10

Managing Undo Data

Objectives

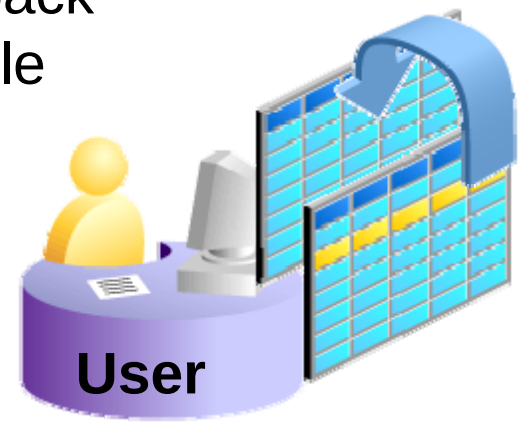
After completing this lesson, you should be able to:

- 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

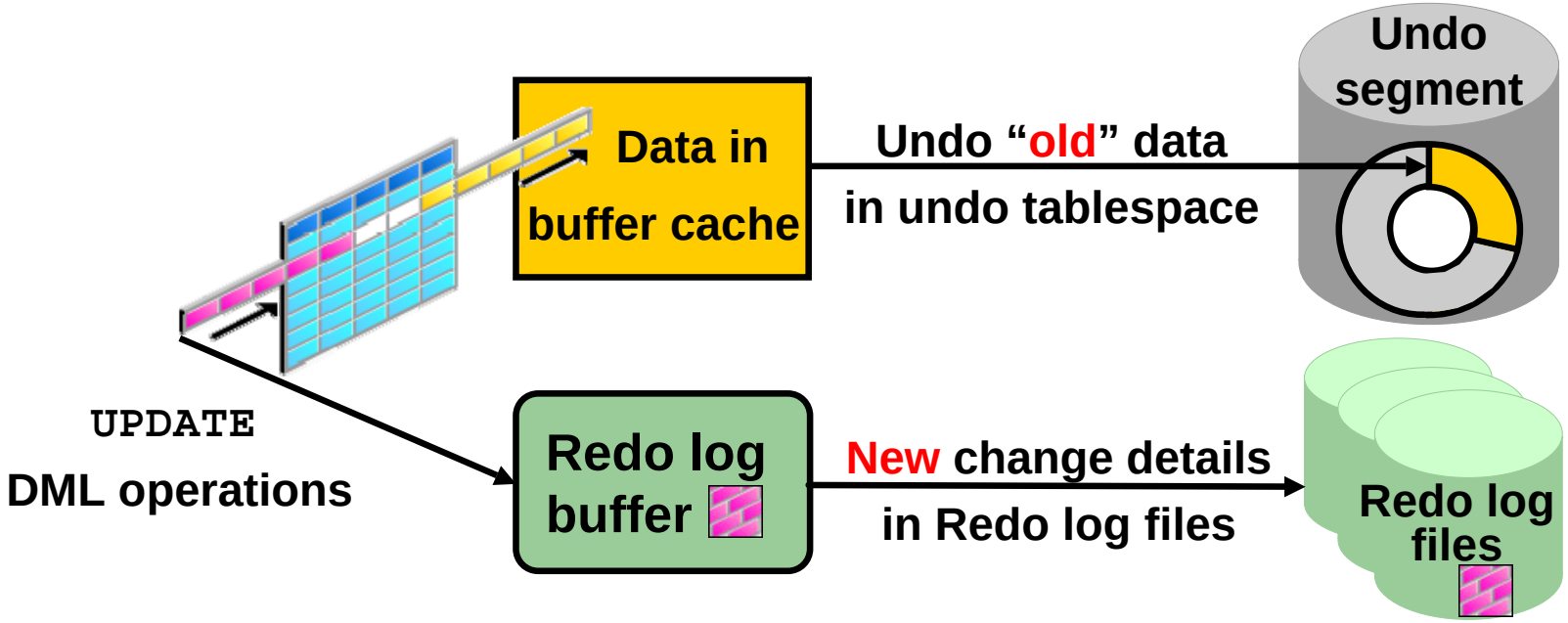
Undo Data

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.

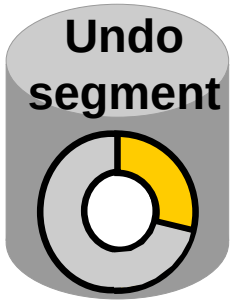
Storing Undo Information

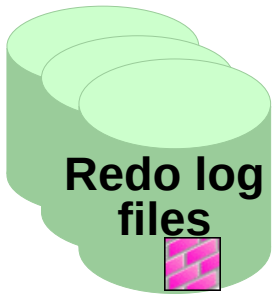
Undo information is stored in undo segments, which are stored in an undo tablespace. Undo tablespaces:

- 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

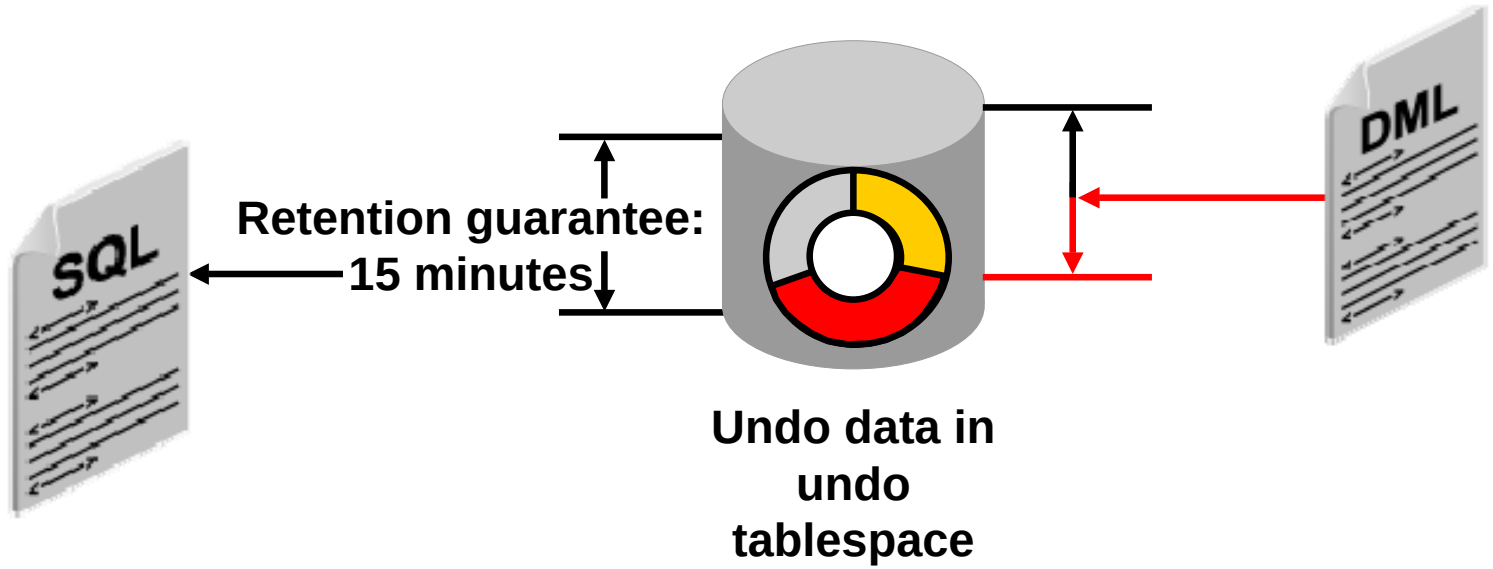
Configuring Undo Retention

`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

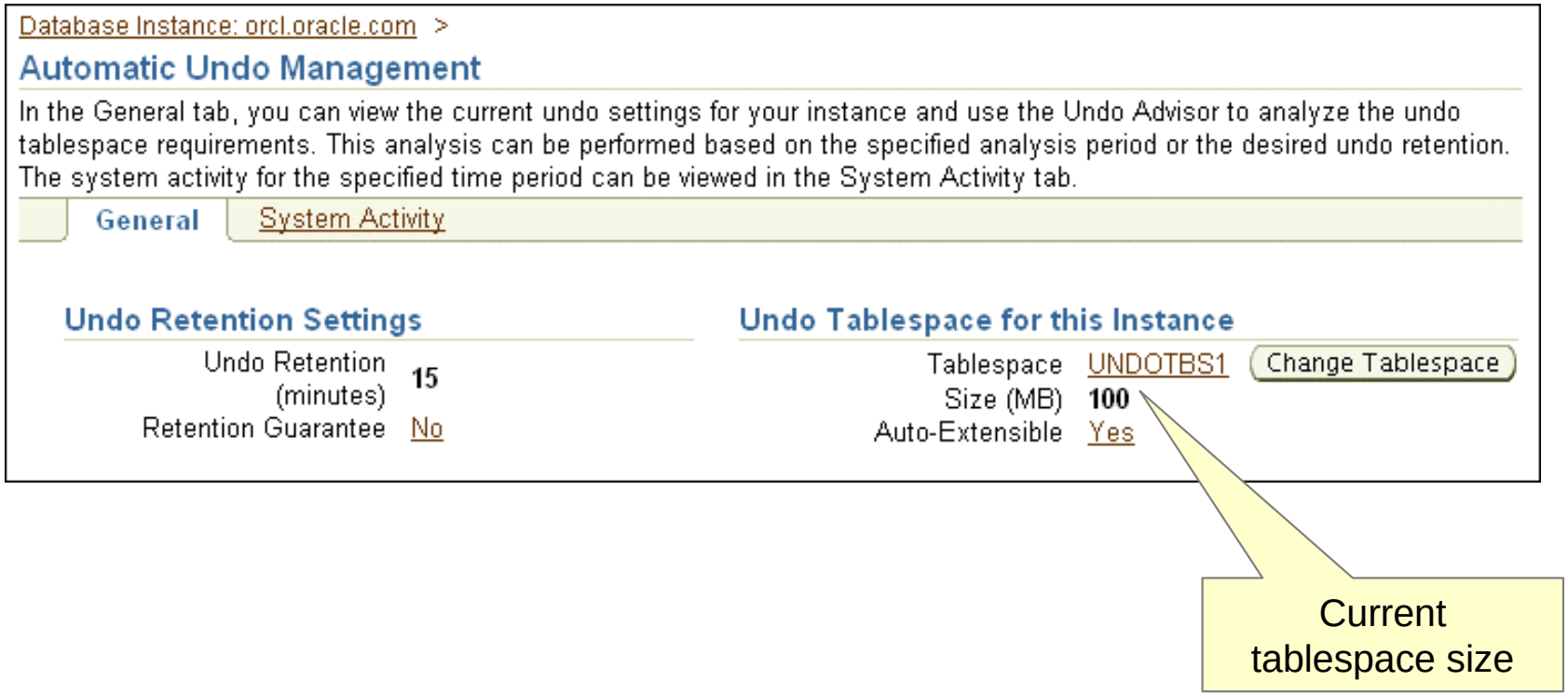
Reasons:

- Supporting Flashback operations
- Limiting tablespace growth

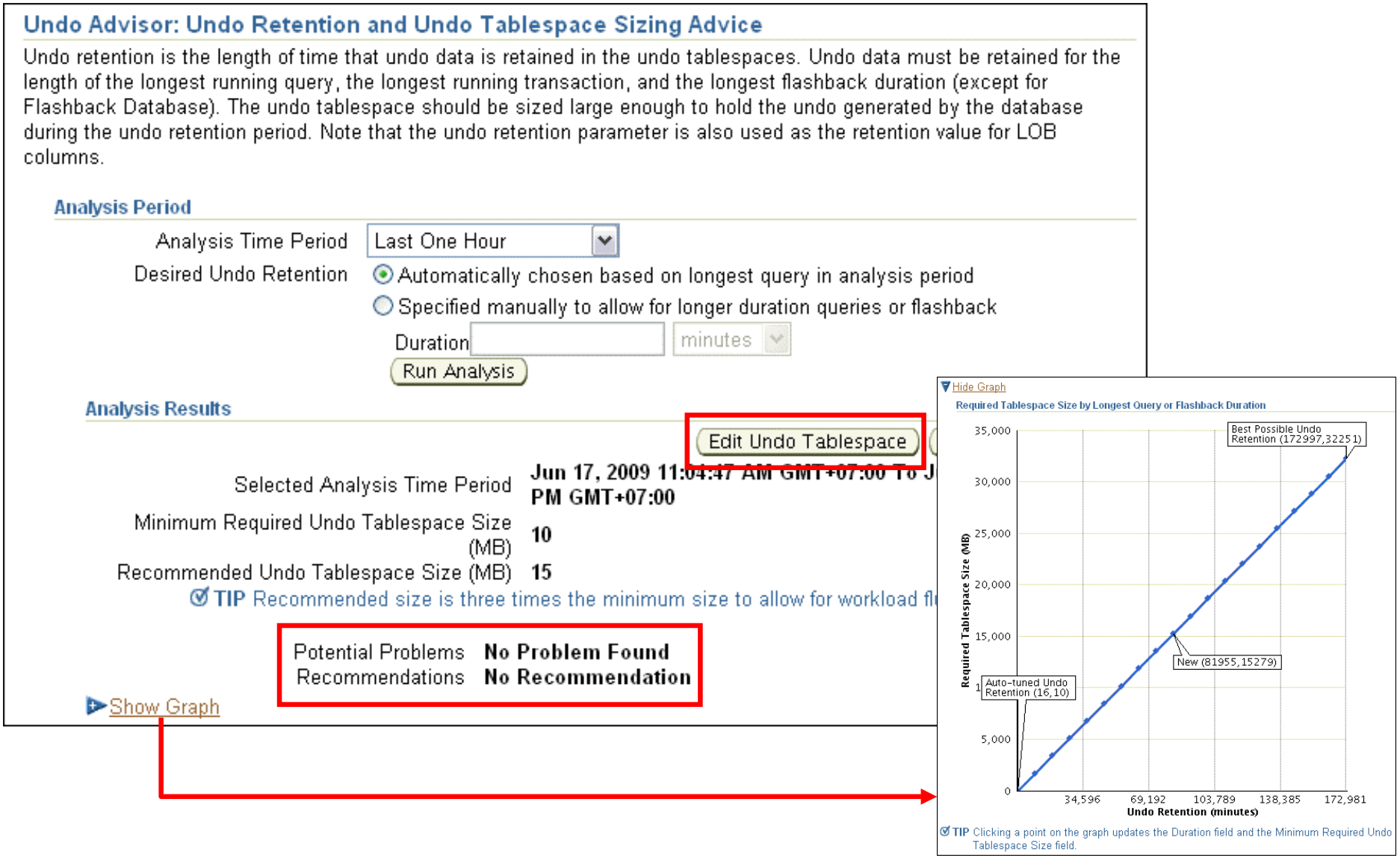
Workflow:

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.

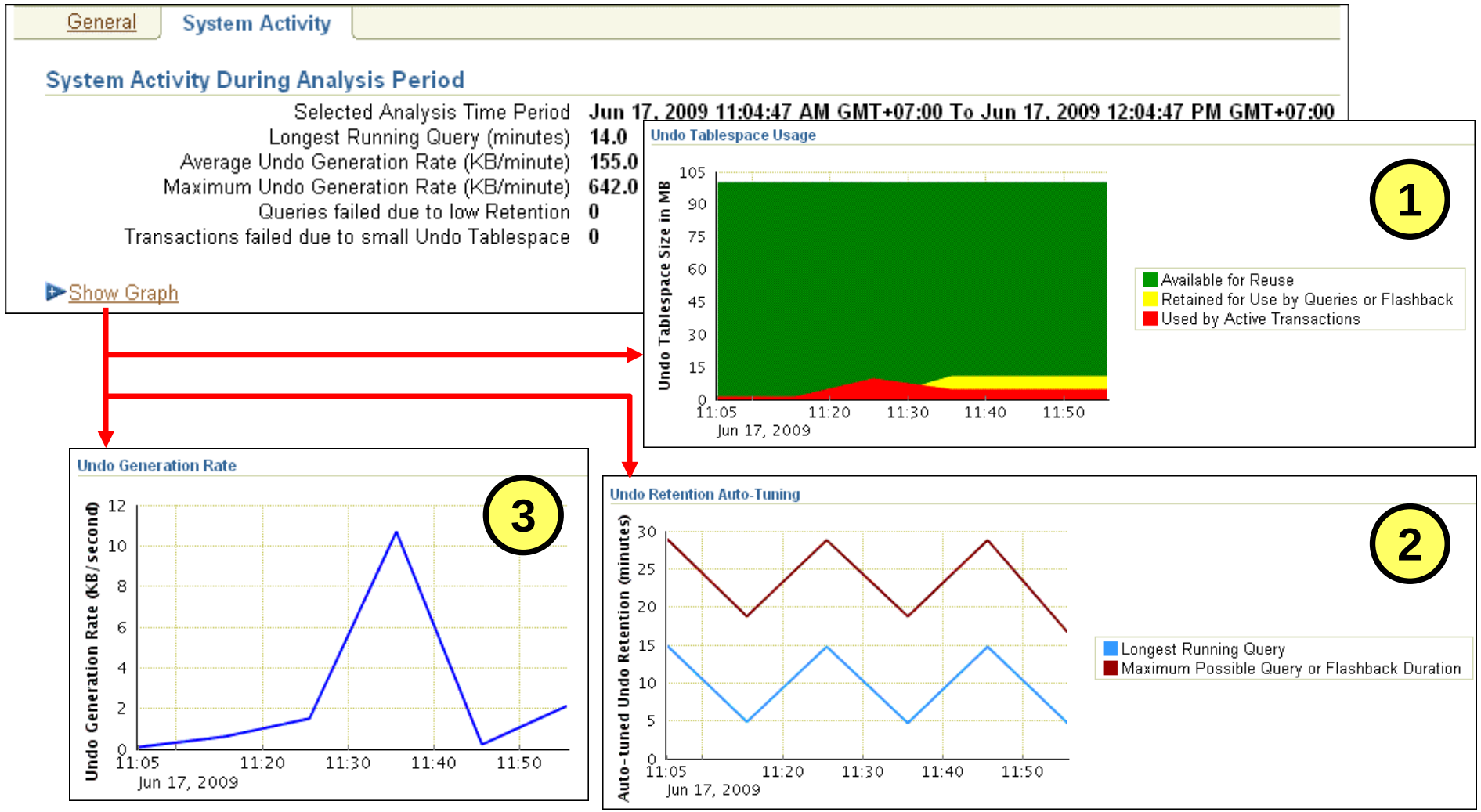
General Undo Information



Using the Undo Advisor



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
- Use the Undo Advisor

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