Microsoft Azure: Application Monitoring and Diagnostics for Developers Workshop*PLUS*

Student Lab Manual

Version 6.3

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Contents

Lab 1.1: Create a Log Analytics Workspace

Introduction

In this lab, you will create a new Log Analytics Workspace.

Objectives

After completing this lab, you will be able to:

- Create a Log Analytics Workspace

Prerequisites

- Access to the Azure Portal

Estimated time to complete this lab

30 minutes

Exercise 1: Create a Log Analytics Workspace

Objectives

In this exercise, you will:

- Create a Log Analytics Workspace.

Prerequisites

- Internet Connectivity
- Microsoft Azure Portal

Scenario

There's an expectation for gathering and processing types of data which include IIS Logs, Events, and ETW Logs.

You need to create a Log Analytics Workspace and configure its data collection settings.

Task 1: Create a Log Analytics workspace

1. Login to the Azure Portal (https://portal.azure.com)
2. Click **All services** and type **Log Analytics**
3. Click **Log Analytics workspaces**
4. Click **+ Add**
5. Create a new Workspace:
    a. Type in **appmon-ws-workspace<XX>** as the workspace name

> XX is meant to be any numerical value that makes the workspace unique.

    b. Select the **Subscription** from the Subscription drop-down box
    c. Create a new **Resource group** with **rg-appmon-loganalytics** as the Resource Group name
    d. Select **East US** as the Workspace Region from the drop-down box
    e. Accept the default **Pricing tier**
    f. Click click **Review + Create** and then **Create**

Task 2: Create a Storage Account for Log Analytics Workspace

1. In the Azure Portal, select **All services** and type **Storage accounts**
2. Click **Storage accounts**
3. On the **Storage Accounts** window that appears, choose **+ Add**
4. Select the subscription in which to create the storage account
5. Under the **Resource group** field, select **rg-appmon-loganalytics**
6. For the **Storage account name**, type in **appmonworkspacesa<XX>**

> **XX** is meant to be any numerical value that makes the workspace unique.

7. For Location, select **East US**
8. Set the following field values:

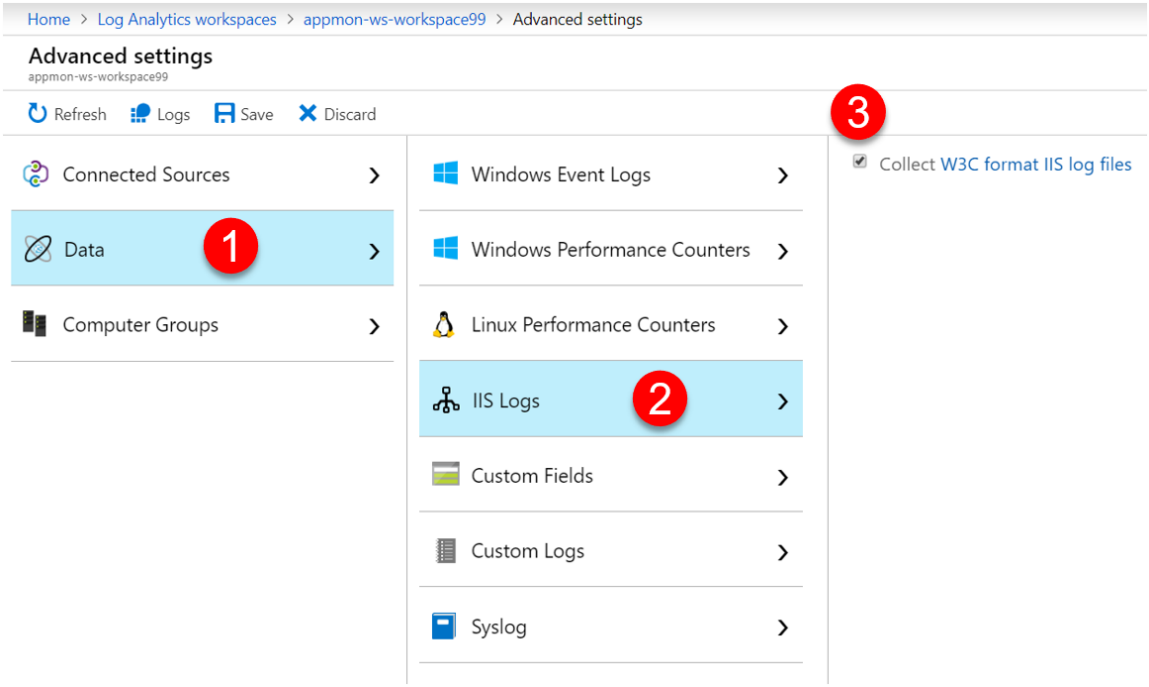
Field	**Value**
Performance	Standard
Account kind	StorageV2 (general-purpose v2)
Replication	Locally redundant storage (LRS)

9. Click **Review + Create** to review your storage account settings and create the account
10. Click **Create**

Task 3: Configure the Log Analytics Workspace Data Collection

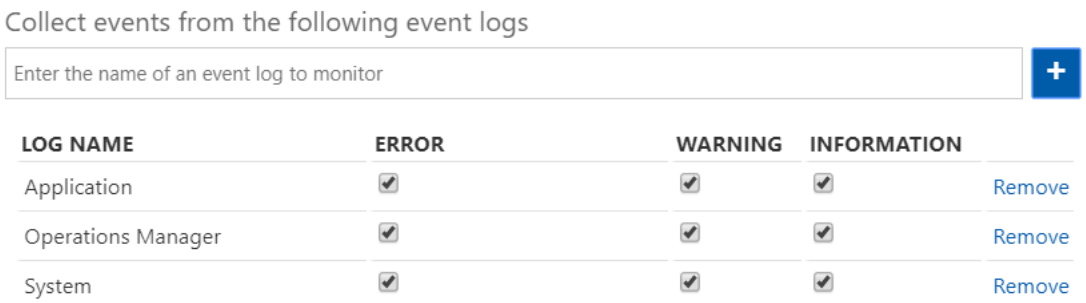
1. In the Azure Portal, navigate to the **Log Analytics workspace** you created in Task 1
2. Under **Settings**, click **Advance settings**
3. Select **Data > IIS Logs**

4. Tick the **Collect W3C format IIS log files**

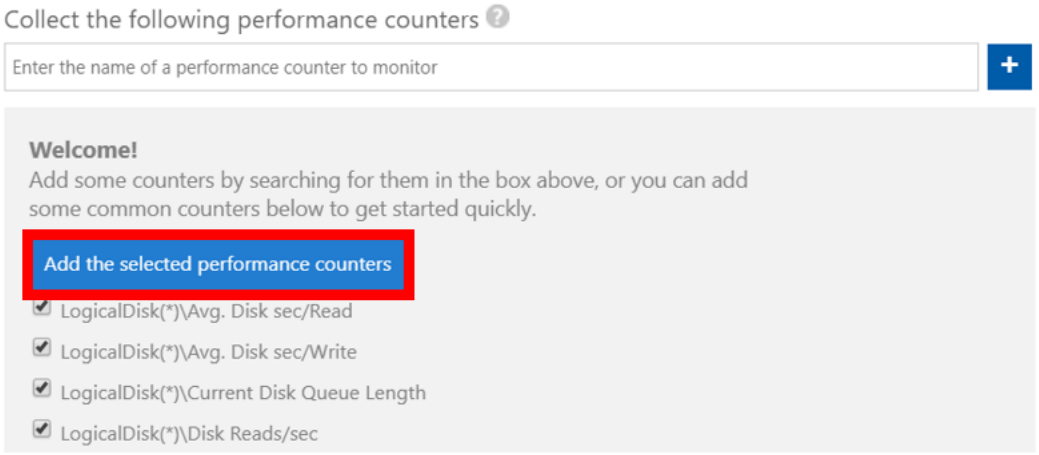


Note: This enables IIS Logs analysis once systems running workloads are integrated with Log Analytics.

5. Click **Windows Event Logs** (still on the **Data** tab)
6. Enter **Application** under the **Collect events from the following event logs** field and then click the **[+]** sign
7. Enter **Operations Manager** under the **Collect events from the following event logs** field and then click the **[+]** sign
8. Enter **System** under the **Collect events from the following event logs** field and then click the **[+]** sign



9. Click **Windows Performance Counters** and click **Add the selected performance counters**



10. Click **Save** on the ribbon
11. Click **OK** when you receive the message **Configuration was successfully saved**
12. **Lab Complete**

Lab 1.2: Configure Computers to Direct Attach to Log Analytics Workspaces

Introduction

In this lab, you will configure a Server Computer to report directly to Log Analytics workspaces.

Objectives

After completing this lab, you will be able to:

- Download and install the Microsoft Management Agent
- Configure the Microsoft Management Agent to directly connect to a Log Analytics workspace
- Query data in Log Analytics workspaces

Prerequisites

- Server Computer
- Internet connectivity
- Log Analytics workspace

Estimated Time to Complete this Lab

30 minutes

Scenario

There is a need to enable logging and obtain performance insights on a Server. You need to configure the Server to report directly to the Log Analytics workspace.

Exercise 1: Install and Configure the Microsoft Management Agent to connect to Log Analytics Workspaces

Objectives

After completing this exercise, you will be able to:

- Understand from where to obtain the Microsoft Management Agent
- Install the Microsoft Management Agent
- Configure the Microsoft Management Agent to connect to Log Analytics

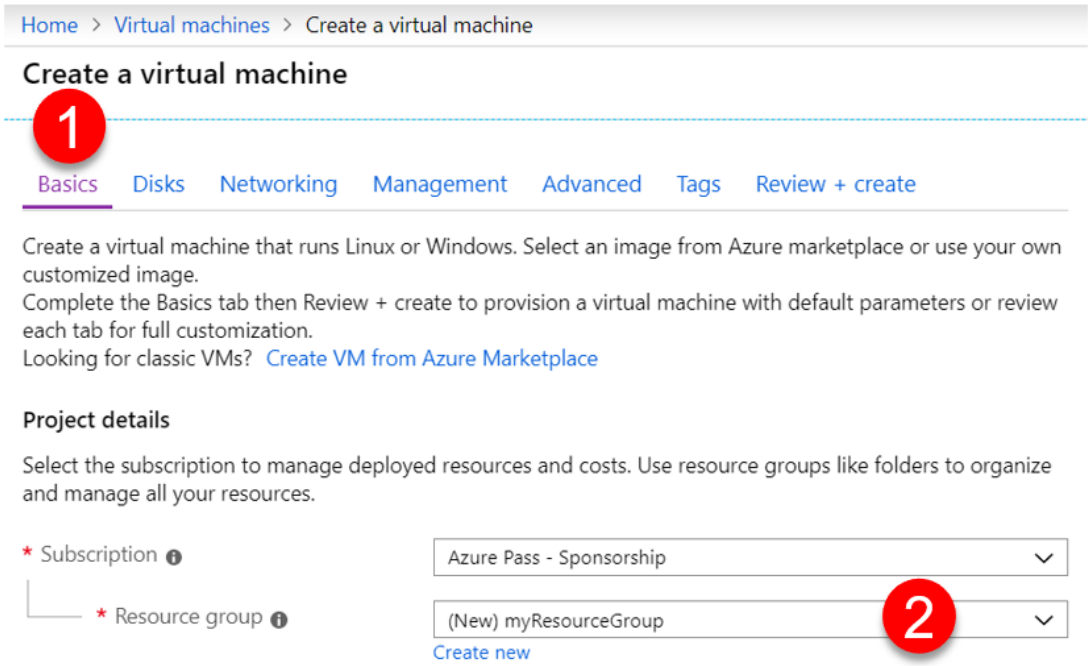
Prerequisites

- Server Computer
- Internet Connectivity
- Log Analytics workspace

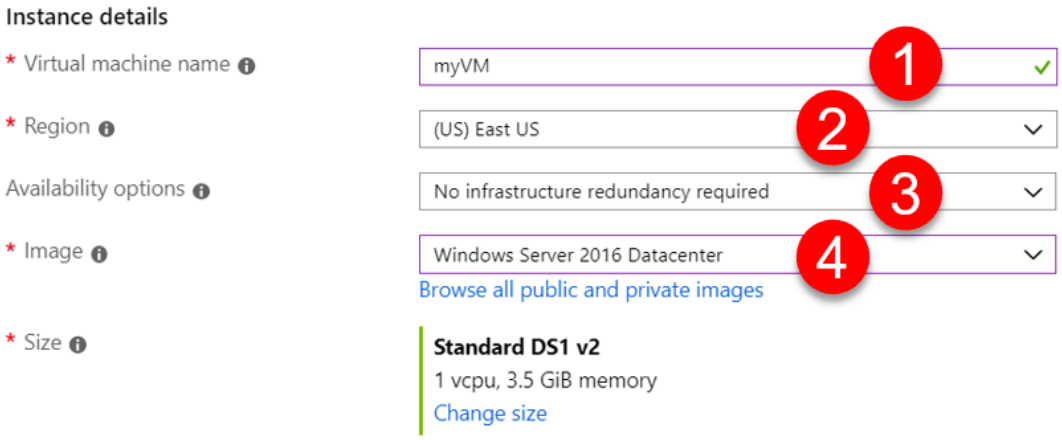
(Optional) Task 1: Create a Virtual Machine in Azure

1. In the Azure Portal, click on **Virtual machines** and click **+ Add**

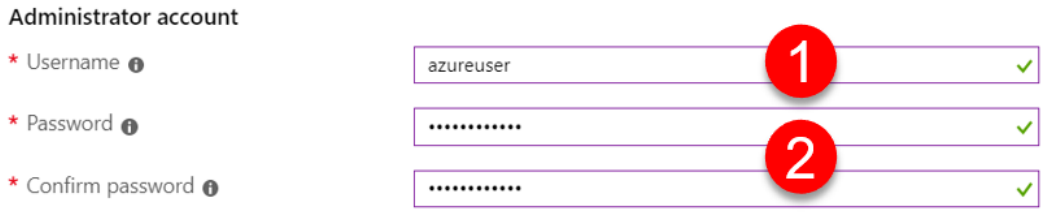
2. In the **Basics** tab, under **Project details**, make sure the correct subscription is selected and **Create new** resource group. Type **myResourceGroup** for the name



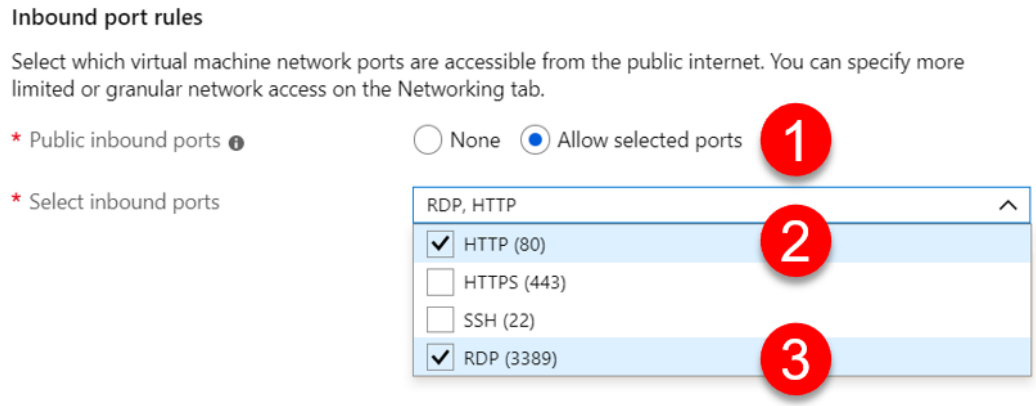
3. Under **Instance details**, type **myVM** for the **Virtual machine name** and choose **East US** for your **Location**. Choose **Windows Server 2016 Datacenter** for the **Image.** Leave all else with their default values



4. Under **Administrator account**, provide a **Username**, such as **azureuser** and a **Password**. The password must be at least 12 characters long and meet the defined complexity requirements



5. Under **Inbound port rules**, choose **Allow selected ports** and then select **RDP (3389)** and **HTTP (80)** from the drop-down



6. On the **Disks** tab, under **Disk options**, select **Standard SSD**
7. On the **Management** tab, set **Boot diagnostics** to **Off**
8. Click the **Review + create** button at the bottom of the page
9. When validation passes, click **Create**

Task 2: Download and install the Microsoft Management Agent

1. **Login** to one of your **Azure Virtual Machines**
2. Login to the **Azure Portal**
3. Navigate to **Log Analytics workspaces**
4. Click to open the **appmon-ws-workspace<NN>**
5. Under **Settings**, click **Advanced settings**
6. Under **Connected Sources** > **Windows Servers** and make a note of **WORKSPACE ID** as well as **PRIMARY KEY**

> **Note**: You will need this information to configure a computer for a Log Analytics workspace.

7. Click **Download Windows Agent (64bit)** and save to the Desktop on the Azure Virtual Machine
8. **Leave the remote desktop connection open**

Task 3: Install and Configure the Microsoft Management Agent

1. On your Azure **Virtual machine**, double-click to execute the file you just downloaded and saved on the Desktop
2. On the Welcome screen, click **Next**
3. On the **Microsoft Software License Terms** screen, click **I Agree**
4. On the **Destination Folder** screen, leave the default installation path and click **Next**
5. Select **Connect the Agent to Azure Log Analytics** and click **Next**
6. When prompted, type in the **Workspace ID** and **Primary Key** you noted in the previous Task
7. Click **Next**

8. For the **Microsoft Update** screen, select **I don't want to use Microsoft Update** and click **Next**
9. Click **Install**
10. Click **Finish**. Once finished, the **Microsoft Monitoring Agent** will appear in **Control Panel** under **System and Security**

Exercise 2: Query Direct Attached Machine data in Log Analytics

Objectives

In this exercise, you will:

- Query Log Analytics for Direct Attached Machine data.

Prerequisites

- Log Analytics Workspace
- Machine(s) integrated into Log Analytics

Scenario

You have configured a Machine to report to Log Analytics by installing a Direct Attached Agent.

Now you will be getting familiar with querying the information gathered.

Task 1: Query Direct Attached Machine data

1. Navigate back to the **Log Analytics workspace** you created in the Azure Portal
2. Click on **Logs**
3. Query **All Performance data** by typing the following and clicking **Run**:

   ```
   Perf
   ```

4. Query **Average Counter Values grouped by Computer, ObjectName and CounterName (Table view)** by typing as follows (all in a single line):

   ```
   Perf | summarize AggregatedValue = avg(CounterValue) by Computer, ObjectName, CounterName
   ```

5. Query **Average Counter Values grouped by Computer, ObjectName and CounterName sorted per Computer (Table view)** by typing as follows (all in a single line):

```
Perf | summarize AggregatedValue = avg(CounterValue) by Computer, ObjectName,
CounterName | sort by Computer asc
```

6. Query **Average Counter Values grouped by Computer, ObjectName and CounterName (LineChart view) - last 15 minutes** by typing as follows (all in a single line):

```
Perf | summarize AggregatedValue = avg(CounterValue) by Computer, ObjectName,
CounterName, bin(TimeGenerated, 15m)
```

Lab 1.3: Add Solution Packs to Log Analytics Workspaces

In this lab, you will be adding a new Solution Pack to a Log Analytics workspace.

Objectives

After completing this lab, you will be able to:

- Understand the many Solution Packs available on the Log Analytics workspaces Solution Gallery
- Understand how to implement a Solution Pack

Prerequisites

- Internet connectivity
- Log Analytics workspace

Estimated Time to Complete this Lab

15 minutes

Scenario

Your Company has created a Log Analytics workspace.

You need to add the following Solution Pack for now:

- Activity Log Analytics

Exercise 1: Add A Solution Pack to a Log Analytics Workspace

Objectives

After completing this exercise, you will be able to:

- Add the Solution Packs from the Log Analytics Solutions Gallery to a Log Analytics Workspace.

Prerequisites

- Internet Connectivity
- Log Analytics Workspace

Scenario

A Log Analytics Workspace has been created without any additional solutions.

You have been tasked to add the following Solution Pack from the Log Analytics Solution Gallery to the Log Analytics workspace in order to prepare the platform to on-board management data:

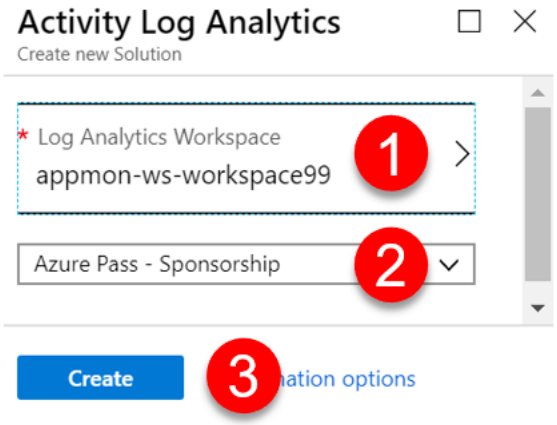
- Activity Log Analytics

Task 1: Add the Activity Log Analytics Solution Pack

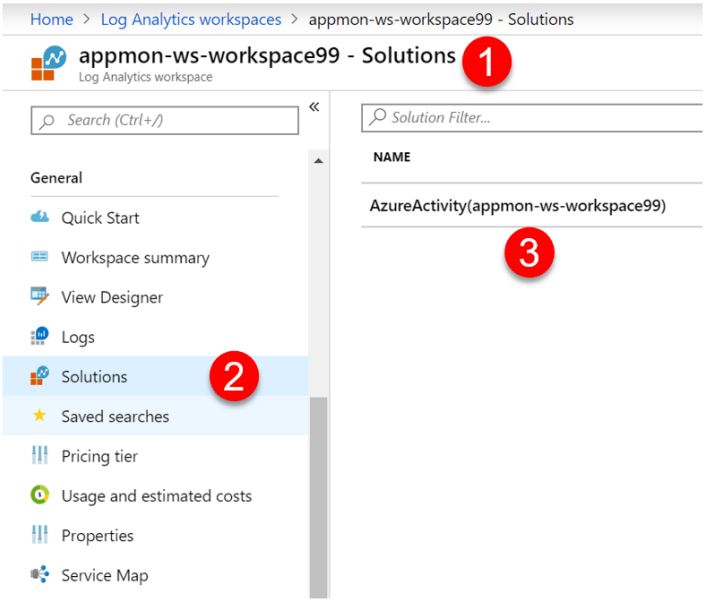
There are many Management Solutions you can install from the Marketplace. You can view them at here. In this particular task, you will install the Activity Log Analytics Solution Pack from the Azure Portal.

1. Browse to the Azure Portal
2. As necessary, login with your **Microsoft Account** and **Password**
3. Click **Create a resource**
4. Search for **Activity Log Analytics**
5. Select **Activity Log Analytics** and click **Create**
6. Select **appmon-ws-workspace<XX>** under **Log Analytics Workspace**
7. Confirm your Subscription

8. Click **Create**



9. When the deployment completes you will see the **Solution** listed in you **Log Analytics workspace.** Click on **Activity Log Analytics** and explore the features



10. **Lab Complete**

Task 2: Add more solutions (Optional)

Optional: Repeat similar steps from previous Tasks for other solutions you may be interested on.

Lab 1.4: Configure Log Analytics to integrate with Azure Virtual Machines and Storage

Introduction

In this lab, you will configure the integration between Log Analytics and Microsoft Azure.

Objectives

After completing this lab, you will be able to:

- Configure Log Analytics
- Integrate Log Analytics with Azure for both Virtual Machines and Storage

Prerequisites

- Successfully completed Lab 1.1 and 1.2
- Access to the Microsoft Azure Portal
- Access to the Microsoft Operations Management Suite Workspace

Estimated time to complete this lab

30 minutes

Scenario

You need to gather insights from Virtual Machines that you cannot log into. You also need to draw insights from IIS Logs and other Diagnostics data generated by Cloud Services and stored in Azure Storage.

Exercise 1: Directly attach an Azure Virtual Machine to Log Analytics

Objectives

In this exercise, you will:

- Configure an Azure Virtual Machine to report to a Log Analytics workspace

Prerequisites

- Successfully completed Lab 1.1 and 1.2
- Microsoft Azure Subscription
- Log Analytics workspace

Scenario

There's a need to establish management insights over an Azure Virtual Machine running IIS. However, there's no way to enable its communication with any other management platform apart from the Log Analytics workspace you have already created.

To enable such functionality, you need to configure Azure Log Analytics to gather information directly from the Azure Virtual Machine into your Log Analytics Workspace.

Task 1: Enable an Azure Virtual Machine within the Azure Portal

1. Browse to the Azure Portal
2. Login with your **Account Name** and **Password** associated with the Azure Subscription related to this course
3. Click **All Services** on the left and then type in **Log Analytics**
4. Click **Log Analytics workspaces** and click **appmon-ws-workspace<XX>**
5. Under **Workspace Data Sources**, click **Virtual machines**
6. For each Virtual Machine that has **Log Analytics Connection** as **Not connected**
    a. Click on the Virtual Machine
    b. Click **Connect** and wait for the **Status** to show as **This workspace**
7. Navigate back to your **Log Analytics workspace**
8. Under **Settings**, click **Advance Settings**
9. Under **Connected Sources > Windows Servers**, confirm the number of **WINDOWS COMPUTER CONNECTED** has updated (Note that this make take up to 10 minutes to occur)

10. **Lab Complete**

Exercise 2: Connect Log Analytics to Azure Storage

Objectives

In this exercise, you will:

- Configure Azure Log Analytics to leverage data from Azure Storage and feed into your Log Analytics Workspace.

Prerequisites

- Internet Connectivity
- Access to the Azure Portal
- **Classic Cloud services application with Diagnostics enabled.**

Scenario

You have been tasked to enable Log Analytics for an Azure Storage Account that is used by a Cloud services application for storage of Azure Diagnostics data. The aim is to enable Event log and IIS Logs collection and reporting using a Log Analytics workspace.

Task 1: Enable Azure Log Analytics to gather data from Azure Storage

1. Browse to the Azure Portal
2. As necessary, login with your **Microsoft Account** and **Password**
3. Click **All Services** on the left and then type in **Log Analytics**.
4. Click **Log Analytics workspaces** and select **appmon-ws-workspace<XX>**
5. Under **Workspace Data Sources**, click the **Storage accounts logs**
6. Click **+ Add**
    a. Click **Please select a storage account.**
    b. Select your **Cloud services** application **Storage account** where **Diagnostics** data is stored.
    c. Click **Please select a data type** and select **Events**.
    d. Under Source, leave **WADWindowsEventLogsTable**.
    e. Click **OK**
7. Click **+ Add** once again

a. Click **Please select a storage account**.

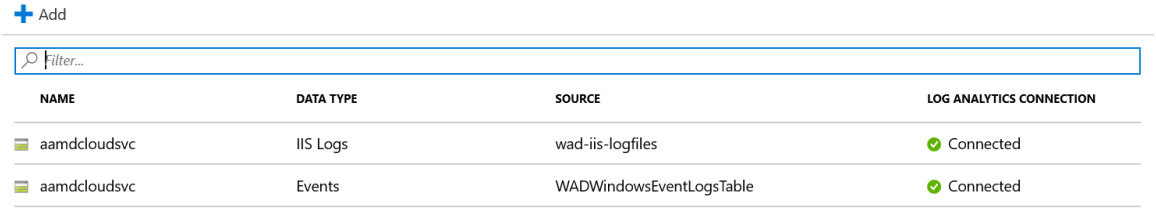
b. Select your **Cloud services** application **Storage Account** where Diagnostics data is stored.

c. Click **Please select a data type** and select **IIS Logs**.

d. Under Source, leave **wad-iis-logfiles** .

e. Click **OK**

8. Check your configuration looks similar to the below:



9. **Lab Complete**

Exercise 3: Query Azure Virtual Machines and Azure Storage data in Log Analytics

Objectives

In this exercise, you will:

- Query Log Analytics for Azure Virtual Machines and Azure Storage data.

Prerequisites

- Log Analytics Workspace
- Azure Virtual Machines and Azure Storage integrated into Log Analytics

Scenario

You have configured Azure Virtual Machines and Storage integration in Log Analytics.

Now you will be getting familiar with querying the information.

Task 1: Query Azure Virtual Machine data

1. Go back to the Azure Portal
2. Click **All Services** on the left and then type in **Log Analytics**.
3. Click **Log Analytics workspaces** and select **appmon-ws-workspace<XX>**
4. Under **General**, click **Logs**
5. Query **All Performance data** by typing as follows:

   ```
   Perf
   ```

6. Query **Average Counter Values grouped by Computer, ObjectName and CounterName sorted per Computer (Table view)** by typing as follows (all in a single line):

   ```
   Perf | summarize AggregatedValue = avg(CounterValue) by Computer, ObjectName, CounterName | sort by Computer asc
   ```

7. Query **Average Counter Values grouped by Computer, ObjectName and CounterName (LineChart view) - last 15 minutes** by typing as follows (all in a single line):

   ```
   Perf | summarize AggregatedValue = avg(CounterValue) by Computer, ObjectName, CounterName, bin(TimeGenerated, 15m)
   ```

8. Query **IIS Logs**:

   ```
   search * | extend Type = $table | where Type == "W3CIISLog"
   ```

> This query would only work if any IIS Webservers have been deployed, configured for IIS Logging and then connected to Log Analytics.

9. Query **IIS Logs for the Default Web Site grouped by Host, Client IP Country and Client IP** by typing as follows (all in a single line):

    ```
    search sSiteName == "Default Web Site" | extend Type = $table | where Type == "W3CIISLog" | summarize AggregatedValue = count(RemoteIPCountry) by Computer, RemoteIPCountry, cIP
    ```

> This query would only work if any IIS Webservers have been deployed, configured for IIS Logging and then connected to Log Analytics.

Task 2: Query Azure Storage data

1. Go back to the **Log Analytics workspace**
2. Under **General**, click **Logs**
3. Query for **IIS Log data** by typing as follows:

    ```
    search * | extend Type = $table | where Type == "W3CIISLog"
    ```

4. **You could also click** to query a specific Storage Account as illustrated:

    The query would look similar to the following:

    ```
    search StorageAccount == "aamdcloudsvc.blob.core.windows.net" | extend Type = $table | where Type == "W3CIISLog"
    ```

5. Query **IIS Logs** from **Azure Storage** grouped by **StorageAccount, Web endpoint** and **status code** by typing as follows (all in a single line):

    ```
    search SourceSystem == "AzureStorage" | extend Type = $table | where Type == "W3CIISLog" | summarize AggregatedValue = count(scStatus) by StorageAccount, csReferer, scStatus
    ```

6. Query **Events from Azure Storage by Host and Event ID** by typing as follows (all in a single line):

    ```
    Event | where SourceSystem == "AzureStorage" and EventLevelName == "Error" | summarize AggregatedValue = count(Computer) by Computer, EventID
    ```

7. **Lab Complete**

Lab 1.5: Configure Log Analytics Workspaces to integrate with Azure SQL Databases

Introduction

In this lab, you will configure the integration between Log Analytics workspaces and Microsoft Azure SQL Databases.

Objectives

After completing this lab, you will be able to:

- Configure Log Analytics workspaces
- Integrate a Log Analytics workspace with Azure for Azure SQL Database resources
- Query Azure SQL Database metrics in Log Analytics

Prerequisites

- Access to the Microsoft Azure Portal
- Azure SQL Database(s) previously deployed
- Access to the Log Analytics Workspace

Estimated time to complete this lab

30 minutes

Scenario

You have an Azure SQL Database deployed into one of your Azure Subscriptions.

There’s an expectation of starting to centralize Azure SQL Database metrics across multiple Azure Subscriptions in Log Analytics workspaces.

You need to start gathering Azure SQL Database metrics into your Log Analytics workspace to test such approach.

Exercise 1: Configure an Azure SQL Database Solution in Log Analytics Workspaces

Objectives

In this exercise, you will:

- Integrate Azure SQL Database metrics with Log Analytics workspaces
- Configure the Azure SQL Database Analytics solution in Log Analytics workspaces

Prerequisites

- Microsoft Azure Subscription with Azure SQL Database(s) deployed
- Log Analytics workspace

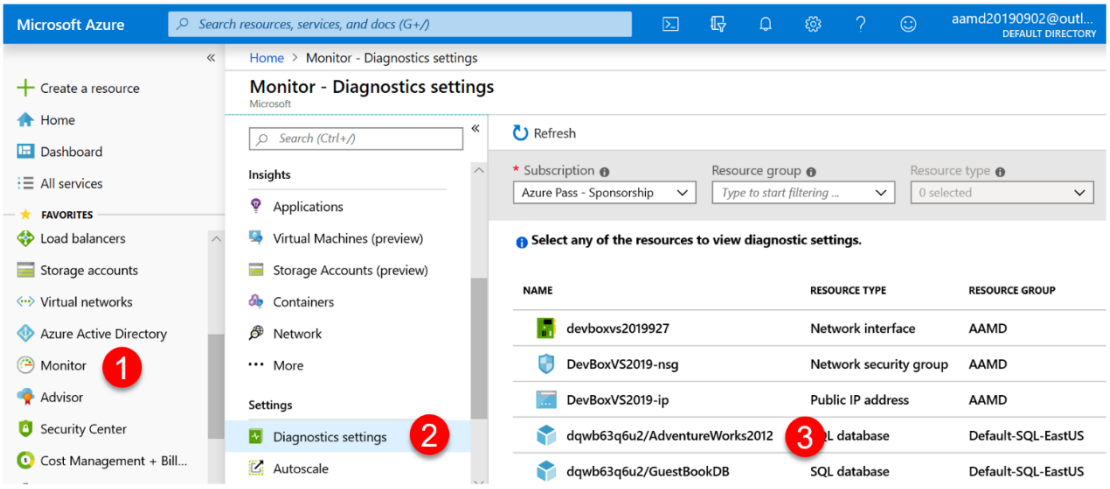
Scenario

There's a need to establish management insights over an Azure SQL Database and centralize such information within a Log Analytics workspace.

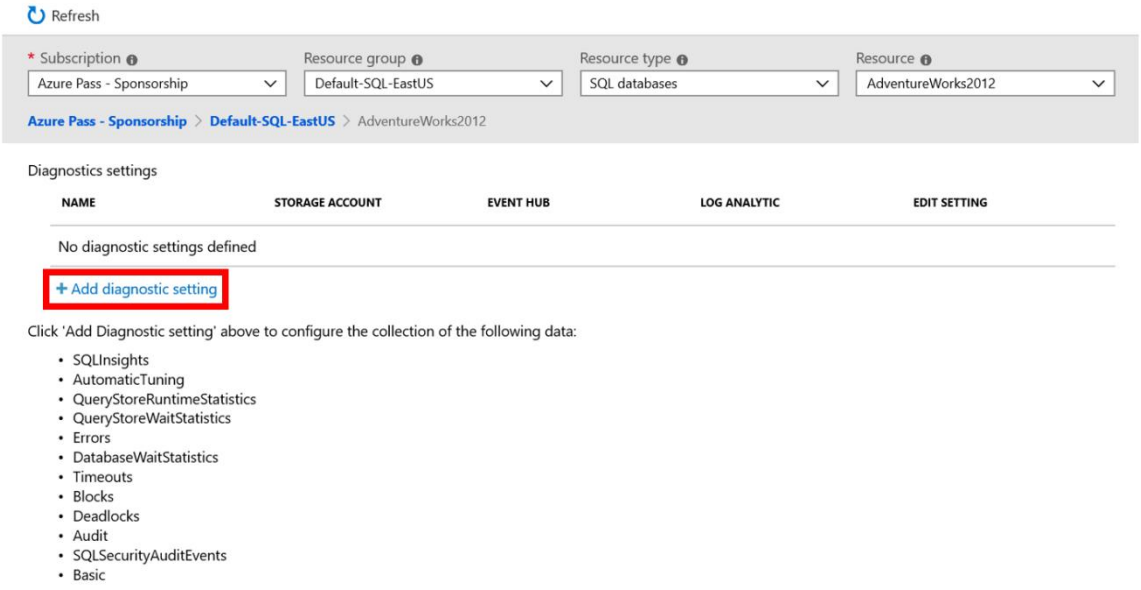
You need to configure Azure Log Analytics workspaces to gather information directly from an Azure SQL Database into your Log Analytics workspace.

Task 1: Connect an Azure SQL Database resource to a Log Analytics workspace

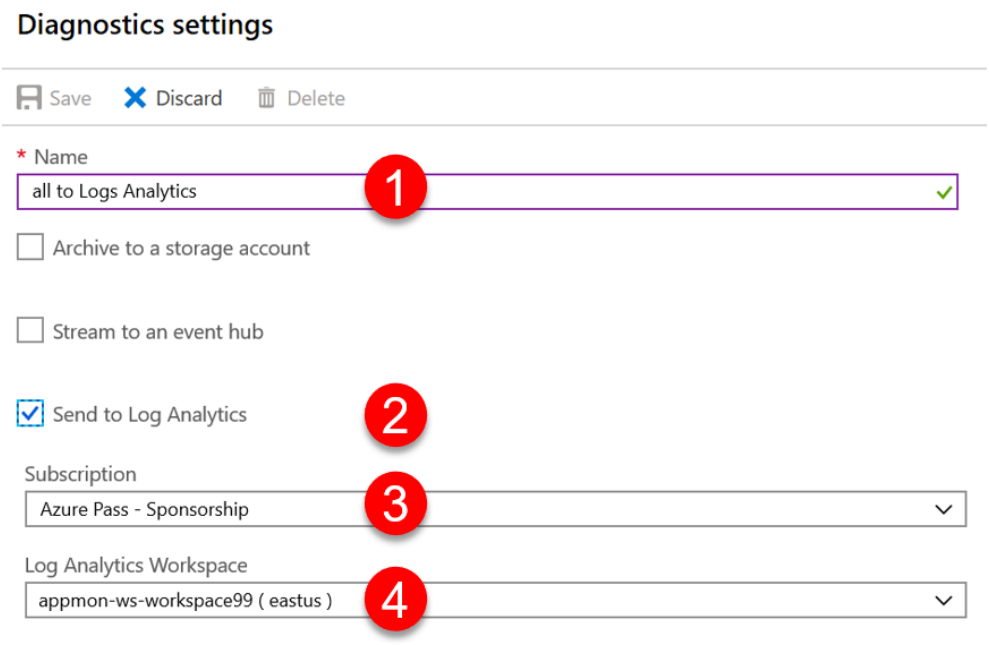
1. Login to the Azure Portal
2. Click **All Services** on the left and then type in **Monitor**
3. Click on **Monitor**
4. Under **Settings**, click **Diagnostic settings**
5. Click on the **SQL Database** you wish to connect to **Log Analytics**



6. Click **+ Add diagnostic setting**



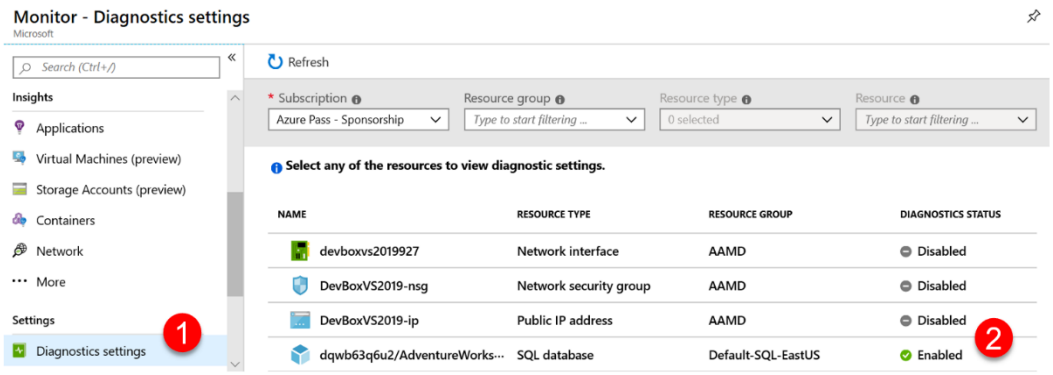
7. Give your setting a name and check the box for **Send to Log Analytics**, then select your **Log Analytics workspace**



8. Under **METRIC** check **Basic**

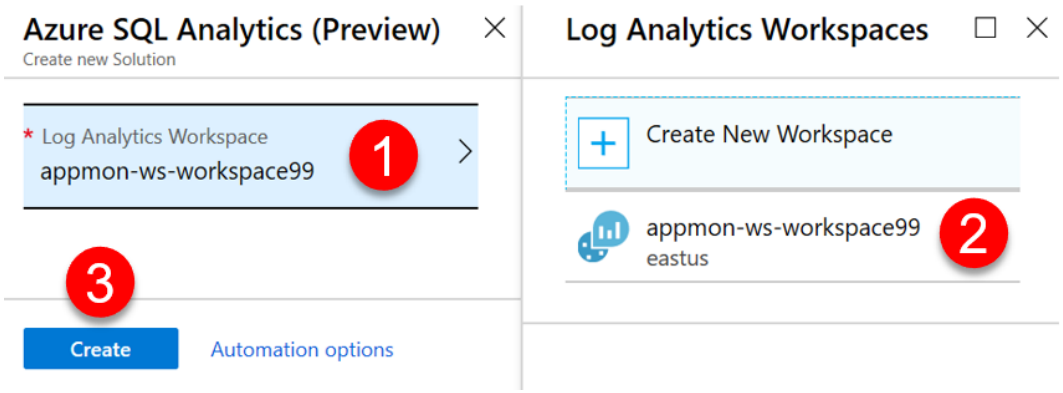
9. Click **Save**

10. Under **Diagnostic settings** in **Monitor**, the **DIAGNOSTIC STATUS** for your **SQL Database** will display **Enabled**

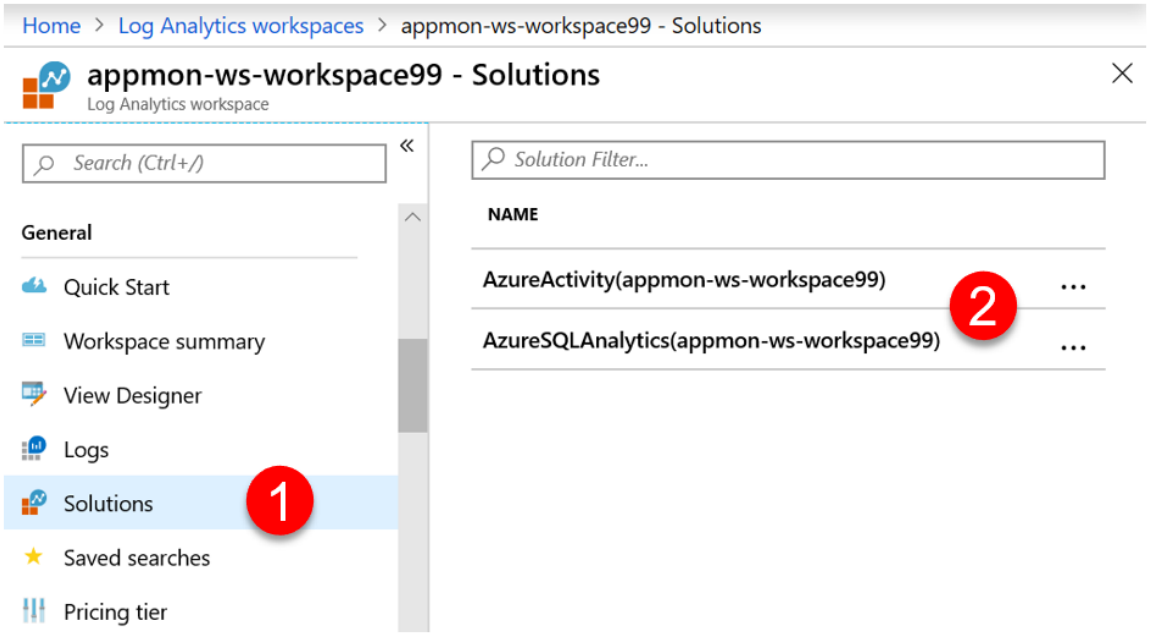


Task 2: Add the Azure SQL Analytics Solution to a Log Analytics Workspace

1. Browse to the Azure Portal
2. As necessary, login with your **Microsoft Account** and **Password**
3. Click **Create a resource**
4. Search for **Azure SQL Analytics**
5. Select **Azure SQL Analytics (Preview)**
6. Click **Create**
7. Select **appmon-ws-workspace<XX>** under **Log Analytics Workspace** and click **Create**



8. Navigate back to **appmon-ws-workspace<XX>.**
9. Under **General**, click **Solutions**. You will see the solutions you created listed.



10. Click on each solution and review features

11. **Lab Complete**

Exercise 2: Query an Azure SQL Database data in a Log Analytics Workspaces

Objectives

In this exercise, you will:

- Query data held in a Log Analytics workspace for a Azure SQL Database.

Prerequisites

- Log Analytics workspace
- Azure SQL Database(s) integrated with a Log Analytics workspace.

Scenario

You have configured the Azure SQL Analytics solution in a Log Analytics workspace.

Now you will be getting familiar with the information gathered as well as with methods to query such information.

Task 1: Query Azure SQL Database data

1. Go back to the **Log Analytics workspace** you named **appmon-ws-workspace<XX>**
2. Under **General**, click **Logs**

> **Note:** to successfully complete this lab you should be browsing/generating some traffic on the Web App you should have previously deployed.

3. Query **Azure Metrics** by typing as follows:

```
AzureMetrics
```

4. Query **Azure Metrics** for the **Azure SQL resources** grouped by **Resource** and **Metric** for the **last 15 minutes** by typing as follows (all in a single line):

```
AzureMetrics | where ResourceProvider == "MICROSOFT.SQL" | summarize
AggregatedValue = avg(Total) by SourceSystem
```

5. **Lab Complete**