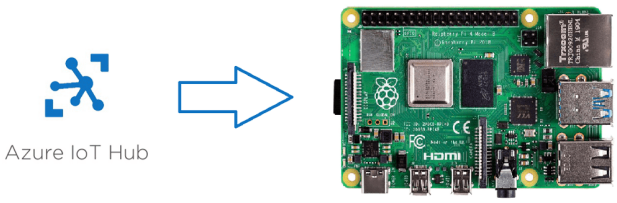
{ Pete Codes }

{Blog}



Explorations in Dot Net Core 3.0 for Raspberry Pi - Part 4

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This is part 4 of a (at least) 5 part blog series on Dot Net Core on the Raspberry Pi....

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On September 25th 2019, the Dot Net Team released version 3.0 of the Dot Net Core Framework at .Net Conf.

To join in the fun, I held a special with Notts IoT, the IoT group I organise in

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Notts IoT - 25th April 2019

Nottingham, where I gave a talk on Dot Net Core 3.0 on the Raspberry Pi.

This blog post is what I've learnt along the way to preparing for the talk as well as afterwards...!

Previously on Pete Codes...

In the last blog post we'd created a Console app that read the status of a button and sent a message to an Azure IoT Hub.

In this post we'll add code to allow us to receive a message back from our IoT Hub that we send from the Microsoft IoT Device Explorer.

What you'll need

- You'll need to have completed the steps in the previous blog post – Read that here
- You'll need an Azure subscription – Grab a trial here

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- You'll need the Azure IoT Device Explorer – Get it here

Putting even more "I" in IoT

If you've followed along with the previous blog, you'll already have installed the Dot Net Core 3.0 binaries and runtimes, and have a console app running that flashes an LED and sends a message to an IoT Hub when you press a button.

Our next step is to write some code which receives messages from the IoT Hub. We can send these messages through the hub using our Azure Device Explorer

Listen up friend

Let's add a subroutine and some code that will listen for messages from the IoT Hub.

Create the following subroutine beneath our existing

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SendDeviceToCloudMessageAsync subroutine;

```
private static async void ReceiveCloudTo
{

}
```

We'll add a Console.WriteLine first so that we know our sub has been called successfully;

```
Console.WriteLine("Receiving Cloud to De
```

Next we'll sit in a loop waiting for a message to be received from the IoT Hub... This is safe to do because we're using an Asynchronous Subroutine. This way the rest of the code will continue. Add the following while loop to the subroutine;

```
while (true)
{
}
```

Next we need to try receiving a Message from the IoT Hub... We do this by calling

the Device Client ReceiveAsync method. Add the following to the while loop;

```
Message receivedMessage = await deviceCl
```

If we don't actually receive any messages from the IoT Hub, the above call will return a Null. So we need to check for this before doing anything else. Add the following below the ReceiveAsync call;

```
if (receivedMessage != null)
{
}
```

Next, assuming that we've received a valid message from the IoT Hub, we can decode that message in a similair way to how we encoded the message string when we were sending a message to the IoT Hub... Add the following within the if statement which will convert the IoT Hub message into an ASCII String;

```
string receivedMessageString = Encoding.
```

We can now spit our message out to the console so we know we've received it;

```
Console.WriteLine("Received message: {0}
```

Next we need to tell the IoT Hub that we've received the message successfully. We do this by calling the Device Client CompleteAsync method on our Device Client;

```
await deviceClient.CompleteAsync(receive
```

When the IoT Hub receives the Complete Acknowledgement it sets the message to completed, which in effect deletes the message we received from the Cloud to Device Queue. You can read more about how the Cloud to Device Queue on the Microsoft Docs Website.

The finished subroutine should now look like;

```
private static async void ReceiveCloudTo
{
    Console.WriteLine("Receiving Cloud t

    while (true)
    {
        Message receivedMessage = await

        if (receivedMessage != null)
```

```
        {
            string receivedMessageString
            Console.WriteLine("Received
            await deviceClient.CompleteA
        }

    }
}
```

Finally we need to kick our subroutine off. After our initial Hello World Console WriteLine we can add a call to the subroutine;

```
ReceiveCloudToDeviceMessageAsync();
```

The finished code should now look like;

```
using System;
using System.Device.Gpio;
using Microsoft.Azure.Devices.Client;
using System.Text;

namespace rpitest
{
    class Program
    {

        private static readonly string c
        private static DeviceClient devi

        static void Main(string[] args)
        {
            Console.WriteLine("Hello Wor
```

```
            deviceClient = DeviceClient.

            ReceiveCloudToDeviceMessageA

            GpioController controller =
            var pin = 10;
            var buttonPin = 26;
            var buttonPressed = false;

            controller.OpenPin(pin, PinM
            controller.OpenPin(buttonPir

            try
            {
                while (true)
                {
                    if (controller.Read(
                    {
                        controller.Write

                        if (buttonPresse
                        {
                            buttonPresse
                            SendDeviceTo
                        }
                    }
                    else
                    {
                        controller.Write
                        buttonPressed =
                    }
                }
            }
            finally
            {
                controller.ClosePin(pin)
            }
        }

        private static async void SendDe
```

```
        {
            var messageString = "Button
            Message message = new Messag

            message.Properties.Add("butt

            await deviceClient.SendEvent
            Console.WriteLine("Sending M

        }

        private static async void Receiv
        {
            Console.WriteLine("Receiving

            while (true)
            {
                Message receivedMessage

                if (receivedMessage != r
                {
                    string receivedMessa
                    Console.WriteLine("R
                    await deviceClient.C
                }

            }
        }
    }
}
```

We can now run the latest version of the application;

```
dotnet run
```

Console App waiting for Cloud to Device Message

Return to the Device Explorer

If we now open the Device Explorer Application again and click the "Messages to Device" tab;

Device Explorer "Message to Device" tab

Make sure that the IoT Hub and Device ID dropdowns have got the right

information in them.

Now enter a message into the “Message” box and press the “Send” Button;

Sent Cloud Message to Device

You should then see our Message appearing in the console of our app;

Cloud to Device Message received

Next Time

In the next post we'll switch to using our main Development PC to code on, remotely deploying and debugging code direct from VS Code.

< Part 3 – Azure IoT

Part 5 – Remote Deployment >

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