# Lab: Publishing and subscribing to Event Grid events

# Student lab manual

## Lab scenario

Your company builds a human resources (HR) system used by various customers around the world. While the system works fine today, your development managers have decided to begin re-architecting the solution by decoupling application components. This decision was driven by a desire to make any future development simpler through modularity. As the developer who manages component communication, you have decided to introduce Microsoft Azure Event Grid as your solution-wide messaging platform.

## Objectives

After you complete this lab, you will be able to:

* Create an Event Grid topic.
* Use the Azure Event Grid viewer to subscribe to a topic and illustrate published messages.
* Publish a message from a .NET application.

## Lab setup

* Estimated time: **45 minutes**

## Instructions

### Before you start

#### Sign in to the lab virtual machine

Ensure that you're signed in to your Windows 10 virtual machine (VM) by using the following credentials:

* Username: **Admin**
* Password: **Pa55w.rd**

#### Review the installed applications

Find the taskbar on your Windows 10 desktop. The taskbar contains the icons for the applications that you'll use in this lab:

* Microsoft Edge
* Microsoft Visual Studio Code

### Exercise 1: Create Azure resources

#### Task 1: Open the Azure portal

1. Sign in to the Azure portal (<https://portal.azure.com>).
2. If this is your first time signing in to the Azure portal, you'll notice a dialog box offering a tour of the portal. Select **Get Started** to skip the tour.

#### Task 2: Open Azure Cloud Shell

1. Open a new Cloud Shell instance in the Azure portal.
2. If Cloud Shell isn't already configured, configure the shell for Bash by using the default settings.
3. At the **Cloud Shell** command prompt in the portal, use the **az** command with the **--version** flag to get the version of the Azure Command-Line Interface (Azure CLI) tool.

#### Task 3: Register the Microsoft.EventGrid provider

1. Use the **az** command with the **--help** flag to find a list of subgroups and commands at the root level of the Azure CLI.
2. Use the **az provider** command with the **--help** flag to get a list of commands available for resource providers.
3. Use the **az provider list** command to get a list of all currently registered providers.
4. Use the **az provider list** command again with the **--query "[].namespace"** flag to list just the namespaces of the currently registered providers.
5. Review the list of currently registered providers. Note that the **Microsoft.EventGrid** provider is currently in the list of providers.
6. Close the Cloud Shell pane.

#### Task 4: Create a custom Event Grid topic

1. Create a new Event Grid topic with the following details:
   * Name: **hrtopic*[yourname]***
   * New resource group: **PubSubEvents**
   * Location: **East US**
   * Event Schema: **Event Grid Schema**

* **Note**: Wait for Azure to finish creating the topic before you continue with the lab. You'll receive a notification when the app is created.

#### Task 5: Deploy the Azure Event Grid viewer to a web app

1. Create a new web app with the following details:
   * Existing resource group: **PubSubEvents**
   * Name: **eventviewer*[yourname]***
   * Publish: **Docker Container**
   * Operating system: **Linux**
   * Region: **East US**
   * New App Service plan: **EventPlan**
   * SKU and size: **Premium V2 P1v2**
   * Docker options: **Single Container**
   * Image source: **Docker Hub**
   * Access type: **Public**
   * Image and tag: **microsoftlearning/azure-event-grid-viewer:latest**

* **Note**: Wait for Azure to finish creating the web app before you continue with the lab. You'll receive a notification when the app is created.

#### Review

In this exercise, you created the Event Grid topic and web app that you will use throughout the remainder of the lab.

### Exercise 2: Create an Event Grid subscription

#### Task 1: Access the Event Grid Viewer web application

1. Access the **eventviewer*[yourname]*** web app that you created earlier in this lab.
2. In the **Settings** section, go to the **Properties** section, and then record the value in the **URL** text box. You'll use this value later in the lab.
3. Browse to the currently running web app.
4. Observe the currently running **Azure Event Grid viewer** web application. Leave this web application running for the remainder of the lab.

* **Note**: This web application will update in real-time as events are sent to its endpoint. We will use this to monitor events throughout the lab.

1. Return to the Azure portal.

#### Task 2: Create new subscription

1. Access the **hrtopic*[yourname]*** Event Grid topic that you created earlier in this lab.
2. Create a new **Event Subscription** with the following details:
   * Name: **basicsub**
   * Event Schema: **Event Grid Schema**
   * Endpoint Type: **Web Hook**
   * Endpoint: ***Web App URL recorded earlier in the lab, with an* https://\* prefix and an */api/updates* suffix**
   * **Note**: For example, if your **Web App URL** value is **http://eventviewerstudent.azurewebsites.net/**, then your endpoint would be **https://eventviewerstudent.azurewebsites.net/api/updates**.

* **Note**: Wait for Azure to finish creating the subscription before you continue with the lab. You'll receive a notification when the app is created.

#### Task 3: Observe the subscription validation event

1. Return to Azure Event Grid viewer.
2. Review the **Microsoft.EventGrid.SubscriptionValidationEvent** event that was created as part of the subscription creation process.
3. Select the event and review its JSON content.
4. Return to Azure portal.

#### Task 4: Record subscription credentials

1. Access the **hrtopic*[yourname]*** Event Grid topic that you created earlier in this lab.
2. Record the value of the **Topic Endpoint** field. You'll use this value later in the lab.
3. In the **Settings** section, go to the **Access keys** section, and then record the value in the **Key 1** text box. You'll use this value later in the lab.

#### Review

In this exercise, you created a new subscription, validated its registration, and then recorded the credentials required to publish a new event to the topic.

### Exercise 3: Publish Event Grid events from .NET

#### Task 1: Create .NET project

1. Using Visual Studio Code, open the **Allfiles (F):\Allfiles\Labs\10\Starter\EventPublisher** folder.
2. Using a terminal, create a new .NET project named **EventPublisher** in the current folder:

* dotnet new console --name EventPublisher --output .
* **Note**: The **dotnet new** command will create a new **console** project in a folder with the same name as the project.

1. Using the same terminal, import version 3.2.0 of **Microsoft.Azure.EventGrid** from NuGet:

* dotnet add package Microsoft.Azure.EventGrid --version 3.2.0
* **Note**: The **dotnet add package** command will add the **Microsoft.Azure.EventGrid** package from NuGet. For more information, go to [Microsoft.Azure.EventGrid](https://www.nuget.org/packages/Microsoft.Azure.EventGrid/3.2.0).

1. Using the same terminal, build the .NET web application:

* dotnet build

1. Close the current terminal.

#### Task 2: Modify the Program class to connect to Event Grid

1. Open the **Program.cs** file in Visual Studio Code.
2. Delete all existing code in the **Program.cs** file.
3. Add the following **using** directives for libraries that the application will reference:

* using Microsoft.Azure.EventGrid;  
  using Microsoft.Azure.EventGrid.Models;  
  using System;  
  using System.Collections.Generic;  
  using System.Threading.Tasks;

1. Create a new **Program** class with two constant string properties named **topicEndpoint** and **topicKey**, and then create an asynchronous **Main** entry point method:

* public class Program  
  {  
   private const string topicEndpoint = "";  
   private const string topicKey = "";  
    
   public static async Task Main(string[] args)  
   {  
   }  
  }

1. Update the **topicEndpoint** string constant by setting its value to the **Topic Endpoint** of the Event Grid topic that you recorded earlier in this lab.
2. Update the **topicKey** string constant by setting its value to the **Key** of the Event Grid topic that you recorded earlier in this lab.

#### Task 3: Publish new events

1. In the **Main** method, perform the following actions:
   1. Add the following block of code to connect to the Event Grid using the credentials you specified earlier in the lab:
   * TopicCredentials credentials = new TopicCredentials(topicKey);  
     EventGridClient client = new EventGridClient(credentials);
   1. Create a new variable named **events**, of type **List**:
   * List<EventGridEvent> events = new List<EventGridEvent>();
   1. Add the following block of code to: create two new variables named **firstPerson** of an anonymous type, and **firstEvent** of type **EventGridEvent**; populate the **EventGridEvent** variable with sample data; and add the **firstEvent** instance to your **events** list:
   * var firstPerson = new  
     {  
      FullName = "Alba Sutton",  
      Address = "4567 Pine Avenue, Edison, WA 97202"  
     };   
       
     EventGridEvent firstEvent = new EventGridEvent  
     {  
      Id = Guid.NewGuid().ToString(),  
      EventType = "Employees.Registration.New",  
      EventTime = DateTime.Now,  
      Subject = $"New Employee: {firstPerson.FullName}",  
      Data = firstPerson.ToString(),  
      DataVersion = "1.0.0"  
     };  
     events.Add(firstEvent);
   1. Add the following block of code to: create two new variables named **secondPerson** of an anonymous type, and **secondEvent** of type **EventGridEvent**; populate the **EventGridEvent** variable with sample data; and add the **secondEvent** instance to your **events** list:
   * var secondPerson = new  
     {  
      FullName = "Alexandre Doyon",  
      Address = "456 College Street, Bow, WA 98107"  
     };  
       
     EventGridEvent secondEvent = new EventGridEvent  
     {  
      Id = Guid.NewGuid().ToString(),  
      EventType = "Employees.Registration.New",  
      EventTime = DateTime.Now,  
      Subject = $"New Employee: {secondPerson.FullName}",  
      Data = secondPerson.ToString(),  
      DataVersion = "1.0.0"  
     };  
     events.Add(secondEvent);
   1. Add the following block of code to obtain the **Hostname** from the **topicEndpoint** variable, and then use that hostname as a parameter to the [**EventGridClient.PublishEventsAsync**](https://docs.microsoft.com/dotnet/api/microsoft.azure.eventgrid.eventgridclient.publisheventswithhttpmessagesasync) method invocation:
   * string topicHostname = new Uri(topicEndpoint).Host;  
     await client.PublishEventsAsync(topicHostname, events);
   1. Render the **Events published** message to the console:
   * Console.WriteLine("Events published");
2. Save the **Program.cs** file.
3. Using a terminal, run the .NET console application project:

* dotnet run
* **Note**: If there are any build errors, review the **Program.cs** file in the **Allfiles (F):\Allfiles\Labs\10\Solution\EventPublisher** folder.

1. Review the success message output from the currently running console application.
2. Close the current terminal.

#### Task 4: Observe published events

1. Return to the browser window with the **Azure Event Grid viewer** web application.
2. Review the **Employees.Registration.New** events that were created by your console application.
3. Select any of the events and review its JSON content.
4. Return to Azure portal.

#### Review

In this exercise, you published new events to your Event Grid topic using a .NET console application.

### Exercise 4: Clean up your subscription

#### Task 1: Open Azure Cloud Shell

1. In the Azure portal, select the **Cloud Shell** icon to open a new shell instance.
2. If Cloud Shell isn't already configured, configure the shell for Bash by using the default settings.
3. At the **Cloud Shell** command prompt, enter the following command, and then select Enter to list all resource groups in the subscription:

* az group list

1. Enter the following command, and then select Enter to get a list of possible commands to delete a resource group:

* az group delete --help

#### Task 2: Delete resource groups

1. Enter the following command, and then select Enter to delete the **PubSubEvents** resource group:

* az group delete --name PubSubEvents --no-wait --yes

1. Close the Cloud Shell pane.

#### Task 3: Close the active applications

1. Close the currently running Microsoft Edge application.
2. Close the currently running Visual Studio Code application.

#### Review

In this exercise, you cleaned up your subscription by removing the resource groups used in this lab.

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