



Building Enterprise Class Web Services in Microsoft Azure

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ocp | One Commercial
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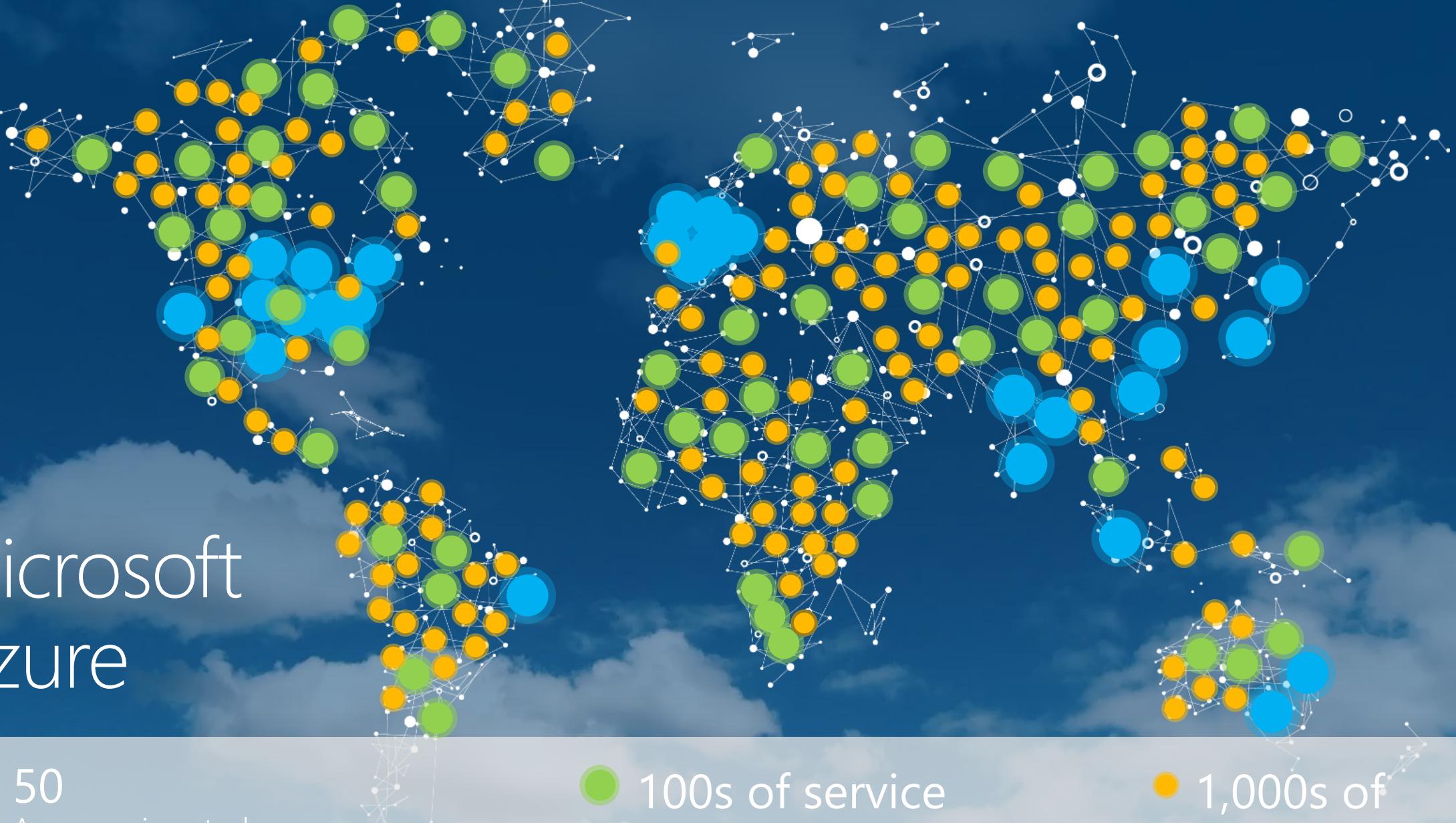


Microsoft Azure



50

Azure regions today
More than AWS & Google combined



● 100s of service providers

● 1,000s of enterprises

Part 1: Writing Enterprise Class Web Services

- Cloud basics
- Azure AD
- ASP.NET Core WebAPI
- Resource Manager
- Azure App Services
- Calling our service from SPFx
- Continuous deployment
- SQL Server and Entity Framework
- Azure Key Vault
- Deployment Slots
- App Insights
- Scaling up and out

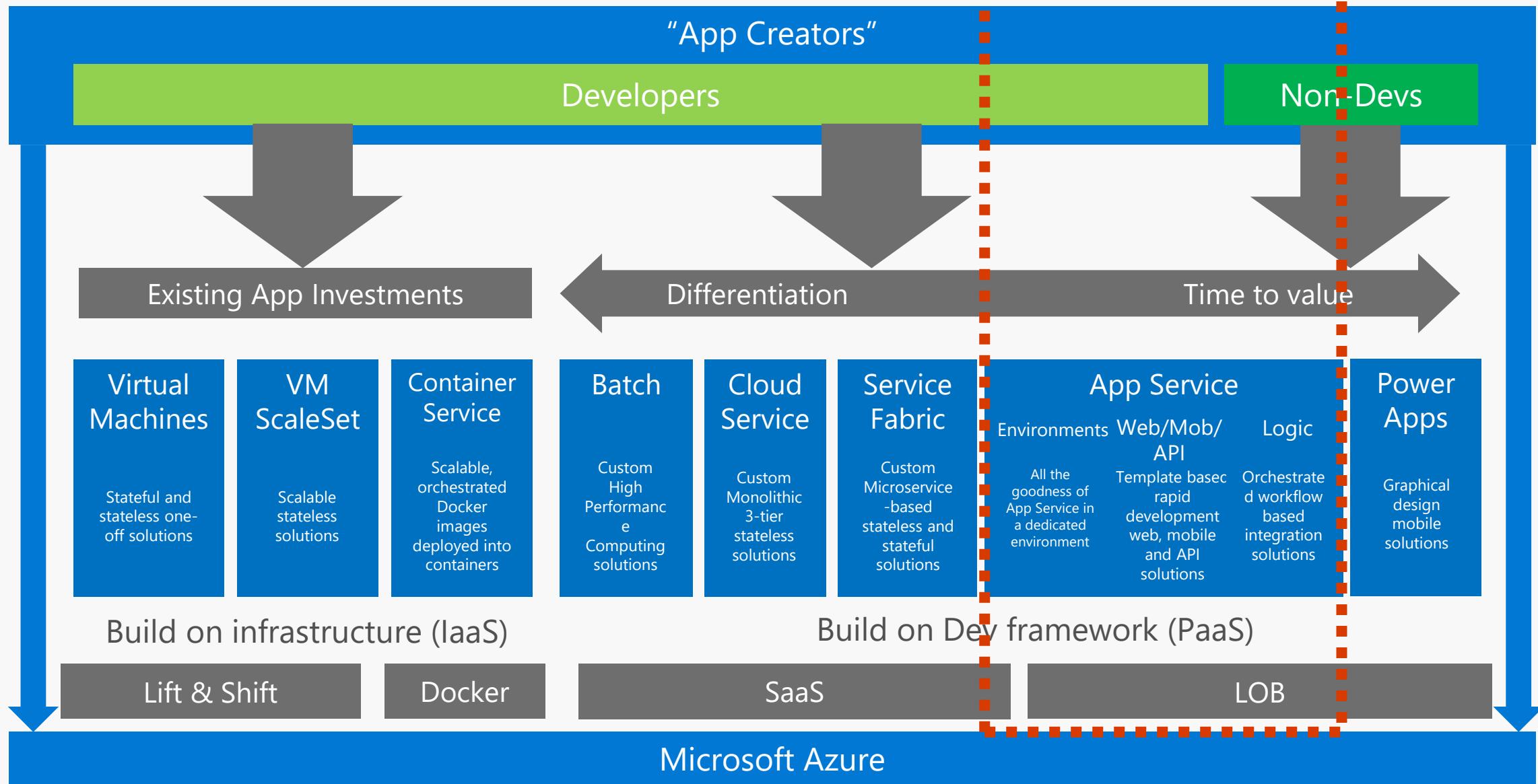
Control and Responsibility

	On Premises	IaaS (Azure VMs)	CaaS (Docker, Kubernetes)	PaaS (Azure Cloud Services)	PaaS (Azure App Services)	SaaS (Office 365)
Application, Data	YOU	YOU	YOU	YOU	YOU	VENDOR
Deployment, Security, etc.	YOU	YOU	YOU	YOU	VENDOR	VENDOR
Middleware		YOU	YOU	VENDOR	VENDOR	VENDOR
OS	YOU	YOU	VENDOR	VENDOR	VENDOR	VENDOR
Virtualization, Servers, Storage, Networking, Data center	YOU	VENDOR	VENDOR	VENDOR	VENDOR	VENDOR

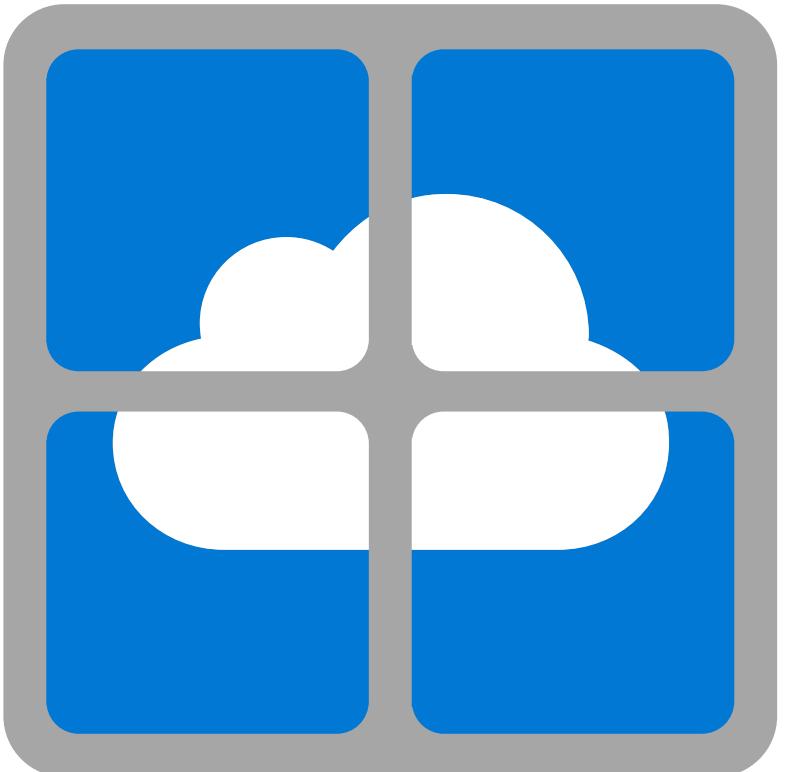
Traditional **Infrastructure as a Service** **Container as a Service** **Platform as a Service** **Software as a Service**

Lift and Shift *Portable* *Build* *Configure and use*

The Azure Application Platform

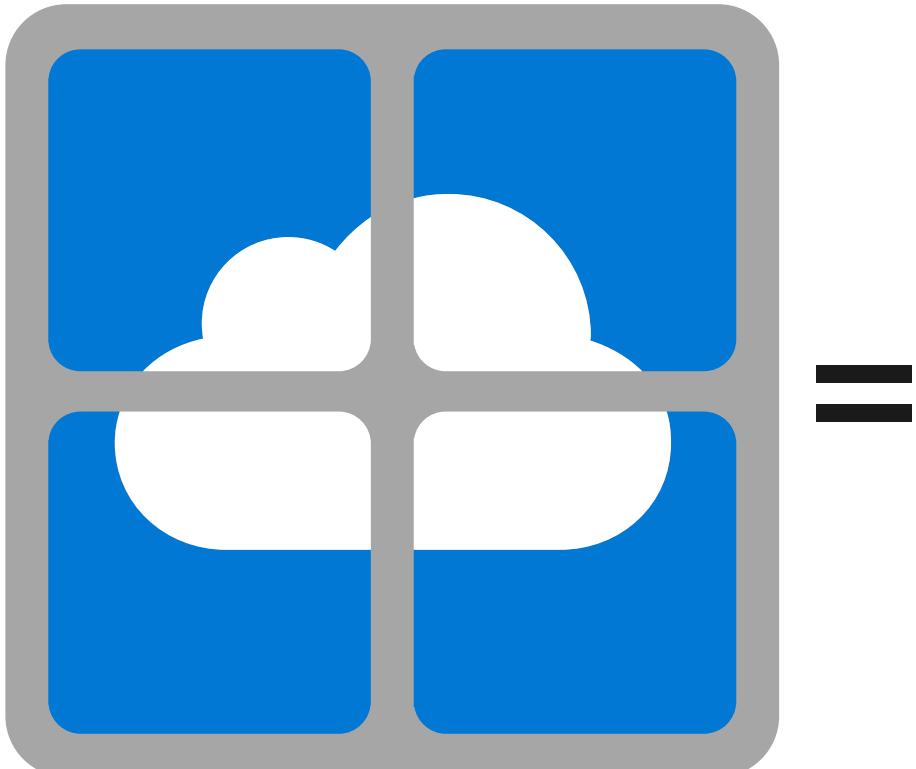


Azure App Service



 Web apps Web apps that scale with your business	 Mobile apps Build mobile apps for any device
 Logic apps Automate business processes across SaaS and on-premises	 API apps Easily build and consume APIs in the cloud
 Functions Serverless event based development accelerator	

Azure App Service



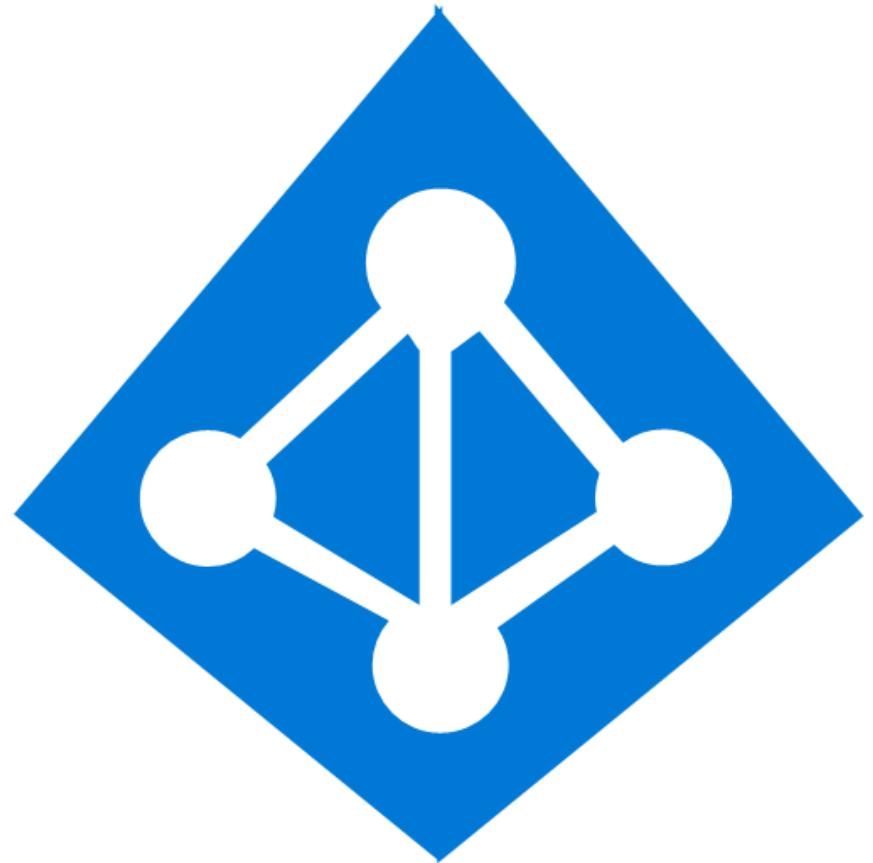
=

Auto-patching and auto-scale

.NET, Java, Node.js, PHP, Python

Integrate with SaaS and on-premises

Continuous integration with VSTS,
Github, BitBucket, and more



Azure Active Directory

A confusing landscape

Azure ACS	Azure AD v1 Endpoint	Azure AD v2 Endpoint
Federation with “social” accounts (Google, Facebook, Microsoft, etc)	Azure AD only	“Unified” Azure AD + Microsoft accounts
	Program with ADAL	Program with MSAL
Used in SharePoint and Office add-in models, S2S trusts	Most widely used in O365/Azure	The future but there are gaps
Static consent model	Static consent model	Dynamic consent model
Register in Azure Service Bus (or in SharePoint for add-ins and S2S)	Register in Azure Portal, PowerShell etc.	New app registration portal
Deprecated – will be turned off November 2018*	One app registration for each platform/scenario	One app registration (and one app ID) for all platforms

* SharePoint and Office Add-ins won’t be affected



A rose by any other name ...

Tenant ID, Directory ID

Unique identifier an instance of Azure AD

App ID, Application ID, Client ID

Unique identifier for an application

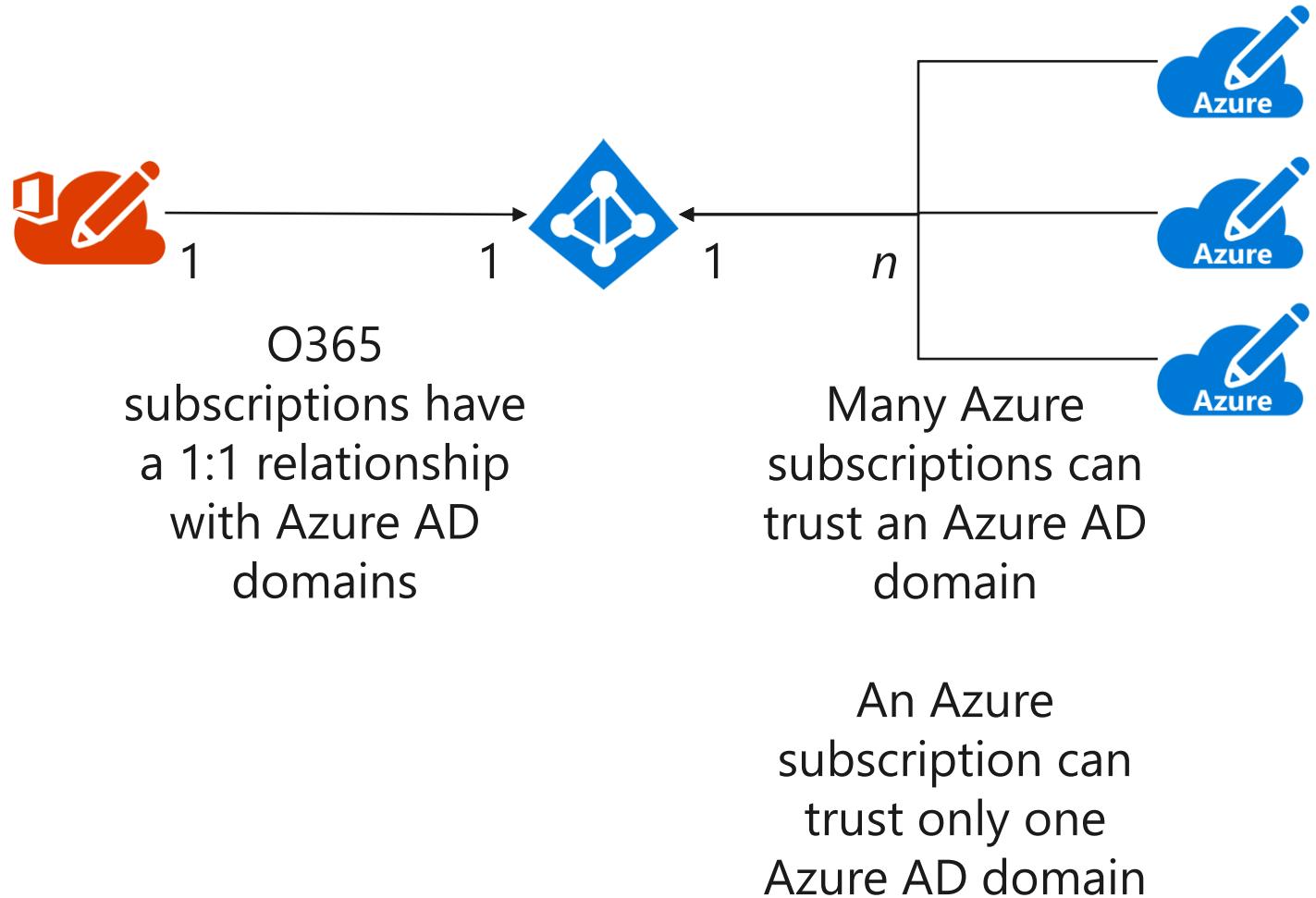
App Secret, App Key, Client Secret

Password used to authenticate the application

Enterprise Application (in portal), Service Principal

App registration applied to a service, possibly in another tenant

Azure AD and Subscriptions

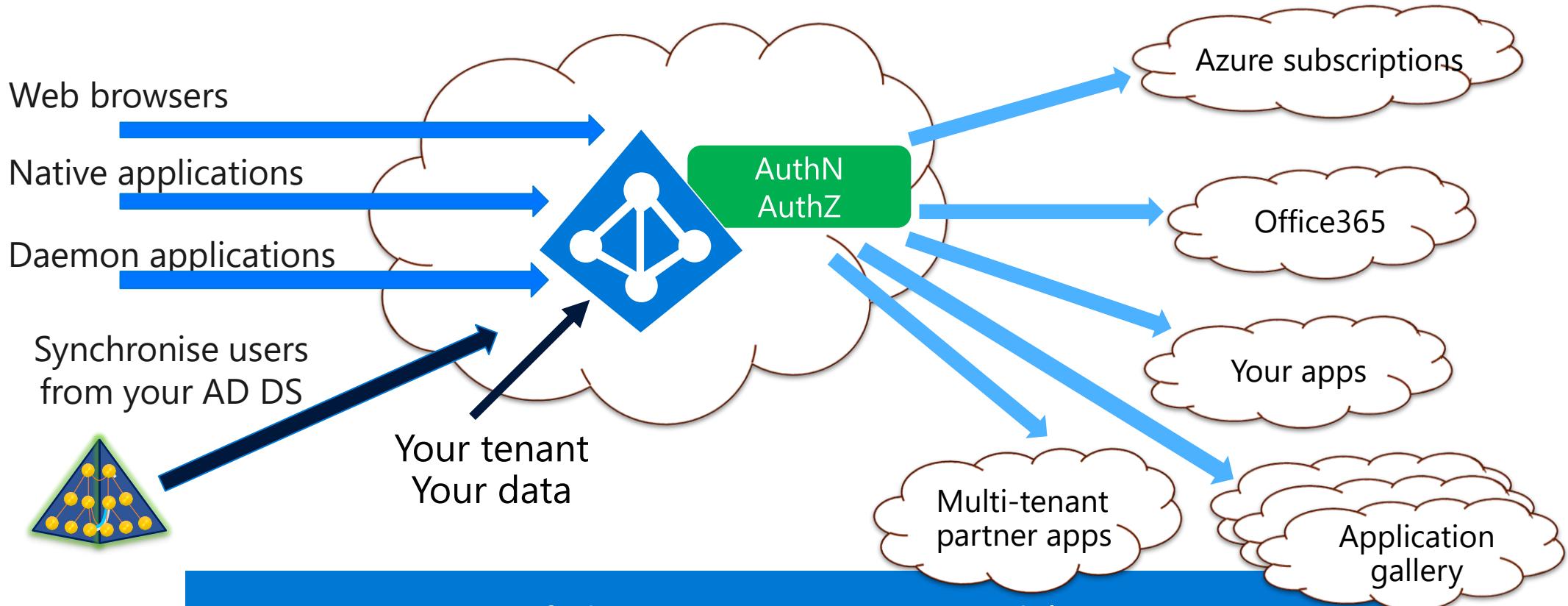


DEMO

View and change subscription/
Azure AD associations

Microsoft Azure Active Directory

Single Sign-On in the cloud



- On-premises AD federation
- Multi-factor authentication
- B2B federation
- Consent model
- Conditional access
- Self-service password, group mgmt

OpenID Connect / OAuth 2.0 Flows

Calling from → to	Use this flow
Browser → Web application	Open ID Connect / OAuth 2.0
Browser → Web service	OAuth 2.0 Implicit Flow
Browser → Web service → Web service (do not elevate permission)	On-Behalf-Of Flow
Daemon or service app → Web Service (elevate permission)	Oauth 2.0 Client Credentials Flow
Native application → Web Service	OAuth 2.0 Authorization Code Flow

Azure AD Key Concepts

1. App Registration

- Application ID – uniquely identifies an app
- App Secret – effectively the password for app “service account”; not used w/implicit flow
- Redirect URI – used to direct responses back to your app
- More depending on the flow you plan to use

2. Resources – e.g. <https://graph.windows.net>

(Not to be confused with Azure Resource Manager resources!)

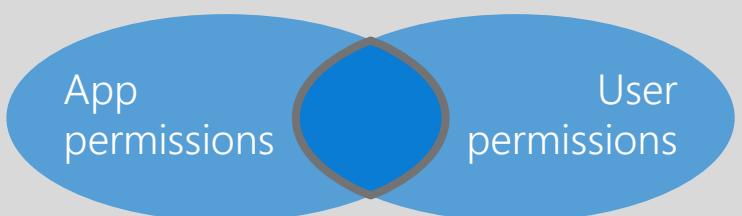
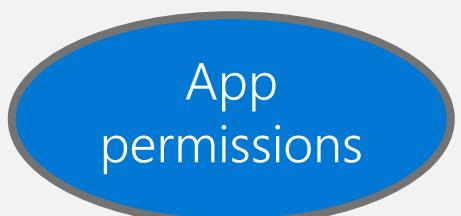
These are things that are secured by Azure AD.

Your application can be a resource

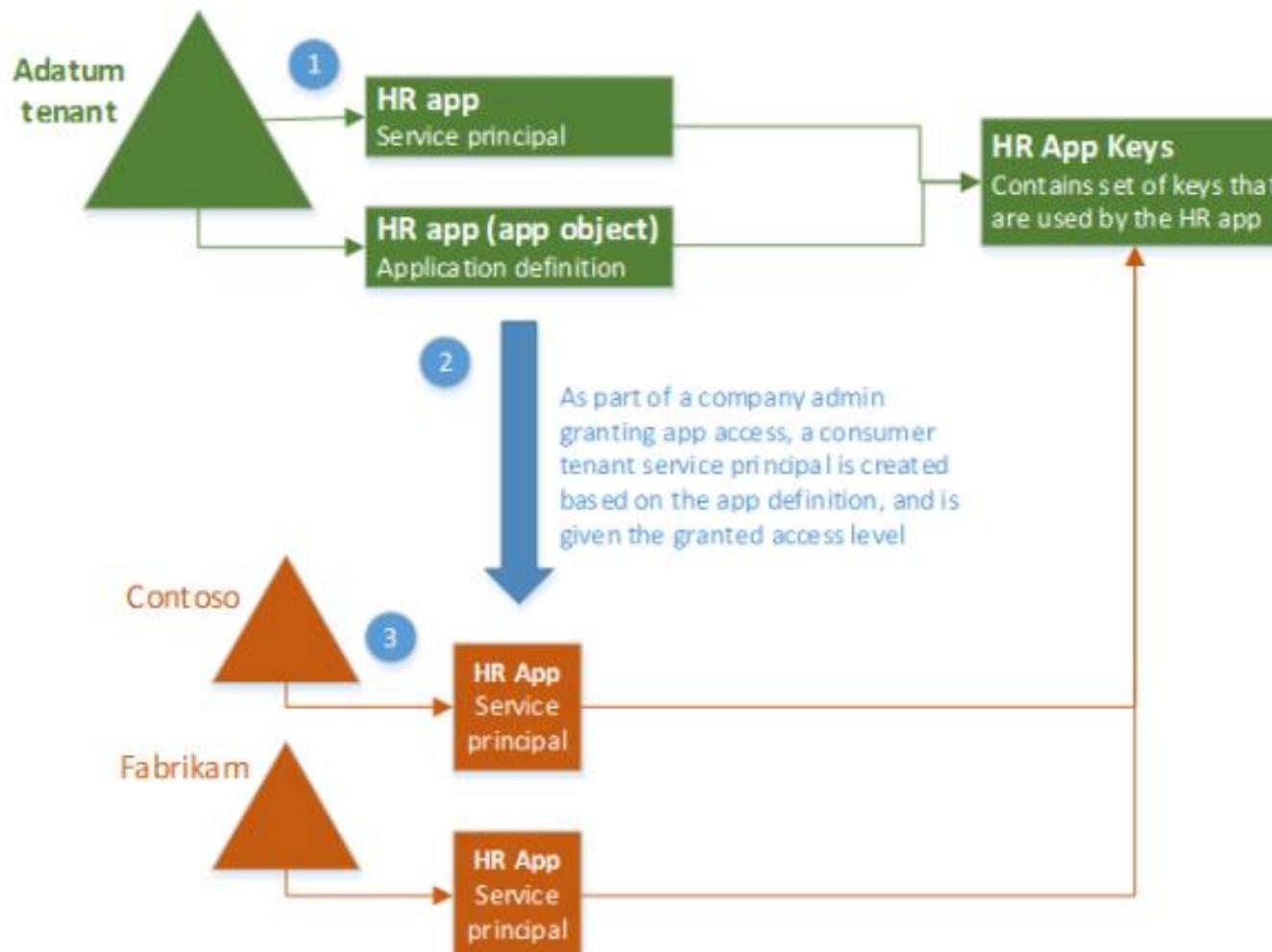
3. Scopes – e.g. Directory.Read

These are permissions that are specific to each resource

App types and permission types

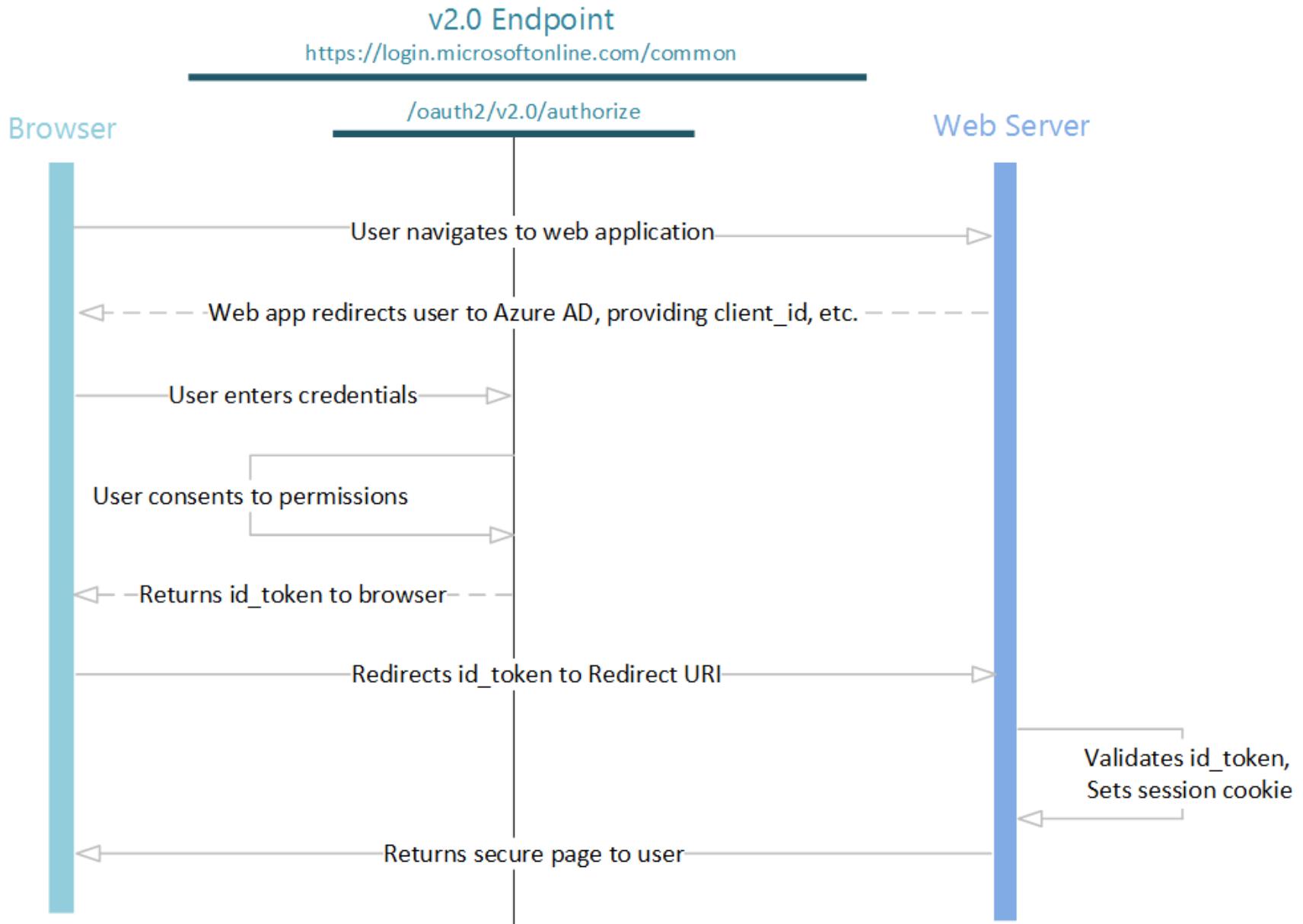
	Get access on behalf of users	Get access as a service
App type	Mobile, Web and Single page app	Service and Daemon
Permission type	Delegated permission (user permission)	Application permission
Who can consent	Users can consent for their data	Admin can consent for them or for all users
Effective Permissions	 A Venn diagram consisting of two overlapping blue ovals. The left oval is labeled "App permissions" and the right oval is labeled "User permissions". The overlapping area represents the effective permissions.	 A single blue oval with a thick grey border, labeled "App permissions".

Applications and Service Principals (a.k.a. Enterprise Applications)



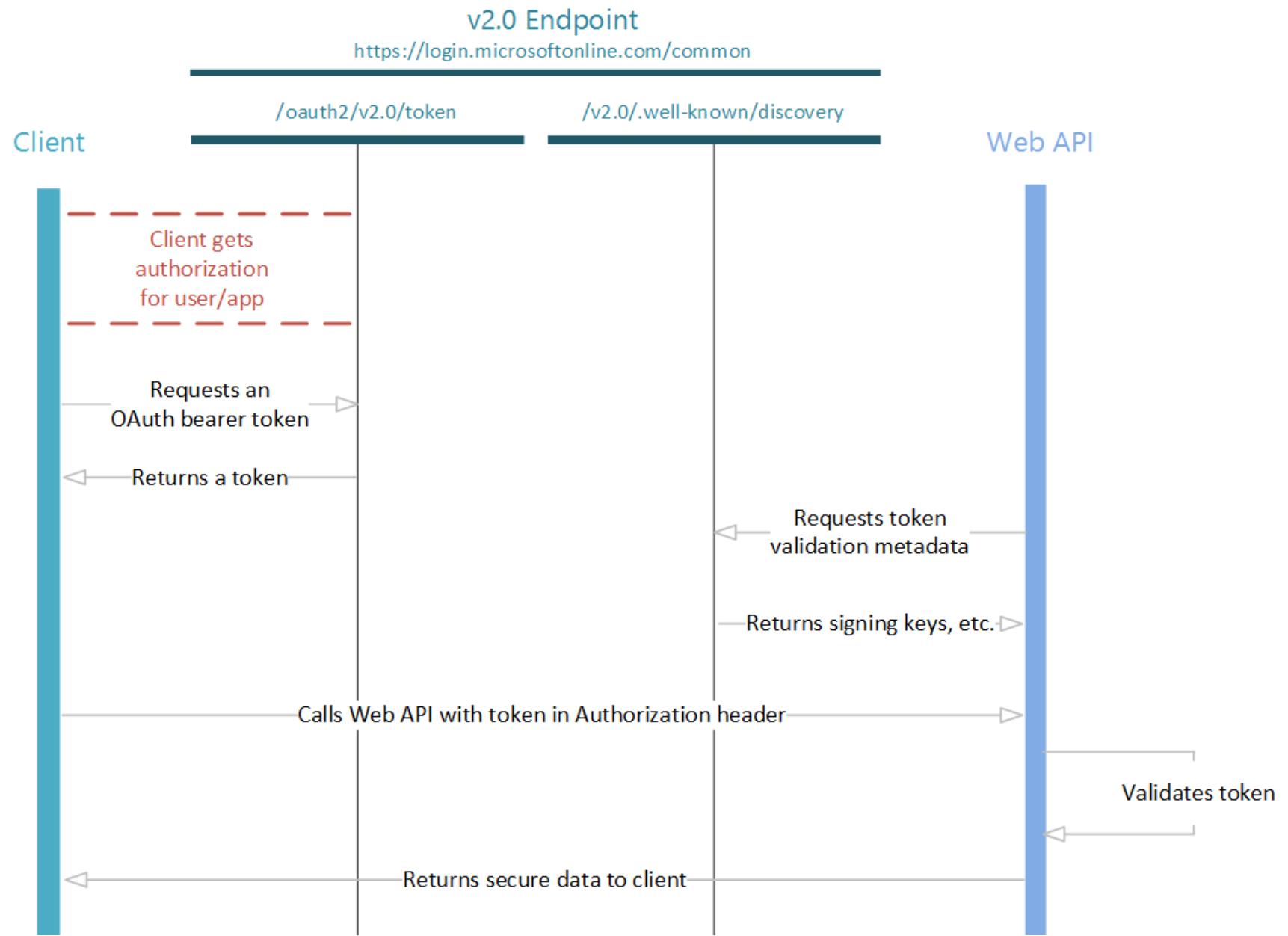
Open ID Connect Flow

Web Applications



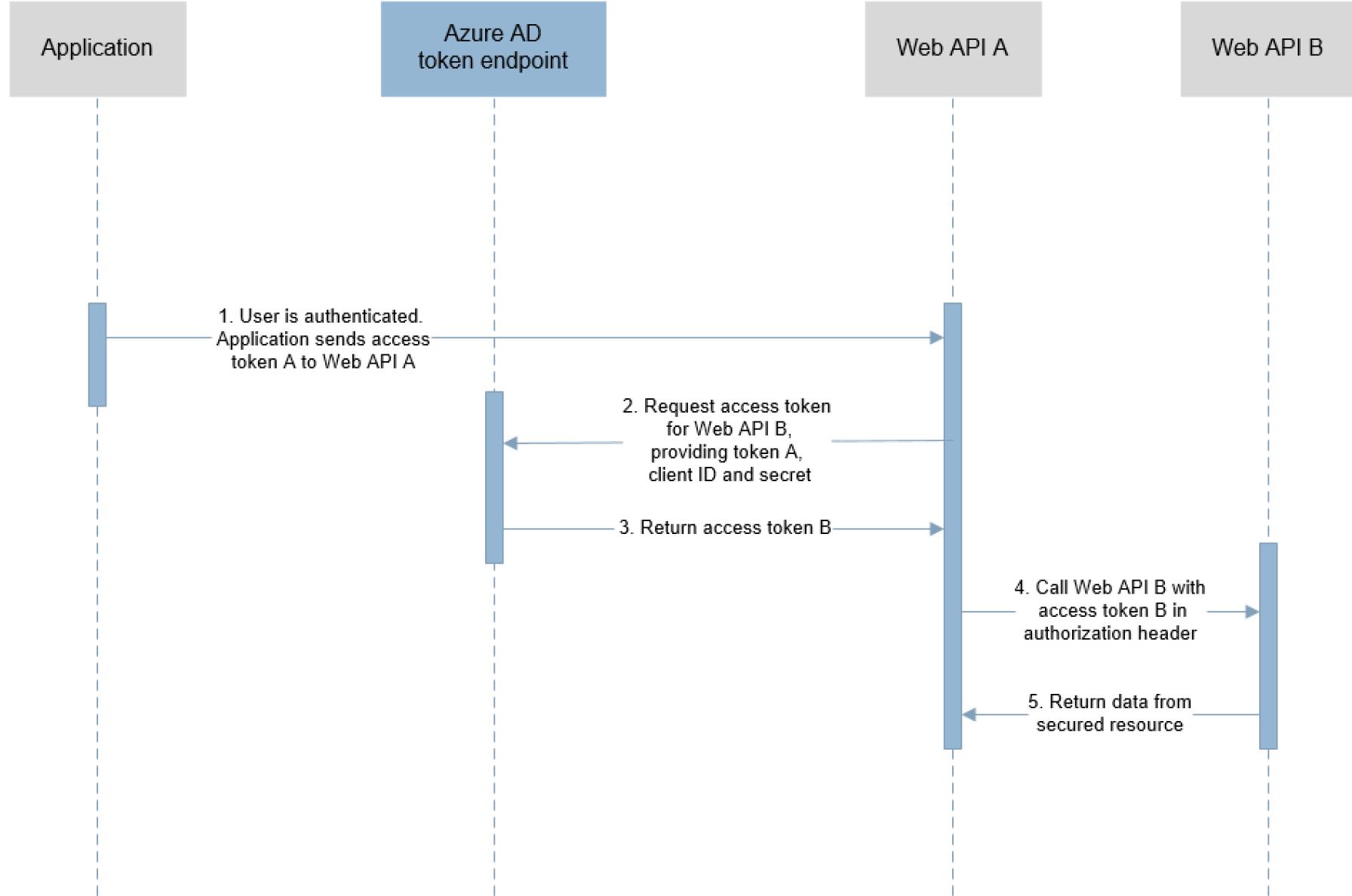
Consuming OAuth 2.0 Access Tokens

Web API



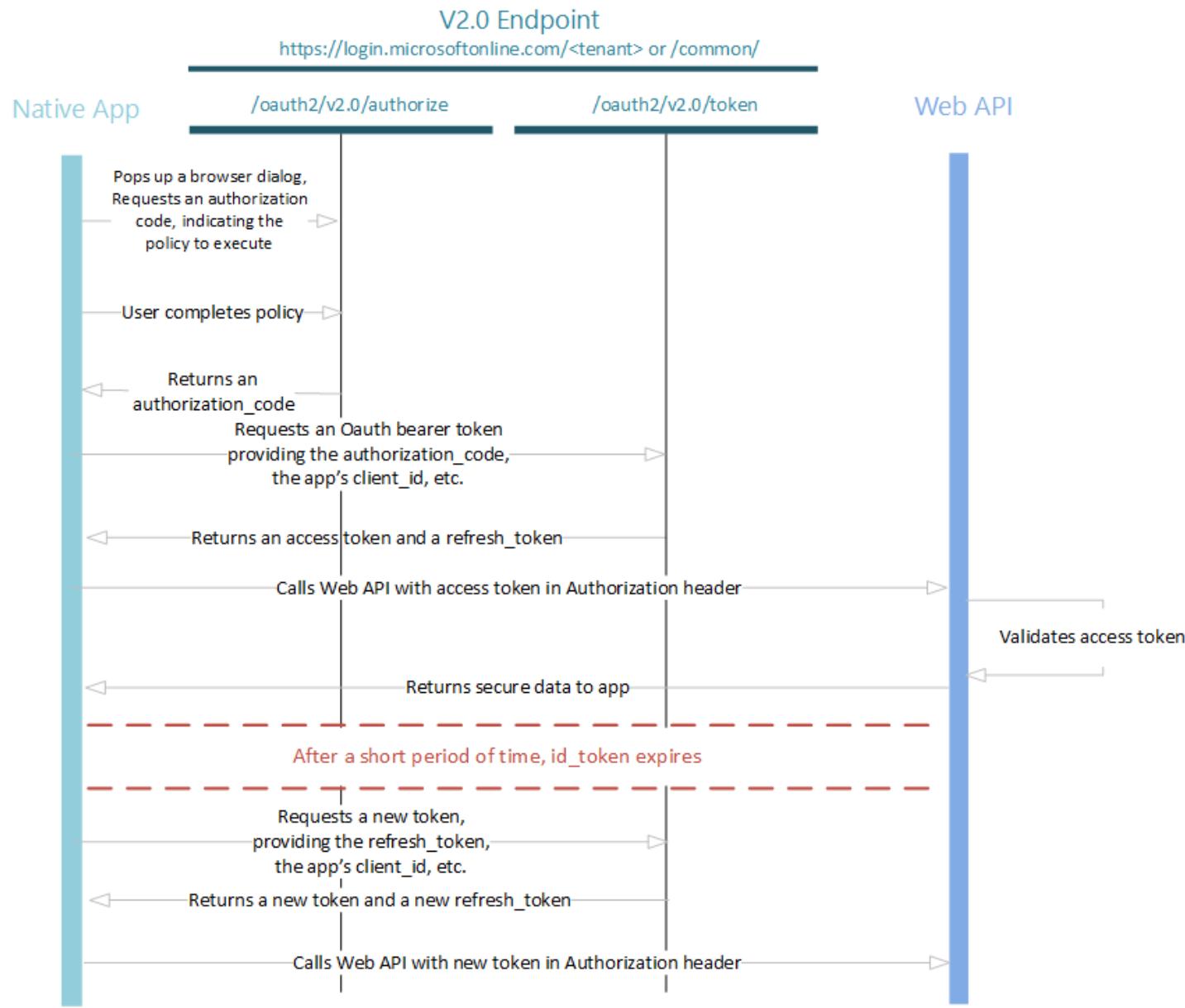
On-Behalf-Of Flow

Web API



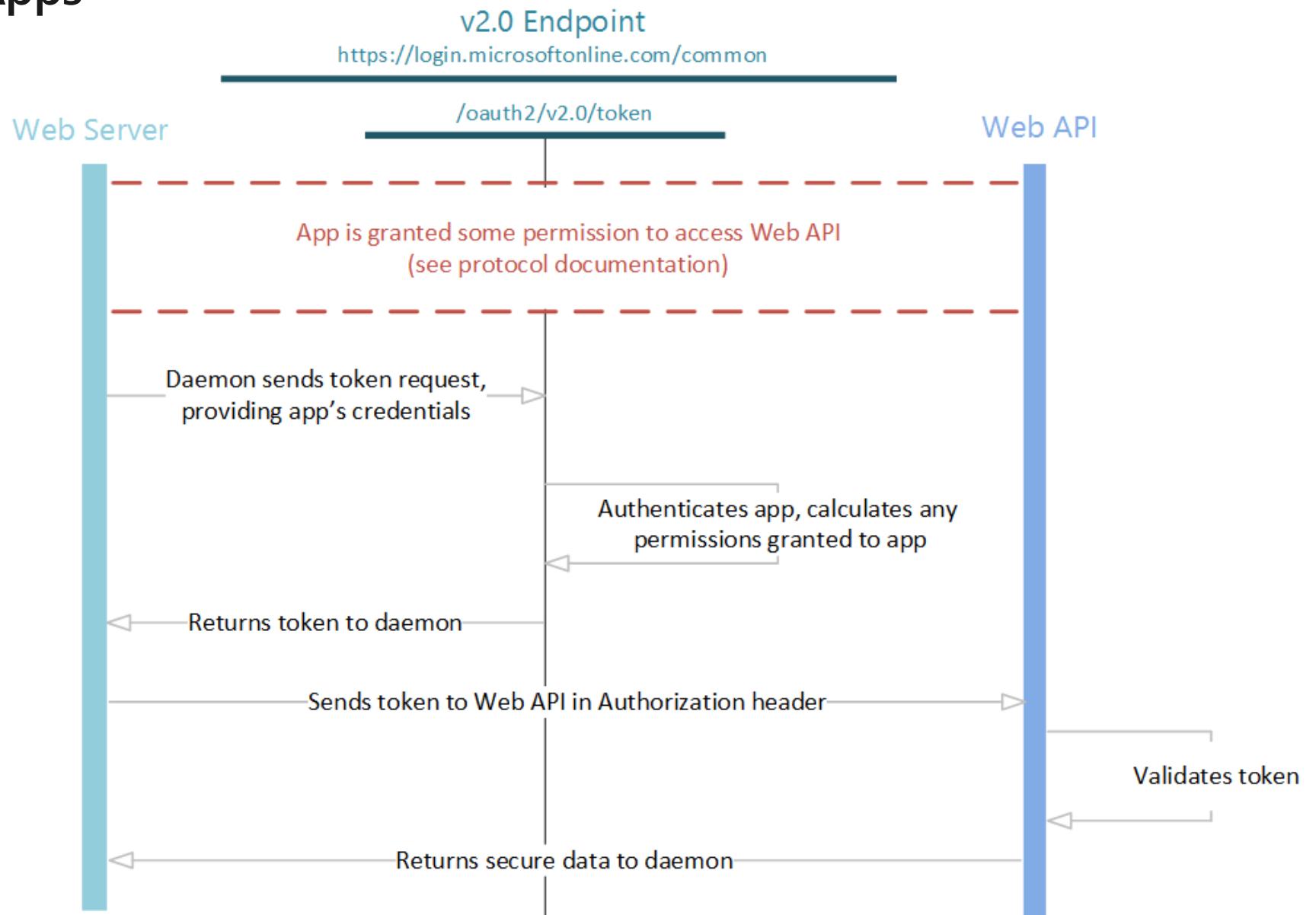
OAuth 2.0 Authorization Code Flow

Native Apps



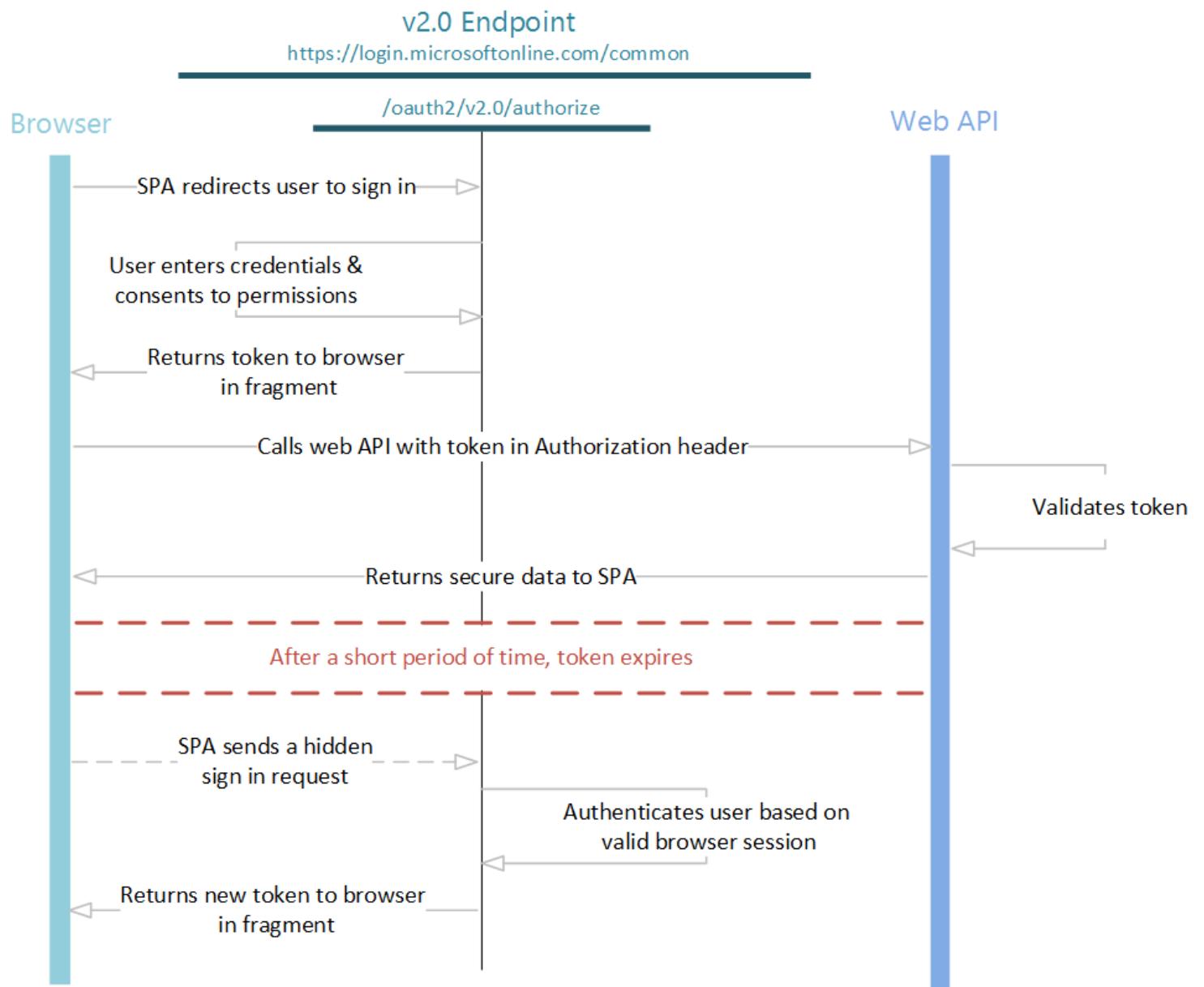
OAuth 2.0 Client Credentials Flow

Daemons and Server Apps



OAuth 2.0 Implicit Flow

Browser Apps



Authentication Troubleshooting Checklist

- Is the App ID correct?
- Is the App Secret correct? Did you recently make a major change to the App registration that might invalidate the App Secret?
- In your Auth URL are you referencing the right resource (the one you plan to access?)
- Are you using Implicit flow, and if so, is allowImplicitFlow set in the app manifest?
- Are permissions correct?
- Have you pressed the "Grant" button to grant permission?

DEMO

App registration
Setting app scopes/permissions
Call Graph API with Postman



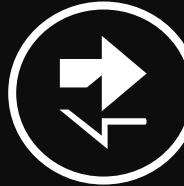
ASP.NET Core 2.0 Web API



ASP.NET Core and the Modern Web



Totally Modular



Faster Development Cycle



Seamless transition
from on-premises to cloud



Choose your Editors
and Tools



Open Source
with Contributions

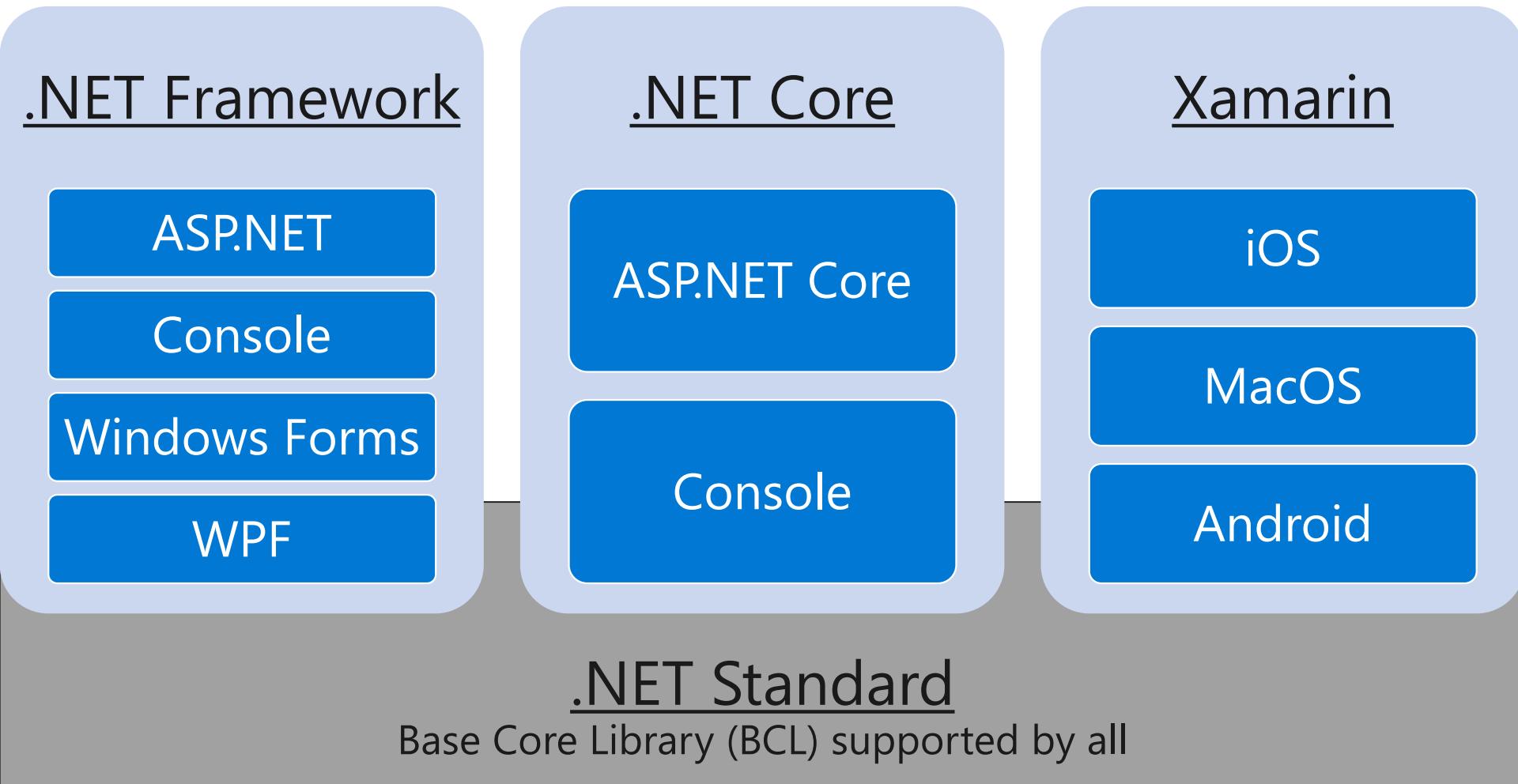


Cross-Platform

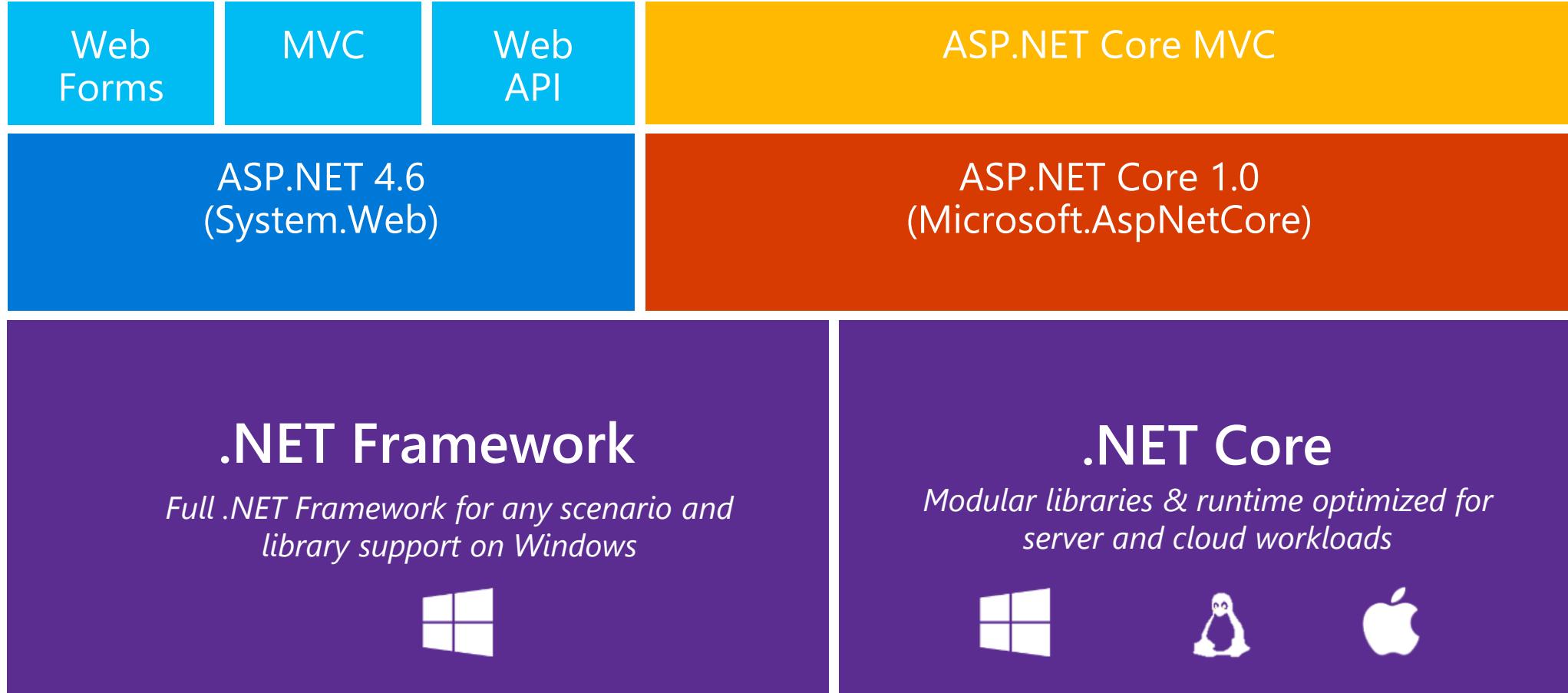


Fast

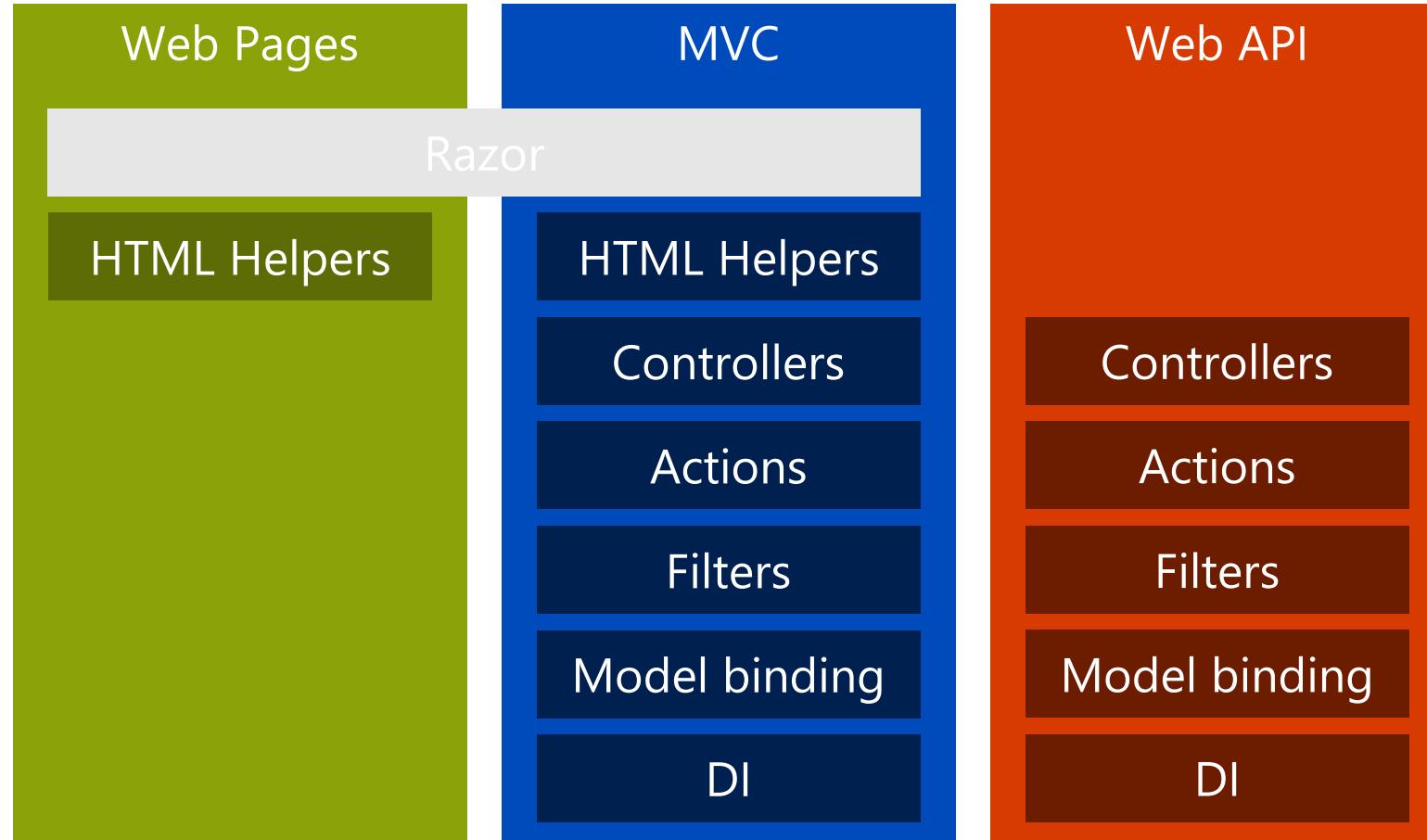
.NET today



ASP.NET Landscape

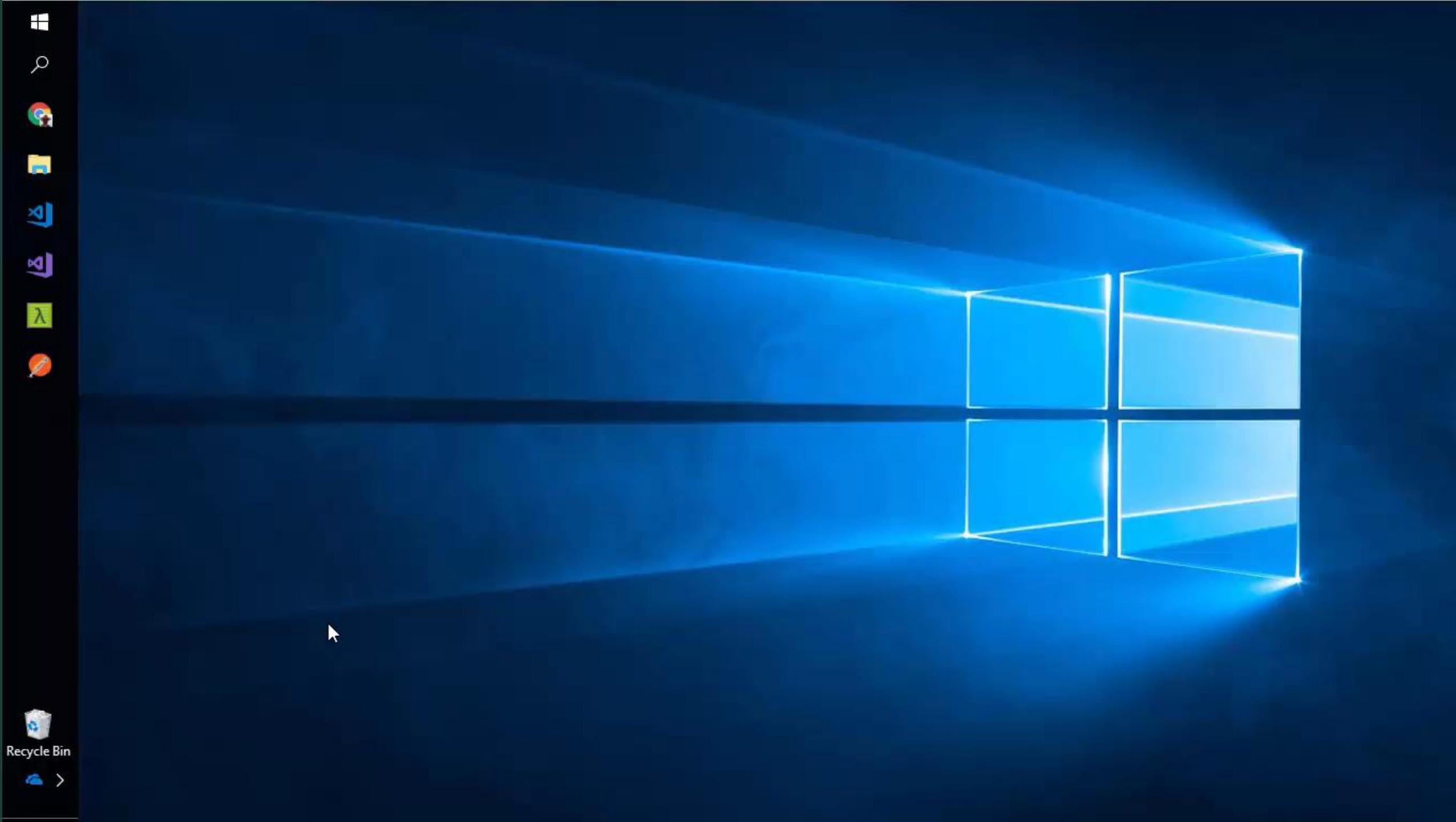


ASP.NET frameworks - similar, but different



DEMO

Create a new ASP.NET Core WebAPI
Work with authorization
Test locally and in Azure



REManager - Microsoft Visual Studio (Administrator)

File Edit View Project Build Debug Team Tools Test Analyze Window Help

Debug Any CPU IIS Express

SQL Server Object Explorer Cloud Explorer Recycle Bin

ValuesController.cs* REManager

REManager.Controllers.ValuesController Get()

```
1  using System;
2  using System.Collections.Generic;
3  using System.Linq;
4  using System.Threading.Tasks;
5  using Microsoft.AspNetCore.Authorization;
6  using Microsoft.AspNetCore.Mvc;
7
8  namespace REManager.Controllers
9  {
10     [Authorize]
11     [Route("api/[controller]")]
12     public class ValuesController : Controller
13     {
14         // GET api/values
15         [HttpGet]
16         public IEnumerable<string> Get()
17         {
18             return new string[] { "value1", "value2" };
19         }
20     }
}
```

160 %

Error List Package Manager Console Web Publish Activity Output

Ln 10 Col 16 Ch 16 INS ↑ 0 ⌂ 33 AzureSPC-WebAPI master

Solution Explorer

Search Solution Explorer (Ctrl+F)

+ Solution 'REManager' (1 project)

+ REManager

- Connected Services
- Dependencies
- Properties
- wwwroot
- Controllers
- + C# ValuesController.cs
- + Extensions
- + appsettings.json
- + C# Program.cs
- + C# Startup.cs

Solution Explorer | Team Explorer

Properties

Bob German

Diagnostic Tools

Keys - Microsoft Azure

Secure | https://portal.azure.com/#@BGTest18.onmicrosoft.com/blade/Microsoft_AAD_IAM/ApplicationBlade/appId/63029ef5-80fc-43be-b586-6cd4053f85c2/objectId/...

Office Home GitHub Admin TeamsLab Tools Learn Office Apps Graph AuthN SPFx Upgrade FutureProof Azure Consume enterprise Webhook

Microsoft Azure

Home > mslabs - App registrations > REManager > Settings > Keys

Search resources, services and docs

Create a resource

All services

FAVORITES

Dashboard All resources Resource groups

REManager Notes.txt - Notepad

File Edit Format View Help

Callback URL: https://www.getpostman.com/oauth2/callback

Auth URL: https://login.microsoftonline.com/common/oauth2/authorize?resource=63029ef5-80fc-43be-b586-6cd4053f85c2

Access Token URL: https://login.microsoftonline.com/common/oauth2/token

Client ID: 63029ef5-80fc-43be-b586-6cd4053f85c2

Client Secret: 6TgHpcqLZu+FgsHI1IeJgLpc6NjgwUCAF8JHgL3IJLU=

Scope: user_impersonation

Keys

Save Discard Upload Public Key

Copy the key value. You won't be able to retrieve after you leave this blade.

Passwords

DESCRIPTION	EXPIRES	VALUE
Key description	4/15/2019	Hidden

Bob@BGTest18.onmic... MSLABS

MS Labs



File Edit View Help

New Import Runner +

My Workspace



SYNC OFF



Sign In

Filter

History

Collections



Postman Echo

37 requests

PropMan

2 requests

SPC

1 request

Webhook1

4 requests

https://propman2018

A1 localhost:44353/ap

TestWS



No Environment



GET

https://localhost:44391/api/values

Params

Send

Save

OAuth 2.0

Access Token

eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiIsInq1dC...

Available Tokens

Get New Access Token

The authorization data will be automatically generated when you send the request. [Learn more about authorization](#)

Add authorization data to

Request Headers

Preview Request

Body

Cookies

Headers (6)

Test Results

Status: 200 OK

Time: 43 ms

Size: 315 B

Pretty

Raw

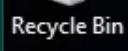
Preview

JSON



Save Response

```
1 [  
2   "value1",  
3   "value2"  
4 ]
```



ASP.NET Core Configuration

- Default configuration sources:
 - appsettings.json
 - appsettings.<environment>.json (development, staging, production, etc)
 - User secrets (in development environment)
 - Environment variables
 - Command-line arguments (if not null)
- Modify in Program.cs / BuildWebHost() method
- Other options you can add:
 - KeyVault
 - XML files
 - INI files
 - In-memory (set via methods, good for testing)

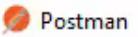
DEMO

Show resources in Azure
Code walk-through:

- Data model, mock data, updated values controller
- Configuration – application.json, user secrets

DEMO

Show data in PostMan



+ New

Import

Runner



My Workspace ▾



SYNC OFF



Sign In

Filter

History

Collections

Postman Echo
37 requestsPropMan
2 requestsSPC
1 requestWebhook1
4 requests

https://propman2018

A1 localhost:44353/ap

TestWS



No Environment



Examples (0) ▾

▶ TestWS

GET

https://remanagerws.azurewebsites.net/api/values/

Params

Send

Save

Authorization

Headers (2)

Body

Pre-request Script

Tests

Cookies Code

TYPE

OAuth 2.0

The authorization data will be automatically generated when you send the request. [Learn more about authorization](#)

Add authorization data to

Request Headers

Preview Request

Access Token

eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiIsInq1dCI6...

Available Tokens

Get New Access Token

Response

Hit the Send button to get a response.



R E S O U R C E M A N A G E R



Home > New

New

Search the Marketplace

Azure Marketplace [See all](#)

Featured [See all](#)

Category	Service	Description
Get started	Web App	Quickstart tutorial
Recently created	Logic App	Quickstart tutorial
Compute	Web App for Containers	Quickstart tutorial
Networking	CDN	Quickstart tutorial
Storage	Media Services	Quickstart tutorial
Web	Azure Search	Quickstart tutorial
Mobile	API App	Learn more
Containers	Template deployment	Learn more
Databases	API management	Quickstart tutorial
Analytics		
AI + Machine Learning		
Internet of Things		
Integration		
Security		
Identity		
Developer tools		
Management Tools		
Software as a service (SaaS)		
Blockchain		

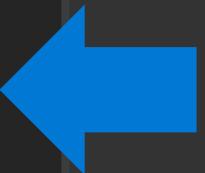
Create a resource

All services

Favorites

- Dashboard
- All resources
- Azure Active Directory
- Resource groups
- App Service plans
- App Services
- Bot Services
- Function Apps
- Logic apps
- Logic Apps Custom Co...
- API Connections
- On-premises Data Gat...
- SQL servers
- SQL databases
- Cognitive Services
- Key vaults
- Application Insights
- Storage accounts

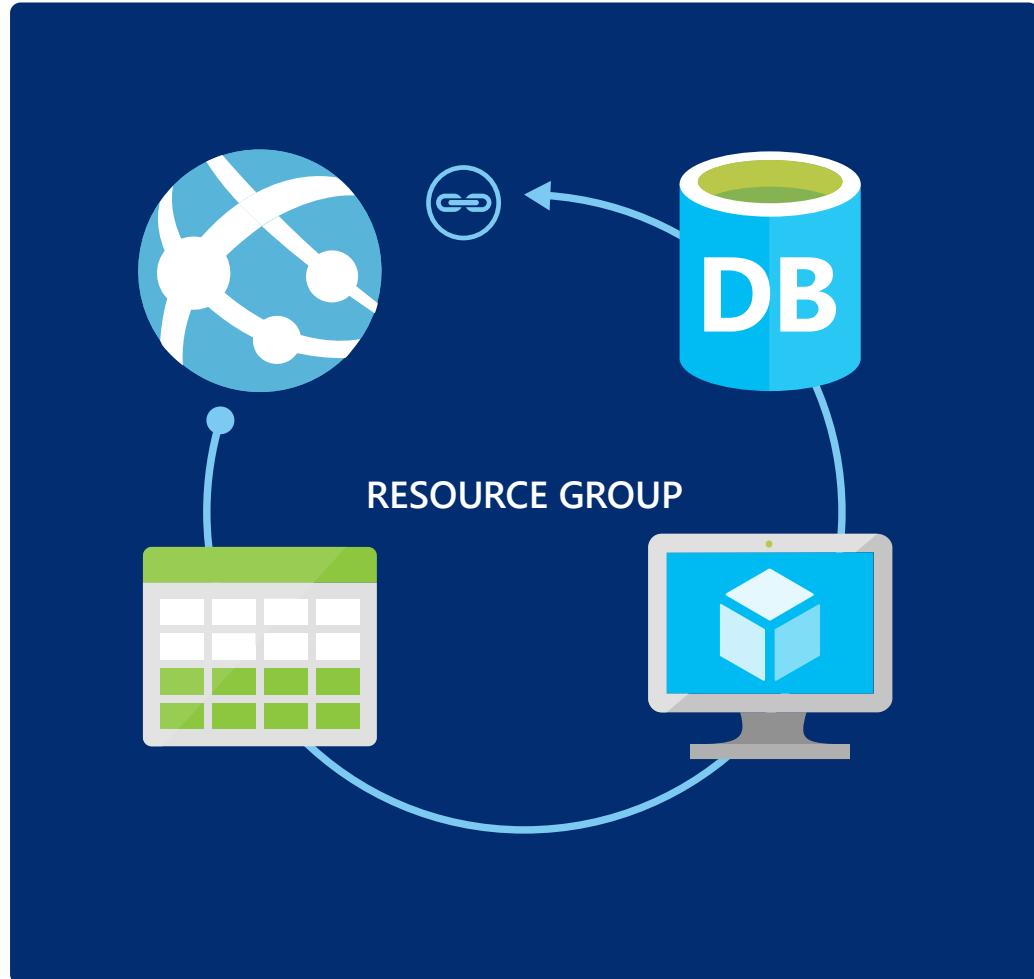
These are all *resources*



The Azure portal is calling
Resource Manager to
manage them for you

ARM = Azure Resource Manager

Microsoft Azure Resource Groups



Tightly coupled containers of resources that are related in some way

Every resource **must** exist in one and only one resource group

Resource groups can span regions

Nesting of Resource Groups not supported

- Set Permissions
- Monitor and alerting rules
- Billing
- Deployment
- Communication

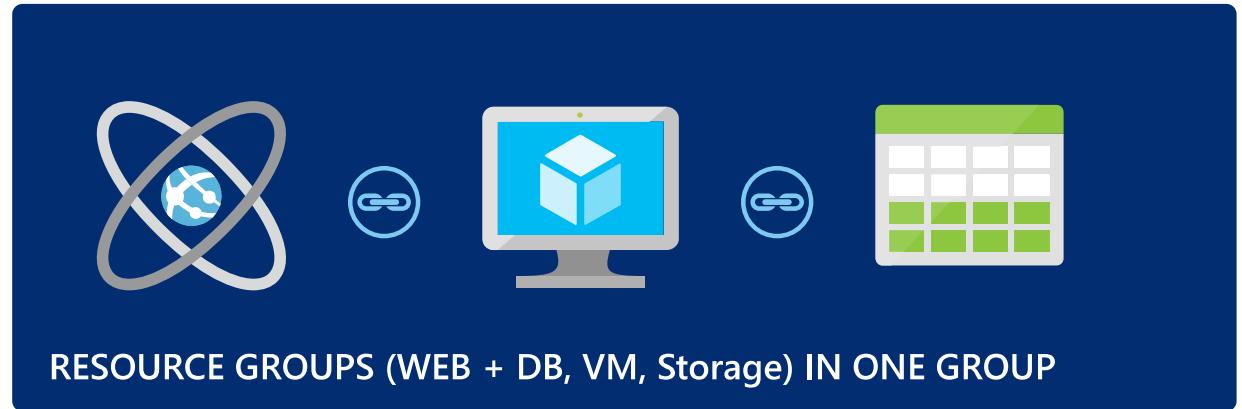
Resource Group Lifecycle

Question:

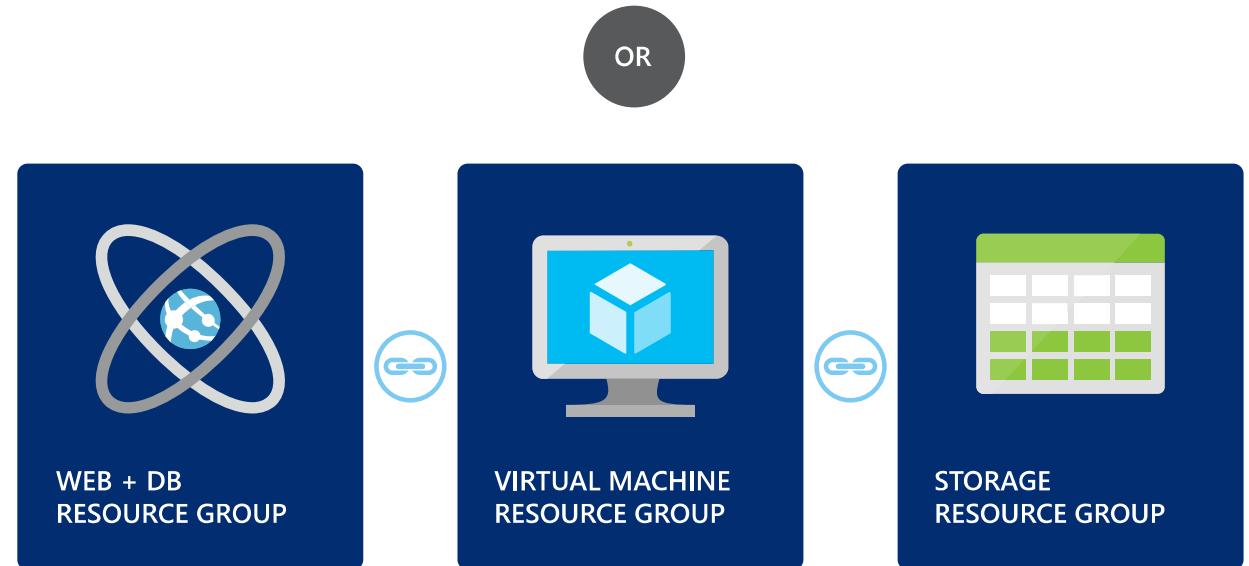
Should these resources be in the same group or a different one?

Hint:

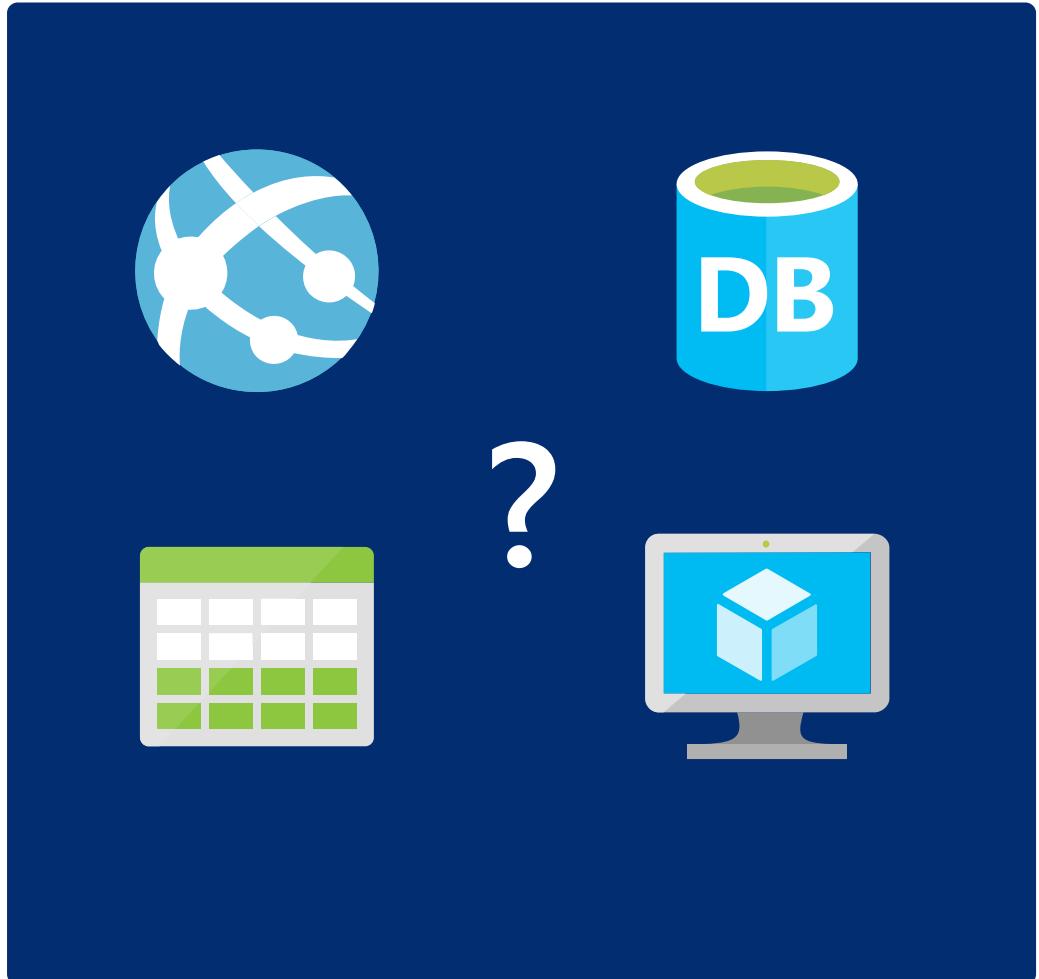
Do they have common lifecycle
and management?



OR



Microsoft Azure Resource Groups



DEMO

Show resources in Portal, PowerShell,
and Resource Explorer

Azure Resource Group Limits

Resource	Default Limit	Maximum Limit
Resources per resource group (per resource type)	800	800
Deployments per resource group	800	800
Resources per deployment	800	800
Management Locks (per unique scope)	20	20
Number of Tags (per resource or resource group)	15	15
Tag key length	512	512
Tag value length	256	256

<https://azure.microsoft.com/en-us/documentation/articles/azure-subscription-service-limits/>

Resource Tags



- Name-value pairs assigned to resources or resource groups
- Subscription-wide taxonomy
- Each resource can have up to 15 tags

Tagging Tips

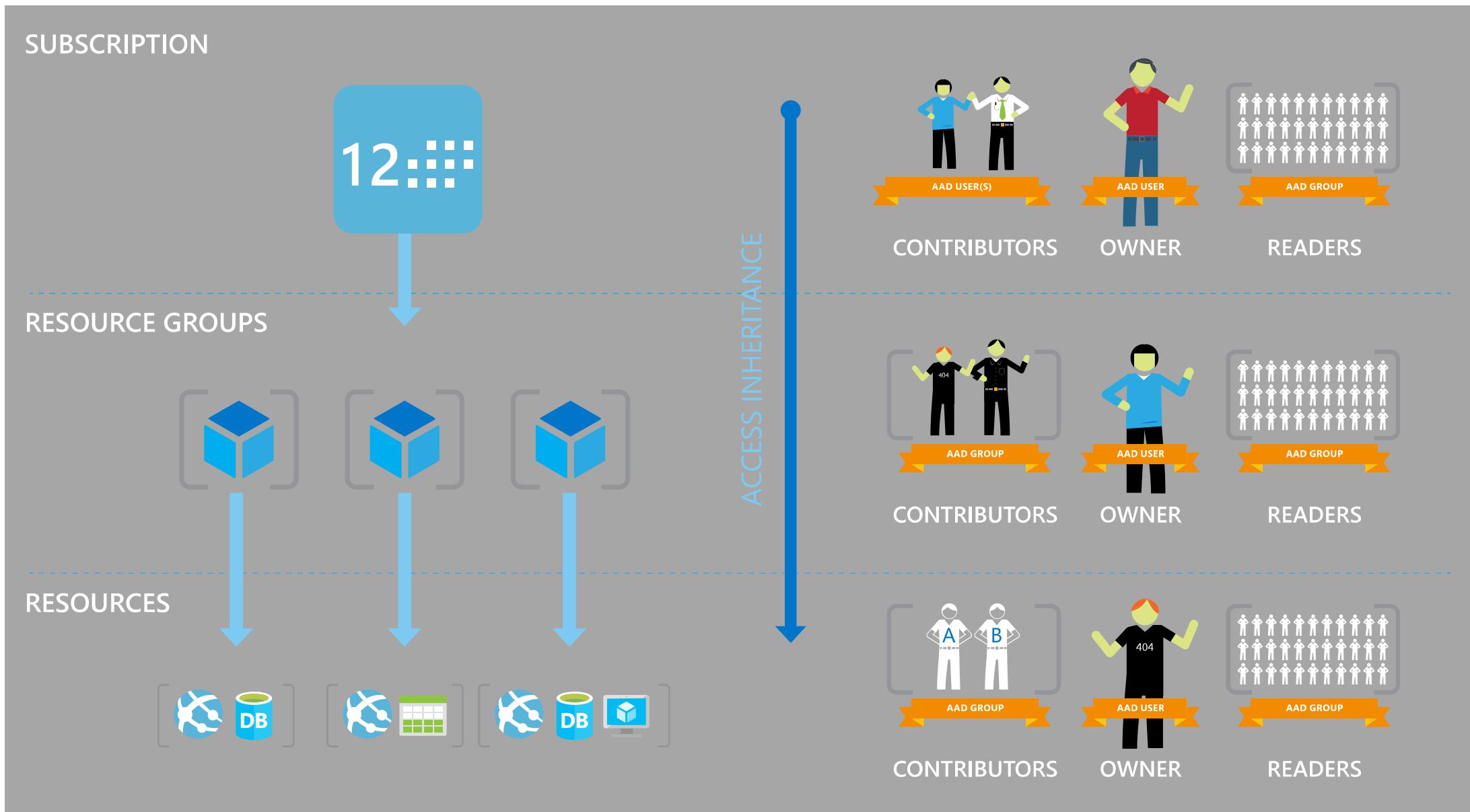
- Tag by environment, e.g. dev/test/prod
- Tag by role, e.g. web/cache/db
- Tag by department, e.g. finance/retail/legal
- Tag by responsible party, e.g. Bob
- Tags show up in billing

Tagging & Billing

When you download the usage CSV for services that support tags with billing, the tags will appear in the **Tags** column.

Daily Usage						Tags
Usage Date	Meter Category	Unit	Consumed	Resource Group	Instance Id	
5/14/2015	"Virtual Machines"	"Hours"	3.999984	"computeRG"	"virtualMachines/catalogVM"	{"costCenter":"finance", "env":"prod"}
5/14/2015	"Virtual Machines"	"Hours"	3.999984	"businessRG"	"virtualMachines/dataVM"	{"costCenter":"hr", "env":"test"}

Role Based Access Control (RBAC)



RBAC Concepts

Role Definitions

- describes the set of permissions (e.g. read actions)
- can be used in multiple assignments

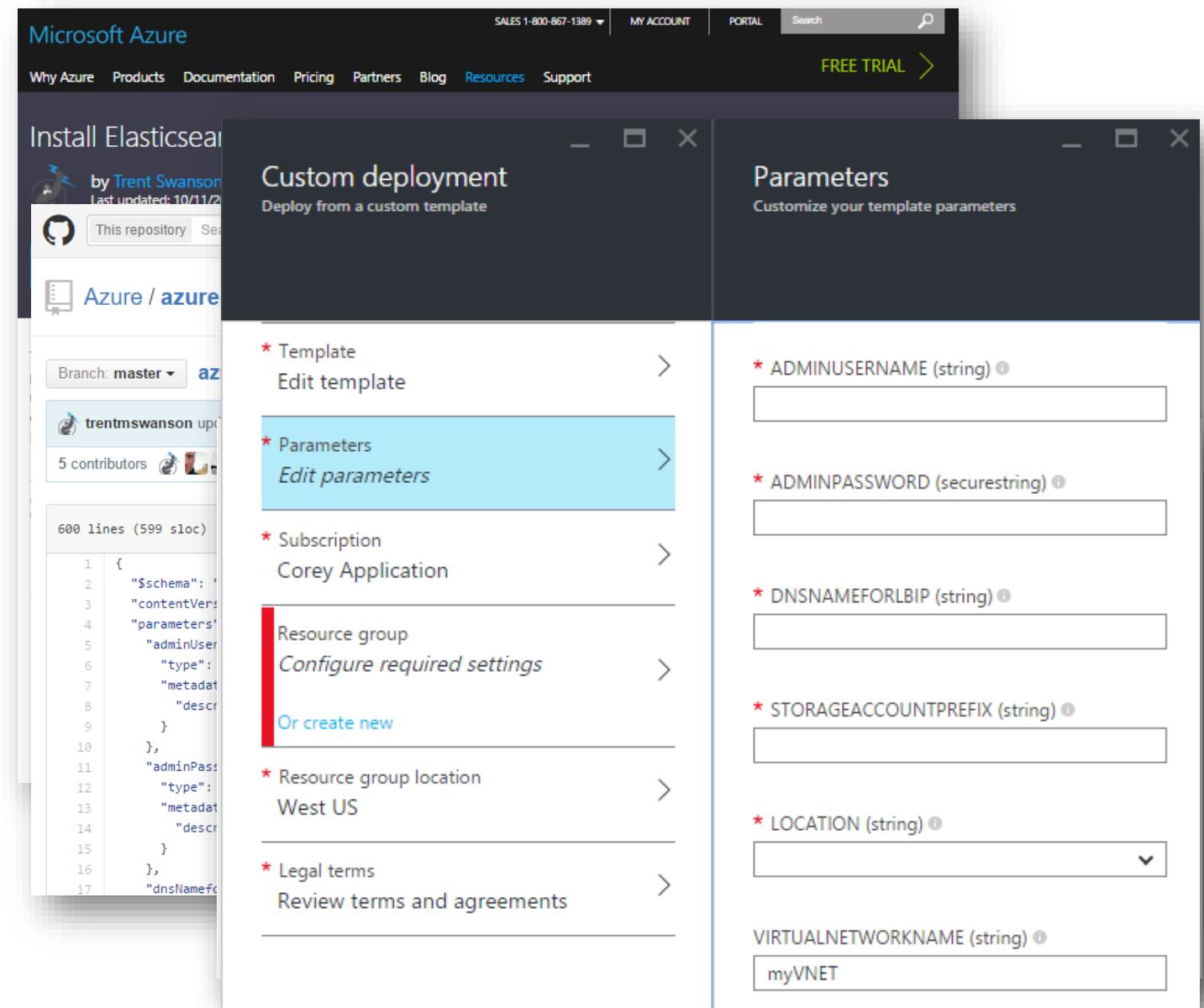
Role Assignments

- associate role definitions with an identity (e.g. user/group) at a scope (e.g. resource group)
- always inherited – subscription assignments apply to all resources

DEMO

Show permissions in portal and PowerShell

Azure Resource Manager (ARM) Templates



Growing Community

- >240 unique templates
- >170 unique contributors
- >5,000 visitors each day
- >4,500 commits

The basis of Azure DevOps

Develop in Visual Studio, Visual Studio Code, or any editor

Deploy from PowerShell, Visual Studio, GitHub

Azure Portal integration

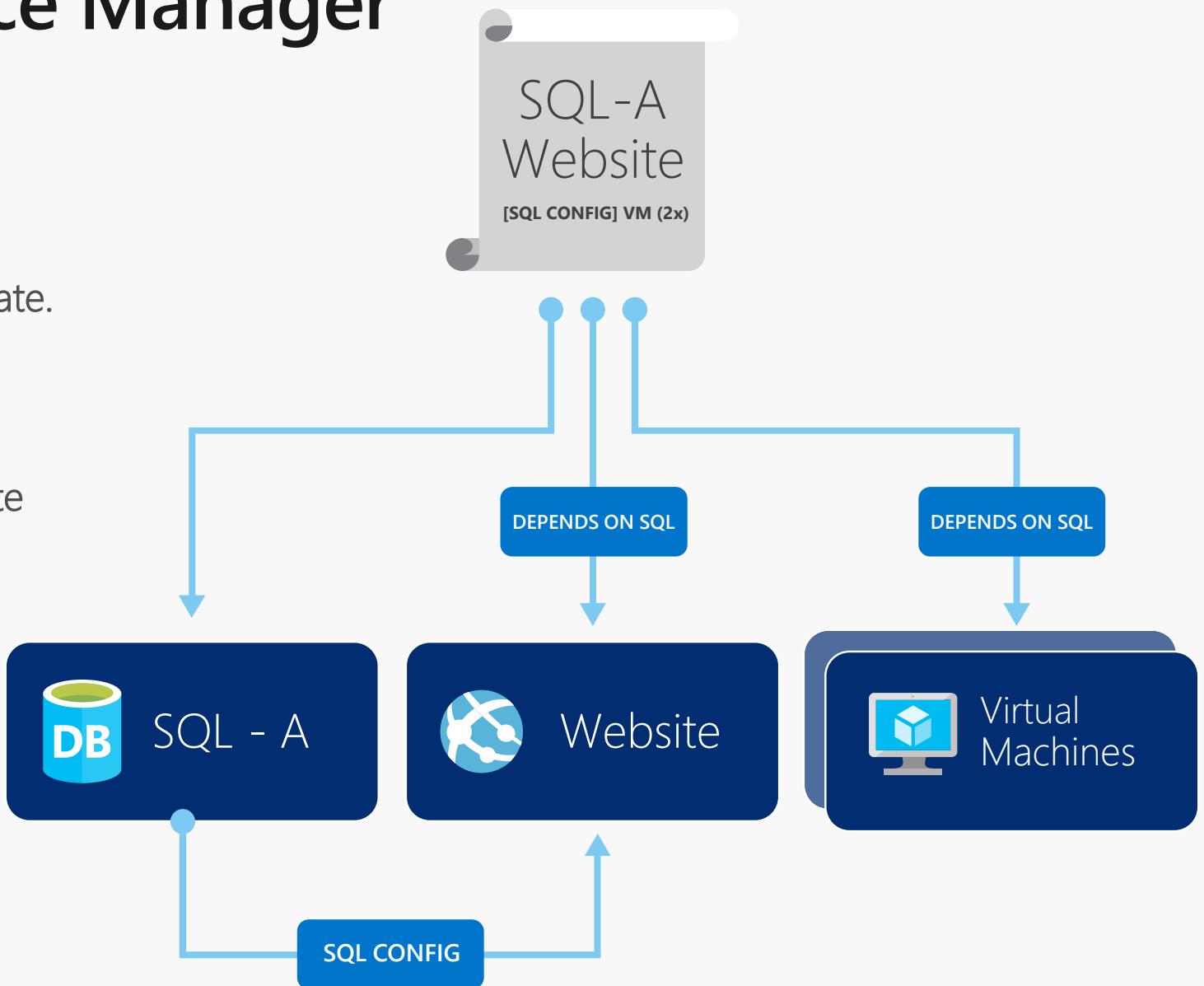
What is Azure Resource Manager template?

Azure Templates can:

- Repeated deployment and consistent state.
- Simplify Orchestration
- Simplify Roll-back
- Provide unified management and Update Support.

Azure Templates are:

- Source file, checked-in
- Able to specify resources and dependencies (VMs, WebSites, DBs) and connections (config, LB sets)
- Based on parametrized input/output



What's in an ARM template?

```
{  
  "$schema": "",  
  "contentVersion": "",  
  "parameters": {},  
  "variables": {},  
  "resources": [],  
  "outputs": {}  
}
```

Element name	Required	Description
\$schema	Yes	Location of the JSON schema file that describes the version for the template language. You should use the URL.
contentVersion	Yes	Version of the template. (i.e.1.0.0.0). Any value can be provided. When deploying resources using the template, this value ensures that the right template is being used.
parameters	No	Values that are provided when deployment is executed to customize resource deployment
variables	No	Values that are used as JSON fragments in the template to simplify template language expressions
resources	Yes	Resource types that are deployed or updated in a resource group
outputs	No	Values that are returned after deployment

What's in an ARM template?

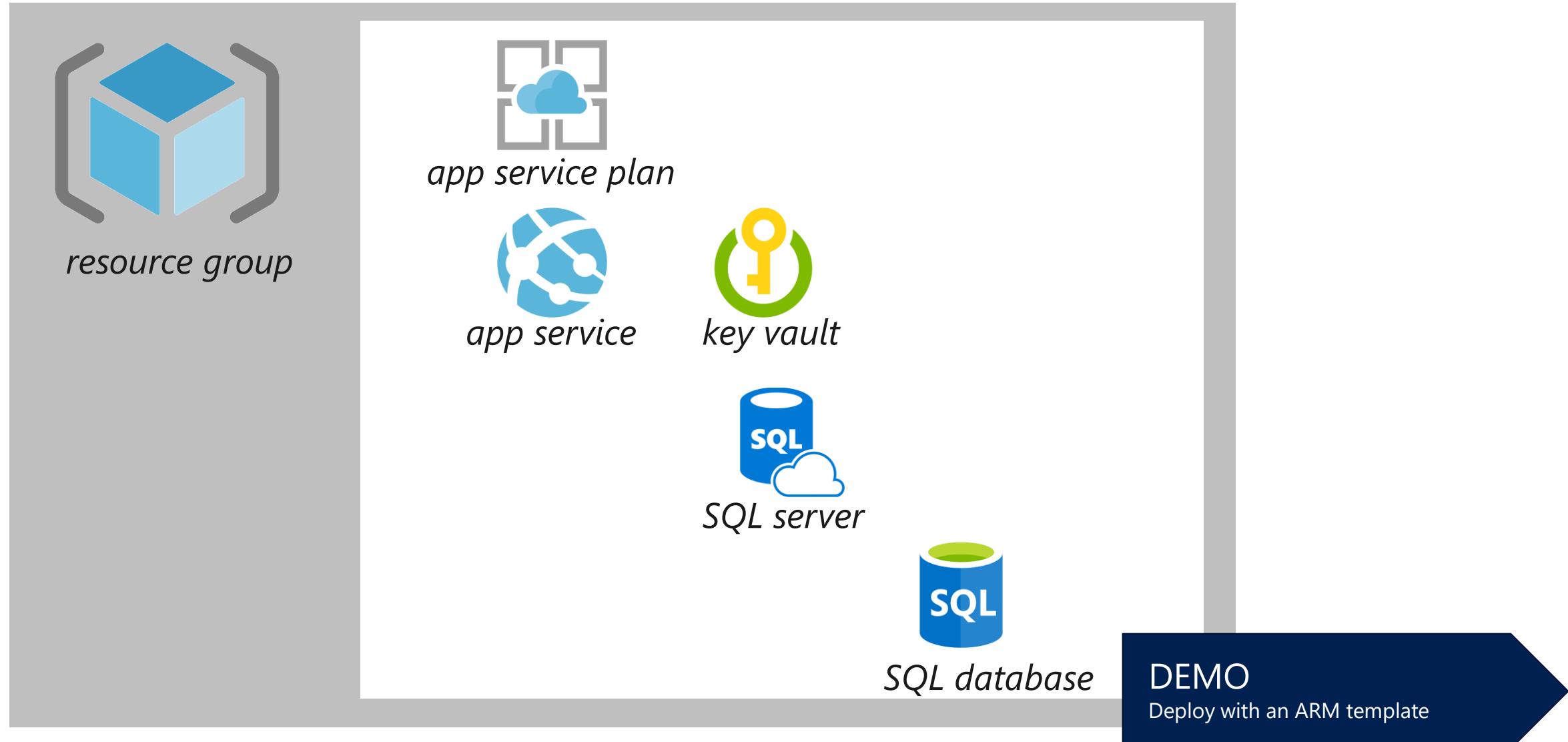


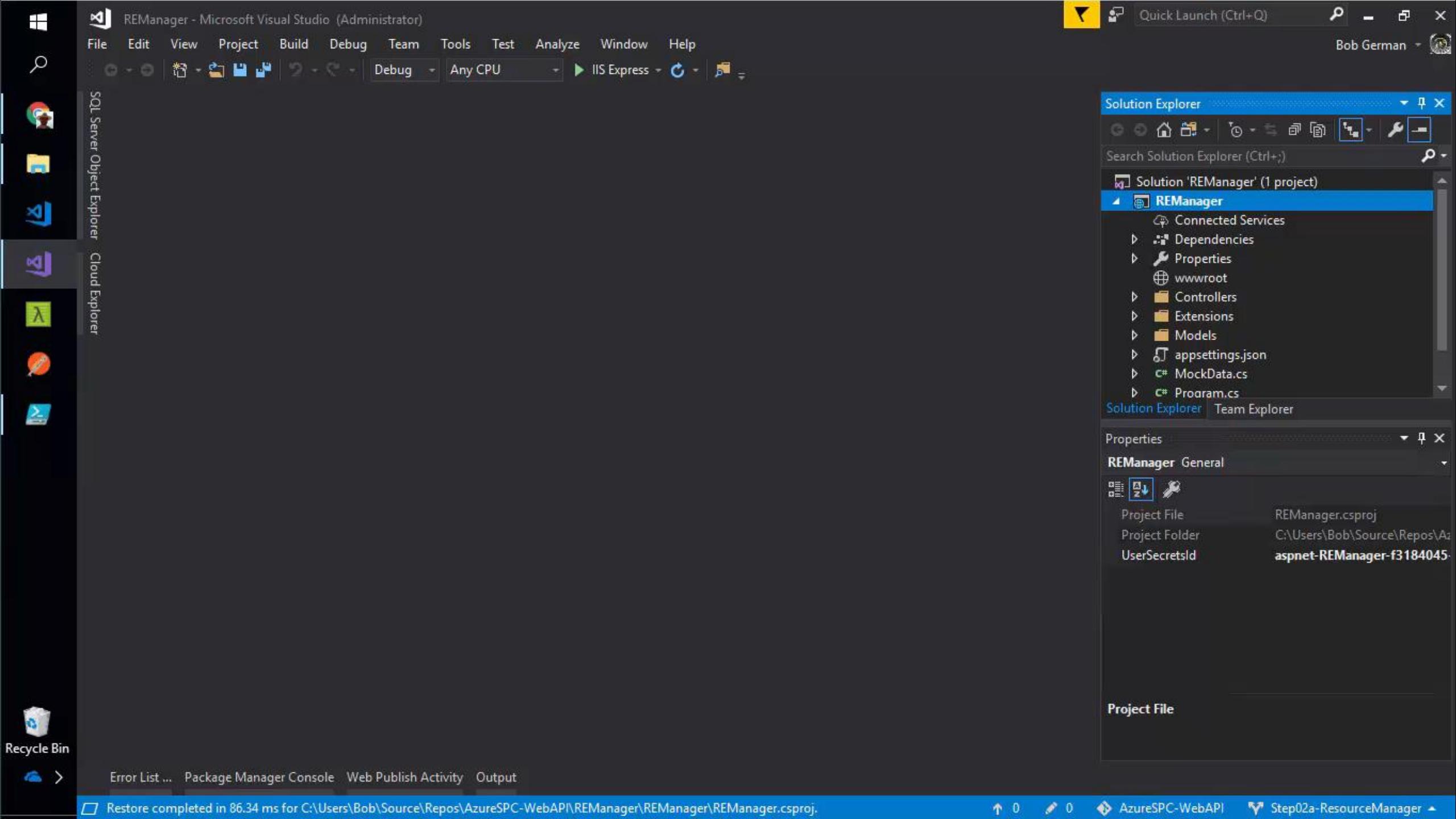
```
Branch: master
"resources": [
  {
    "type": "Microsoft.Storage/storageAccounts",
    "name": "[parameters('newStorageAccountName')]",
    "apiVersion": "2015-05-01-preview",
    "location": "[variables('location')]",
    "properties": {
      "accountType": "[variables('storageAccountType')]"
    }
  },
  {
    "apiVersion": "2015-05-01-preview",
    "type": "Microsoft.Network/publicIPAddresses",
    "name": "[variables('publicIPAddressName')]",
    "location": "[variables('location')]",
    "properties": {
      "publicIPAllocationMethod": "[variables('publicIPAddressType')]",
      "dnsSettings": {
        "domainNameLabel": "[parameters('dnsNameForPublicIP')]"
      }
    }
  }
],
```

The screenshot shows a code editor displaying an ARM (Azure Resource Manager) template. The template defines two resources: a storage account and a public IP address. The storage account is created with a specific name, location, and account type. The public IP address is also created with a specific name, location, and allocation method. The code is annotated with line numbers (1 through 16) and syntax highlighting for JSON objects, arrays, and strings. A vertical sidebar on the left shows a file tree with a 'Branch: master' indicator.

Demo Web API

Contoso Real Estate Manager





Incremental vs. Complete Deployment

Incremental deployment

- **leaves unchanged** resources that exist in the resource group but aren't specified in the template
- **adds** resources specified in the template that don't exist in the resource group
- **does not re-provision** resources that exist in the resource group in the same condition defined in the template

Complete deployment

- **deletes** resources that exist in the resource group but aren't specified in the template
- **adds** resources specified in the template that don't exist in the resource group
- **does not re-provision** resources that exist in the resource group in the same condition defined in the template

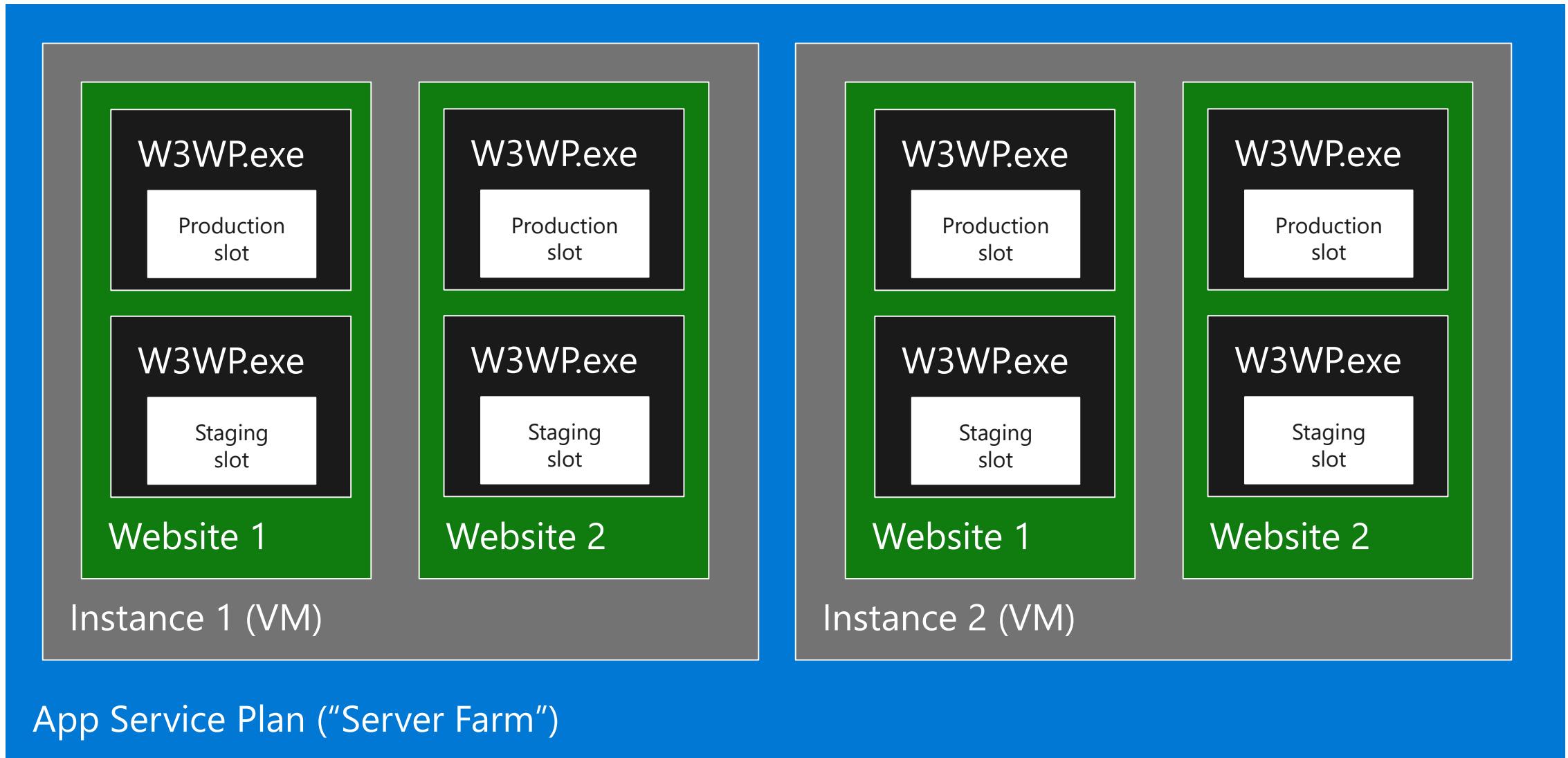
Deployment Best Practices for ARM

1. Define and deploy your infrastructure through the declarative syntax in Resource Manager templates, rather than through imperative commands.
2. Define all deployment and configuration steps in the template. You should have no manual steps for setting up your solution.
3. Run imperative commands to manage your resources, such as to start or stop an app or machine.
4. Arrange resources with the same lifecycle in a resource group. Use tags for all other organizing of resources.

Azure App Services



App Service Architecture





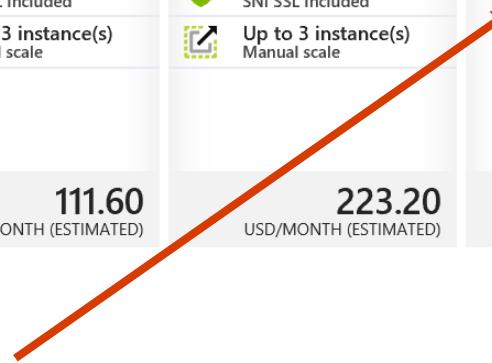
A rose by any other name...

Name in Azure Portal	Name in Resource Manager	Other aliases	What is it?
App Service Plan	Microsoft.Web/serverFarms	Web service Plan, Server farm	Virtualized web farm
App Service	Microsoft.Web/sites	Web service	Web site
App Service Authentication	use a "Config" resource within Microsoft.Web/sites	Easy Auth	

App Service Tiers

I1 Isolated	I2 Isolated	I3 Isolated	P1V2 PremiumV2	P2V2 PremiumV2	P3V2 PremiumV2	P1 Premium	P2 Premium
1 Core	2 Core	4 Core	1 Core	2 Core	4 Core	1 Core	2 Core
3.5 GB RAM	7 GB RAM	14 GB RAM	3.5 GB RAM	7 GB RAM	14 GB RAM	1.75 GB RAM	3.5 GB RAM
SSD and faster CPU Dv2 series workers	SSD and faster CPU Dv2 series workers	SSD and faster CPU Dv2 series workers	SSD and faster CPU Dv2 series workers	SSD and faster CPU Dv2 series workers	SSD and faster CPU Dv2 series workers	SSD and faster CPU Dv2 series workers	250 GB Storage
App Service Environment... Single tenant system	App Service Environment... Single tenant system	App Service Environment... Single tenant system	250 GB Storage	250 GB Storage	250 GB Storage	Custom domains / SSL SNI Incl & IP SSL Support	Custom domains / SSL SNI Incl & IP SSL Support
Runs in your vNET Network isolated	Runs in your vNET Network isolated	Runs in your vNET Network isolated	Custom domains / SSL SNI Incl & IP SSL Support	Custom domains / SSL SNI Incl & IP SSL Support	Custom domains / SSL SNI Incl & IP SSL Support	Up to 20 instance(s) * Subject to availability	Up to 20 instance(s) * Subject to availability
Private app access Using an ILB ASE	Private app access Using an ILB ASE	Private app access Using an ILB ASE	Up to 20 instance(s) * Subject to availability	Up to 20 instance(s) * Subject to availability	Up to 20 instance(s) * Subject to availability	20 slots Web app staging	20 slots Web app staging
Used across ASE 1 TB Storage	Used across ASE 1 TB Storage	Used across ASE 1 TB Storage	20 slots Web app staging	20 slots Web app staging	20 slots Web app staging	50 times daily Backup	50 times daily Backup
Up to 100 instance(s) More upon request	Up to 100 instance(s) More upon request	Up to 100 instance(s) More upon request	Traffic Manager Geo availability				
297.60 USD/MONTH (PER INSTANCE)	595.20 USD/MONTH (PER INSTANCE)	1,190.40 USD/MONTH (PER INSTANCE)	204.60 USD/MONTH (ESTIMATED)	409.20 USD/MONTH (ESTIMATED)	818.40 USD/MONTH (ESTIMATED)	223.20 USD/MONTH (ESTIMATED)	446.40 USD/MONTH (ESTIMATED)
P3 Premium	S1 Standard	S2 Standard	S3 Standard	B1 Basic	B2 Basic	B3 Basic	F1 Free
4 Core	1 Core	2 Core	4 Core	1 Core	2 Core	4 Core	- Shared infrastructure
7 GB RAM	1.75 GB RAM	3.5 GB RAM	7 GB RAM	1.75 GB RAM	3.5 GB RAM	7 GB RAM	1 GB Storage
250 GB Storage	50 GB Storage	50 GB Storage	50 GB Storage	10 GB Storage	10 GB Storage	10 GB Storage	
Custom domains / SSL SNI Incl & IP SSL Support	Custom domains / SSL SNI Incl & IP SSL Support	Custom domains / SSL SNI Incl & IP SSL Support	Custom domains / SSL SNI Incl & IP SSL Support	Custom domains	Custom domains	Custom domains	
Up to 20 instance(s) * Subject to availability	Up to 10 instance(s) Auto scale	Up to 10 instance(s) Auto scale	Up to 10 instance(s) Auto scale	Up to 10 instance(s) Auto scale	Up to 3 instance(s) Manual scale	Up to 3 instance(s) Manual scale	
20 slots Web app staging	Daily Backup	Daily Backup	Daily Backup	Daily Backup			
50 times daily Backup	5 slots Web app staging	5 slots Web app staging	5 slots Web app staging	5 slots Web app staging			
Traffic Manager Geo availability	Traffic Manager Geo availability	Traffic Manager Geo availability	Traffic Manager Geo availability	Traffic Manager Geo availability			
892.80 USD/MONTH (ESTIMATED)	74.40 USD/MONTH (ESTIMATED)	148.80 USD/MONTH (ESTIMATED)	297.60 USD/MONTH (ESTIMATED)	55.80 USD/MONTH (ESTIMATED)	111.60 USD/MONTH (ESTIMATED)	223.20 USD/MONTH (ESTIMATED)	0.00 USD/MONTH (ESTIMATED)
D1 Shared*							
- Shared infrastructure							
1 GB Storage							
Custom domains							

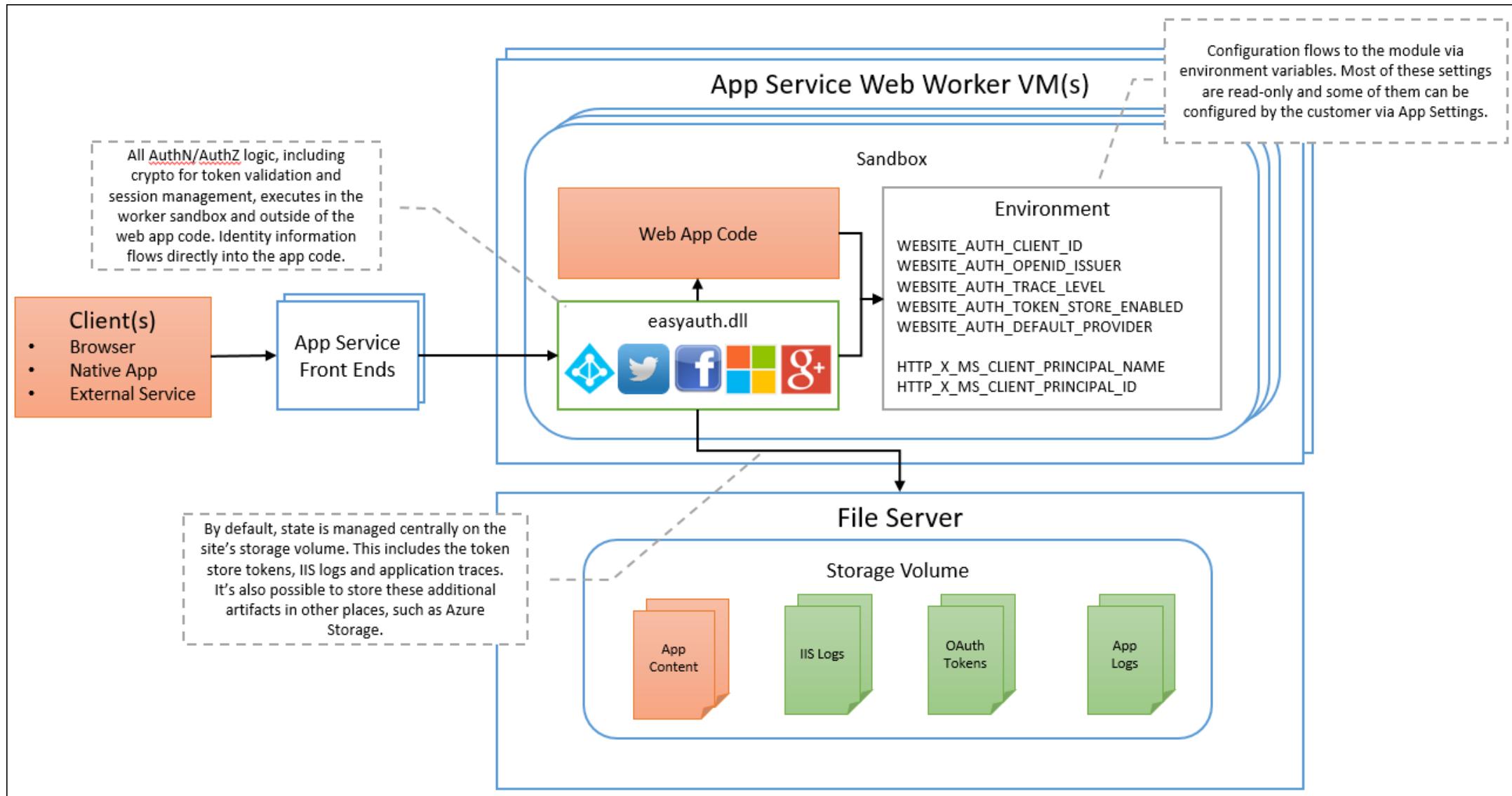
99.95% SLA does not apply to free and shared tiers



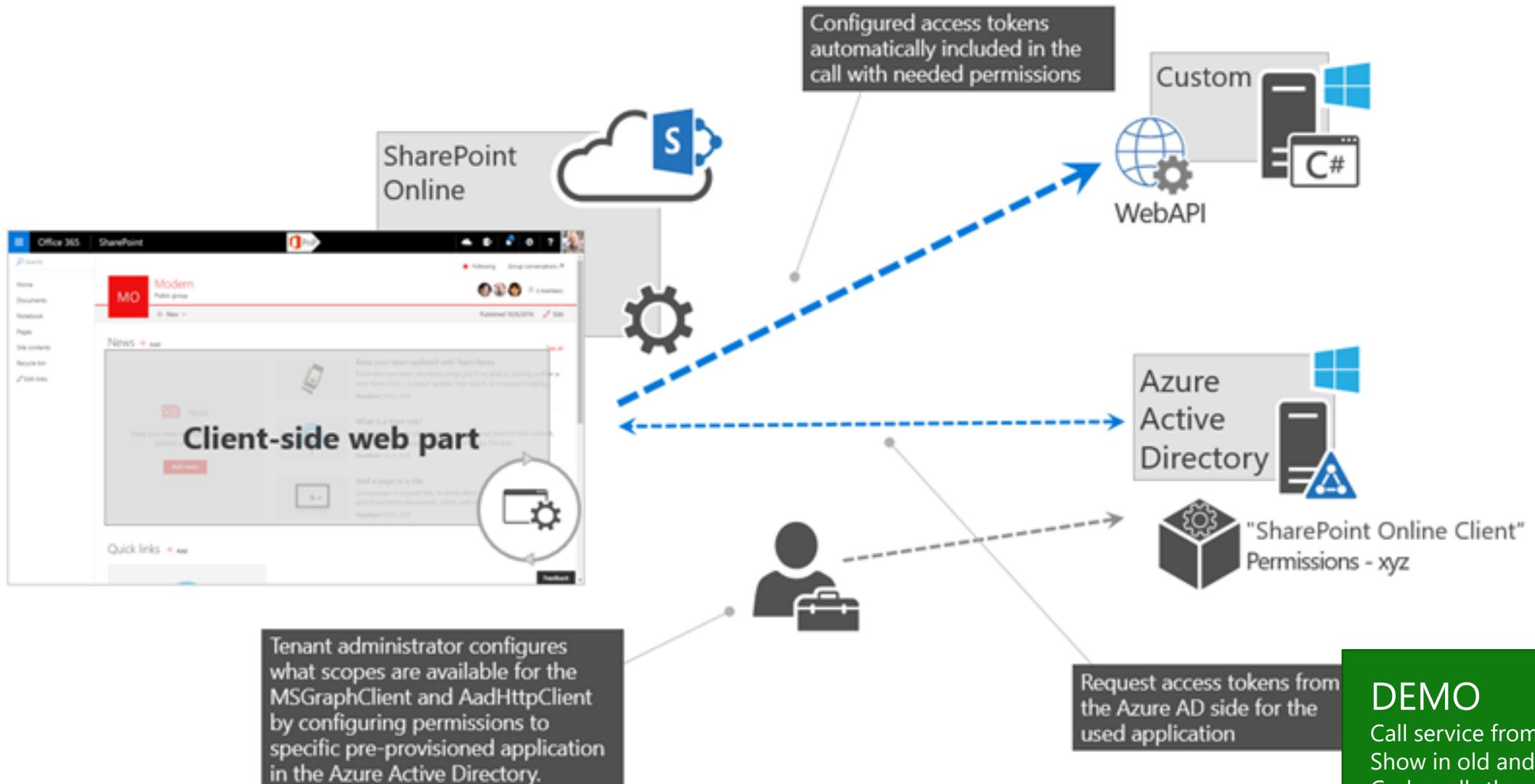
App Service Tiers

	FREE	SHARED GOOD FOR FOR DEV/TEST	BASIC GOOD FOR DEV/TEST	STANDARD GOOD FOR PRODUCTION WORKLOADS	PREMIUM ENHANCED PERF AND SCALE	<u>ISOLATED</u> HIGH-PERF, SECURITY AND ISOLATION
Web, mobile, or API apps	10	100	Unlimited	Unlimited	Unlimited	Unlimited
Disk space	1 GB	1 GB	10 GB	50 GB	250 GB	1 TB
Maximum instances	–	–	Up to 3	Up to 10	Up to 20	Up to 100*
Custom domain	–	Supported	Supported	Supported	Supported	Supported
Auto Scale	–	–	–	Supported	Supported	Supported
VPN hybrid connectivity	–	–	–	Supported	Supported	Supported
Network Isolation						Supported

App Service AuthN (a.k.a. EasyAuth)



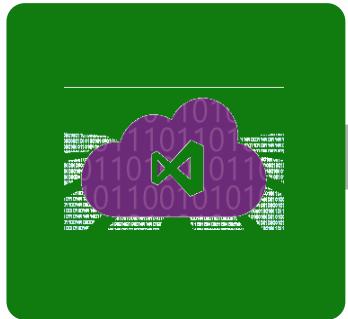
Connect to your API from SPFx



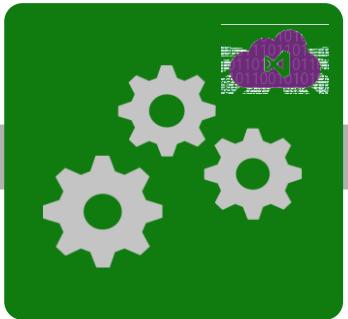
DEMO
Call service from SPFx web part
Show in old and new admin portals
Code walk-through

Agile Development on App Service

2) Code repository



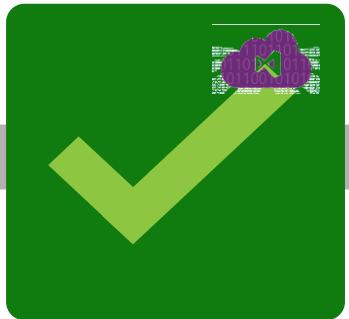
3) Build



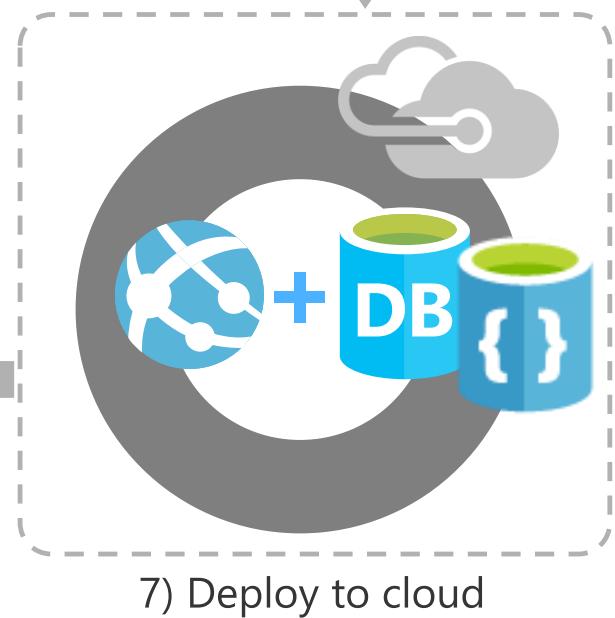
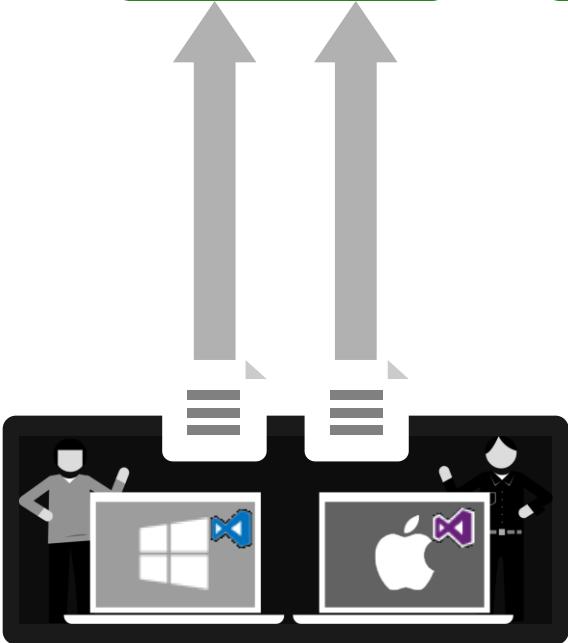
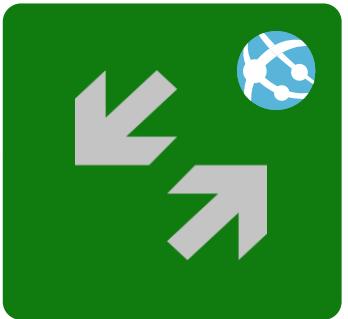
4) Deploy to stage



5) Validate



6) Publish



Deploy from your favorite repositories



Visual Studio Team Services



OneDrive



Local Git



Github



BitBucket



Dropbox



External repositories

DEMO

Show ARM code to deploy from Github
Show .deployment file
Show in portal



SQL Server and Entity Framework

NOTE: You don't need to use Entity Framework, I just think it's cool. If you have an existing data access layer, you can probably reuse it!

SQL Server in Azure VM & Azure SQL Database

Which one to use?

SQL Server in Azure VM

Need a specific version of SQL Server or Windows

Need instance-level SQL features (e.g. Agent Job, Linked Servers, DTC)

Ok configuring/managing SQL Server and Windows (patching, high availability, backups)

Great for migrating existing apps

Azure SQL Database

Don't need a specific version of SQL Server or Windows

Don't need instance-level SQL features

Don't want to configure and manage SQL Server or Windows

Great for new apps

Many customers use both

Azure SQL Database

Fully managed SQL database service so you can focus on your business



- Built for SaaS and Enterprise applications
- Predictable performance & pricing
- 99.99% availability built-in
- Standard databases transitioning to premium storage
- Premium databases run on local SSD
- Geo-replication and restore services for data protection
- Secure and compliant for your sensitive data
- Fully compatible with SQL Server 2014 databases

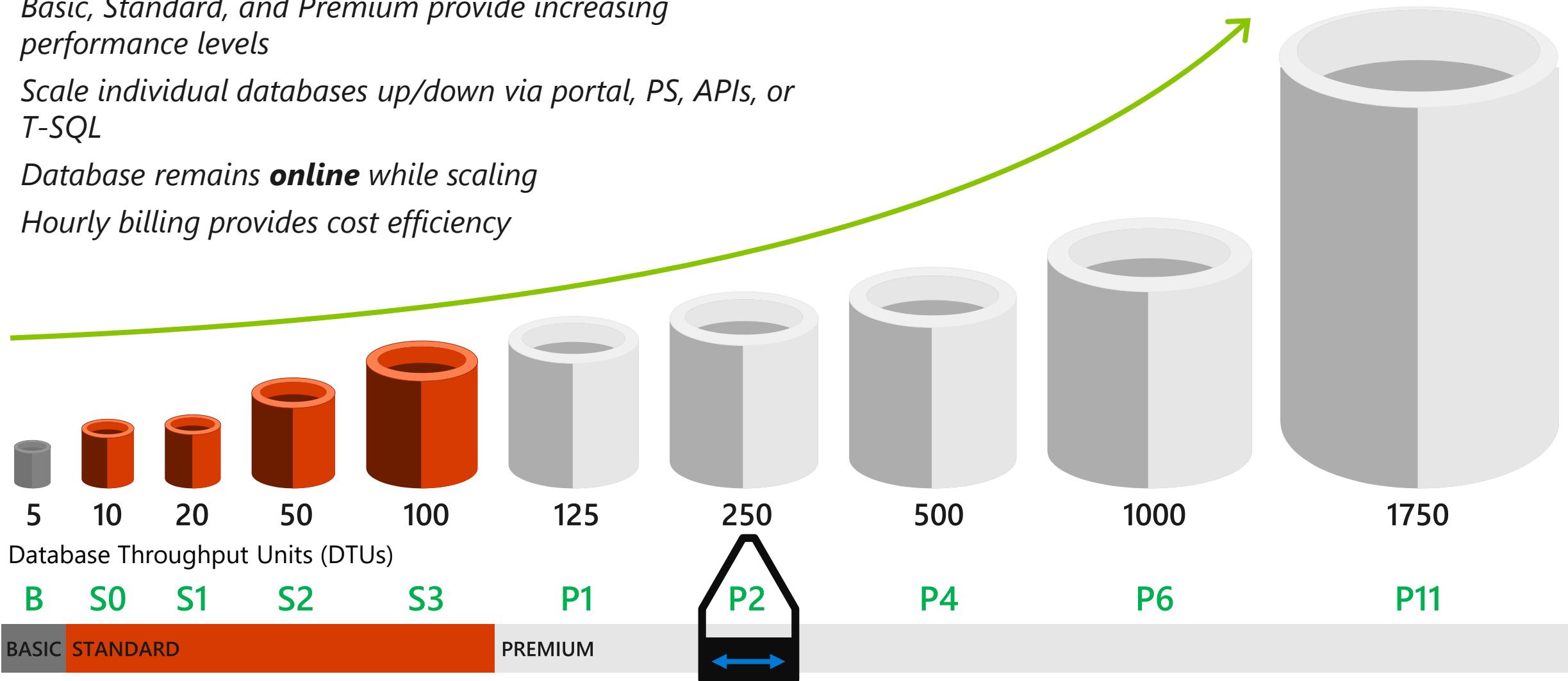
Azure SQL Database Service Tiers

Basic, Standard, and Premium provide increasing performance levels

Scale individual databases up/down via portal, PS, APIs, or T-SQL

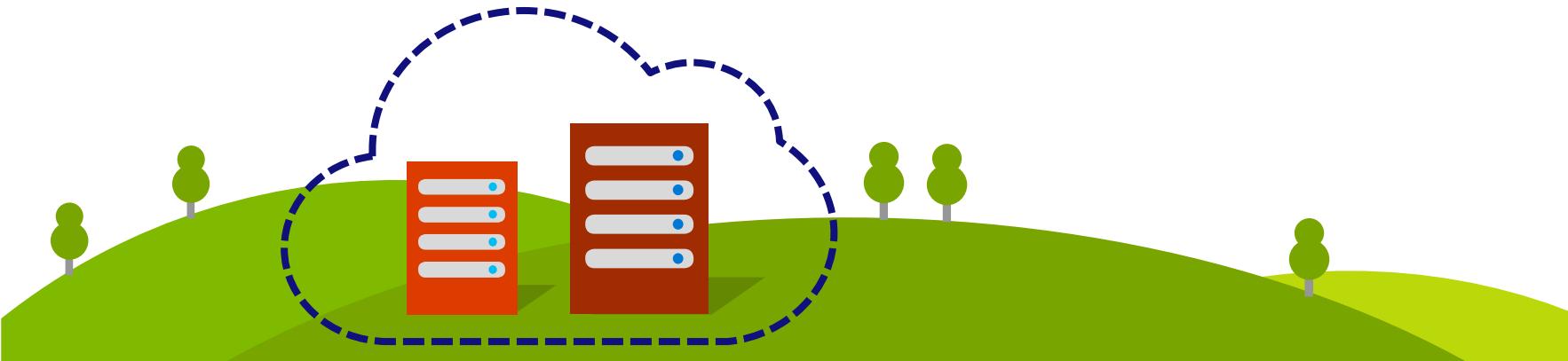
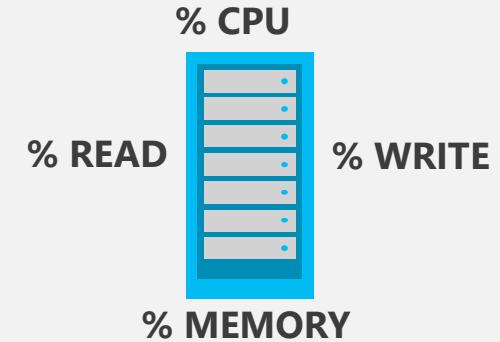
*Database remains **online** while scaling*

Hourly billing provides cost efficiency



What exactly is a DTU?

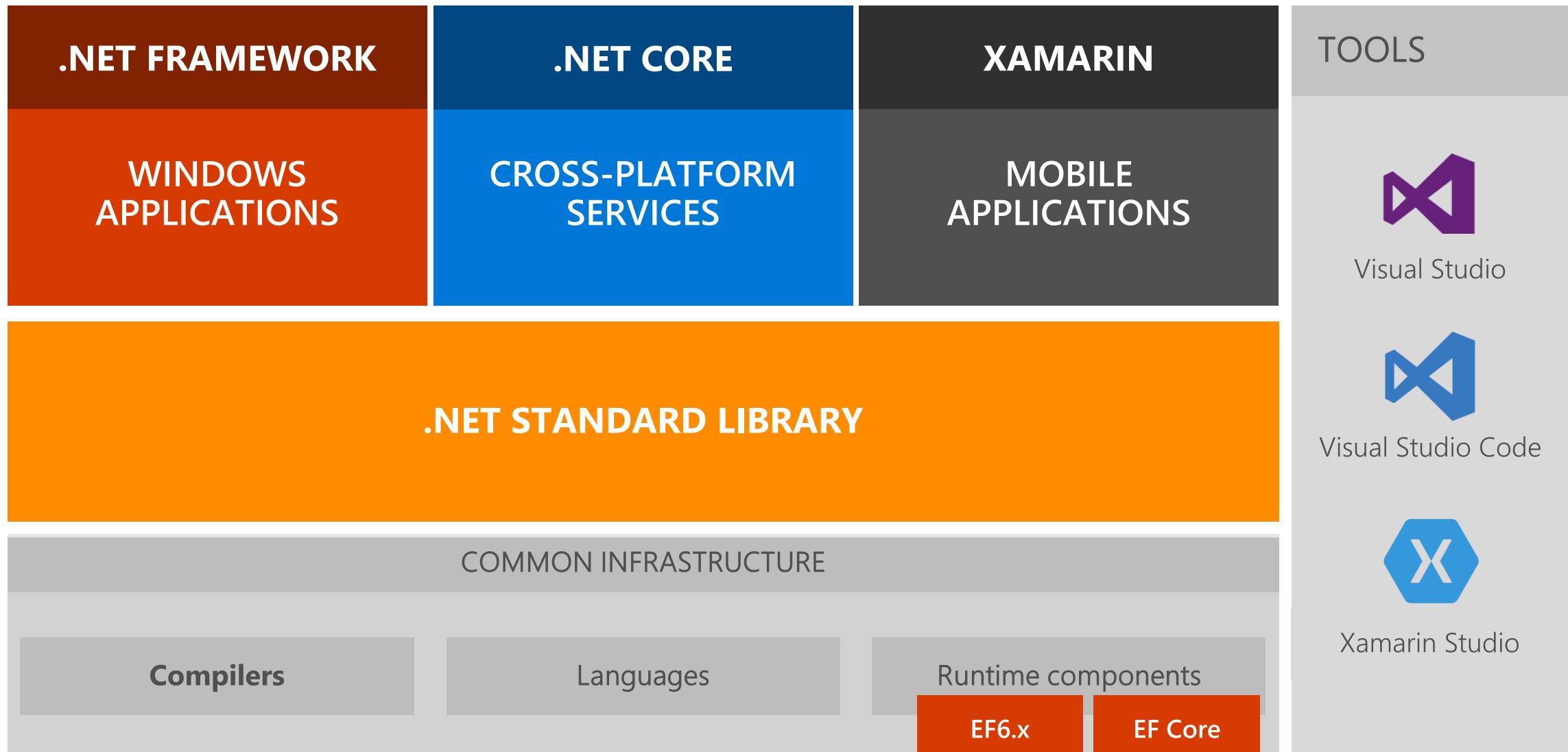
DTU represents a set of operations that are typical for an online transaction processing (OLTP) request, and then measured by how many transactions could be completed per second under fully loaded conditions



DEMO

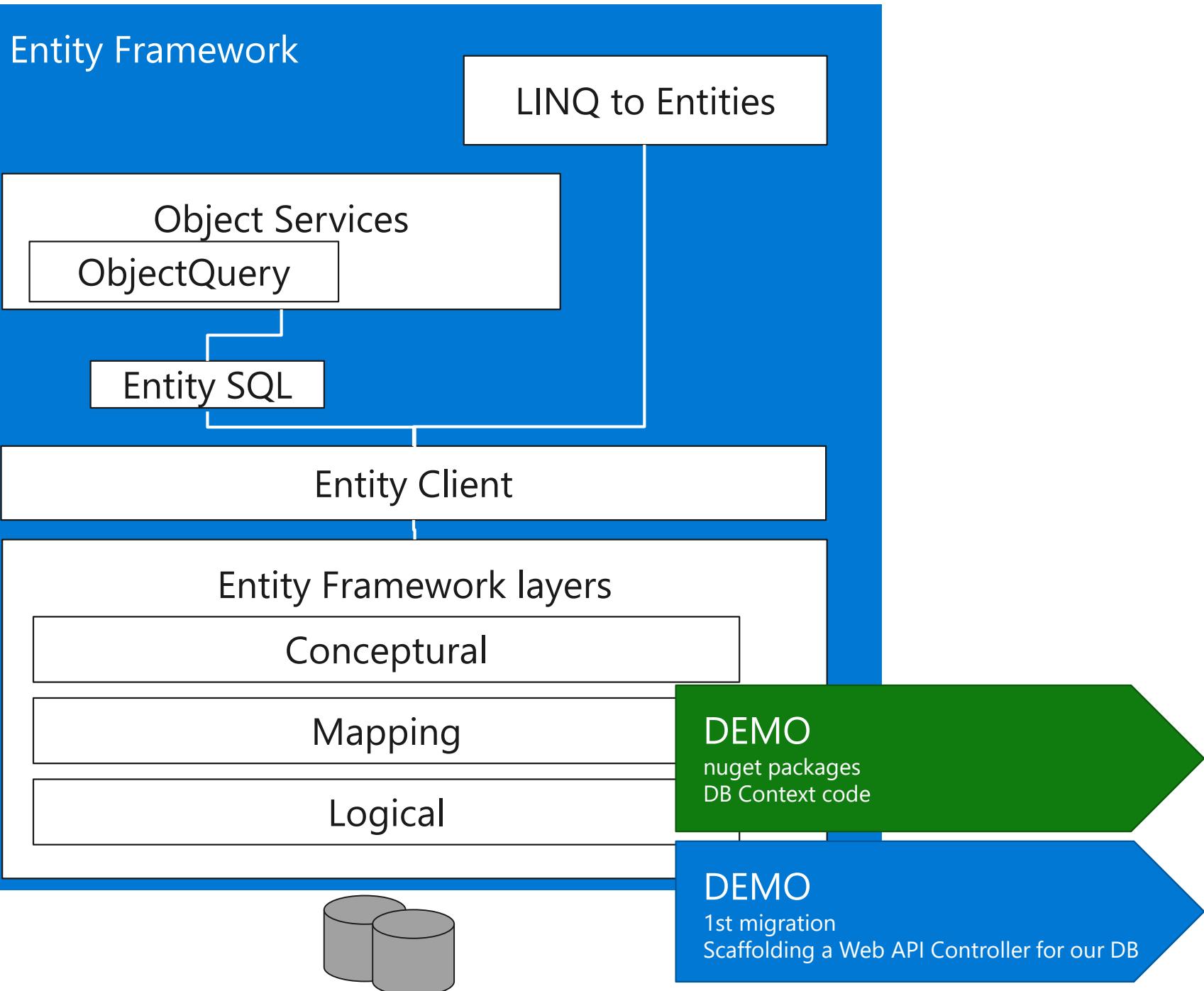
Create SQL Server and database using ARM

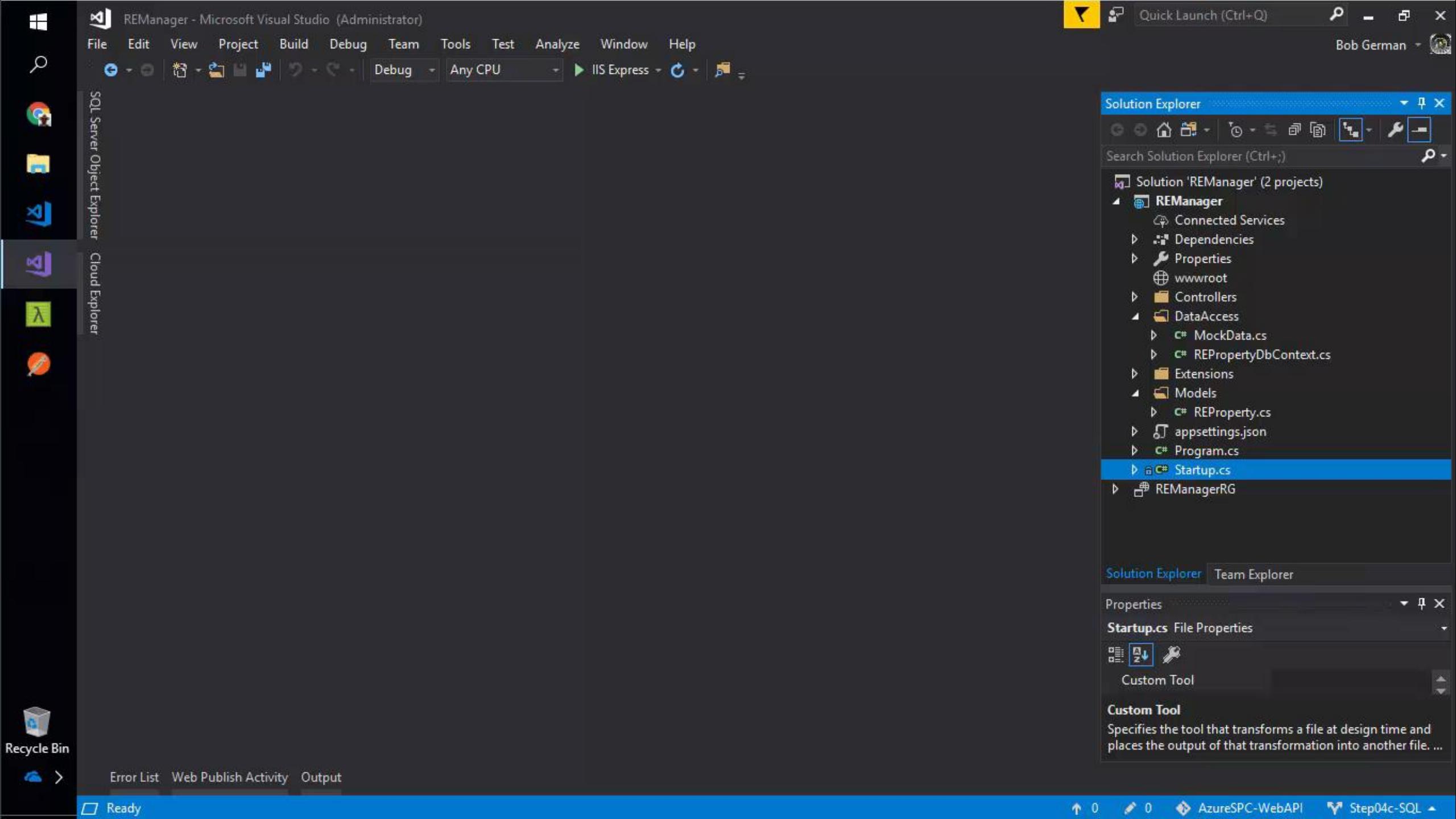
New Platforms



Entity Framework

Object Relational Mapping
for .NET and .NET Core





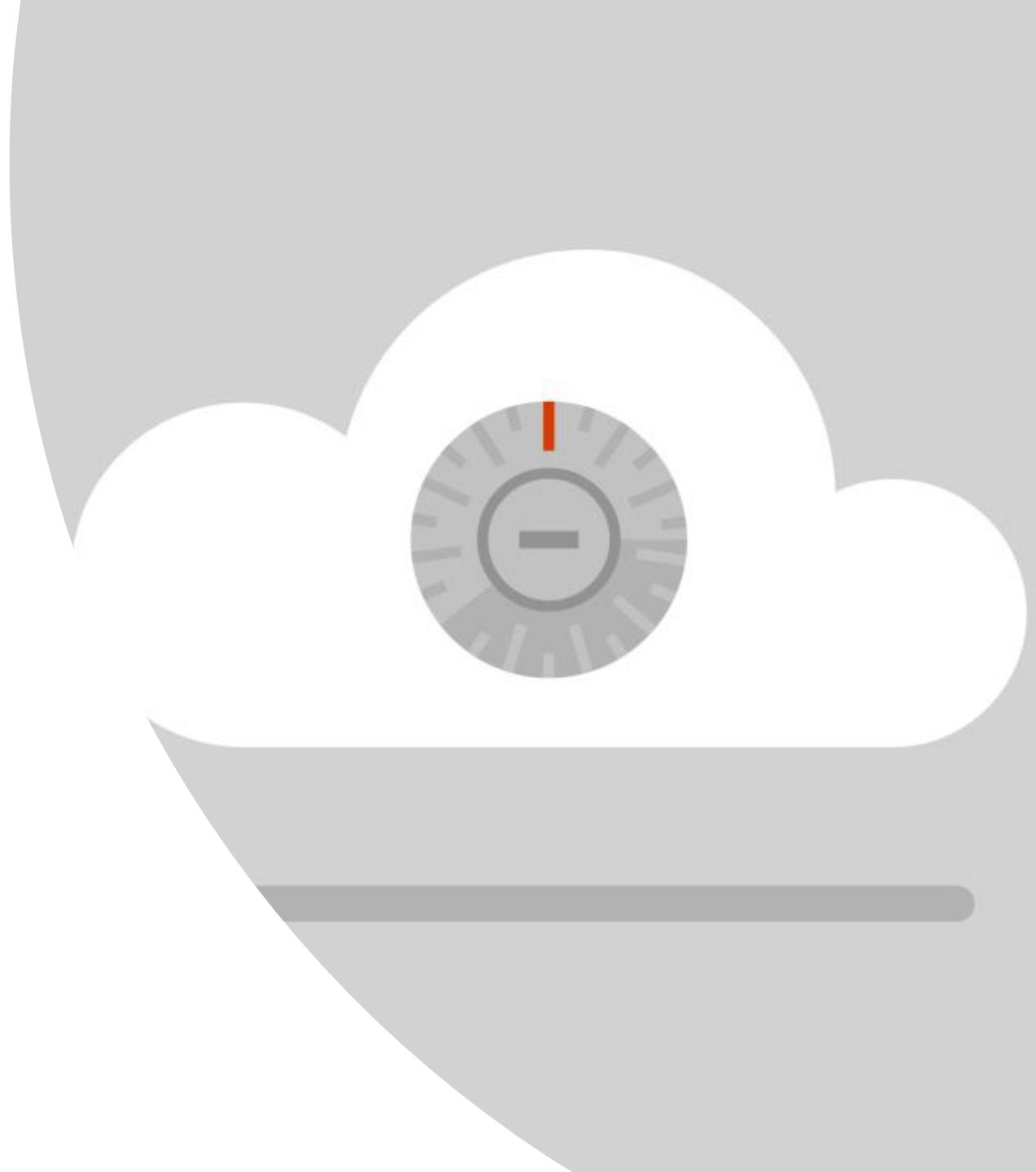


Key Vault

Stores secrets in Azure in Hardware Security Modules (HSMs) certified to FIPS 140-2 level 2

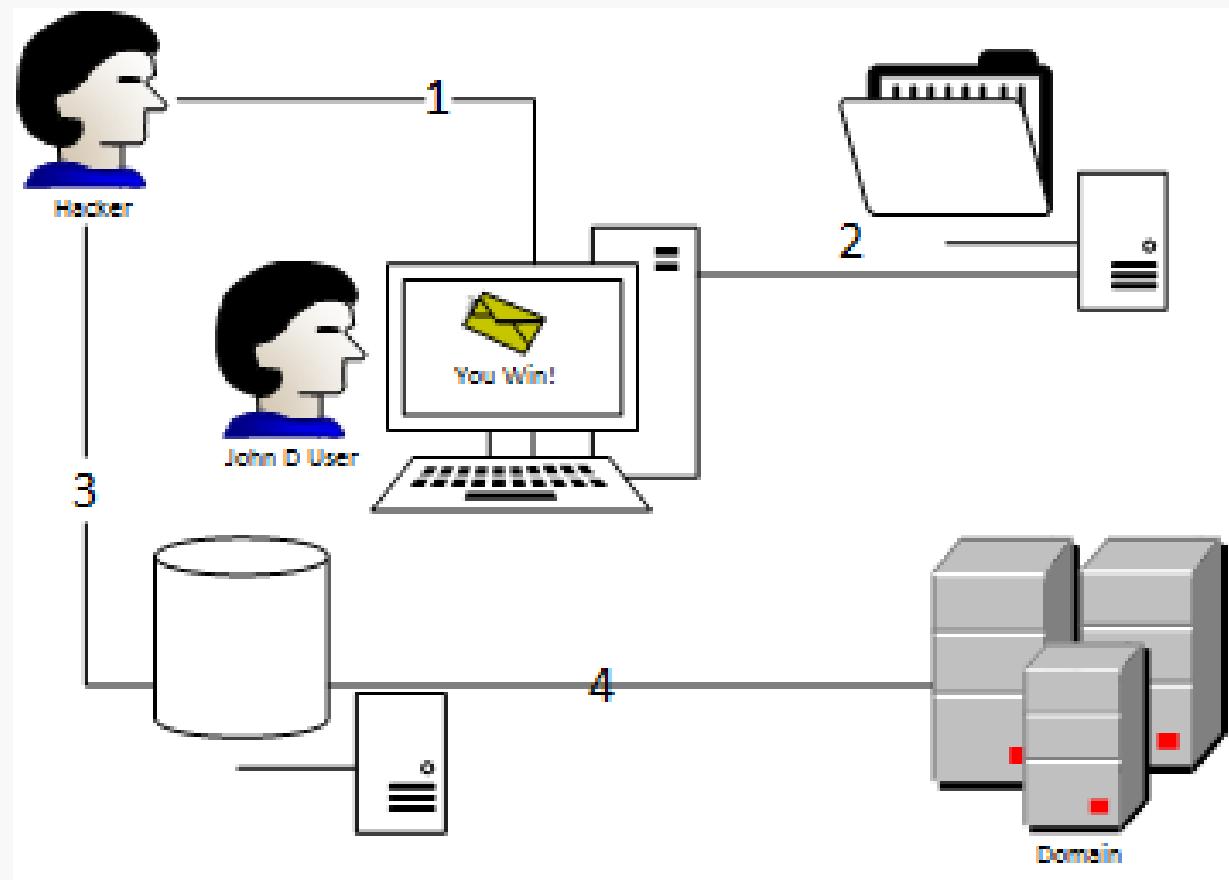
The secrets we keep...

- Connection strings
- Application keys / Client secrets
- Certificates, and passwords to certificate private keys
- Encryption keys
- Service account passwords



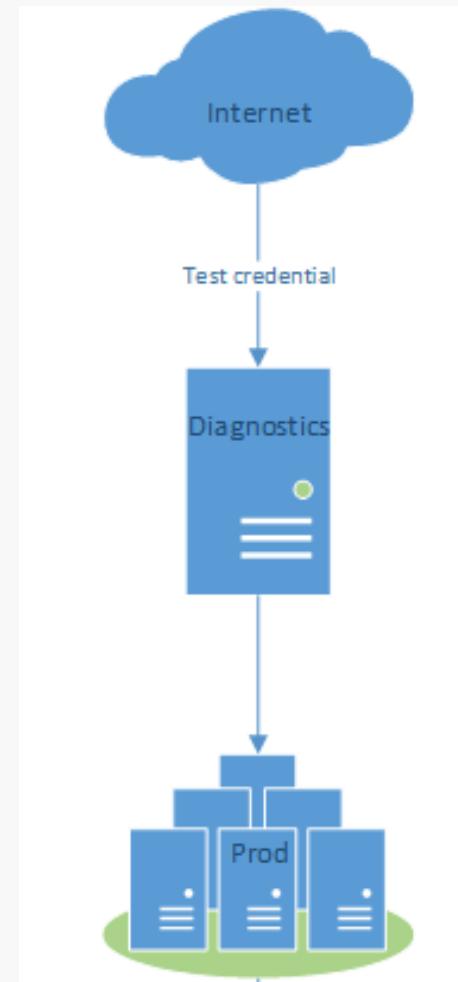
Story time

1. Attacker sends a phishing email to user
2. Attacker leverages user's access to find source files on share
3. Attacker uses creds to access SQL Server
4. Attacker copies all the company's confidential data, a major breach



Story time

1. Credential shipped in external library
2. Gives access to diagnostics site
3. Diagnostics site has production access
4. Attacker takes over production environment



KeyVault Scenarios

1. Store Web App settings in KeyVault 
2. Store ARM parameters in KeyVault
(e.g. SQL Server password)
3. Provision KeyVaults from ARM

KeyVault Data Management Services

- In Public Preview
 - Automatically generates and manages an App Registration Principal for you or Function
 - In KeyVault, grants app admins access to secrets they need
- I need to get my secrets from KeyVault
- What's the app key that has access to KeyVault?

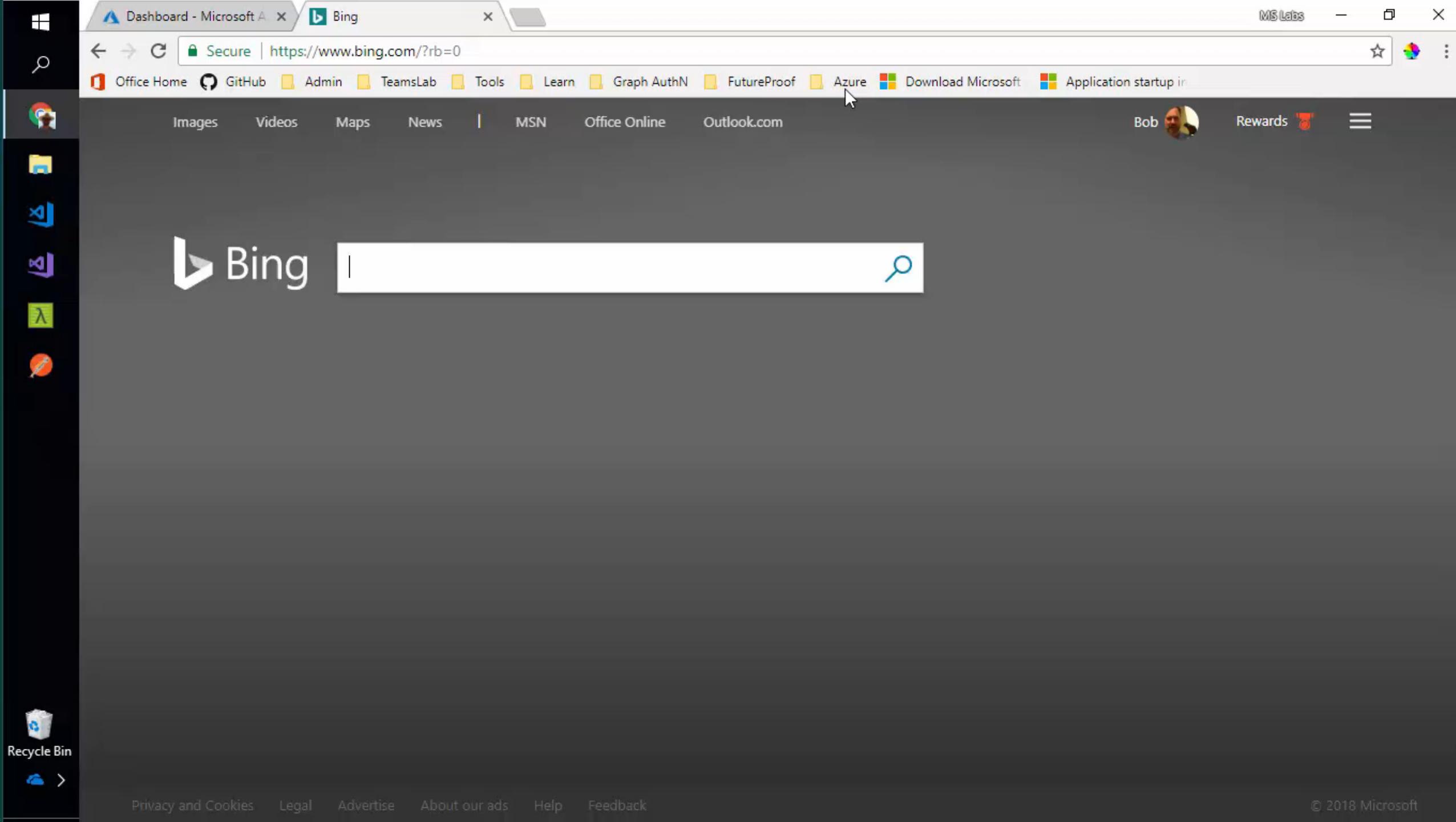
DEMO

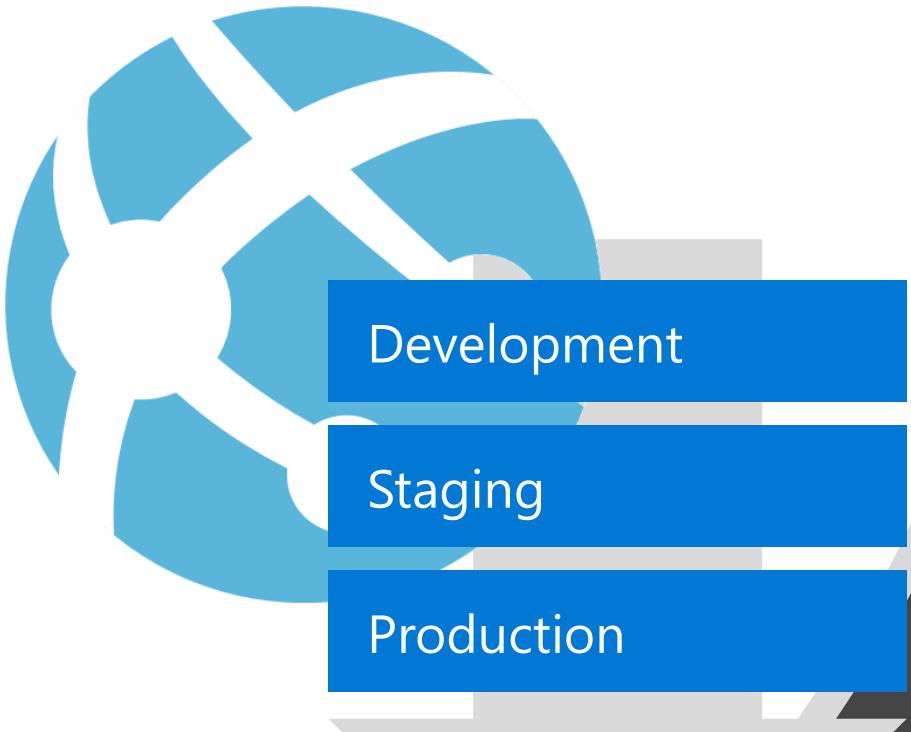
Show enabling Managed Service Identity
Show code changes

DEMO

Remove connection string from settings
Swap to KeyVault

* in preview

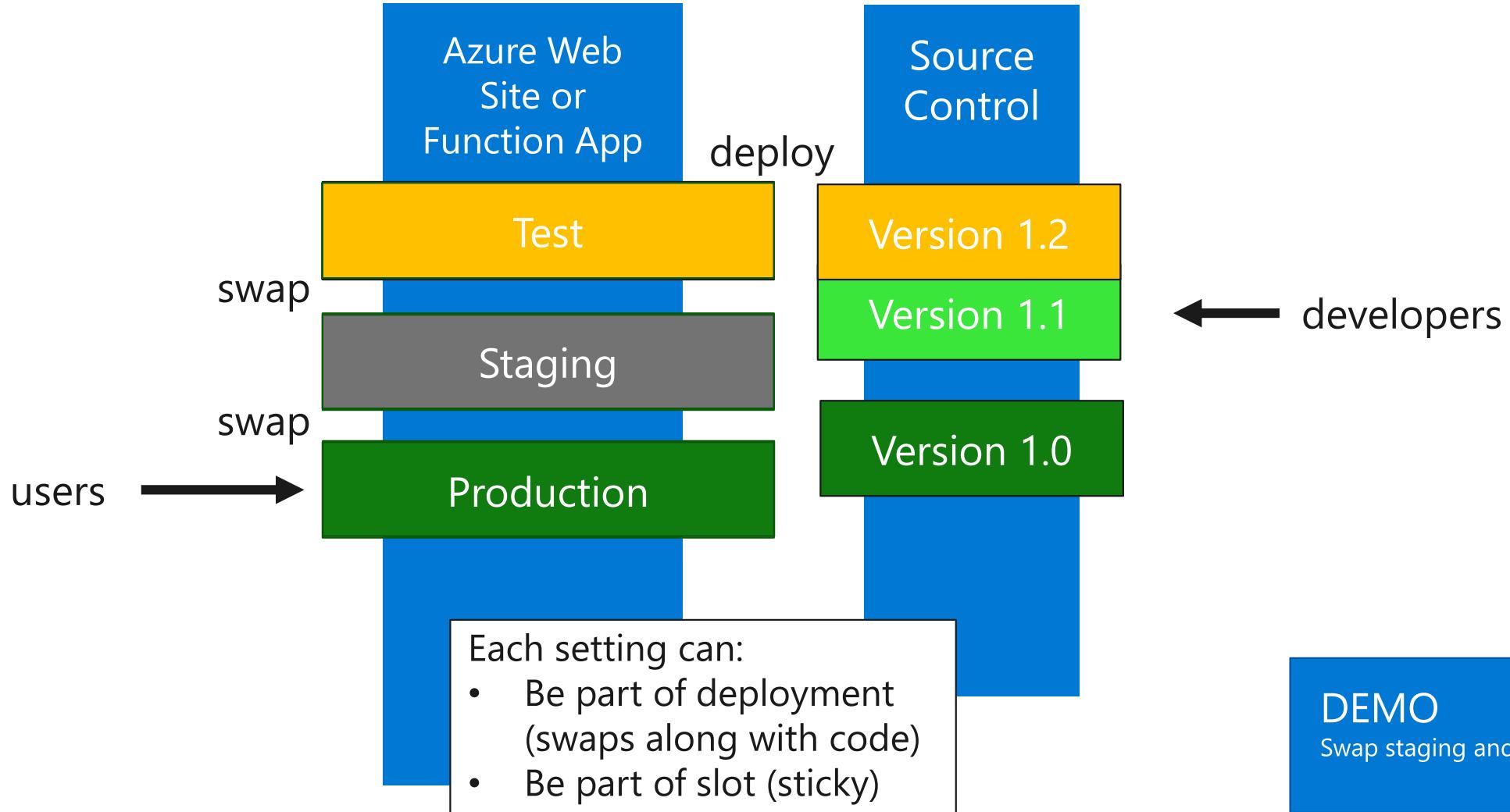


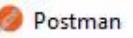


Deployment Slots

Deployment Slots

Caveat: Currently deployment slots are not compatible with Azure AD Managed Service Identities





Postman

File Edit View Help

New

Import

Runner



My Workspace



SYNC OFF

No Environment

Filter

TestWS



History

Collections



Postman Echo
37 requests

PropMan
2 requests

SPC
1 request

Webhook1
4 requests

GET

https://remgrwebapirg6mawh7cyslk.azurewebsites.net/api/REProperties

Params

Send

Save

Pretty

Raw

Preview

JSON



Save Response

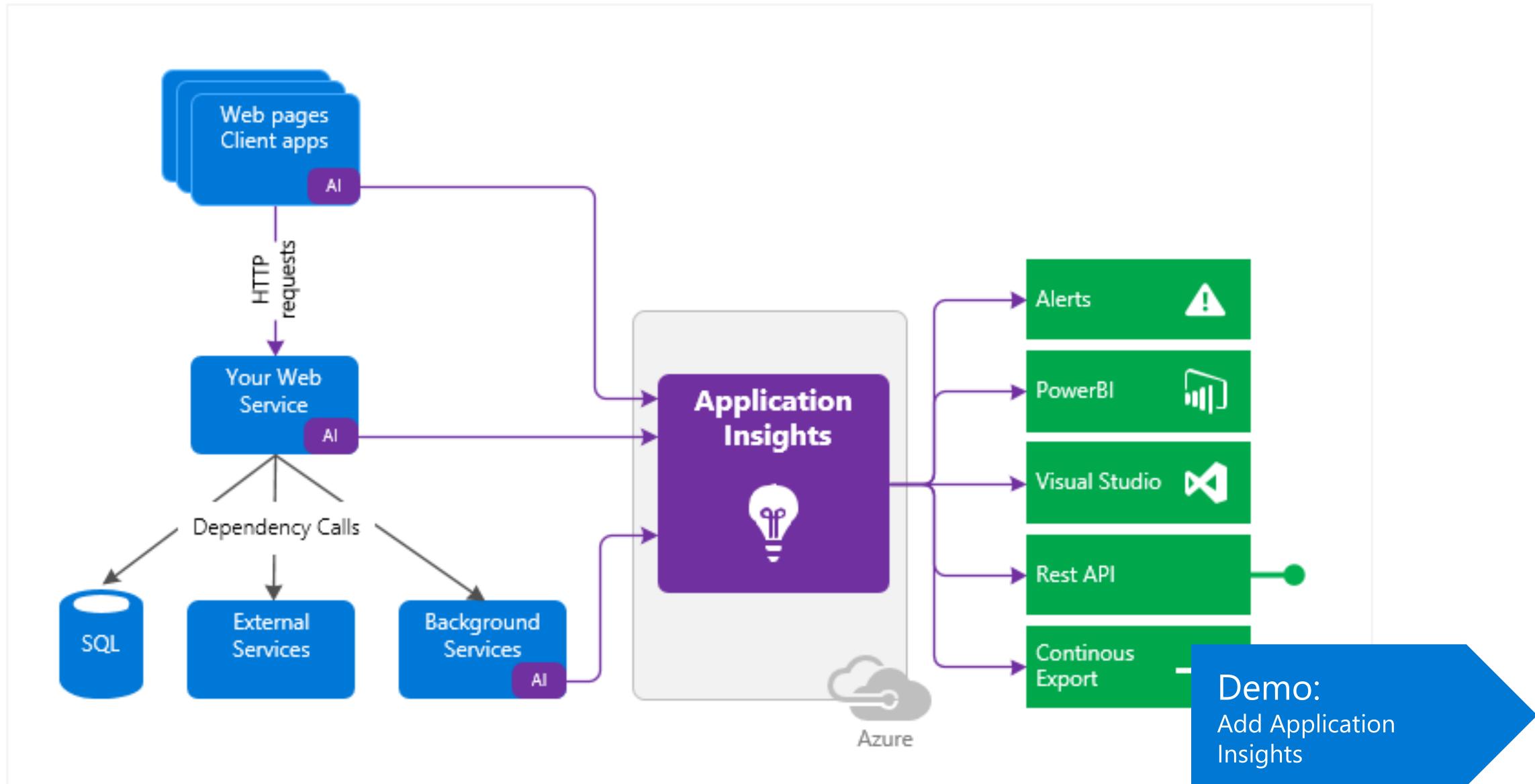
```
1  [
2   {
3     "id": 1,
4     "name": "Prod 1",
5     "address": "1 Production Blvd.",
6     "unit": null,
7     "city": "Production",
8     "state": "MA",
9     "postalCode": "10101",
10    "country": "USA",
11    "purchaseDate": "2001-01-01T00:00:00",
12    "purchaseAmount": 1000000,
13    "isForSale": true,
14    "isForRent": false
15  },
16  [
17    {
18      "id": 2,
19      "name": "Prod 2",
20      "address": "2 Production Blvd",
21      "unit": "2",
22      "city": "Production",
23      "state": "MA",
24      "postalCode": "20202",
25      "country": "USA",
26      "purchaseDate": "2002-02-22T00:00:00",
27      "purchaseAmount": 2200000,
28      "isForSale": false,
29      "isForRent": false
30    }
31  ]
```





Application Insights

Application Insights



REManager - Microsoft Visual Studio (Administrator)

File Edit View Project Build Debug Team Tools Test Analyze Window Help

Debug Any CPU IIS Express

Quick Launch (Ctrl+Q) Bob German

SQL Server Object Explorer Cloud Explorer

JSON Outline azuredeploy.json

Schema: https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#

```
100 {  
101   "name": "[variables('webApiName')]",  
102   "type": "Microsoft.Web/sites",  
103   "location": "[resourceGroup().location]",  
104   "apiVersion": "2015-08-01",  
105   "dependsOn": [  
106     "[ resourceId('Microsoft.Web/serverfarms', varia  
107   ],  
108   "tags": {  
109     "[concat('hidden-related:', resourceId('Micro  
110     "displayName": "webApi"  
111   },  
112   "identity": {  
113     "type": "SystemAssigned"
```

Commit 9d1e7df3 created locally. Sync to share your changes with the server.

Branch: Step07a-AppInsights

Enter a commit message <Required>

Commit All Actions

Changes There are no unstaged changes in the working directory.

Error List

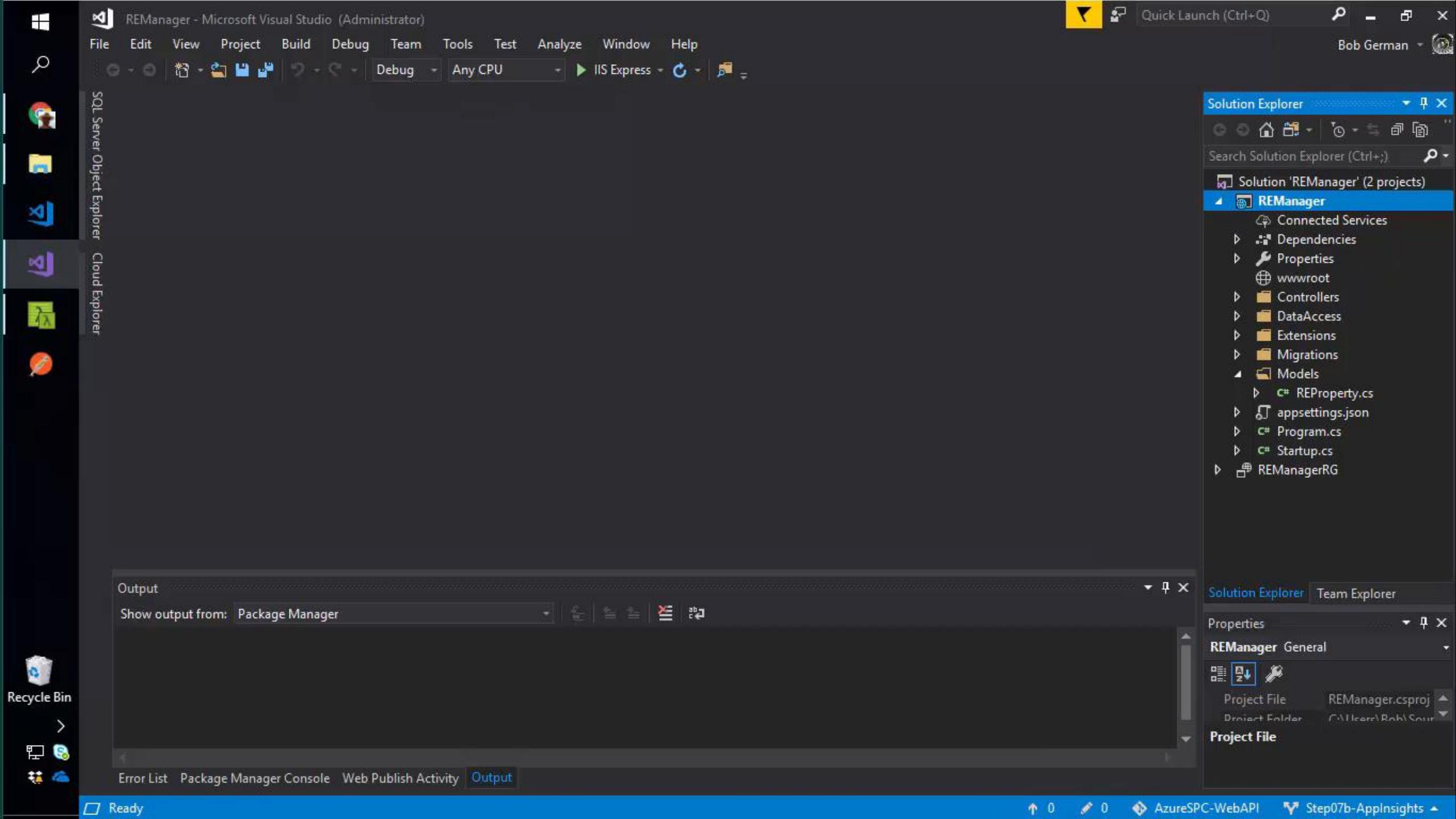
Entire Solution 0 Errors 0 Warnings 0 of 10 Messages Build + IntelliSense Search Error

Code Description Project File Line Suppression St...

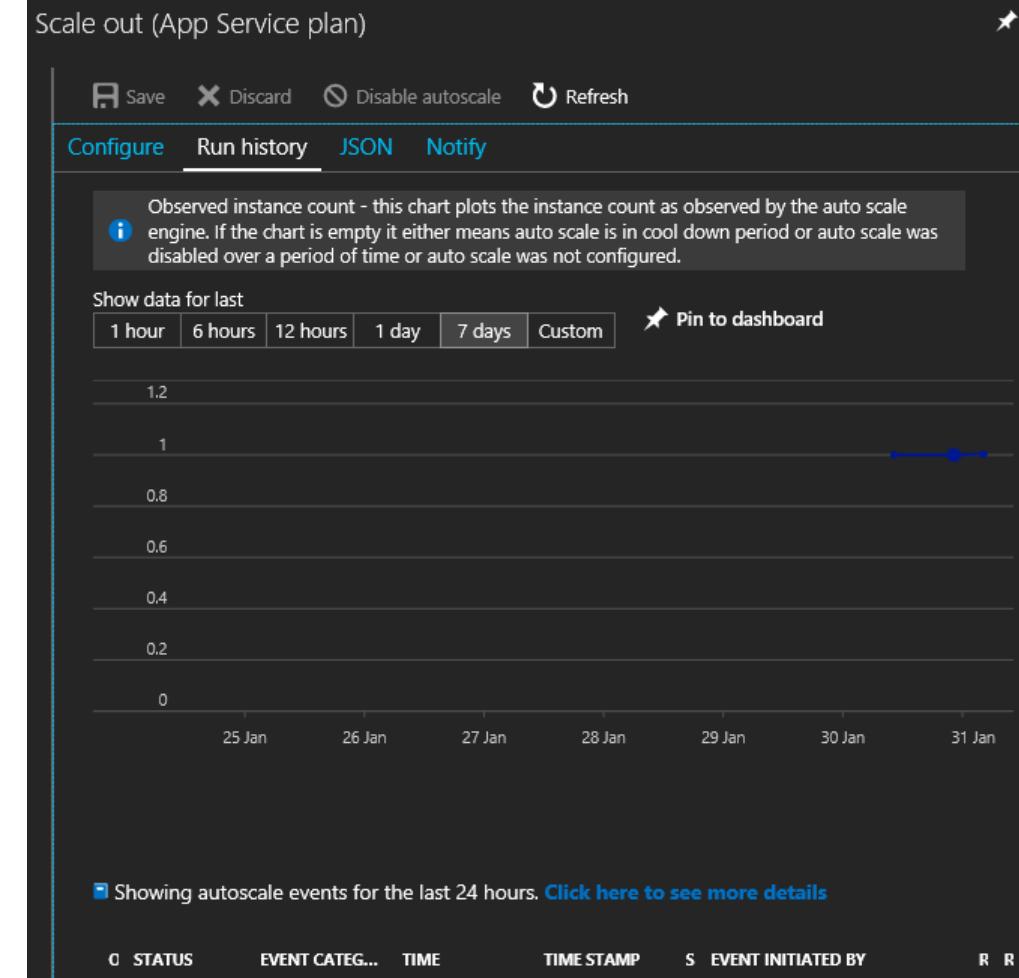
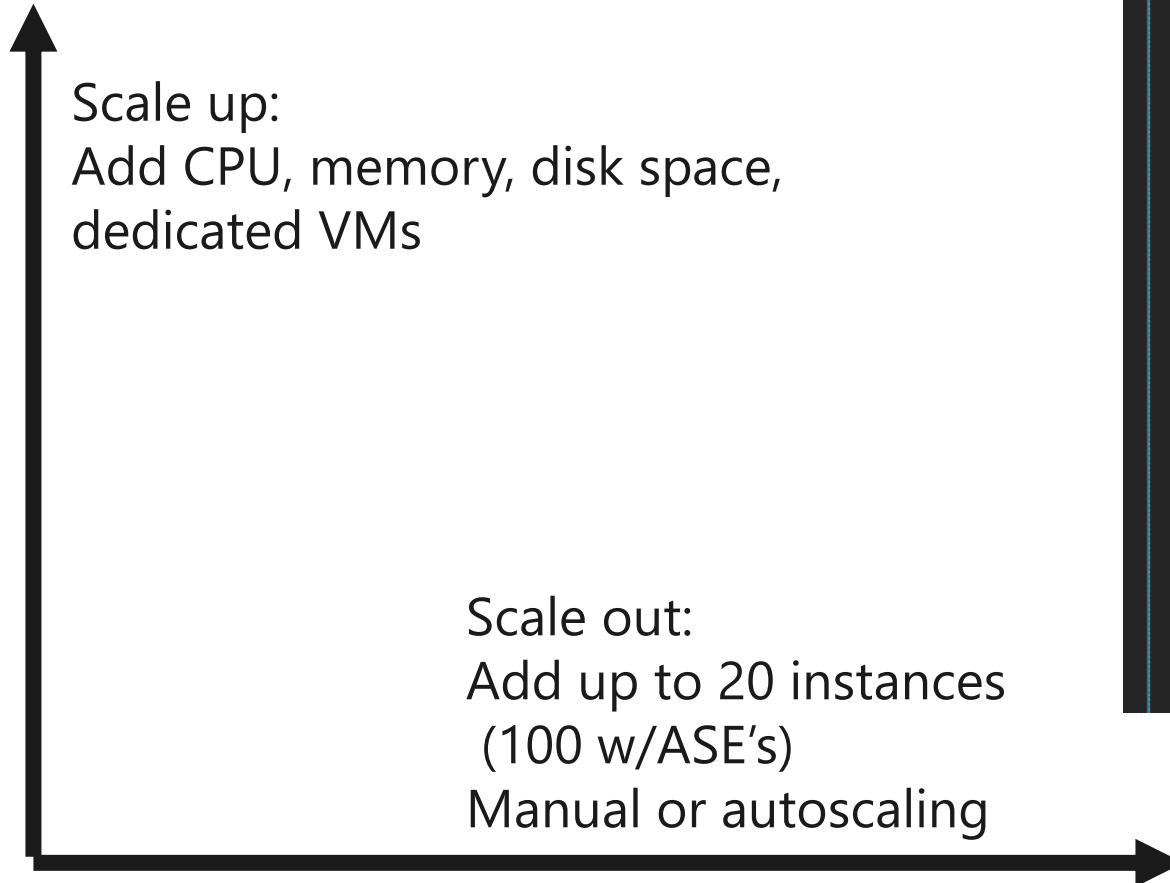
How do I deploy project artifacts with an Azure deployment template?

Recycle Bin

Ready 1 0 AzureSPC-WebAPI Step07a-AppInsights

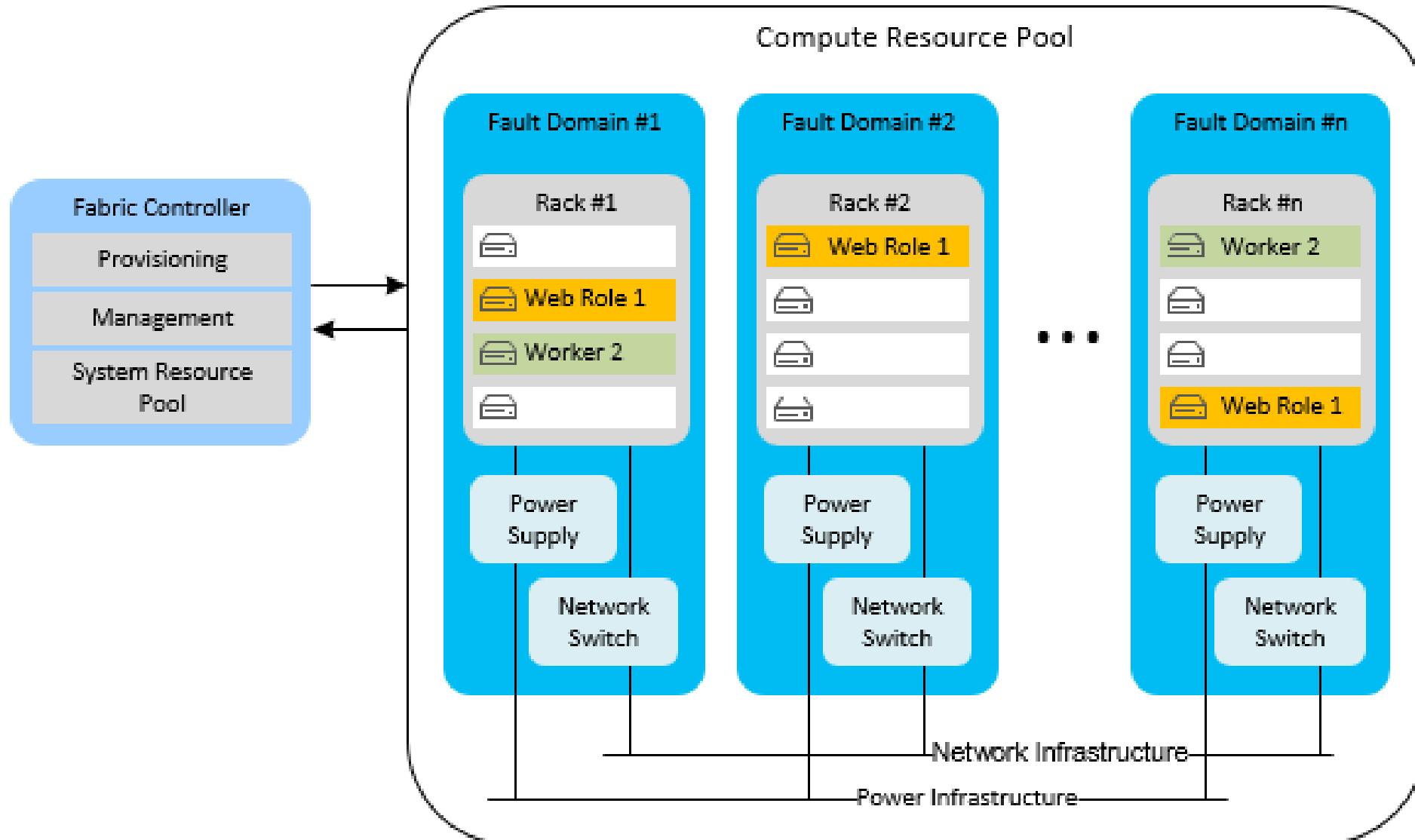


Scaling your solution



Demo:
Show scale up/out in portal

What about high availability?



Traffic Manager

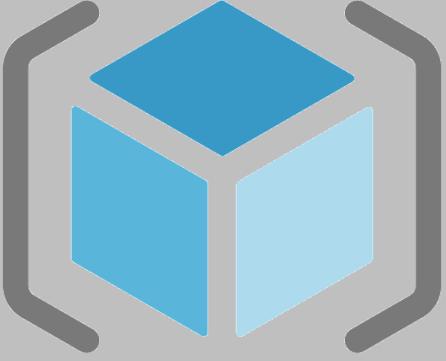
DNS-based load balancing and failover

Health probe of endpoints to determine availability

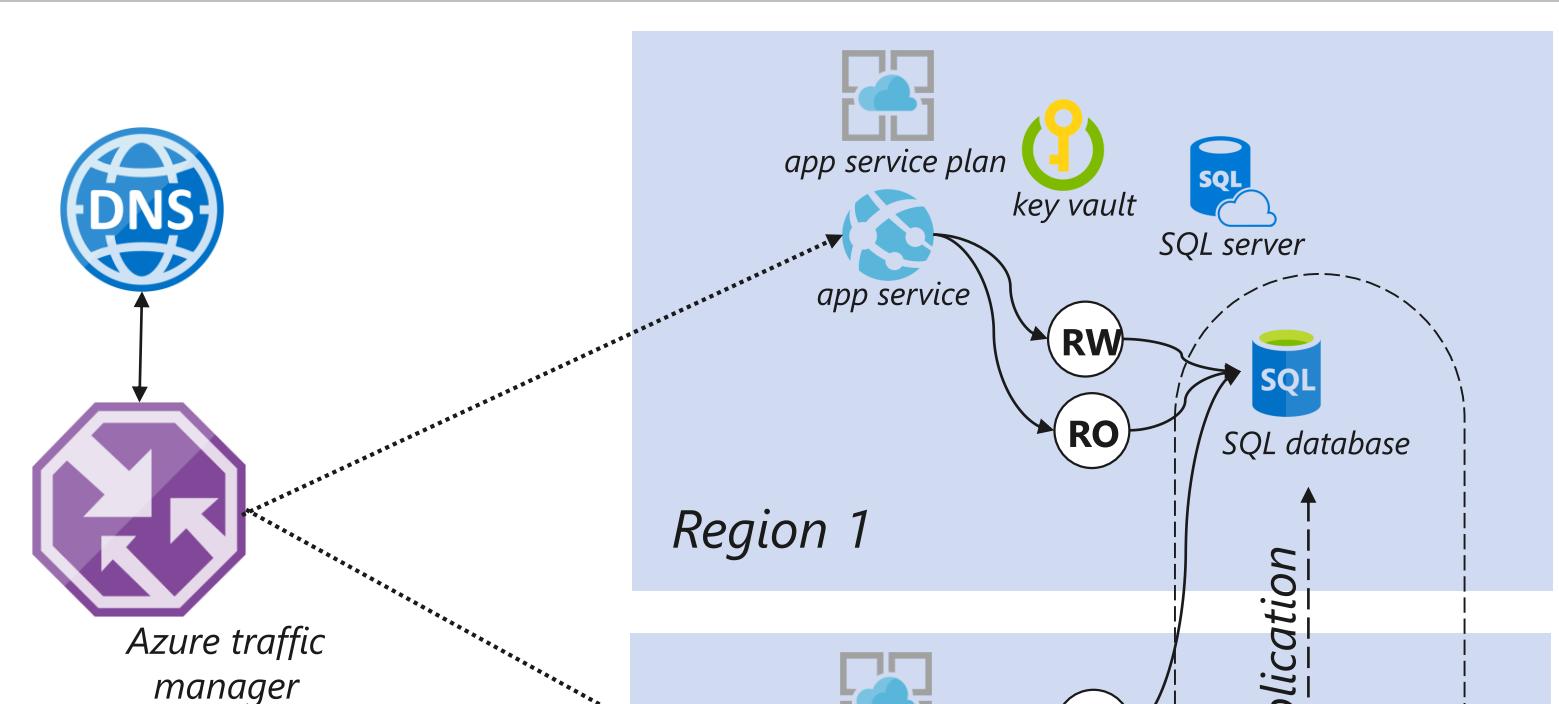
Impact of Time To Live (TTL)

Multiple performance policies

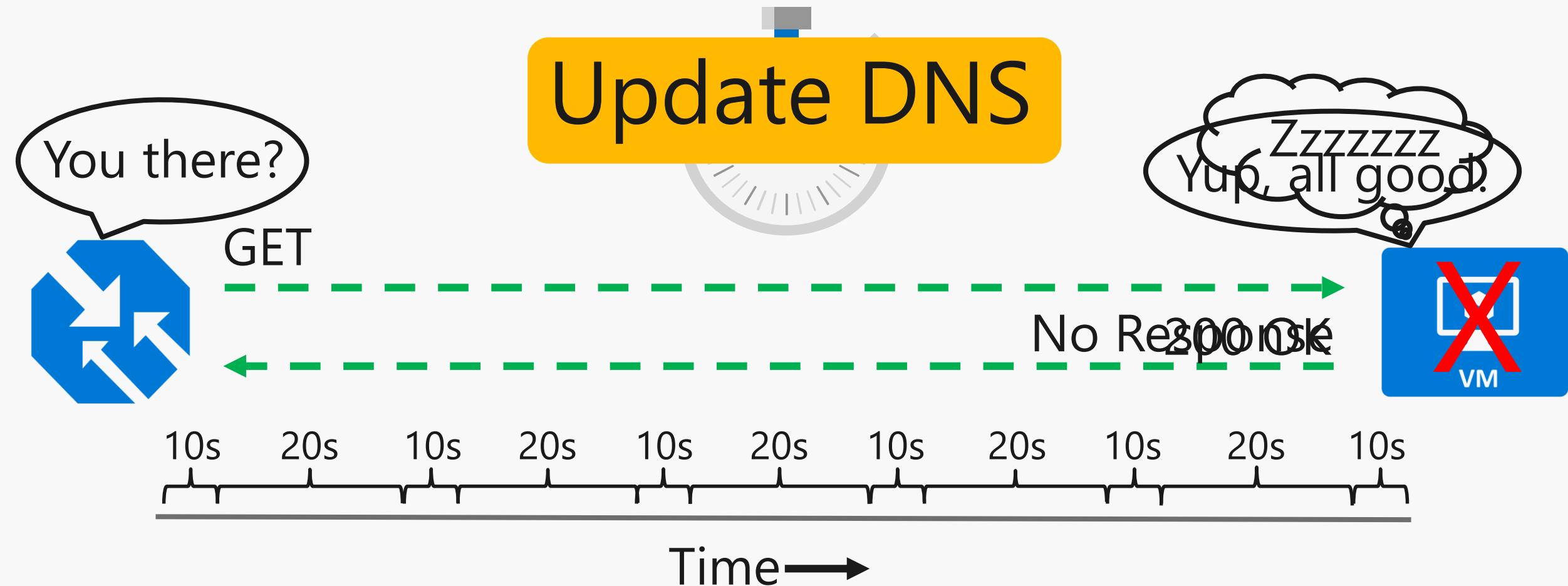




resource group



How Traffic Manager handles endpoint loss



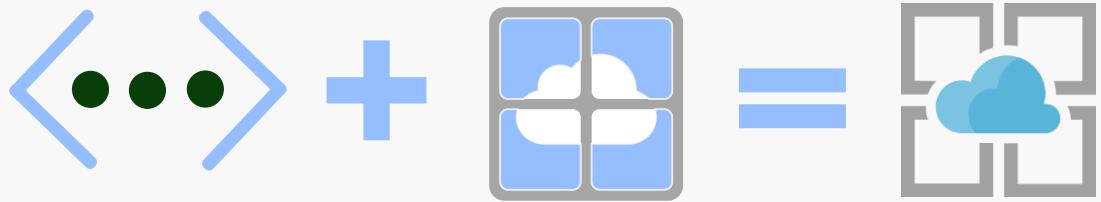
App Service Environment (ASE)

Deployment of App Service in
your Virtual Network

Private location

Supports very large scale

Isolation and secure network
access



Messaging Solutions

Azure Storage Queues

Store large numbers (millions) of messages

Access anywhere in the world

Common Uses

- Process work backlogs asynchronously

- Pass Messages from web role to worker role

Azure Service Bus

Multi-tenant service

Communications through Namespace

- Queues

- Topics

- Relays

