Demo- Azure Functions & .NET Core

8 minutes

Value Props

The **three things developers** should take away from this demo:

Key Message –Build, debug and deploy high performance serverless apps across the globe all with the productivity and power of Visual Studio, .NET and Azure

1. **Azure Functions – integrate powerful serverless functions in your apps**
    - Azure Functions is a serverless compute experience that scales on demand and you only pay for the resources you consume. Never worry about infrastructure, just your code.
    - Using Azure Functions, .NET developers can add functionality in small, serverless chunks and you only pay for the resources you consume when the function is running. They can be written and debugged locally in the environment you're familiar with - Visual Studio.
2. **Use the power of Visual Studio 2017 to build, debug, deploy and manage the lifecycle of your functions.**
    - Visual Studio 2017 fully supports developing Azure Functions in C# as well as local debugging and diagnostics. Use the highly productive IDE you are used to for building serverless functions in the cloud.
3. **.NET Core and Azure App Service give developers unrivaled efficiency and production runtime visibility.**
    - .NET Core is our cross-platform and open source runtime that gives us great performance and is perfect for cloud-native apps. App Service is perfect for websites build with ASP.NET Core. It provides a fully managed platform where we can scale and monitor our apps effortlessly.

Install Pre-Requisites

- **Visual Studio 2017 15.5 or higher – Azure & .NET Core workloads selected in VS installer**
- **Snapshot debugger, Azure Functions Tools installed (use the Quick launch toolbar in Visual Studio to install)**
- **Clone repo:** https://github.com/Microsoft/SmartHotel360-public-web
- Install Node 8.9.1
- Install Python 2

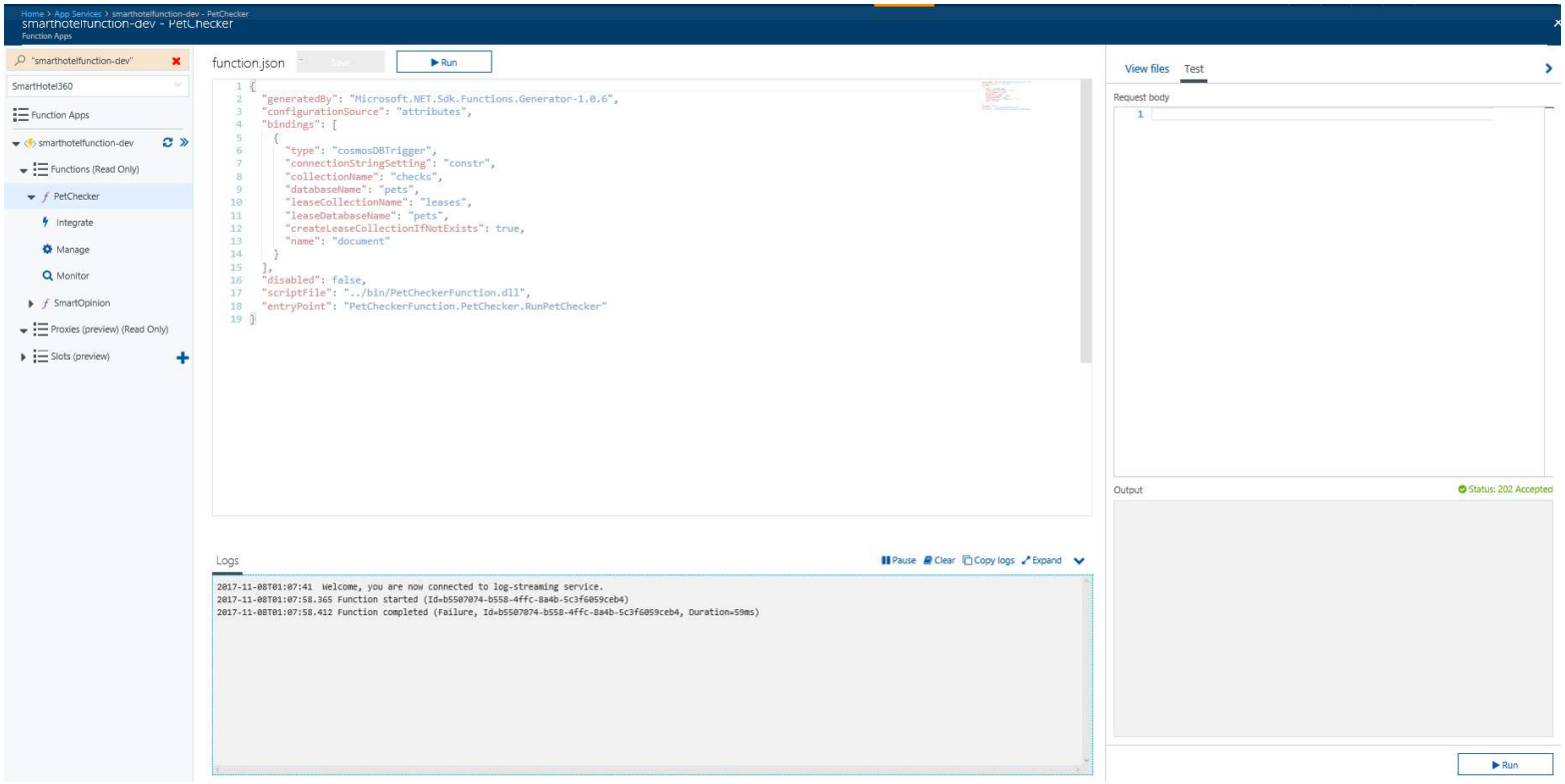
From an admin prompt, navigate to SmartHotel360.PublicWeb:

- `npm install -g windows-build-tools`
- `Npm install`

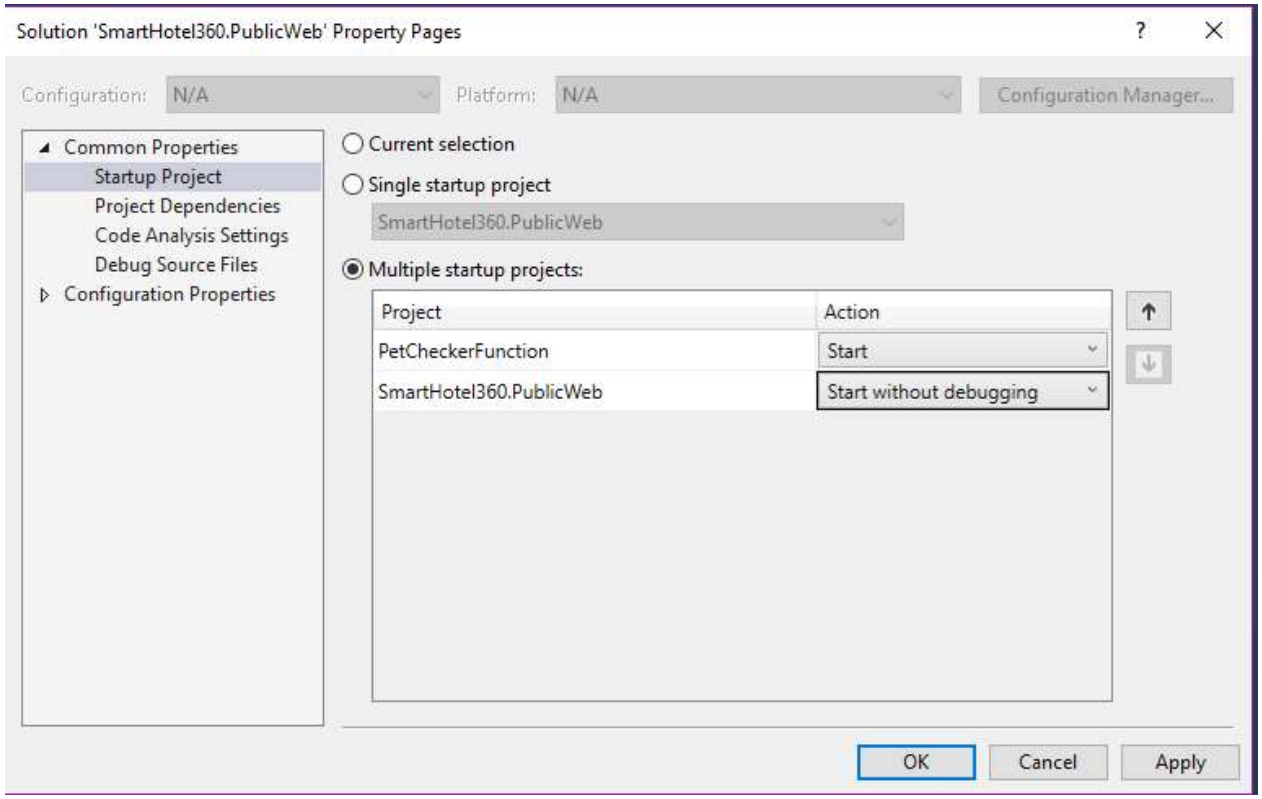
- Npm rebuild node-sass –force
- Npm run dev
-

Demo Pre-Setup

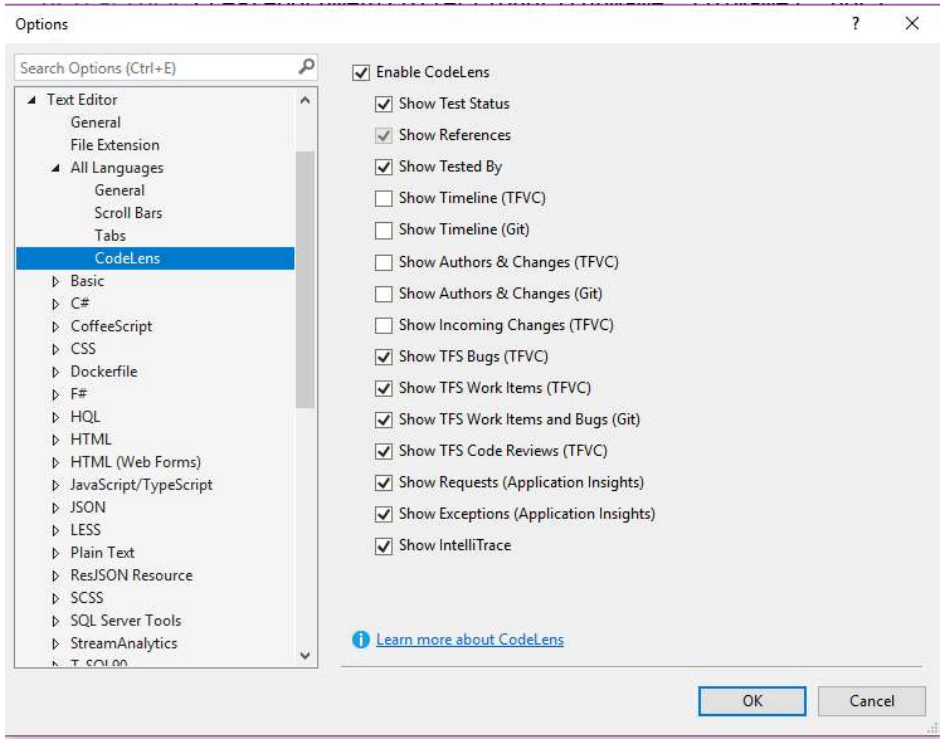
- Follow the instructions for setting up the Azure services related to this demo: https://github.com/Microsoft/SmartHotel360-public-web/blob/master/doc/demo-setup.md
- Open browser tabs to:
    - PublicWeb deployed to Azure app service, either your own or the publicly available one (i.e. mysmarthotel360app.azurewebsites.net or http://smarthotel360public.azurewebsites.net/)
    - Open your Azure portal to the PetChecker Azure Function. Make sure the Logs section is showing and expand test section.



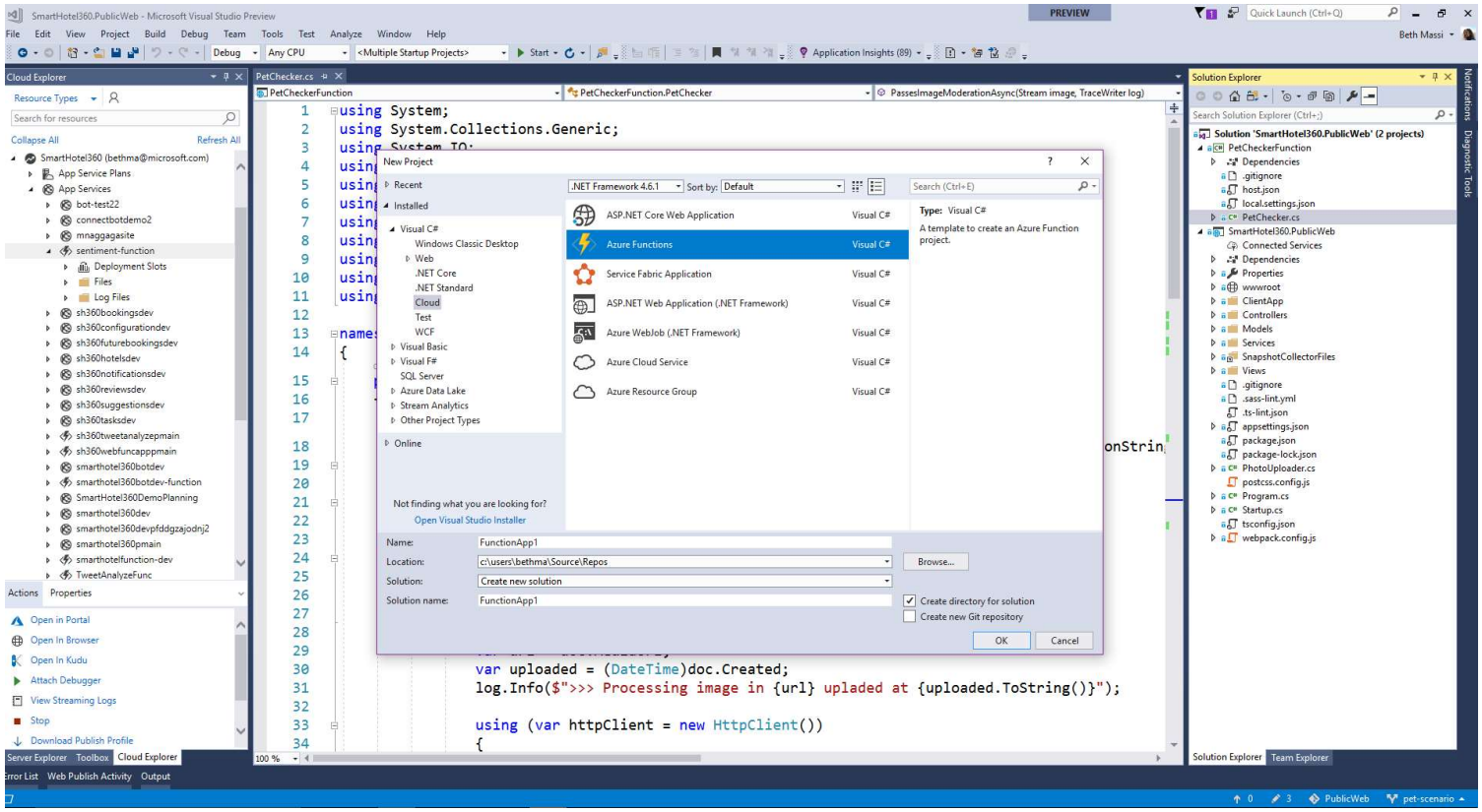
- Warm up the AzureFunction by hitting the Test -> run
- Open an instance of Visual Studio to SmartHotel360.PublicWeb.sln. This contains the PublicWeb and the PetCheckerFunction project.
    - Right-click on the solution and verify Multiple Startup projects are set to start up on debug. Set website to start without debugging.

- 

- Set Code Lens options

- 

  - Set Fonts & Colors (For Text Editor, Data Tips, Watch windows) to 11pt
  - Open the Solution Explorer and open the PetChecker.cs
  - Open the Cloud Explorer to the PetCheckerFunction.
  - Open the New project dialog and highlight the new Azure Function template.

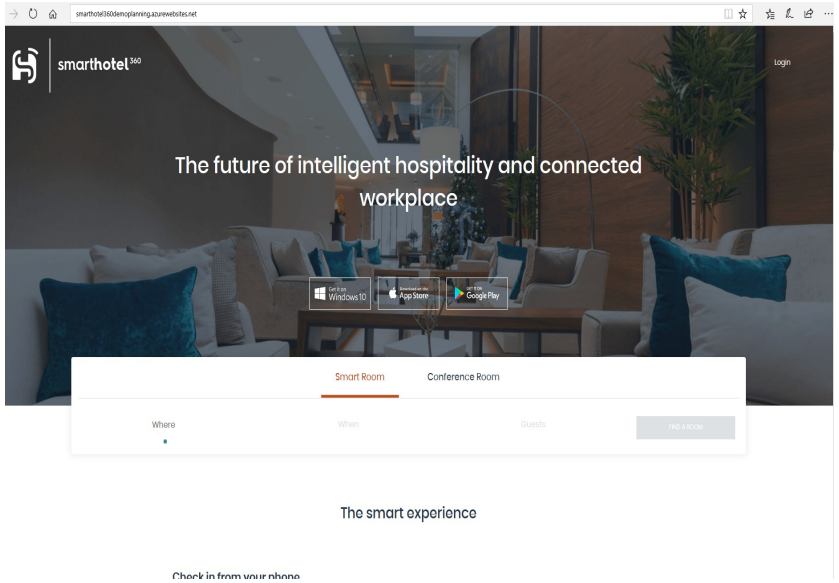
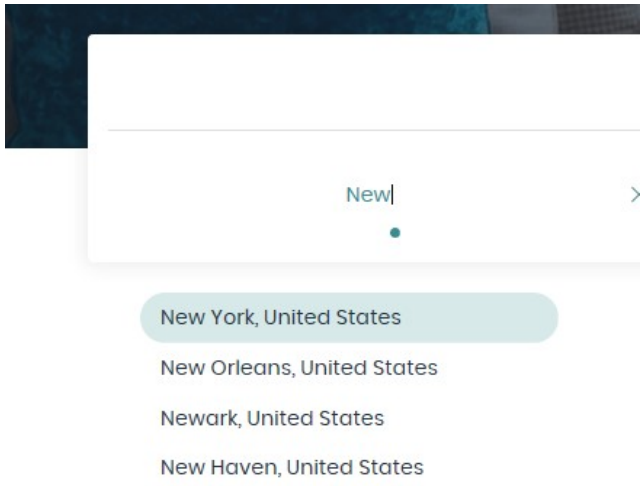


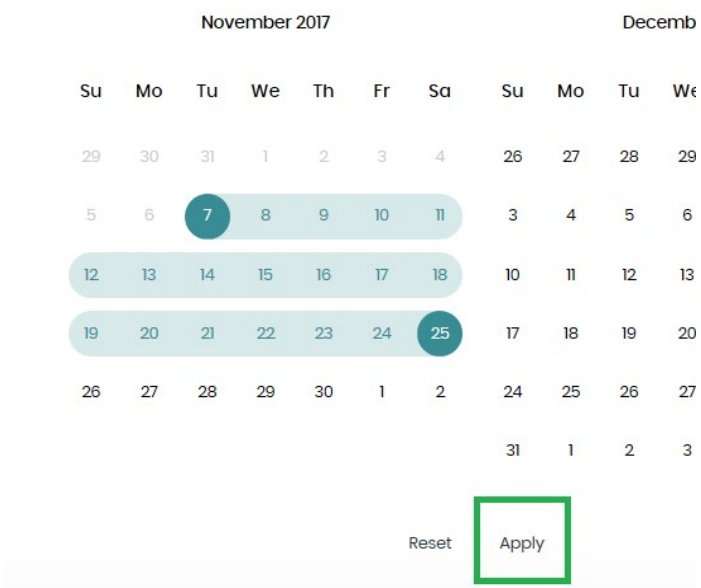
- Grab a couple pictures of animals. You'll need one large dog photo (to test) and one small animal like a pet pig or small cat.

Overall Demo walk-through

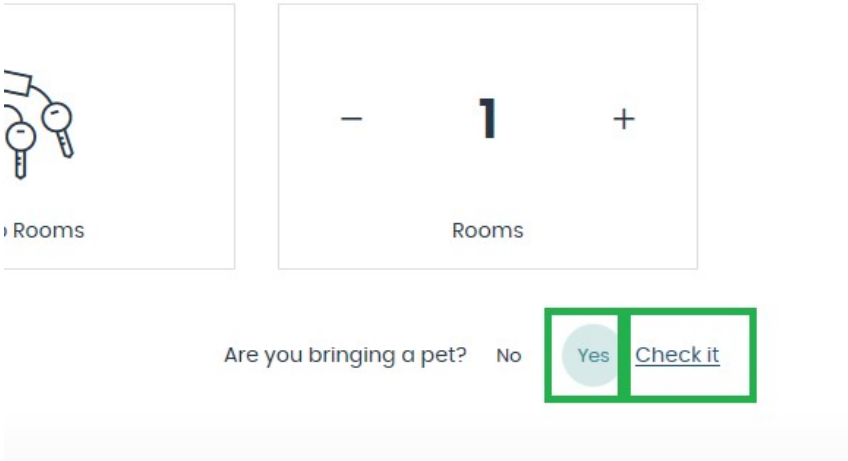
Story – Debug and integrate Azure function into a public ASP.NET Core site.

Screenshot	Actions	Talk track

	Open the public website Quickly walk through features Search for a city: New York Click "Find a room" Show a room detail	Let's take a look at the SmartHotel360 public website. This website was **built in C#** and runs on **.NET Core** which is our **open source, cross-platform** runtime that gives us great performance and is **perfect for cloud-native apps.** This website is deployed to **Azure App Service** which **is perfect for websites** like this. It provides a fully managed platform where we can **scale and monitor our apps effortlessly**.
	Walk through booking a room.	As you can see this is where people get their first impression of our Smart Hotel and make reservations.



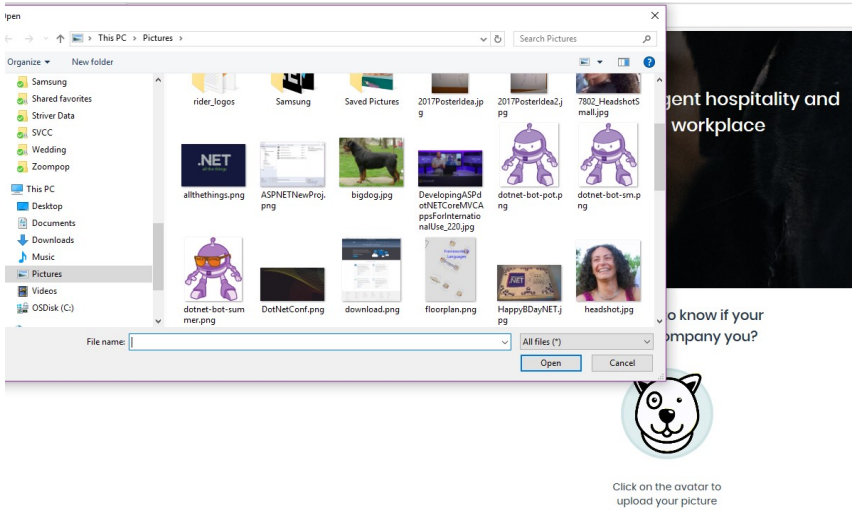
Select a date range and click Apply

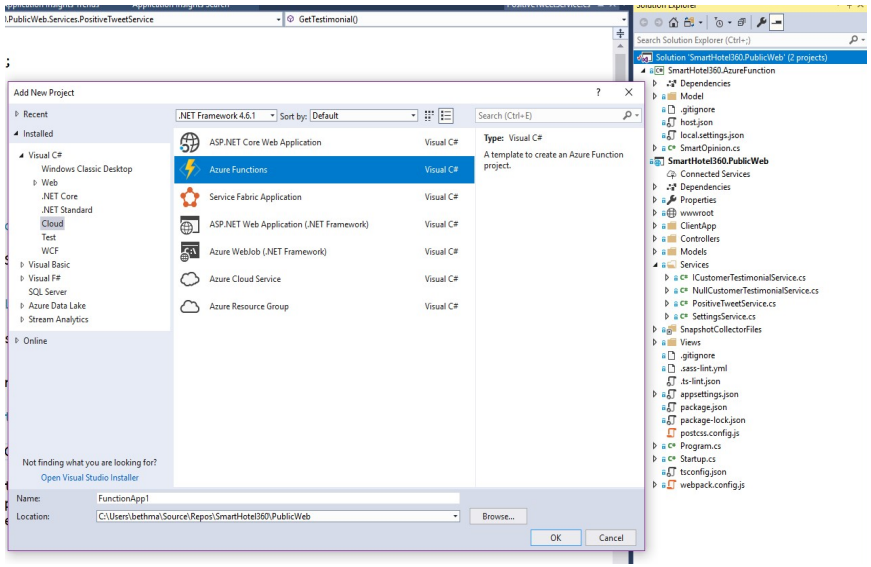


Click “Are you bringing a pet?”

Click “Check it”

Guests can also indicate whether they are bringing a pet.

	Click the Dog image and select a picture of a small pig.	Here we request the guest upload a picture of their animal. We're only allowing dogs at the hotel. Let's try this photo of my pet pig and see what happens.
	While you wait, tell the audience what's happening….	We analyze the picture to make sure it's a dog using Cognitive Services Vision API. This is implemented using Azure Functions.



Flip Visual Studio.

Point out new template.

Click Cancel

Azure Functions is a is an event-based serverless compute experience to accelerate your development. Azure Functions can scale on demand and you pay only for the resources you consume.

But what's really cool is that Visual Studio supports building, debugging, and managing Azure Functions. This gives you all the benefits of Visual Studio including intellisense, debugging and source control. This is needed particularly as our functions get more complex.

We used Visual Studio to build this one. Notice the new Azure Function App template. A function app lets you group functions as a logical unit for easier management, deployment, and sharing of resources.

```
PetChecker.cs*
PetCheckerFunction | PetCheckerFunction.PetChecker | RunPetChecker(IReadOnlyList<Document> document, TraceWrite
1  using System;
2  using System.Collections.Generic;
3  using System.IO;
4  using System.Linq;
5  using System.Net.Http;
6  using System.Threading.Tasks;
7  using Microsoft.Azure.Documents;
8  using Microsoft.Azure.Documents.Client;
9  using Microsoft.Azure.WebJobs;
10 using Microsoft.Azure.WebJobs.Host;
11 using Microsoft.ProjectOxford.Vision;
12
13 namespace PetCheckerFunction
14 {
   0 references | Eduard Tomàs, 1 hour ago | 1 author, 2 changes
15     public static class PetChecker
16     {
17         [FunctionName("PetChecker")]
           0 references | Eduard Tomàs, 1 hour ago | 1 author, 2 changes | 0 exceptions
18         public static async Task RunPetChecker([CosmosDBTrigger("pets", "checks", ConnectionStrin
19             TraceWriter log)
20         {
21             foreach (dynamic doc in document)
22             {
23                 var isProcessed = doc.IsApproved != null;
24                 if (isProcessed)
25                 {
26                     continue;
27                 }
28
29                 var url = doc.MediaUrl;
30                 var uploaded = (DateTime)doc.Created;
31                 log.Info($">>> Processing image in {url} upladed at {uploaded.ToString()}");
32
33                 using (var httpClient = new HttpClient())
```

Show PetChecker.cs Code

Highlight CosmosDBTrigger (line 18)

Here's the code for our function. Notice we're using Azure Cosmos DB here.

Cosmos DB is Microsoft's globally distributed, multi-model database that can elastically and independently scale across any number of Azure's geographic regions.

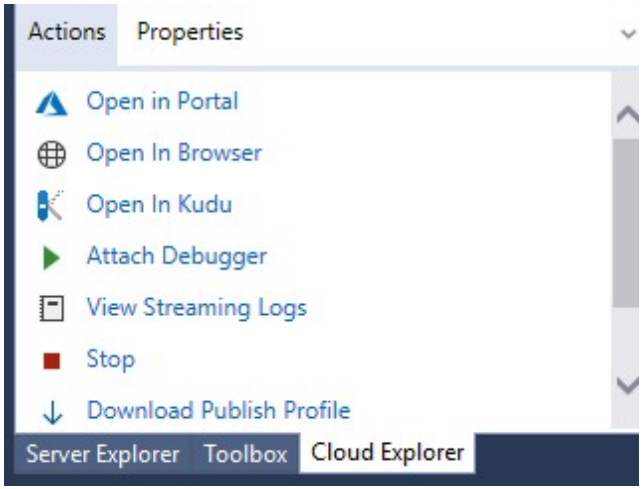
From the website, we're uploading the picture to Cosmos DB which triggers the function to perform the analysis and stores the result.

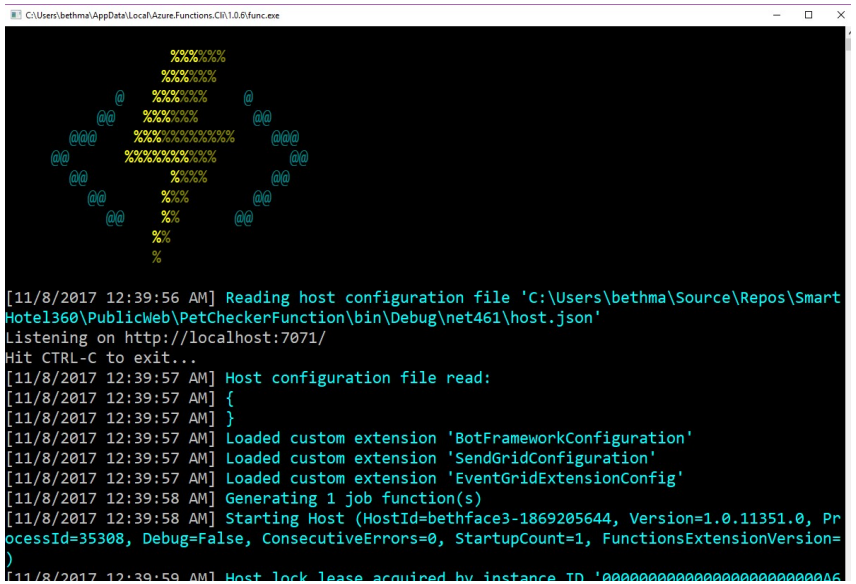
```
   1 reference | Eduard Tomàs, 1 day ago | 1 author, 1 change
65 public static async Task<(bool, string)> PassesImageModerationAsync(Stream image, TraceWri
66 {
67     log.Info("--- Creating VisionApi client and analyzing image");
68     var key = Environment.GetEnvironmentVariable("MicrosoftVisionApiKey");
69     var endpoint = Environment.GetEnvironmentVariable("MicrosoftVisionApiEndpoint");
70     var client = new VisionServiceClient(key, endpoint);
71     var features = new VisualFeature[] { VisualFeature.Description };
72     var result = await client.AnalyzeImageAsync(image, features);
73     log.Info($"--- Image analyzed with tags: {String.Join(",", result.Description.Tags)}")
74     if (!int.TryParse(Environment.GetEnvironmentVariable("MicrosoftVisionNumTags"), out va
```

Highlight VisionAPI code (line 70)

Here's where we are calling the Cognitive Services VisionAPI. **Cognitive Services provide intelligent algorithms to see, hear, speak, understand and interpret your user needs through natural methods of communication. The VisionAPI provides image-processing algorithms to smartly identify, caption, and moderate pictures.**

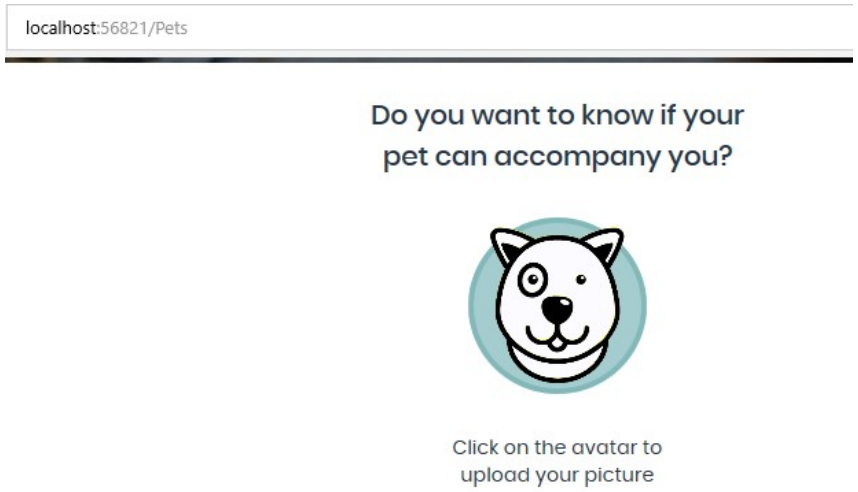
Once the service analyzes our picture, it returns a set of tags that it sees and a message describing our picture.

76 tagsToFetch = 5; 77 } 78 bool isAllowed = result.Description.Tags.Take(tagsToFetch).Contains("small"); 79 string message = result?.Description?.Captions.FirstOrDefault()?.Text; 80 return (isAllowed, message); 81 } 82 }	Add code to check for small animals: Line 78: change “dog” to “small”	Here we’re looking for the tag “dog”. However, we’re finding that our hotel isn’t really set up to accommodate large animals. I also don’t think it’s fair to not allow my pet pig. So instead of approving only dogs, we’ll modify this code to determine the size of the animal instead.
	Point out the “Attach Debugger” in Cloud Explorer (don’t click it).	Now we need to debug this to make sure it works. Notice we can debug our functions in production using the cloud explorer.
78 bool isAllowed = result.Description. 79 string message = result?.Description 80 return (isAllowed, message); 81 } 82 }	Set breakpoint on line 80 Hit F5	However, I want to locally debug this change I made before deploying it. Let’s set a breakpoint here.



Show Azure Functions tools CLI

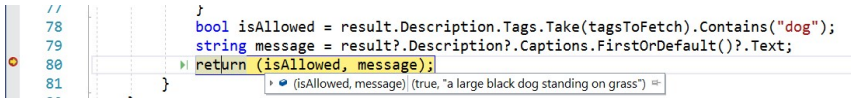
Notice Azure Functions Core Tools fires up. This lets you run Azure Functions locally.



Navigate to localhost../pets page.

Upload same pig picture.

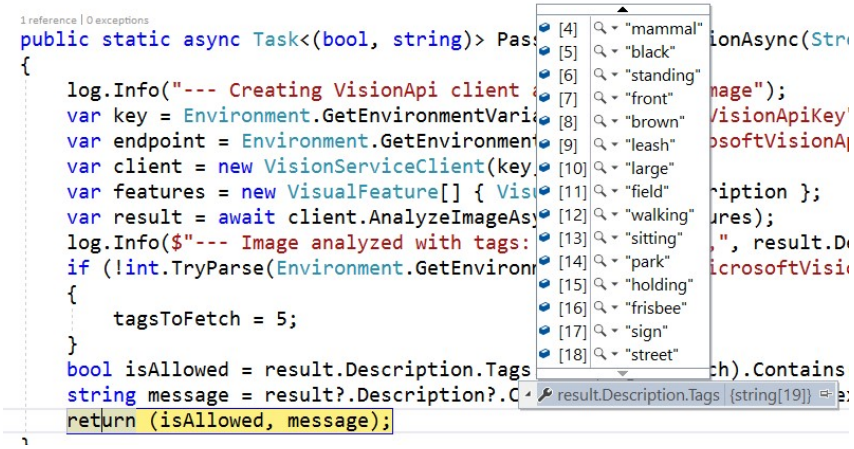
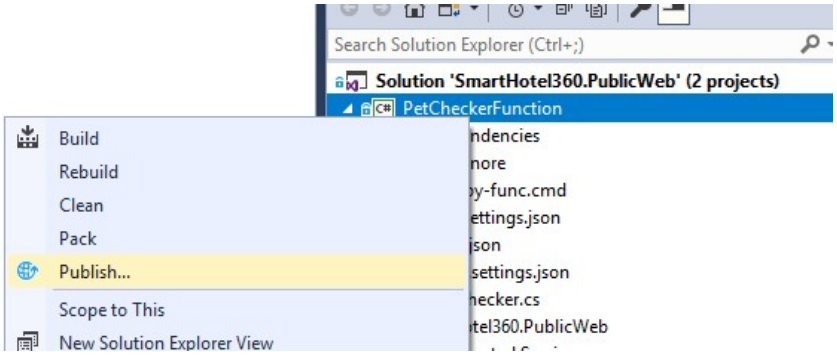
Now let's go ahead and test it again.

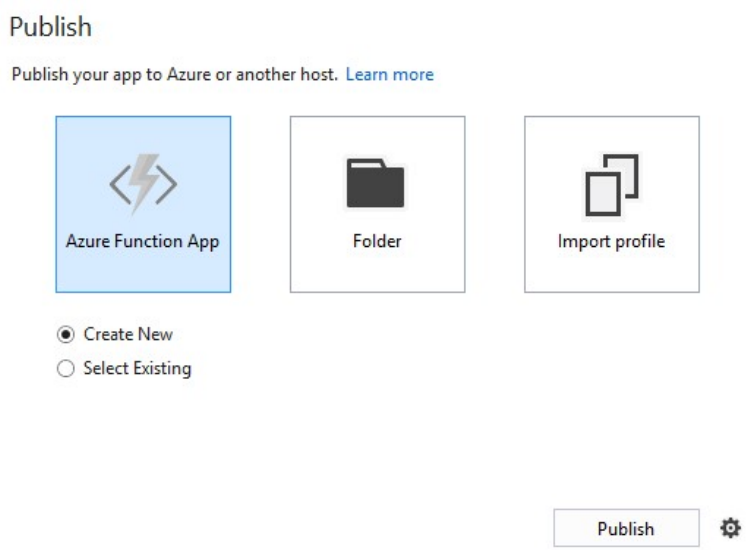


Flip to VS and show breakpoint hit.

Hover over the open parenthesis to display the value of the tuple.

And as you can see our breakpoint gets hit and we see that my pet pig is now allowed at the hotel!

	Inspect the Tags by hovering over Description.Tags on line 78	Notice the tags that come back that describe our picture. The VisionAPI provides us rich information about our photo.
	Right click on function Select Publish	I can also easily publish this back into production right here.



Don't do anything just say this -→

Azure functions and Visual Studio make building, debugging and managing serverless microservices super simple and easy. No other cloud gives you the power and productivity like this!

Thank you!