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Cloud Development with Azure Developer CLI (azd)

Jonah Andersson

slido



**How do you feel and excited
are you for Sweetugg today?**

ⓘ Start presenting to display the poll results on this slide.



SOURCE CODE!

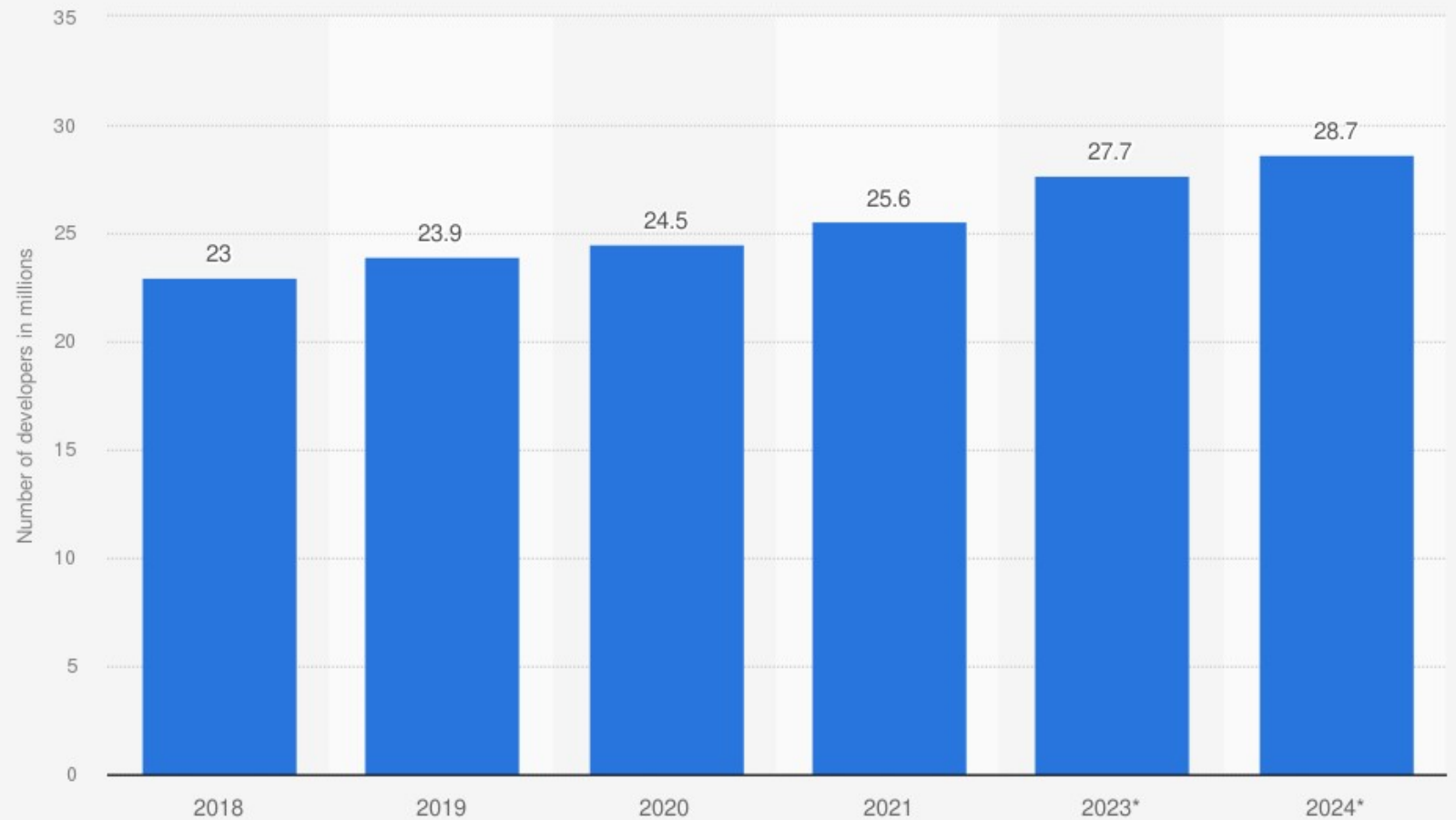
Who are developers here?

28.7 millions
developers
around the
world.

Statista.com



Number of software developers worldwide in 2018 to 2024 (in millions)

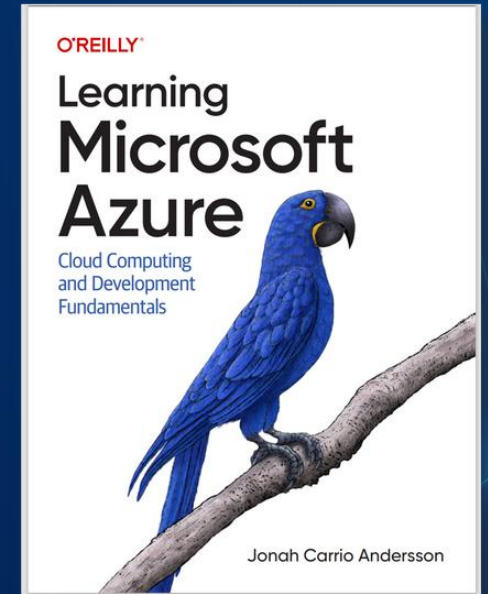


Source
Evans Data
© Statista 2023

Additional Information:
Worldwide; 2018 to 2022

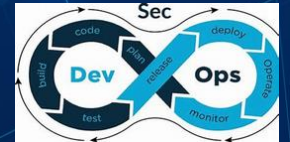
JONAH ANDERSSON

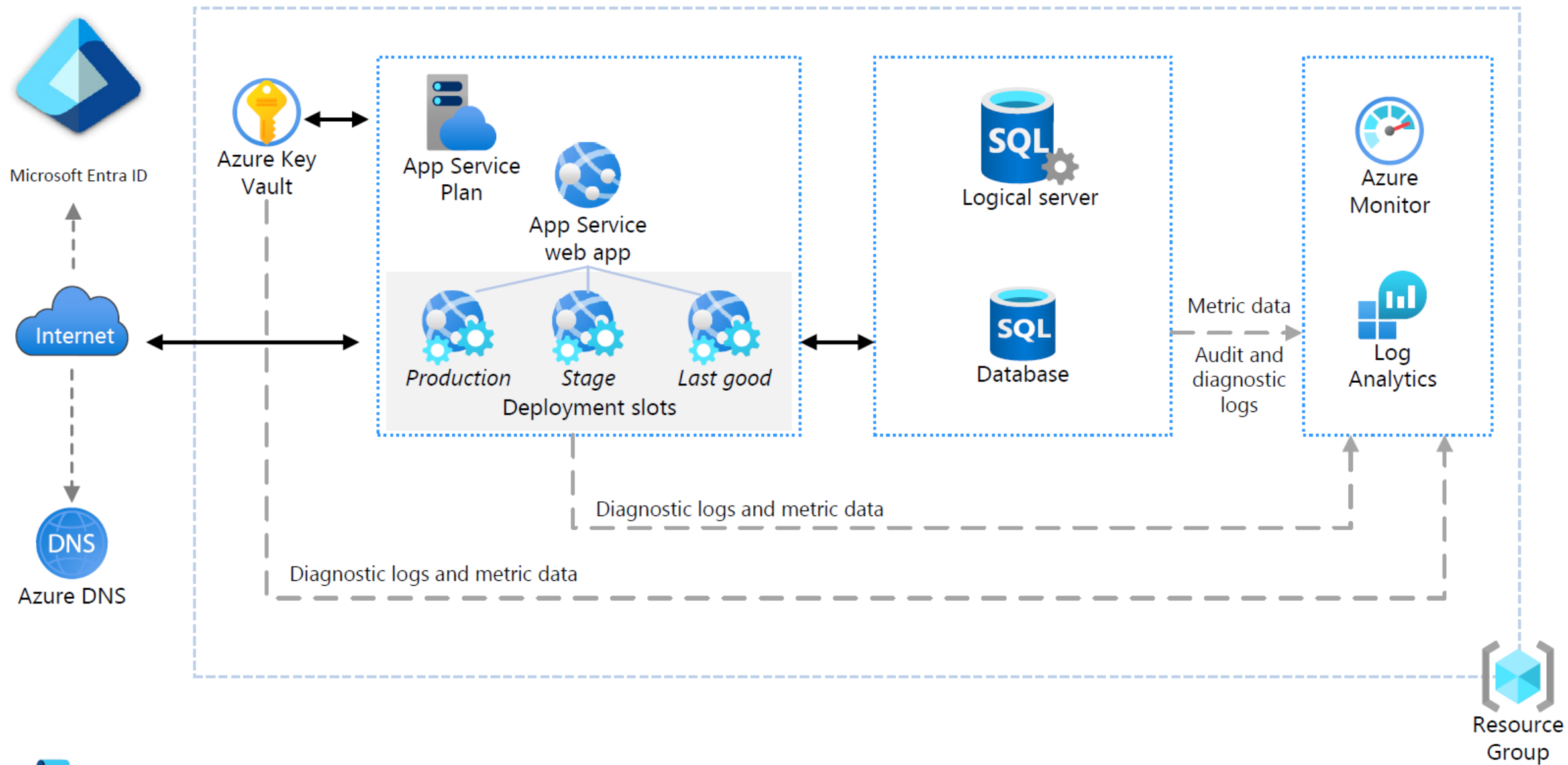
- Senior Azure Consultant @Solidify
- Founder @ Jonah Andersson Tech
- Developer
- Writer, Community Leader, Tech Trainer
- Cloud & DevOps Engineer Lead/Architect



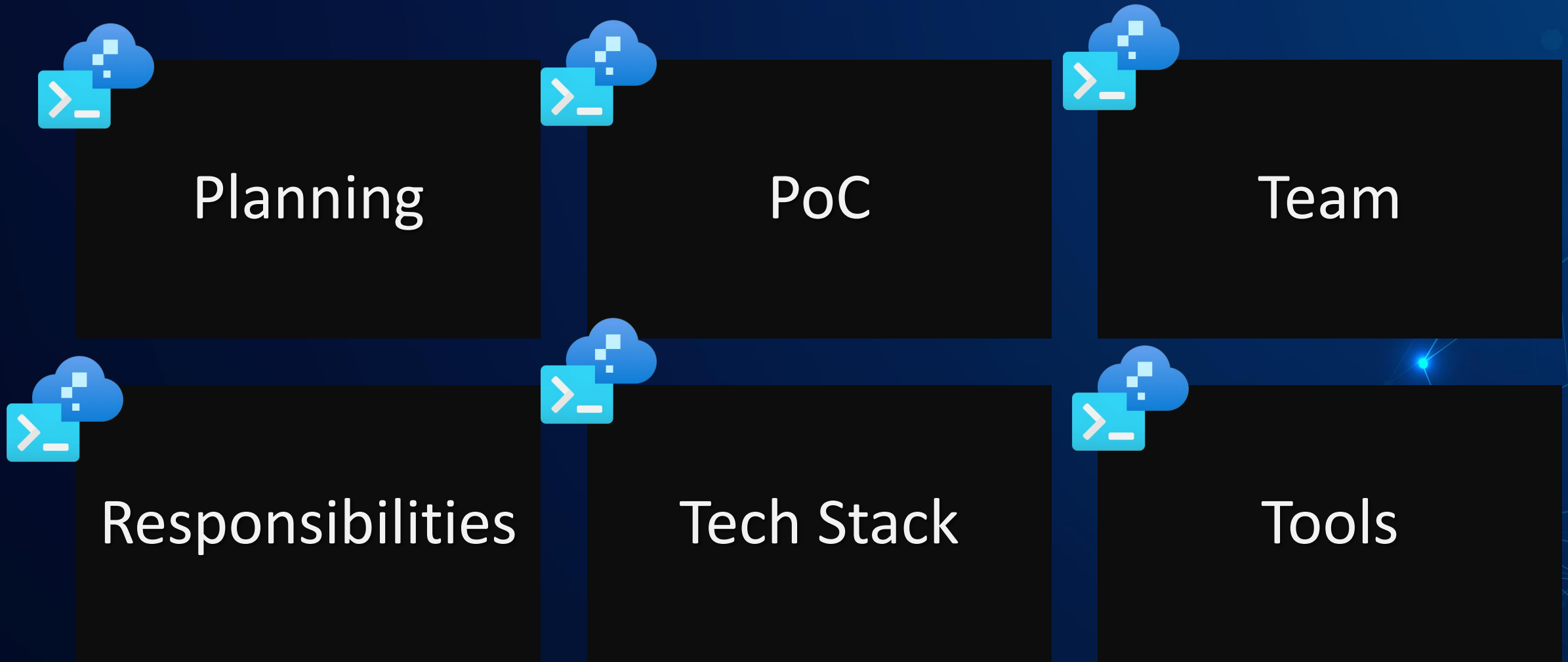
Twitter/ X: @cjkodare

LinkedIn: Jonah Andersson





When you start a project to Cloud





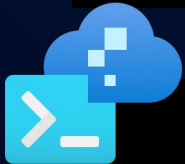
Frontend



Backend



DevSecOps,
CI/CD



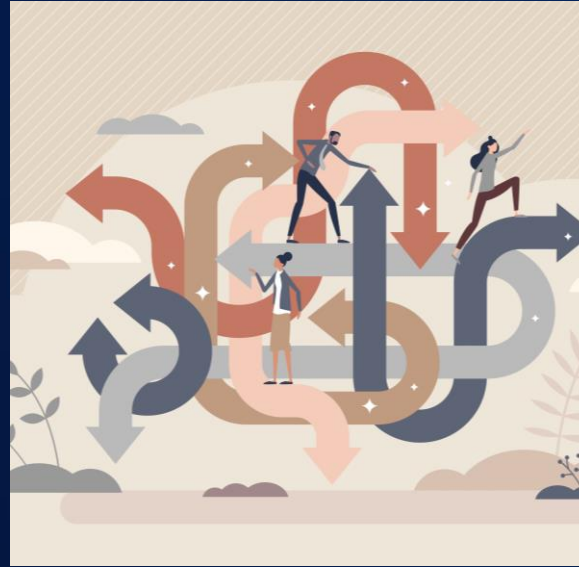
Infrastructure
(IaC)



Cloud



Testing



**Source code, repos and projects
in different tools everywhere!**

What is Azure Developer CLI?

- Empowered and ruled by **azd**-commands!
- Open-Source, Polyglot
- Developer-Centric = Developer Productivity
- Ideal for POC (Proof of Concept) projects
- All source code in shared workspace for your applications



Extensible Azure Developer CLI templates

azd template list



AZD Release Notes - [This Month](#) | Give us a [🌟](#) on [Github](#)

Contribute

Awesome AZD Templates

A community-contributed templates gallery

[Contribute Your Template! 🌟](#)

Filters 67 sites

OR ☐

Featured Help Wanted JavaScript TypeScript .NET/C# Java Python Django React.js Node.js PHP Bicep Terraform MongoDB FastAPI FHIR Service Flask NestJS SAP SAP Cloud SDK Spring Thymeleaf Dapr ChatGPT Jupyter Notebooks KEDA Kubernetes Streamlit Dev Center Azure Health Data Service Azure App Insights Azure Log Analytics Azure App Service Azure Monitor Azure Key Vault Azure Container Apps CosmosDB Azure SignalR Azure Functions Azure Blob Storage Web Apps Azure SQL Azure DB For PostgreSQL Azure Static Web Apps Dapr Azure Service Bus Virtual Networks (VNET) Azure Cognitive Search Azure OpenAI Service Azure AI Service Azure API Management Azure Kubernetes Service Azure Content Delivery Network Azure Front Door Grafana Prometheus Azure Spring Apps Azure Redis Cache Azure Application Gateway Azure AI Bot Service Azure Deployment Environments Data Science Enterprise App Patterns Artificial Intelligence Platform Engineering

Featured Templates

Search for site name...

ChatGPT + Enterprise Data with Azure OpenAI and Cognitive Search ❤️ Azure Content Team

A sample app for the Retrieval-Augmented Generation pattern running in Azure, using Azure Cognitive Search for retrieval and Azure

ChatGPT Plugin using Python (FastAPI) ❤️ Azure Content Team

This is a quickstart for creating a ChatGPT Plugin using Python and Azure.

Containerized React Web App with Java API and MongoDB ❤️ Azure Dev

A blueprint for getting a React web app with a Java API and a MongoDB database on Azure. The blueprint includes sample application code (a ToDo web app) which can be removed and replaced with your own application code.

Containerized React Web App with Node.js API and MongoDB ❤️ Azure Dev

A blueprint for getting a React web app with a Node.js API and a MongoDB database on Azure. The blueprint includes sample application code (a ToDo web app) which can be removed and replaced with your own

azd template list



```
PS C:\WINDOWS\system32> azd template list
```

Repository Path

Azure-Samples/ASA-Samples-Event-Driven-Application

Azure-Samples/ASA-Samples-Web-Application

Azure-Samples/app-service-javascript-sap-cloud-sdk-quickstart

Azure-Samples/app-templates-java-openai-springapps

Azure-Samples/apptemplate-wordpress-on-ACA

Azure-Samples/azure-django-postgres-aca

Azure-Samples/azure-search-openai-demo

Azure-Samples/azure-search-openai-demo-csharp/

Azure-Samples/bindings-dapr-csharp-cron-postgres

Azure-Samples/bindings-dapr-nodejs-cron-postgres

Azure-Samples/bindings-dapr-python-cron-postgres

Azure-Samples/chatgpt-quickstart

Azure-Samples/contoso-real-estate

Azure-Samples/fastapi-on-azure-functions

Azure-Samples/function-csharp-ai-textsummarize

Azure-Samples/function-python-ai-textsummarize

Azure-Samples/msdocs-django-postgresql-sample-app

Azure-Samples/msdocs-flask-postgresql-sample-app

Azure-Samples/openai-plugin-fastapi

Azure-Samples/pubsub-dapr-csharp-servicebus

Azure-Samples/pubsub-dapr-nodejs-servicebus

Azure-Samples/pubsub-dapr-python-servicebus

Azure-Samples/react-component-toolkit-openai-demo

Azure-Samples/spring-chatgpt-sample

Azure-Samples/spring-petclinic-java-mysql

Azure-Samples/svc-invoke-dapr-csharp

Azure-Samples/svc-invoke-dapr-nodejs

Azure-Samples/svc-invoke-dapr-python

Azure-Samples/todo-csharp-cosmos-sql

Azure-Samples/todo-csharp-sql

Azure-Samples/todo-csharp-sql-swa-func

Azure-Samples/todo-java-mongo

Azure-Samples/todo-java-mongo-aca

Azure-Samples/todo-nodejs-mongo

Azure-Samples/todo-nodejs-mongo-aca

Azure-Samples/todo-nodejs-mongo-aks

Azure-Samples/todo-nodejs-mongo-swa-func

Azure-Samples/todo-nodejs-mongo-terraform

Azure-Samples/todo-python-mongo

Azure-Samples/todo-python-mongo-aca

Azure-Samples/todo-python-mongo-swa-func

Azure-Samples/todo-python-mongo-terraform

Azure/reliable-web-app-pattern-dotnet

Source

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Name

Event Driven Java Application with Azure Service Bus on Azure Spring Apps

Static React Web App with Java API and PostgreSQL

SAP Cloud SDK on Azure App Service Quickstart (TypeScript)

Java Spring Apps with Azure OpenAI

WordPress with Azure Container Apps

Python (Django) Web App with PostgreSQL via Azure Container Apps

ChatGPT and Enterprise data with Azure OpenAI and Cognitive Search

ChatGPT + Enterprise Data with Azure OpenAI and Cognitive Search

Microservices App - Dapr Bindings Cron C# ACA PostgreSQL

Microservices App - Dapr Bindings Cron Node.js ACA PostgreSQL

Microservices App - Dapr Bindings Cron Python ACA PostgreSQL

Simple Chat Application using Azure OpenAI

Enterprise-Grade Reference Architecture for JavaScript

FastAPI on Azure Functions

Function App - C# AI Text Summarize

Function App - Python AI Text Summarize

Python (Django) Web App with PostgreSQL

Python (Flask) Web App with PostgreSQL

ChatGPT Plugin using Python (FastAPI)

Microservices App - Dapr PubSub C# ACA ServiceBus

Microservices App - Dapr PubSub Node.js ACA ServiceBus

Microservices App - Dapr PubSub Python ACA ServiceBus

React Component Toolkit with ChatGPT and OpenAI

Spring ChatGPT Application using Azure OpenAI on Azure Spring Apps

Spring PetClinic - Java Spring MySQL

Microservices App - Dapr Service Invoke C# ACA

Microservices App - Dapr Service Invoke Node.js ACA

Microservices App - Dapr Service Invoke Python ACA

React Web App with C# API and MongoDB

React Web App with C# API and SQL Database

Static React Web App + Functions with C# API and SQL Database

React Web App with Java API and MongoDB

Containerized React Web App with Java API and MongoDB

React Web App with Node.js API and MongoDB

Containerized React Web App with Node.js API and MongoDB

Kubernetes React Web App with Node.js API and MongoDB

Static React Web App + Functions with Node.js API and MongoDB

React Web App with Node.js API and MongoDB

React Web App with Python API and MongoDB

Containerized React Web App with Python API and MongoDB

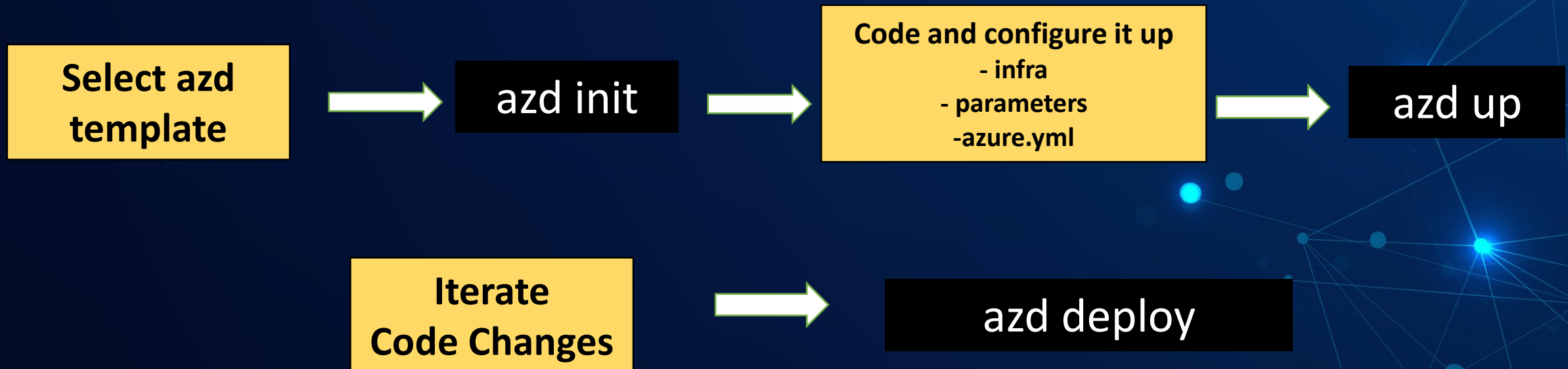
Static React Web App + Functions with Python API and MongoDB

React Web App with Python API and MongoDB

Reliable Web App Pattern for .NET

<https://aka.ms/awesome-azd>

Azure Developer CLI (azd) Workflow



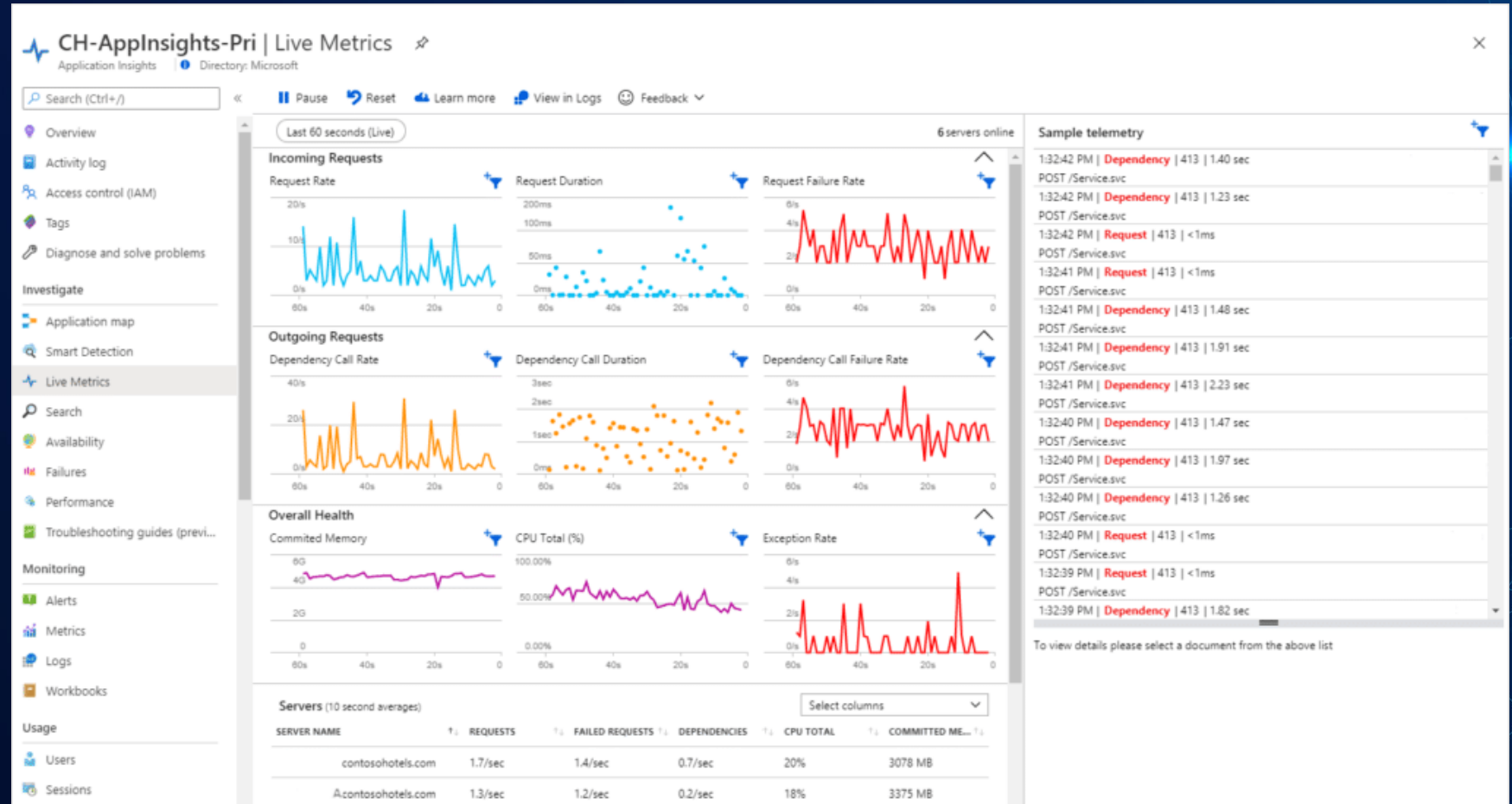
Azure Developer CLI - Workflow

- **azd init** - initializes the project with the template by running
- **azd up** - package and provision to deploy the app
- **azd deploy** - continuously iterate your code changes to the application code and deploy changes when needed
- **azd provision** - (optional) update your Azure resources by modifying the template's Infrastructure as Code (IaC).

Monitoring using Azure Developer CLI (azd)

azd monitor

- *overview*
- *logs*
- *live*



File Edit Selection View Go Run Terminal Help ListsFunctions.cs - azd-examples - Visual Studio Code [Administrator]

EXPLORER

▼ AZD-EXAMPLES

- ▼ .azdo \ pipelines
- ! azure-dev.yml
- ▼ .azure
- > Dev
- () config.json
- ▼ .devcontainer
- () devcontainer.json
- 📄 Dockerfile
- ▼ .github \ workflows
- ! azure-dev.yml
- > .vscode
- > assets
- ▼ infra
- > app
- > core
- () abbreviations.json
- 🔗 main.bicep
- () main.parameters.json
- ▼ src
- ▼ api
- 🔗 .gitignore
- () host.json
- 🔗 ListsFunctions.cs
- 🔗 ListsRepository.cs
- () local.settings.json
- ! openapi.yaml
- 🔗 Program.cs
- 📖 README.md
- 🔗 Todo.Api.csproj
- 🔗 TodoDb.cs
- 🔗 TodoItem.cs
- 🔗 TodoList.cs
- > web
- > tests
- 🔗 .gitattributes
- 🔗 .gitignore
- ! azure.yaml
- > OUTLINE
- > TIMELINE

ListsFunctions.cs

```
src > api > ListsFunctions.cs
1 using System.Net;
2 using Microsoft.Azure.Functions.Worker;
3 using Microsoft.Azure.Functions.Worker.Http;
4 using Microsoft.Extensions.Logging;
5 using System.Text.Json;
6
7 namespace SimpleTodo.Api;
8 public class ListsFunctions
9 {
10     private readonly ILogger _logger;
11     private readonly ListsRepository _repository;
12
13     public ListsFunctions(ILoggerFactory loggerFactory, ListsRepository repository)
14     {
15         _logger = loggerFactory.CreateLogger<ListsFunctions>();
16         _repository = repository;
17     }
18
19     [Function("GetLists")]
20     public async Task<HttpStatusCode> GetLists(
21         [HttpTrigger(AuthorizationLevel.Anonymous, "get", Route = "lists")]
22         HttpRequestData req, int? skip, int? batchSize)
23     {
24         var response = req.CreateResponse(HttpStatusCode.OK);
25         var lists = await _repository.GetListsAsync(skip, batchSize);
26         response.WriteString(JsonSerializer.Serialize(lists));
27         return response;
28     }
29
30     [Function("CreateList")]
31     public async Task<HttpStatusCode> CreateList(
32         [HttpTrigger(AuthorizationLevel.Anonymous, "post", Route = "lists")] HttpRequestData req,
33         string name, string description)
34     {
35         var response = req.CreateResponse(HttpStatusCode.Created);
36         var todoList = new TodoList(name)
37         {
38             Description = description
39         };
40         await _repository.AddListAsync(todoList);
41         response.WriteString(JsonSerializer.Serialize(todoList));
42         return response;
43     }
44
45     [Function("GetList")]
46     public async Task<HttpStatusCode> GetList(
47         [HttpTrigger(AuthorizationLevel.Anonymous, "get", Route = "lists/{list_id}")]
```

The typical azd
project folder
structure

Ways to Develop with Azure Developer CLI (azd)

Locally –
Powershell,
IDE (VSCode)

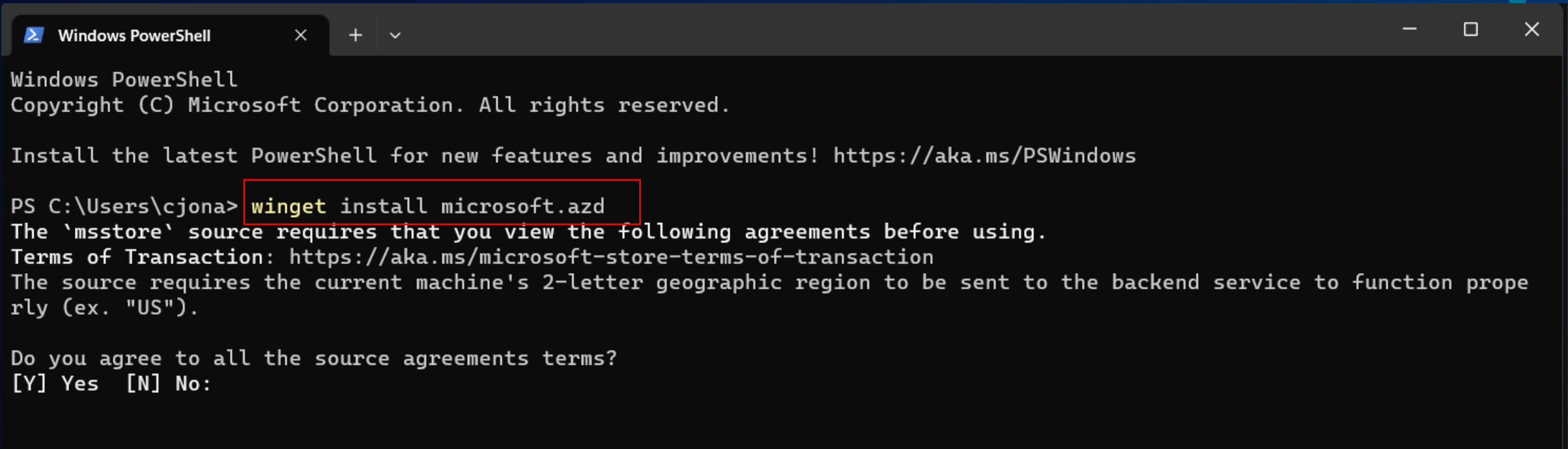
GitHub
Codespaces

Dev Containers



<https://bit.ly/mslearn-installing-azd>

Powershell – Setting up azd locally



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\cjona> winget install microsoft.azd
The 'msstore' source requires that you view the following agreements before using.
Terms of Transaction: https://aka.ms/microsoft-store-terms-of-transaction
The source requires the current machine's 2-letter geographic region to be sent to the backend service to function properly (ex. "US").

Do you agree to all the source agreements terms?
[Y] Yes  [N] No:
```

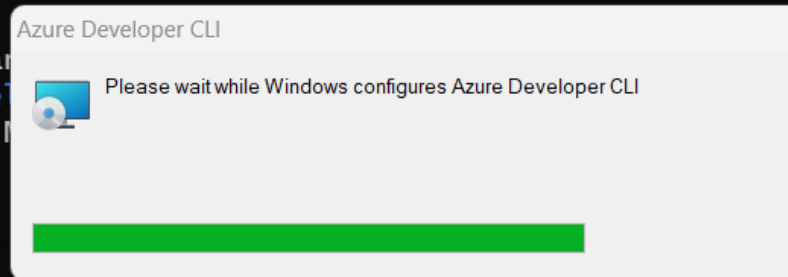
Powershell – Setting up azd locally

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.


Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\cjona> winget install microsoft.azd
The 'msstore' source requires that you view the following agreements before using.
Terms of Transaction: https://aka.ms/microsoft-store-terms-of-transaction
The source requires the current machine's 2-letter geographic region to be sent to the backend service to function properly (ex. "US").


Do you agree to all the source agreements terms?
[Y] Yes [N] No: Y
Found an existing package already installed. Trying to upgrade the installed package...
Found Azure Developer CLI [Microsoft.Azd] Version 0.9.3
This application is licensed to you by its owner. Microsoft is not responsible for, nor does it grant
Downloading https://github.com/Azure/azure-dev/releases/download/v0.9.3/azd-windows-amd64.msi
8.01 MB / 8.01 MB
Successfully verified installer hash
Starting package install...
```





VS Code Extension for azd

 Visual Studio | Marketplace

Visual Studio Code > Azure > Azure Developer CLI



Azure Developer CLI Preview

Microsoft  microsoft.com |  520,889 installs | ★★★★★ (3) | Free

Makes it easy to run, provision, and deploy Azure applications using the Azure Developer CLI

[Install](#) [Trouble Installing?](#)

[Overview](#) [Version History](#) [Q & A](#) [Rating & Review](#)

Azure Developer CLI Visual Studio Code extension

This extension makes it easier to run, create Azure Resources, and deploy Azure applications with the Azure Developer CLI.

What It Does

For more information about Azure Developer CLI and this VS Code extension, please [see the documentation](#).

Categories

Azure

Tags

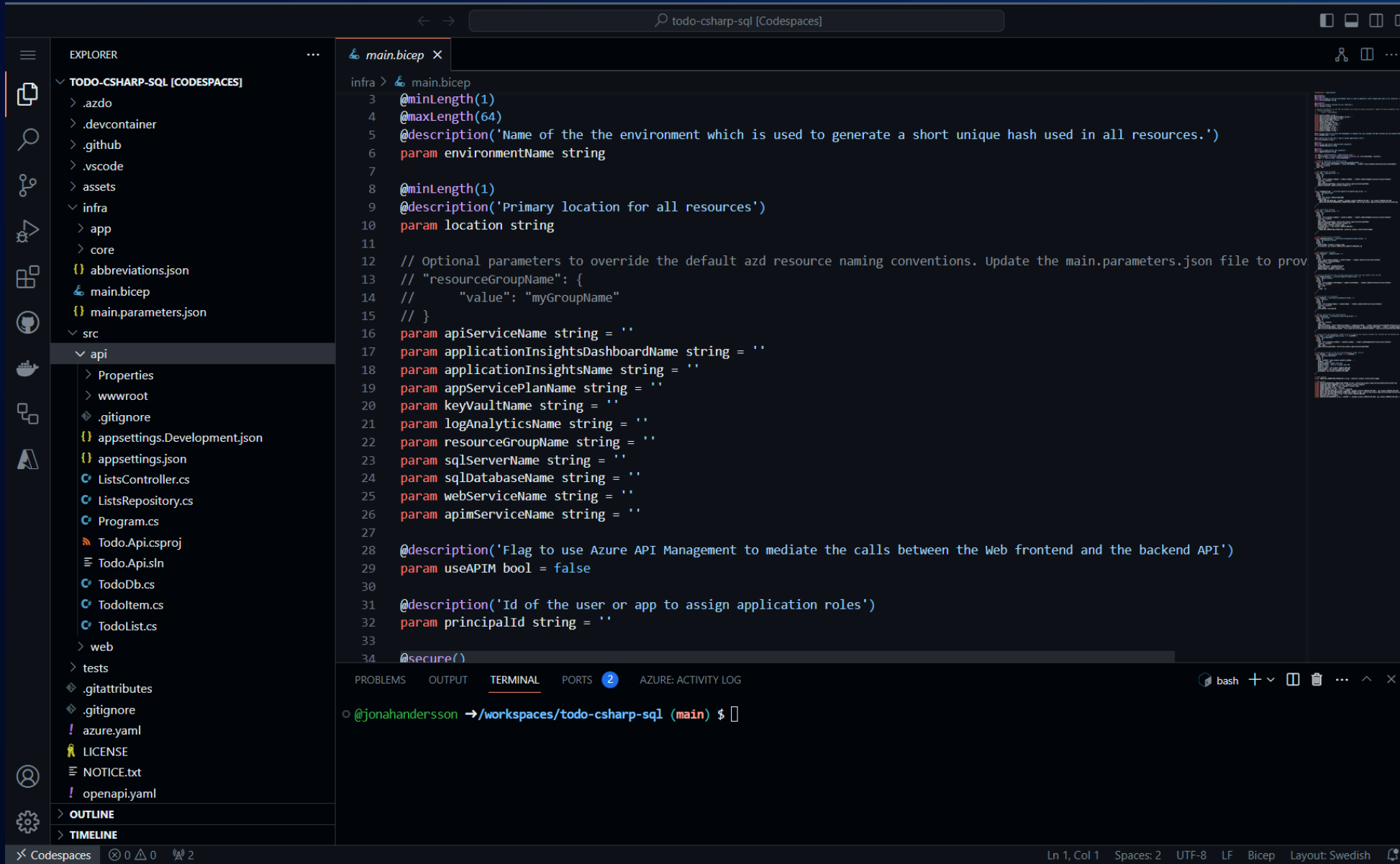
azd

azure

Works with

Universal

GitHub Codespaces – Azure Developer CLI



The screenshot displays the GitHub Codespaces environment for a project named 'todo-csharp-sql'. The interface is divided into three main sections: a file explorer on the left, a code editor in the center, and a terminal at the bottom.

File Explorer (Left): Shows the project structure under 'TODO-CSHARP-SQL [CODESPACES]'. The 'infra' directory is expanded, showing 'main.bicep' and 'main.parameters.json'. The 'src' directory is also expanded, showing the 'api' folder with various files like 'Properties', 'wwwroot', '.gitignore', 'appsettings.Development.json', 'appsettings.json', 'ListsController.cs', 'ListsRepository.cs', 'Program.cs', 'Todo.Api.csproj', 'Todo.Api.sln', 'TodoDb.cs', 'TodoItem.cs', 'TodoList.cs', 'web', 'tests', '.gitattributes', 'LICENSE', 'NOTICE.txt', and 'openapi.yaml'.

Code Editor (Center): The 'main.bicep' file is open, showing Bicep code for resource provisioning. The code includes parameters for environment name, location, and various service names, along with descriptions and optional parameters for overriding default naming conventions.

```
infra > main.bicep
3 @minLength(1)
4 @maxLength(64)
5 @description('Name of the the environment which is used to generate a short unique hash used in all resources.')
6 param environmentName string
7
8 @minLength(1)
9 @description('Primary location for all resources')
10 param location string
11
12 // Optional parameters to override the default azd resource naming conventions. Update the main.parameters.json file to prov
13 // "resourceGroupName": {
14 //   "value": "myGroupName"
15 // }
16 param apiServiceName string = ''
17 param applicationInsightsDashboardName string = ''
18 param applicationInsightsName string = ''
19 param appServicePlanName string = ''
20 param keyVaultName string = ''
21 param logAnalyticsName string = ''
22 param resourceGroupName string = ''
23 param sqlServerName string = ''
24 param sqlDatabaseName string = ''
25 param webServiceName string = ''
26 param apiServiceName string = ''
27
28 @description('Flag to use Azure API Management to mediate the calls between the Web frontend and the backend API')
29 param useAPIM bool = false
30
31 @description('Id of the user or app to assign application roles')
32 param principalId string = ''
33
34 @secure()
```

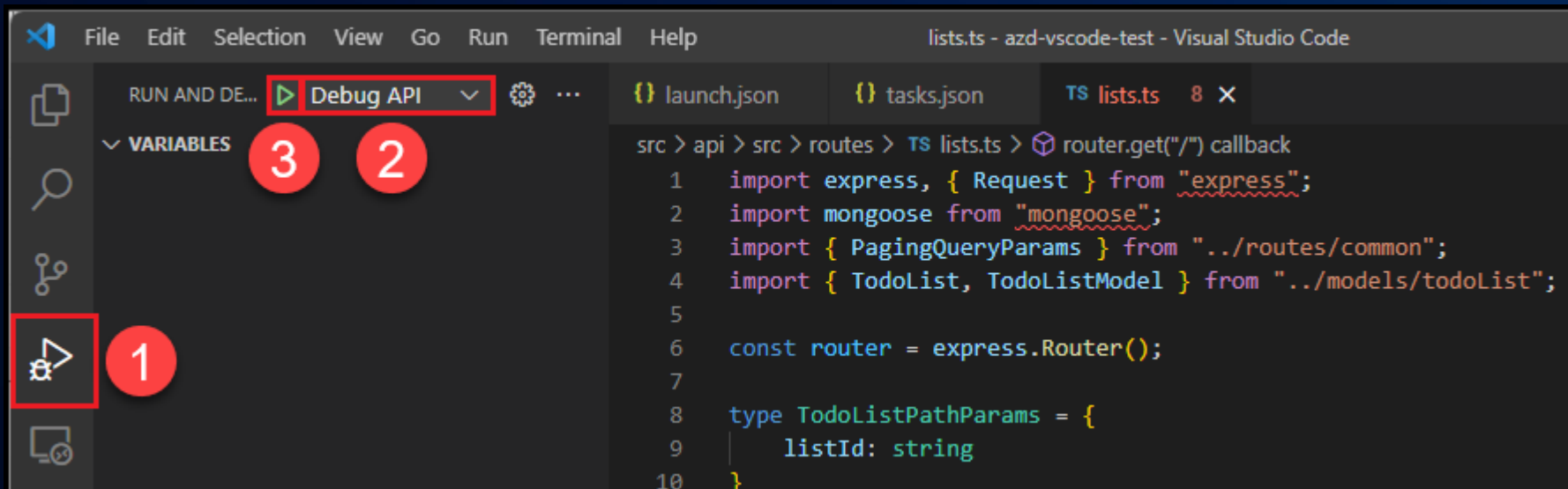
Terminal (Bottom): The terminal shows the user '@jonahandersson' in the 'main' branch of the 'todo-csharp-sql' workspace, with a prompt '\$'.

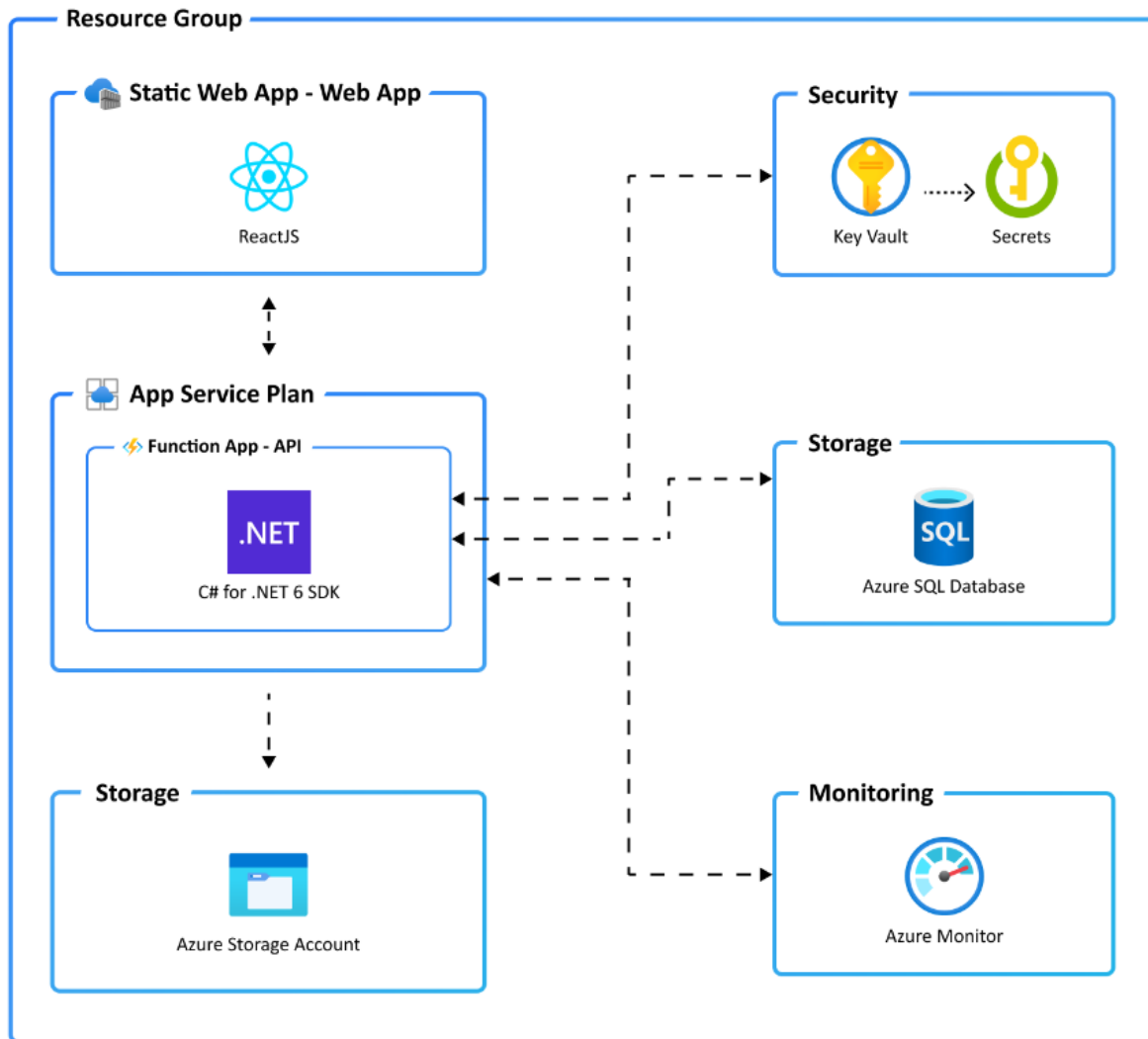
The status bar at the bottom indicates the current file is 'Ln 1, Col 1', with 'Spaces: 2', 'UTF-8', 'LF', 'Bicep', and 'Layout: Swedish'.

Debugging and Troubleshooting with azd

azd up -- debug = it enables debugging and diagnostic output

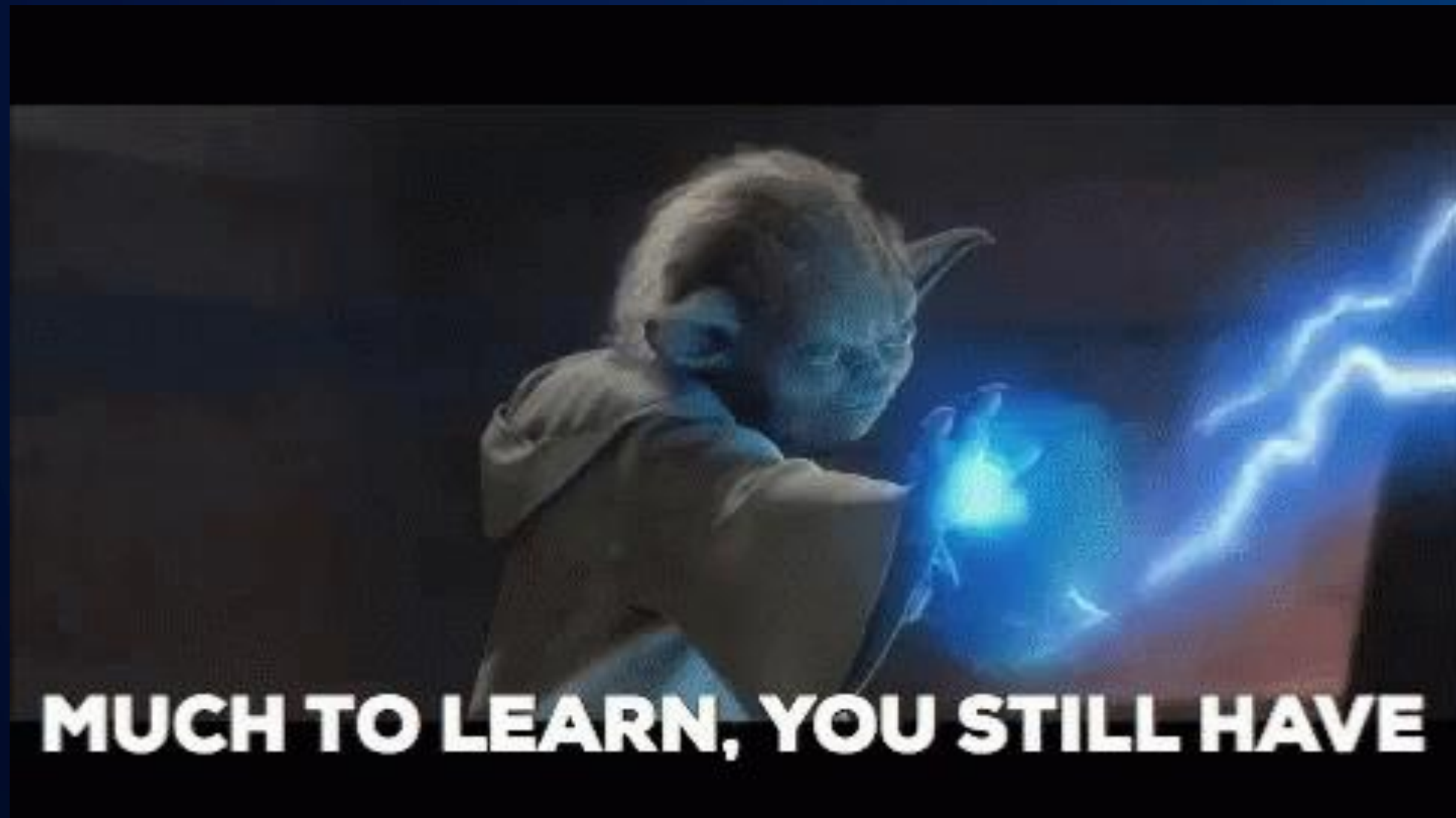
azd up – debug > "<your-file-path>.txt"





CODE DEMO

[Azure-Samples/todo-csharp-sql-swa-func](https://github.com/Azure-Samples/todo-csharp-sql-swa-func)



MUCH TO LEARN, YOU STILL HAVE

Blog – Cloud Development with azd



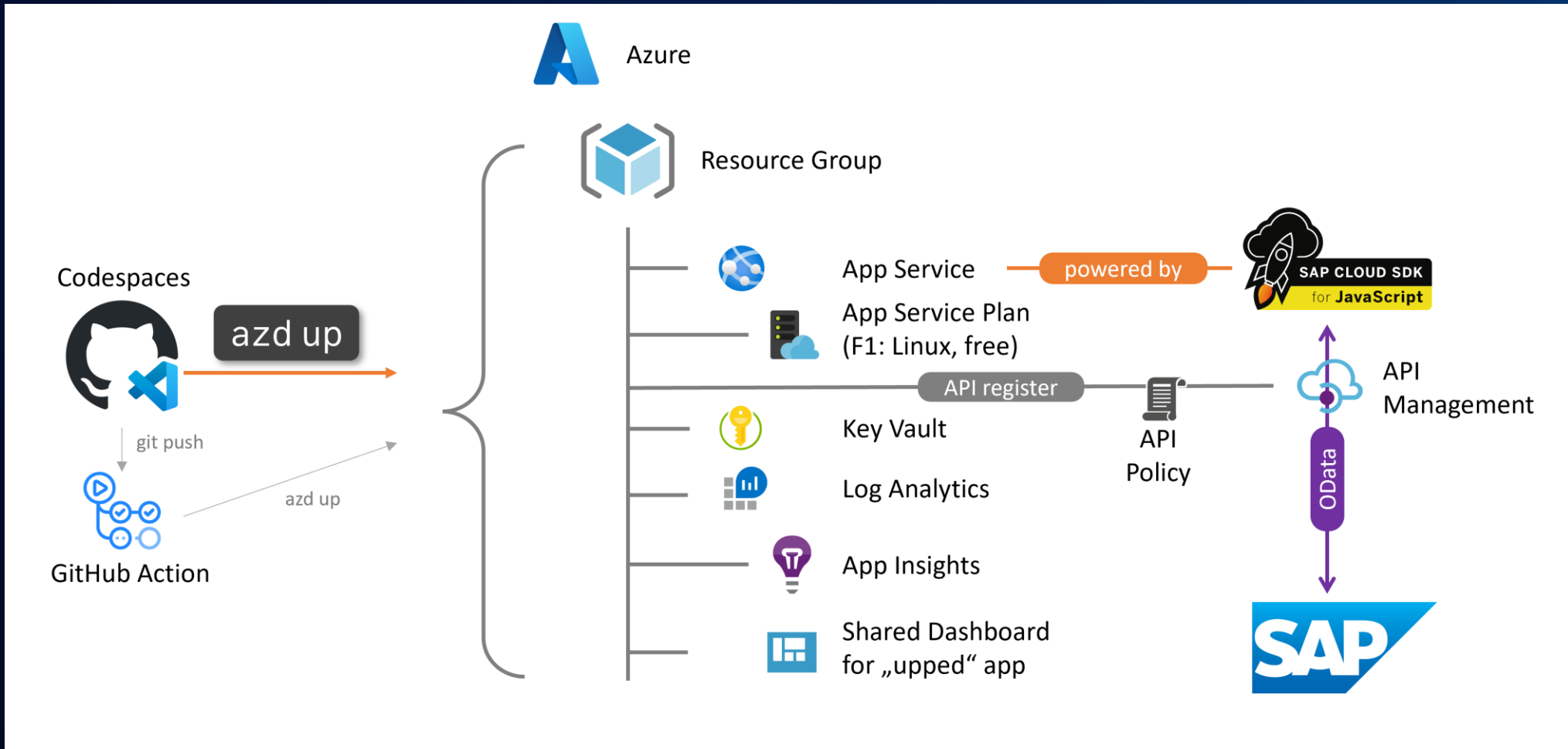
**Cloud Development with
Azure Delveloper CLI (azd)
with Jonah Andersson**

**AZURE
BACK TO
SCHOOL**



<https://bit.ly/azuredevelopercli-azd>

Azure Developer CLI (azd) with SAP-integration



Azure User Group Sweden – azd session



Martin Pankranz

Product Manager for SAP Integration
@ Microsoft



Christian Lechner

Development Architect @ SAP SE

Azure Developer CLI: "azd up"
- One command to rule them all



Learn by Doing, Learn with the Community!



Docs: <https://aka.ms/azd>



Azd Standups: <https://aka.ms/azd-standups>

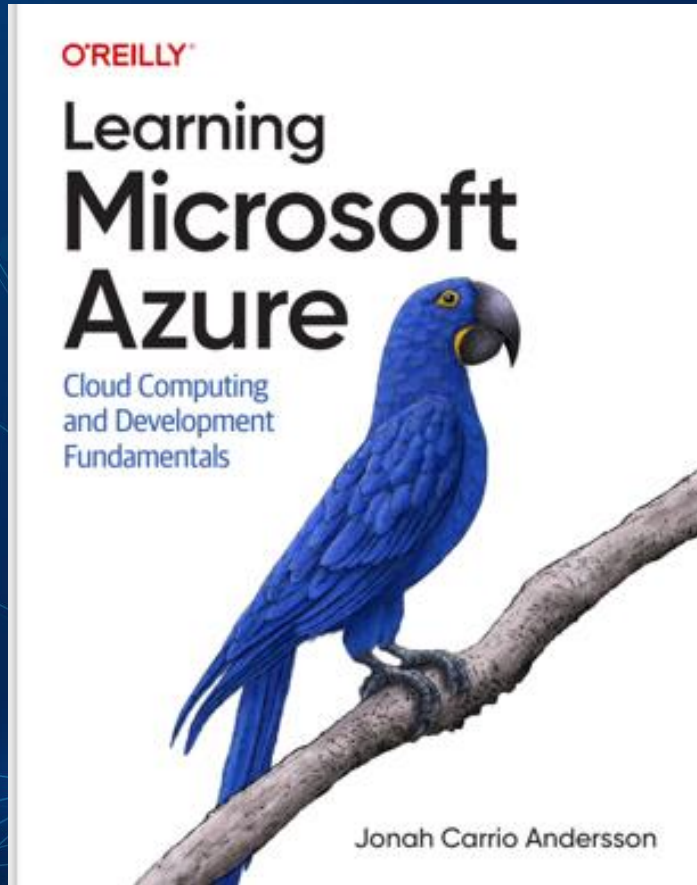


Blog <https://aka.ms/latest-azd-release>



GitHub Universe 2023 <https://aka.ms/ghu-azure-mainstage>





Check out my book!

Learning Microsoft Azure:
Cloud Computing & Development
Fundamentals

<https://learningmicrosoftazure.com>

“When I was a programming coach in schools, I taught my students to **code**, to **learn** and to **share** their code **to others!** “

- Jonah Andersson

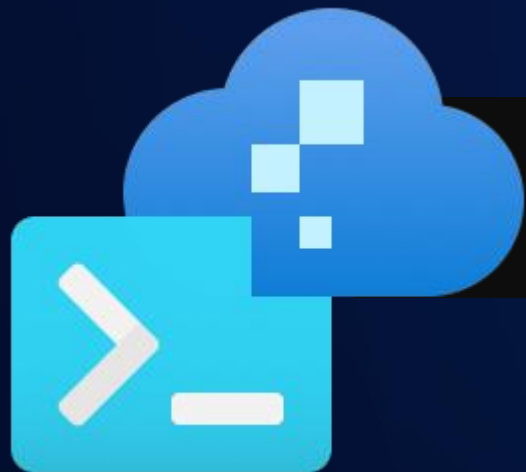




QUESTIONS?



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GÖTEBORGG



Cloud Development with Azure Developer CLI (azd) with Jonah Andersson

COPY of Presentation will be
available on my GitHub

GitHub: jonahandersson



THANK YOU

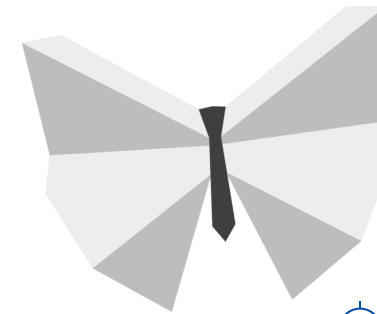


Scan QR to Connect to Jonah



LinkedIn: Jonah Andersson

Twitter/X: @cjkodare



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www.jonahandersson.tech

