



Chad Green

From Zero to Serverless

DogFoodCon
October 4, 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](https://twitter.com/ChadGreen)

 [ChadwickEGreen](https://www.linkedin.com/in/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**?

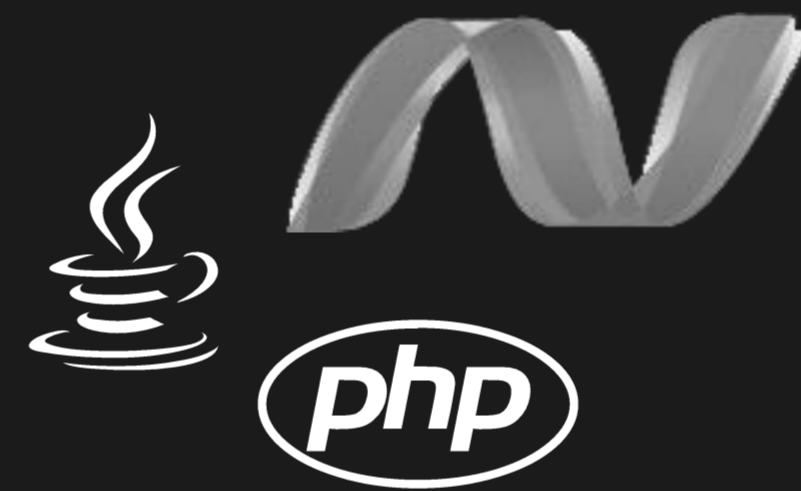
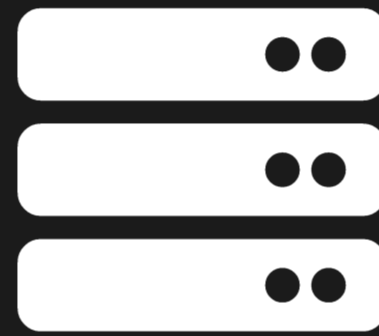
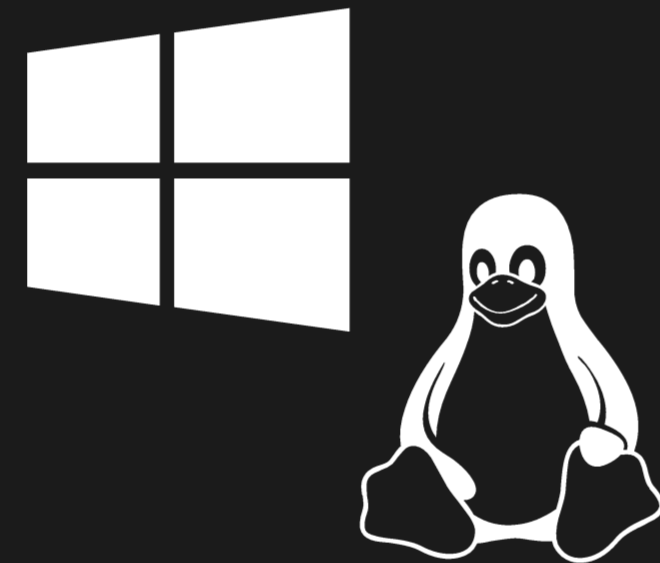
What size of **servers** should I **buy**?

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

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

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

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?

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



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

How can I dynamically **configure** my app?

The evolution of application platforms

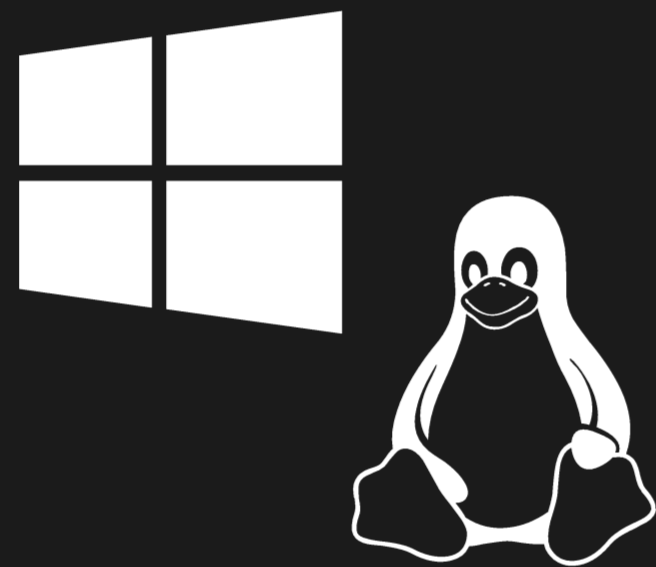
IaaS

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

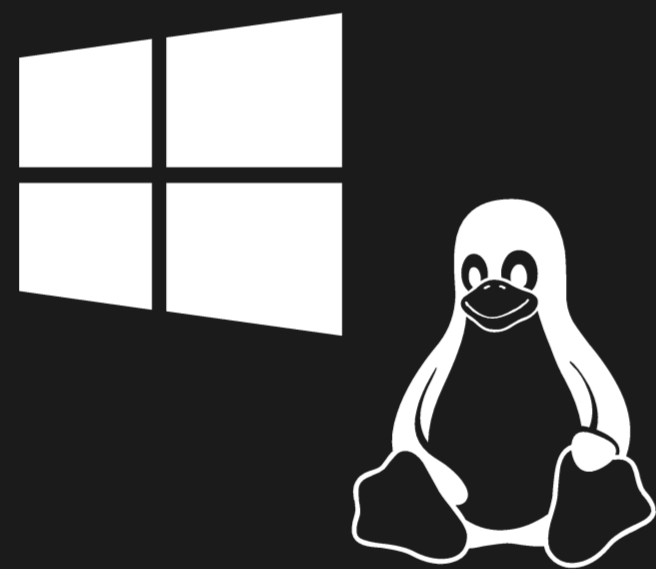
PaaS

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

How can I increase **server** utilization?

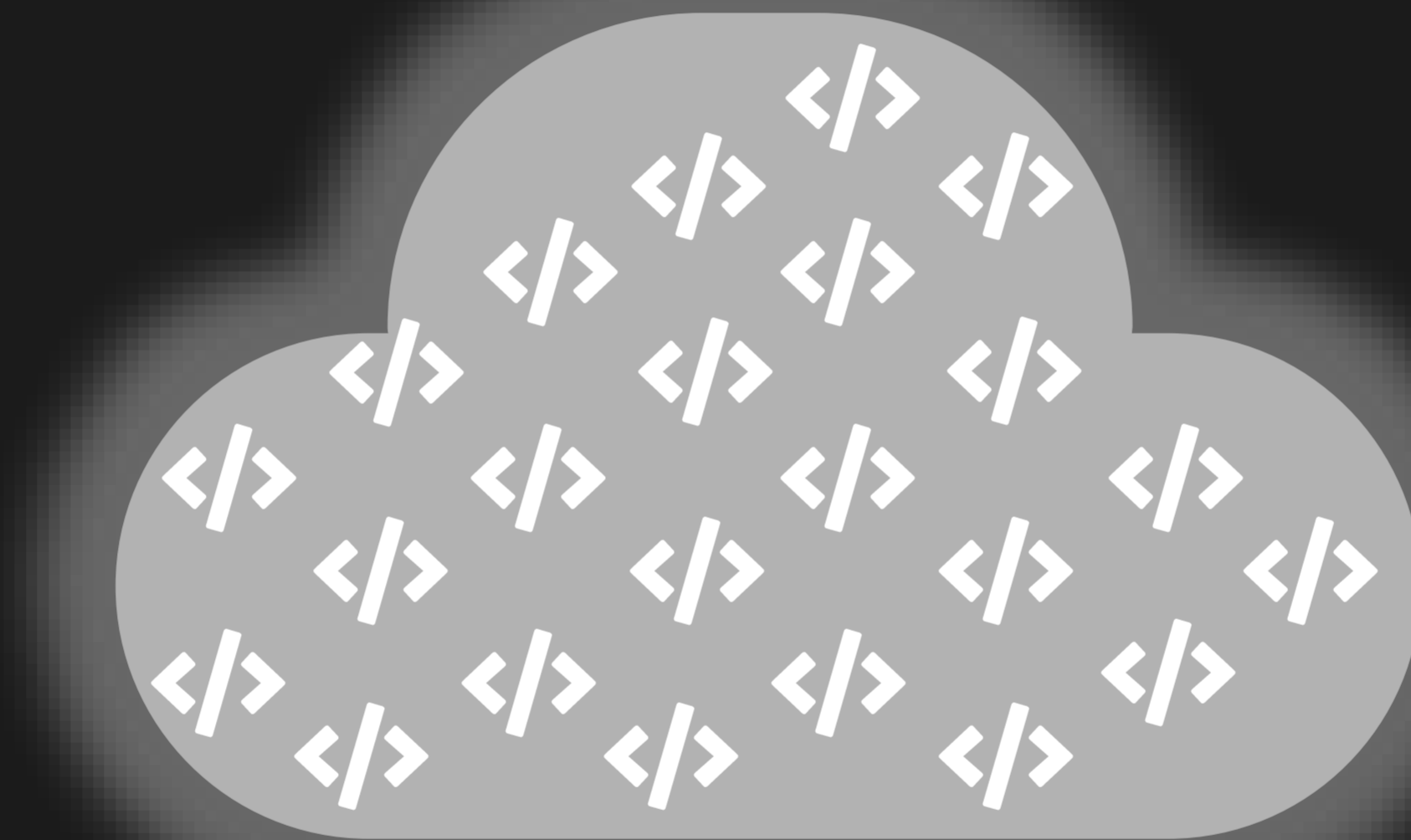
How many **servers** do I need?

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

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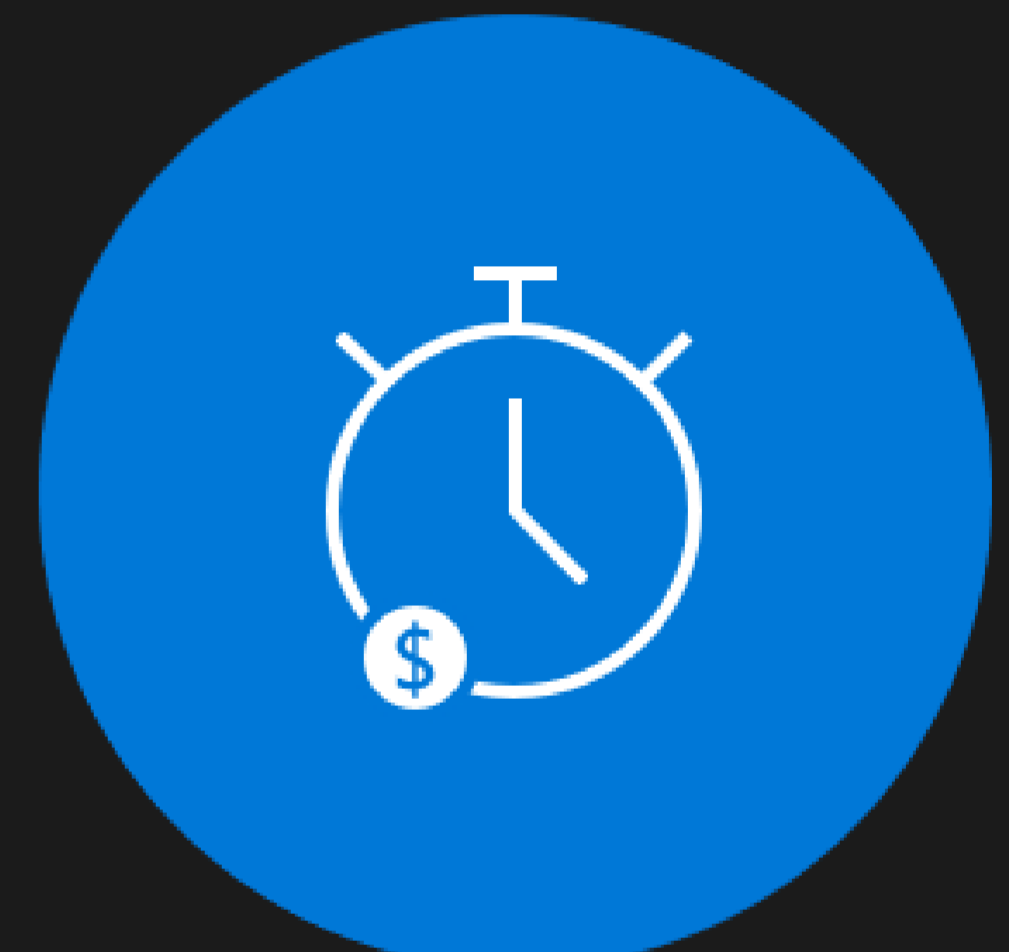
What is Serverless?



Abstraction of Servers



Event-Driven/Instant Scale



Micro-Billing

Benefits of Serverless



Manage apps not servers

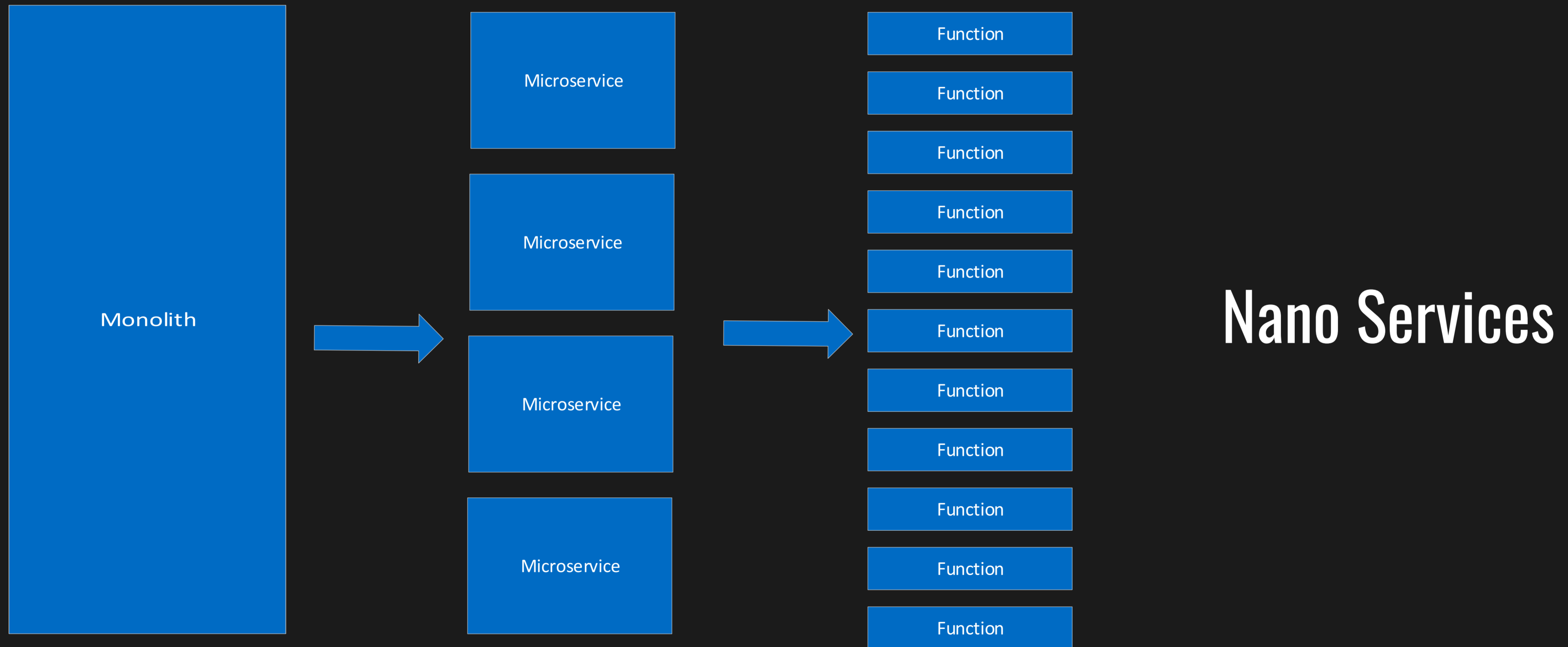


Reduced DevOps



Faster Time to Market

Serverless Scale



Challenges of Serverless Architecture

Complexity

**Organizational
Support**

**No Runtime
Optimization**



Serverless Options

From Zero to Serverless

Serverless Options

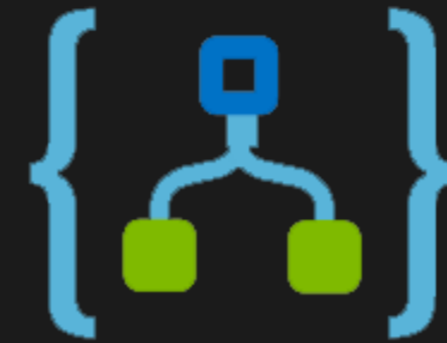
- ~~Zimki~~
- Google Cloud Functions
- Amazon Lambda
- IBM Cloud Functions
- Auth0 WebTask
- Azure

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



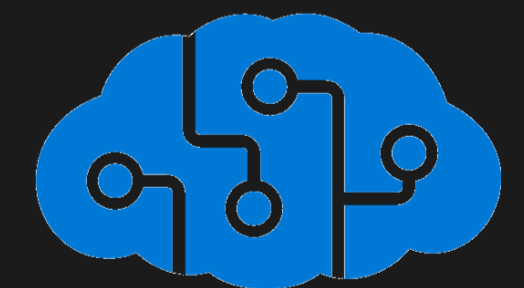
Security



IoT



Analytics



Intelligence

Code

Events + data



Azure Functions

From Zero to Serverless

Azure Functions Architecture

Code

Config

Language Runtime

C#, Node.js, F#, PHP, etc.

WebJobs Script Runtime

Azure Functions Host – Dynamic Compilation, Language abstractions, etc.

WebJobs Core

Programming model, common abstractions

WebJobs Extensions

Triggers, input, and output bindings

App Service Dynamic Runtime

Hosting, CI, Deployment Slots, Remote Debugging, etc.

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

A screenshot of the GitHub repository page for Azure Functions. The page shows the repository name 'Azure / Azure-Functions', the number of commits (56), branches (3), releases (0), and contributors (9). It also displays a list of recent commits, including 'Update VS-AzureTools-ReleaseNotes.md' and 'Update ISSUE_TEMPLATE.md'. The 'readme.md' file is highlighted, and its content is visible below, including the title 'Azure Functions' and a description of the service.

Search or jump to... Pull requests Issues Marketplace Explore

Azure / Azure-Functions Watch 126 Star 397 Fork 47

Code Issues 363 Pull requests 0 Projects 1 Wiki Insights

No description or website provided.

azure-functions

56 commits 3 branches 0 releases 9 contributors

Branch: master New pull request Create new file Upload files Find file Clone or download

cartermp Update VS-AzureTools-ReleaseNotes.md Latest commit 4f6f061 on Jun 25

.github	Update ISSUE_TEMPLATE.md	a year ago
VS-AzureTools-ReleaseNotes.md	Update VS-AzureTools-ReleaseNotes.md	2 months ago
readme.md	Update issues links based on repo renames	5 months ago

readme.md

Azure Functions

Azure Functions is an event driven, compute-on-demand experience that extends the existing Azure application platform with capabilities to implement code triggered by events occurring in virtually any Azure or 3rd party service as well as on-premises systems. Azure Functions allows developers to take action by connecting to data sources or messaging solutions, thus making it easy to process and react to events. Azure Functions scale based on demand and you pay only for the resources you consume.

This repository acts as a directory for folks looking for the various resources we have for Azure Functions.

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



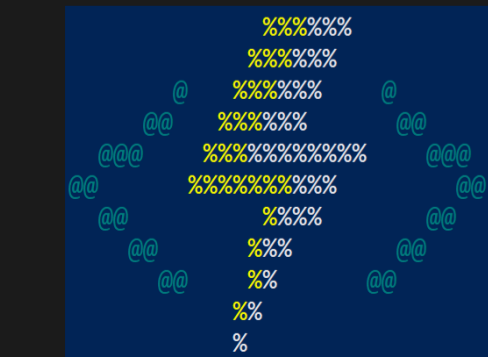
- Azure Portal
 - Quickly get started without having to install anything else



- 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

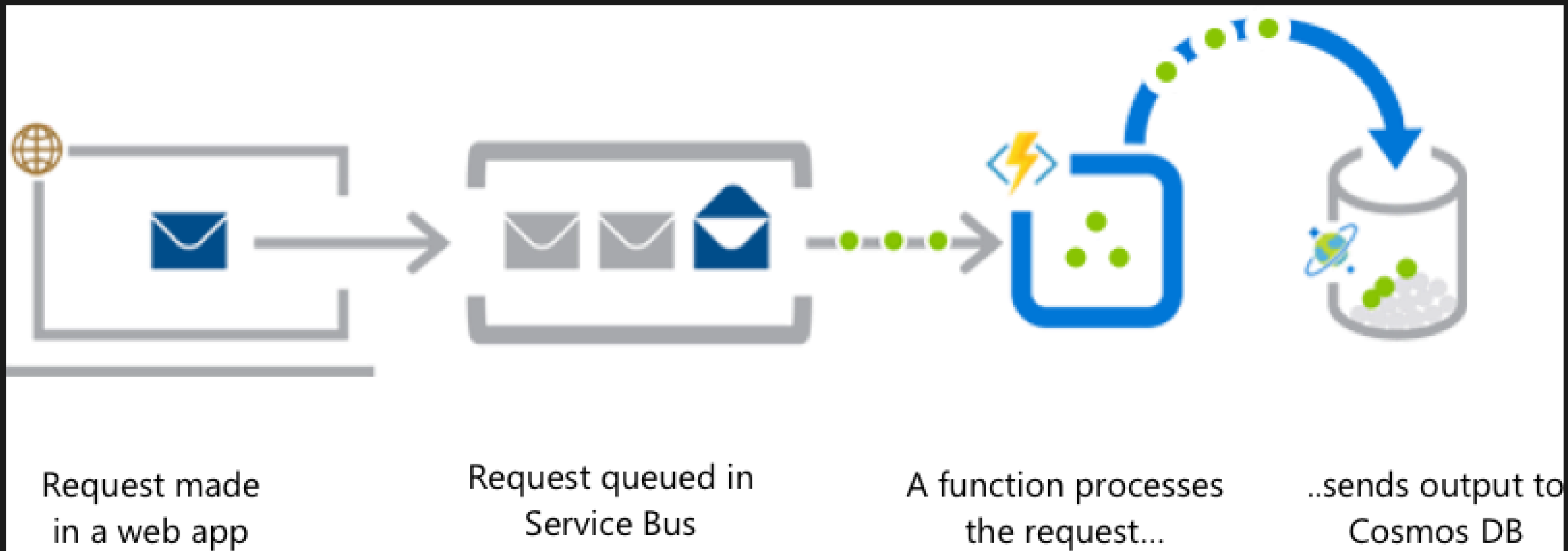
Runtime 1.x

- .NET Framework 4.6
- Generally Available

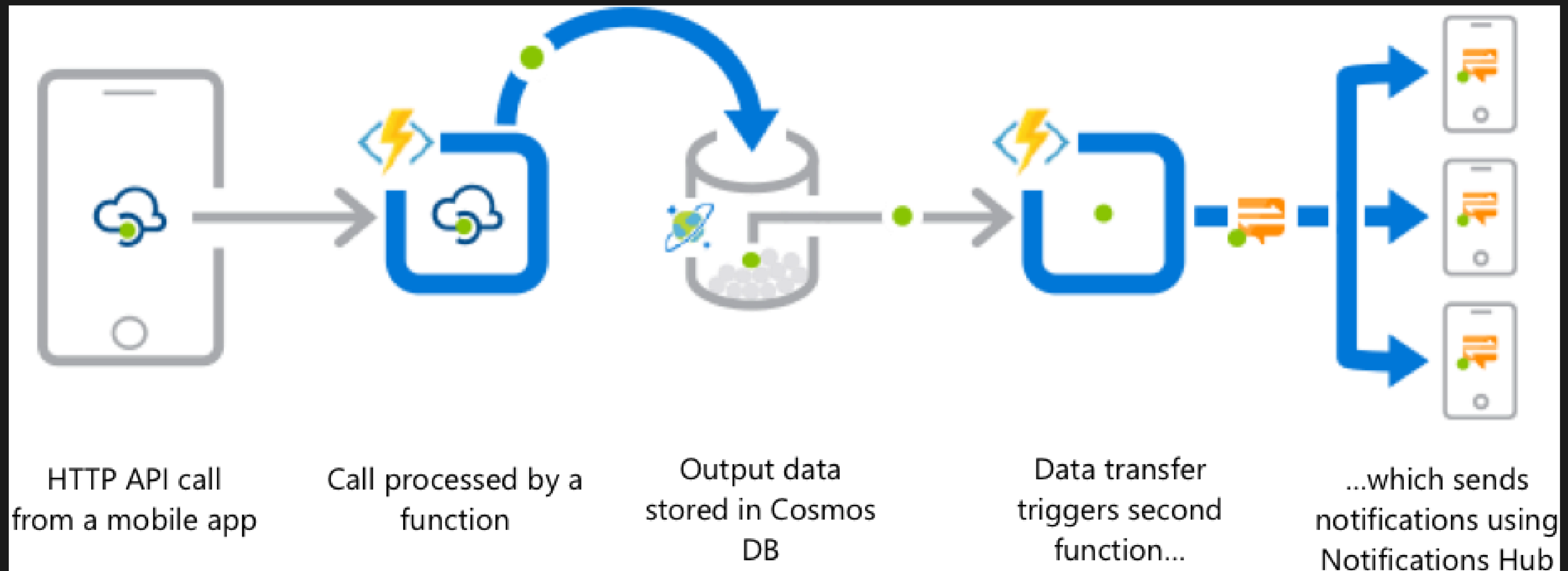
Runtime 2.x

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

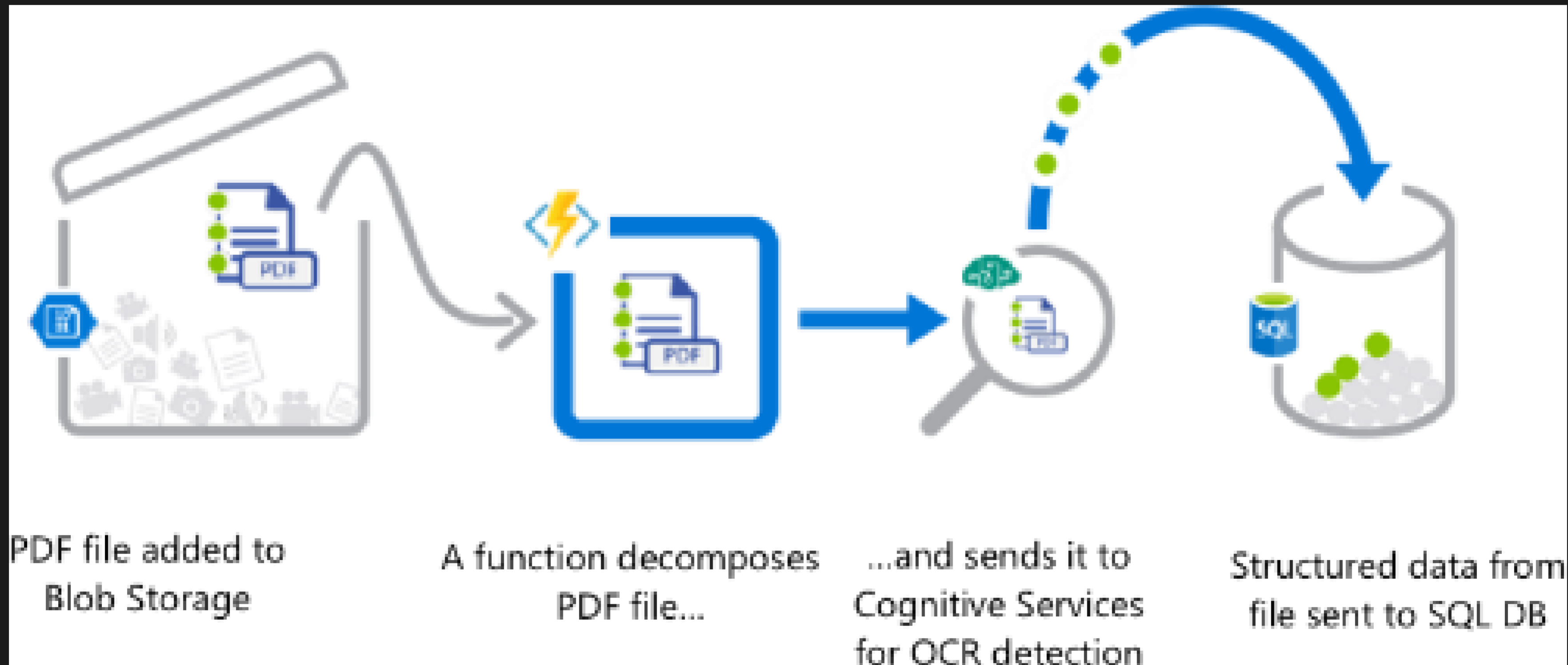
Web Application Backends



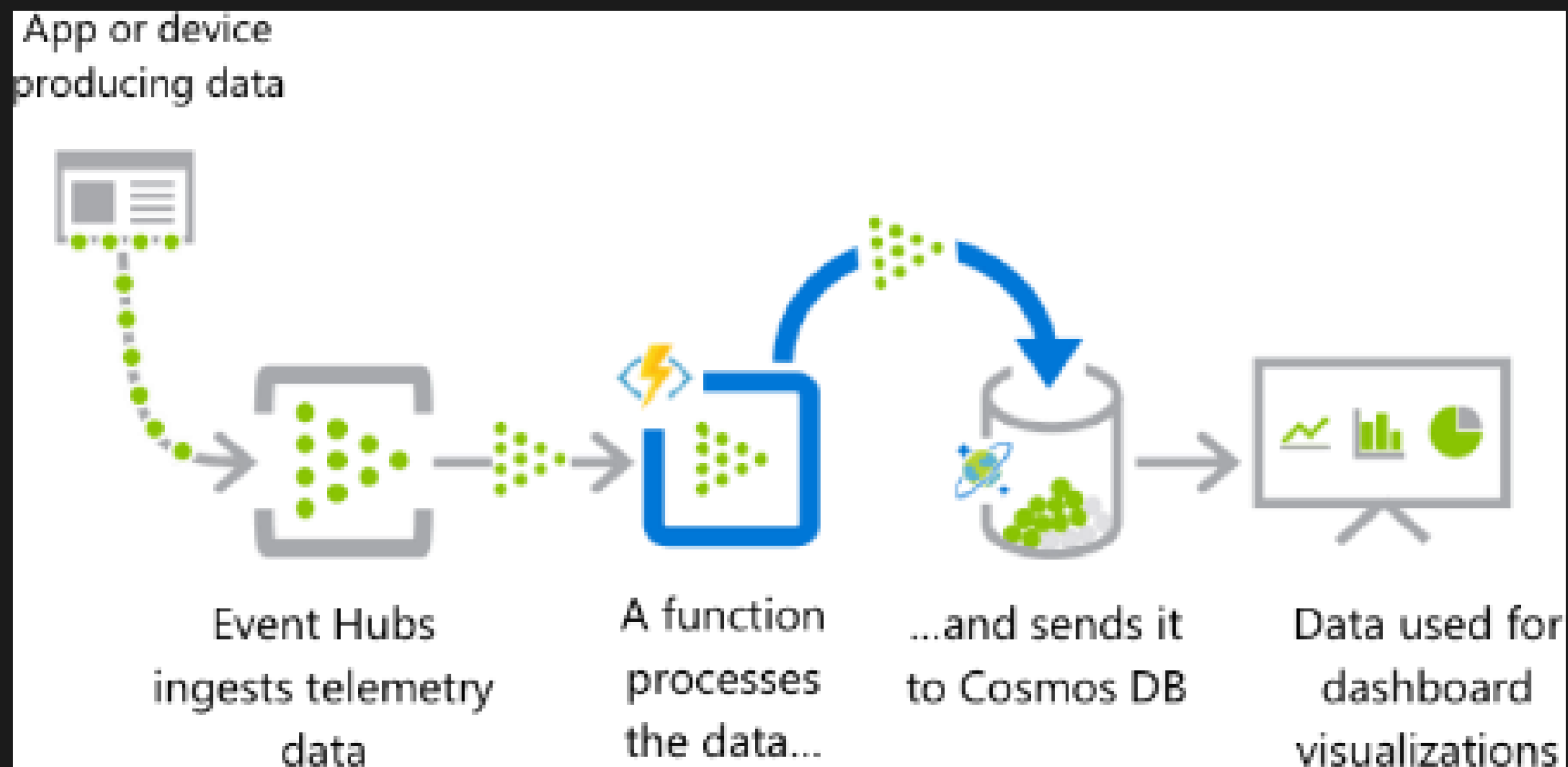
Mobile Application Backends



Real-Time File Processing



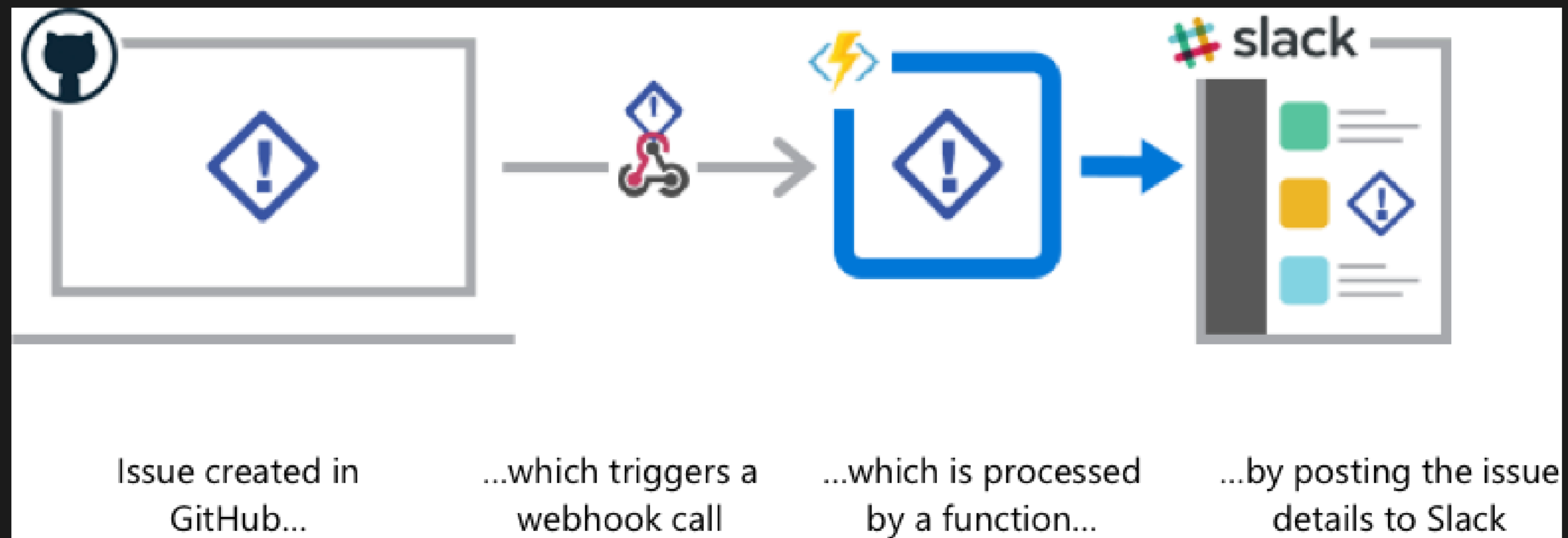
Real-Time Stream Processing



Automation of Scheduled Tasks



Extending SaaS Applications





Demo 1: Create an Azure
Function from the Portal

+ 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](#)

Marketplace

Help + support

chadgreen
WEB APP

Running

louisvilleazurebootca...
WEB APP

Running

louisvilleazurebootca...

Deleted

CPL-Attendees
SQL DATABASE

Online

- 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](#) Featured [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

-  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

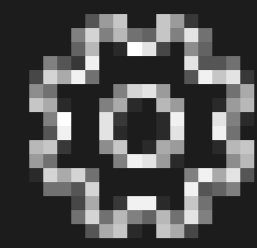
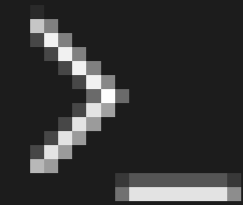
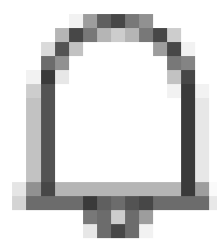
* Storage ⓘ
 Create new Use existing
stirrekfunction8e7d ✓

Application Insights ⓘ On Off

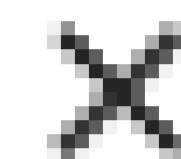
Pin to dashboard

Create

[Automation options](#)



chadgreen@chadgre...
CHAD GREEN (CHADGREENC...



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](#)

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

Create a resource

All services

FAVORITES

Dashboard

Resource groups

All resources

Recent

App Services

Virtual machines (classic)

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Function Apps

Home > stirrek-functions - HttpTriggerCSharp1

stirrek-functions - HttpTriggerCSharp1

Function Apps

Search

All subscriptions

Function Apps

stirrek-functions

Functions

HttpTriggerCSharp1

Integrate

Manage

Monitor

Proxies

Slots (preview)

run.csx

Save

Run

Get function URL

```
1 using System.Net;
2
3 public static async Task<HttpResponseMessage> Run(HttpRequestMessage req, TraceWriter log)
4 {
5     log.Info("C# HTTP trigger function processed a request.");
6
7     // parse query parameter
8     string name = req.GetQueryStringParameter("name");
9     string url = req.GetQueryStringParameter("url");
10
11     if (name == null)
12     {
13         // Get request body
14         dynamic data = await req.Content.ReadAsStringAsync();
15         name = data?.name;
16     }
17
18     return name == null
19         ? req.CreateResponse(HttpStatusCode.BadRequest, "Please pass a name on the query string or in the request body")
20         : req.CreateResponse(HttpStatusCode.OK, "Hello " + name);
21 }
22
23
```

Key
default (Host key)

URL
https://stirrek-functions.azurewebsites.net/api/HttpTriggerCSharp1?code=3QSZbp3IBhquawGny78Igj0sHkruq5p67J7ZczNmcnaFIUNKORAc6w==

Copy

stirtrek-functions.azurev X + v - □ X

← → ↻ <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	Subscription	Resource group	URL
 Running	Windows Azure MSDN - Visual Studio Ultimate	StirTrek2018	https://stirtrek-functions.azurewebsites.net
	Subscription ID	Location	App Service plan / pricing tier
	080cb092-efc4-4c0a-b0e8-c0f5c864090c	East US	EastUSPlan (Consumption)







Configured features

 [Function app settings](#)

 [Application settings](#)

 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



Daily Usage Quota (GB-Sec) ⓘ

Application settings

[Manage application settings](#)

Runtime version

Runtime version: 1.0.11702.0 (~1)

Function app edit mode

Change the edit mode of your function app

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.

Host Keys (All functions)

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

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](#).

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++.


 **Desktop development with C++**

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

 **.NET desktop development**

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

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








By continuing, you agree to the [license](#) for the Visual Studio edition you selected. We also offer the ability to download other software with Visual Studio. This software is licensed separately, as set out in the [3rd Party Notices](#) or in its accompanying license. By continuing, you also agree to those licenses.

Modify

- 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:

Location:

Solution name:

-
- Create directory for solution
- Add to Source Control

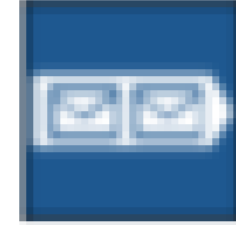
Azure Functions v1 (.NET Framework)



Empty



Http trigger



Queue trigger



Timer trigger

Storage Account (AzureWebJobsStorage)

Storage Emulator

⚠ Some capabilities may require an Azure storage account.

Access rights

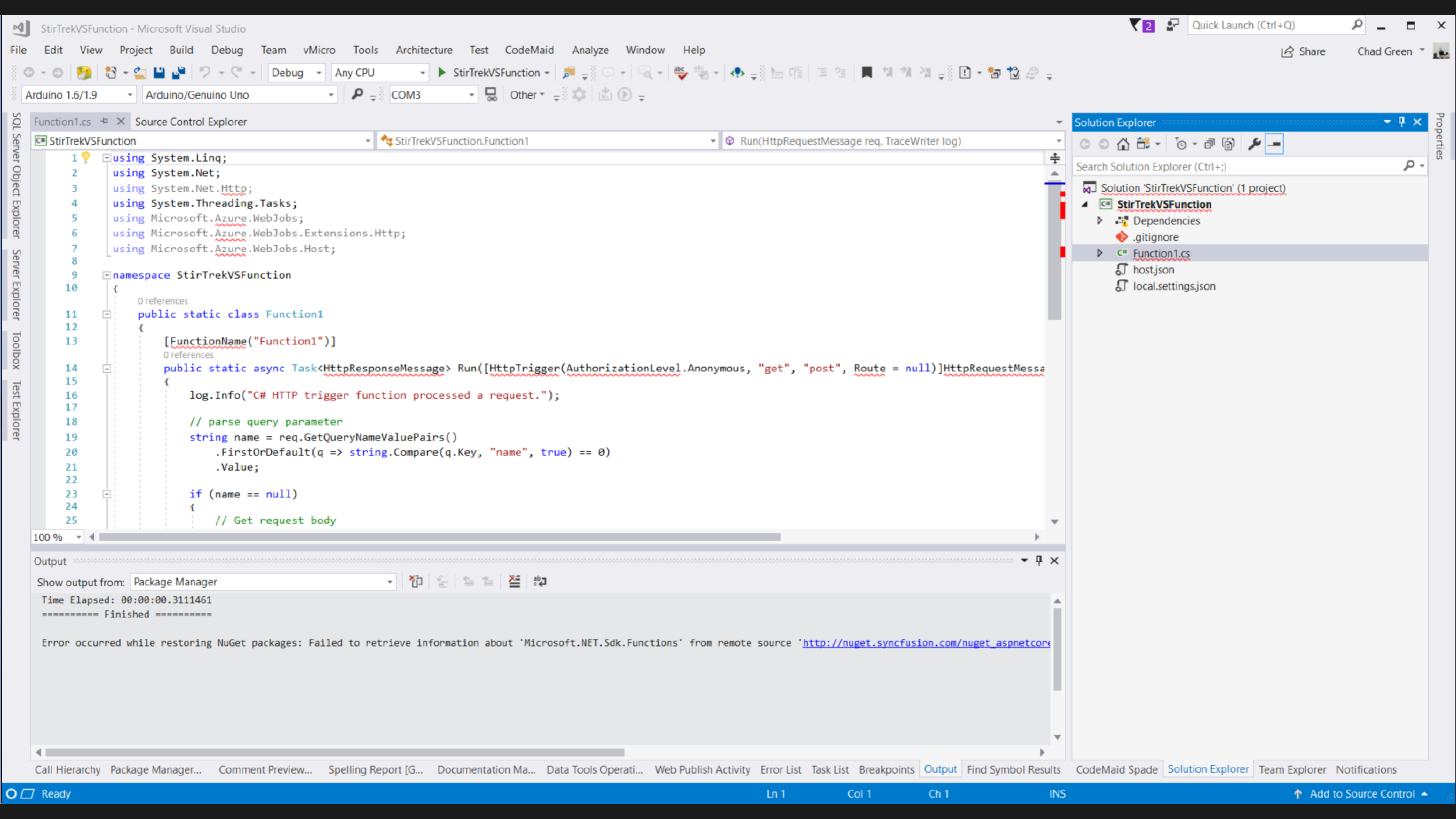
Anonymous

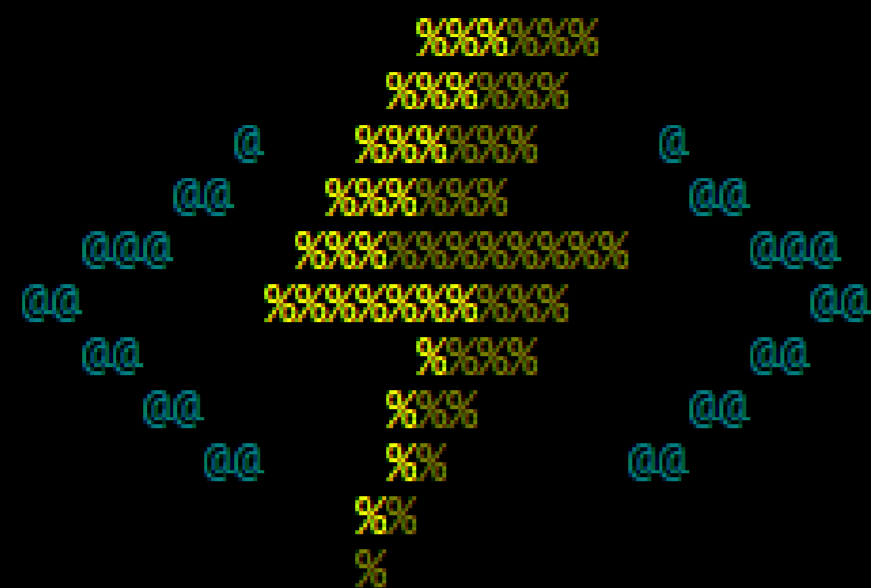
Creates an Azure function project with an Http trigger. Additional triggers can be added during development

[Get started with Azure Functions](#)

OK

Cancel





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

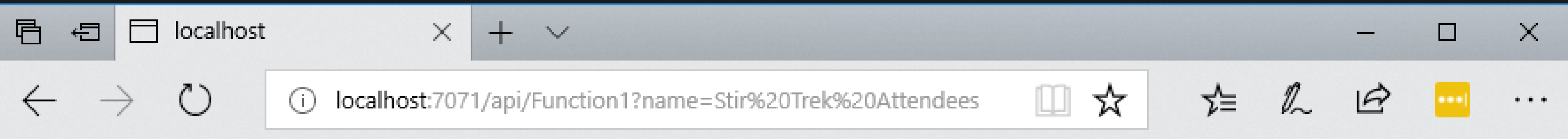
[4/18/2018 3:52:28 AM] Job host started

[4/18/2018 3:52:29 AM] Host lock lease acquired by instance ID '0000000000000000000000002F9917ED'.

Debugger listening on [::]:5858

localhost

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



"Hello Stir Trek Attendees"

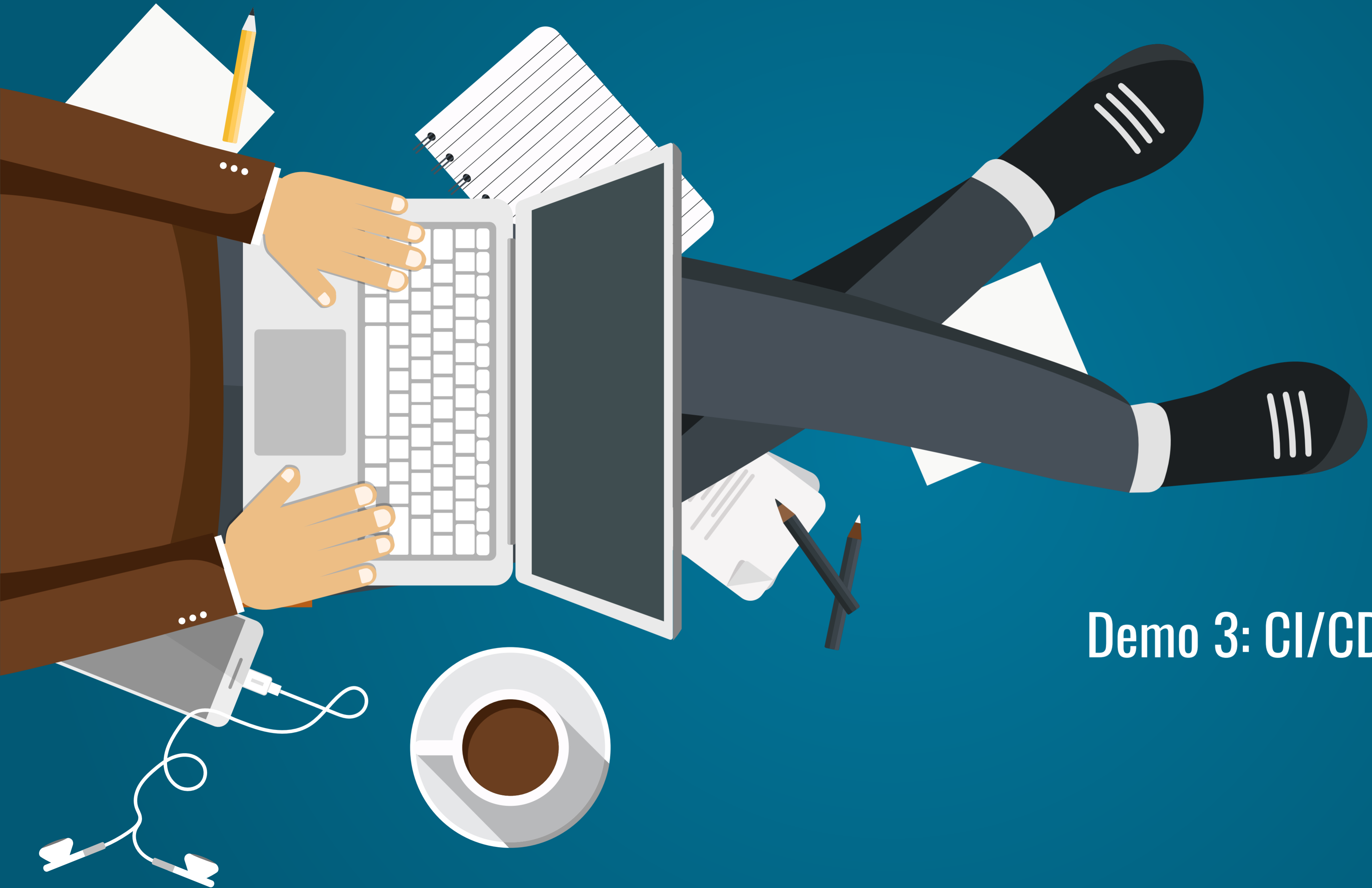
Deployment and Monitoring

Deployment Options


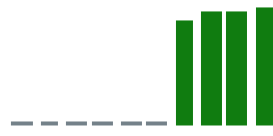

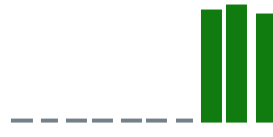




- Visual Studio
- Functions CLI
- Visual Studio Team Services
- Azure Resource Manager
- Maven / Jenkins

Monitoring Options

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



Demo 3: CI/CD

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 FunctionsSupport package and started the Functions library. 🔗 422 in 📁 \$/Stir Trek 2018/Dev/v1.00/Avengers.Data	

Select a source

TFVC

GitHub

GitHub Enterprise

Subversion

Bitbucket® Cloud

External Git

Workspace mappings

Type	Server path
Map <input type="checkbox"/>	\$/Stir Trek 2018 <input type="button" value="..."/>

Local path under \$(build.sourcesDirectory)

+ Add

Continue

Select a template

Or start with an [Empty process](#)

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.

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

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

azure 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](#) [X Remove](#)

Version

Display name *

Azure subscription * ⓘ | [Manage](#)

⌵ ↻

App type * ⓘ

⌵

App Service name * ⓘ

⌵ ↻

Deploy to slot ⓘ

Virtual application ⓘ

Package or folder * ⓘ

⋮

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 *

 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.
```

- ▶ 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

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

 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 

GET

POST

DELETE

HEAD

PATCH

PUT

OPTIONS

TRACE

Backend URL

ps://stirtrek.azurewebsites.net/api/HttpTriggerCSharp1?code=k9as3MKuDEAOyj3GbniZgJjWrm1cMqTAcDhnbzqgAldUcYk67EX8QVg==

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 

GET

POST

DELETE

HEAD

PATCH

PUT

OPTIONS

TRACE

Backend URL

`https://stirtrek.azurewebsites.net/api/HttpTriggerCSharp1?code=k9as3MKuDEAOyj3GbniZgJjWm1cMqTAcDhzbzqgAldUcYk57EX8QVg`

[+ 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 

- | | | | |
|---|-------------------------------|----------------------------------|--------------------------------|
| <input checked="" type="checkbox"/> GET | <input type="checkbox"/> POST | <input type="checkbox"/> DELETE | <input type="checkbox"/> HEAD |
| <input type="checkbox"/> PATCH | <input type="checkbox"/> PUT | <input type="checkbox"/> OPTIONS | <input type="checkbox"/> TRACE |

Backend URL

`https://stavengers.azurewebsites.net/api/GetTeamMember?code=pxrv3nVaDvAZBYvtCFNnDgVobgg5FpS0xMy6zPGZUEsIr4uYALMLX0`

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

GET

POST

DELETE

HEAD

PATCH

PUT

OPTIONS

TRACE

Backend URL

`https://stavengers.azurewebsites.net/api/GetTeamMembers?code=pVX8/DnTPICzvEktC7CEqzNlvStovGQoJbAM5nOZh05QHphYsDZ4t`

[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

POST

DELETE

HEAD

PATCH

PUT

OPTIONS

TRACE

Backend URL

`https://stavengers.azurewebsites.net/api/PostTeamMember?code=YES6hsYzyXzIEZ6EvCj4lev62w2t75c2we5IUH9aVdaUS4kCh2iSjg==`

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

PUT

OPTIONS

TRACE

Backend URL

`https://stavengers.azurewebsites.net/api/PutTeamMember?code=5EJU9WE1FSXhOAHE9jwqagRcpwowLTBkLSUhqhvJajkMUU6eQbm?`

[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 

- | | | | |
|--------------------------------|-------------------------------|--|--------------------------------|
| <input type="checkbox"/> GET | <input type="checkbox"/> POST | <input checked="" type="checkbox"/> DELETE | <input type="checkbox"/> HEAD |
| <input type="checkbox"/> PATCH | <input type="checkbox"/> PUT | <input type="checkbox"/> OPTIONS | <input type="checkbox"/> 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

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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



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