

Deploy gRPC_Sender to Azure App Service using Visual Studio Code

FACTS

Size:	n/a
Software:	ArcGIS Velocity
Application/Extension:	n/a
Database:	n/a
Other Software Required:	Azure Portal, Microsoft Visual Studio Code, Azure App Service extension for VS Code, Git
Platforms Tested:	Windows 10, Mac OS X
Special Functionality:	Azure App Service
Audience:	Industry and sales teams

PURPOSE

gRPC_Sender is a C#.Net console app that can be configured and run to send event messages to a gRPC service. Intended to be deployed to an Azure portal as an Azure WebJob running in an App Service to support real-time demonstrations for Velocity, the app provides a simulated stream of event messages so that Velocity can receive them as if from remote sensors sending updates.

These instructions will guide you through the process of deploying your own gRPC_Sender app to support your industry demos of Velocity. Specifically, it will lead you through the following steps:

- Set up your deployment environment
- Clone the gRPC_Sender app
- Configure it to use your demo simulation data and gRPC endpoint
- Create an App Service resource to host the gRPC_Sender app
- Deploy your gRPC_Sender to your App Service

DATA SOURCES AND DESCRIPTION (Refer to Data Distribution Permission statement at the end of this document)

For this demo resource one csv file is hosted in an Amazon Web Service (AWS) S3 bucket which you may use to set up your gRPC_Sender . This is provided for illustrative purposes only and we generally expect most users will replace our sample csv file with their own simulation data:

1. Gather your deployment resources

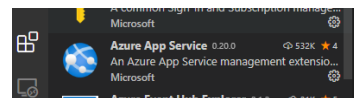
You'll need:

- An Azure account with an active subscription. [Create one for free.](#)
- A delimited text file of events you wish to simulate. It must be hosted in a place where it is accessible by URL such as an Amazon S3 bucket or GitHub repo. To get started you may use the sample file hosted at https://a4iot-test-data.s3.us-west-2.amazonaws.com/point/Charlotte_Simulations/Buses_in_CharlotteNC.csv
- A gRPC feed in Velocity configured with the schema from the simulation file.
- Visual Studio Code (VS Code) installed on your local machine. [Get it here.](#)
- The Azure App Service extension for VS Code ([Get it here](#) or install from within VS Code)
- Git installed on your local machine. [Get it here.](#)

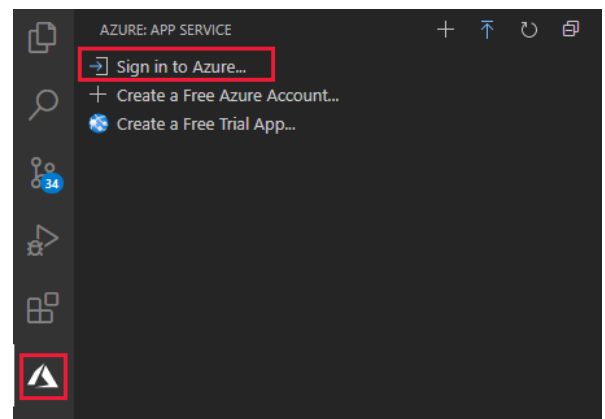
2. Sign in to Azure in VS Code

If you already use the Azure service extensions, you should already be logged in and can skip this step. If you don't use the Azure service extensions, continue in this section to install it.

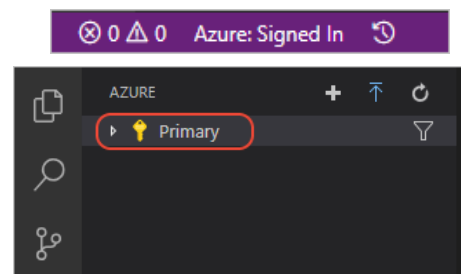
1. In VS Code click **View > Extensions**
2. In the search bar type **Azure App Service**
3. Click **Install** on the Azure App Service extension



Once you've installed the Azure App Service extension in VS Code, you need to sign into your Azure account by navigating to the **Azure Explorer**, select **Sign in to Azure**, and follow the prompts. (If you have multiple Azure extensions installed, select **App Service**.)



After signing in, verify that the email address of your Azure account (or "Signed In") appears in the Status Bar and your subscription(s) appears in the Azure Explorer:

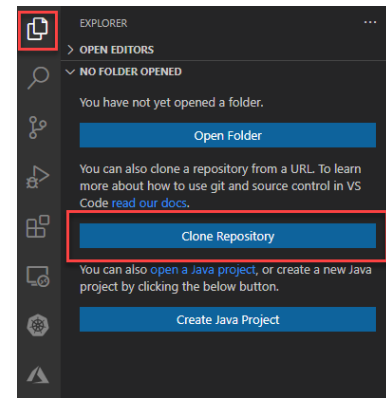


3. Clone the grpc-sender repo

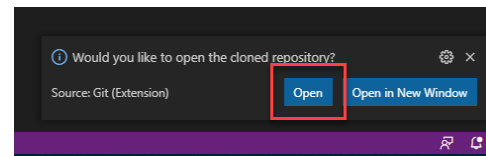
Create the app by cloning a Git repository. Two methods for doing so are illustrated below.

Method 1: Use Git in VS Code:

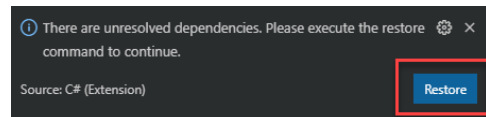
1. In VS Code, select the explorer icon to open the Files and Folders Explorer, then click **Clone Repository**
2. Paste **`https://github.com/Esri/realtime-grpc-feed.git`** into the search bar and click 'Clone from URL **`https://github.com/Esri/realtime-grpc-feed.git`**'
3. Navigate to the folder where you will save the cloned application files and click **Select Repository Location**.



4. Click **Open**.



5. If a message appears indicating unresolved dependencies click **Restore**.



6. The application files appear in the **Files and Folders Explorer**.

Method 2: Use Git directly:

1. Open a terminal command prompt and change directories to the location where you want to create the app folder.

Or

1. In Windows Explorer in the folder where you want to create the app, right click and click **Git Bash Here** to open a Git Bash command window.
2. Enter the following git command in the terminal or Git Bash window to clone the repository:

```
git clone https://github.com/Esri/realtime-grpc-feed.git
```

3. Change into the correct subfolder of the cloned repo directory by running the following command:

```
cd samples/csharp/grpc_sender
```

4. Install the application's dependencies by running the command:

```
npm install
```

5. Start VS Code with the following command:

code .

4. Update app.config to reflect your gRPC endpoint URL, gRPC endpoint header path, credentials (if required) and simulation file

For this step you'll need the gRPC endpoint URL and header path for your feed. To obtain these, in Velocity go to your feed's details page and note the values in the Feed Details section.

The app.config file in the gRPC_Sender code files contains a set of key/value pairs that the app uses to initialize settings for your deployment. You will need to update some of the values in this file in order to configure the app for your needs.

4. In VS Code's **File and Folders Explorer** click app.config to open the file in the VS Code editor.

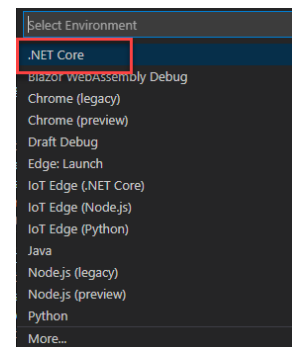
```
<configuration>
  <appSettings>
    <!-- gRPC feed connection settings-->
    <add key="gRPC_endpoint_URL" value="" /><!--the gRPC endpoint URL where messages should be sent-->
    <add key="gRPC_endpoint_header_path" value="" /><!--the gRPC endpoint header path-->
    <add key="gRPC_endpoint_header_path_key" value="grpc-path" /><!--the gRPC endpoint header path key-->
    <add key="gRPC_endpoint_URL_port" value="443" /><!--the gRPC endpoint URL port-->
    <add key="streamData" value="true" /><!--if true will stream data; if false will send unary requests -->
    <!-- authentication settings-->
    <add key="authenticationArcGIS" value="false" /><!-- true -- use ArcGIS authentication, false -- no authentication-->
    <add key="tokenPortalUrl" value="" /><!--only used if authenticationArcGIS is true. The url to the portal to be used for requesting an authentication token-->
    <add key="username" value="" /><!--only used if authenticationArcGIS is true. The username for requesting an authentication token-->
    <add key="password" value="" /><!--only used if authenticationArcGIS is true. The password for requesting an authentication token-->
    <add key="tokenExpiry" value="21600" /><!--integer; the token expiry in minutes; ignored if authenticationArcGIS == false--> You, an hour ago • Update app.config
    <!-- simulation settings-->
    <add key="fileUrl" value="" /><!--url string to the delimited file to be simulated-->
    <add key="hasHeaderRow" value="true" /><!--true or false, the simulation file has a header row of field names-->
    <add key="fieldDelimiter" value="," /><!--the field delimiter in your data file-->
    <add key="numLinesPerBatch" value="100" /><!--the number of lines to send in each batch-->
    <add key="sendInterval" value="1000" /><!--the interval in milliseconds between batches-->
    <add key="timeField" value="1" /><!--the 0-based index of the field containing time values-->
    <add key="setToCurrentTime" value="true" /><!--true or false, reset time values to the current time-->
    <add key="dateFormat" value="" /><!--optional, only used if setToCurrentTime is true. In that case the date values will be formatted as strings according to this format-->
    <add key="dateCulture" value="" /><!--optional, examples: "en-US", "es-ES", "fr-FR"; only used if setToCurrentTime is true and dateFormat is not empty. In that case data-->
    <add key="iterationLimit" value="1" /><!--integer; the number of times to run the simulation; a value less than 1 indicates unlimited repetition-->
  </appSettings>
</configuration>
```

5. Enter or update values for the keys as follows:
 - gRPC_endpoint_URL - In the empty quotes after 'value=' paste the complete gRPC endpoint URL you noted above.
 - gRPC_endpoint_header_path – In the empty quotes after 'value=' paste the complete gRPC endpoint header path you noted above.
 - streamData – set to True to have the app send data in a stream (better for high velocity data), or False to send data in discrete requests (not recommended for high velocity data).
 - authenticationArcGIS - True if your Velocity feed requires ArcGIS authentication, false if not.
 - tokenPortalUrl – Used only if authenticationArcGIS is true. The root url to the ArcGIS portal to be used for obtaining a token.
 - username – Used only if authenticationArcGIS is true. The username for generating a token.
 - password – Used only if authenticationArcGIS is true. The password for generating a token.
 - tokenExpiry – Used only if authenticationArcGIS is true. The token expiration in minutes from 1 to 21600.
 - fileUrl – Enter the URL to the simulation delimited file containing the data to be sent. If using our sample file, set this value to **"https://a4iot-test-data.s3.us-west-2.amazonaws.com/point/Charlotte_Simulations/Buses_in_CharlotteNC.csv"**.
 - hasHeaderRow – Enter true or false to indicate whether the simulation file has a header row of field names. If using our sample csv file, set this value to **"true"**.
 - fieldDelimiter – the delimiter between fields in the simulation file. If using our sample csv file, set this value to **" , "**.

- `numLinesPerBatch` – Enter the number of lines to send with each batch. The app will read this number of lines from the simulation file, bundle them into a batch of events and send them to the gRPC endpoint all at once. Then it will read the next set of lines into a batch, send them and repeat until the end of the simulation file is reached and all lines have been sent. You might set this value to be equal to the number of unique track IDs in your data or use it in conjunction with the `sendInterval` to simply control the rate of events into your gRPC endpoint. If using our sample csv file, there are **57** unique track IDs.
 - `sendInterval` – Enter the number of milliseconds between batches sent to the gRPC endpoint. This time includes the time required to send a batch. Thus, if this value is set to 1000ms, and it takes 700ms to send a batch, the app will wait 300ms before sending the next batch. If it takes longer than this value to send a batch, it will not wait before sending the next batch.
 - `timeField` – The zero-based index of the field in the simulation file containing date values. If using our sample csv file, set this value to “0”.
 - `setToCurrentTime` – Enter true or false to indicate whether to update the values in the date field to the date and time the event is sent to the gRPC endpoint. If using our sample csv file, set this value to “true”.
 - `dateFormat` – Optional, only used if `setToCurrentTime` is true. In that case the date values will be formatted as strings according to this formatter. If this value is empty, date values will be epochs. Formatting string can be standard or custom. See <https://docs.microsoft.com/en-us/dotnet/standard/base-types/standard-date-and-time-format-strings> and <https://docs.microsoft.com/en-us/dotnet/standard/base-types/custom-date-and-time-format-strings>
 - `dateCulture` - Optional, examples: "en-US", "es-ES", "fr-FR"; only used if `setToCurrentTime` is true and `dateFormat` is not empty. In that case date strings will be formatted according to the culture specified in this setting or the default culture if empty
 - `iterationLimit` – Enter an integer to indicate the number of times to repeat the simulation. A value less than 1 indicates unlimited repetition.
6. Click File > Save.

5. (Optional) Run your local gRPC_Sender app

1. In VS Code click Run > Start Debugging.
2. If a message appears prompting you to select an Environment, select **.NET Core**.



After a pause while the app initializes and loads in the simulation file you configured, in the VS Code Debug Console you should see a scrolling list of messages indicating that the app has sent messages to your gRPC endpoint in the format “A batch of <<`numLinesPerBatch`>> events has been sent. It took *n*

```

TERMINAL  PROBLEMS  OUTPUT  DEBUG CONSOLE
A batch of 57 events has been published. It took 262 milliseconds. Waiting for 238 milliseconds. Total sent: 57.
A batch of 57 events has been published. It took 234 milliseconds. Waiting for 266 milliseconds. Total sent: 114.
A batch of 57 events has been published. It took 126 milliseconds. Waiting for 374 milliseconds. Total sent: 171.
A batch of 57 events has been published. It took 108 milliseconds. Waiting for 392 milliseconds. Total sent: 228.
A batch of 57 events has been published. It took 96 milliseconds. Waiting for 404 milliseconds. Total sent: 285.
A batch of 57 events has been published. It took 97 milliseconds. Waiting for 403 milliseconds. Total sent: 342.
A batch of 57 events has been published. It took 92 milliseconds. Waiting for 408 milliseconds. Total sent: 399.
A batch of 57 events has been published. It took 104 milliseconds. Waiting for 396 milliseconds. Total sent: 456.
A batch of 57 events has been published. It took 161 milliseconds. Waiting for 339 milliseconds. Total sent: 513.
A batch of 57 events has been published. It took 109 milliseconds. Waiting for 391 milliseconds. Total sent: 570.
A batch of 57 events has been published. It took 91 milliseconds. Waiting for 409 milliseconds. Total sent: 627.

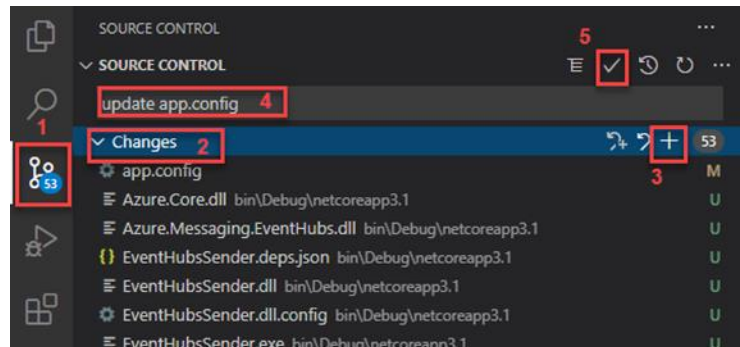
```

milliseconds. Waiting for $\ll sendInterval - n \gg$ milliseconds. Total sent: $\ll numLinesPerBatch * \text{number of batches sent} \gg$.

3. Commit changes in the app.config file to the local repo

Having edited the app.config file, you must commit the changes to your local repository so that they will be reflected in the published App Service.

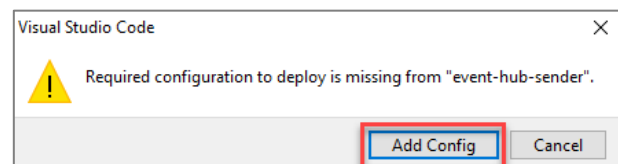
1. Open the Source Control explorer.
2. Select the Changes list.
3. Click the + button to stage all changes for a commit.
4. Enter a comment such as "updated app.config" to indicate the reason for the commit.
5. Click the checkmark button ✓ to commit the changes.



4. Create App service resource in VS Code

1. From the command palette (**Ctrl+Shift+P** on Windows, **Cmd+Shift+P** on Mac), type "create web" and select **Azure App Service: Create New Web App...Advanced**. You use the advanced command to have full control over the deployment including resource group, App Service Plan, and operating system rather than use Linux defaults.

2. If a message appears indicating a required configuration to deploy is missing, click **Add Config**.

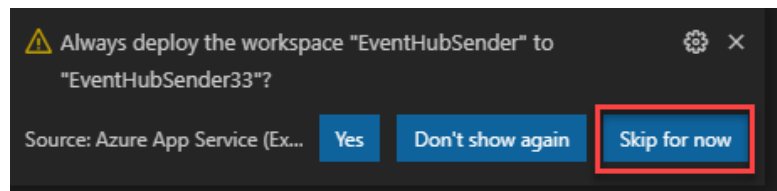


3. Respond to the prompts as follows:

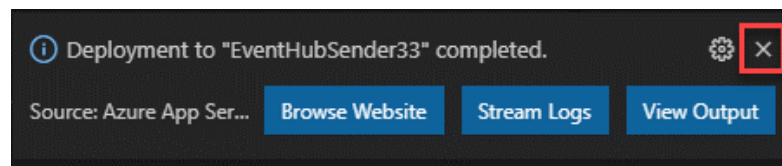
- Select your **Subscription** account.
- For **Enter a globally unique name**, enter a name that's unique across all of Azure. Use only alphanumeric characters ('A-Z', 'a-z', and '0-9') and hyphens ('-')

- Select **Create new resource group** and provide a name like gRPC_Sender-rg.
- Select the **.Net Core 3.1 (LTS)** runtime stack.
- Select an operating system (Windows or Linux).
- Select **Create a new App Service plan**, provide a name like gRPC_Sender-plan, and select any [pricing tier](#). The app will incur costs on any pricing tier other than **F1 Free**.
- Select **Skip for now** for the Application Insights resource.
- Select a location near you or where you want the app to run.

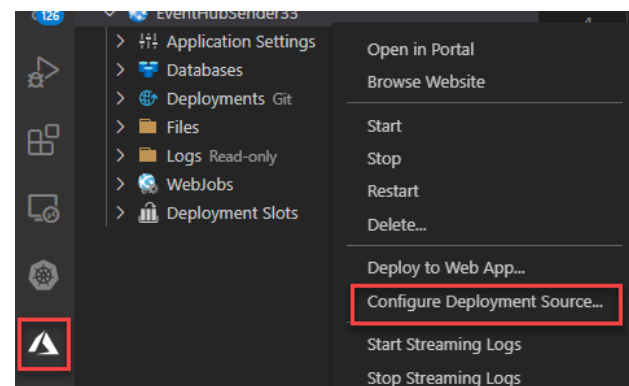
If a message asks to 'Always deploy the workspace gRPC_Sender to ' this App Service click **Skip for now**.



4. After a short time, VS Code notifies you that creation is complete. Close the notification with the **X** button:



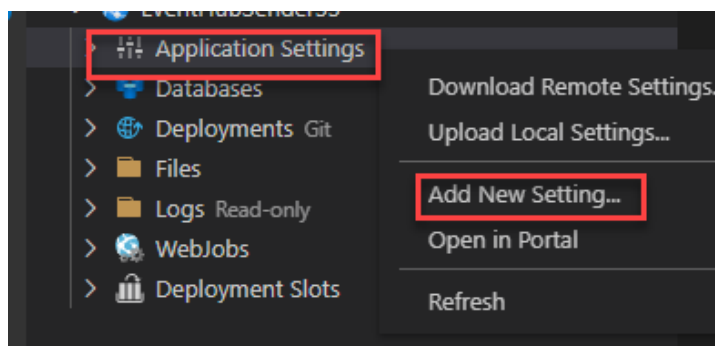
5. With the web app in place, you next instruct VS Code to deploy your code from the local Git repo. Select the Azure icon to open the **Azure App Service** explorer, expand your subscription node, right-click the name of the web app you just created, and select **Configure Deployment Source**.



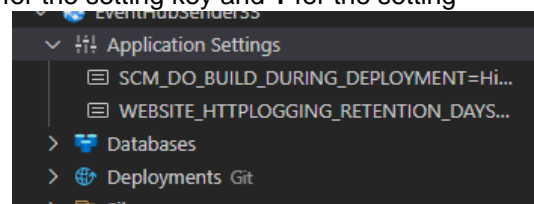
6. When prompted, select **LocalGit**.

If deploying to an App Service on Windows, you need to create an additional setting before deployment:

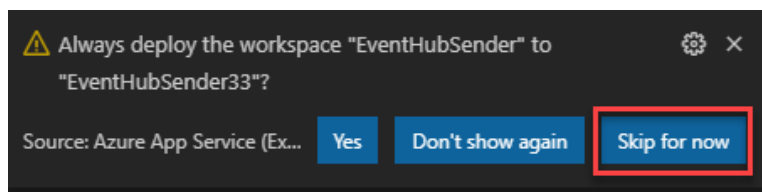
- i. In VS Code, expand the node for the new App Service, right-click **Application Settings**, and select **Add New Setting**:



- ii. Enter **SCM_DO_BUILD_DURING_DEPLOYMENT** for the setting key and **1** for the setting value. This setting forces the server to run npm install upon deployment.
- iii. Expand the **Application Settings** node to verify the setting is in place.



7. Select the blue up arrow icon to deploy your code to Azure:
8. At the prompts, select your **subscription** account again and then select the name of the web app created earlier.
9. If a message appears about uncommitted change(s) in your local repo, click **Deploy Anyway**.
10. When deploying to Linux, select **Yes** when prompted to update your configuration to run npm install on the target server.
11. If a message asks to 'Always deploy the workspace gRPC_Sender to' this App Service click **Skip for now**.



Congratulations. You have deployed an Azure App Service and WebJob that continuously sends event messages to your Velocity gRPC feed.

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