Implementing In-Memory SQL Database Objects

Getting Started

Overview

Microsoft SQL Server enables various techniques to improve performance of a database. In this course you'll learn techniques for implementing In-Memory features including columnstore indexes, memory-optimized tables, and native stored procedures.

To complete the labs in this course, you will need to set up a lab environment that includes the **AdventureWorksDW** sample database. This document explains how to achieve this using a SQL Server database, running in a Microsoft Azure virtual machine. This is the recommended environment for the labs as it requires minimal software installation and configuration on your computer. However, if you prefer, you can install a local instance of SQL Server and download and attach the sample database – there are instructions at the end of this document for doing this.

Each module in this course consists of:

- An online video presentation.
- A hands-on lab.

The recommended approach for this course is to complete each module in turn; first watching the online presentation, then completing the lab, and finally answering the review questions for that module. Then, when you're comfortable with what you've learned, move onto the next module and repeat the process. You can complete the course as quickly or slowly as you want, though we recommend pacing yourself to ensure that you absorb the lessons from each module before progressing to the next one.

Each lab consists of a document that contains a number of progressively complex challenges, which you should be able to complete by using the information that was presented in the online presentation as well as the references to further information that are provided in the lab itself. Suggested solution scripts are provided for each lab.

What You'll Need

- A web browser
- A Microsoft account
- A Microsoft Azure subscription
- A Microsoft Windows* computer

***** The labs were written and tested on Microsoft Windows. If you are using a non-Windows computer, you can install a third-party SQL Server client application for your platform. Microsoft provides no endorsement or support for non-Microsoft client tools, and you install and use them at your own discretion. There are some suggestions for using SQL Server client tools on Linux and Mac OS X at the end of this document.

Creating a Free Trial Azure Subscription

If you already have a Microsoft Azure subscription, you can skip this section. Otherwise, follow these steps to create a free trial subscription, which includes enough free credit in your local currency to complete the labs. You will need to provide a valid credit card number for verification, but you will not be charged for Azure services – for more information, see the frequently asked questions in the Azure sign-up page.

1. If you already have a Microsoft account that has not already been used to sign up for a free Azure trial subscription, you're ready to get started. If not, don't worry, just create a new Microsoft account at https://signup.live.com.
2. After you've created a Microsoft account, browse to https://aka.ms/edx-dat215x-az and click the **Free Trial** link. Then follow the instructions to sign up for a free trial subscription to Microsoft Azure. You'll need to sign-in with your Microsoft account if you're not already signed in. Then you'll need to:
    a. Enter your cellphone number and have Microsoft send you a text message to verify your identity.
    b. Enter the code you have been sent to verify it.
    c. Provide valid payment details – don't worry, your credit card won't be charged for any services you use during the trial period, and the account is automatically deactivated at the end of the trial period unless you explicitly decide to keep it active.

Provisioning an Azure Virtual Machine with SQL Server

This course uses features that are not supported with Azure SQL Database and will only work with an on-premises version of SQL Server. For the best experience for the supported labs, use the following instructions to provision an Azure virtual machine with SQL Server, and deploy a sample database to be used in the labs.

Note: These instructions assume you are familiar with Windows and comfortable installing software.

Provision an Azure Virtual Machine

1. Browse to http://portal.azure.com.

2. Sign in with the credentials that you used to create your Azure account.

3. Click **New**.
4. Click **Virtual Machines**.
5. Click **SQL Server 2016 RTM Enterprise on Windows Server 2012 R2**.
6. Click **Create**.
7. In **Name**, type **SQLDemo**.
8. In **User name**, type **Student**.
9. In **Password** and **Confirm password**, type **Pa$$w0rdPa$$w0rd**.
10. In **Resource group**, click **Create new** and type **DemoRG**.
11. In **Location**, select your nearest location that is compatible.
12. Click **OK**.
13. On the **Choose a size** pane, click **View all**.
14. Click **DS1_V2 Standard** and click **Select**.
15. Click **OK**.
16. In **SQL connectivity**, select **Public (Internet)**.
17. In **SQL Authentication**, click **Enable**.
18. In **Login name**, type **Student**.
19. In **Password**, type **Pa$$w0rdPa$$w0rd**.
20. In **R Services (Advanced analytics)**, click **Enable**.
21. Click **OK**.
22. Click **OK**.
23. Wait for the virtual machine to deploy.

Install the AdventureWorksDW Sample Database

1. Browse to http://msftdbprodsamples.codeplex.com/releases/view/55330.
2. Click the link to download **AdventureWorksDW2012_Data** (be careful to choose this download and not any of the others!) Save the **AdventureWorksDW2012_Data.mdf** file to a memorable location. For this example, I will use **D:\Data**.
3. Browse to http://portal.azure.com.
4. Sign in with the credentials that you used to create your Azure account.

5. In the left-hand navigation bar, click **All Resources**.
6. Click **SQLDemo**.
7. Click **Connect**.
8. Click **Save As**, click **Desktop**, and click **Save**.
9. Close or minimize all open windows.
10. On your desktop, right-click **SQLDemo** and click **Edit**.
11. Click the **Local Resources** tab.
12. Click **More**.
13. Expand **Drives** and select the drive that you specified in step 2.
14. Click **OK**.
15. Click **Connect** and click **Connect**.
16. In **Password**, type **Pa$$w0rdPa$$w0rd** and click **OK**.
17. If a **Remote Desktop Connection** warning pops up, click **Yes**.
18. Close **Server Manager**.
19. Open **File Explorer**.
20. In **Devices and drives**, double click the drive and folder that you specified in step 2.
21. Right-click **AdventureWorksDW2012_Data** and click **Copy**.
22. Browse to **C:\Program Files\Microsoft SQL Server\MSSQL13.MSSQLSERVER\MSSQL\DATA**, right-click a blank area, and click **Paste**.
23. Click **Start**, type **SQL Server Management**, and click **Microsoft SQL Server Management Studio**.
24. When prompted, enter or select the following options and click **Connect**:
    - **Server type**: Database Engine
    - **Server name**: SQLDEMO
    - **Authentication**: Windows Authentication
25. If the Object Explorer pane is not visible, on the **View** menu, click **Object Explorer**. Then in Object Explorer, right-click **Databases** and click **Attach**.
26. In the **Attach Databases** dialog box, under the **Databases to attach** list, click **Add**. Then browse to **C:\Program Files\Microsoft SQL Server\MSSQL13.MSSQLSERVER\MSSQL\DATA**, select **AdventureWorksDW2012_Data.mdf**, click OK, and click **OK** again.
27. In Object Explorer, expand the databases folder and verify that the **AdventureWorksDW2012** database is listed.
28. On the toolbar, click **New Query**. Then in the **Available Databases** list, ensure that **AdventureWorksDW2012** is select and type the following query: SELECT * FROM dbo.DimProduct;
29. On the toolbar, click **Execute**, and verify that a table of product data is returned.
30. Close SQL Server Management Studio without saving any files.