



# Managing Undo Data

# Objectives

**After completing this lesson, you should be able to do the following:**

- **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**

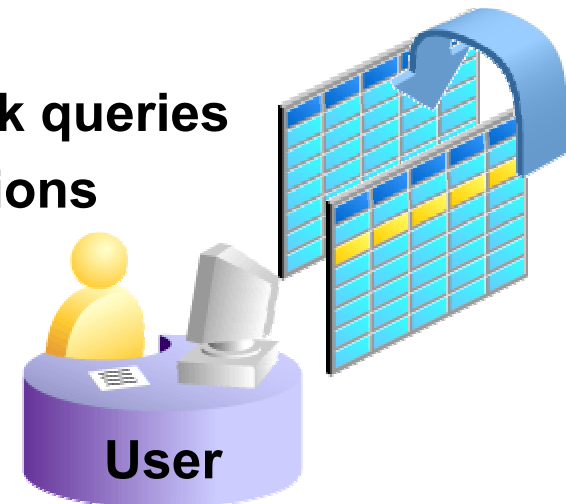
# Data Manipulation

- **Data manipulation language (DML) consists of the following SQL statements:**
  - **INSERT**
  - **UPDATE**
  - **DELETE**
  - **MERGE**
- **DML always executes as part of a transaction, which can be:**
  - **Rolled back, using the ROLLBACK command**
  - **Committed, using the COMMIT command**

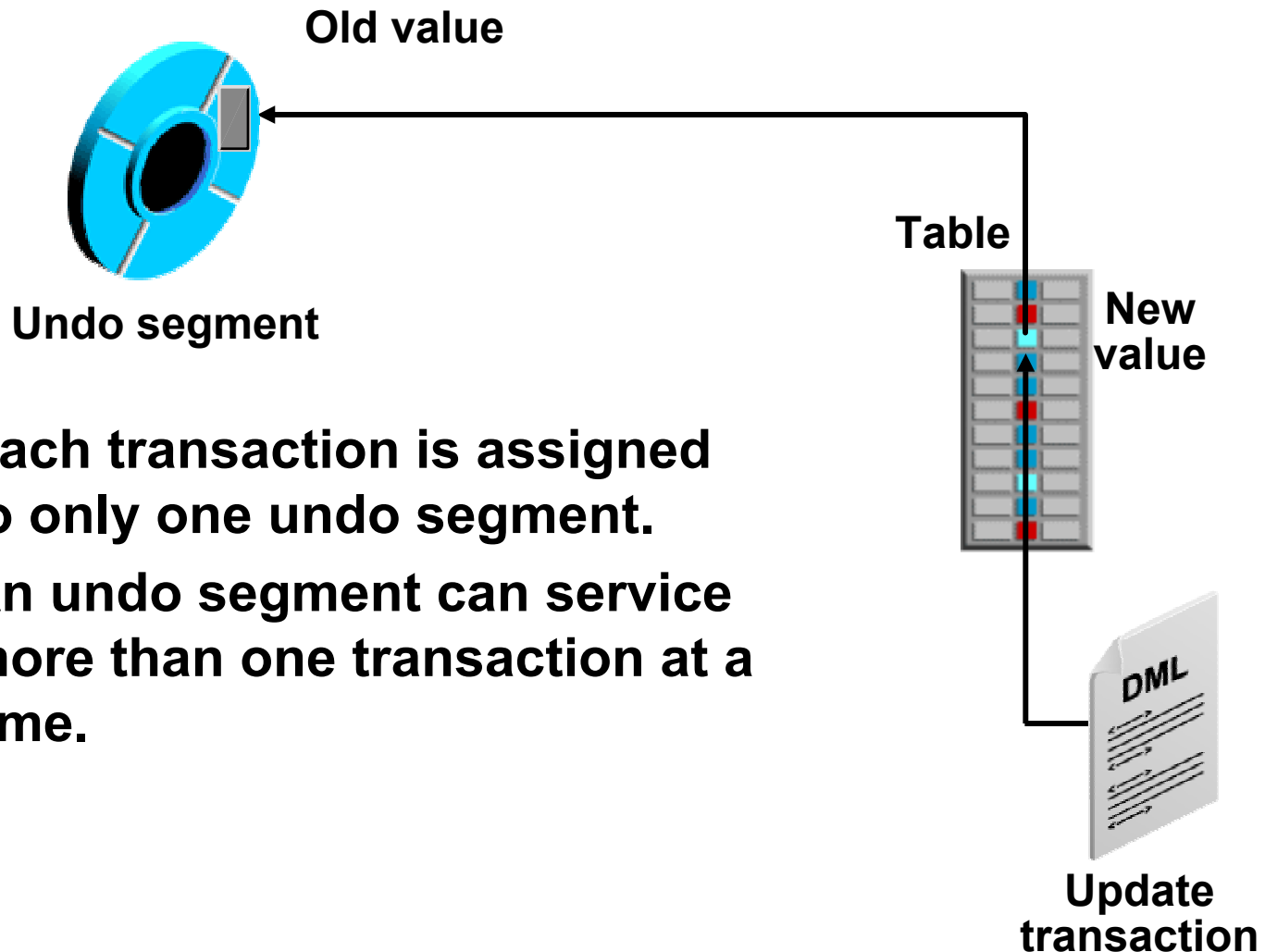
# Undo Data

**Undo data is:**

- **A copy of original, premodified data**
- **Captured for *every* transaction that changes data**
- **Retained at least until the transaction is ended**
- **Used to support:**
  - **Rollback operations**
  - **Read-consistent and flashback queries**
  - **Recovery from failed transactions**



# Transactions and Undo Data

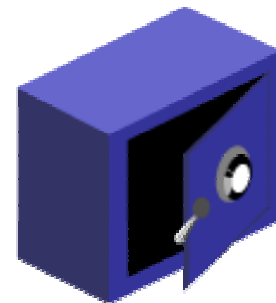


- Each transaction is assigned to only one undo segment.
- An undo segment can service more than one transaction at a time.

# Storing Undo Information

**Undo information is stored in undo segments, which are, in turn, 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**



# Undo Data Versus 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
Protects against	Inconsistent reads in multiuser systems	Data loss

# Monitoring Undo

**Undo usually requires little management. The areas to monitor include:**

- **Free space in an undo tablespace**
- **“Snapshot too old” errors**





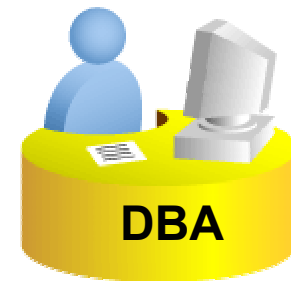
# Administering Undo

**Administration of undo should include preventing:**

- **Space errors in an undo tablespace:**
  - Size the undo tablespace properly.
  - Ensure that large transactions commit periodically.
- **“Snapshot too old” errors:**
  - Configure an appropriate undo retention interval.
  - Size the undo tablespace properly.
  - Consider guaranteeing undo retention.

**Use automatic undo management:**

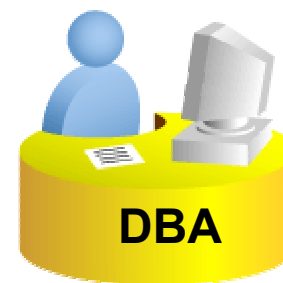
```
UNDO_MANAGEMENT=AUTO  
UNDO_TABLESPACE=UNDOTBS1
```



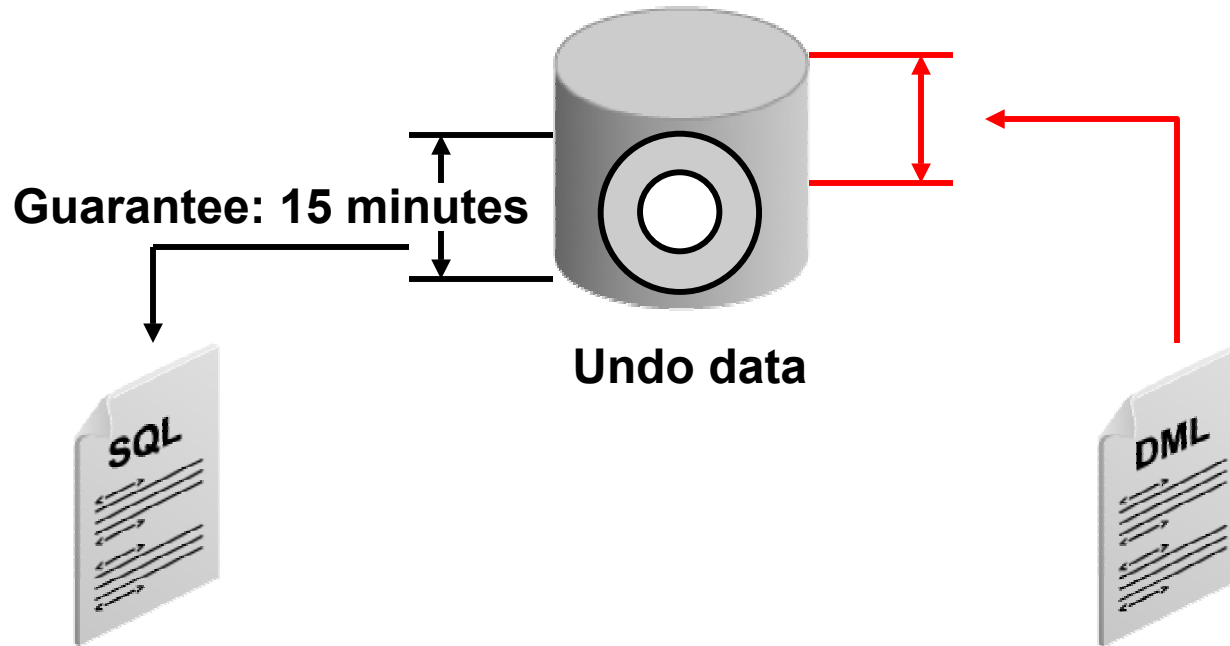
# Configuring Undo Retention

**UNDO\_RETENTION** specifies (in seconds) how long already committed undo information is to be retained. The only time you must set this parameter is when:

- The undo tablespace has the **AUTOEXTEND** option enabled
- You want to set undo retention for LOBs
- You want to guarantee retention



# Guaranteeing Undo Retention



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

**A transaction that generates  
more undo than what there  
is space for will fail.**

# Sizing the Undo Tablespace

## Undo Management

Undo Advisor

### Configuration

Auto-tuned Undo Retention (minutes) **15**  
Minimum Undo Retention (minutes) **15**  
Guarantee Minimum Undo Retention **No**

Undo Tablespace **UNDOTBS1**  
Size (MB) **35**  
Auto-Extensible **Yes**

Change Tablespace

**Current table-  
space size**

### Recommendations

Choose the time period that best represents the system activity to get the recommendations for undo retention length and undo tablespace size. [Edit Undo Tablespace](#)

Analysis Time Period **Last One Hour**

Update Analysis

Selected Analysis Time Period **5/11/05 4:18 PM - 5/11/05 5:18 PM**

Potential Problems **No Problem Found**  
Recommendations **No Recommendation**

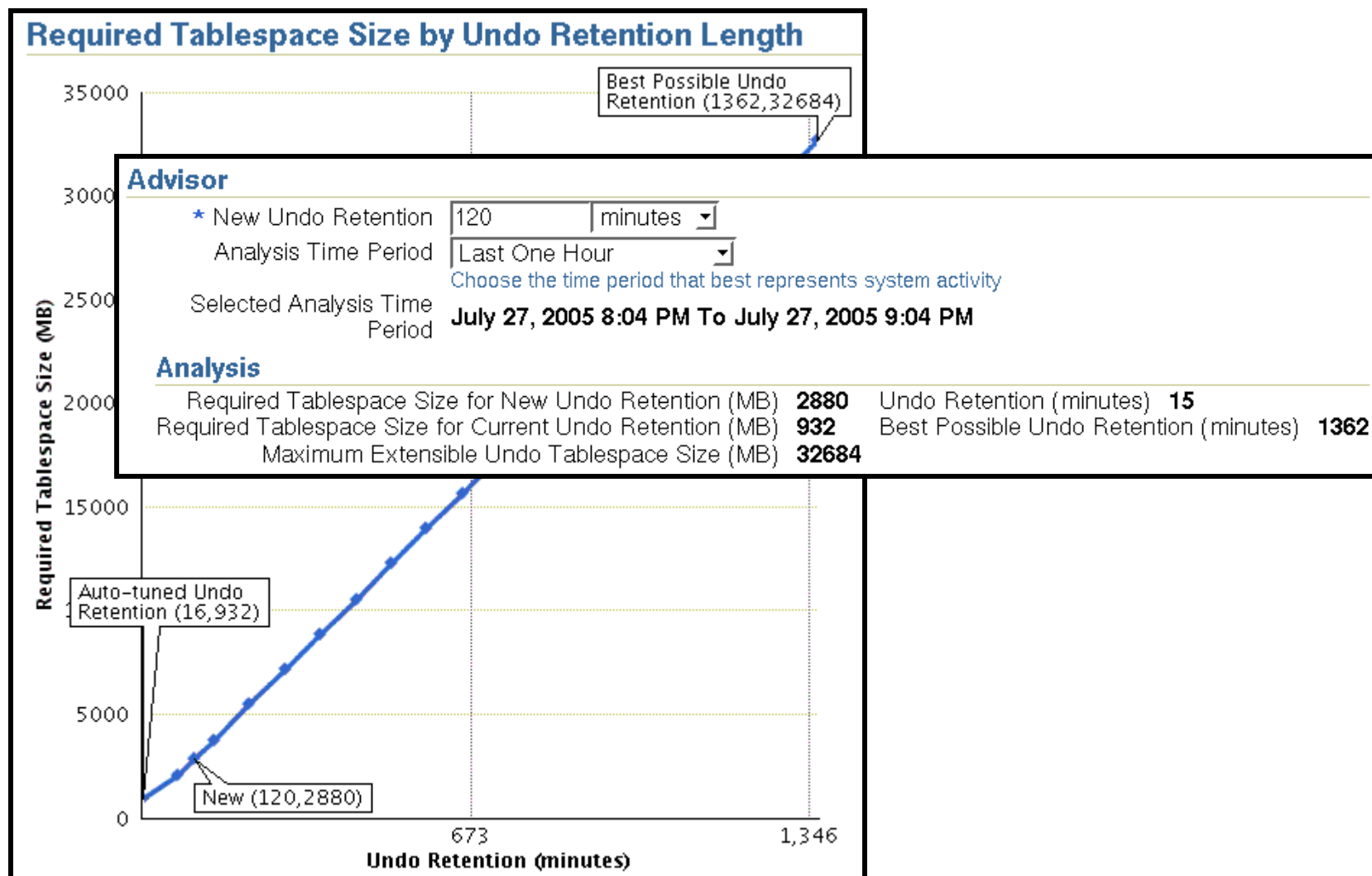
### System Activity and Tablespace Usage

The recommendations are based on system activity and undo tablespace usage for the selected analysis time period.

Longest Running Query (seconds) **333**  
Average Undo Generation Rate (KB/minute) **24.0**  
Maximum Undo Generation Rate (KB/minute) **63.0**

**Undo consumption rate**

# Using the Undo Advisor



# Summary

**In this lesson, you should have learned how to:**

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

# **Practice Overview: Managing Undo Segments**

**This practice covers the following topics:**

- **Calculating undo tablespace sizing to support a 48-hour retention interval**
- **Modifying an undo tablespace to support a 48-hour retention interval**