

# Backend get D2C message




# What to do ?

Develop a back-end application to monitor message from device via IoT Hub










Open Visual Studio / Create C# Console App .NET Core / Name = backD2C


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C# All Platforms Console

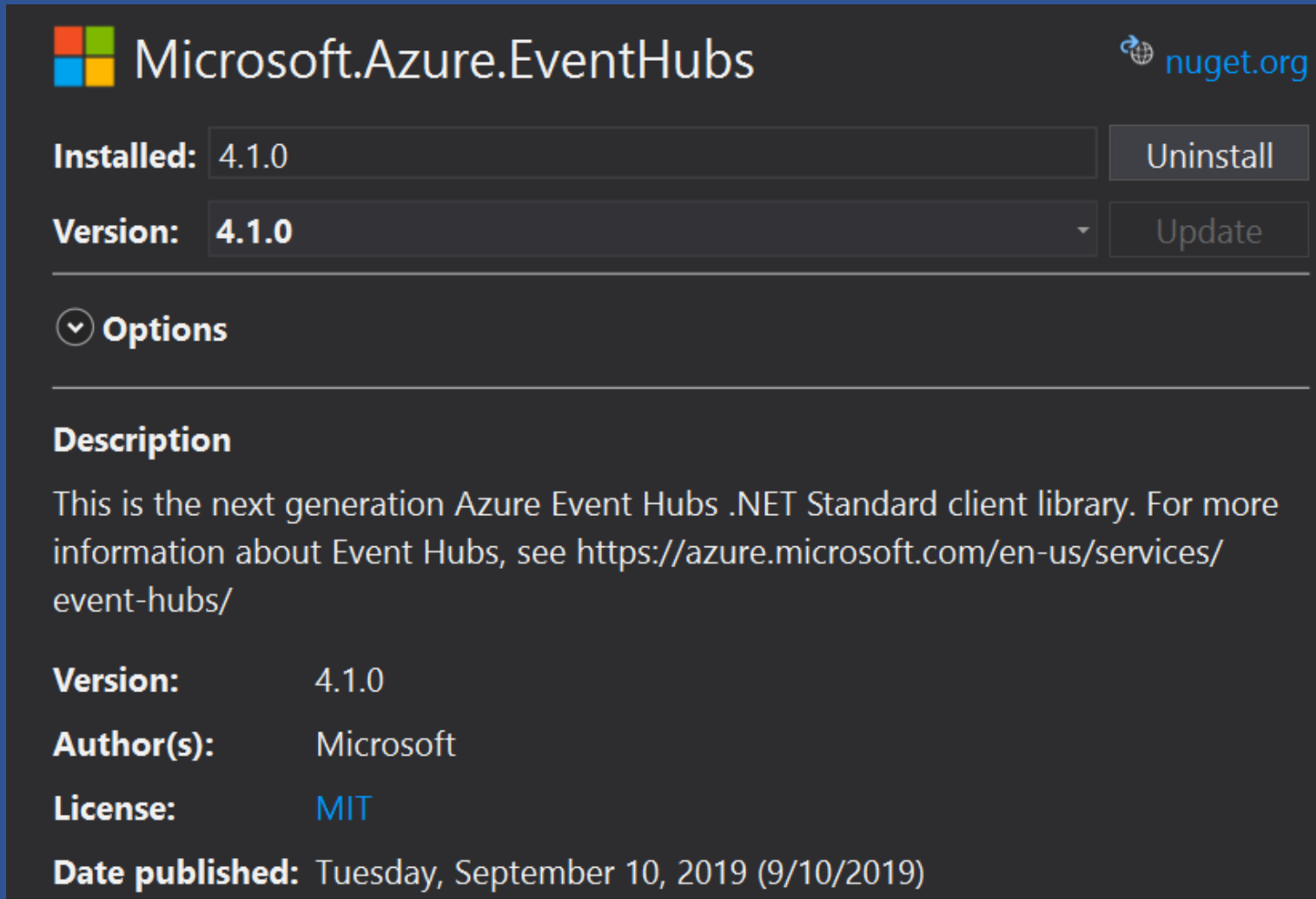
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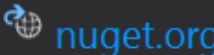
 Console App (.NET Framework)  
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# NuGet Microsoft.Azure.EventHubs



The screenshot shows the NuGet package page for Microsoft.Azure.EventHubs. At the top, there is a Microsoft logo and the package name. To the right is the nuget.org logo. Below the package name, there are two rows: 'Installed: 4.1.0' with an 'Uninstall' button, and 'Version: 4.1.0' with a dropdown arrow and an 'Update' button. A section titled 'Options' with a downward arrow is below that. The 'Description' section follows, containing a paragraph about the next generation Azure Event Hubs .NET Standard client library and a link to the Azure services page. At the bottom, there are four rows of metadata: 'Version: 4.1.0', 'Author(s): Microsoft', 'License: MIT', and 'Date published: Tuesday, September 10, 2019 (9/10/2019)'.

 Microsoft.Azure.EventHubs 

**Installed:** 4.1.0 **Uninstall**

**Version:** 4.1.0 **Update**

Options

**Description**

This is the next generation Azure Event Hubs .NET Standard client library. For more information about Event Hubs, see <https://azure.microsoft.com/en-us/services/event-hubs/>

**Version:** 4.1.0

**Author(s):** Microsoft

**License:** MIT

**Date published:** Tuesday, September 10, 2019 (9/10/2019)

## Add Namespace

```
6
7  using System;
8      using Microsoft.Azure.EventHubs;
9      using System.Threading.Tasks;
10     using System.Threading;
11     using System.Text;
12     using System.Collections.Generic;
13
```

# Get Event Hubs Compatible Endpoint & Path

Home > loyiothub1 - Built-in endpoints

## loyiothub1 - Built-in endpoints

IoT Hub

Search (Ctrl+/)

Save Undo

Each IoT hub comes with built-in system endpoints to handle system and device me

### Events

Events is the the default endpoint, and is used until custom routing rules are

Partitions ⓘ

2

Event Hub-compatible name ⓘ

iothub-ehub-loyiothub1-3-c4bf924f3c

Event Hub-compatible endpoint ⓘ

Endpoint=sb://ihsuprodsgre1-1.namespace.servicebus.windows.net/Shared

Retain for ⓘ

Consumer Groups ⓘ

**CONSUMER GROUPS**

\$Default

loycg1

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Events

**Settings**

Shared access policies

Pricing and scale

IP Filter

Certificates

**Built-in endpoints**

Failover

# Get IoT Hub Sas Key

Home > loyiothub1 - Shared access policies

## loyiothub1 - Shared access policies

IoT Hub

Search (Ctrl+J)

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Events
- Settings
  - Shared access policies**
  - Pricing and scale
  - IP Filter
  - Certificates

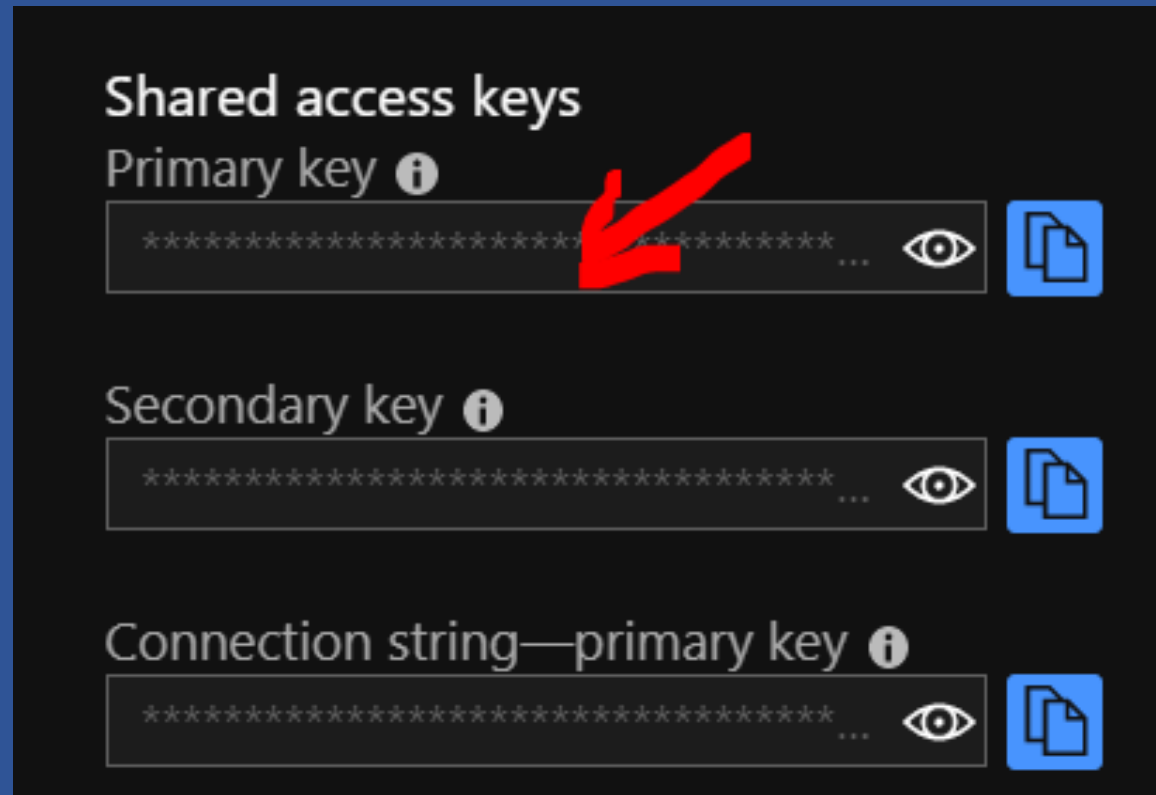
+ Add

IoT Hub uses permissions to grant access to each IoT hub functionality.

Search to filter items...

POLICY
iothubowner
<b>service</b>
device
registryRead
registryReadWrite

## Get Iot Hub Sas Key





## Add 5 class private fields

```
private readonly static string s_eventHubsCompatibleEndpoint =  
    "sb://ihsuprods.[REDACTED]space.servicebus.windows.net/";  
  
private readonly static string s_eventHubsCompatiblePath =  
    "iothub-ehub-loyiothu[REDACTED]-c4bf924f3c";  
  
private readonly static string s_iotHubSasKey =  
    "KCyf3omKkmWncXu[REDACTED]IxBWRoWgmAw=";  
  
private readonly static string s_iotHubSasKeyName = "service";  
private static EventHubClient s_eventHubClient;
```

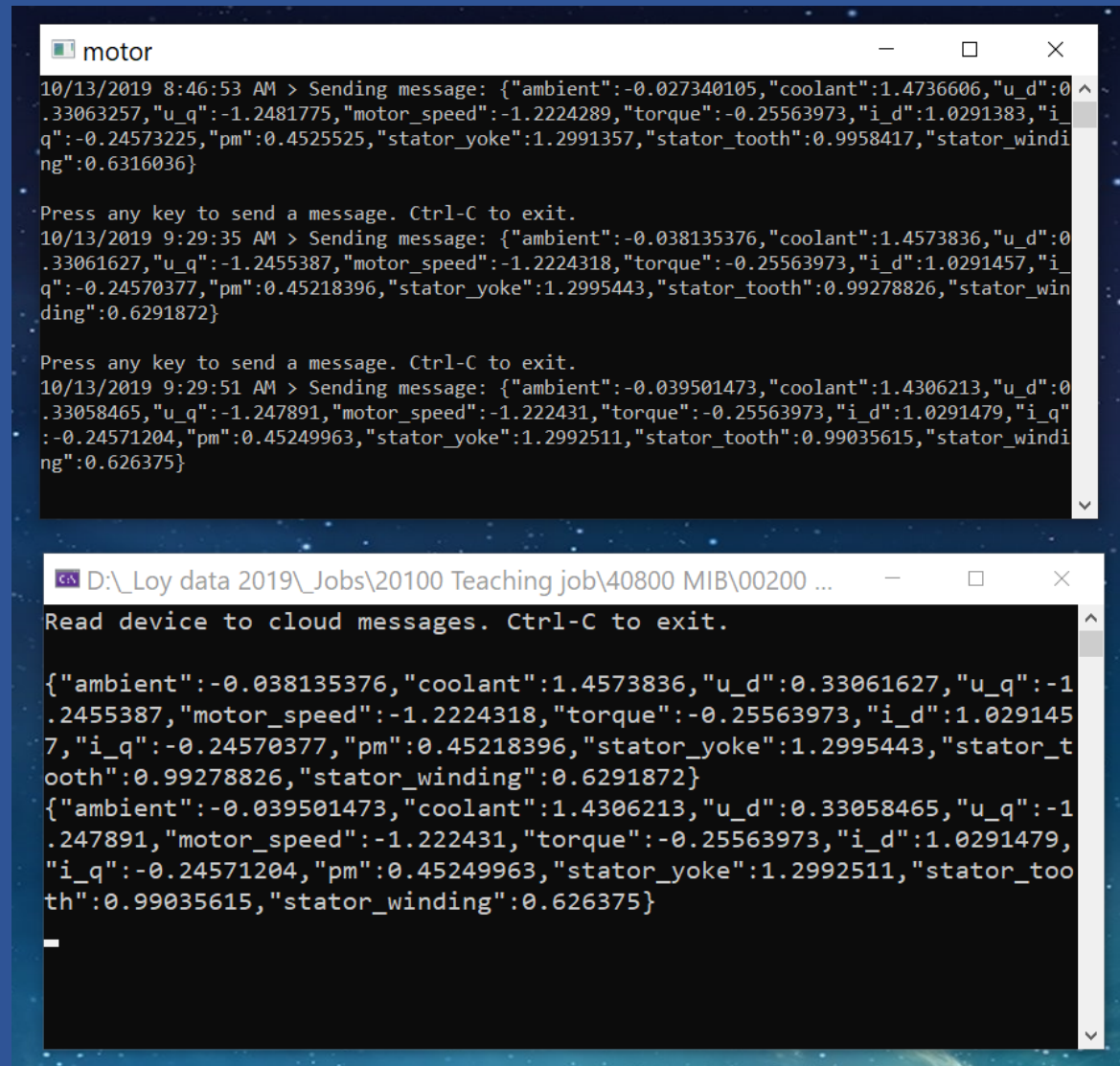
## Add method GetD2CMessage

```
30 private static async Task GetD2CMessage(  
31     string partition, CancellationToken ct)  
32 {  
33     var eventHubReceiver = s_eventHubClient.CreateReceiver(  
34         "$Default",  
35         partition,  
36         EventPosition.FromEnqueuedTime(DateTime.Now));  
37     while (true)  
38     {  
39         if (ct.IsCancellationRequested) break;  
40         var events = await eventHubReceiver.ReceiveAsync(100);  
41         if (events == null) continue;  
42         foreach (EventData eventData in events)  
43         {  
44             Console.WriteLine(  
45                 Encoding.UTF8.GetString(eventData.Body.Array));  
46         }  
47     }  
48 }
```

## Add code to Main

```
50 private static async Task Main(string[] args)
51 {
52     Console.WriteLine(
53         "Read device to cloud messages. Ctrl-C to exit.\n");
54     var connectionString = new EventHubsConnectionStringBuilder(
55         new Uri(s_eventHubsCompatibleEndpoint),
56         s_eventHubsCompatiblePath,
57         s_iotHubSasKeyName,
58         s_iotHubSasKey);
59     s_eventHubClient = EventHubClient.CreateFromConnectionString(
60         connectionString.ToString());
61     var runtimeInfo =
62         await s_eventHubClient.GetRuntimeInformationAsync();
63     var d2cPartitions = runtimeInfo.PartitionIds;
64     CancellationTokensSource cts = new CancellationTokensSource();
65     Console.CancelKeyPress += (s, e) =>
66     {
67         e.Cancel = true;
68         cts.Cancel();
69         Console.WriteLine("Exiting...");
70     };
71     var tasks = new List<Task>();
72     foreach (string partition in d2cPartitions)
73     {
74         tasks.Add(GetD2CMessage(partition, cts.Token));
75     }
76     Task.WaitAll(tasks.ToArray());
77 }
```

## Run program c2d and this app to test



The image shows two terminal windows. The top window, titled 'motor', displays a series of JSON messages being sent from a device to a cloud service. The messages contain sensor data such as ambient temperature, coolant level, motor speed, torque, and stator winding parameters. The bottom window, titled 'D:\Loy data 2019\Jobs\20100 Teaching job\40800 MIB\00200 ...', shows the corresponding JSON messages received by the cloud service, mirroring the data sent in the top window.

```
motor
10/13/2019 8:46:53 AM > Sending message: {"ambient":-0.027340105,"coolant":1.4736606,"u_d":0.33063257,"u_q":-1.2481775,"motor_speed":-1.2224289,"torque":-0.25563973,"i_d":1.0291383,"i_q":-0.24573225,"pm":0.4525525,"stator_yoke":1.2991357,"stator_tooth":0.9958417,"stator_winding":0.6316036}

Press any key to send a message. Ctrl-C to exit.
10/13/2019 9:29:35 AM > Sending message: {"ambient":-0.038135376,"coolant":1.4573836,"u_d":0.33061627,"u_q":-1.2455387,"motor_speed":-1.2224318,"torque":-0.25563973,"i_d":1.0291457,"i_q":-0.24570377,"pm":0.45218396,"stator_yoke":1.2995443,"stator_tooth":0.99278826,"stator_winding":0.6291872}

Press any key to send a message. Ctrl-C to exit.
10/13/2019 9:29:51 AM > Sending message: {"ambient":-0.039501473,"coolant":1.4306213,"u_d":0.33058465,"u_q":-1.247891,"motor_speed":-1.222431,"torque":-0.25563973,"i_d":1.0291479,"i_q":-0.24571204,"pm":0.45249963,"stator_yoke":1.2992511,"stator_tooth":0.99035615,"stator_winding":0.626375}

D:\Loy data 2019\Jobs\20100 Teaching job\40800 MIB\00200 ...
Read device to cloud messages. Ctrl-C to exit.

{"ambient":-0.038135376,"coolant":1.4573836,"u_d":0.33061627,"u_q":-1.2455387,"motor_speed":-1.2224318,"torque":-0.25563973,"i_d":1.0291457,"i_q":-0.24570377,"pm":0.45218396,"stator_yoke":1.2995443,"stator_tooth":0.99278826,"stator_winding":0.6291872}
{"ambient":-0.039501473,"coolant":1.4306213,"u_d":0.33058465,"u_q":-1.247891,"motor_speed":-1.222431,"torque":-0.25563973,"i_d":1.0291479,"i_q":-0.24571204,"pm":0.45249963,"stator_yoke":1.2992511,"stator_tooth":0.99035615,"stator_winding":0.626375}
-
```

# What's next?

