Chad Green

From Zero to Serverless

CoderCruise
August 31, 2018

Who is Chad Green

- Data & Solutions Architect at ProgressiveHealth
- Community Involvement
    - Code PaLOUsa Conference Chair
    - Louisville .NET Meetup Organizer
    - Louisville Tech Leaders Meetup Co-Organizer
    - Louisville Tech Ladies Committee Member
- Contact Information

chadgreen@chadgreen.com

chadgreen.com

ChadGreen

ChadwickEGreen

What is Serverless Computing

From Zero to Serverless

The evolution of application platforms

On-Premises

What media should I use to keep **backups**?

What is the right **size** of **servers** for the business needs?

How do I **deploy** new **code** to my **servers**?

What happens in case of **server hardware** failure?

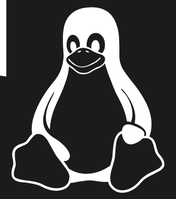
How can I increase **server** utilization?

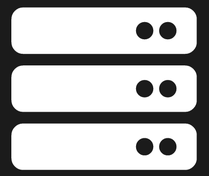
Which packages should be on my **server?**

Who **monitors** my **App**?

How often should I backup my **server**?

What size of **servers** should I **buy?**





How can I **scale** my app?

Are my **servers** in a secure location?

Do I need a secondary **network connection**?

Who has **physical** access to my **servers**?

Which **Operating System** should I use?

What **happens** if the power goes out?

How many **servers** do I need?

Who **monitors** my **servers?**

Do I need a **UPS**?

What **storage** do I need to use?

How often should I **patch** my **servers**?

It takes how long to **provision** a new **server**?

How can I dynamically configure my app?

The evolution of application platforms

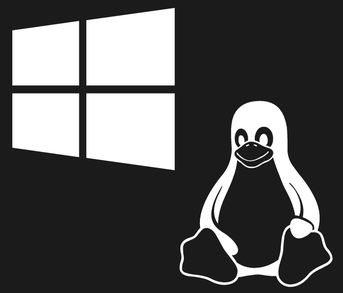
IaaS

What is the right **size** of servers for my business needs?

How can I increase **server** utilization?

How many **servers** do I need?

How can I **scale** my application?



How often should I **patch** my **servers**?

How often should I backup my **server**?

Which packages should be on my **server**?

How do I **deploy** new **code** to my **server**?

Which **Operating System** should I use?

Who **monitors** my application?

The evolution of application platforms

PaaS

What is the right **size** of servers for my business needs?

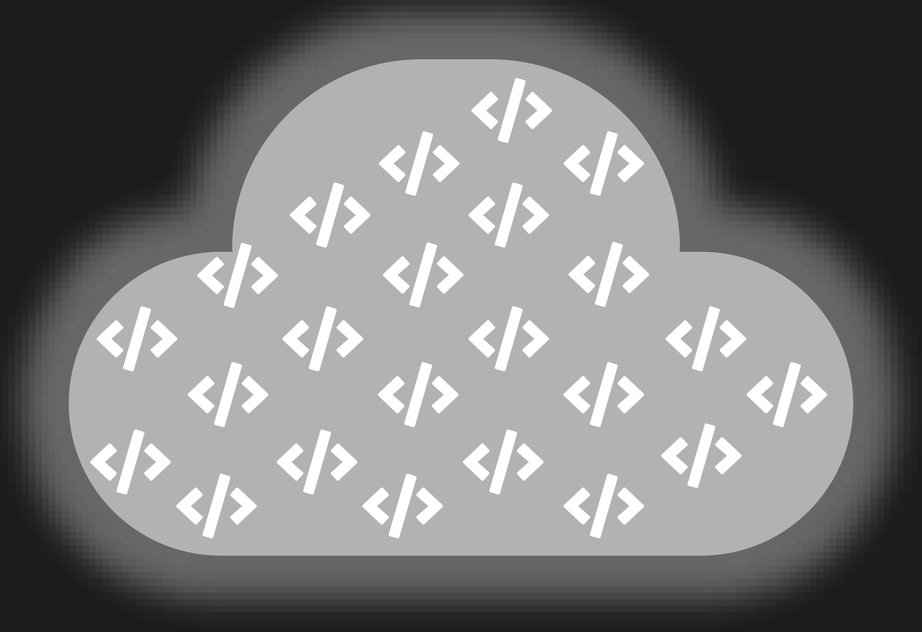
How can I increase **server** utilization?

How many **servers** do I need?

How can I **scale** my application?

The evolution of application platforms

Serverless



The platform for next generation applications

What is Serverless?

Area #1 Backend as a Service (BaaS)

- Applications that significantly or fully depend on services (in the cloud) to manage server-side logic and state

Area #2 Functions as a Service (FaaS)

- Application run in stateless compute containers that are event-triggered, ephemeral, and fully managed by a 3rd party

What is Serverless?

Area #1 Backend as a Service (BaaS)

- Applications that significantly or fully depend on services (in the cloud) to manage server-side logic and state

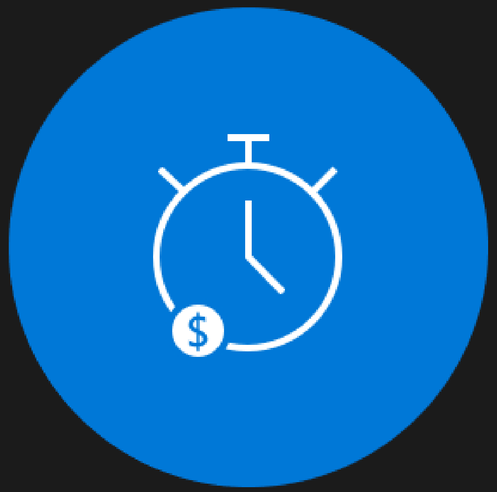
Area #2 Functions as a Service (FaaS)

- Application run in stateless compute containers that are event-triggered, ephemeral, and fully managed by a 3rd party

What is Serverless?

Abstraction of Servers

Event-Driven/Instant Scale



Micro-Billing

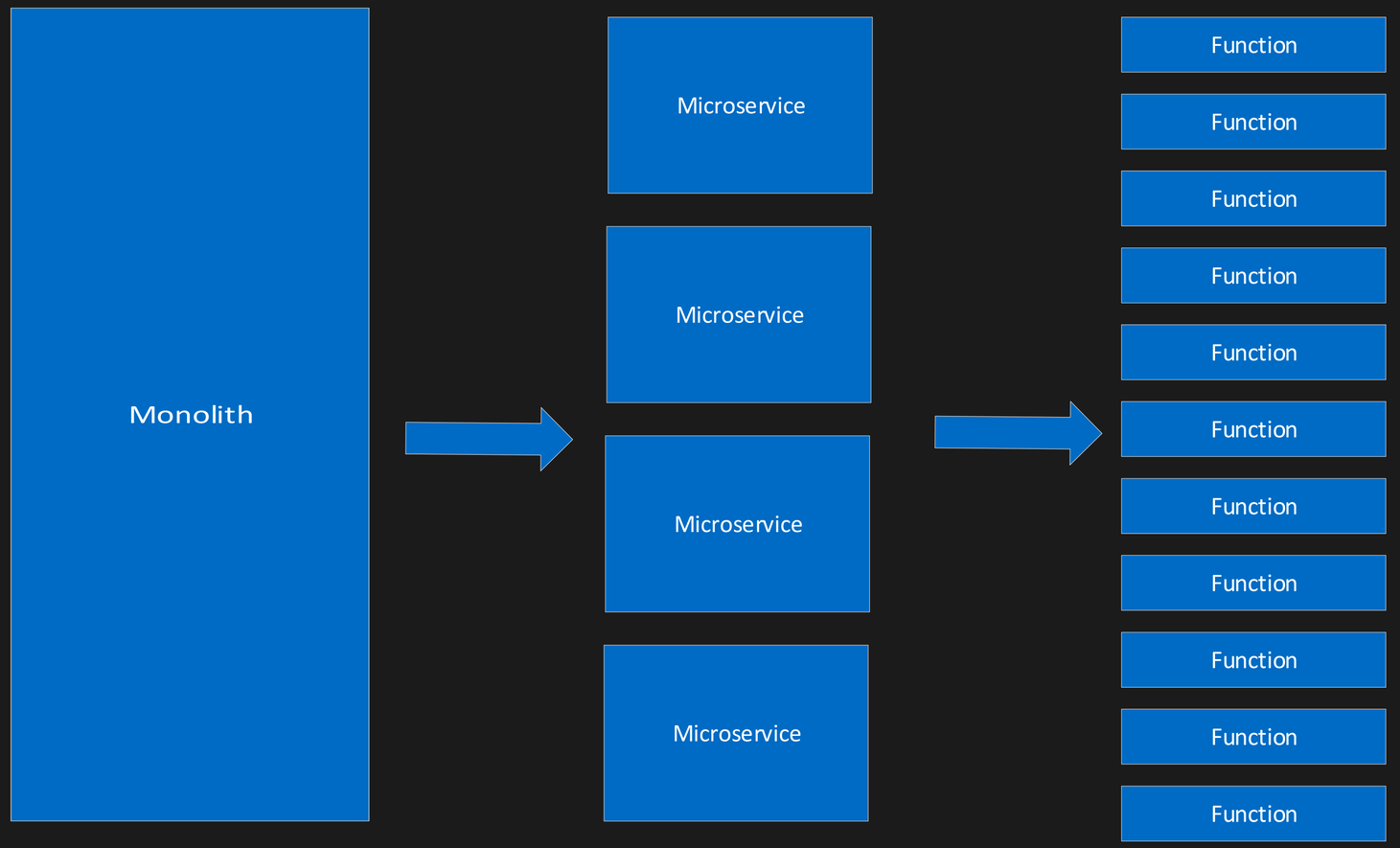
Benefits of Serverless

Manage apps not servers

Reduced DevOps

Faster Time to Market

Serverless Scale



Nano Services

Challenges of Serverless Architecture

Serverless Options

From Zero to Serverless

Serverless Options

- ~~Zimki~~
- Google Cloud Functions
- Amazon Lambda
- IBM Cloud Functions
- Auth0 WebTask
- Azure

Azure Serverless

Functions

Execute your code based on events you specify

Logic Apps

Design workflows and orchestrate processes

Event Grid

Manage all events that can trigger code or logic

Azure Serverless

Functions

Execute your code based on events you specify

Logic Apps

Design workflows and orchestrate processes

Event Grid

Manage all events that can trigger code or logic

Database

Storage

Security

IoT

Analytics

Intelligence

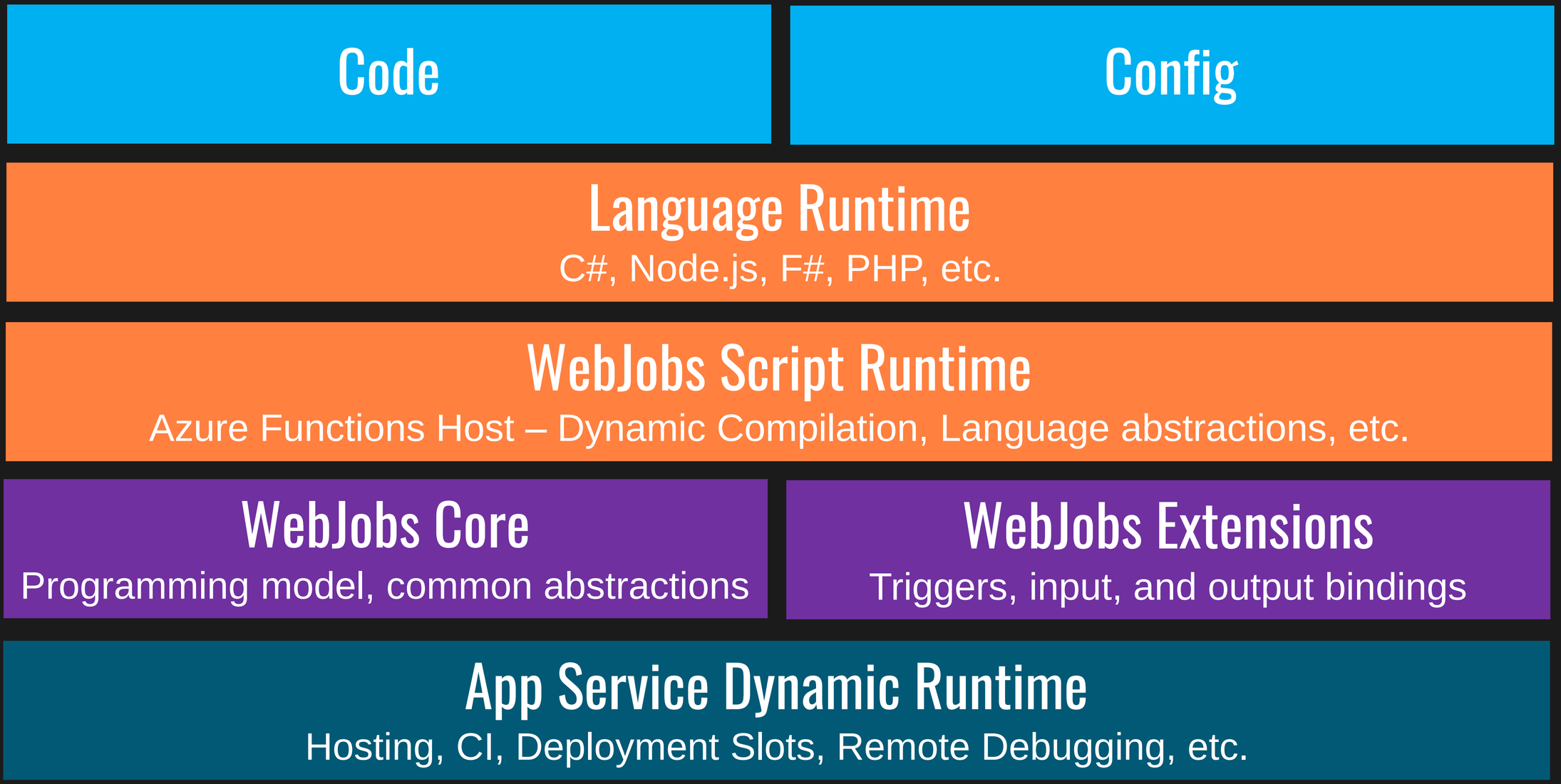
Code

Events + data

Azure Functions

From Zero to Serverless

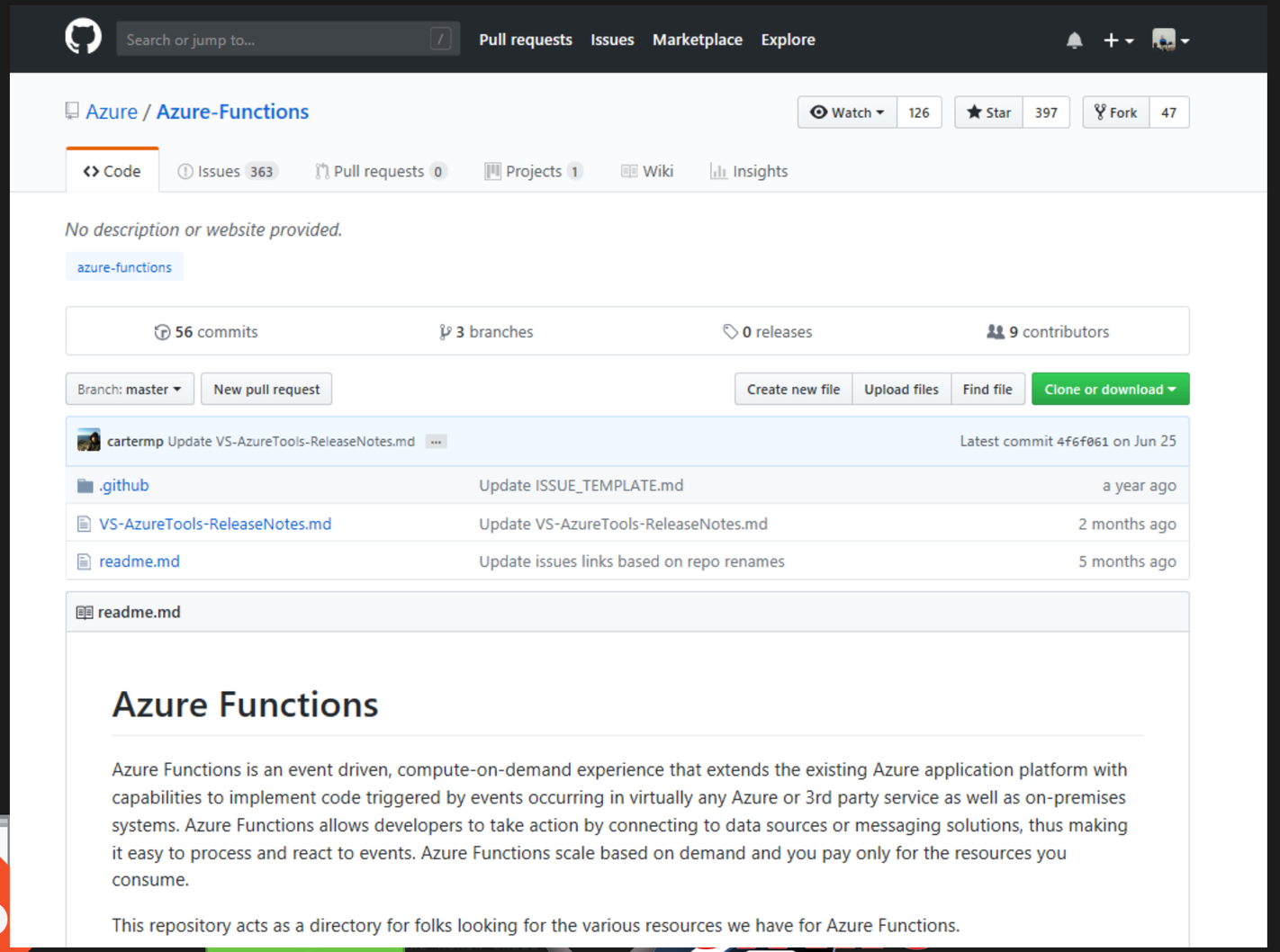
Azure Functions Architecture



Features of Azure Functions

- Choice of language
- Pay-per-use pricing model
- Bring your own dependencies
- Integrated security
- Simplified integration
- Flexible development
- Open-source

Batch



Triggers and Bindings

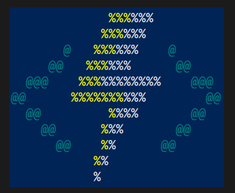
Type	Service	Trigger	Input	Output
Schedule	Azure Functions	✓		
HTTP (REST or webhook)	Azure Functions	✓		✓
Blob Storage	Azure Storage	✓	✓	✓
Events	Azure Event Hubs	✓		✓
Queues	Azure Storage	✓		✓
Queues and topics	Azure Service Bus	✓		✓
Storage tables	Azure Storage		✓	✓
SQL tables	Azure Mobile Apps		✓	✓
NoSQL DB	Azure Cosmos DB		✓	✓
Push Notifications	Azure Notification Hubs			✓
Twilio SMS Text	Twilio			✓
SendGrid Email	SendGrid			✓

Develop How You Want

- Azure Portal
  - Quickly get started without having to install anything else

- Visual Studio 2017
  - First class C# development experience

- Visual Studio Code
  - First class Node.js development experience
  - Edit any function project generated via CLI



- Azure Functions Core Tools (CLI)
  - Build any kind of function and edit in IDE of your choice

Runtime Versions

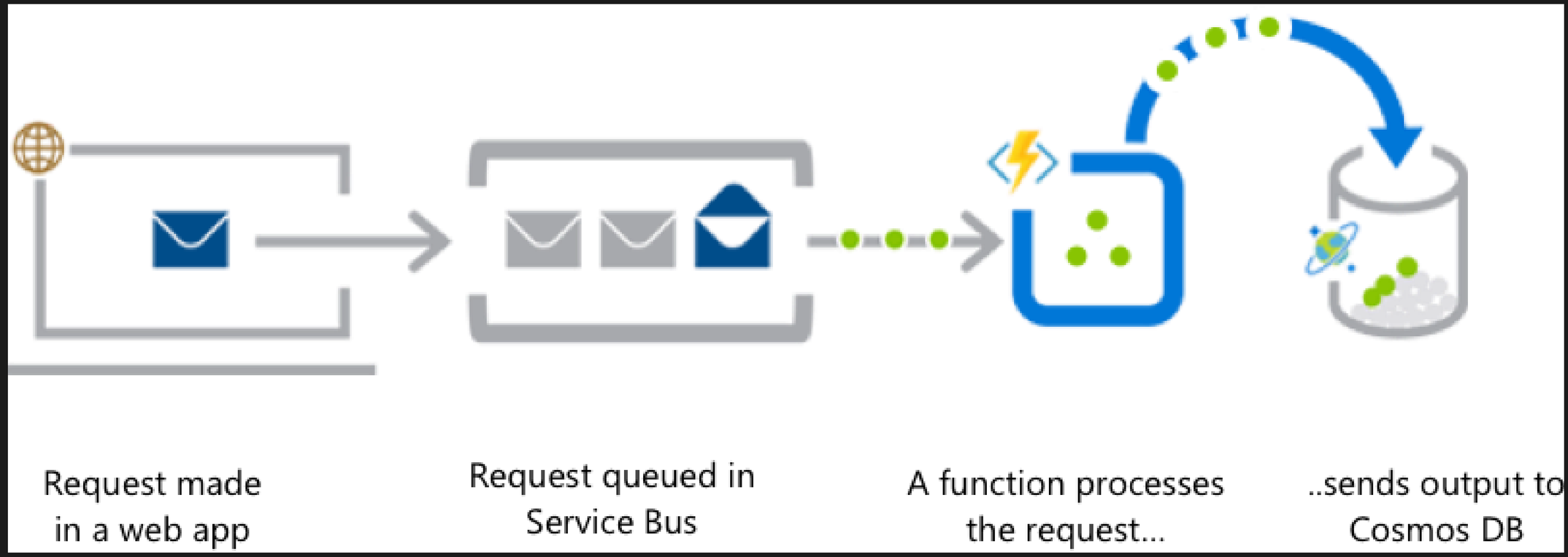
Runtime 1.x

- .NET Framework 4.6
- Generally Available

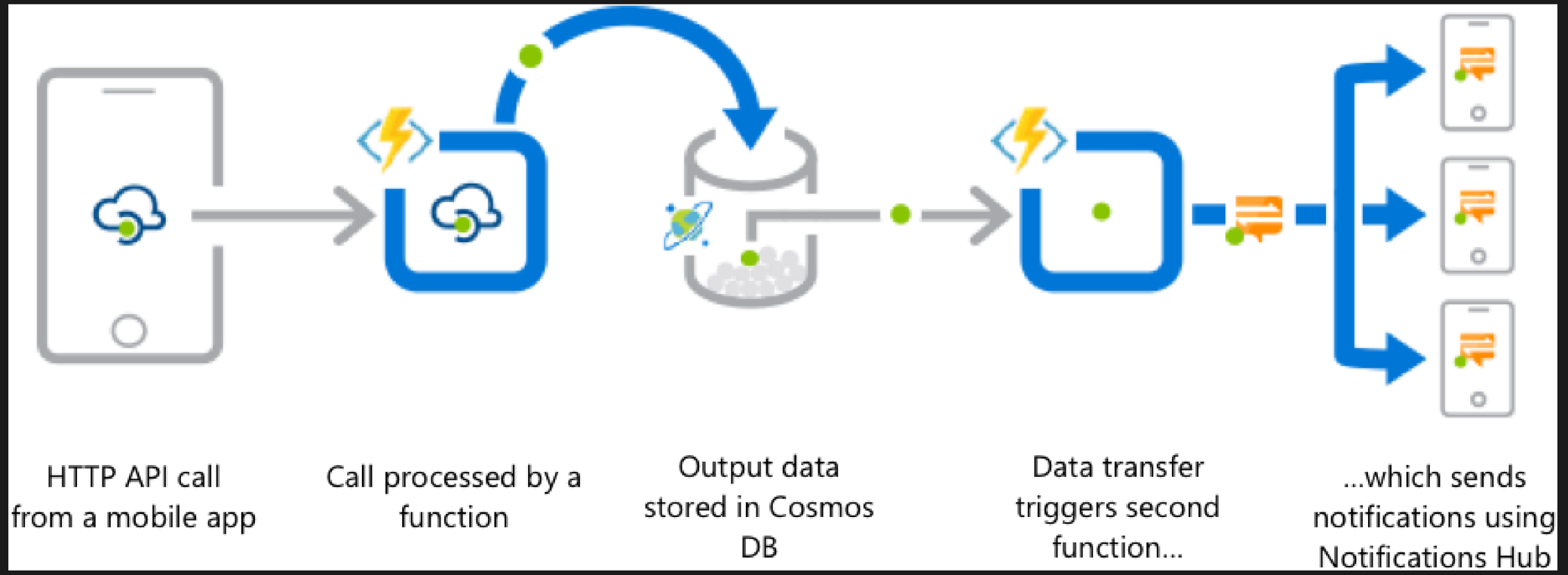
Runtime 2.x (Preview)

- .NET Core 2.0
- Cross Platform
- Language Extensions
  - Java
- Binding Extensions
  - Microsoft Graph
  - Durable Functions

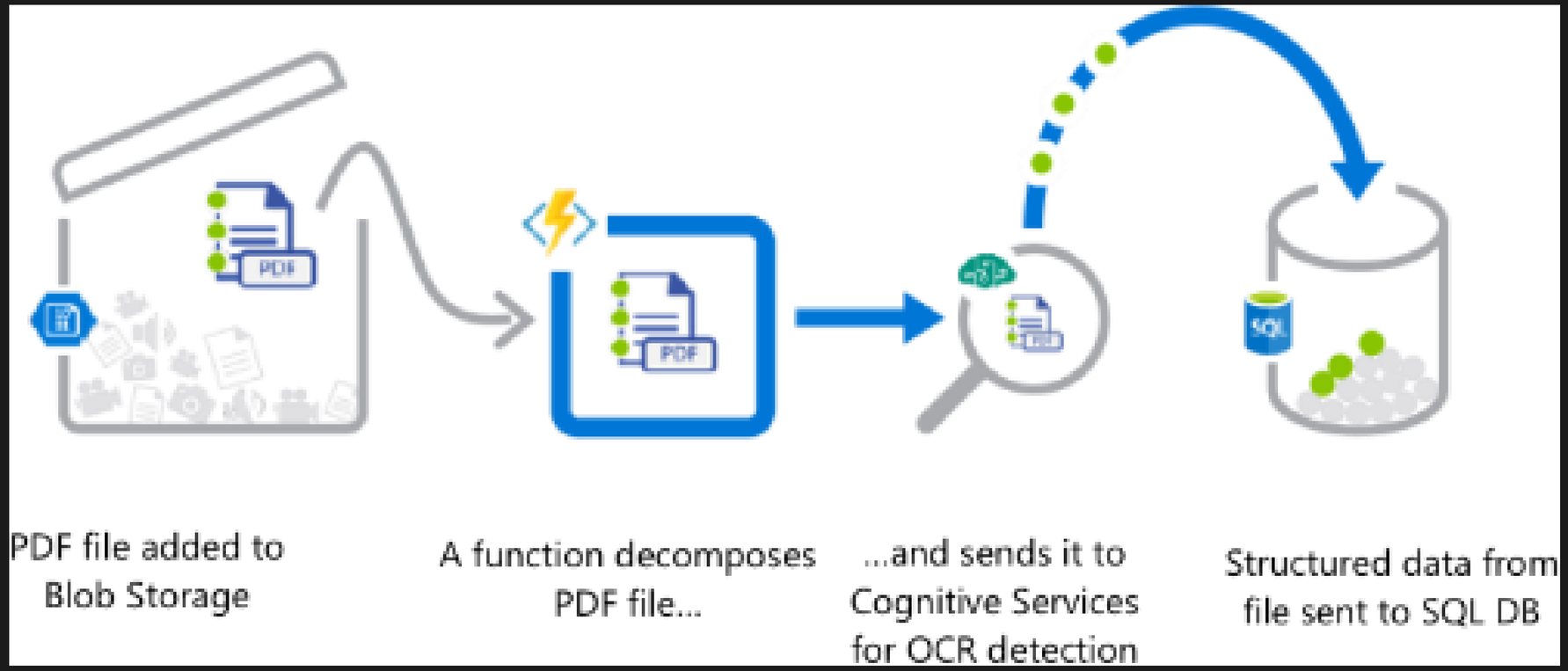
Web Application Backends



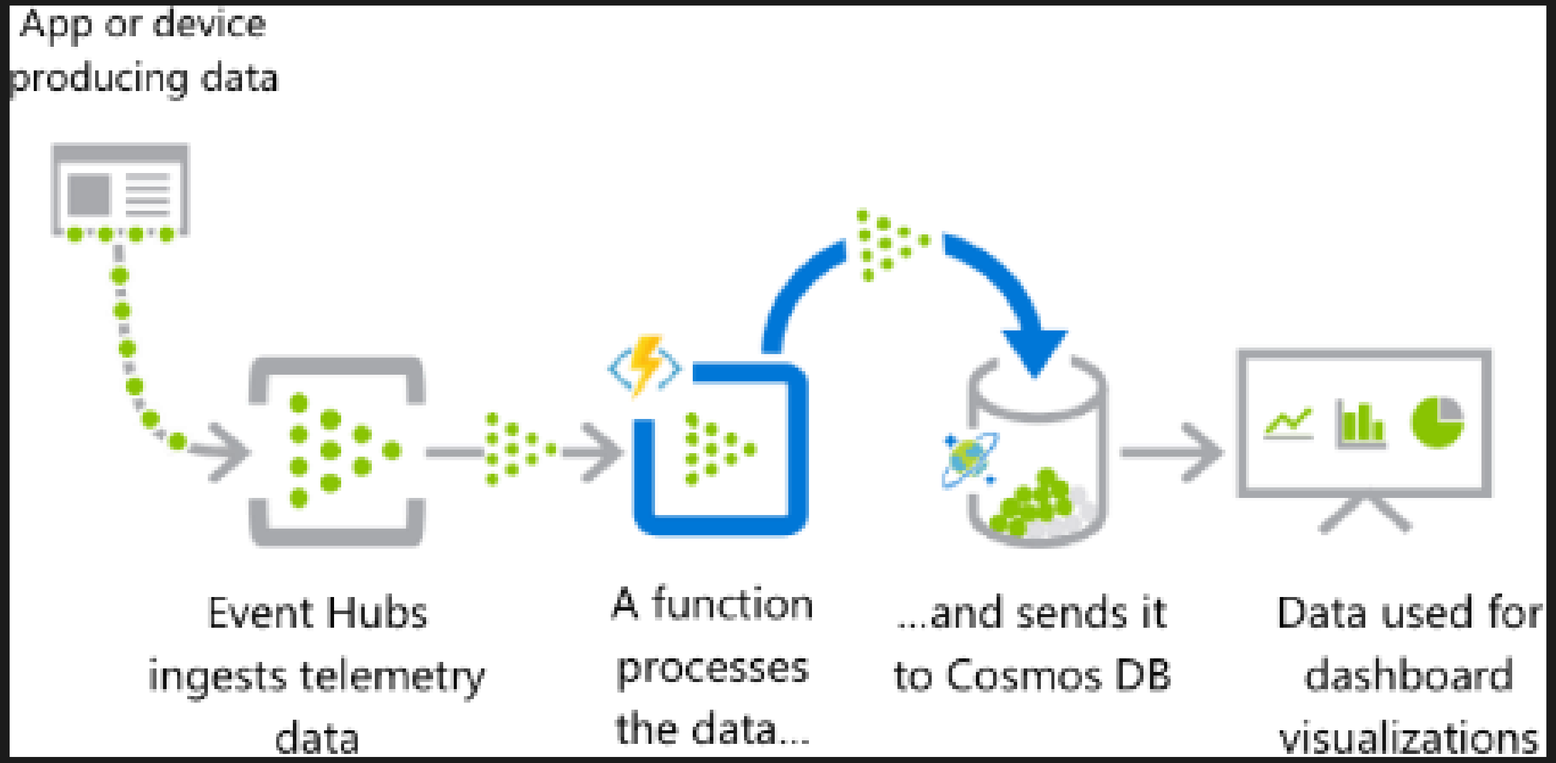
Mobile Application Backends



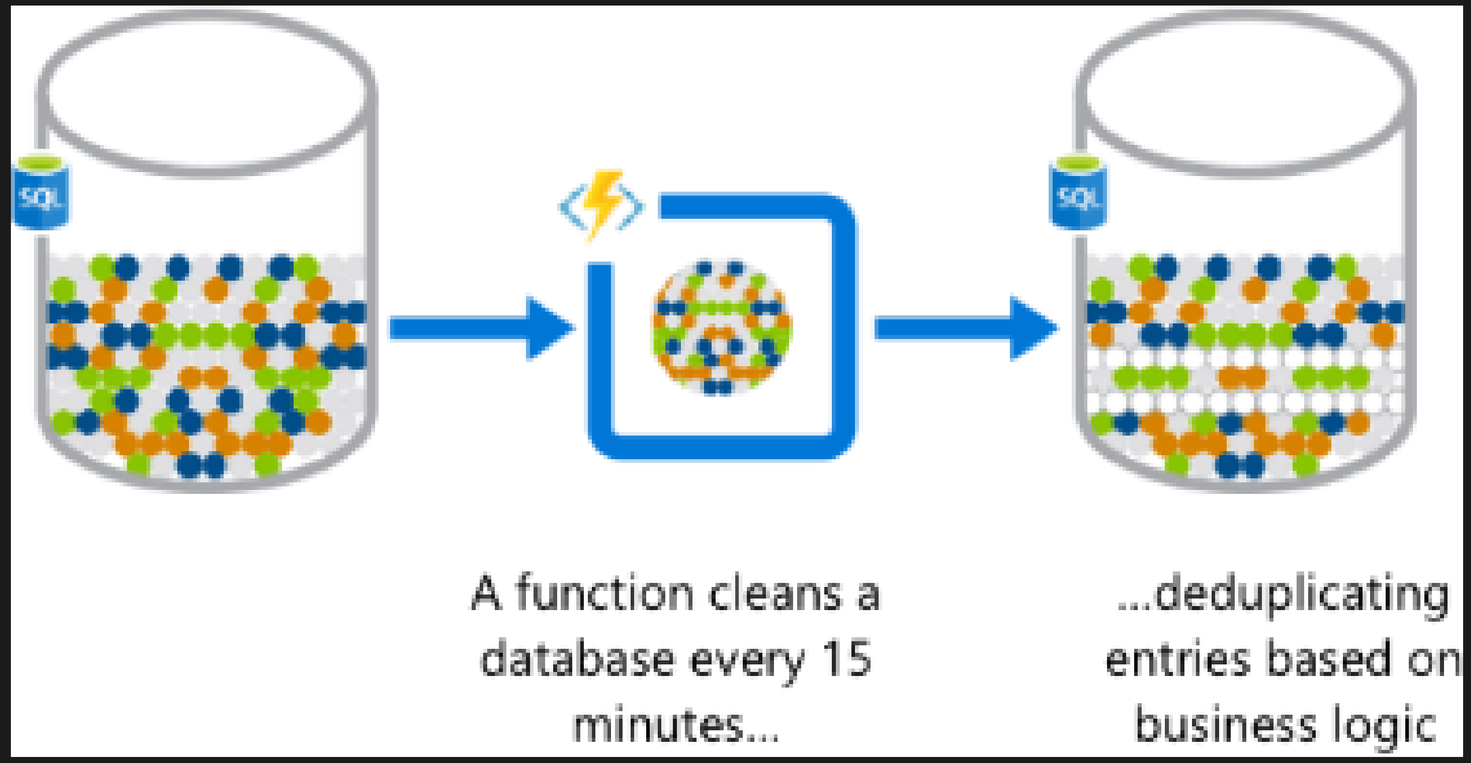
Real-Time File Processing



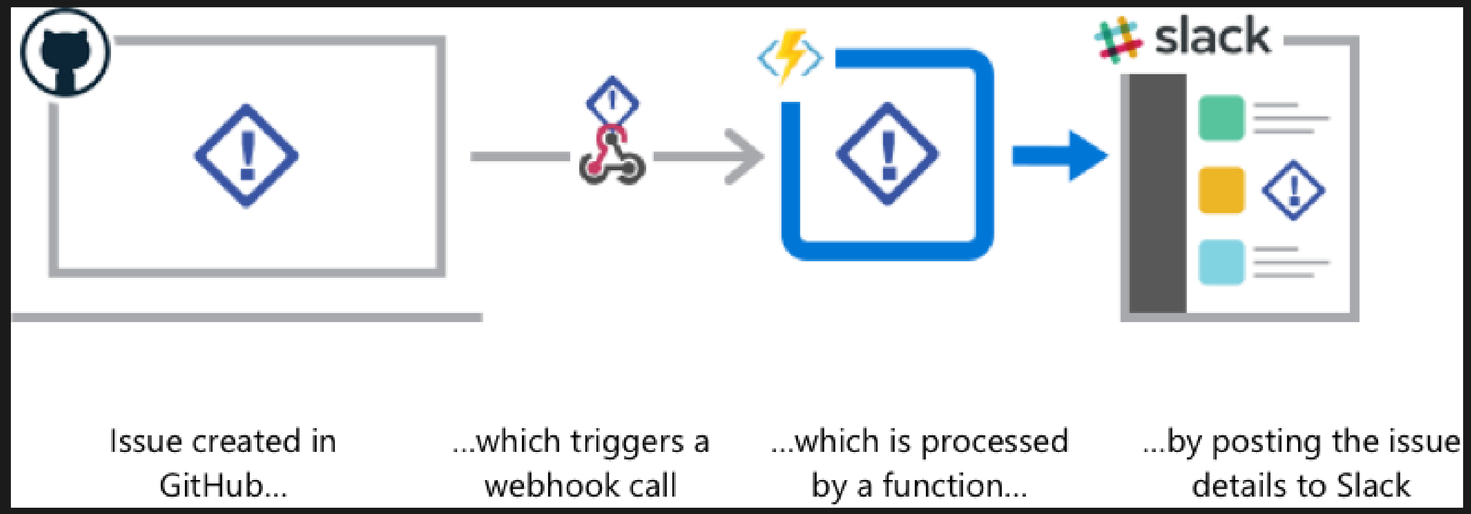
Real-Time Stream Processing

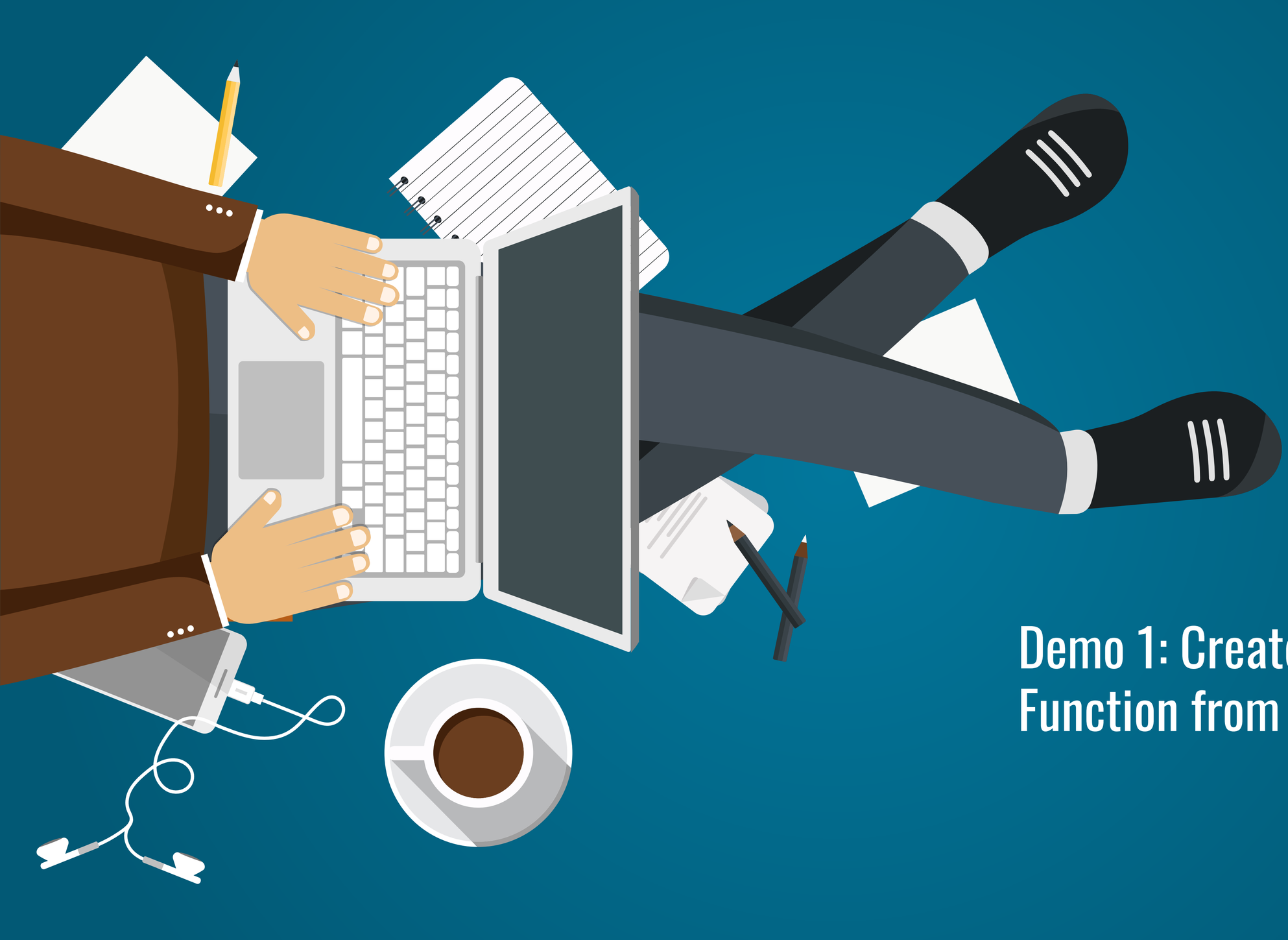


Automation of Scheduled Tasks

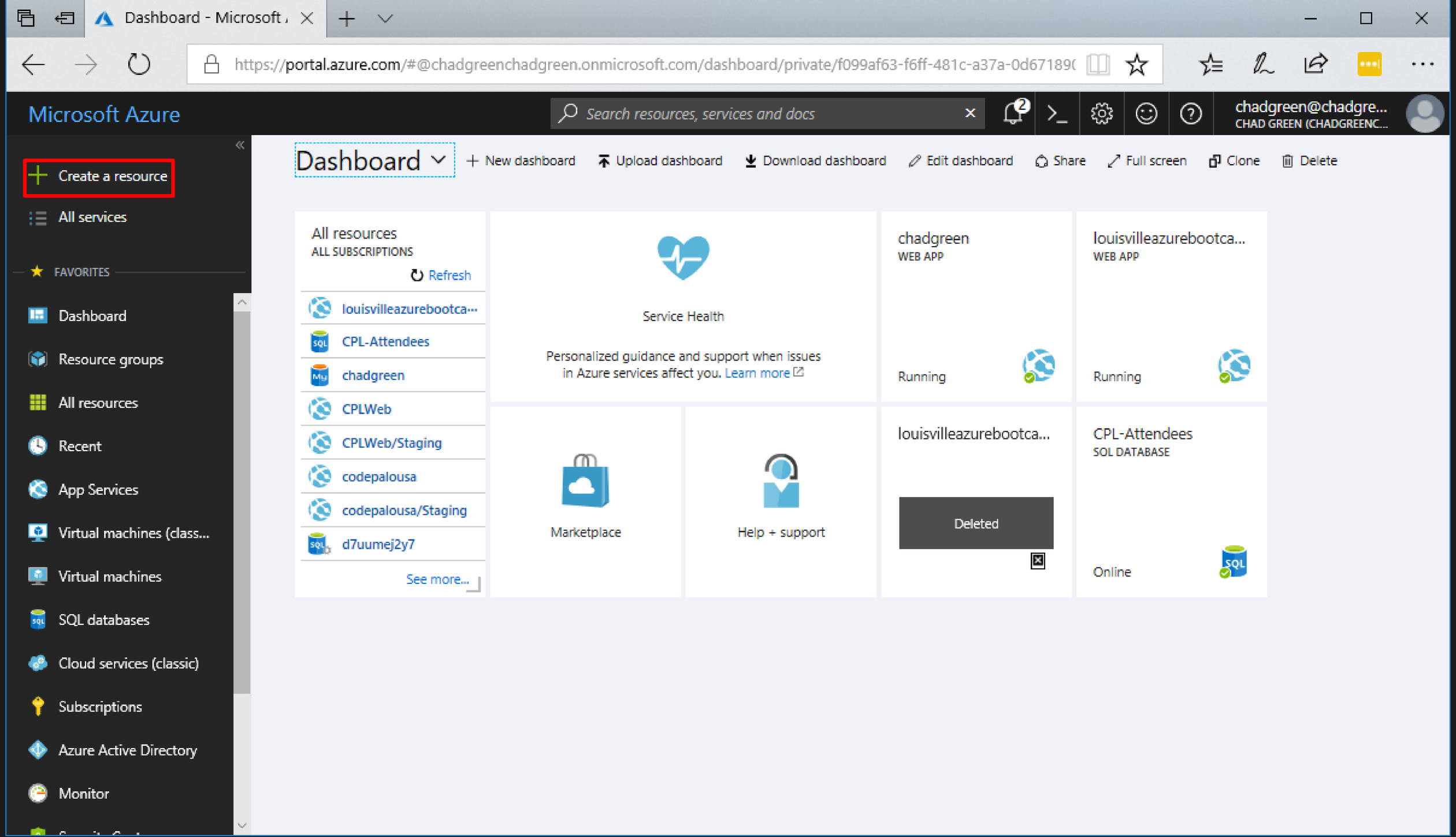


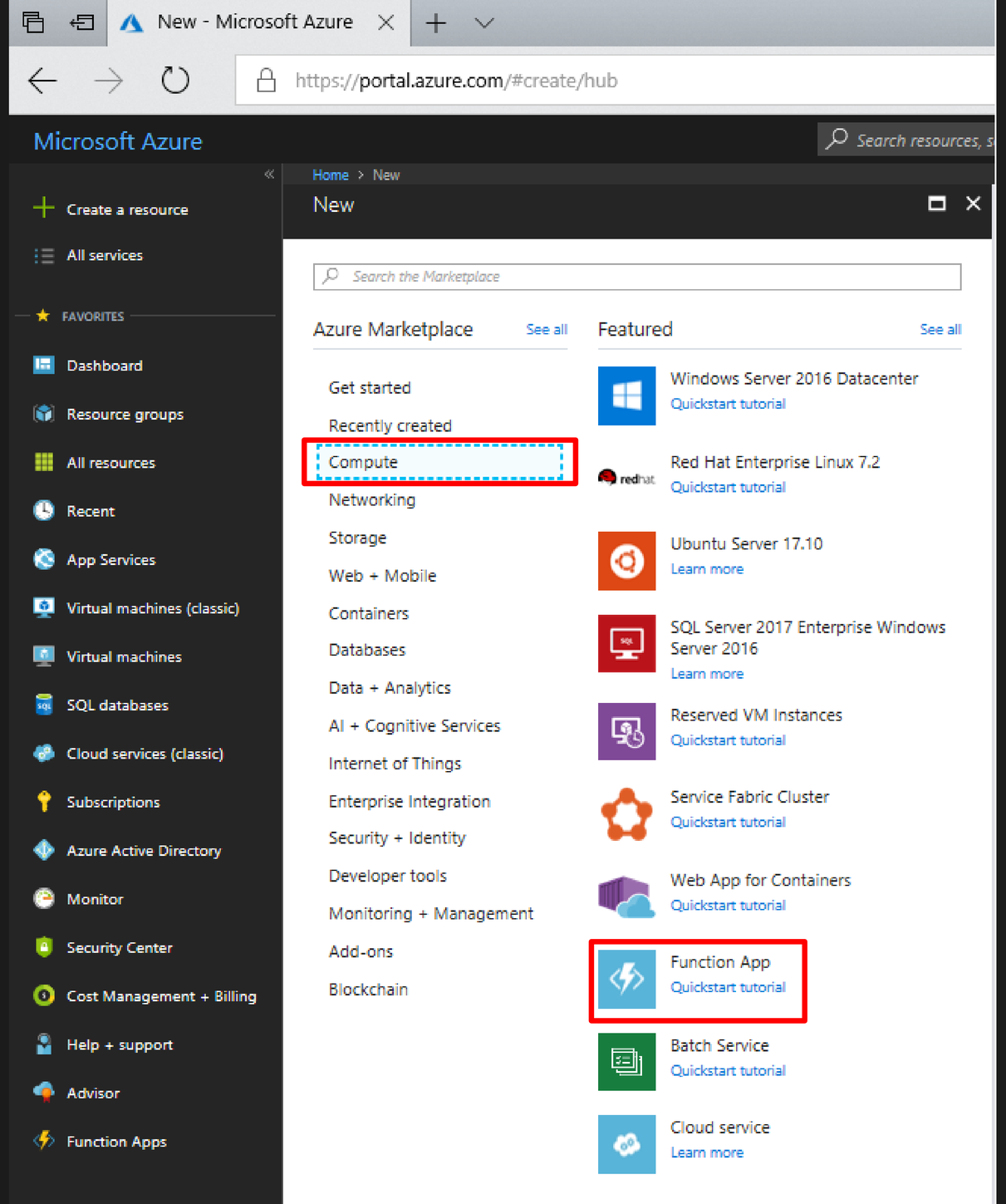
Extending SaaS Applications

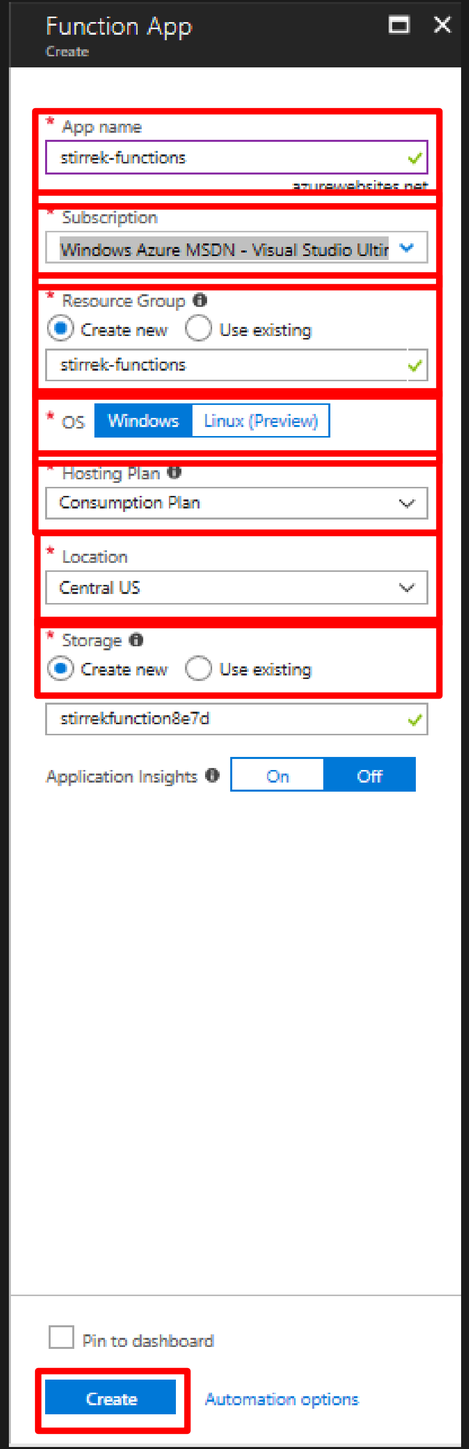




Demo 1: Create an Azure Function from the Portal


Dashboard - Microsoft
https://portal.azure.com/#@chadgreenchadgreen.onmicrosoft.com/dashboard/private/f099af63-f6ff-481c-a37a-0d67189(
Microsoft Azure
Search resources, services and docs
chadgreen@chadgre...
CHAD GREEN (CHADGREENC...
Create a resource
All services
FAVORITES
Dashboard
Resource groups
All resources
Recent
App Services
Virtual machines (class...
Virtual machines
SQL databases
Cloud services (classic)
Subscriptions
Azure Active Directory
Monitor
Dashboard
New dashboard
Upload dashboard
Download dashboard
Edit dashboard
Share
Full screen
Clone
Delete
All resources
ALL SUBSCRIPTIONS
Refresh
louisvilleazurebootca...
CPL-Attendees
chadgreen
CPLWeb
CPLWeb/Staging
codepalousa
codepalousa/Staging
d7uumej2y7
See more...
Service Health
Personalized guidance and support when issues in Azure services affect you. Learn more
chadgreen
WEB APP
Running
louisvilleazurebootca...
WEB APP
Running
Marketplace
Help + support
louisvilleazurebootca...
Deleted
CPL-Attendees
SQL DATABASE
Online


New - Microsoft Azure
https://portal.azure.com/#create/hub
Microsoft Azure
Search resources, s
Create a resource
All services
FAVORITES
Dashboard
Resource groups
All resources
Recent
App Services
Virtual machines (classic)
Virtual machines
SQL databases
Cloud services (classic)
Subscriptions
Azure Active Directory
Monitor
Security Center
Cost Management + Billing
Help + support
Advisor
Function Apps
Home > New
New
Search the Marketplace
Azure Marketplace
See all
Get started
Recently created
Compute
Networking
Storage
Web + Mobile
Containers
Databases
Data + Analytics
AI + Cognitive Services
Internet of Things
Enterprise Integration
Security + Identity
Developer tools
Monitoring + Management
Add-ons
Blockchain
Featured
See all
Windows Server 2016 Datacenter
Quickstart tutorial
Red Hat Enterprise Linux 7.2
Quickstart tutorial
Ubuntu Server 17.10
Learn more
SQL Server 2017 Enterprise Windows Server 2016
Learn more
Reserved VM Instances
Quickstart tutorial
Service Fabric Cluster
Quickstart tutorial
Web App for Containers
Quickstart tutorial
Function App
Quickstart tutorial
Batch Service
Quickstart tutorial
Cloud service
Learn more


Function App
Create
* App name
stirrek-functions
azurewebsites.net
* Subscription
Windows Azure MSDN - Visual Studio Ultir
* Resource Group
Create new
Use existing
stirrek-functions
* OS
Windows
Linux (Preview)
* Hosting Plan
Consumption Plan
* Location
Central US
* Storage
Create new
Use existing
stirrekfunction8e7d
Application Insights
On
Off
Pin to dashboard
Create
Automation options

Notifications

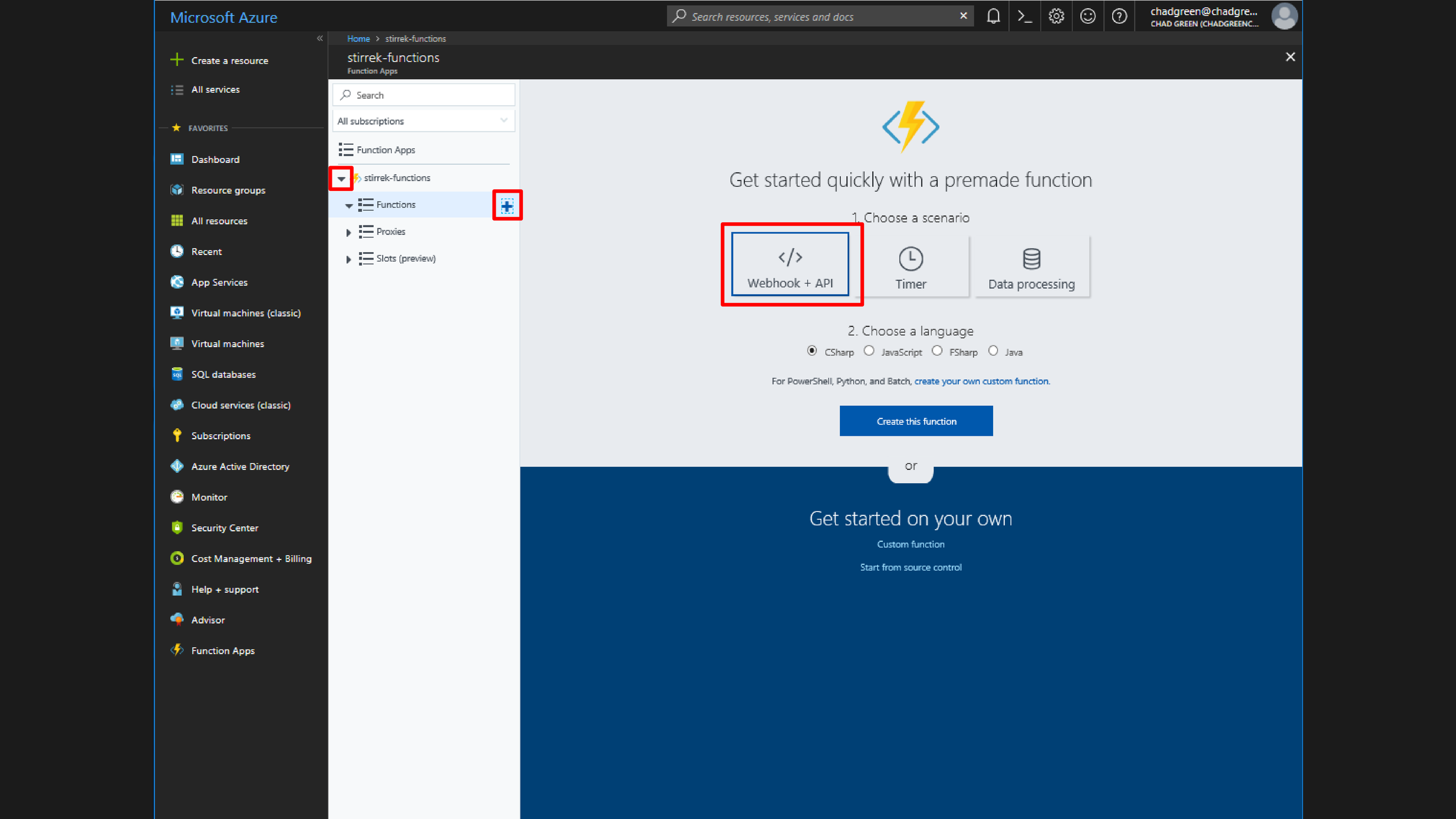
Dismiss: Informational Completed All

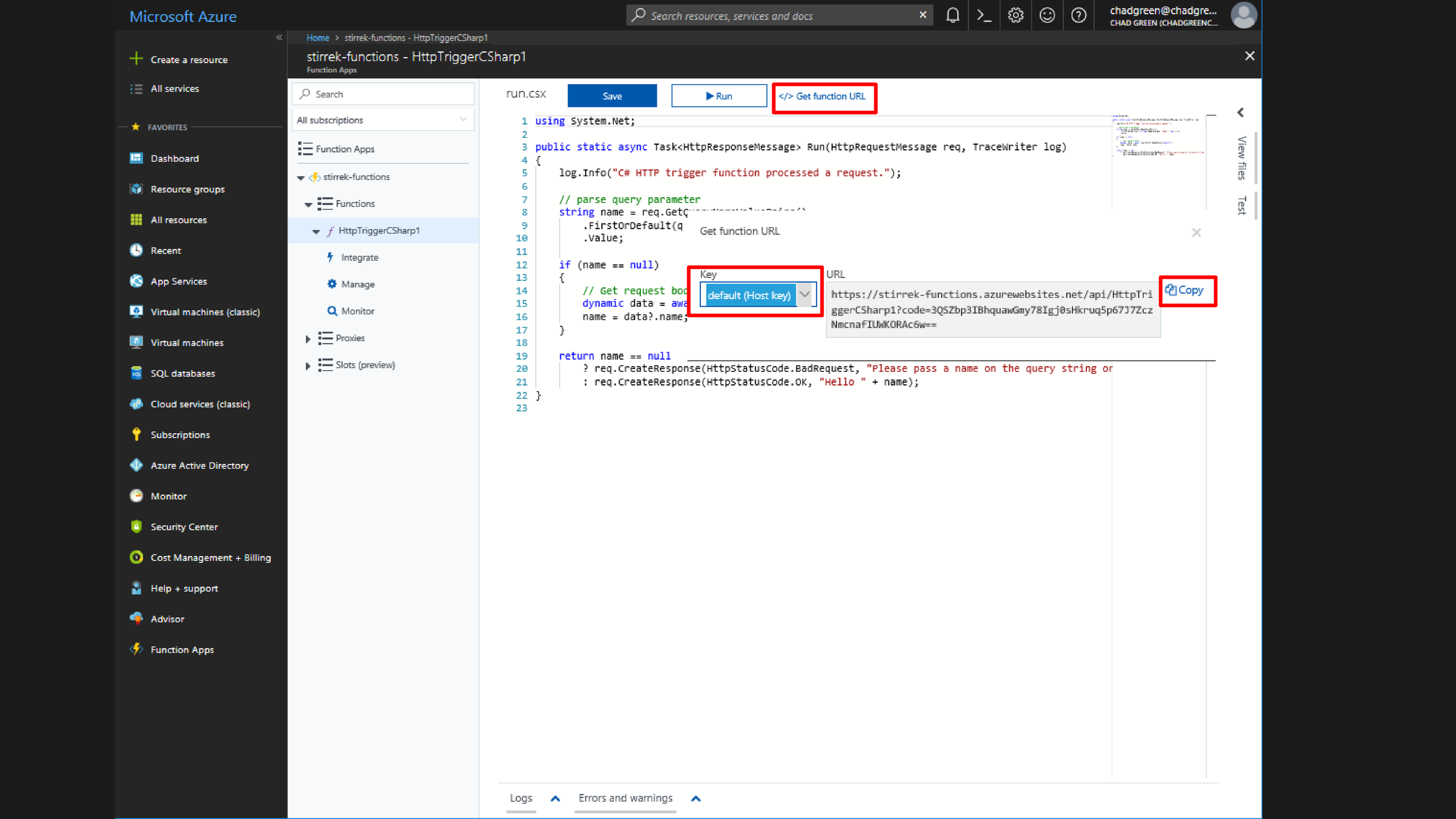
Deployment succeeded

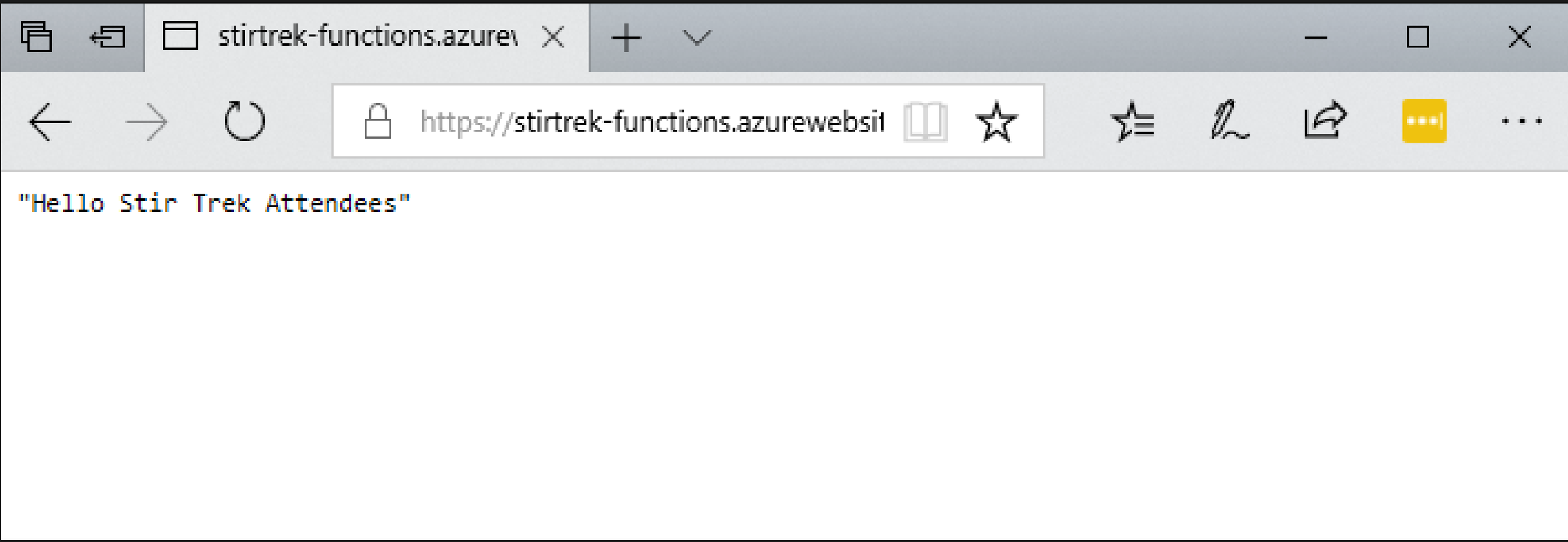
9:47 PM

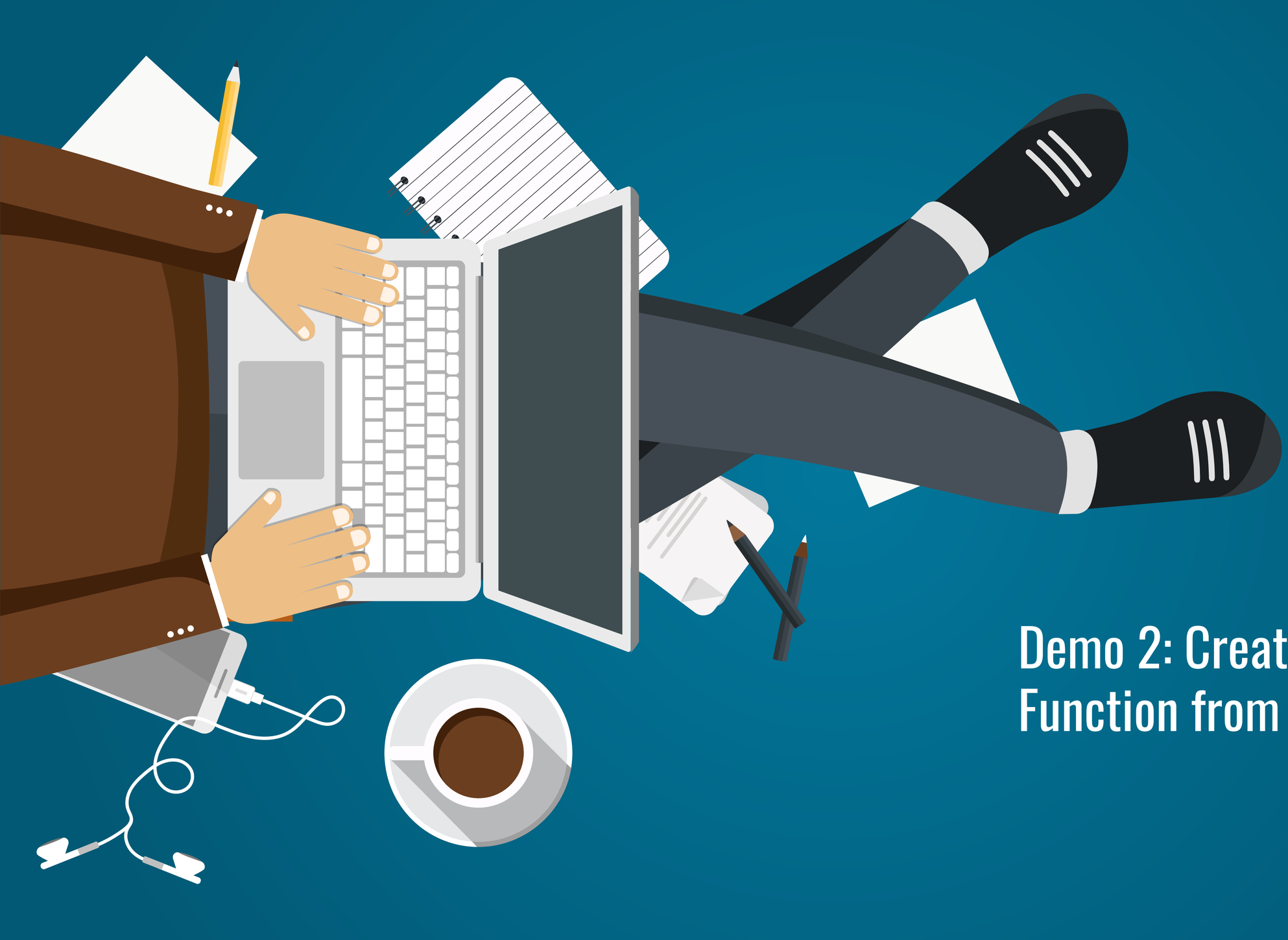
Deployment 'Microsoft.FunctionAppc59de1ba-8909' to resource group 'stirrek-functions' was successful.

Go to resource | Pin to dashboard

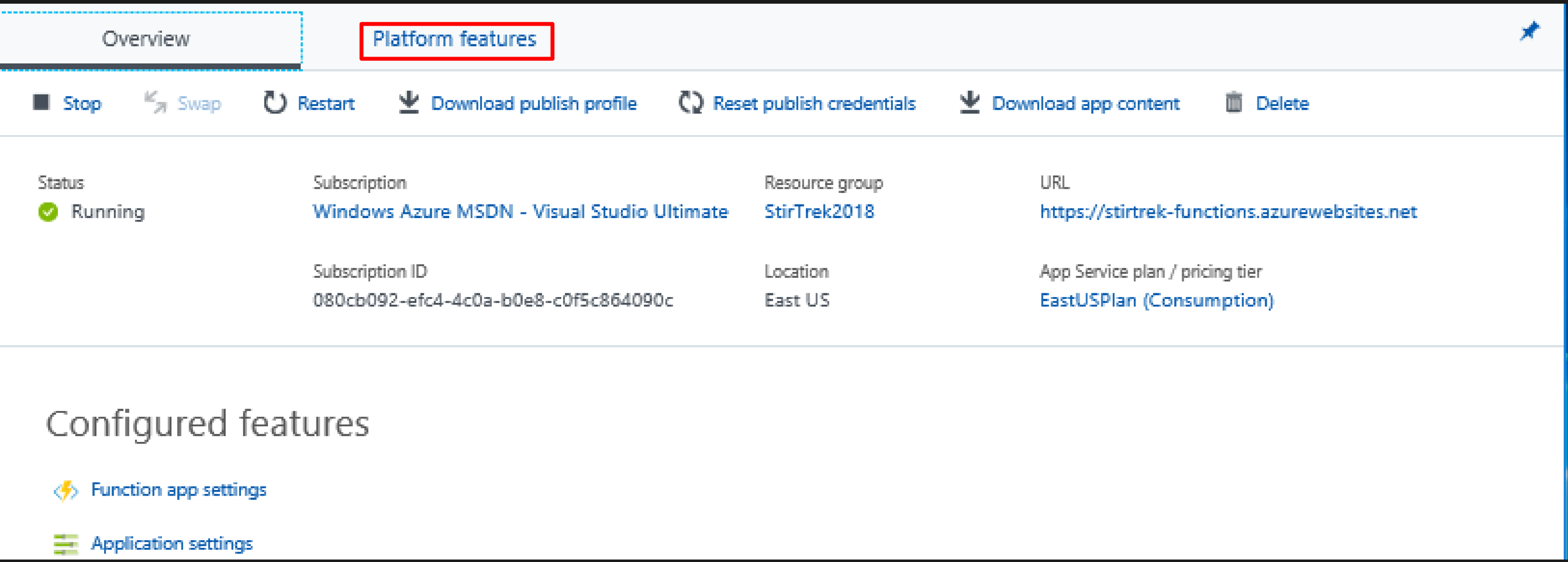

Microsoft Azure
Search resources, services and docs
chadgreen@chadgre...
CHAD GREEN (CHADGREENC...
Create a resource
All services
FAVORITES
Dashboard
Resource groups
All resources
Recent
App Services
Virtual machines (classic)
Virtual machines
SQL databases
Cloud services (classic)
Subscriptions
Azure Active Directory
Monitor
Security Center
Cost Management + Billing
Help + support
Advisor
Function Apps
Home > stirrek-functions
stirrek-functions
Function Apps
Search
All subscriptions
Function Apps
stirrek-functions
Functions
Proxies
Slots (preview)
Get started quickly with a premade function
1. Choose a scenario
Webhook + API
Timer
Data processing
2. Choose a language
CSharp
JavaScript
FSharp
Java
For PowerShell, Python, and Batch, create your own custom function.
Create this function
or
Get started on your own
Custom function
Start from source control


Microsoft Azure
Search resources, services and docs
chadgreen@chadgre...
CHAD GREEN (CHADGREENC...
Home > stirrek-functions - HttpTriggerCSharp1
stirrek-functions - HttpTriggerCSharp1
Function Apps
Create a resource
All services
FAVORITES
Dashboard
Resource groups
All resources
Recent
App Services
Virtual machines (classic)
Virtual machines
SQL databases
Cloud services (classic)
Subscriptions
Azure Active Directory
Monitor
Security Center
Cost Management + Billing
Help + support
Advisor
Function Apps
Search
All subscriptions
Function Apps
stirrek-functions
Functions
HttpTriggerCSharp1
Integrate
Manage
Monitor
Proxies
Slots (preview)
run.csx
Save
Run
</> Get function URL
using System.Net;
public static async Task<HttpResponseMessage> Run(HttpRequestMessage req, TraceWriter log)
{
log.Info("C# HTTP trigger function processed a request.");
// parse query parameter
.FirstOrDefault(q
.Value;
if (name == null)
{
// Get request bod
dynamic data = awa
name = data?.name;
}
return name == null
? req.CreateResponse(HttpStatusCode.BadRequest, "Please pass a name on the query string or
: req.CreateResponse(HttpStatusCode.OK, "Hello " + name);
}
Get function URL
Key
default (Host key)
URL
https://stirrek-functions.azurewebsites.net/api/HttpTriggerCSharp1?code=3QSZbp3IBhquawGmy78Igj0sHkruq5p67J7ZczNmcnafIUWKORAc6w==
Copy
View files
Test
Logs
Errors and warnings


stirtrek-functions.azurev
https://stirtrek-functions.azurewebsit
"Hello Stir Trek Attendees"



Demo 2: Create an Azure Function from Visual Studio


Overview
Platform features
Stop
Swap
Restart
Download publish profile
Reset publish credentials
Download app content
Delete
Status
Running
Subscription
Windows Azure MSDN - Visual Studio Ultimate
Resource group
StirTrek2018
URL
https://stirtrek-functions.azurewebsites.net
Subscription ID
080cb092-efc4-4c0a-b0e8-c0f5c864090c
Location
East US
App Service plan / pricing tier
EastUSPlan (Consumption)
Configured features
Function app settings
Application settings

Overview | Platform features

Search features

GENERAL SETTINGS

- Function app settings
- Application settings
- Properties
- Backups
- All settings

CODE DEPLOYMENT

- Deployment options
- Deployment credentials

DEVELOPMENT TOOLS

- Logic Apps
- Console
- Advanced tools (Kudu)
- App Service Editor
- Resource Explorer
- Extensions

NETWORKING

- Networking
- SSL
- Custom domains
- Authentication / Authorization
- Managed service identity
- Push notifications

MONITORING

- Diagnostic logs
- Log streaming
- Process explorer

API

- API definition
- CORS

APP SERVICE PLAN

- App Service plan
- Quotas

RESOURCE MANAGEMENT

- Activity log
- Access control (IAM)
- Tags
- Locks
- Automation script

Overview | Platform features | Function app settings

Daily Usage Quota (GB-Sec)

Enter value in GB-sec

Set quota

Application settings

Manage application settings

Runtime version

Runtime version: 1.0.11702.0 (~1)

~1 | beta

Function app edit mode

Change the edit mode of your function app

Read/Write | Read Only

Slots (preview)

Enable deployment slots (preview).

Known issues:
Logic apps integration with Functions does not work when Slots(preview) is enabled.
Opting into this preview feature will reset any pre-existing secrets. Function secrets can be found under the **'Manage'** node for each function.

Off | On

Host Keys (All functions)

NAME	VALUE	ACTIONS		
_master	Click to show	Copy	Renew	
default	Click to show	Copy	Renew	Revoke

Add new host key

host.json

```
1 {}
```

Visual Studio Installer

Products

Installed

Visual Studio Enterprise 2017

15.6.6

Microsoft DevOps solution for productivity and coordination across teams of any size

Release notes

Modify | Launch | More

Welcome!

We invite you to go online to hone your skills and find additional tools to support your development workflow.

Learn

Whether you're new to development or an experienced developer, we have you covered with our tutorials, videos, and sample code.

Marketplace

Use Visual Studio extensions to add support for new technologies, integrate with other products and services, and fine-tune your experience.

Need some help?

Check out the Microsoft Developer Community where developers provide feedback and answers to many common problems.

Get help from Microsoft at Visual Studio Support.

1.15.3248.309

Visual Studio Installer

Modifying — Visual Studio Enterprise 2017 — 15.6.6

Workloads | Individual components | Language packs

Windows (3)

Universal Windows Platform development
Create applications for the Universal Windows Platform with C#, VB, JavaScript, or optionally C++.

.NET desktop development
Build WPF, Windows Forms, and console applications using C#, Visual Basic, and F#.

Desktop development with C++
Build Windows desktop applications using the Microsoft C++ toolset, ATL, or MFC.

Web & Cloud (7)

ASP.NET and web development
Build web applications using ASP.NET, ASP.NET Core, HTML/JavaScript, and Containers including Docker support.

Azure development
Azure SDKs, tools, and projects for developing cloud apps, creating resources, and building Containers including...

Python development
Editing, debugging, interactive development and source control for Python.

Node.js development
Build scalable network applications using Node.js, an asynchronous event-driven JavaScript runtime.

Summary

- Visual Studio core editor
- Universal Windows Platform development *
- .NET desktop development
- ASP.NET and web development
- Azure development
- Data storage and processing
- .NET Core cross-platform development
- Individual components
  - Visual Studio C++ core features
  - PowerShell Tools for Visual Studio 2017
  - ReadyRoll for VS2017
  - SQL Prompt Core
  - TypeScript 2.3 SDK
  - Arduino IDE for Visual Studio
  - PowerShell Pro Tools for Visual Studio 2017
  - Windows Template Studio
  - VS Live Share - Preview

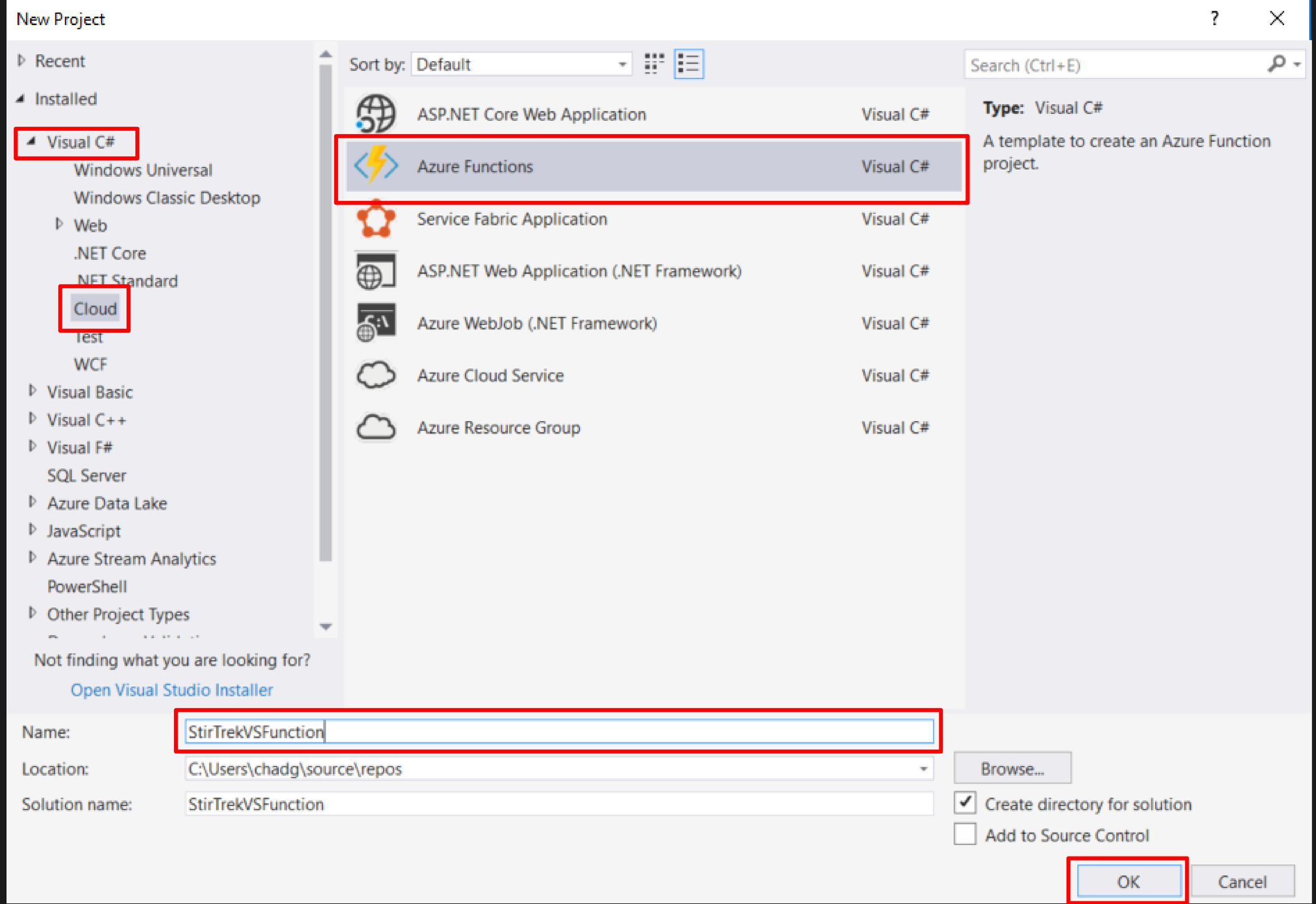
Location

c:\Program Files (x86)\Microsoft Visual Studio\2017\Enterprise

Total install size: 0 KB

Modify

1.15.3248.309


New Project
Recent
Installed
Visual C#
Windows Universal
Windows Classic Desktop
Web
.NET Core
.NET Standard
Cloud
Test
WCF
Visual Basic
Visual C++
Visual F#
SQL Server
Azure Data Lake
JavaScript
Azure Stream Analytics
PowerShell
Other Project Types
Not finding what you are looking for?
Open Visual Studio Installer
Sort by: Default
Search (Ctrl+E)
ASP.NET Core Web Application Visual C#
Azure Functions Visual C#
Service Fabric Application Visual C#
ASP.NET Web Application (.NET Framework) Visual C#
Azure WebJob (.NET Framework) Visual C#
Azure Cloud Service Visual C#
Azure Resource Group Visual C#
Type: Visual C#
A template to create an Azure Function project.
Name: StirTrekVSFunction
Location: C:\Users\chadg\source\repos
Browse...
Solution name: StirTrekVSFunction
Create directory for solution
Add to Source Control
OK
Cancel

New Project - StirTrekVSFunction

Azure Functions v1 (.NET Framework)

Empty | Http trigger | Queue trigger | Timer trigger

Creates an Azure function project with an Http trigger. Additional triggers can be added during development

Storage Account (AzureWebJobsStorage)

Storage Emulator

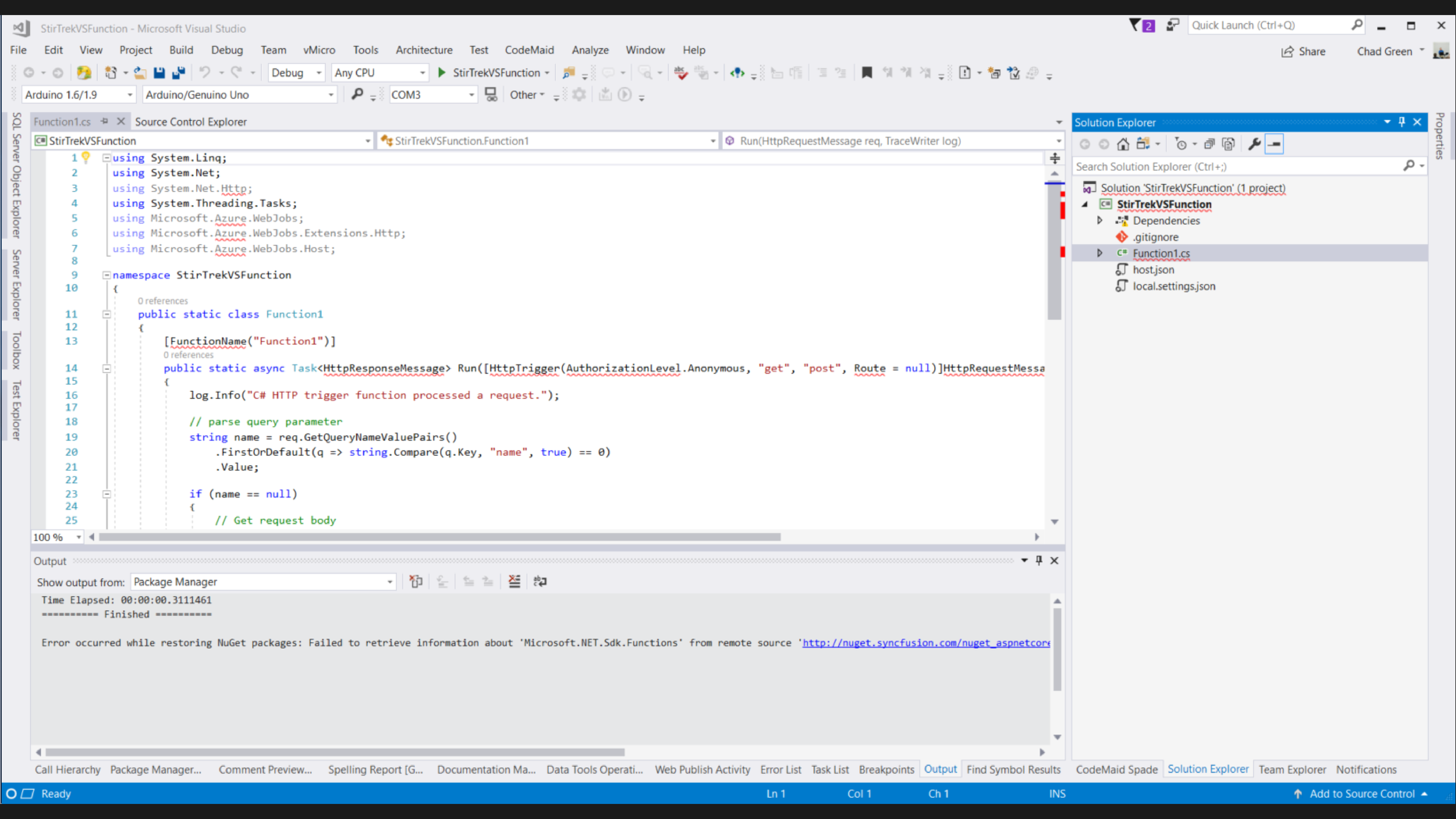
Some capabilities may require an Azure storage account.

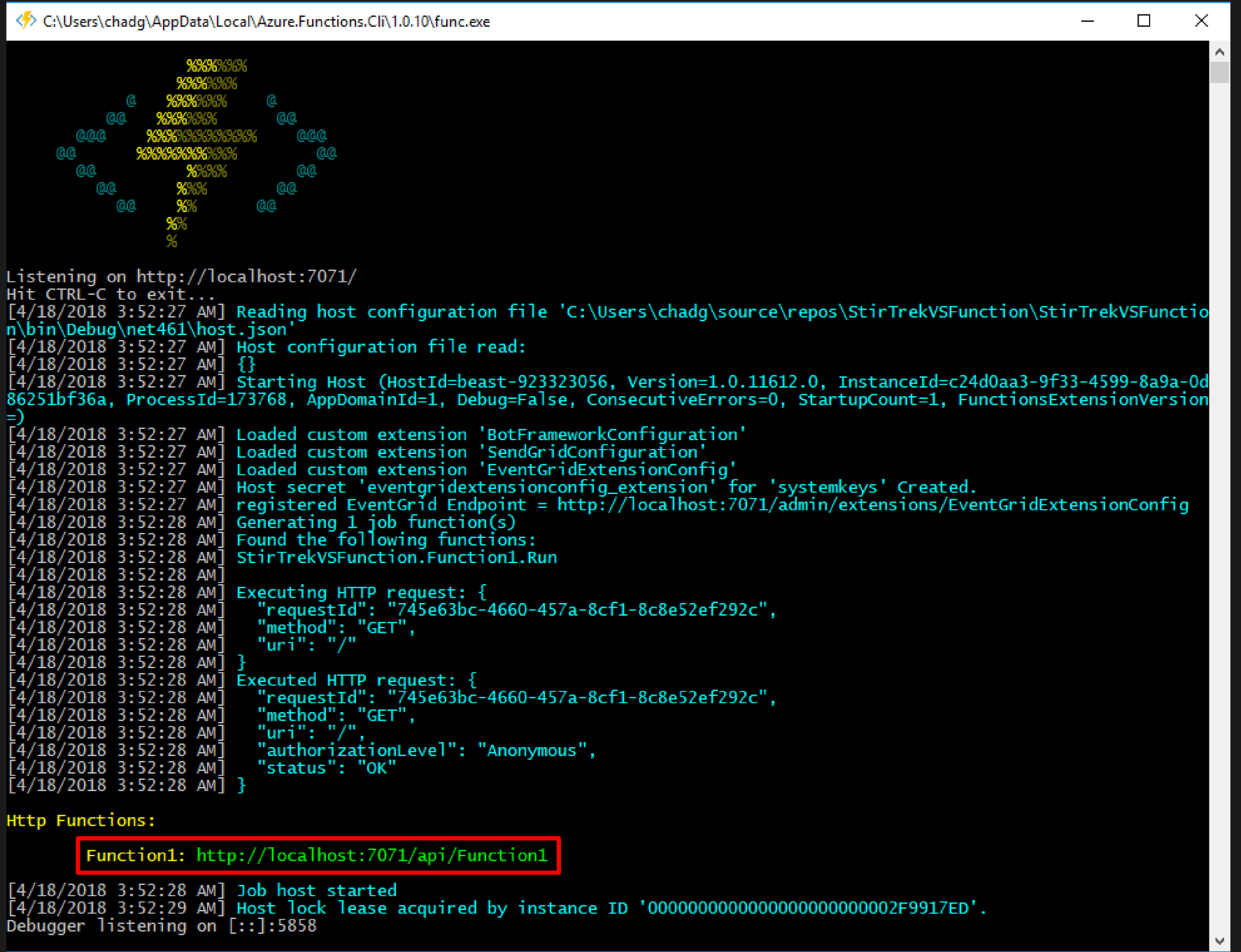
Access rights

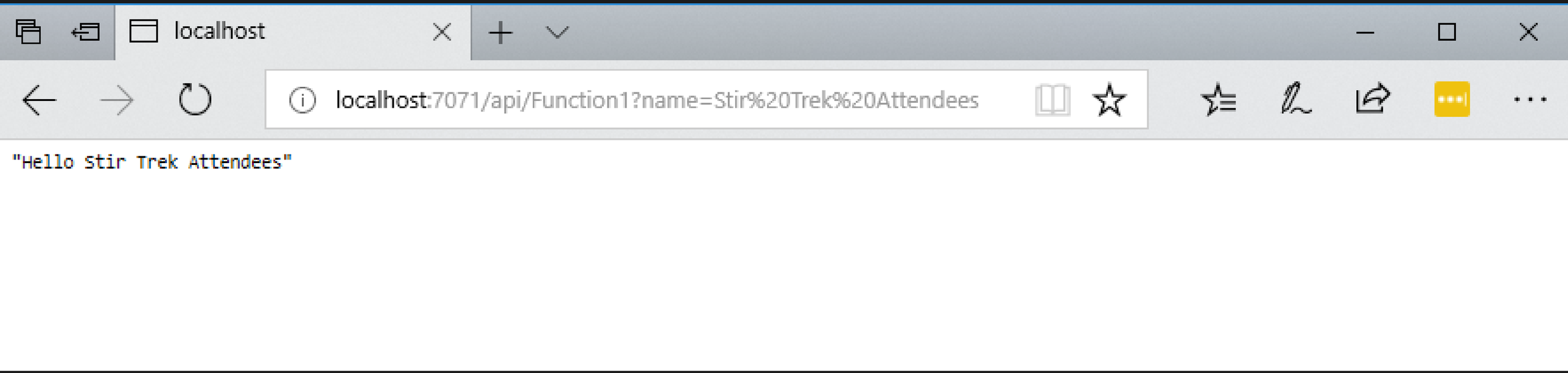
Anonymous

Get started with Azure Functions

OK Cancel


StirTrekVSFunction - Microsoft Visual Studio
Quick Launch (Ctrl+Q)
File Edit View Project Build Debug Team vMicro Tools Architecture Test CodeMaid Analyze Window Help
Share
Chad Green
Debug
Any CPU
StirTrekVSFunction
Arduino 1.6/1.9
Arduino/Genuino Uno
COM3
Other
Function1.cs
Source Control Explorer
StirTrekVSFunction
StirTrekVSFunction.Function1
Run(HttpRequestMessage req, TraceWriter log)
using System.Linq;
using System.Net;
using System.Net.Http;
using System.Threading.Tasks;
using Microsoft.Azure.WebJobs;
using Microsoft.Azure.WebJobs.Extensions.Http;
using Microsoft.Azure.WebJobs.Host;
namespace StirTrekVSFunction
{
0 references
public static class Function1
{
[FunctionName("Function1")]
0 references
public static async Task<HttpResponseMessage> Run([HttpTrigger(AuthorizationLevel.Anonymous, "get", "post", Route = null)]HttpRequestMessa
{
log.Info("C# HTTP trigger function processed a request.");
// parse query parameter
string name = req.GetQueryNameValuePairs()
.FirstOrDefault(q => string.Compare(q.Key, "name", true) == 0)
.Value;
if (name == null)
{
// Get request body
100 %
Output
Show output from: Package Manager
Time Elapsed: 00:00:00.3111461
========== Finished ==========
Error occurred while restoring NuGet packages: Failed to retrieve information about 'Microsoft.NET.Sdk.Functions' from remote source 'http://nuget.syncfusion.com/nuget_aspnetcore
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'StirTrekVSFunction' (1 project)
StirTrekVSFunction
Dependencies
.gitignore
Function1.cs
host.json
local.settings.json
SQL Server Object Explorer
Server Explorer
Toolbox
Test Explorer
Properties
Call Hierarchy
Package Manager...
Comment Preview...
Spelling Report [G...
Documentation Ma...
Data Tools Operati...
Web Publish Activity
Error List
Task List
Breakpoints
Output
Find Symbol Results
CodeMaid Spade
Solution Explorer
Team Explorer
Notifications
Ready
Ln 1
Col 1
Ch 1
INS
Add to Source Control


C:\Users\chadg\AppData\Local\Azure.Functions.Cli\1.0.10\func.exe
Listening on http://localhost:7071/
Hit CTRL-C to exit...
[4/18/2018 3:52:27 AM] Reading host configuration file 'C:\Users\chadg\source\repos\StirTrekVSFunction\StirTrekVSFunction\bin\Debug\net461\host.json'
[4/18/2018 3:52:27 AM] Host configuration file read:
[4/18/2018 3:52:27 AM] {}
[4/18/2018 3:52:27 AM] Starting Host (HostId=beast-923323056, Version=1.0.11612.0, InstanceId=c24d0aa3-9f33-4599-8a9a-0d86251bf36a, ProcessId=173768, AppDomainId=1, Debug=False, ConsecutiveErrors=0, StartupCount=1, FunctionsExtensionVersion=)
[4/18/2018 3:52:27 AM] Loaded custom extension 'BotFrameworkConfiguration'
[4/18/2018 3:52:27 AM] Loaded custom extension 'SendGridConfiguration'
[4/18/2018 3:52:27 AM] Loaded custom extension 'EventGridExtensionConfig'
[4/18/2018 3:52:27 AM] Host secret 'eventgridextensionconfig_extension' for 'systemkeys' Created.
[4/18/2018 3:52:27 AM] registered EventGrid Endpoint = http://localhost:7071/admin/extensions/EventGridExtensionConfig
[4/18/2018 3:52:28 AM] Generating 1 job function(s)
[4/18/2018 3:52:28 AM] Found the following functions:
[4/18/2018 3:52:28 AM] StirTrekVSFunction.Function1.Run
[4/18/2018 3:52:28 AM]
[4/18/2018 3:52:28 AM] Executing HTTP request: {
[4/18/2018 3:52:28 AM] "requestId": "745e63bc-4660-457a-8cf1-8c8e52ef292c",
[4/18/2018 3:52:28 AM] "method": "GET",
[4/18/2018 3:52:28 AM] "uri": "/"
[4/18/2018 3:52:28 AM] }
[4/18/2018 3:52:28 AM] Executed HTTP request: {
[4/18/2018 3:52:28 AM] "requestId": "745e63bc-4660-457a-8cf1-8c8e52ef292c",
[4/18/2018 3:52:28 AM] "method": "GET",
[4/18/2018 3:52:28 AM] "uri": "/",
[4/18/2018 3:52:28 AM] "authorizationLevel": "Anonymous",
[4/18/2018 3:52:28 AM] "status": "OK"
[4/18/2018 3:52:28 AM] }
Http Functions:
Function1: http://localhost:7071/api/Function1
[4/18/2018 3:52:28 AM] Job host started
[4/18/2018 3:52:29 AM] Host lock lease acquired by instance ID '00000000000000000000000002F9917ED'.
Debugger listening on [::]:5858


localhost
localhost:7071/api/Function1?name=Stir%20Trek%20Attendees
"Hello Stir Trek Attendees"

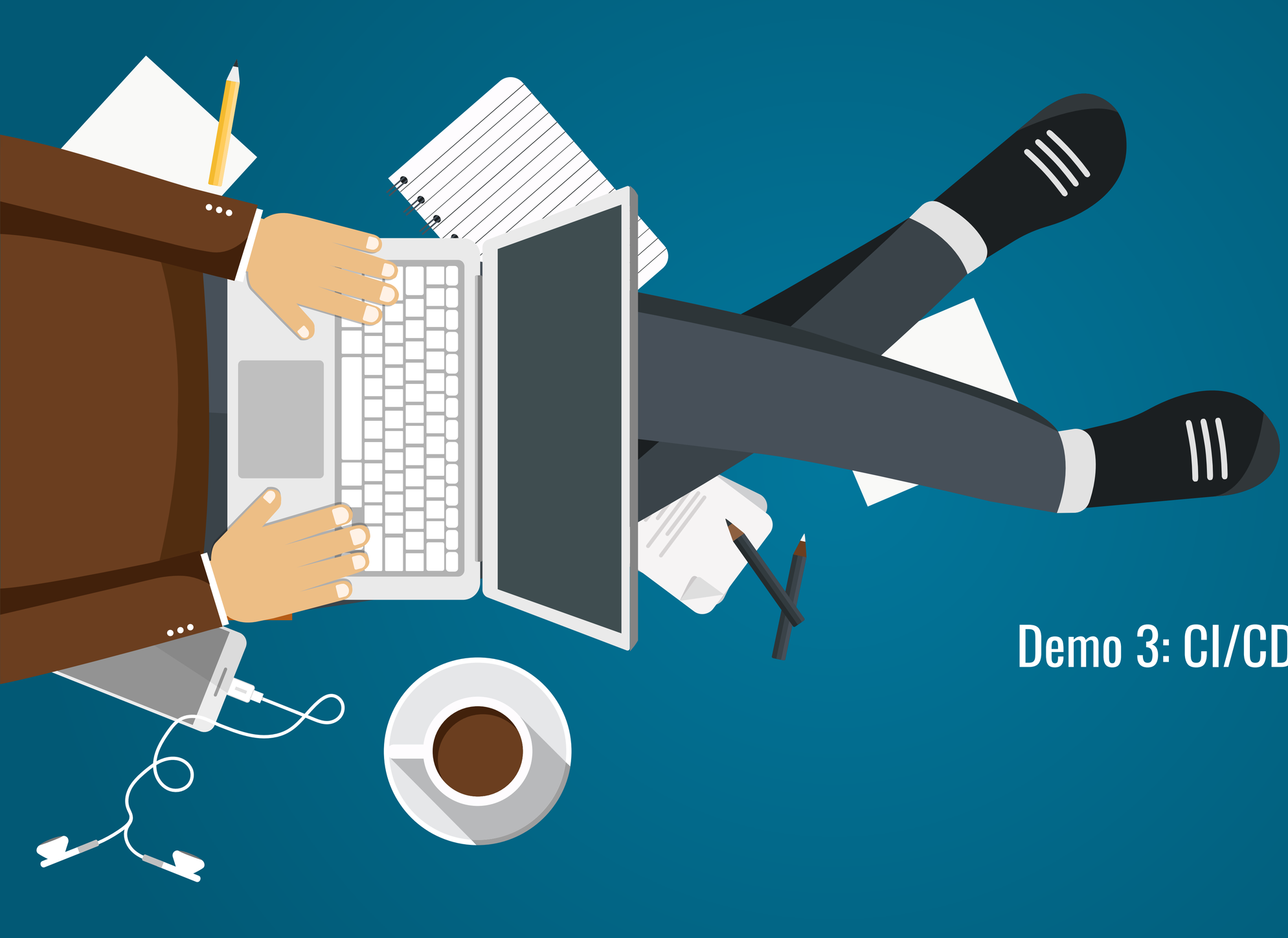
Deployment and Monitoring

Deployment Options

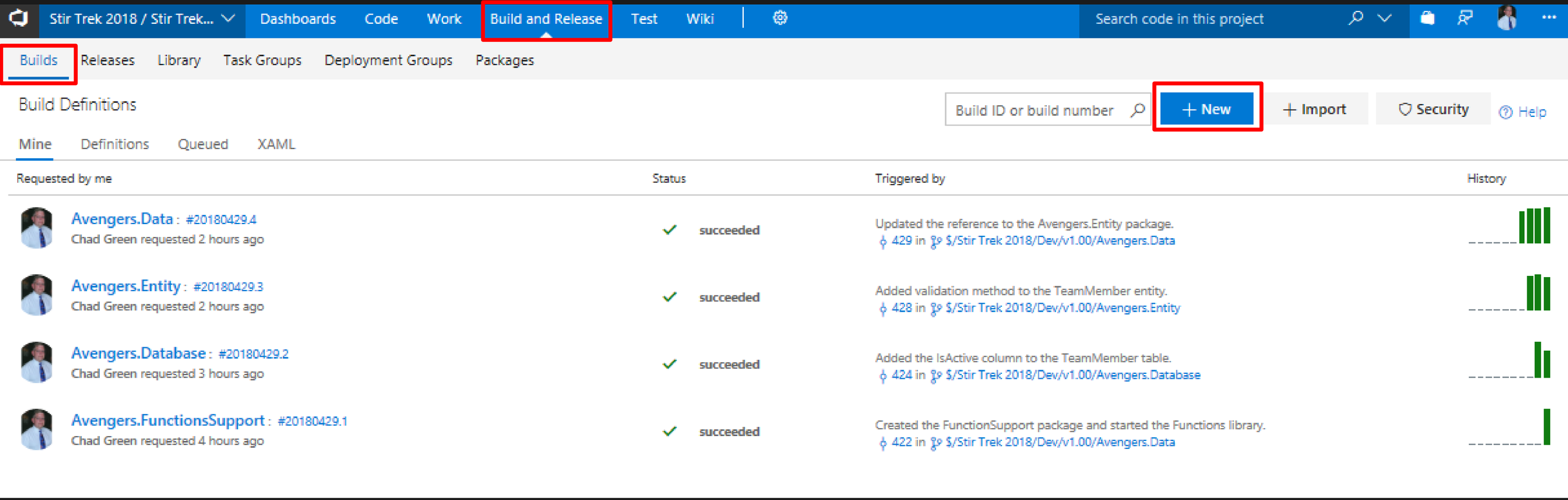
- Visual Studio
- Functions CLI
- Visual Studio Team Services
- Azure Resource Manager
- Maven / Jenkins

Monitoring Options

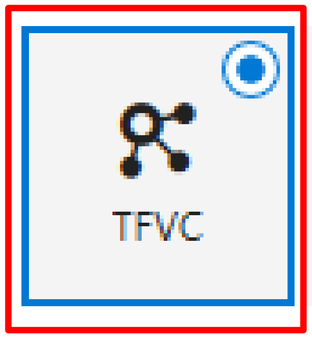
- Azure App Insights
- Function Logs
- Azure Monitor (preview)



Demo 3: CI/CD


Stir Trek 2018 / Stir Trek...
Dashboards
Code
Work
Build and Release
Test
Wiki
Search code in this project
Builds
Releases
Library
Task Groups
Deployment Groups
Packages
Build Definitions
Build ID or build number
+ New
+ Import
Security
Help
Mine
Definitions
Queued
XAML
Requested by me
Status
Triggered by
History
Avengers.Data : #20180429.4
Chad Green requested 2 hours ago
succeeded
Updated the reference to the Avengers.Entity package.
429 in $/Stir Trek 2018/Dev/v1.00/Avengers.Data
Avengers.Entity : #20180429.3
Chad Green requested 2 hours ago
succeeded
Added validation method to the TeamMember entity.
428 in $/Stir Trek 2018/Dev/v1.00/Avengers.Entity
Avengers.Database : #20180429.2
Chad Green requested 3 hours ago
succeeded
Added the IsActive column to the TeamMember table.
424 in $/Stir Trek 2018/Dev/v1.00/Avengers.Database
Avengers.FunctionsSupport : #20180429.1
Chad Green requested 4 hours ago
succeeded
Created the FunctionSupport package and started the Functions library.
422 in $/Stir Trek 2018/Dev/v1.00/Avengers.Data

Select a source



Workspace mappings

Type

Map

Server path

$/Stir Trek 2018

Local path under $(build.sourcesDirectory)

Add

Continue

Select a template

Or start with an Empty process

Search

Featured

.NET Desktop
Build and run tests for .NET Desktop or Windows Classic Desktop solutions. This template requires that Visual Studio be installed on the build agent.

ASP.NET
Build ASP.NET web applications

ASP.NET Core
Build ASP.NET Core web applications targeting .NET Core

ASP.NET Core (.NET Framework)
Build ASP.NET Core web applications targeting the full .NET Framework

Apply

Azure Web App
Build, package, test and deploy your Azure Web App.

Universal Windows Platform
Build Universal Windows Platform applications using Visual Studio. This template requires that Visual Studio and the Universal templates are installed on the build agent.

Others

ASP.NET with Containers
Build and push an ASP.NET project with container support

Android
Build your Android projects, run tests, sign and align Android App Package files. This template requires the Android SDK to be installed on the build agent.

Ant
Build your Java projects and run tests with Apache Ant. This template requires Ant to be installed on the build agent.

Stir Trek 2018-ASP.NET Core (.NET Framework

Tasks | Variables | Triggers | Options | Retention | History | Save & queue | Discard | Summary | Queue | ...

Process
Build process

Get sources
Stir Trek 2018 $/Stir Trek 2018

Phase 1
Run on agent

- Use NuGet 4.4.1
  NuGet Tool Installer
- NuGet restore
  NuGet
- Build solution
  Visual Studio Build
- Test Assemblies
  Visual Studio Test
- Publish symbols path
  Index Sources & Publish Symbols
- Publish Artifact
  Publish Build Artifacts

Agent phase

Remove

Display name *

Phase 1

Agent selection

Agent queue | Manage

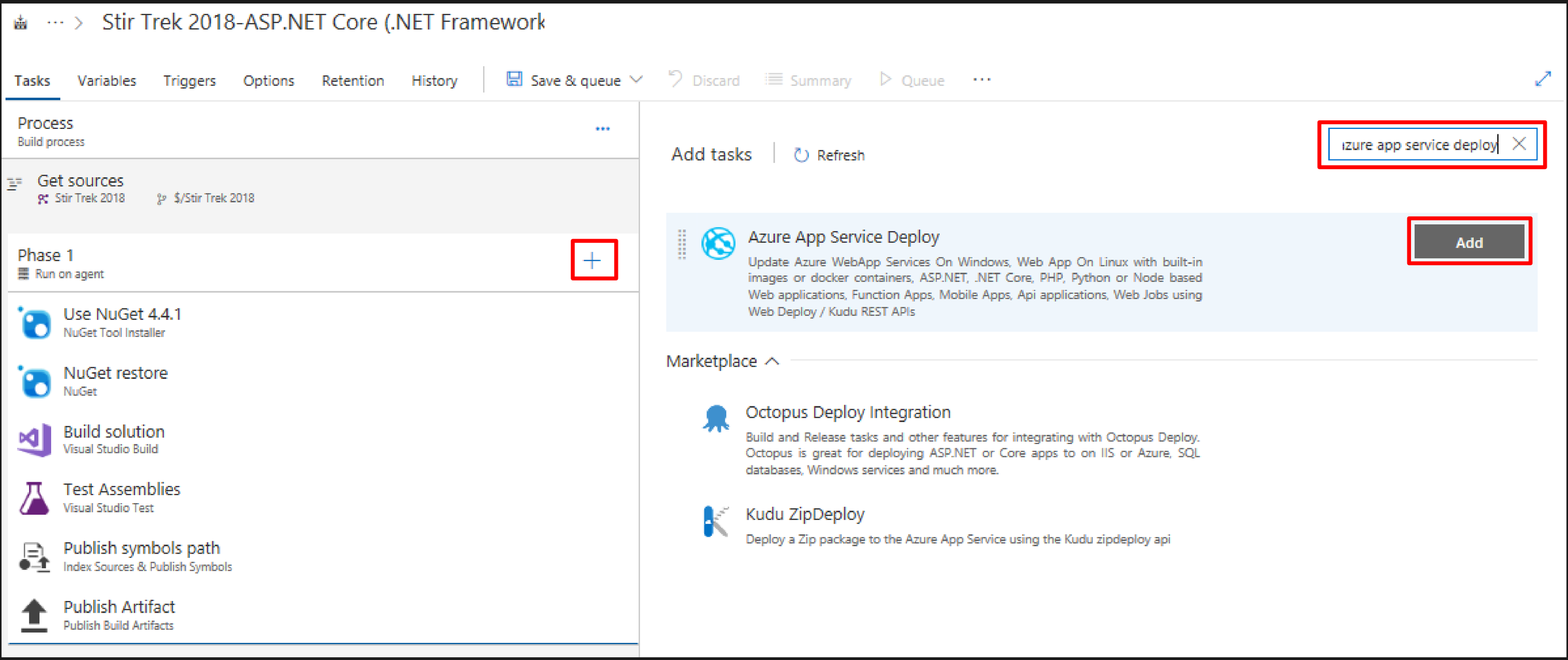
<inherit from definition>

Demands

Name	Condition	Value
msbuild	exists	
visualstudio	exists	
vstest	exists	

Add

Execution plan


Stir Trek 2018-ASP.NET Core (.NET Framework
Tasks
Variables
Triggers
Options
Retention
History
Save & queue
Discard
Summary
Queue
Process
Build process
Get sources
Stir Trek 2018
$/Stir Trek 2018
Phase 1
Run on agent
Use NuGet 4.4.1
NuGet Tool Installer
NuGet restore
NuGet
Build solution
Visual Studio Build
Test Assemblies
Visual Studio Test
Publish symbols path
Index Sources & Publish Symbols
Publish Artifact
Publish Build Artifacts
Add tasks
Refresh
izure app service deploy
Azure App Service Deploy
Update Azure WebApp Services On Windows, Web App On Linux with built-in images or docker containers, ASP.NET, .NET Core, PHP, Python or Node based Web applications, Function Apps, Mobile Apps, Api applications, Web Jobs using Web Deploy / Kudu REST APIs
Add
Marketplace
Octopus Deploy Integration
Build and Release tasks and other features for integrating with Octopus Deploy. Octopus is great for deploying ASP.NET or Core apps to on IIS or Azure, SQL databases, Windows services and much more.
Kudu ZipDeploy
Deploy a Zip package to the Azure App Service using the Kudu zipdeploy api

Azure App Service Deploy ⓘ

Link settings | Remove

Version 3.*

Display name *

Deploy the functions to Azure

Azure subscription * ⓘ | Manage

Windows Azure MSDN - Visual Studio Ultimate (080cb092-efc4-4c0a-b0e8-c0f5c864090c)

App type * ⓘ

Function App

App Service name * ⓘ

stirtrek-functions

Deploy to slot ⓘ

Virtual application ⓘ

Package or folder * ⓘ

$(build.artifactstagingdirectory)/**/*.zip

Avengers.Functions

Tasks | Variables | Triggers | Options | Retention | History | Save & queue | Discard | Summary | Queue | ...

Process
Build process

Get sources
Stir Trek 2018 | $/Stir Trek 2018/Dev/v1.00/Avengers.Functions

Build and Deploy the Avengers.Functions
Run on agent

- Use NuGet 4.4.1
  NuGet Tool Installer
- NuGet restore
  NuGet
- Build solution
  Visual Studio Build
- Test Assemblies
  Visual Studio Test
- Publish symbols path
  Index Sources & Publish Symbols
- Publish Artifact
  Publish Build Artifacts
- Deploy the functions to Azure
  Azure App Service Deploy

Name *
Avengers.Functions

Agent queue * | Manage
Hosted VS2017

Parameters | Unlink all

Path to solution or packages.config *
***.sln

Artifact Name *
drop

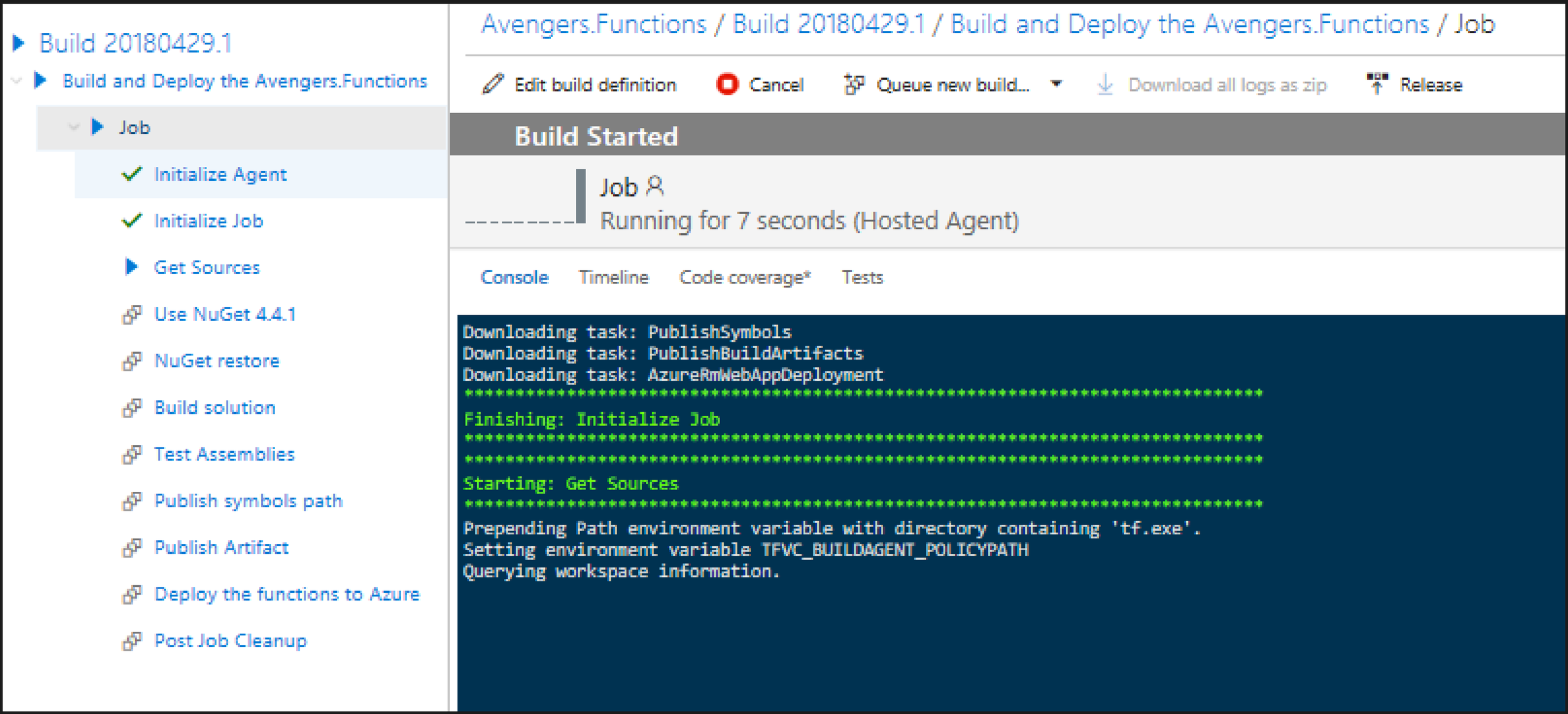
Avengers.Functions

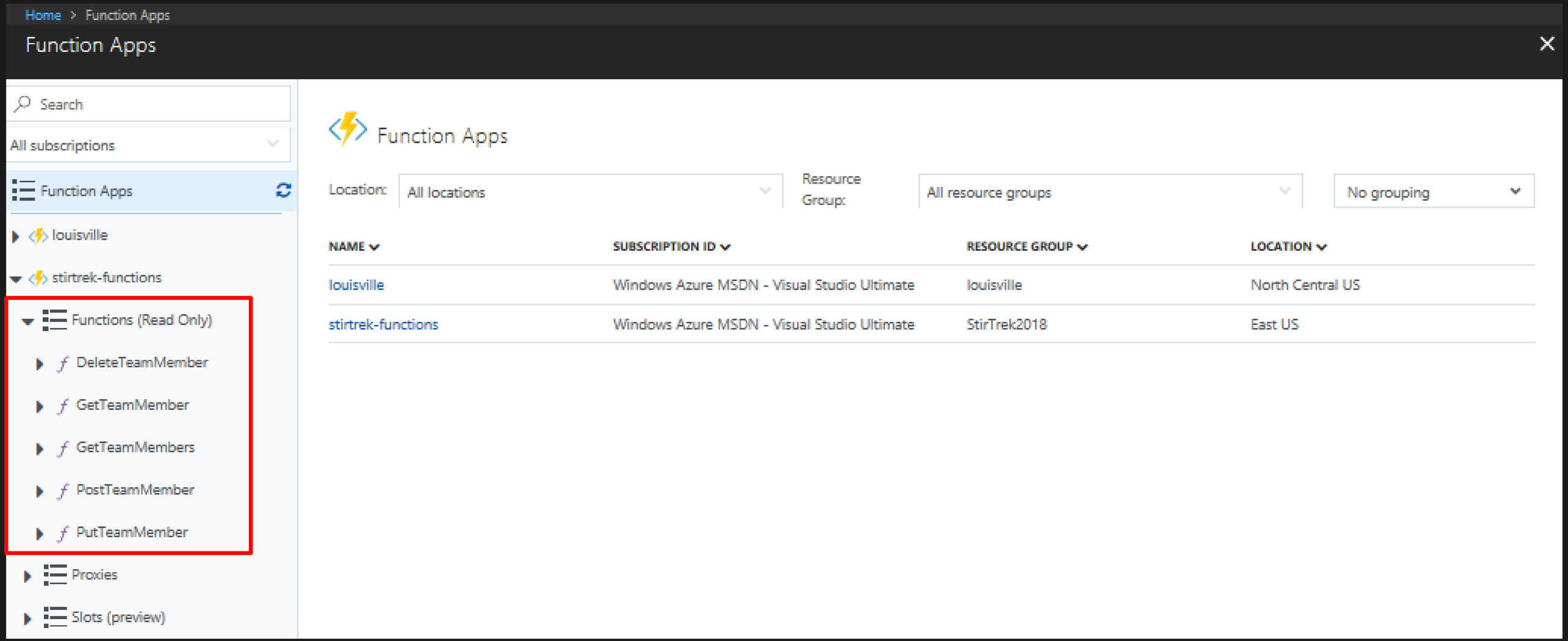
Build #20180429.1 has been queued.

Tasks | Variables | Triggers | Options | Retention | History | Save & queue | Discard | Summary | Queue | ...

Process
Build process

Name *


Build 20180429.1
Build and Deploy the Avengers.Functions
Job
Initialize Agent
Initialize Job
Get Sources
Use NuGet 4.4.1
NuGet restore
Build solution
Test Assemblies
Publish symbols path
Publish Artifact
Deploy the functions to Azure
Post Job Cleanup
Avengers.Functions / Build 20180429.1 / Build and Deploy the Avengers.Functions / Job
Edit build definition
Cancel
Queue new build...
Download all logs as zip
Release
Build Started
Job
Running for 7 seconds (Hosted Agent)
Console
Timeline
Code coverage*
Tests
Downloading task: PublishSymbols
Downloading task: PublishBuildArtifacts
Downloading task: AzureRmWebAppDeployment
Finishing: Initialize Job
Starting: Get Sources
Prepending Path environment variable with directory containing 'tf.exe'.
Setting environment variable TFVC_BUILDAGENT_POLICYPATH
Querying workspace information.


Home > Function Apps
Function Apps
Search
All subscriptions
Function Apps
louisville
stirtrek-functions
Functions (Read Only)
DeleteTeamMember
GetTeamMember
GetTeamMembers
PostTeamMember
PutTeamMember
Proxies
Slots (preview)
Function Apps
Location: All locations
Resource Group: All resource groups
No grouping
NAME
SUBSCRIPTION ID
RESOURCE GROUP
LOCATION
louisville
Windows Azure MSDN - Visual Studio Ultimate
louisville
North Central US
stirtrek-functions
Windows Azure MSDN - Visual Studio Ultimate
StirTrek2018
East US

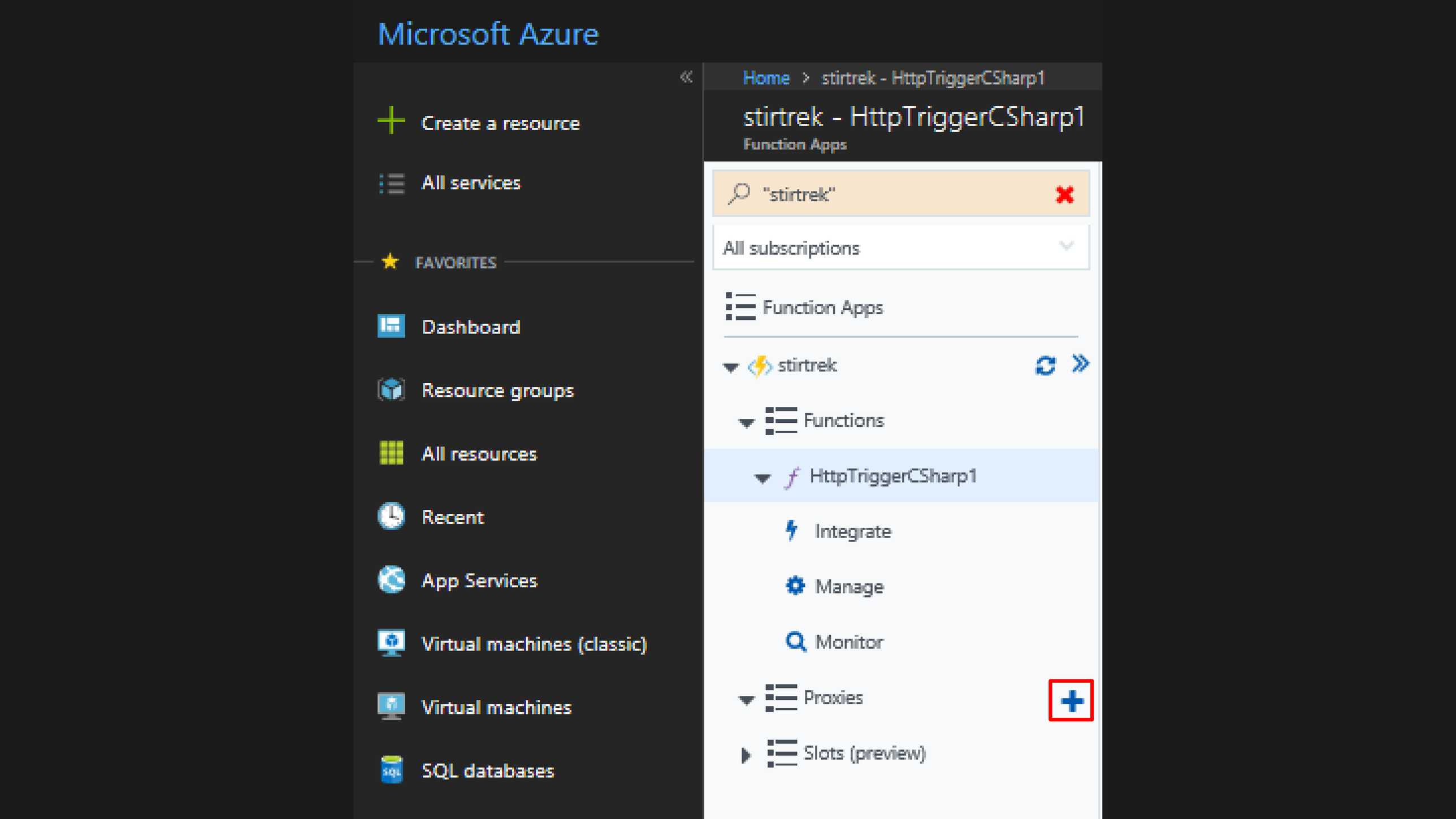
Proxies

- Provide more control over all functions or just select methods
- Can point to any HTTP resource

Take our current function url:
https://stirtrek.azurewebsites.net/api/HttpTriggerCSharp1?code=k9as3MKuDEAOyj3GbniZgJjWrn1cMqTAcDhbzqgAldUcYk67EX8QVg==&name={name}

Our function URL would then be like this:
https://stirtrek.azurewebsites.net/HelloWorld/{name}

Demo 4: Setting up routing and proxies


Microsoft Azure
Create a resource
All services
FAVORITES
Dashboard
Resource groups
All resources
Recent
App Services
Virtual machines (classic)
Virtual machines
SQL databases
Home > stirtrek - HttpTriggerCSharp1
stirtrek - HttpTriggerCSharp1
Function Apps
"stirtrek"
All subscriptions
Function Apps
stirtrek
Functions
HttpTriggerCSharp1
Integrate
Manage
Monitor
Proxies
Slots (preview)

New proxy

Name

Hello World Proxy

Route template

HelloWorld/{name}

Allowed HTTP methods

Selected methods

- [x] GET
- [ ] POST
- [ ] DELETE
- [ ] HEAD
- [ ] PATCH
- [ ] PUT
- [ ] OPTIONS
- [ ] TRACE

Backend URL

ps://stirtrek.azurewebsites.net/api/HttpTriggerCSharp1?code=k9as3MKuDEAOyj3GbniZgJjWrn1cMqTAcDhbzqgAldUcYk67EX8QVg==

− Request override

HTTP method

GET

Query

name {name}

+ Add parameter

Headers

+ Add header

+ Response override

Create

Hello World Proxy

Proxy URL

`https://stirtrek.azurewebsites.net/HelloWorld/{name}` Copy

Route template

HelloWorld/{name}

Allowed HTTP methods

Selected methods

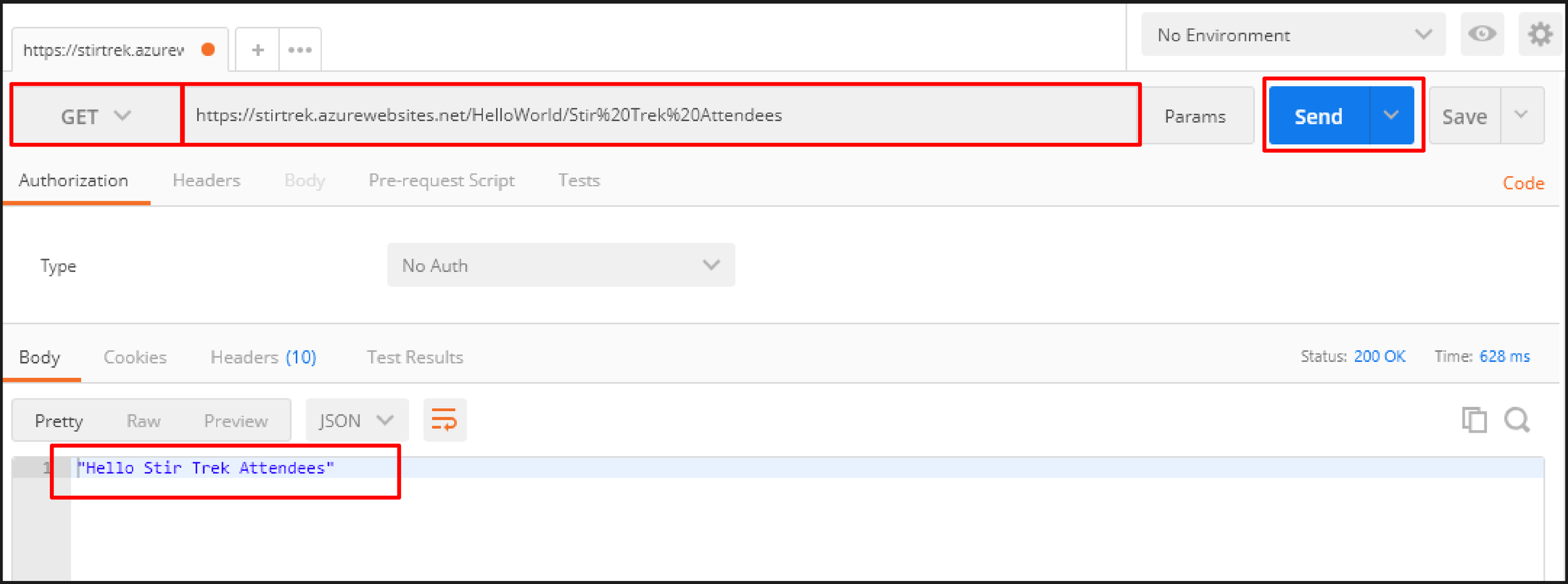
- [x] GET
- [ ] POST
- [ ] DELETE
- [ ] HEAD
- [ ] PATCH
- [ ] PUT
- [ ] OPTIONS
- [ ] TRACE

Backend URL

https://stirtrek.azurewebsites.net/api/HttpTriggerCSharp1?code=k9as3MKuDEAOyj3GbniZgJjWrn1cMqTAcDhbzqgAldUcYk67EX8QVg

+ Request override

+ Response override


https://stirtrek.azurev
No Environment
GET
https://stirtrek.azurewebsites.net/HelloWorld/Stir%20Trek%20Attendees
Params
Send
Save
Authorization
Headers
Body
Pre-request Script
Tests
Code
Type
No Auth
Body
Cookies
Headers (10)
Test Results
Status: 200 OK
Time: 628 ms
Pretty
Raw
Preview
JSON
1
"Hello Stir Trek Attendees"

GetTeamMember

Proxy URL

`https://avengerproxy.azurewebsites.net/TeamMember/{Id}` Copy

Route template

TeamMember/{Id}

Allowed HTTP methods

Selected methods

- [x] GET
- [ ] POST
- [ ] DELETE
- [ ] HEAD
- [ ] PATCH
- [ ] PUT
- [ ] OPTIONS
- [ ] TRACE

Backend URL

https://stavengers.azurewebsites.net/api/GetTeamMember?code=pxrv3nVaDvAZBYvtCFNnDgVobgg5FpS0xMy6zPGZUEsIr4uYALMLX(

— Request override

HTTP method

GET

Query

Id	{Id}

+ Add parameter

Headers

+ Add header

+ Response override

GetTeamMembers

Proxy URL

https://avengerproxy.azurewebsites.net/TeamMember

Copy

Route template

TeamMember

Allowed HTTP methods

Selected methods

- [x] GET
- [ ] POST
- [ ] DELETE
- [ ] HEAD
- [ ] PATCH
- [ ] PUT
- [ ] OPTIONS
- [ ] TRACE

Backend URL

https://stavengers.azurewebsites.net/api/GetTeamMembers?code=pVX8/DnTPlCzvEktC7CEqzNlvStovGQoJbAM5nOZh0SQHphYsDZ4t

– Request override

HTTP method

No override

Query

+ Add parameter

Headers

+ Add header

+ Response override

PostTeamMember

Proxy URL

https://avengerproxy.azurewebsites.net/TeamMember

Copy

Route template

TeamMember

Allowed HTTP methods

Selected methods

- [ ] GET
- [x] POST
- [ ] DELETE
- [ ] HEAD
- [ ] PATCH
- [ ] PUT
- [ ] OPTIONS
- [ ] TRACE

Backend URL

https://stavengers.azurewebsites.net/api/PostTeamMember?code=YES6hsYzyXzlEZ6EvCj4lev62w2t75c2we5lUH9aVdaUS4kCh2iSJg==

− Request override

HTTP method

No override

Query

+ Add parameter

Headers

+ Add header

+ Response override

PutTeamMember

Proxy URL

https://avengerproxy.azurewebsites.net/TeamMember Copy

Route template

TeamMember

Allowed HTTP methods

Selected methods

- [ ] GET
- [ ] POST
- [ ] DELETE
- [ ] HEAD
- [ ] PATCH
- [x] PUT
- [ ] OPTIONS
- [ ] TRACE

Backend URL

https://stavengers.azurewebsites.net/api/PutTeamMember?code=5EJU9WE1FSXhOAHE9jwqagRcpwowLTBkLSUhqhvJajkMUU6eQbm2

− Request override

HTTP method

No override

Query

+ Add parameter

Headers

+ Add header

+ Response override

DeleteTeamMember

Proxy URL

https://avengerproxy.azurewebsites.net/TeamMember/{Id}

Copy

Route template

TeamMember/{Id}

Allowed HTTP methods

Selected methods

- [ ] GET
- [ ] POST
- [x] DELETE
- [ ] HEAD
- [ ] PATCH
- [ ] PUT
- [ ] OPTIONS
- [ ] TRACE

Backend URL

https://stavengers.azurewebsites.net/api/DeleteTeamMember?code=J7UQVSRuXS/1vCaqvHUkXDgd7fBKJMuRg5R5kutR/IPcaebCRCN

- Request override

HTTP method

DELETE

Query

Id	{Id}

+ Add parameter

Headers

+ Add header

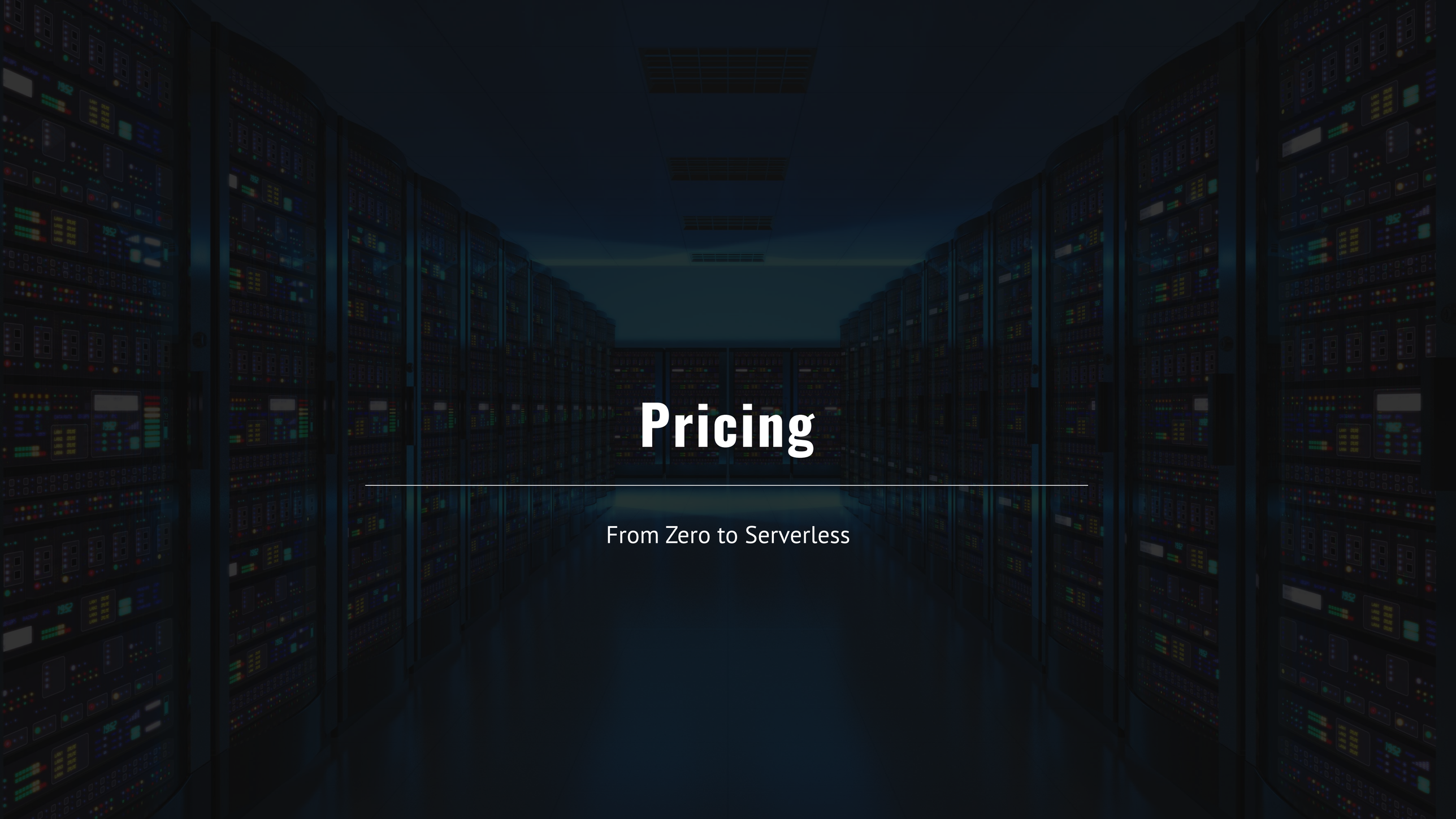
+ Response override

Securing your Azure Functions

- HTTPTriggers can be protected by OAuth providers
  - Azure Active Directory
  - Microsoft Account
  - Facebook
  - Google
  - Twitter

Function Timeouts

- Default timeout of 5 minutes
- Maximum timeout of 10 minutes
- For longer running functions use the App Service Plan and/or Durable Functions



Pricing

From Zero to Serverless

Pricing – General Information

- No upfront cost
- No termination fees
- Pay only for what you use

Pricing – Two Different Pricing Plans

Consumption Plan

- Takes care of everything but your code
- Pay only when your functions are running
- Scale out automatically

App Service Plan

- You pretty much take care of everything
- Consider when:
  - Existing, underutilized VMs
  - Function apps to run continuously
  - More CPU or memory options
  - Run longer than maximum execution time
  - Require features only available on App Service plan
  - Want to run on Linux (on general availability tier)

Pricing – Consumption Plan Details

Meter	Price	Free Grant
Execution Time	$0.000016 per Gb-s	400,000 GB-s
Executions	$0.20 per million executions	1 million executions

- Gigabyte-second (GB-s) – Combination of memory size and execution time
- Executions – Each time a function is executed

Pricing Example

- Execution Time
  - 3 million executions x 1 second per execution = 3 million seconds
  - Resource consumption of 512-Mb → 1.5 million GB-s
  - 1.5 million GB-s minus grant of 400,000 Gb-s = 1.1 million Gb-s
  - Execution Total = $17.60
- Executions
  - 3 million executions minus grant of 1 million executions = 2 million executions
  - 2 million transactions at 20 cents per million = $0.40
- Grand Total: $18.00

Best Practices

From Zero to Serverless

The absolute minimum best practices

- Functions *should* do one thing
- Functions *should* be idempotent
- Functions *should* finish as quickly as possible

General Best Practices

- Avoid long running functions

General Best Practices

- Avoid long running functions
- Cross function communication

General Best Practices

- Avoid long running functions
- Cross function communication
- Write functions to be stateless

General Best Practices

- Avoid long running functions
- Cross function communication
- Write functions to be stateless
- Write defensive functions

Scalability Best Practices

- Do not mix test and production code in the same function app

Scalability Best Practices

- Do not mix test and production code in the same function app
- Use async code but avoid blocking calls

Scalability Best Practices

- Do not mix test and production code in the same function app
- Use async code but avoid blocking calls
- Receive messages in batch whenever possible

Scalability Best Practices

- Do not mix test and production code in the same function app
- Use async code but avoid blocking calls
- Receive messages in batch whenever possible
- Configure host behaviors to better handle concurrency

Where to get started

- Start small, replace 1 API or background processing item
- Integration is a great place, often it’s a new layer on top of old layers

Questions

chadgreen@chadgreen.com

chadgreen.com

ChadGreen

ChadwickEGreen

bit.ly/CCruise18