



# Azure (Serverless) for JavaScript/TypeScript Folks

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# Why is the cloud awesome?

- ▶ You only pay for what you use!
- ▶ When Azure was new, it was not the polished product we enjoy today
- ▶ It was slow, clunky and difficult to use
- ▶ Thus many developers didn't get past 'Hello World'
  - ▶ (and didn't shut it down)
- ▶ And received \$\$\$ invoices for it even though the application wasn't doing anything

The background of the slide is a dark blue sky with large, white, fluffy clouds. On the left side, there is a solid pink arrow pointing towards the right. The text is centered in the middle of the slide.

In the cloud, you don't pay for  
what you use, but instead for  
what you **reserve**.

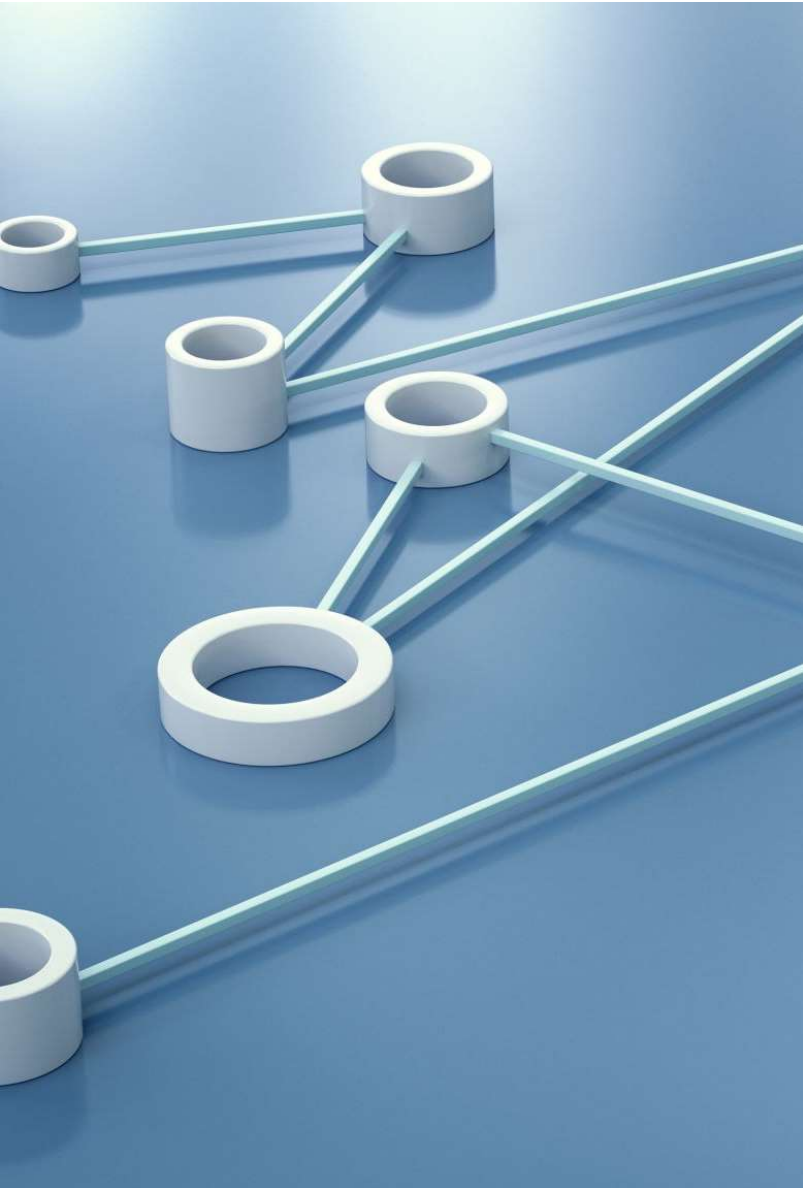


## Obligatory Narcissism Slide (*who is this guy?*)

- ▶ Hi! I'm Douglas!
- ▶ From Memphis, TN area
- ▶ Professional Explainer
  - ▶ Technical Author (Pluralsight)
  - ▶ Speaker
- ▶ Community
  - ▶ Memphis Python User Group
  - ▶ Scenic City Summit
  - ▶ TDevConf
- ▶ 3x Microsoft Most Valuable Professional (Python)



- This is an Azure first talk
- It started out a year ago as a talk about the 'Power Triumvirate' of Python, Azure, and Visual Studio Code
- Since then it has been adapted for .NET (C#) and JavaScript / TypeScript
- Most of the **concepts** are applicable to other supported languages
- The (limited) code samples are in JavaScript / TypeScript



# Serverless

- Reduces complexity
- Shifts infrastructure burden
- Cost effective
- Focus on the code that makes your application unique



# Azure Serverless Products

- Compute
  - Azure Functions
  - Azure Container Apps
- Databases
  - Azure Cosmos DB
  - Azure SQL Database
- AI
  - Azure Bot Service
  - Azure Cognitive Services
- Azure API Management
- Azure Logic Apps
- Azure Event Grid
- Azure Blob Storage



# Azure Serverless Products

- Compute
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# Tooling Web Portal

Microsoft Azure

Home > Resource groups >

## Resource groups

Default Directory (douglasastarnesoutlook.onmicr...)

+ Create ⚙️ Manage view ▾ ...

Filter for any field...

Name ↑↓	
cloud-shell-storage-eastus	...
das-fy-22-23-sql-rg	...
das-fy22-23-vm-rg	...
das-linux-vm-rg	...
das-postgres-flex-rg	...
das-vsc-rg	...
DefaultResourceGroup-EUS	...
DefaultResourceGroup-EUS2	...
NetworkWatcherRG	...

das-vsc-rg Resource group

Search

+ Create ⚙️ Manage view ▾ 🗑️ Delete resource group 🔄 Refresh ⬇️

### Essentials

Subscription (move) : [Visual Studio Enterprise Subscription](#)

Subscription ID : [xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx](#)

Tags (edit) : [Click here to add tags](#)

### Resources Recommendations (1)

Filter for any field... Type equals all × Location equals all ×

Showing 1 to 6 of 6 records. ☐ Show hidden types ⓘ

<input type="checkbox"/> Name ↑↓
<input type="checkbox"/> das-vsc
<input type="checkbox"/> das-vsc-ip
<input type="checkbox"/> das-vsc-nsg
<input type="checkbox"/> das-vsc-rg-vnet
<input type="checkbox"/> das-vsc146
<input type="checkbox"/> das-vsc_OsDisk_1_7e5e0dab98344dd2b0b8a0686096e536

### Settings

- Deployments
- Security
- Policies
- Properties
- Locks

### Monitoring

- Insights (preview)
- Alerts
- Metrics
- D diagnostic settings
- Logs
- Advisor recommendations
- Workbooks

### Automation

- Export template

### Support + troubleshooting

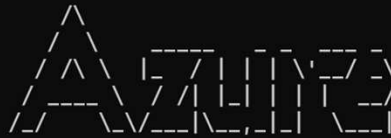
- New Support Request

# Tooling

## Command Line

PowerShell

PS C:\Users\dougl> az



Welcome to the cool new Azure CLI!

Use 'az --version' to display the current version.  
Here are the base commands:

account	: Manage Azure subscription information.
acr	: Manage private registries with Azure Container Registries.
ad	: Manage Azure Active Directory Graph entities needed for Role Based Access Control.
advisor	: Manage Azure Advisor.
afd	: Manage Azure Front Door Standard/Premium. For classical Azure Front Door, please refer <a href="https://docs.microsoft.com/en-us/cli/azure/network/front-door?view=azure-cli-latest">https://docs.microsoft.com/en-us/cli/azure/network/front-door?view=azure-cli-latest</a> .
aks	: Manage Azure Kubernetes Services.
ams	: Manage Azure Media Services resources.
apim	: Manage Azure API Management services.
appconfig	: Manage App Configurations.
appservice	: Manage App Service plans.
aro	: Manage Azure Red Hat OpenShift clusters.
backup	: Manage Azure Backups.
batch	: Manage Azure Batch.
bicep	: Bicep CLI command group.
billing	: Manage Azure Billing.
bot	: Manage Microsoft Azure Bot Service.
cache	: Commands to manage CLI objects cached using the '--defer' argument.
capacity	: Manage capacity.
cdn	: Manage Azure Content Delivery Networks (CDNs).
cloud	: Manage registered Azure clouds.
cognitiveservices	: Manage Azure Cognitive Services accounts.
communication	: Manage communication service with communication.
config	: Manage Azure CLI configuration.
configure	: Manage Azure CLI configuration. This command is interactive.
consumption	: Manage consumption of Azure resources.

# Tooling

## Visual Studio Code

The screenshot displays the Visual Studio Code interface. The left sidebar shows the 'EXTENSIONS: MARKETPLACE' view with a list of installed and available extensions. The main editor area shows a JavaScript file named 'serviceWorker.js' with a dropdown menu open for the 'navigator.serviceWorker.ready' property. The bottom panel shows a terminal window with the output of a command.

**EXTENSIONS: MARKETPLACE**

- @sort:installs**
- Python** 2019.6.24221 54.9M ★ 4.5  
Linting, Debugging (multi-threaded, ...  
Microsoft **Install**
- GitLens — Git sup...** 9.8.5 23.1M ★ 5  
Supercharge the Git capabilities buil...  
Eric Amodio **Install**
- C/C++** 0.24.0 23M ★ 3.5  
C/C++ IntelliSense, debugging, and ...  
Microsoft **Install**
- ESLint** 1.9.0 21.9M ★ 4.5  
Integrates ESLint JavaScript into VS ...  
Dirk Baeumer **Install**
- Debugger for Ch...** 4.11.6 20.6M ★ 4  
Debug your JavaScript code in the C...  
Microsoft **Install**
- Language Supp...** 0.47.0 18.7M ★ 4.5  
Java Linting, Intellisense, formatting, ...  
Red Hat **Install**
- vscode-icons** 8.8.0 17.2M ★ 5  
Icons for Visual Studio Code  
VSCo Icons Team **Install**
- Vetur** 0.21.1 17M ★ 4.5  
Vue tooling for VS Code  
Pine Wu **Install**
- C#** 1.21.0 15.6M ★ 4  
C# for Visual Studio Code (powered ...  
Microsoft **Install**

**Code Editor:** `src > JS serviceWorker.js > register > window.addEventListener`

```
39 checkValidServiceWorker(swUrl, confi
40
41 // Add some additional logging to lo
42 // service worker/PWA documentation.
43 navigator.serviceWorker.ready.then((
44   product
45   productSub
46   removeSiteSpecificTrackingException
47   removeWebWideTrackingException
48   requestMediaKeySystemAccess
49   sendBeacon
50   serviceWorker (property) Navigator.ser
51   storage
52   storeSiteSpecificTrackingException
53   storeWebWideTrackingException
54 }   userAgent
55 }   vendor
56
57 function registerValidSW(swUrl, config) {
58   navigator.serviceWorker
59     .register(swUrl)
60     .then(registration => {
```

**TERMINAL** 1: node

You can now view **create-react-app** in the browser.

**Local:** http://localhost:3000/  
**On Your Network:** http://10.211.55.3:3000/

Note that the development build is not optimized.

master 0 0 Ln 43, Col 19 Spaces: 2 UTF-8 LF



# Azure Functions

- ▶ A function in Azure is similar to a function in JavaScript
  - ▶ Narrow scope
  - ▶ Executes quickly
- ▶ The deployed code does not implement an entire application
- ▶ You are charged only for the resources consumed when the function is being executed
- ▶ You are not charged for provisioning and deployment



# Azure Functions

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- ▶ You are not charged for provisioning and deployment (\*)



# Function Triggers

- ▶ An Azure Function is executed in response to a **trigger** (event)
  - ▶ HTTP request
  - ▶ Timer
  - ▶ Cosmos DB document change
  - ▶ Blob storage upload



# Function App Plans

## Consumption

Charged for resources consumed while function executes  
Auto-scaling



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## Premium

Pre-warmed instances  
Longer time outs





# Function App Plans

Consumption	Charged for resources consumed while function executes Auto-scaling
Premium	Pre-warmed instances Longer time outs
Dedicated	Runs in an Azure App Service instance Good if you have Azure App Service web deployments



# Azure Functions Pricing



## Consumption

\$0.000016/GB-s

\$0.20 / 1M  
executions



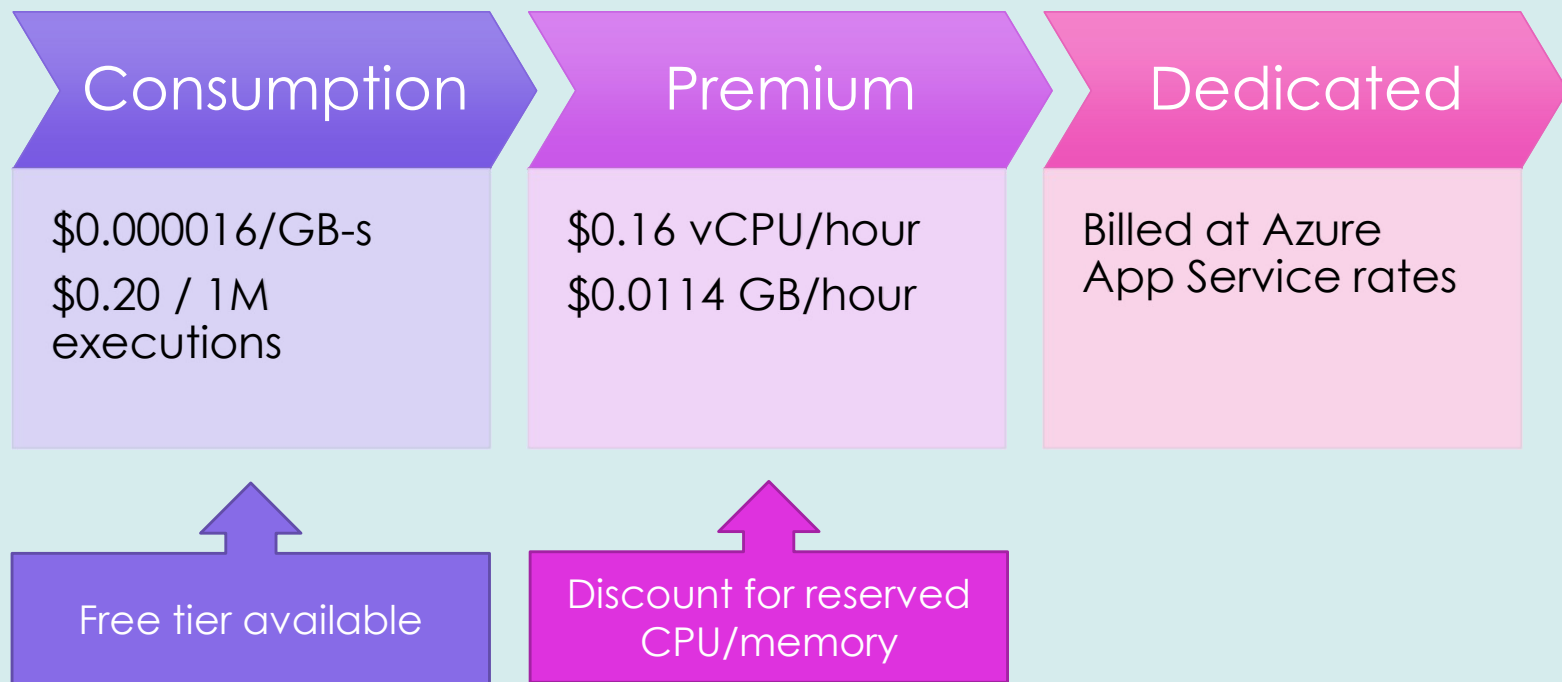
What the heck is a GB-s?

**A gigabyte-second is the compute required to use 1 gigabyte of memory for 1 second**

number of seconds executed \* memory required

ex. A function that runs for 10 seconds and requires 512MB (0.5GB) of memory will be charged for 5 GB-s

# Azure Functions Pricing





## Sidebar: Quicksort



## Sidebar: Quicksort



a



b



## Sidebar: Quicksort

item < a

a

a < item < b

b

item > b

## Sidebar: Quicksort





## Sidebar: Quicksort

This is the fastest known sorting algorithm



## Sidebar: Quicksort

This is the fastest known sorting algorithm (\*)



## Sidebar: Quicksort

This is the fastest known sorting algorithm (\*)



(\*) At around 20-30 elements an insertion sort is generally faster



# Sometimes the simplest ideas are the best!

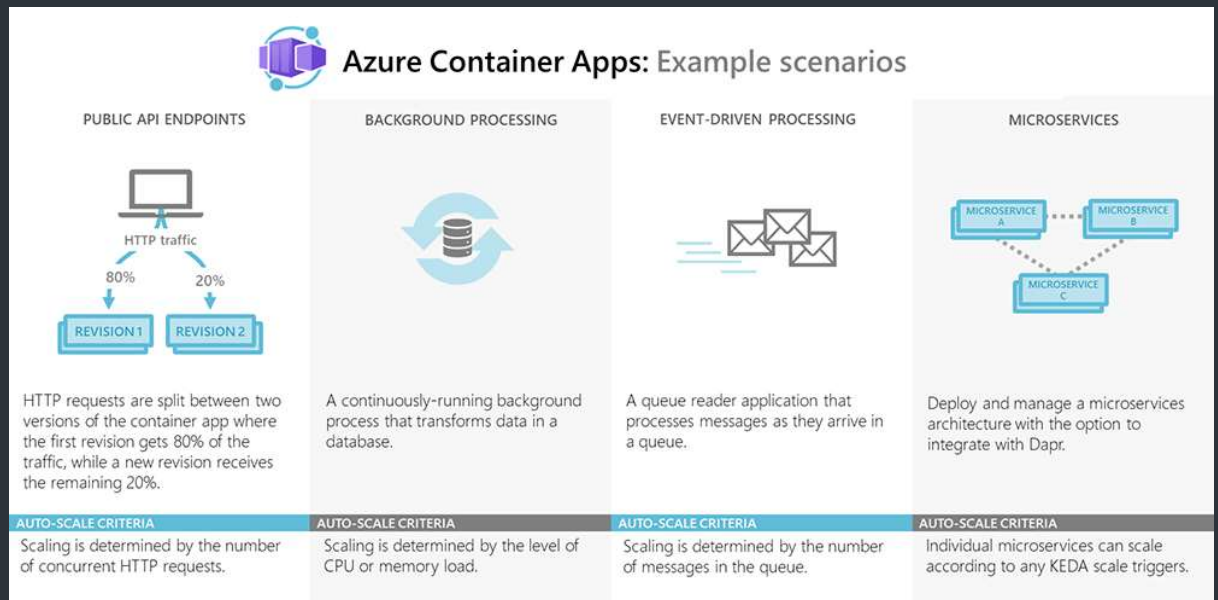
- What could be simpler (for deployment) than a container?
  - If it works on the development machine in a container, it will work when deployed to a production server in a container
- Prior to serverless, containers were deployed to Azure using Azure Kubernetes Service
- But Azure Kubernetes Service has a major drawback ...



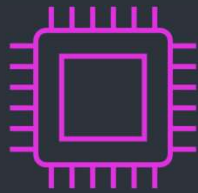
You are required to  
use Kubernetes!

# Azure Container Apps

- Build Kubernetes-style serverless applications with containers, without using Kubernetes



# Azure Container Apps Pricing



## vCPU

Active Price: \$0.000024/second

Idle Price: \$.000003/second



## Memory

\$0.000003 GB-s

- Active apps are starting or processing requests
- Idle apps are started but not processing requests
- Apps scale to zero by default
- Prices do not include Azure Container Registry or other resources required by the container

Yes!  
There is a  
free tier!



# Azure Cosmos DB

- Massively scalable globally distributed datastore
- Fast – single digit millisecond reads
- 99.999% uptime
- Multi interface
  - Core (SQL)
  - MongoDB
  - Cassandra
  - Gremlin (Graph)
  - Azure Tables
  - New! – PostgreSQL
- Operations Models
  - Provisioned Throughput
  - Serverless
  - vCores



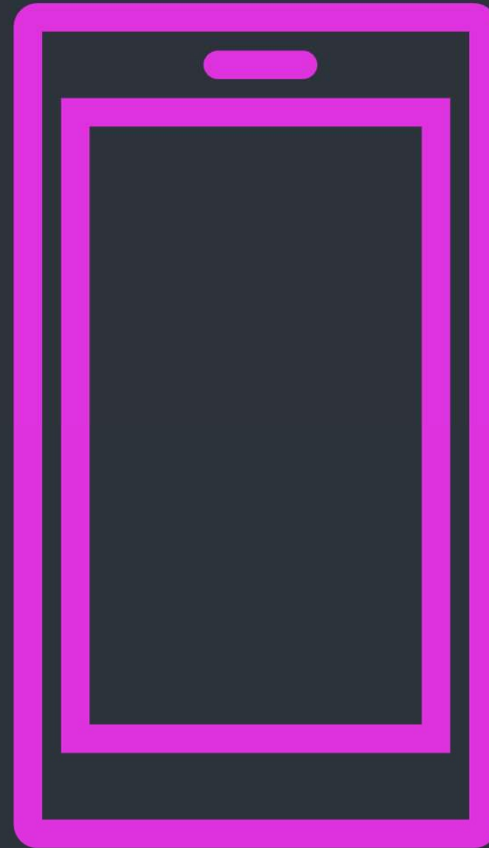


# Azure Cosmos DB Pricing

- Provisioned Throughput
  - Single Region Writes - \$0.008 per hour per 100/RUs
  - Multi Region Writes - \$0.016 per hour per 100/RUs
  - Reserved capacity pricing
- Serverless
  - \$0.282 per 1 million RUs
- vCores
  - Hourly rates

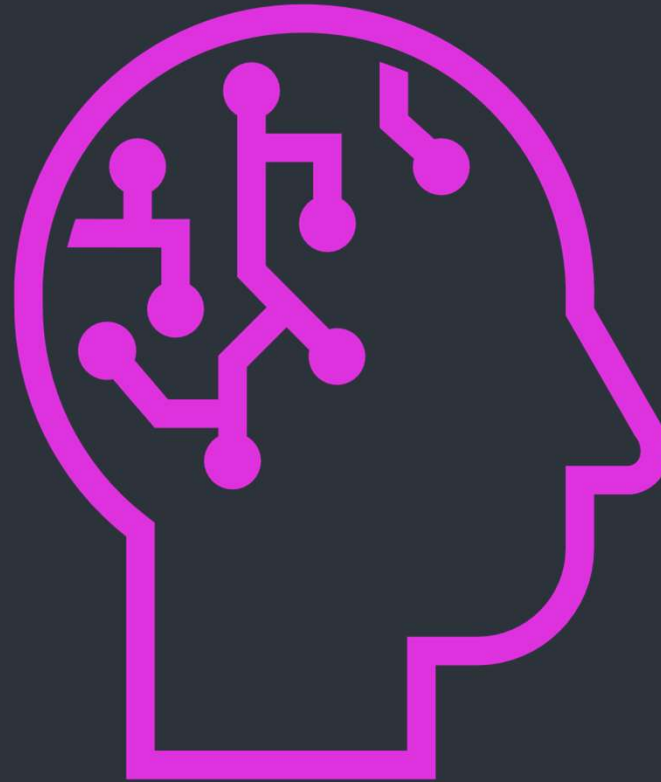
# Connected Mobile Apps

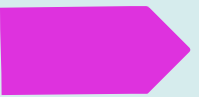
- Hey! That's a neat idea!
- There is a practical use for this!
- If your app doesn't use this, you're an outlier!



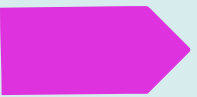
# Artificial Intelligence

- Hey! That's a neat idea!
- There is a practical use for this!
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# Azure Cognitive Services



## Azure Cognitive Services

Add AI to any app without knowing anything about AI



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Common AI tasks (ie. facial detection, sentiment analysis)



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SDKs for popular languages (include JavaScript / TypeScript)



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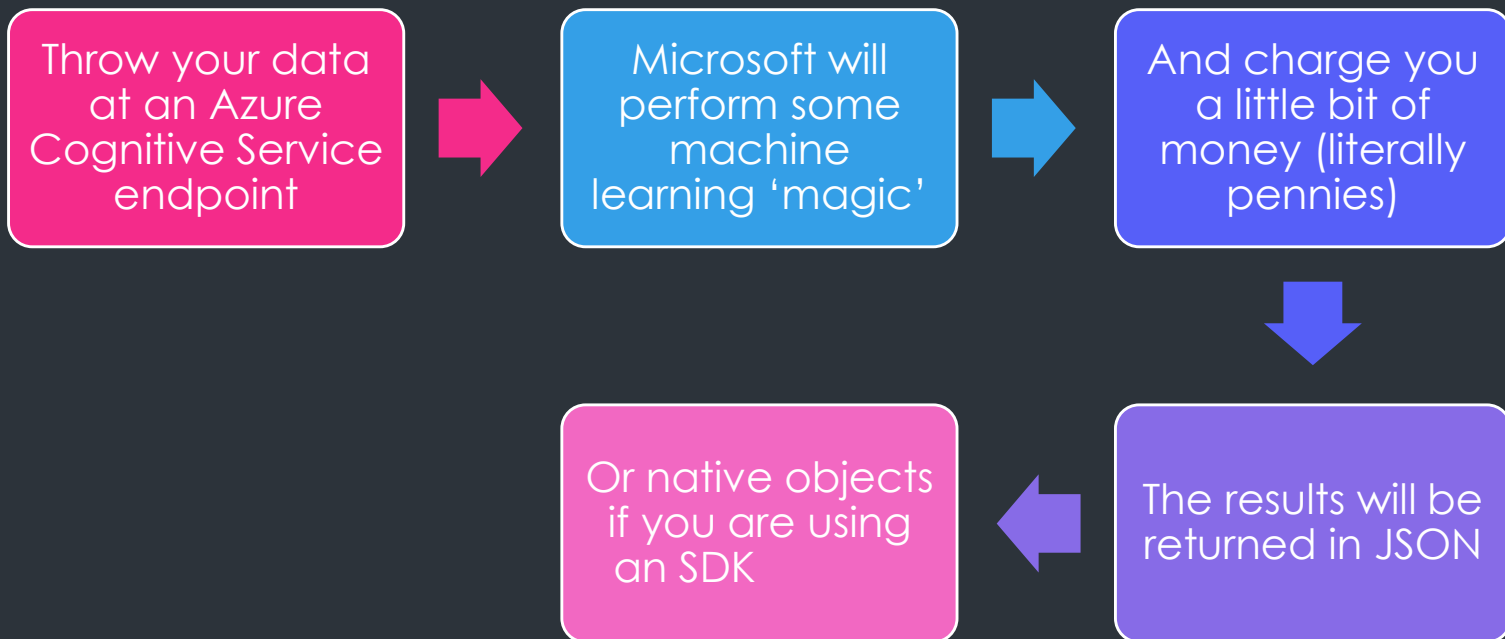
Models trained at Microsoft scale

Exposed as REST APIs

SDKs for popular languages (include JavaScript / TypeScript)

If you can call a REST API (or use an SDK) you can use AI in your app!

# Azure Cognitive Services



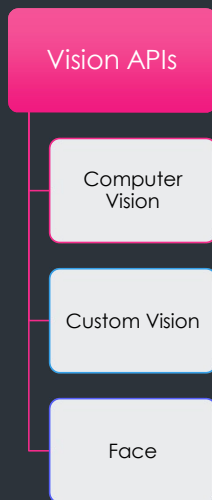
And there are free tiers!



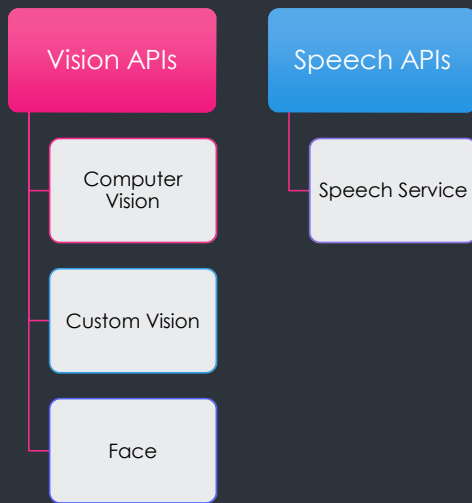
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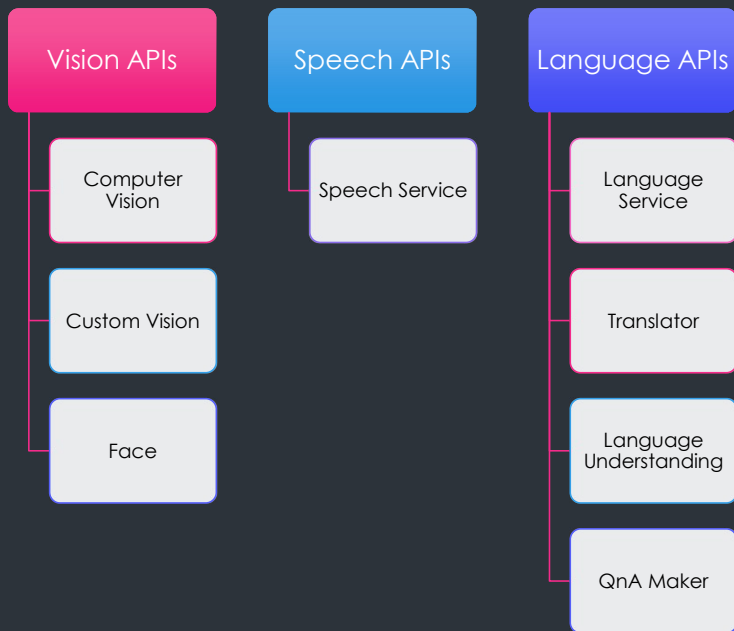
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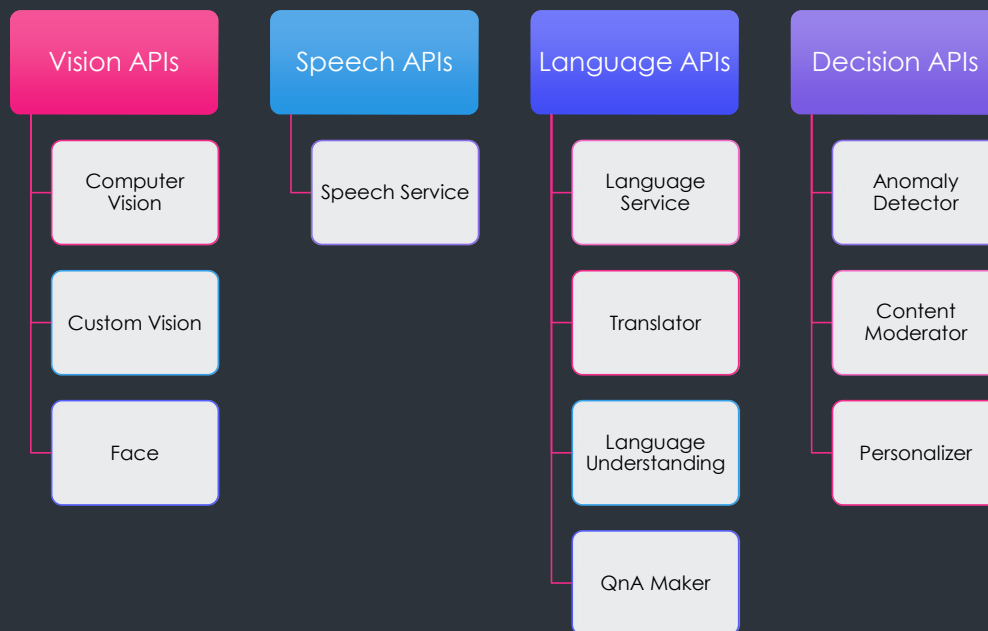
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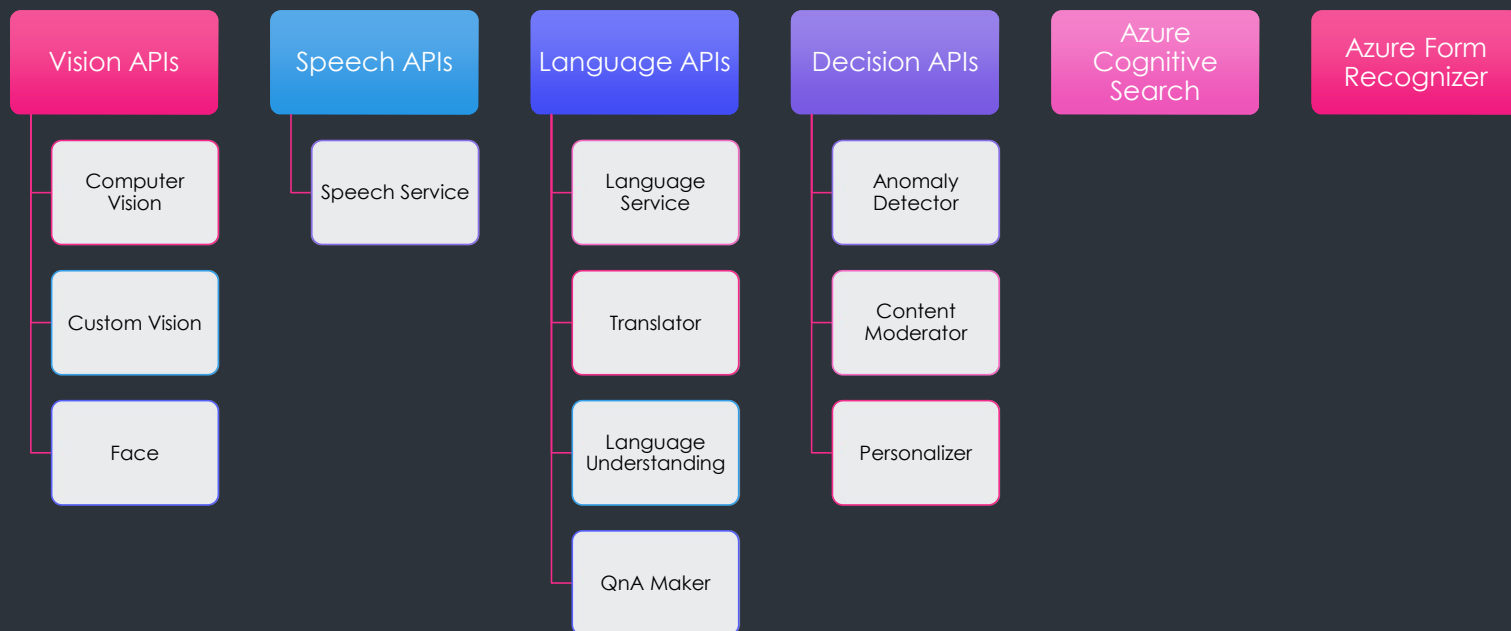


# Azure Cognitive Services





# Azure Cognitive Services



# Azure Cognitive Services Pricing

## Face API

- 0-1 million transactions - \$1 per 1000
- 1-5 million transactions - \$0.80 per 1000
- 30K per month free

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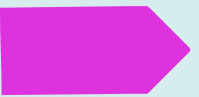
- 0-1 million transactions - \$1 per 1000
- 1-5 million transactions - \$0.80 per 1000
- 30K per month free

## Text Analytics

- 0-0.5 million text records - \$1 per 1000
- 0.5-2.5 million text records - \$0.75 per 1000
- 5000 text records free for 12 months

DEMOS





## Summary



## Azure Functions

Deploy a functions  
worth of code, not an  
entire application



## Summary



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Kubernetes-style applications, without the overhead of Kubernetes



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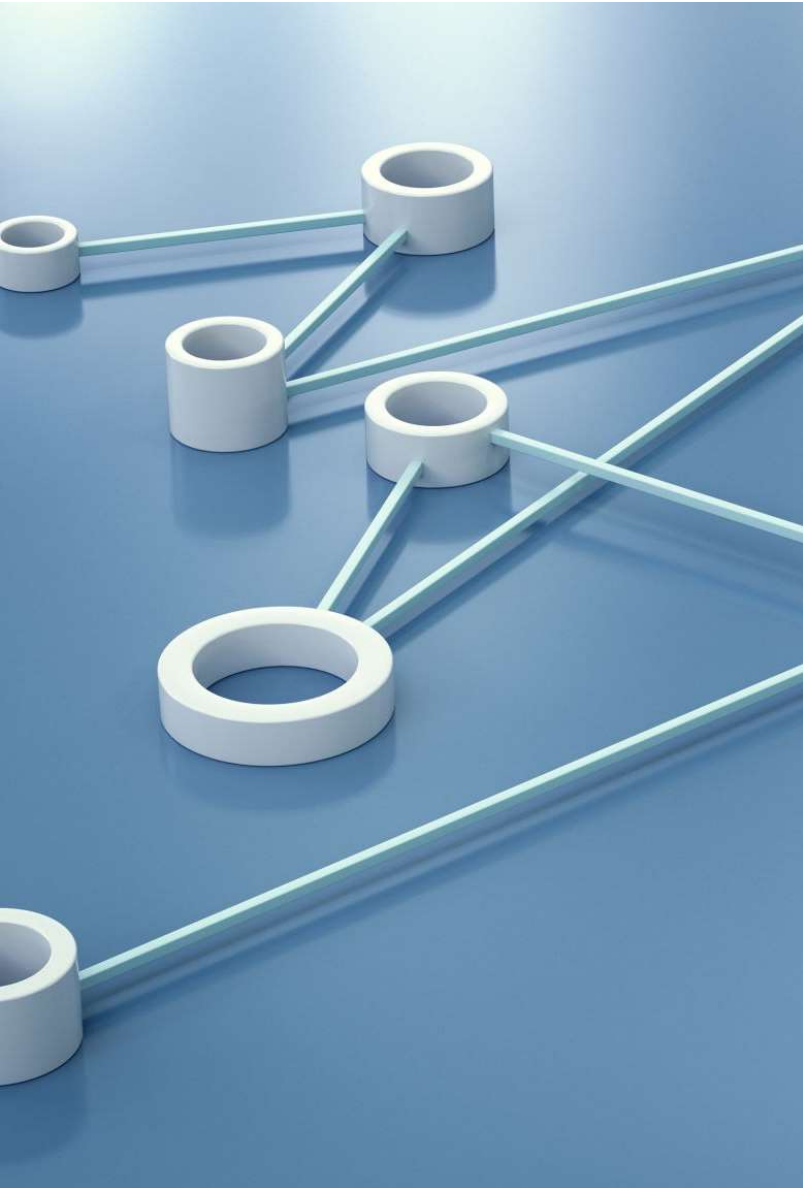
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Add AI to any app



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# Thank You!



<https://linktr.ee/douglasstarnes>