Managing Undo Data

Objectives

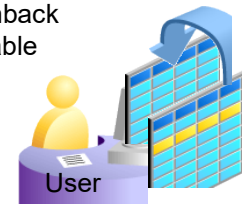
After completing this lesson, you should be able to:

- Explain DML and undo data generation
- Monitor and administer undo data
- Describe the difference between undo data and redo data
- Configure undo retention
- Guarantee undo retention
- Enable temporary undo
- Use the Undo Advisor

Undo Data: Overview

Undo data is:

- A record of the action of a transaction
- Captured for *every* transaction that changes data
- Retained at least until the transaction is ended
- Used to support:
  - Rollback operations
  - Read-consistent queries
  - Oracle Flashback Query, Oracle Flashback Transaction, and Oracle Flashback Table
  - Recovery from failed transactions



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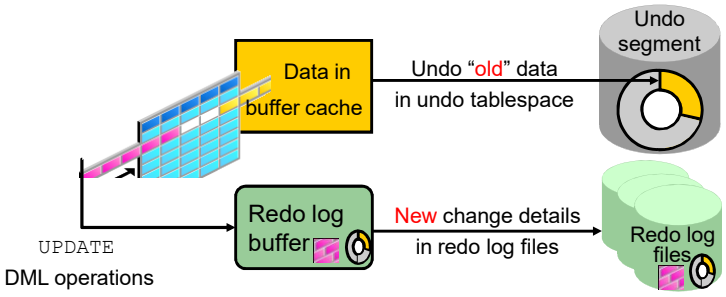
Transactions and Undo Data



- Each transaction is assigned to only one undo segment.
- An undo segment can service more than one transaction at a time.

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Storing Undo Information

- Undo information is stored in undo segments, which are stored in an undo tablespace.
- Undo tablespaces:
  - Are used only for undo segments
  - Have special recovery considerations
  - May be associated with only a single instance
  - Require that only one of them be the current writable undo tablespace for a given instance at any given time

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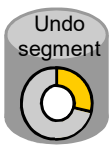
Comparing Undo Data and Redo Data

	Undo	Redo
Record of	How to undo a change	How to reproduce a change
Used for	Rollback, read consistency, flashback	Rolling forward database changes
Stored in	Undo segments	Redo log files



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Managing Undo

Automatic undo management:

- Fully automated management of undo data and space in a dedicated undo tablespace
- For all sessions
- Self-tuning in `AUTOEXTEND` tablespaces to satisfy long-running queries
- Self-tuning in fixed-size tablespaces for best retention

DBA tasks in support of Flashback operations:

- Configuring undo retention
- Changing undo tablespace to a fixed size
- Avoiding space and “snapshot too old” errors

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Configuring Undo Retention

- `UNDO_RETENTION` specifies (in seconds) how long already committed undo information is to be retained.
- Set this parameter when:
  - The undo tablespace has the `AUTOEXTEND` option enabled
  - You want to set undo retention for LOBs
  - You want to guarantee retention

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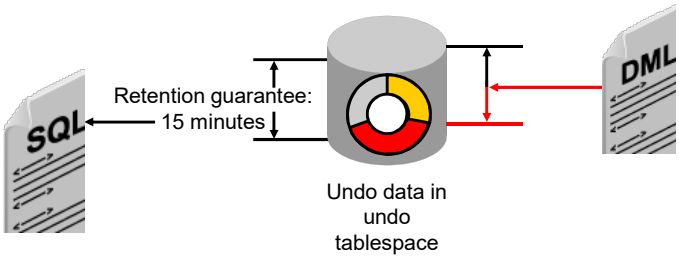
Guaranteeing Undo Retention

```
SQL> ALTER TABLESPACE undotbs1 RETENTION GUARANTEE;
```



`SELECT` statements running 15 minutes or less are always satisfied.

A transaction will fail if it generates more undo than there is space.

Note: This example is based on an `UNDO_RETENTION` setting of 900 seconds (15 minutes).

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Changing an Undo Tablespace to a Fixed Size

- Rationale:
  - Supporting Flashback operations
  - Limiting tablespace growth
- Steps:
  1. Run regular workload.
  2. Self-tuning mechanism establishes minimum required size.
  3. (Optional) Use the Enterprise Manager Cloud Control Undo Advisor, which calculates required size for future growth.
  4. (Optional) Change undo tablespace to a fixed size.

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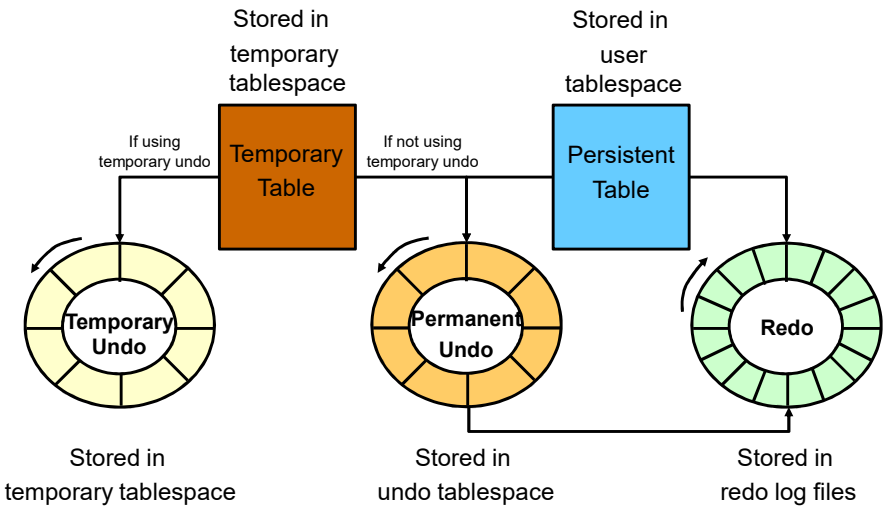
Temporary Undo: Overview



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Enabling Temporary Undo

- Enable temporary undo for a session:

```
SQL> ALTER session SET temp_undo_enabled = true;
```

- Enable temporary undo for the database instance:

```
SQL> ALTER system SET temp_undo_enabled = true;
```

- Temporary undo mode is selected when a session first uses a temporary object.

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Monitoring Temporary Undo

```
SELECT to_char(BEGIN_TIME,'dd/mm/yy hh24:mi:ss'),
       TXNCOUNT,MAXCONCURRENCY,UNDOBLKCNT,USCOUNT,NOSPACEERRCNT
FROM   V$TEMPUNDOSTAT;

TO_CHAR(BEGIN_TIM TXNCOUNT MAXCONCURRENCY UNDOBLKCNT USCOUNT NOSPACEERRCNT
----------------- -------- -------------- ---------- ------- -------------
...
19/08/12 22:19:44         0              0          0       0             0
19/08/12 22:09:44         0              0          0       0             0
...
19/08/12 13:09:44         0              0          0       0             0
19/08/12 12:59:44         3              1         24       1             0

576 rows selected.

SQL>
```

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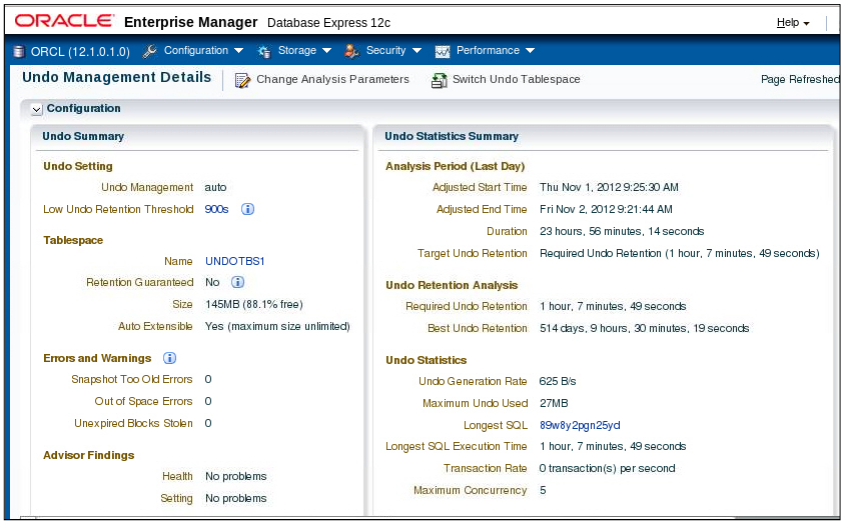
Viewing Undo Information



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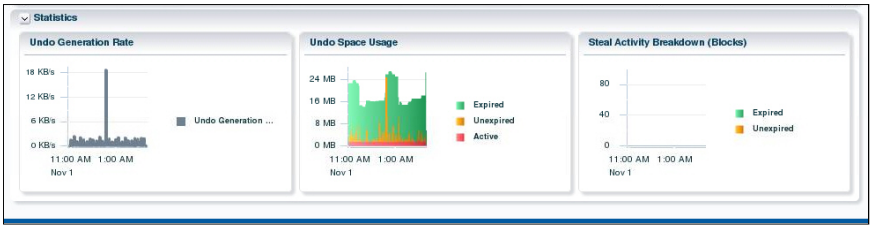
Viewing Undo Activity



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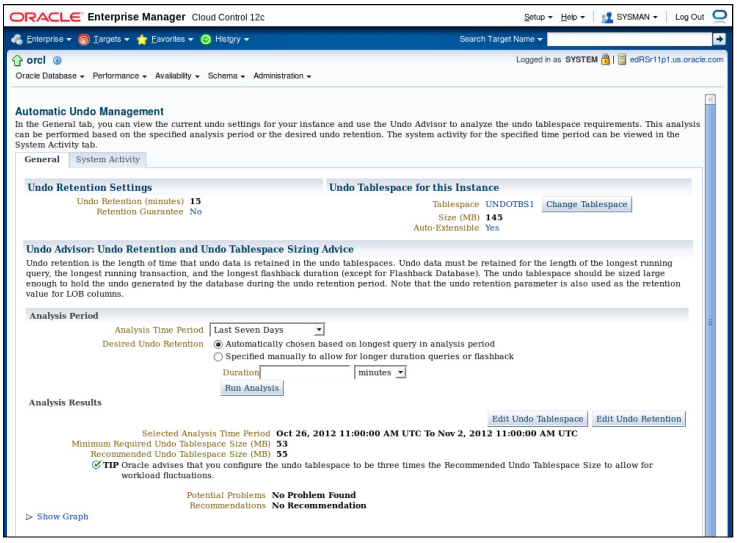
Using the Undo Advisor



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Summary

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- Monitor and administer undo data
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- Guarantee undo retention
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