# 9

# Managing Undo Data

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## 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
- Use the Undo Advisor

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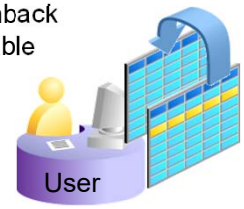
## Undo Data: Overview

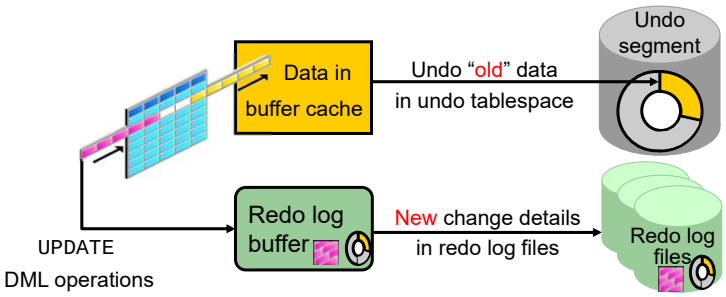
Undo data is:

- 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






## 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.

## 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



## 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

## 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 guarantee retention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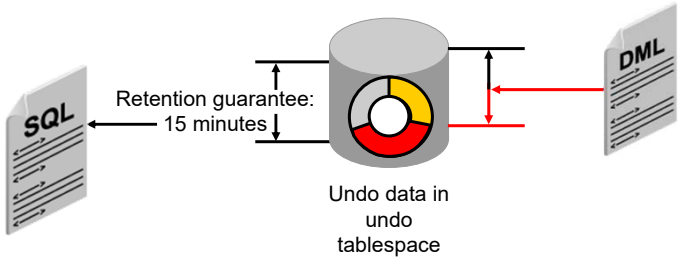
## Guaranteeing Undo Retention

```
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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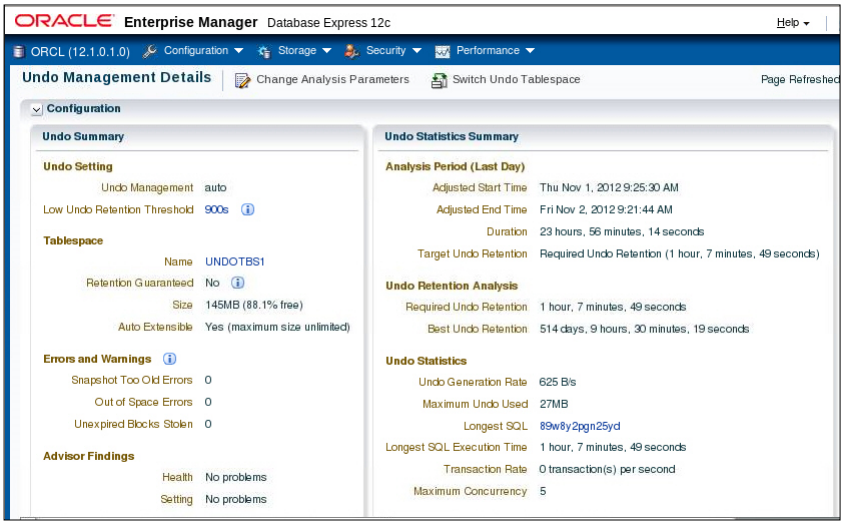
## Changing an Undo Tablespace to a Fixed Size

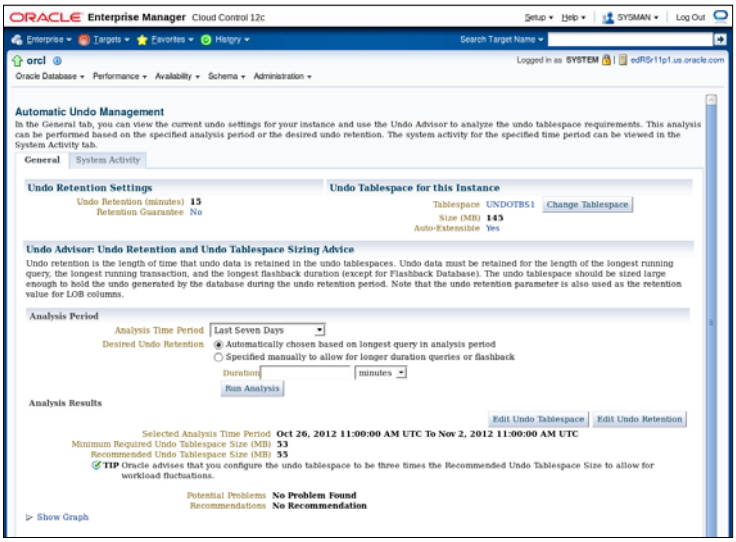
- Rationale:
  - Supporting Flashback operations
  - Limiting tablespace growth
- Steps:
  1. Run regular workload.
  2. Self-tuning mechanism establishes minimum required size.
  3. (Optional) Use the Enterprise Manager Cloud Control Undo Advisor, which calculates required size for future growth.
 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



## Viewing Undo Information



## Using the Undo Advisor






## Summary

In this lesson, you should have learned how 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
- Use the Undo Advisor