

10

Managing Undo Data

Objectives

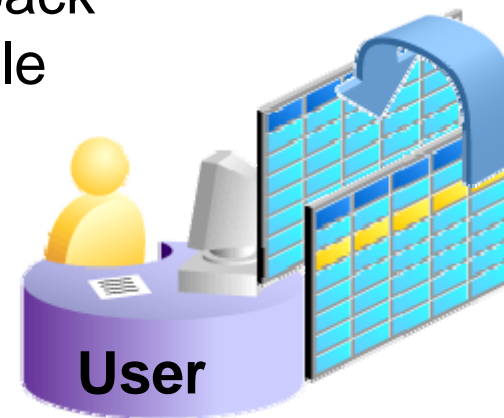
After completing this lesson, you should be able to:

- 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
- Use the Undo Advisor

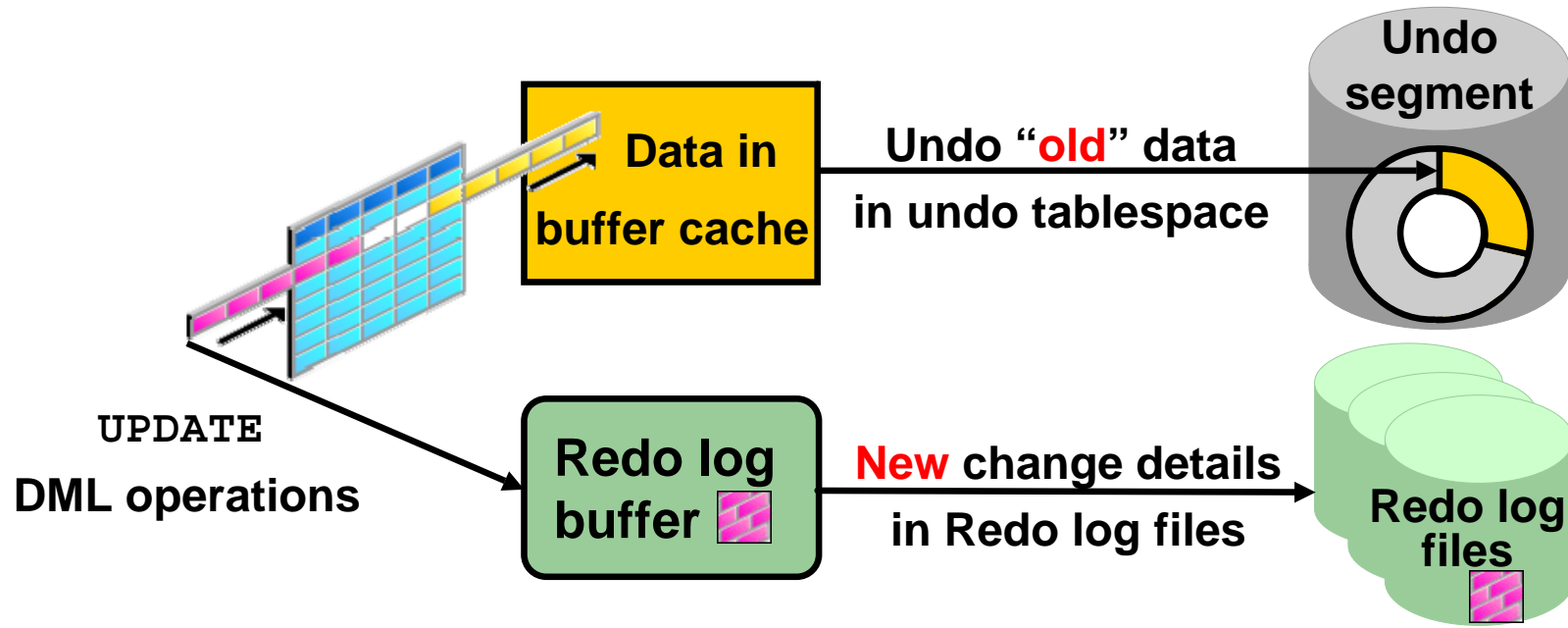
Undo Data

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 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.

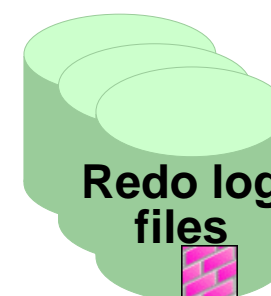
Storing Undo Information

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

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



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

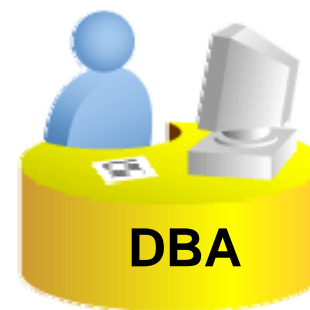
DBA tasks in support of Flashback operations:

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

Configuring Undo Retention

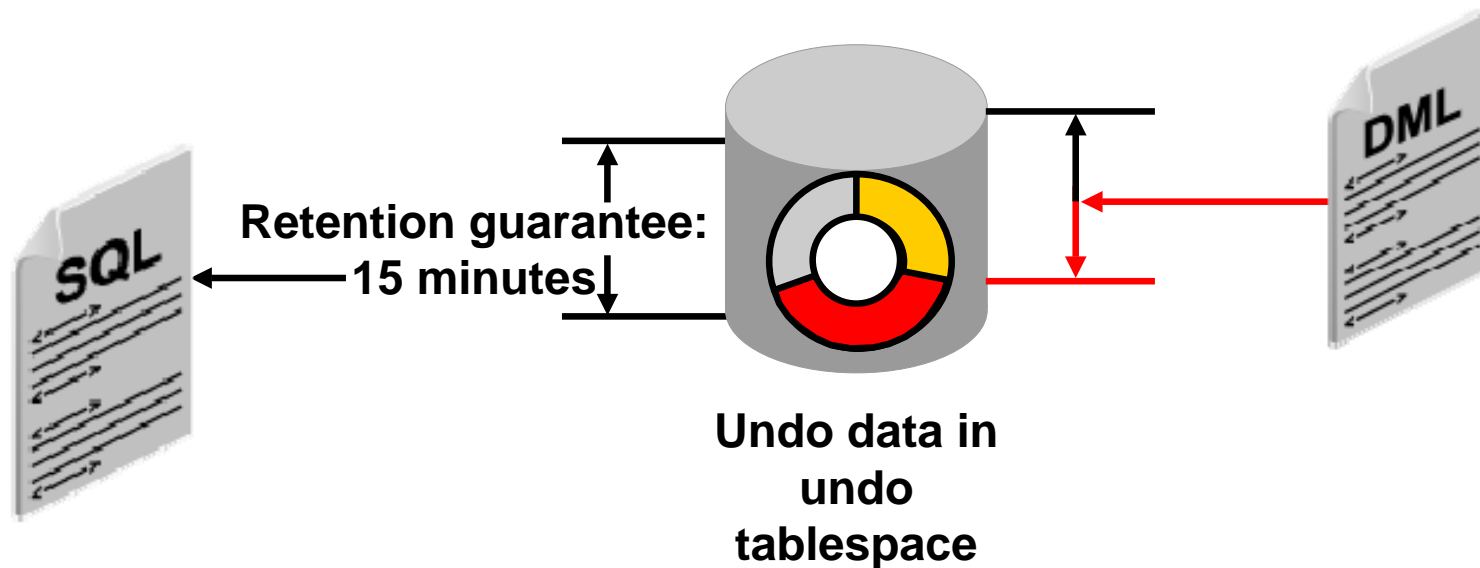
UNDO_RETENTION specifies (in seconds) how long already committed undo information is to be retained. The only time you must set this parameter is when:

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



Guaranteeing Undo Retention

```
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).

Changing an Undo Tablespace to a Fixed Size

Reasons:

- Supporting Flashback operations
- Limiting tablespace growth

Workflow:

1. Run regular workload.
2. Self-tuning mechanism establishes minimum required size.
3. (Optional) Use Undo Advisor, which calculates required size for future growth.
4. (Optional) Change undo tablespace to a fixed size.



General Undo Information

Database Instance: [orcl.oracle.com](#) >

Automatic Undo Management

In the General tab, you can view the current undo settings for your instance and use the Undo Advisor to analyze the undo tablespace requirements. This analysis can be performed based on the specified analysis period or the desired undo retention. The system activity for the specified time period can be viewed in the System Activity tab.

General

[System Activity](#)

Undo Retention Settings

Undo Retention (minutes)	15
Retention Guarantee	No

Undo Tablespace for this Instance

Tablespace	UNDOTBS1	Change Tablespace
Size (MB)	100	
Auto-Extensible	Yes	

Current
tablespace size

Using the Undo Advisor

Undo Advisor: Undo Retention and Undo Tablespace Sizing Advice

Undo retention is the length of time that undo data is retained in the undo tablespaces. Undo data must be retained for the length of the longest running query, the longest running transaction, and the longest flashback duration (except for Flashback Database). The undo tablespace should be sized large enough to hold the undo generated by the database during the undo retention period. Note that the undo retention parameter is also used as the retention value for LOB columns.

Analysis Period

Analysis Time Period:

Desired Undo Retention: ☒ Automatically chosen based on longest query in analysis period
☐ Specified manually to allow for longer duration queries or flashback

Duration: minutes

Analysis Results

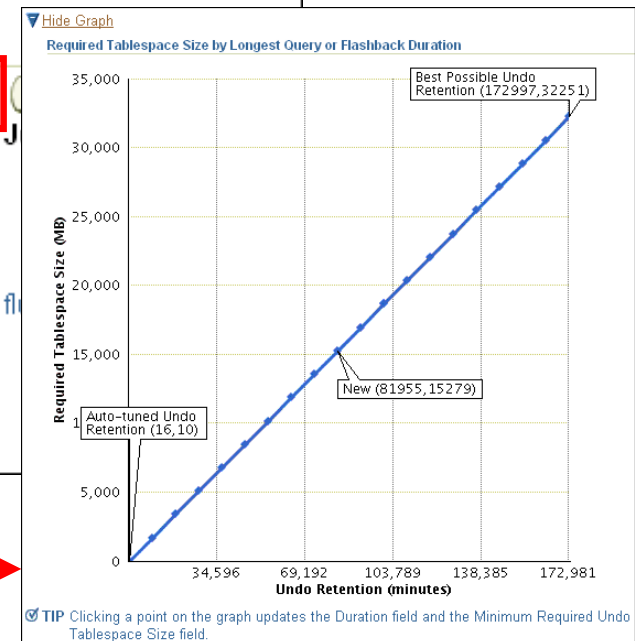
Selected Analysis Time Period: Jun 17, 2009 11:04:47 AM GMT+07:00 To Jun 17, 2009 11:04:47 PM GMT+07:00

Minimum Required Undo Tablespace Size (MB): 10

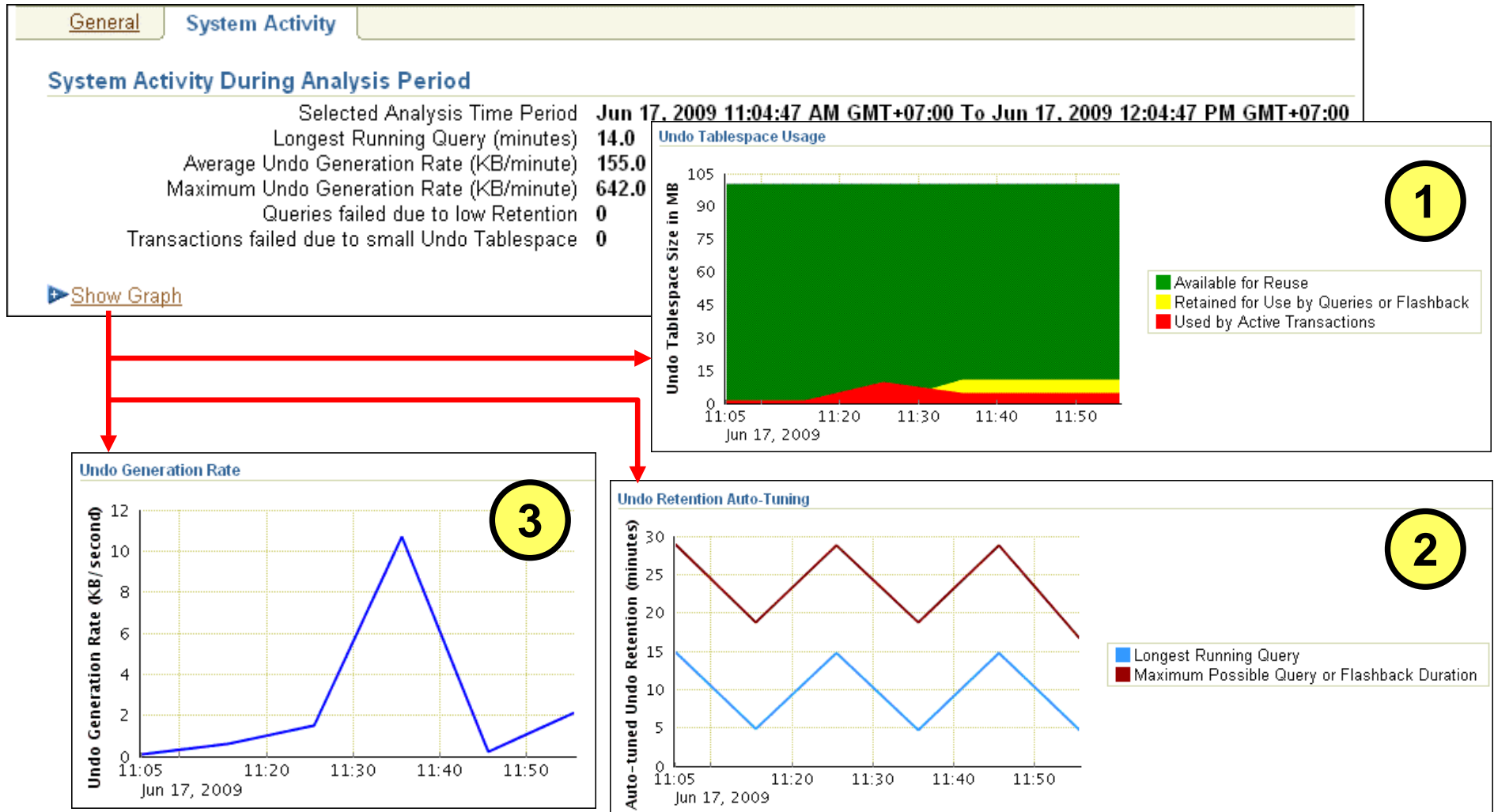
Recommended Undo Tablespace Size (MB): 15

☒ **TIP** Recommended size is three times the minimum size to allow for workload fluctuations.

Potential Problems: No Problem Found
Recommendations: No Recommendation



Viewing System Activity



Quiz

All you need to do to guarantee that all queries under 15 minutes will find the undo data needed for read consistency, is set the UNDO_RETENTION parameter to 15 minutes.

1. True
2. False

Quiz

Which statement does not relate to undo data?

1. Provides a record of how to undo a change
2. Is used for rollback, read consistency, and flashback
3. Is stored in memory only, not written to disk
4. Protects against inconsistent reads in a multiuser system

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
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Practice 10 Overview: Managing Undo Segments

This practice covers the following topics:

- Viewing system activity
- Calculating undo tablespace sizing to support a 48-hour retention interval
- Modifying an undo tablespace to support a 48-hour retention interval