12

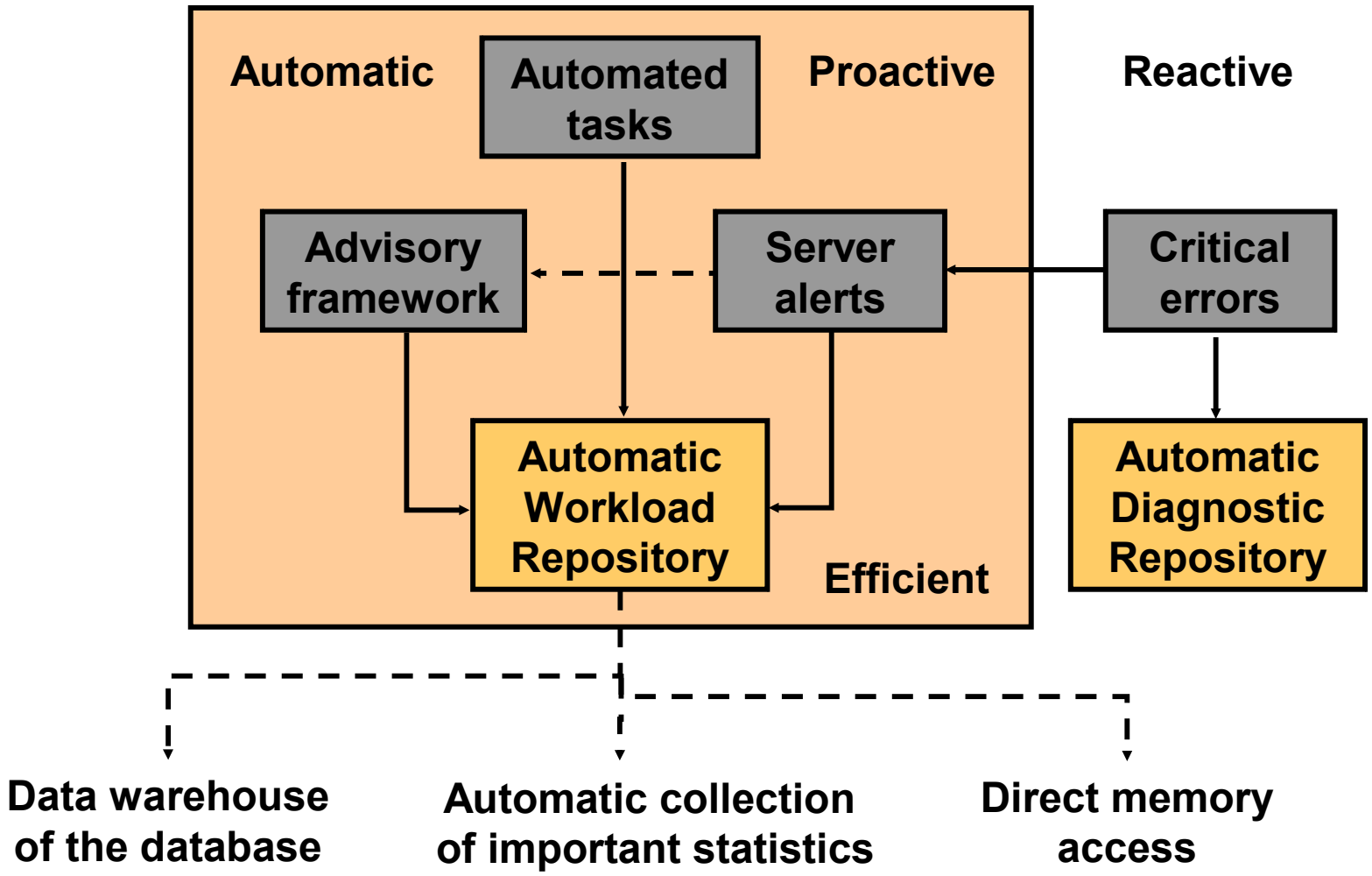
Database Maintenance

Objectives

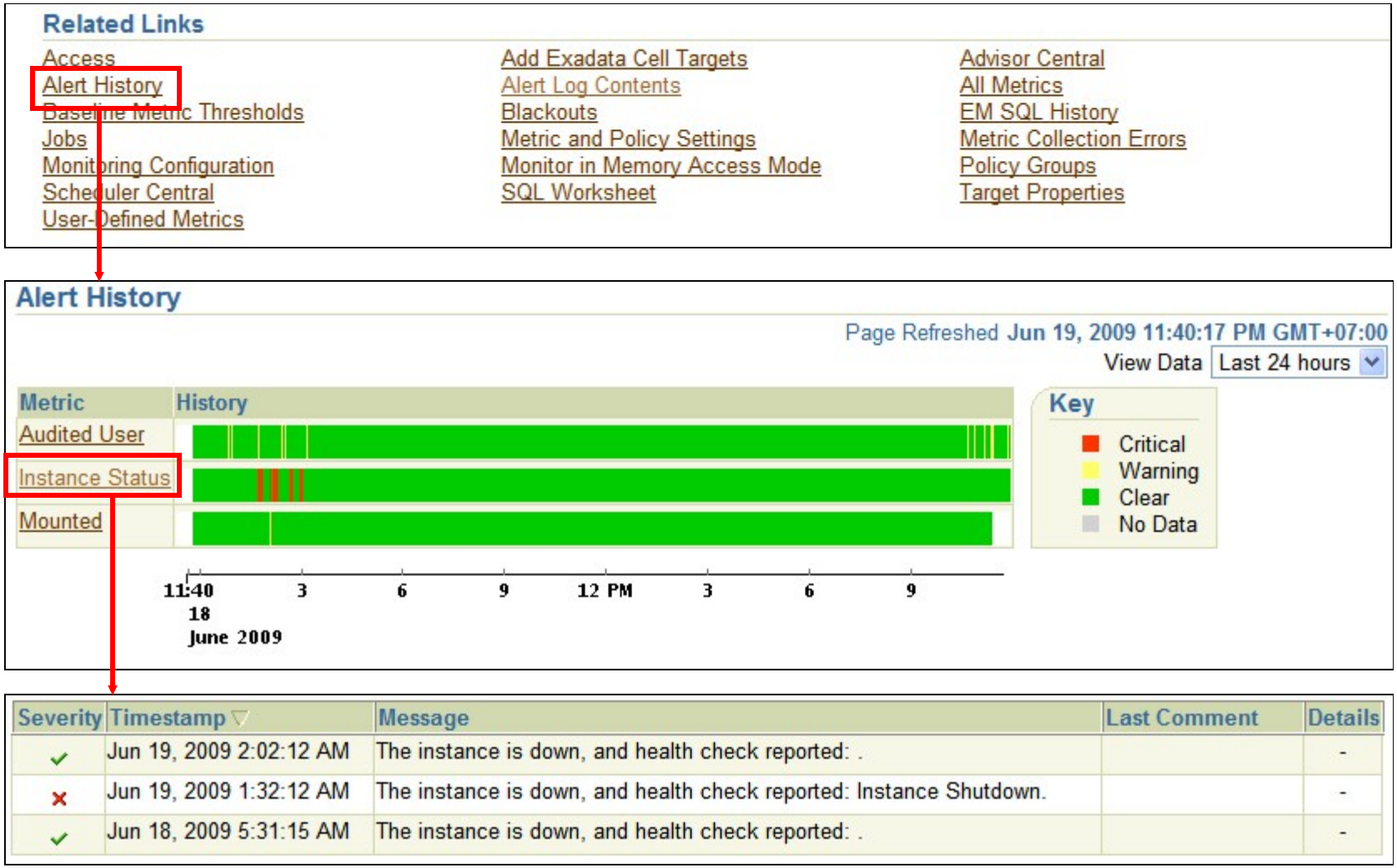
After completing this lesson, you should be able to:

- Manage optimizer statistics
- Manage the Automatic Workload Repository (AWR)
- Use the Automatic Database Diagnostic Monitor (ADDM)
- Describe and use the advisory framework
- Set alert thresholds
- Use server-generated alerts
- Use automated tasks

Database Maintenance



Viewing the Alert History



Terminology

- Automatic Workload Repository (AWR): Infrastructure for data gathering, analysis, and solutions recommendations
- AWR Baseline: A set of AWR snapshots for performance comparison
- Metric: Rate of change in a cumulative statistic
- Statistics: Data collections providing database and object detail
  - Optimizer statistics: Used by query optimizer
  - Database statistics: Used for performance
- Threshold: A boundary value against which metric values are compared

Oracle Optimizer: Overview

The Oracle optimizer determines the most efficient execution plan and is the most important step in the processing of any SQL statement.

The optimizer:

- Evaluates expressions and conditions
- Uses object and system statistics
- Decides how to access the data
- Decides how to join tables
- Determines the most efficient path

Optimizer Statistics

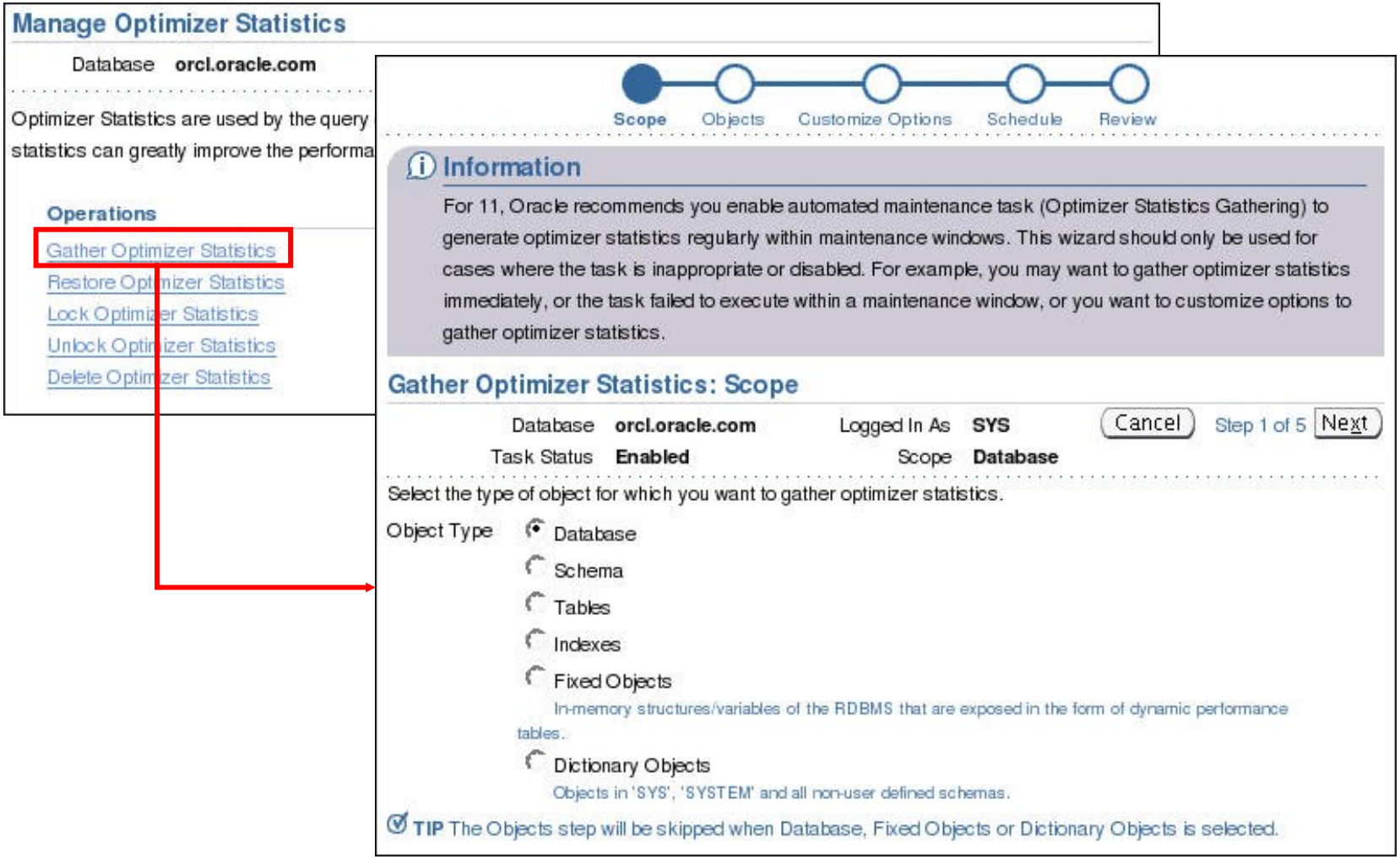
Optimizer statistics are:

- A snapshot at a point in time
- Persistent across instance restarts
- Collected automatically

```
SQL> SELECT COUNT(*) FROM hr.employees;
  COUNT(*)
----------
       214
SQL> SELECT num_rows FROM dba_tables
  2 WHERE owner='HR' AND table_name = 'EMPLOYEES';
  NUM_ROWS
----------
       107
```

Using the Manage Optimizer Statistics Page

Gathering Optimizer Statistics Manually



Preferences for Gathering Statistics

Optimizer statistics gathering task

SCOPE

STATEMENT LEVEL

TABLE LEVEL

SCHEMA LEVEL

DATABASE LEVEL

GLOBAL LEVEL

PREFERENCES

CASCADE

DEGREE

ESTIMATE_PERCENT

NO_INVALIDATE

METHOD_OPT

GRANULARITY

INCREMENTAL

PUBLISH

STALE_PERCENT

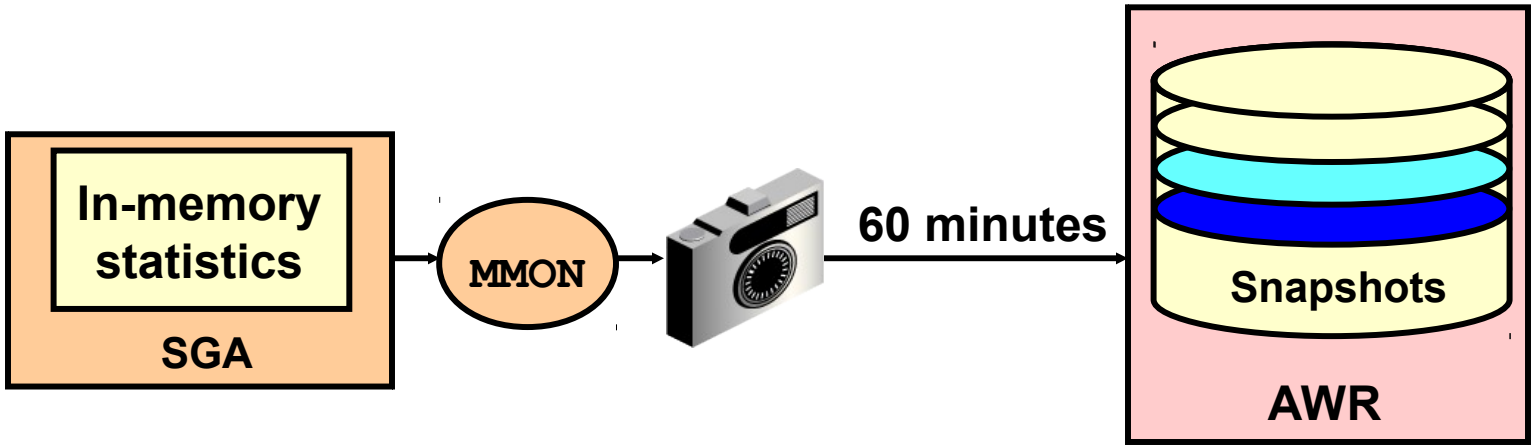
DBMS_STATS

set | get | delete | export | import

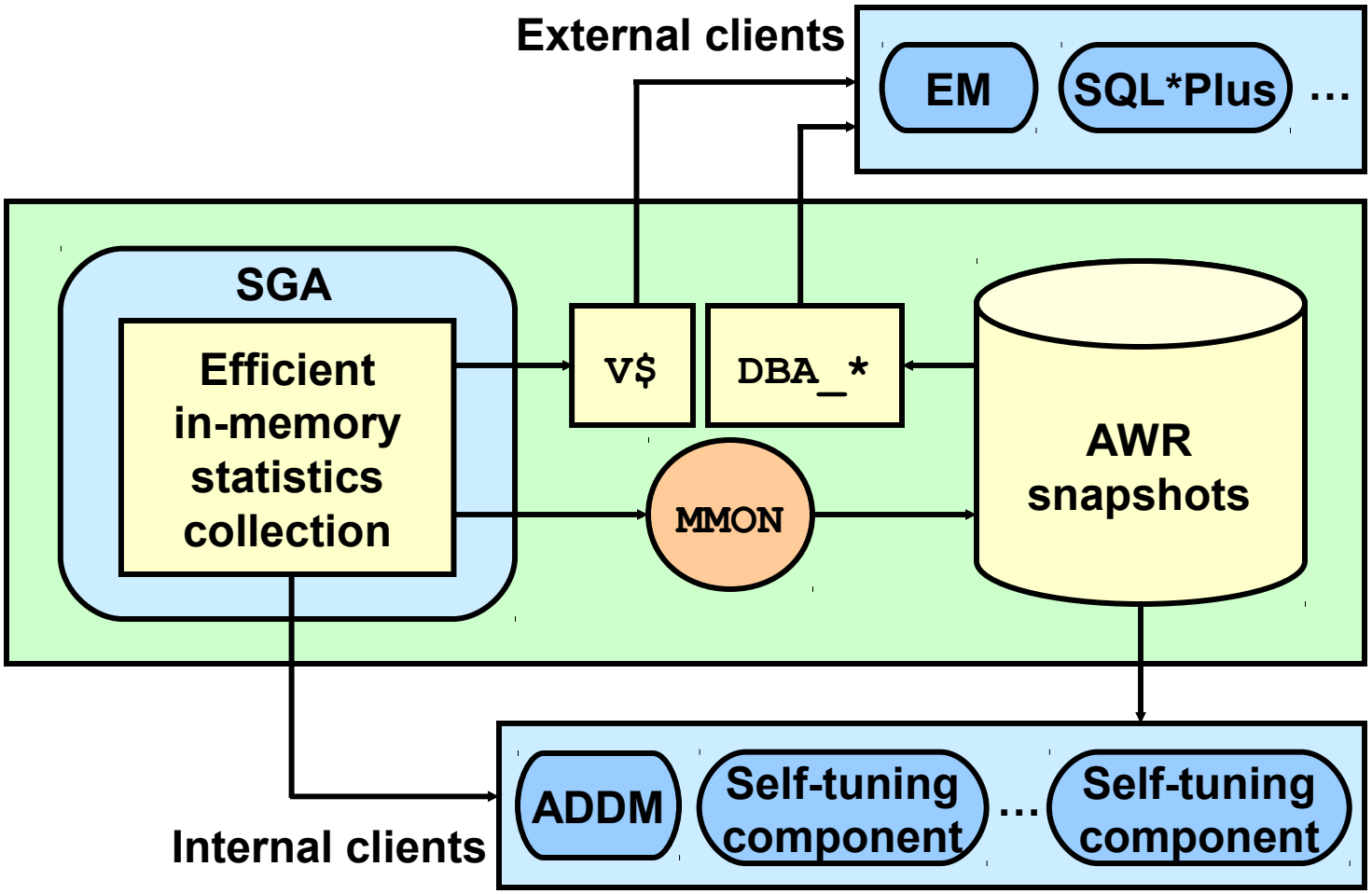
```
exec dbms_stats.set_table_prefs('SH','SALES','STALE_PERCENT','13');
```

Automatic Workload Repository (AWR)

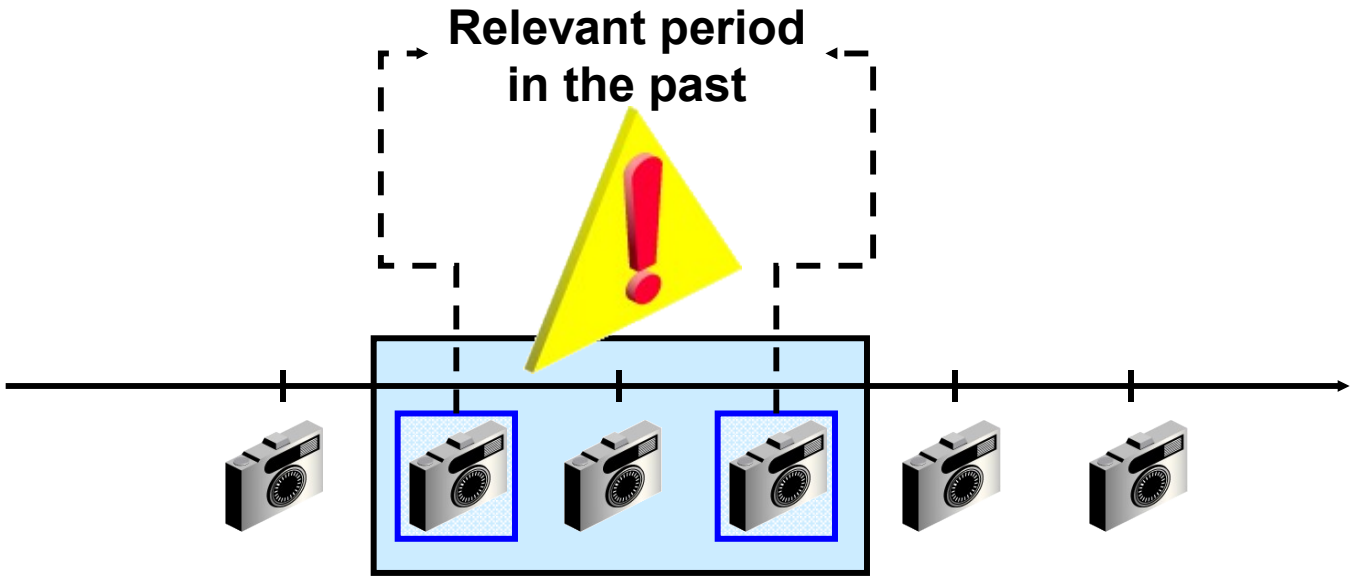
- Built-in repository of performance information
- Snapshots of database metrics taken every 60 minutes and retained for eight days
- Foundation for all self-management functions



AWR Infrastructure

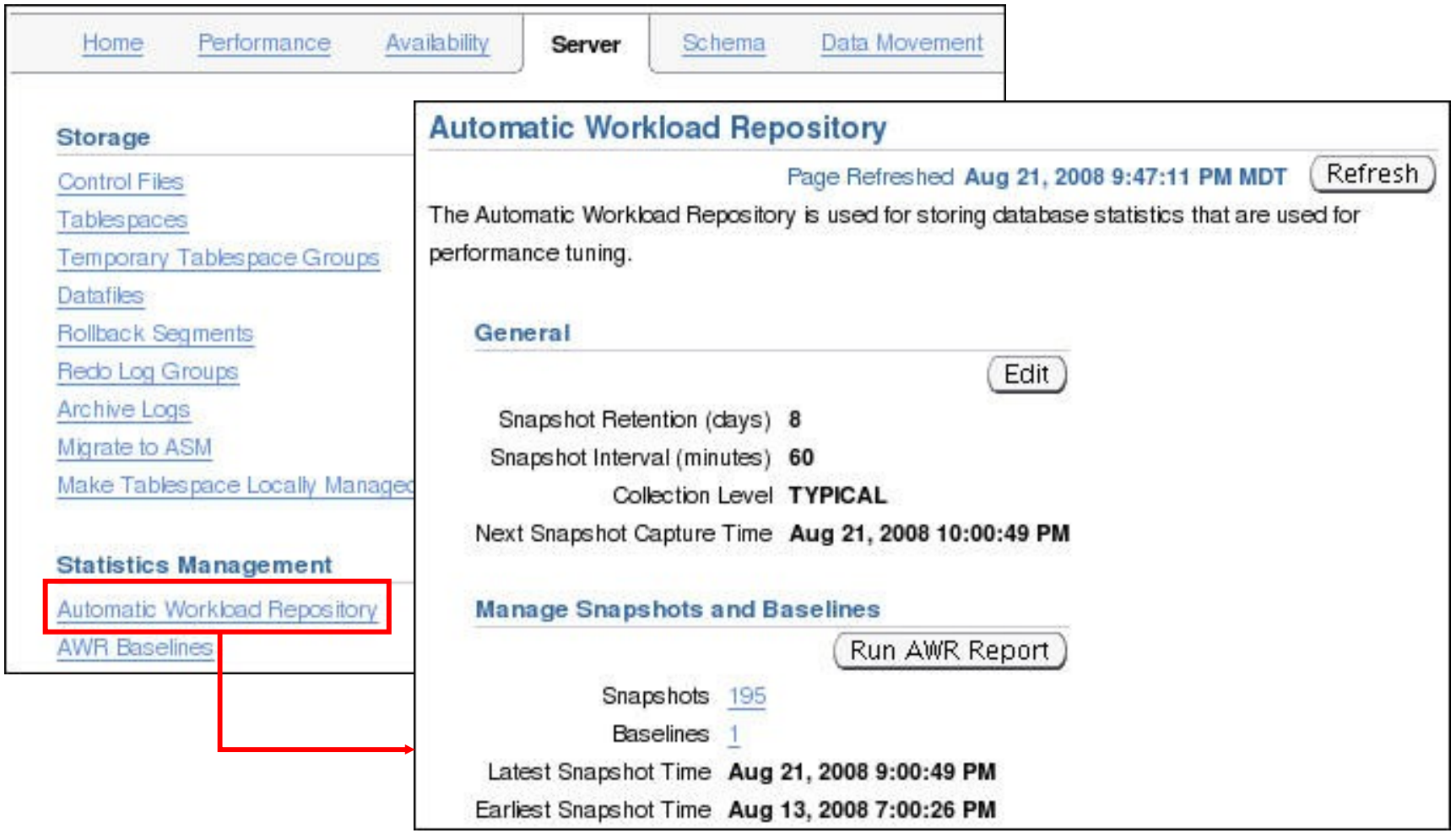


AWR Baselines



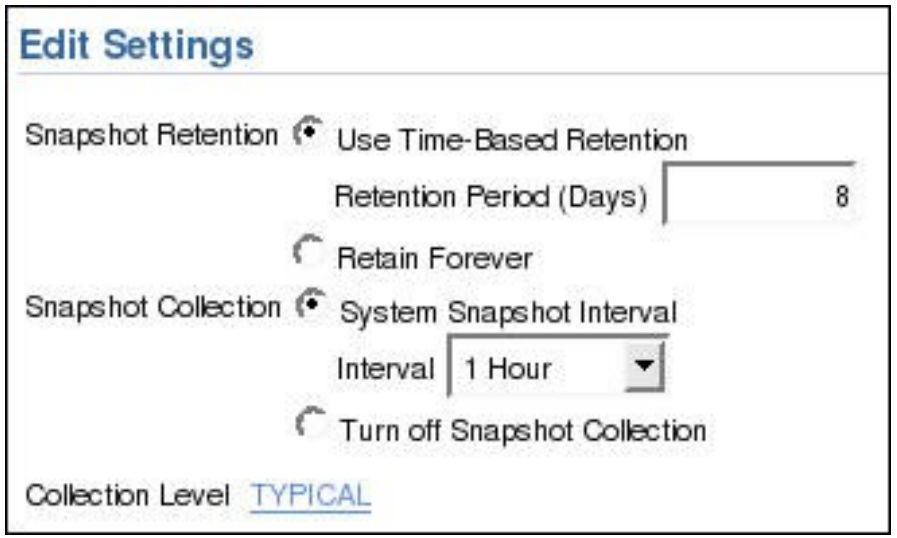

```
DBMS_WORKLOAD_REPOSITORY.CREATE_BASELINE ( -
        start_snap_id IN NUMBER,
        end_snap_id   IN NUMBER,
        baseline_name IN VARCHAR2);
```

Enterprise Manager and the AWR

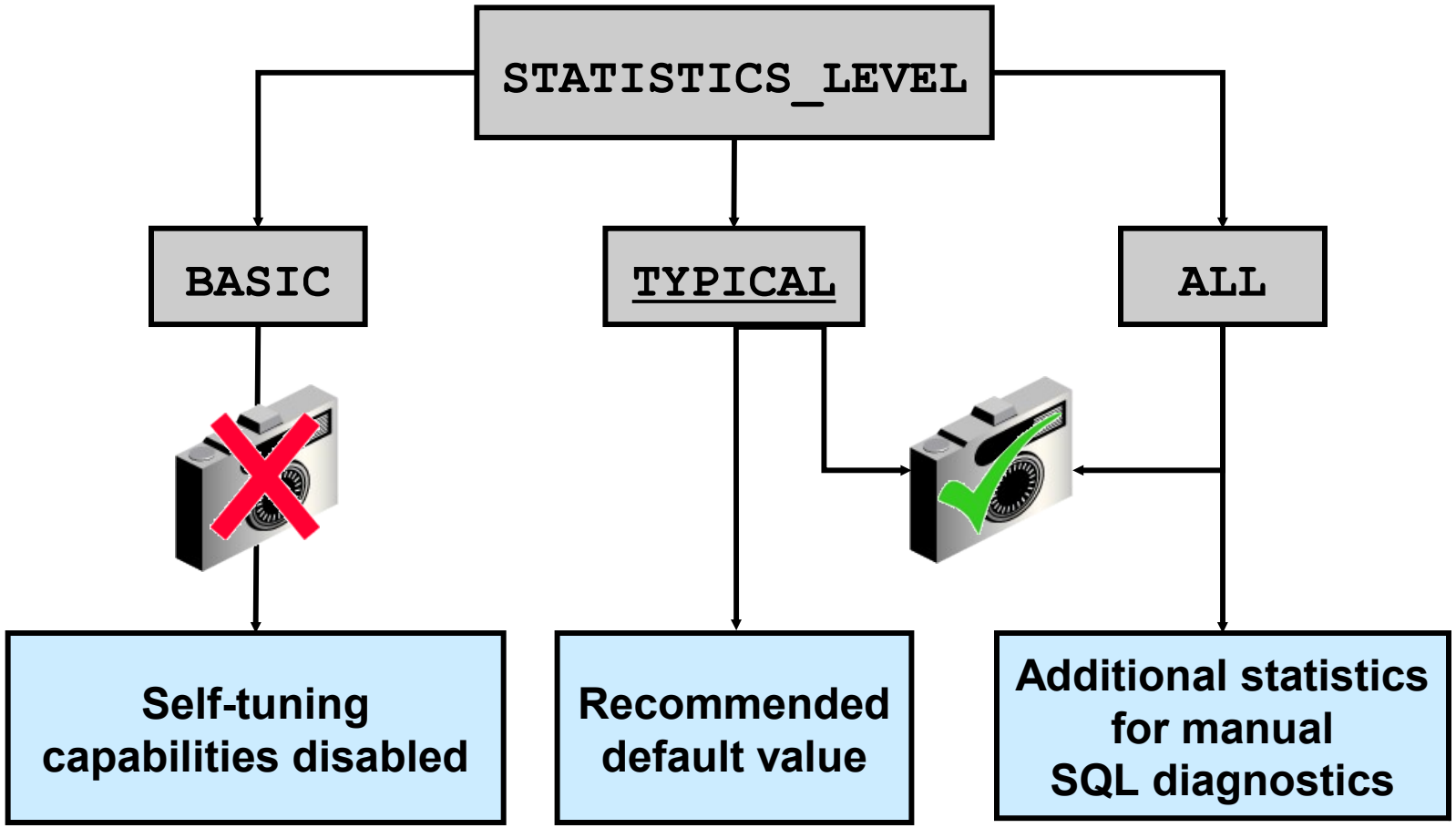


Managing the AWR

- Retention period
  - Default: Eight days
  - Consider storage needs
- Collection interval
  - Default: 60 minutes
  - Consider storage needs and performance impact
- Collection level
  - Basic (disables most ADDM functionality)
  - Typical (recommended)
  - All (adds additional SQL tuning information to snapshots)

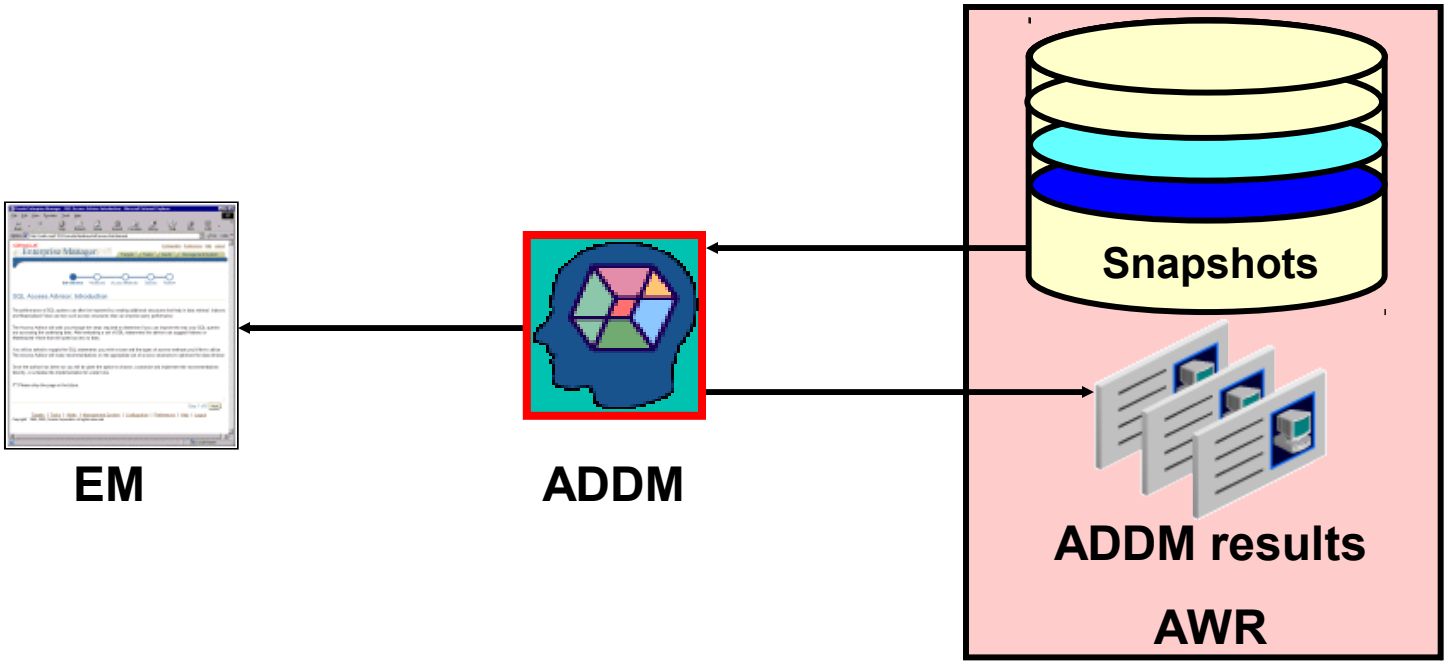


Statistic Levels

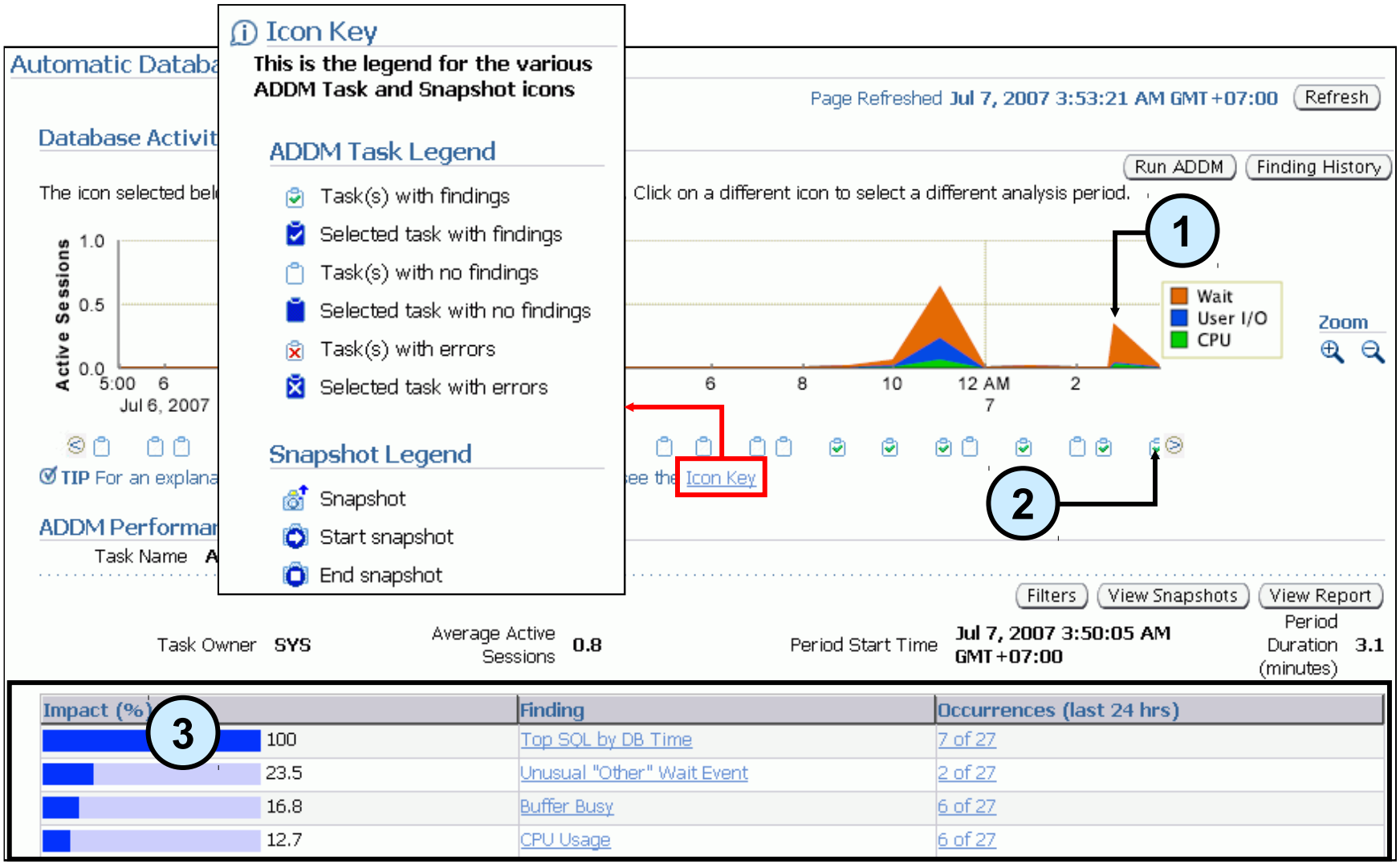


Automatic Database Diagnostic Monitor (ADDM)

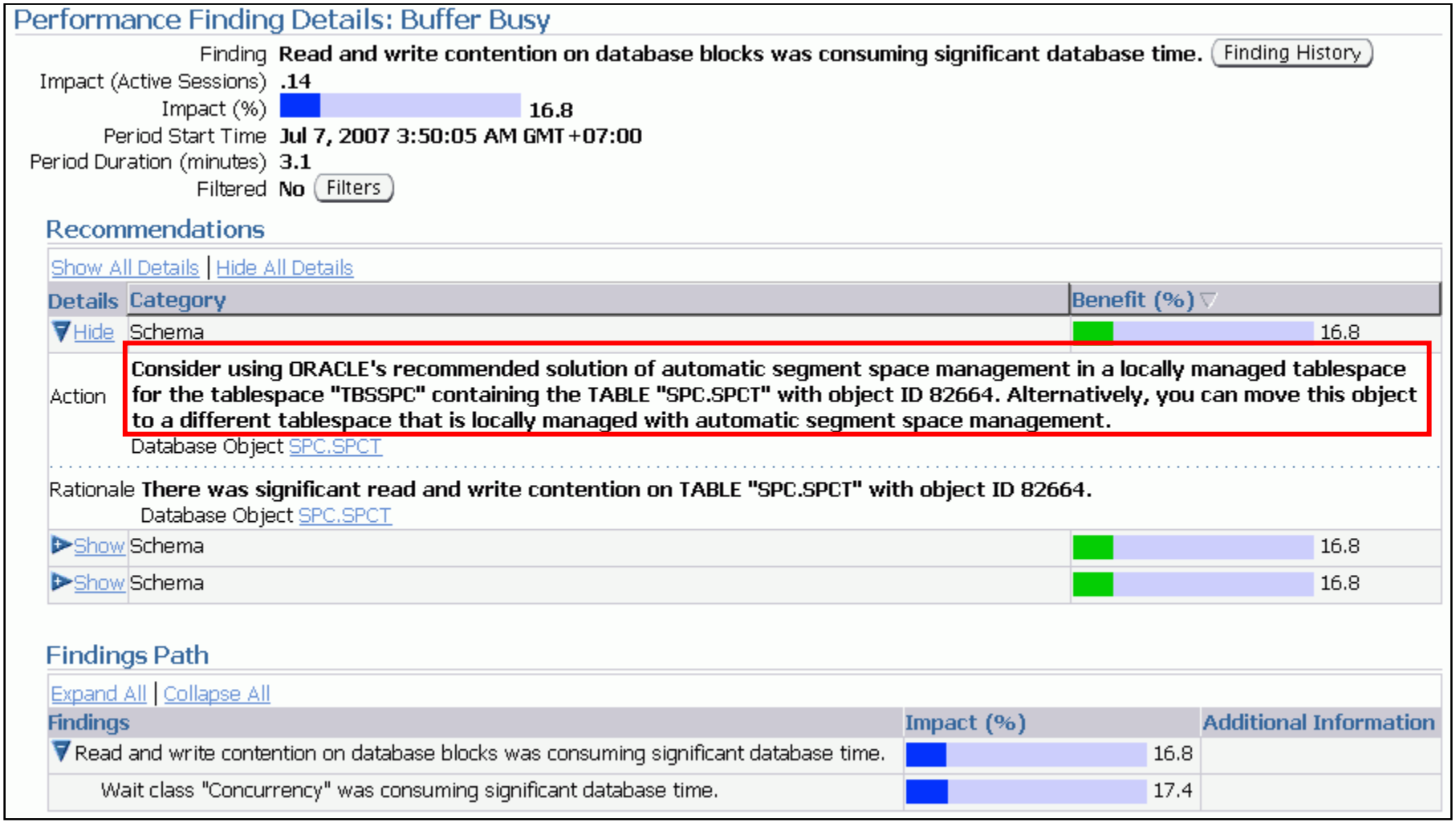
- Runs after each AWR snapshot
- Monitors the instance; detects bottlenecks
- Stores results in the AWR



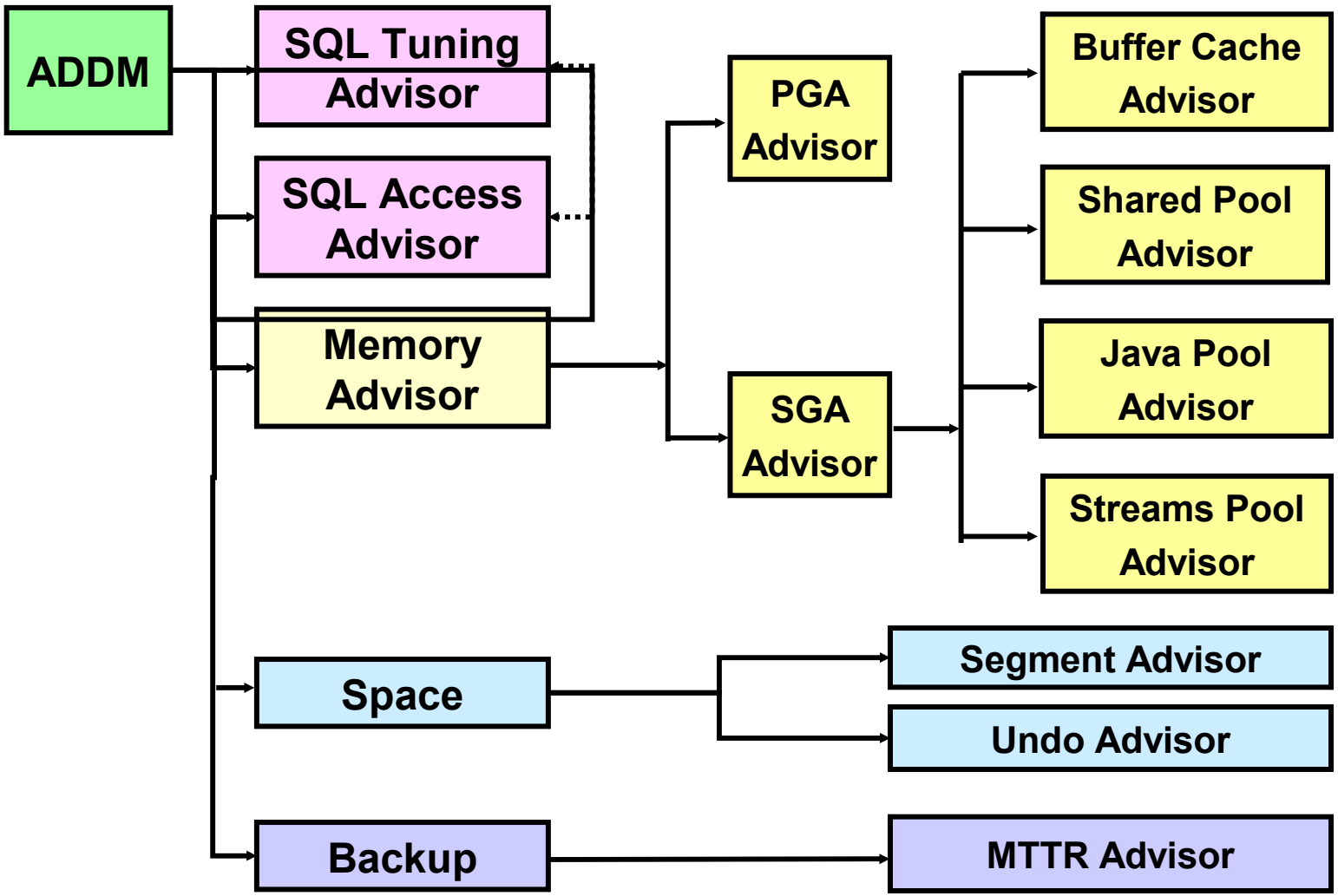
ADDM Findings



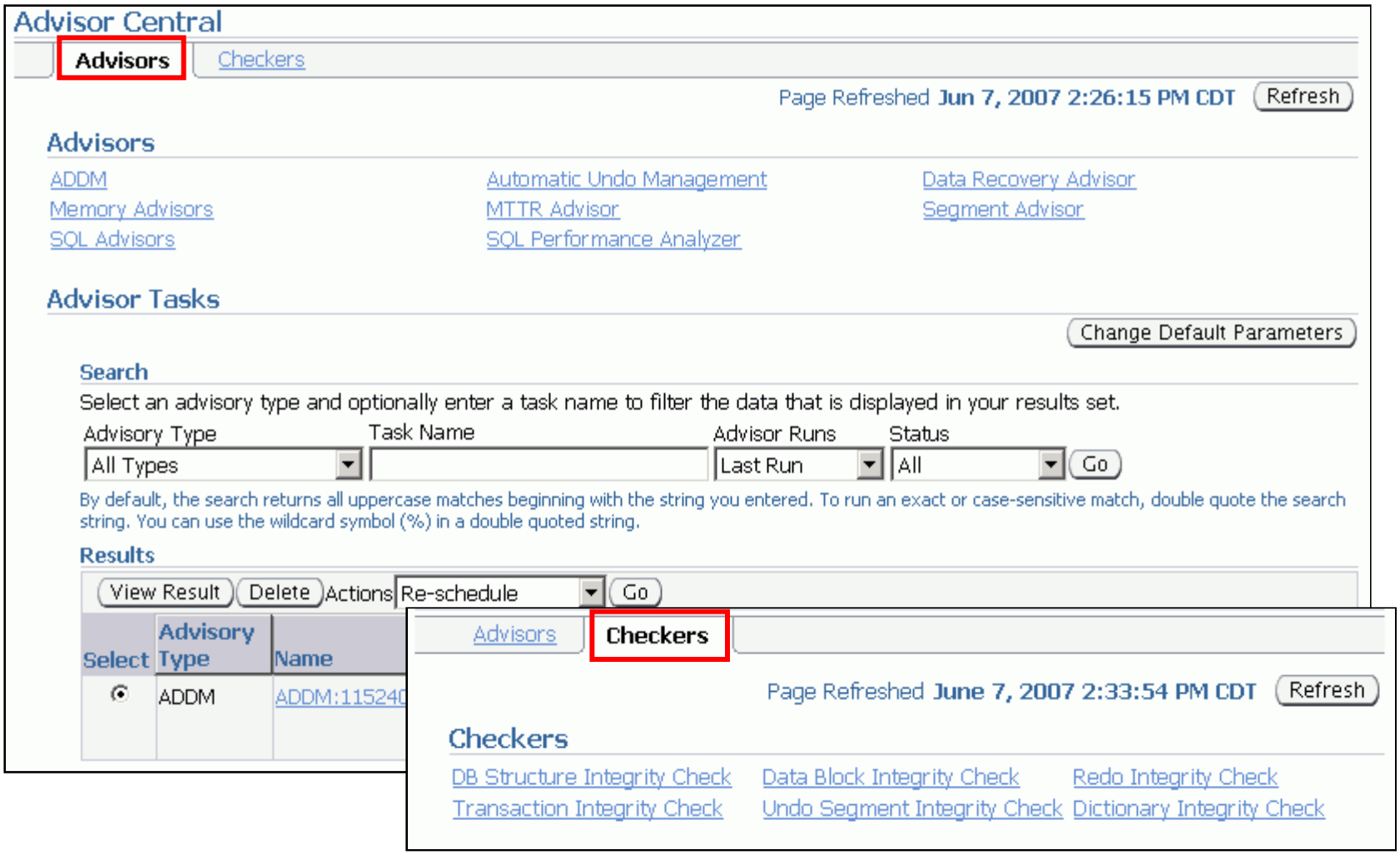
ADDM Recommendations



Advisory Framework



Enterprise Manager and Advisors



DBMS_ADVISOR Package

Procedure	Description
CREATE_TASK	Creates a new task in the repository
DELETE_TASK	Deletes a task from the repository
EXECUTE_TASK	Initiates execution of the task
INTERRUPT_TASK	Suspends a task that is currently executing
GET_TASK_REPORT	Creates and returns a text report for the specified task
RESUME_TASK	Causes a suspended task to resume
UPDATE_TASK_ATTRIBUTES	Updates task attributes
SET_TASK_PARAMETER	Modifies a task parameter
MARK_RECOMMENDATION	Marks one or more recommendations as accepted, rejected, or ignored
GET_TASK_SCRIPT	Creates a script of all the recommendations that are accepted

Quiz

The optimizer statistic `num_rows` will always reflect the true row count for a table.

1. True
2. False

Automated Maintenance Tasks

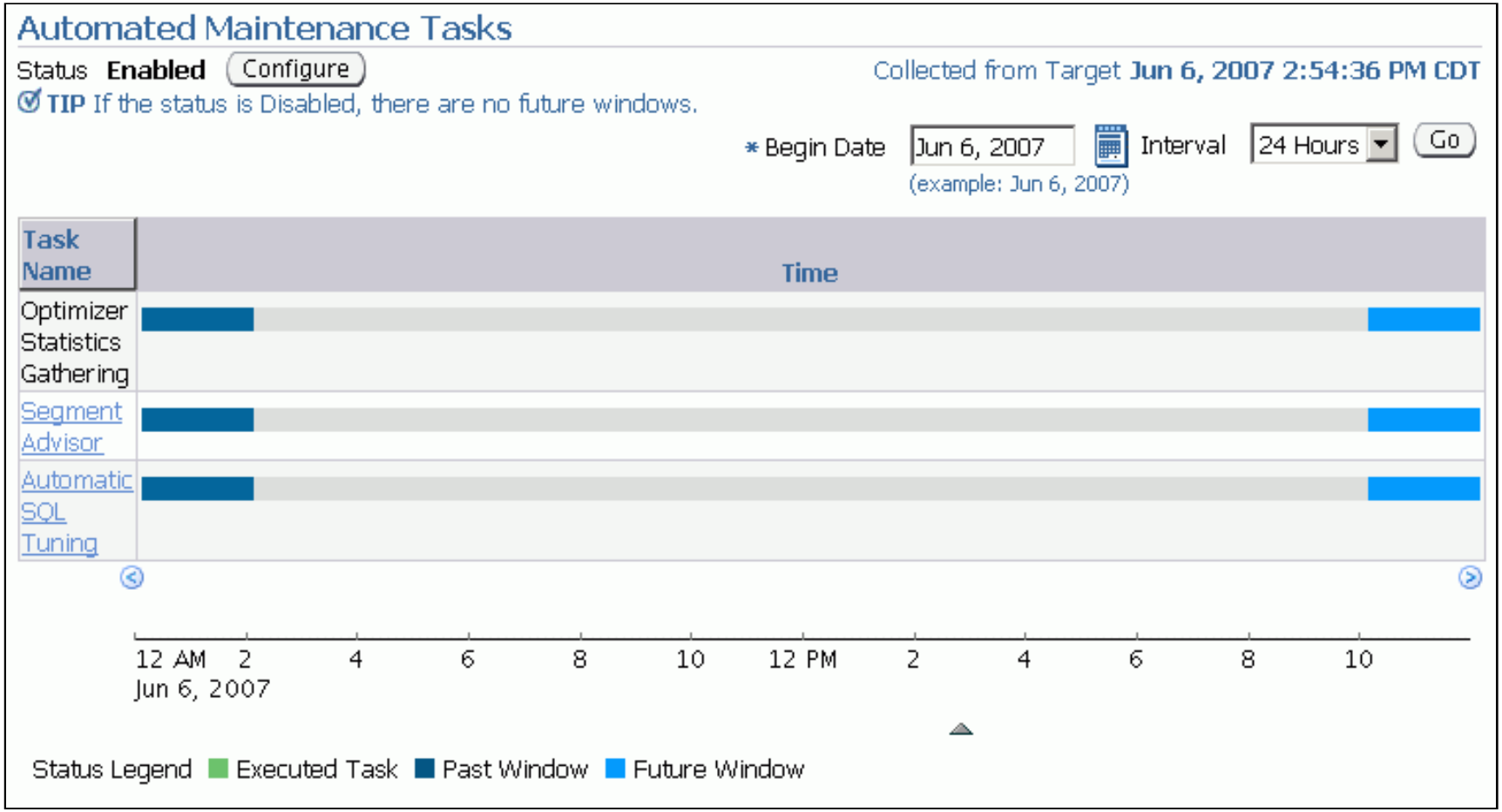
Autotask maintenance process:

1. Maintenance Window opens.
2. Autotask background process schedules jobs.
3. Scheduler initiates jobs.
4. Resource Manager limits impact of Autotask jobs.

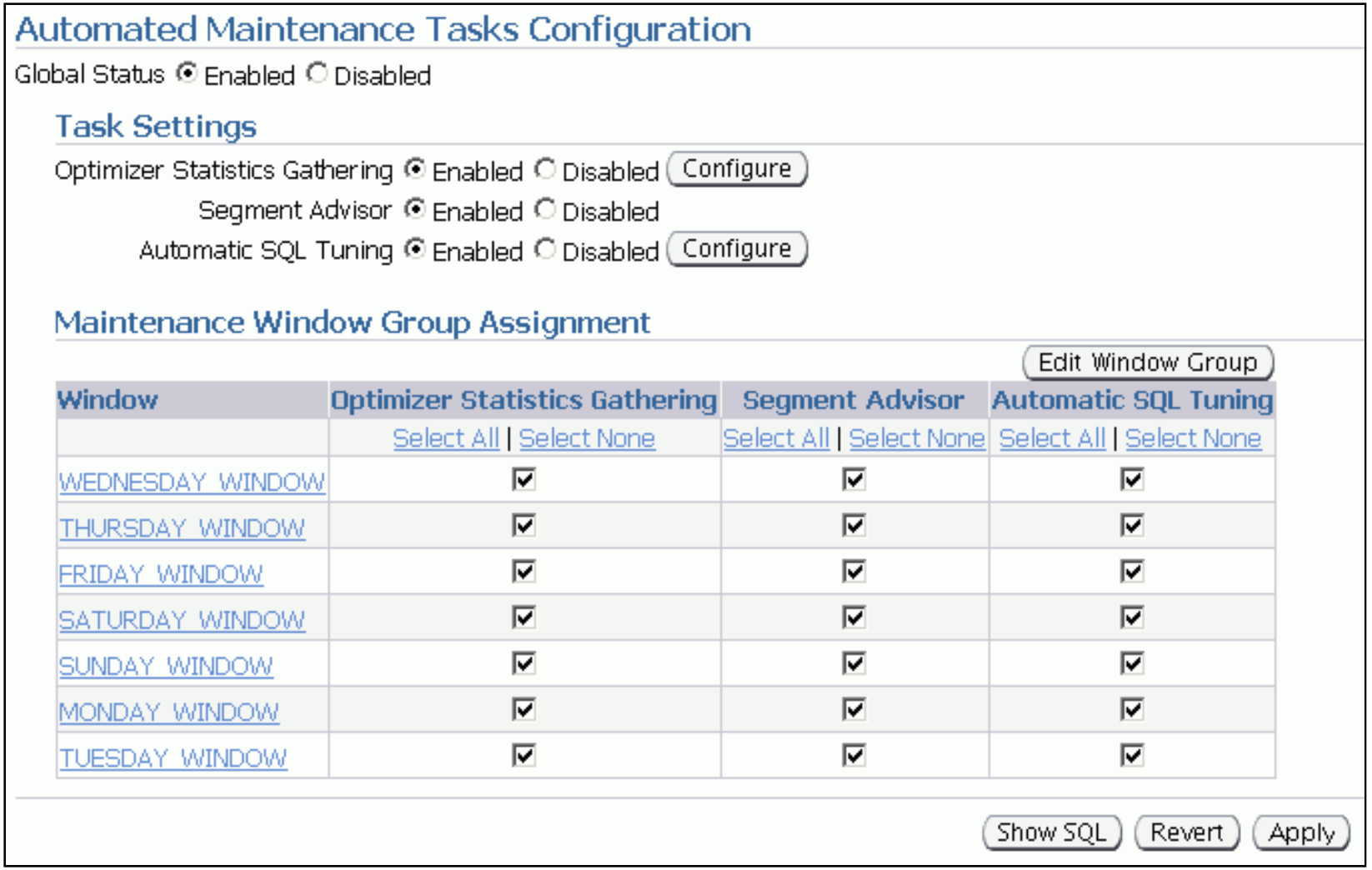
Default Autotask maintenance jobs:

- Gathering optimizer statistics
- Automatic Segment Advisor
- Automatic SQL Advisor

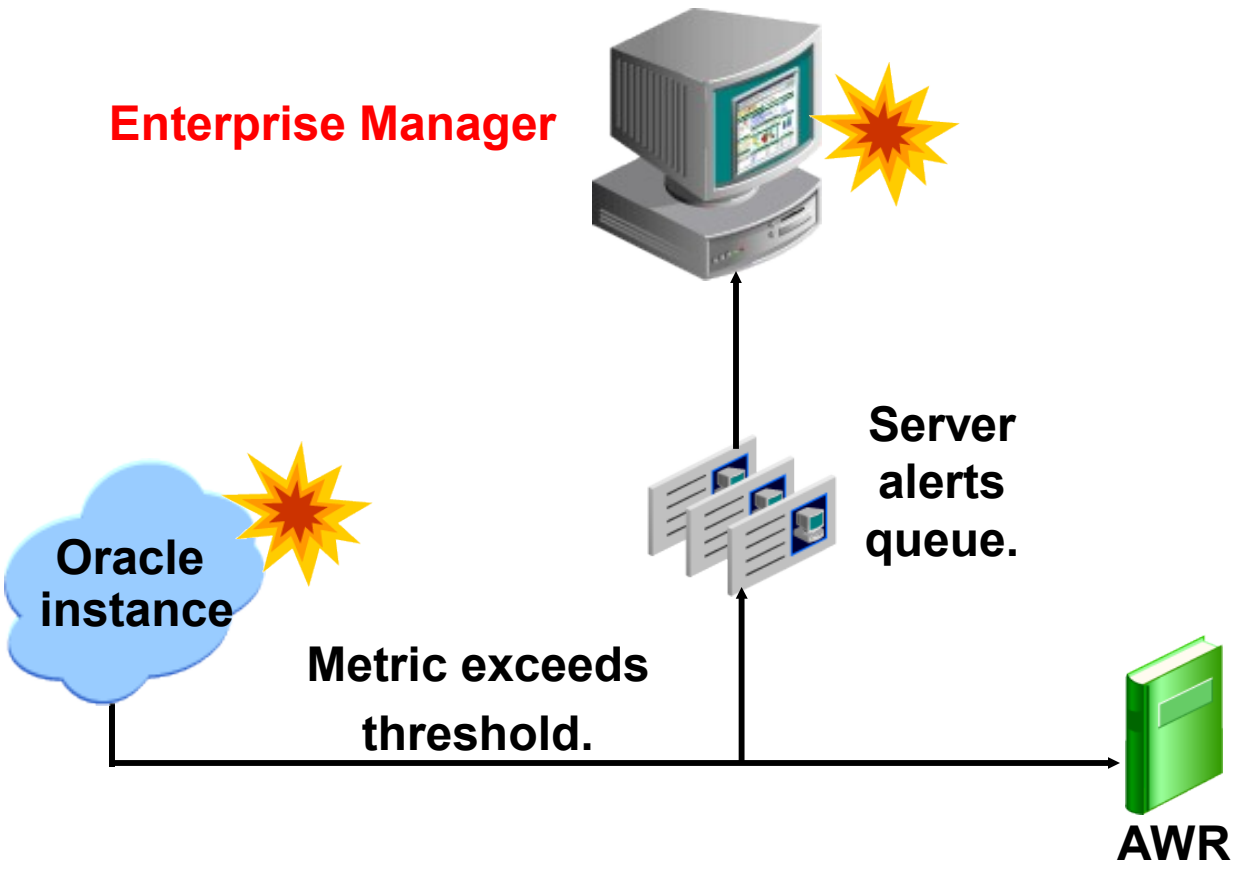
Automated Maintenance Tasks



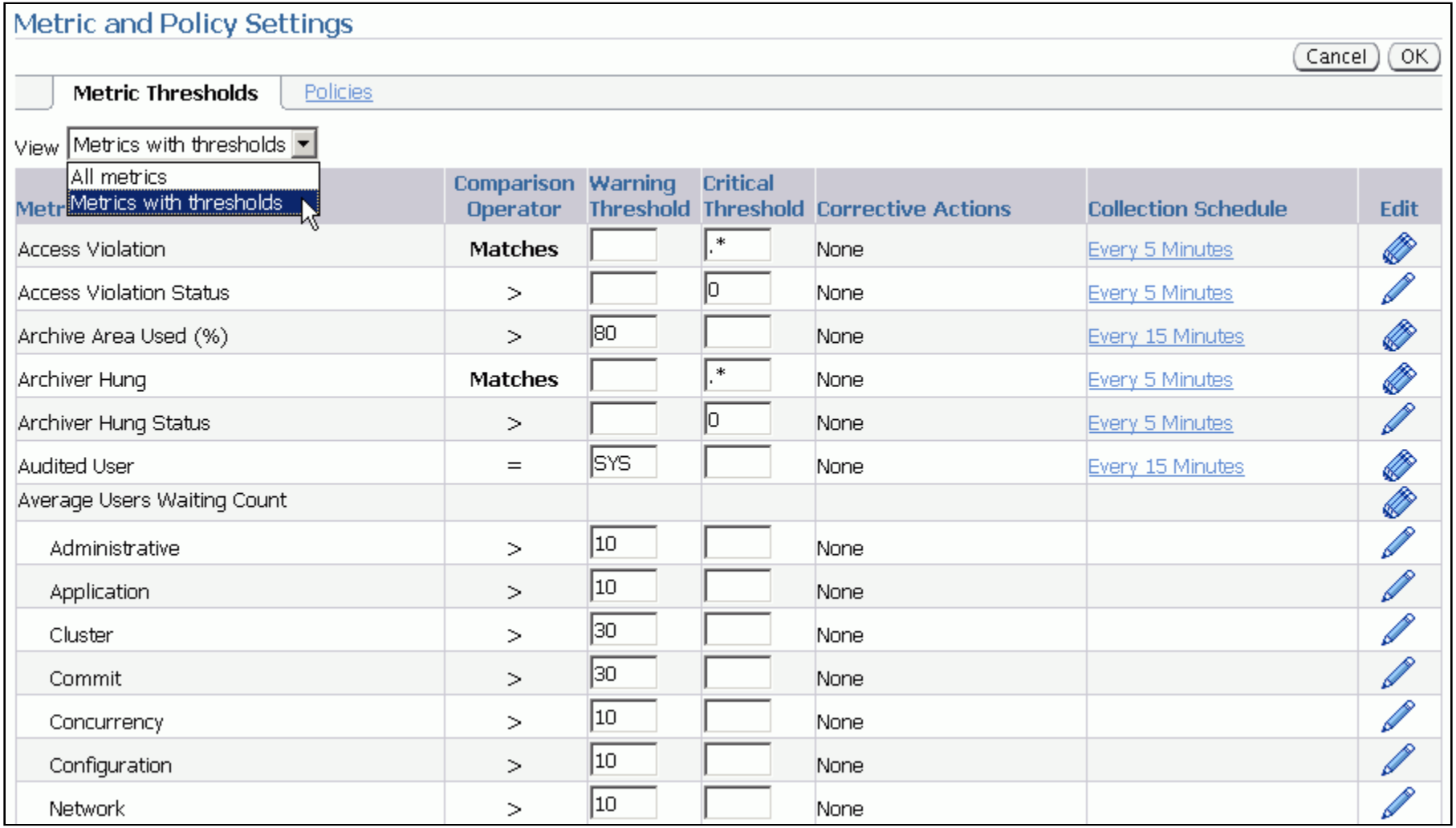
Automated Maintenance Tasks Configuration



Server-Generated Alerts

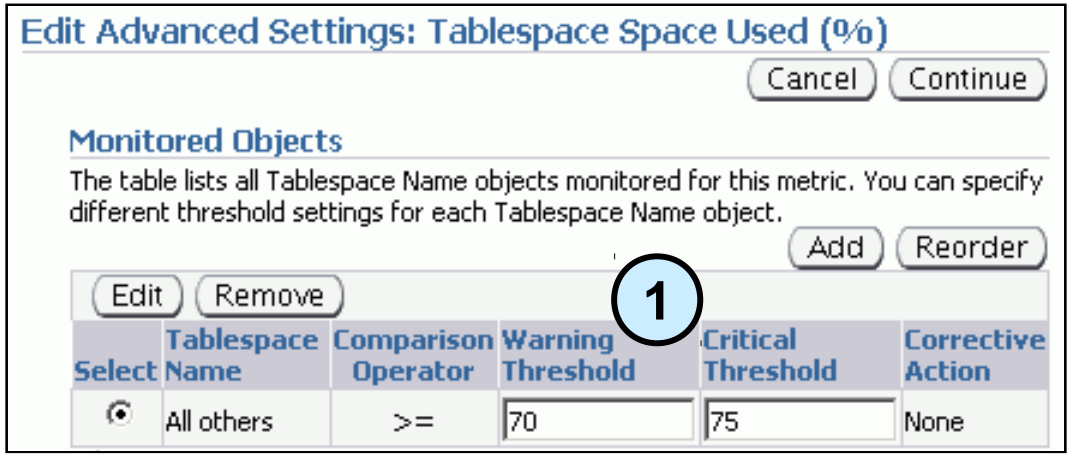


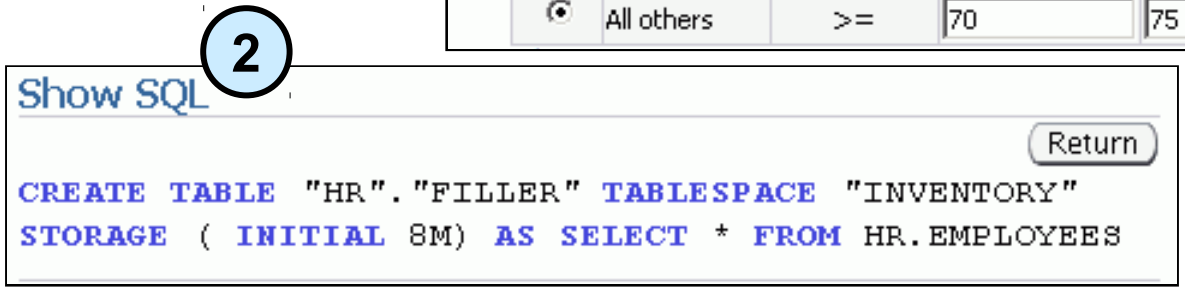
Setting Thresholds

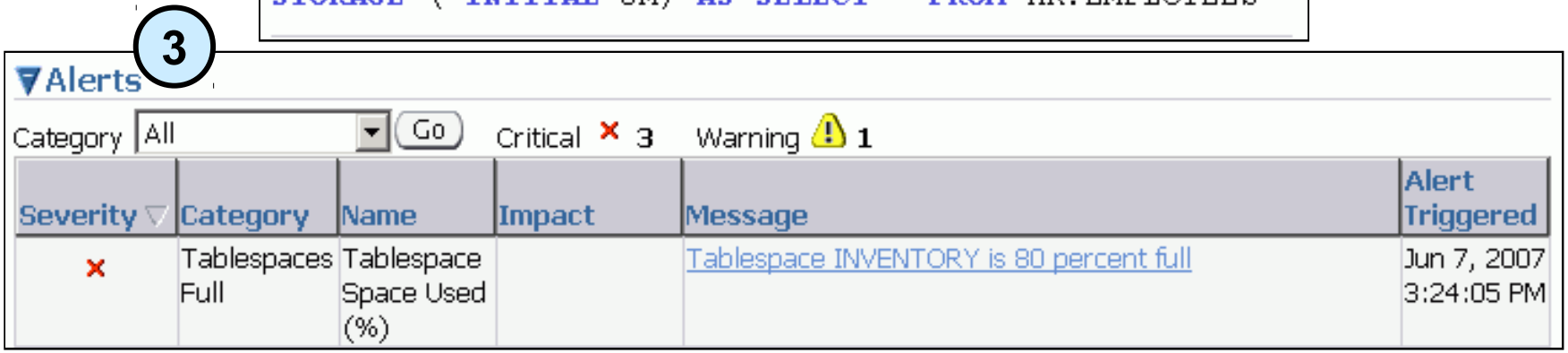


Creating and Testing an Alert

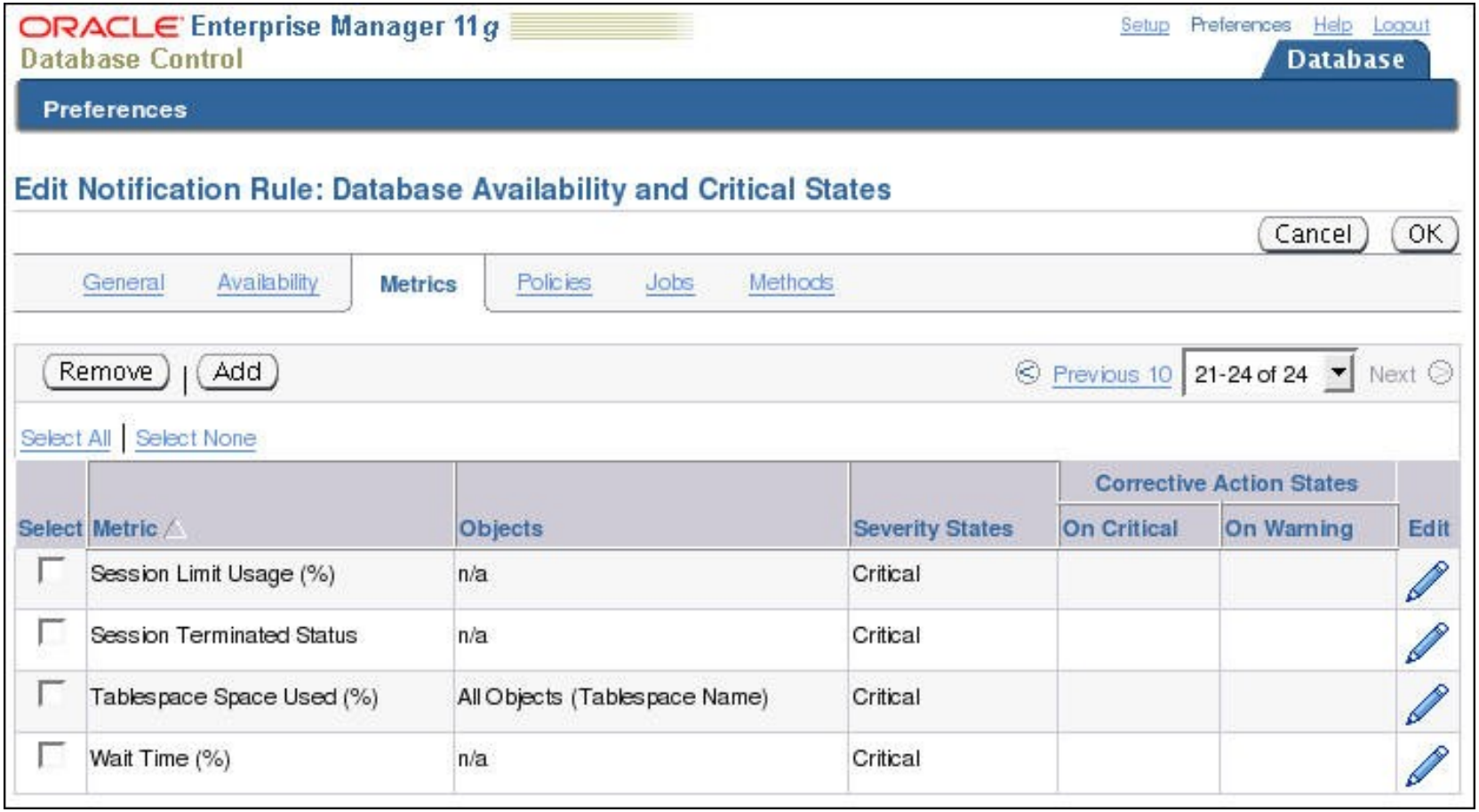
1. Specify a threshold.
2. Create a test case.
3. Check for an alert.







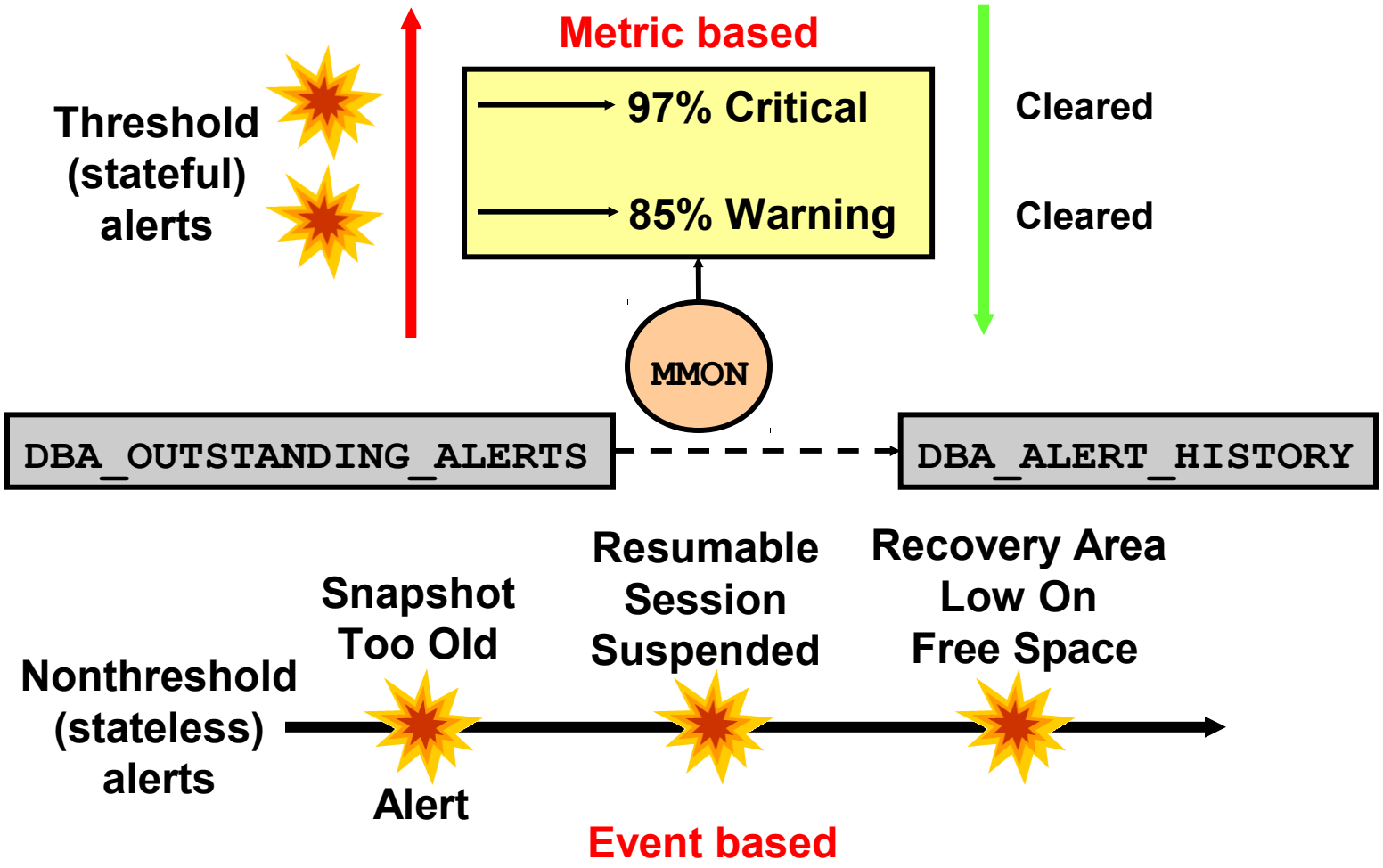
Alerts Notification



Reacting to Alerts

- If necessary, you should gather more input (for example, by running ADDM or another advisor).
- Investigate critical errors.
- Take corrective measures.
- Acknowledge alerts that are not automatically cleared.

Alert Types and Clearing Alerts



Quiz

Stateless alerts such as `SNAPSHOT TOO OLD` can be found in the dictionary view `DBA_OUTSTANDING_ALERTS`.

1. True
2. False

Summary

In this lesson, you should have learned how to:

- Manage optimizer statistics
- Manage the Automatic Workload Repository (AWR)
- Use the Automatic Database Diagnostic Monitor (ADDM)
- Describe and use the advisory framework
- Set alert thresholds
- Use server-generated alerts
- Use automated tasks

Practice 12 Overview: Proactive Maintenance

This practice covers proactively managing your database with ADDM, including:

- Setting up an issue for analysis
- Reviewing your database performance
- Implementing a solution