# Practices for Lesson 30: Monitoring Database Performance

Practices for Lesson 30: Overview

Overview

In these practices, you will view performance information by using Enterprise Manager Database Express.

Practice 30-1: Using Enterprise Manager Database Express to Manage Performance

Overview

In this practice, you view the performance of the database instance by using Enterprise Manager Database Express (EM Express).

You could use V$ views to analyze performance statistics and metrics, but it is much easier to use EM Express or EM Cloud Control. Whichever tool you use, the key to identifying instance performance issues are wait events and high-cost SQL.

Assumptions

You are logged in as the oracle user.

Tasks

Enable Flash-Based Enterprise Manager Database Express

Open a new terminal window and source the oraenv script. Use the dbstart.sh script to start the database and listener. Run the commands below to enable Flash-based EM Express.

Start an Application Workload

Execute the $HOME/labs/DBMod\_MonTune/PERF\_setup\_tuning.sh shell script. This script creates a user named OE, a tablespace named TBS\_APP, and a schema named OE in the TBS\_APP tablespace. This script runs for apx several minutes. You can ignore any error messages about objects not existing.

Start an application workload in ORCLPDB1 and ORCLPDB2.

**Note:** This script generates continuous output in the terminal window where it starts.

Review the Performance Hub in EM Express

Open a browser. Launch Enterprise Manager Database Express by clicking on the **EM Express** link in the menu-bar –or- by entering the following URL: https://localhost:5500/em

If a message appears: This Pluging is vulnerable and should be updated… Click on the red circle and then **Allow** button on the popup. Do not select Remember this decision.

On the Login page, enter the username SYS and the password. Leave the Container Name box empty, select as sysdba and then click **Login**. See the “Course Practice Environment: Security Credentials” document in your Activity Guide for the ***password***.

Select **Performance** and then **Performance Hub**.

The Performance Hub provides a consolidated view of all performance data for a given time range. You must have the Oracle Diagnostics Pack (licensed option) to use the Performance Hub.

Learn about the Time Picker at the top of the page. The Time Picker displays average active sessions over time.

Click **Hide Time Picker** to ide it.

Click **Show Time Picker** to show it.

At the top of the page, click **Select Time Period**.

In the dialog box, you can select a time range, and the detail tabs will display the available performance data for the selected time range. Click the drop-down list and review the options. Notice that you can choose to view historical and real-time data.

Select **Real Time - Last Hour** and click **OK**. In real-time mode, performance data is retrieved from in-memory views. The time picker shows data for the past hour, and you can select any time range from within this period. The default selection is the past 5 minutes.

If there are peaks in the time picker, on the chart you can drag the selected time range to the period of interest to get more information. Drag the time picker to test this out and try moving just one of the time picker handles to increase and decrease the time range.

Click **Select Time Period**, select **Historical - Day** and click **OK**. In historical mode, data is retrieved from the Automatic Workload Repository (AWR). You can select any time period for the database, provided the data is still contained in AWR. When you switch to historical mode, the default selected time range is dependent on the amount of data shown in the time picker: if the time picker displays data for the past week, the default selected time range is one day; and if the time picker displays data for the past day, the default selected time range is one hour. Depending on the uptime of the database, you may receive a message regarding insufficient AWR data when toggling between views.

Change the time picker back to displaying the last hour.

The Performance Hub organizes performance data by dividing it into different tabs. Each tab addresses a specific aspect of database performance.

The **Summary** tab, which is currently displayed, is available in both real-time and historical mode. In real-time mode, this tab shows metrics data that gives an overview of system performance in terms of host resource consumption (CPU, I/O, and memory) and average active sessions. In historical mode, this tab displays system performance in terms of resource consumption, average active sessions, and load profile information.

Click the **Activity** tab. This tab displays Active Session History (ASH) analytics and is available in both real-time and historical mode.

Click the **Workload** tab. This tab is available in both real-time and historical mode and shows metric information about the workload profile, such as call rates, logon rate, and the number of sessions. It also displays the Top SQL for the selected time range. In real-time mode, this tab displays top SQL only by database time, but in historical mode, you can also display top SQL by other metrics, such as CPU time or executions.

Click the **Monitored** SQL tab. This tab displays monitored executions of SQL, PL/SQL, and database operations and is available in both real-time and historical mode.

Click the **ADDM** tab. This tab displays the performance findings and recommendations of Automatic Database Diagnostic Monitor (ADDM) for database tasks performed in the selected time period. It is available in both real-time and historical mode. The ADDM analyzes data in the AWR to identify potential performance bottlenecks.

Click the **Containers** tab. This tab displays performance information about each PDB in the CDB, including active sessions, memory used, I/O requests, and I/O throughput.

View Wait Statistics on the Activity Tab

On the Activity tab, you can view the Active Session History (ASH). ASH is part of the Diagnostics and Tuning Pack. It samples information from the [G]V$ views, allowing you to see current and historical information about active sessions in the database. An active session is a session that is waiting on CPU or any event that does not belong to the IDLE wait class.

If your workload script has ended, start it again in the terminal window.

In EM Express, click the Refresh button a few times. Eventually you will get some data in the time picker.

Click the **Activity** tab.

View the graph in the middle of the page, which shows wait event information. Wait events are statistics that are incremented by a server process or thread to indicate that it had to wait for an event to complete before being able to continue processing. Waits and the associated SQL are key indicators for determining the root cause of an issue.

By default, the graph displays the average active session waits by time, filtered by class (notice that Wait Class is selected in the filters drop-down list). Each wait class consists of wait events. For example, waits resulting from DBA commands that cause users to wait (for example, an index rebuild) are in the Administrative class. Another example is the System I/O class that consists of waits for background process IO, for example, a DBWR wait for 'db file parallel write.' The classes are listed in the legend to the right of the graph.

Position your cursor over one of the wait classes in the legend, for example, the CPU class. Notice that the class is highlighted in yellow in the graph.

In the legend, click the **CPU** wait class. A filter is created, and the graph drills down into the different wait events for the CPU wait class. Notice that the filters drop-down list is now Wait Event.

Click the graph. The graph is displaying only one item at the moment, so don't worry about clicking the wrong part. Notice when you positioned your cursor over the graph it turned yellow again.

Clicking the graph further drills down into wait events. So you can either click the legend items or click the graph items themselves to drill down. Now the graph displays the waits for the ORCLCDB instance.

In the legend, click **ORCLCDB**. You have now drilled down into the waits per service; examine the legend on the right side of the graph.

Remove the filters in the graph by clicking the Xs for each filter.

Another way to filter the graph is to select a filter in the drop-down list. In the dropdown list, select **Top Dimensions**.

Notice that the names of the top dimensions are the same names you just saw as you drilled down into the graph through the legend, for example, Wait Class, Wait Event, Instance, Service, and so on. Selecting a top dimension is a quick and easy way to jump directly to a particular drill-down level.

Position your cursor over **Service** and view the percentage breakdown for service waits. Note values may vary.

Filter Wait Statistics for a SQL ID

If your workload script has ended, start it again in the terminal window.

In EM Express, at the bottom left, view the table that shows the activity (average active sessions) for each SQL ID.

Click the SQL ID that has the greatest average. In this example, the SQL ID is

2bxhpf2vfhqnu.

The Summary tab is displayed with performance information about the selected SQL ID.

Click the **Activity** tab. Notice that the Activity tab is filtered based on your selected SQL ID.

In the filters drop-down list, select **Wait Class** and then **Top Dimensions**.

Position your cursor over **Service**.

Question: What does the information tell you?

Answer: In this example, the percentage value is higher for ORCLPDB1 (55.42%) than ORCLPDB2 (44.58%), which means that executions in ORCLPDB1 have to wait longer than in ORCLPDB2. Your values will be different.

Position your cursor over **Wait Event**. Notice that the execution of the statement is waiting for CPU resources

Click **Log Out** to log out of EM Express and close the browser window.

In the terminal window, if the PERF\_loop.sh script is still running, then press **Crtl+C** to stop it.

Exit the terminal.