

# Lab Answer Key: Module 7: Monitoring SQL Server 2014

## Lab: Monitoring SQL Server 2014

### Exercise 1: Collecting Baseline Metrics

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#### Task 1: Prepare the Lab Environment

1. Ensure that the 20462C-MIA-DC and 20462C-MIA-SQL virtual machines are both running, and then log on to 20462C-MIA-SQL as **ADVENTUREWORKS\Student** with the password **Pa\$\$w0rd**.
2. In the D:\Labfiles\Lab07\Starter folder, right-click **Setup.cmd** and click **Run as administrator**.
3. Click **Yes** when prompted to confirm you want to run the command file, and wait for the script to finish

#### Task 2: Create a Data Collector Set

1. Right-click the Start button and click **Computer Management**.
2. In Computer Management, expand **Performance**, expand **Monitoring Tools**, expand **Data Collector Sets**, and expand **User Defined**.
3. If a data collection set named **SQL Server Workload** already exists (because you completed this lab previously), right-click it and click **Delete**. Then click **Yes** when prompted.
4. Right-click **User Defined**, point to **New**, and click **Data Collector Set**.
5. In the **Create new Data Collector Set** dialog box, enter the name **SQL Server Workload**. Then select **Create manually (Advanced)** and click **Next**.

6. On the **What type of data do you want to include?** Page, under **Create data logs**, select **Performance counter**, and then click **Next**.
7. On the **Which performance counters would you like to add?** page, Click **Add**.
8. In the list of objects, expand the **Processor** object, and select only the **% Processor Time** counter. Then in the **Instances of selected object** list, ensure that **\_Total** is selected and click **Add**.
9. In the list of objects, expand the **Memory** object and select the **Page Faults/sec** counter. Then click **Add**.
10. In the list of objects, expand the **SQLServer:Locks** object, click the **Average Wait Time (ms)** counter, and then hold the **Ctrl** key and click the **Lock Requests/sec** and **Lock Waits/sec** counters. Then in the **Instances of selected object** list, ensure that **\_Total** is selected and click **Add**.
11. In the list of objects, expand the **SQLServer:Memory Manager** object, click the **Database Cache Memory (KB)** counter, and then hold the **Ctrl** key and click the **Free memory (KB)** counter. Then click **Add**.
12. In the list of objects, expand the **SQLServer:Plan Cache** object, and select the **Cache Hit Ratio** counter. Then in the **Instances of selected object** list, ensure that **\_Total** is selected and click **Add**.
13. In the list of objects, expand the **SQLServer:Transactions** object, and select the **Transactions** counter. Then click **Add**.
14. In the **Add Counters** dialog box, click **OK**. Then in the **Create new Data Collector Set** dialog box, on the **Which performance counters would you like to add?** page, Click **Next**.
15. On the **Where would you like the data to be saved?** Page, in the **Root directory box**, type **D:\Labfiles\Lab07\Starter\Logs** and then click **Next**.
16. On the **Create the data collector set?** page, ensure that **Save and close** is selected and click **Finish**.

### Task 3: Run the Data Collector Set

1. In Computer Manager, right-click the **SQL Server Workload** data collector set you created in the previous task and click **Start**.
2. In the D:\Labfiles\Lab07\Starter folder, right-click **Baseline.ps1** and click **Run with PowerShell**. If you are prompted to change the execution policy, enter **Y**. This starts a baseline workload process that takes three minutes to run.
3. When the PowerShell window closes, in Computer Manager, right-click the **SQL Server Workload** data collector set and click **Stop**.

#### Task 4: View the Logged Data

1. In Computer Manager, under **Performance**, expand **Monitoring Tools** and click **Performance Monitor**.
2. In Performance Monitor, on the toolbar, click **View Log Data**.
3. In the **Performance Monitor Properties** dialog box, on the **Source** tab, select **Log files** and click **Add**. Browse to the D:\Labfiles\Lab07\Starter\Logs folder, open the folder with a name similar to **MIA-SQL\_2014010101-000001** and open the **DataCollector01.blg** log file. Then, in the **Performance Monitor Properties** dialog box, click **OK**.
4. In Performance Monitor, in the toolbar, click the **Add** button (a green +).
5. In the **Add Counters** dialog box, click **Memory**, and then hold the **Ctrl** key and click each other object to select them all. Then click **Add** to add all of the counters for all of the objects, and click **OK**.
6. Click any of the counters in the list below the chart and on the toolbar click **Highlight** so that the selected counter is highlighted in the chart. Press the up and down arrow keys on the keyboard to change the selected counter. As you highlight the counters, note the **Last**, **Average**, **Minimum**, and **Maximum** values.
7. On the toolbar, in the **Change Graph Type** list, select **Report** and view the text-based report, which shows the average value for each counter.
8. Right-click anywhere in the report and click **Save Image As**. Then save the report image

as **BaselineAverages.gif** in the D:\Labfiles\Lab07\Starter folder.

9. On the toolbar, in the **Change Graph Type** list, select **Line** to return to the original line chart view.
10. Minimize Computer Manager, you will return to it later.

### Task 5: View Query and I/O Statistics

1. Start SQL Server Management Studio and connect to the **MIA-SQL** database engine instance using Windows authentication.
2. In SQL Server Management Studio, open the **Query DMV.sql** script file in the D:\Labfiles\Lab07\Starter folder.
3. Highlight the Transact-SQL statement under the comment **Get top 5 queries by average reads**, and then click **Execute**.
4. View the results. They include SELECT queries that retrieve data from tables in the **InternetSales** database.
5. In the **Results** pane, right-click any cell and click **Save Results As**. Then save the results as **TopBaselineQueries.csv** in the D:\Labfiles\Lab07 folder.
6. In the query pane, highlight the Transact-SQL statement under the comment **View IO Stats**, and then click **Execute**.
7. View the results. They include details of I/O activity for the files used by the **InternetSales** database.
8. In the **Results** pane, right-click any cell and click **Save Results As**. Then save the results as **BaselineIO.csv** in the D:\Labfiles\Lab07 folder.
9. Minimize SQL Server Management Studio.

**Result:** At the end of this exercise, you will have a data collector set named SQL Server Workload, a log containing baseline measurements, and query and I/O statistics obtained from DMVs and DMFs.



## Exercise 2: Monitoring a Workload

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### Task 1: Run the Data Collector Set

1. In Computer Manager, in the left pane, right-click the **SQL Server Workload** data collector set you created previously, and click **Start**.
2. In the D:\Labfiles\Lab07\Starter folder, right-click **Workload.ps1** and click **Run with PowerShell**. This starts a database workload process that takes three minutes to run.
3. When the PowerShell window closes, in Computer Manager, right-click the **SQL Server Workload** data collector set and click **Stop**.

### Task 2: View the Logged Data

1. In Performance Monitor, on the toolbar, click **View Log Data**.
2. In the **Performance Monitor Properties** dialog box, on the **Source** tab, ensure that **Log files** is selected, select any existing files and click **Remove**.
3. In the **Performance Monitor Properties** dialog box, on the **Source** tab, click **Add**. Browse to the D:\Labfiles\Lab07\Starter\Logs folder, open the folder with a name similar to **MIA-SQL\_2014010101-000002** and open the **DataCollector01.blg** log file. Then, in the **Performance Monitor Properties** dialog box, click **OK**.
4. View the line chart report, noting any counters that look consistently high.
5. On the toolbar, in the **Change Graph Type** list, select **Histogram bar** and view the resulting chart. Then in the **Change Graph Type** list, select **Report** and view the text-based report.
6. In the D:\Labfiles\Lab07\Starter folder, double-click the **BaselineAverages.gif** image you saved earlier to view the baseline metrics in Internet Explorer. Then compare the baseline averages with the figures in performance monitor.
7. Close Internet Explorer and Computer Management.

### Task 3: View Query and I/O Statistics

1. In SQL Server Management Studio, in the **Query DMV.sql** script file highlight the Transact-SQL statement under the comment **Get top 5 queries by average reads**, and then click **Execute**.
2. View the results. Then start Microsoft Excel and open the **TopBaselineQueries.csv** file you saved in the D:\Labfiles\Lab07 folder and compare the results to the queries that were identified during the baseline workload.
3. In SQL Server Management Studio, in the query pane, highlight the Transact-SQL statement under the comment **View IO Stats**, and then click **Execute**.
4. View the results. Then in Microsoft Excel, open the **BaselineIO.csv** file you saved in the D:\Labfiles\Lab07 folder and compare the results to the I/O statistics that were identified during the baseline workload.
5. Close Excel and SQL Server Management Studio without saving any files.

**Result:** At the end of this exercise, you will have a second log file containing performance metrics for the revised workload.







