2 | SYS_FBA_HIST_73527 | <b>DISABLED</b> |

```
SQL> SELECT TABLE_NAME FROM USER_TABLES
 WHERE TABLE_NAME LIKE '%FBA%';
```

```
TABLE_NAME

SYS_FBA_DDL_COLMAP_73527
SYS_FBA_TCRV_73527
SYS_FBA_HIST_73527
```

```
SQL> drop table SYS_FBA_HIST_73527;
```

```
ORA-55622: DML, ALTER and CREATE UNIQUE INDEX operations are not
 allowed on table "INDY"."SYS_FBA_HIST_73527"
```

```
SQL> select count(*) from SYS_FBA_HIST_73527;
```

```
9741
```

# FDA – INTERNALS - Warning

## DROPPING HISTORY TABLES - Workaround

```
SELECT o.object_id, o. owner, o.object_name, t.property
FROM dba_objects o, tab$ t
WHERE o.object_type = 'TABLE'
AND o.object_id = t.obj#
AND t.property = 9126805504;
```

**If the object returned is the one you are trying to drop then:**

```
UPDATE tab$
SET property = 536870912
WHERE property = 9126805504;
COMMIT;
```

```
SQL> SELECT TABLE_NAME FROM USER_TABLES WHERE TABLE_NAME LIKE '%FBA%';
TABLE_NAME

SYS_FBA_DDL_COLMAP_73527
SYS_FBA_TCRV_73527
SYS_FBA_HIST_73527
```

**You will then be able to drop the table. For example:**

```
DROP TABLE SYS_FBA_TCRV_73527;
DROP TABLE SYS_FBA_DDL_COLMAP_73527;
```

# FDA – exp, expdp

Created INDY schema with one table and flashback archive.

```
exp file=test.dmp owner=INDY
```

```
about to export TKRIM's tables via Conventional Path ...
```

```
EXP-00008: ORACLE error 1455 encountered
```

```
ORA-01455: converting column overflows integer datatype
```

```
EXP-00000: Export terminated unsuccessfully
```

exp seem not be working with Oracle flashback archive.

```
expdp schemas=TKRIM dumpfile=test.dp
```

datapump expdp works. But it does not export the history

# FDA – impdp

```
impdp schemas=INDY dumpfile=test.dp TABLE_EXISTS_ACTION=replace
```

```
Processing object type SCHEMA_EXPORT/TABLE/TABLE
```

```
ORA-39121: Table "INDY"."DEMO" can't be replaced, data will be
skipped. Failing error is:
```

```
ORA-55610: Invalid DDL statement on history-tracked table
```

```
ORA-00955: name is already used by an existing object
```

```
Processing object type SCHEMA_EXPORT/TABLE/TABLE_DATA
```

```
Job "SYSTEM"."SYS_IMPORT_SCHEMA_01" completed with 2 error(s) at
09:22:03
```

**Disabling flashback archive on the table does the trick.**

```
ALTER TABLE INDY.demo NO FLASHBACK ARCHIVE;
drop table indy.demo;
```

```
Processing object type SCHEMA_EXPORT/TABLE/TABLE_DATA
```

```
. . imported "TKRIM"."DEMO":"E1" 5.421 KB 2 rows
```

```
. . imported "TKRIM"."DEMO":"E2" 5.429 KB 2 rows
```

```
Job "SYSTEM"."SYS_IMPORT_SCHEMA_01" completed with 1 error(s) at
09:24:05
```

**but the table stays without flashback archiving enable. a query to  
the flashback archive still works.**

```
select * from INDY.demo as of scn 827813;
ALTER TABLE INDY.demo FLASHBACK ARCHIVE fl1 ;
```

**QUESTIONS**  
**ANSWERS**



# Next Presentation

## 331: ASM enhancements in 11g Release 2

### 11g R2 Boot Camp

COLLABORATE

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GAIN

**COLLABORATE 10**  
Technology and Applications Forum for the Oracle Community

April 18 – 22, 2010

Mandalay Bay Convention Center  
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Presented by:

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Quest  
International Users Group

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# *THANKS*