

Staged Data Analytics

DEMO SETUP GUIDANCE

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Introduction

Overview

This document details environmental requirements and steps for setting up a Staged Data Analytics pipeline between Azure Stack and Azure.

Prerequisites

Azure Stack

- An Azure Stack Environment.
 - For information on how to deploy Azure Stack Development Kit see [ASDK-Install](#)
- Plans, Offers and Quotas Configured.
 - For information on how to configure Quotas, Offers and Plans see [Plan-Offer-Quota-Overview](#)
- A tenant subscribed to your Azure Stack Offer/Plan.
 - For information on how to Subscribe to an offer see. [Subscribe-to-an-Offer](#)

Azure

- An Azure Subscription (If you don't have an Azure subscription, create a [free account](#) before you begin)

Objective

The purpose of this demo is to create an automated deployable application to demonstrate the staged data analytics hybrid pattern.

Functional Requirements

- Application should fully implement the architecture
- Application should deploy both the Azure and Azure Stack sides through PowerShell, requiring minimal user interventions.
- Users should be able to deploy the application to any Azure region that supports the required services.
- Users should be able to deploy the application to an Azure Stack Development Kit and an Azure Stack Integrated System.
- Users should be able to select their subscriptions for deployment.

Demo Application Components

Local Insights Application

This should communicate with the Analysis Function via a queue and display the latest anomalies with all "private data".

Global Insights Application

This should communicate with the Transmission Function via a queue in Azure and display the latest anomalies with no private data

Data Generation Application

A command line application that runs on the user's computer, that writes data to the Ingestion Storage Account using blobs of comma-separated values based on a defined schema.

Before you Begin

Install Docker

Install Docker from: <https://docs.docker.com/docker-for-windows/install/>

Docker Information

Setting up Docker Images

Docker images located here: <https://docs.docker.com/v17.12/docker-cloud/builds/push-images/>

Build a Docker Image

```
docker build --tag hybrid-demo-azure-v2
```

Run a Docker Image

```
docker run -it hybrid-demo-azure-v2 powershell
```

Tag a Docker Image

```
docker tag hybrid-demo-azure-v2:latest <docker id>/dockerhub:hybrid-demo-azure-v2
```

Push a Docker Image to a Docker repository

```
docker push < docker id >/dockerhub:hybrid-demo-azure-v2
```

Pull a Docker Image from a Docker repository

```
docker pull < docker id >/dockerhub:hybrid-demo-azure-v2
```

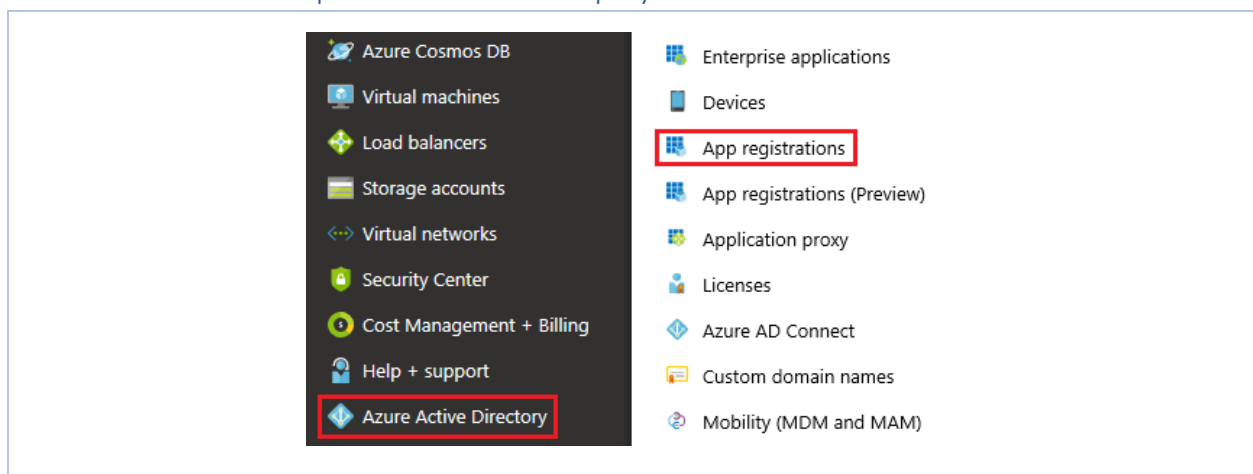
Sample DockerFile (used for this project)

```
FROM microsoft/windowsservercore  
MAINTAINER <maintainer's name>
```

```
COPY DeploySolution-AzureStack.ps1 c:/HybridDemo/  
COPY AzureStack c:/HybridDemo/AzureStack
```

```
CMD powershell c:/HybridDemo/DeploySolution-AzureStack.ps1
```

Create a Service Principal for the Azure Deployment



[+ New application registration](#)

[Endpoints](#)

[Troubleshoot](#)



The preview experience for App registrations is available. Click this banner to launch the preview experience. [→](#)

Search by name or AppID

All apps

Create



* Name ⓘ

SDDemoAzure



Application type ⓘ

Web app / API



* Sign-on URL ⓘ

http://localhost



SDDemoAzure

Registered app



Settings



Manifest



Delete

Display name

SDDemoAzure

Application type

Web app / API

Home page

<http://localhost>

Application ID

XXXXXXXXXXXXXXXXXXXX

Object ID

XXXXXXXXXXXXXXXXXXXX

Managed application in local directory

[SDDemoAzure](#)



SDDemoAzure

Registered app

Settings

Manifest

Delete

Display name

SDDemoAzure

Application type

Web app / API

Home page

<http://localhost>

Application ID

8c3e8ab2-1142-44ee-8307-fa1aa0b38c95

Managed application in local directory

SDDemoAzure

Settings

Filter settings

GENERAL

Properties

Reply URLs

Owners

API ACCESS

Required permissions

Keys

The “**Application ID**” will be used during the deployment as the “**AzureApplicationId**” PowerShell Script parameter.

Settings

Filter settings

GENERAL

Properties

Reply URLs

Owners

API ACCESS

Required permissions

Keys

TROUBLESHOOTING + SUPPORT

Troubleshoot

New support request

Keys

Save

Discard

Upload Public Key

Passwords

DESCRIPTION	EXPIRES	VALUE
SDDemoAzureKey	Never expires	Value will be displayed on save
Key description	Duration	Value will be displayed on save

Public Keys

THUMBPRINT	START DATE	EXPIRES
No results.		

Keys

Save

Discard

Upload Public Key

Update application keys

3:17 PM

Successfully updated application SDDemoAzure keys

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

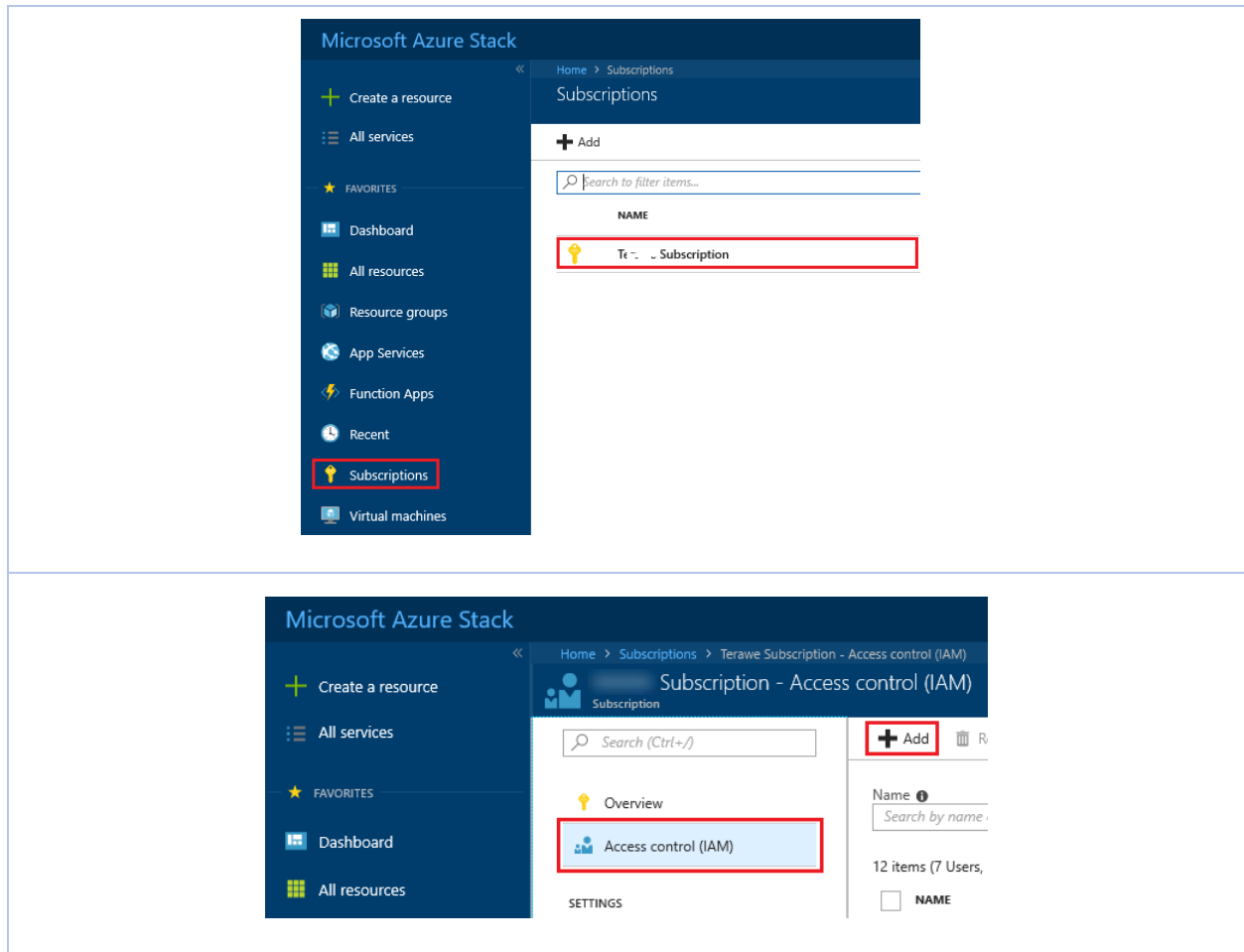
Passwords

DESCRIPTION	EXPIRES	VALUE
SDDemoAzureKey	12/31/2299	<div>Save key</div>
Key description	Duration	Value will be displayed on save

The **"SDDemoAzureKey"** will be used during the deployment as the **"AzureApplicationSecret"** PowerShell script parameter.

Create a Service Principal for the AzureStack Deployment

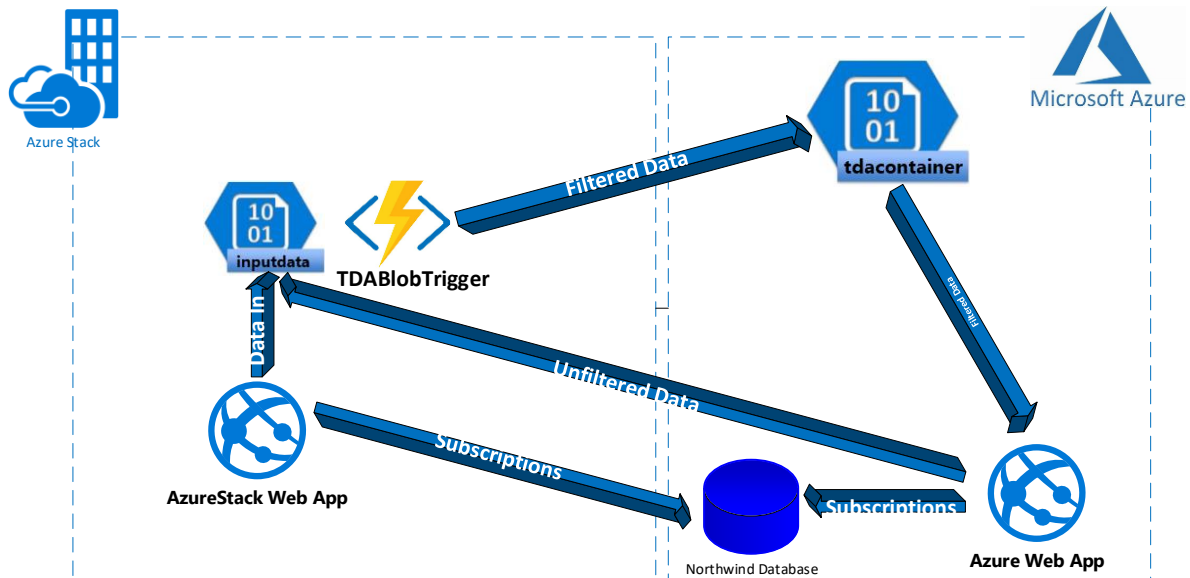
Repeat the steps above in Azure for an AzureStack Application ID and Application Secret.



Reference Architecture

This section details the reference architecture that can be used as a guidance to implement the offer.

Staged Data Analytics Architecture



Azure Components

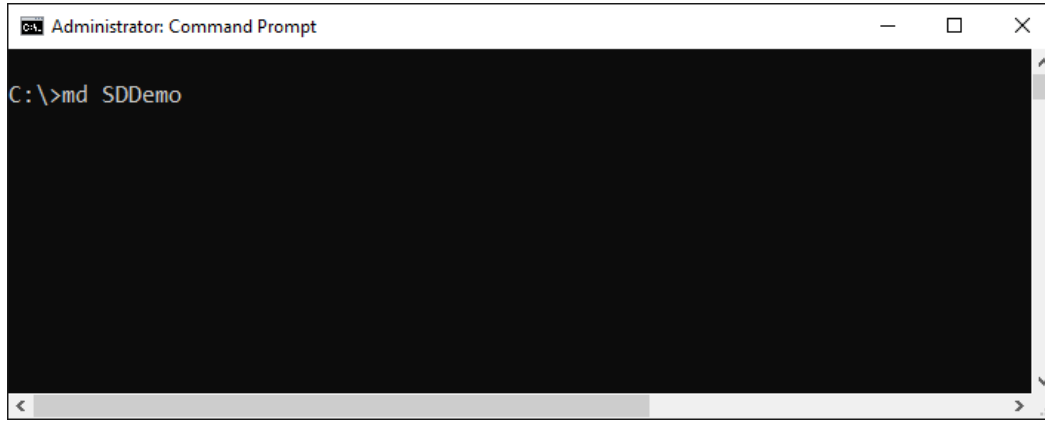
- Storage Account
- App Service Plan
- App Service
- Application Insights
- SQL Server
- SQL Database

Azure Stack Components

- Storage Account
- App Service Plan (Web App)
- App Service (Web App)
- App Service Plan (Function Web App)
- App Service (Function Web App)

Deploying and Validating Demo

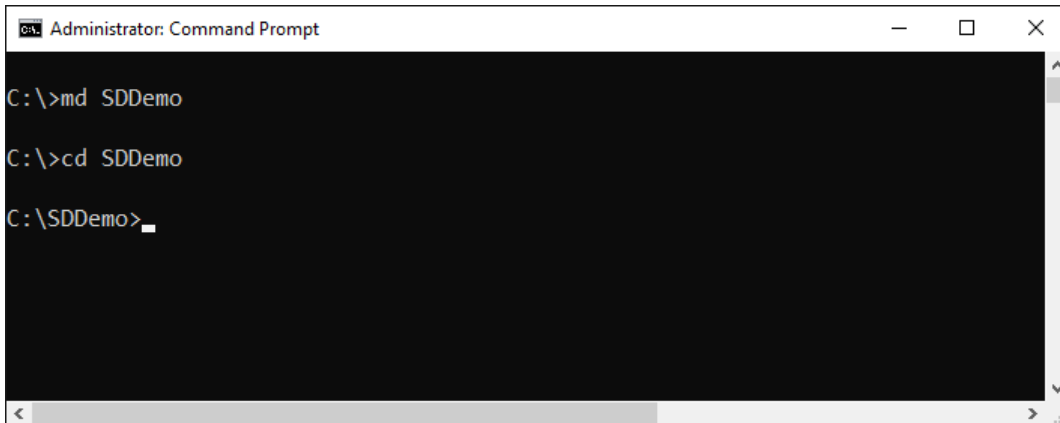
1. Create folders for the Docker Container Download:
md SDDemo\Azure
md SDDemo\AzureStack



```
C:\>md SDDemo
```

The image shows a Windows Command Prompt window titled "Administrator: Command Prompt". The command prompt is at the C:\ drive, and the command "md SDDemo" has been entered, creating a new directory named SDDemo.

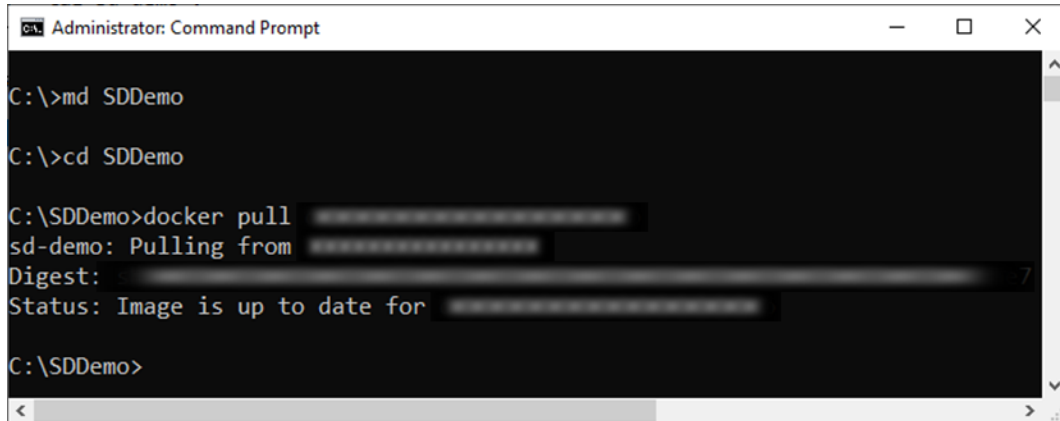
2. Navigate to the C:\SDDemo\Azure folder
cd SDDemo\Azure



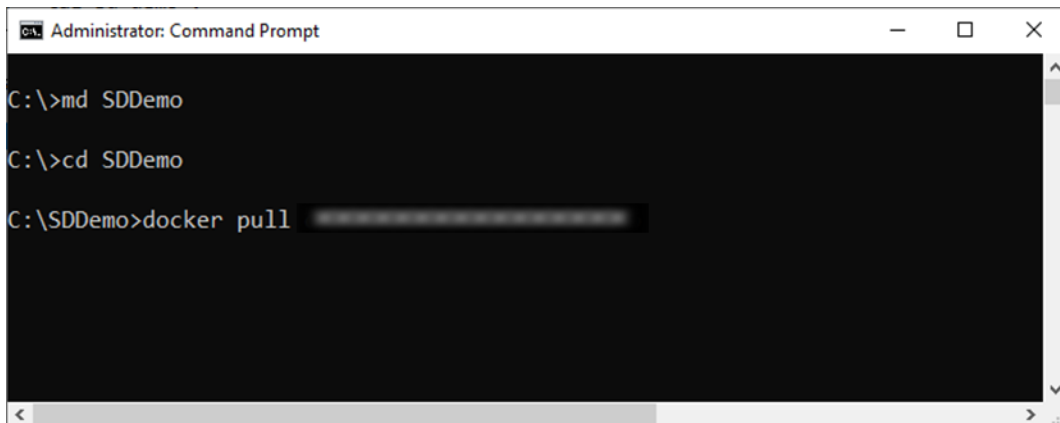
```
C:\>md SDDemo
C:\>cd SDDemo
C:\SDDemo>
```

The image shows a Windows Command Prompt window titled "Administrator: Command Prompt". The command prompt is at the C:\ drive, and the commands "md SDDemo" and "cd SDDemo" have been entered, creating a new directory named SDDemo and navigating to it. The prompt is now at C:\SDDemo>.

3. Run the following command to download the container
`docker pull <container_name>/dockerhub:hybrid-demo-azure-v2`
(for help with this section, refer to page 3: docker information)

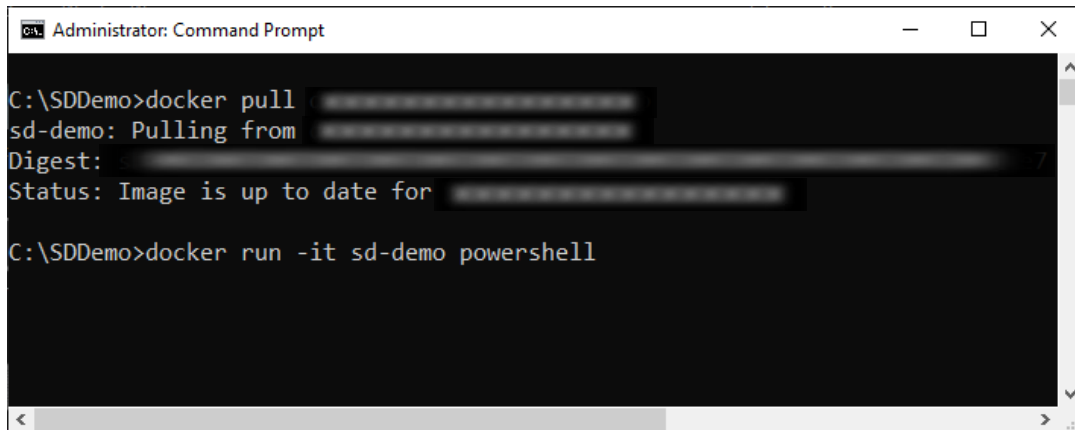


```
Administrator: Command Prompt
C:\>md SDDemo
C:\>cd SDDemo
C:\SDDemo>docker pull [REDACTED]
sd-demo: Pulling from [REDACTED]
Digest: [REDACTED]
Status: Image is up to date for [REDACTED]
C:\SDDemo>
```



```
Administrator: Command Prompt
C:\>md SDDemo
C:\>cd SDDemo
C:\SDDemo>docker pull [REDACTED]
```

4. Run the docker container
`docker run -it hybrid-demo-azure-v2 powershell`

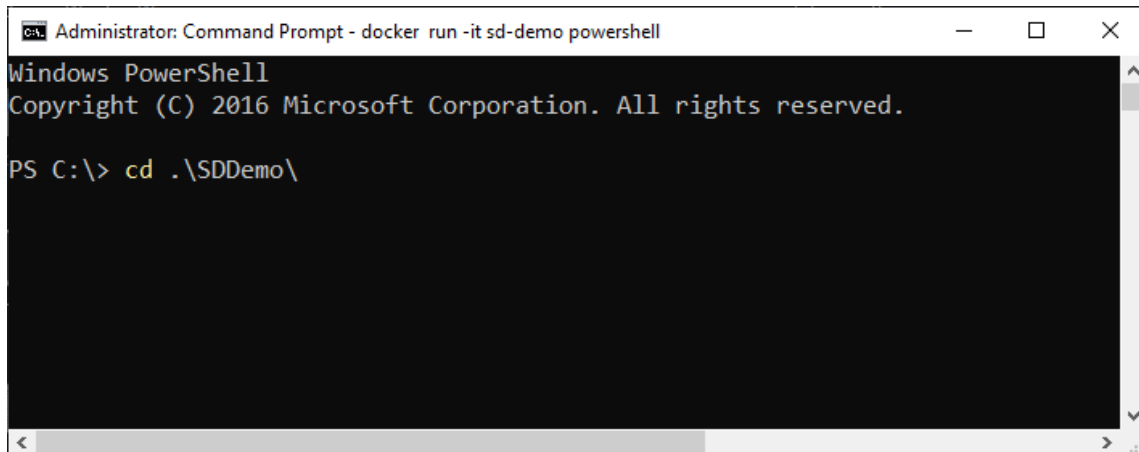


A screenshot of a Windows Command Prompt window titled "Administrator: Command Prompt". The window shows the following commands and output:

```
C:\SDDemo>docker pull [REDACTED]
sd-demo: Pulling from [REDACTED]
Digest: [REDACTED]
Status: Image is up to date for [REDACTED]

C:\SDDemo>docker run -it sd-demo powershell
```

5. Navigate to the SDD Demo Folder
`cd .\SDDemo\`



A screenshot of a Windows PowerShell window titled "Administrator: Command Prompt - docker run -it sd-demo powershell". The window shows the following output and command:

```
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

PS C:\> cd .\SDDemo\
```

6. Run the deploy script
`.\DeploySolution-Azure.ps1`

```
Administrator: Command Prompt - docker run -it sd-demo powershell
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

PS C:\> cd .\SDDemo\
PS C:\SDDemo> .\DeploySolution-Azure-AzureStack.ps1

cmdlet DeploySolution-Azure-AzureStack.ps1 at command pipeline position 1
Supply values for the following parameters:
AADTenantName: _
```

7. Provide all the input parameters.

Note: The parameters will be similar to the following:

AADTenantName	mydomain.onmicrosoft.com
TenantARMEndpoint	https://management.westus.mytenant.com/
AzureApplicationId	xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
AzureApplicationSecret	xx
AzureTenantId	xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
ResourcePrefix	sddemo

```
Administrator: Command Prompt - docker run -it sd-demo powershell
PS C:\> cd .\SDDemo\
PS C:\SDDemo> .\DeploySolution-Azure-AzureStack.ps1

cmdlet DeploySolution-Azure-AzureStack.ps1 at command pipeline position 1
Supply values for the following parameters:
AADTenantName: sample
TenantARMEndpoint: sample
AzureApplicationId: sample
AzureApplicationSecret: sample
AzureTenantId: sample
AzureStackApplicationId: sample
AzureStackApplicationSecret: sample
AzureStackTenantId: sample
resourcePrefix: sddemo _
```

8. If prompted, enter the Region for the deployment and Application Insights

```
Administrator: Command Prompt - docker run -it sd-demo powershell
Please select a Region for the Azure resources from below. Enter the number from the list.
1 - eastasia
2 - southeastasia
3 - centralus
4 - eastus
5 - eastus2
6 - westus
7 - northcentralus
8 - southcentralus
9 - northeurope
10 - westeurope
11 - japanwest
12 - japaneast
13 - brazilsouth
14 - australiaeast
15 - australiasoutheast
16 - southindia
17 - centralindia
18 - westindia
19 - canadacentral
20 - canadaeast
21 - uksouth
22 - ukwest
23 - westcentralus
24 - westus2
25 - koreacentral
26 - koreasouth
27 - francecentral
28 - francesouth
29 - australiacentral
30 - australiacentral2
31 - southafricanorth
32 - southafricawest
Region: 24
```

9. Type "Y" to allow the NuGet provider to be installed

```
Administrator: Command Prompt - docker run -it sd-demo powershell
-AzureStackApplicationSecret
-AzureStackTenantId

cmdlet DeploySolution-Azure-AzureStack.ps1 at command pipeline position 1
Supply values for the following parameters:
resourcePrefix: sddemo01

NuGet provider is required to continue
PowerShellGet requires NuGet provider version '2.8.5.201' or newer to
interact with NuGet-based repositories. The NuGet provider must be
available in 'C:\Program Files\PackageManagement\ProviderAssemblies' or
'C:\Users\ContainerAdministrator\AppData\Local\PackageManagement\ProviderAs
semblies'. You can also install the NuGet provider by running
'Install-PackageProvider -Name NuGet -MinimumVersion 2.8.5.201 -Force'. Do
you want PowerShellGet to install and import the NuGet provider now?
[Y] Yes [N] No [S] Suspend [?] Help (default is "Y"):
```

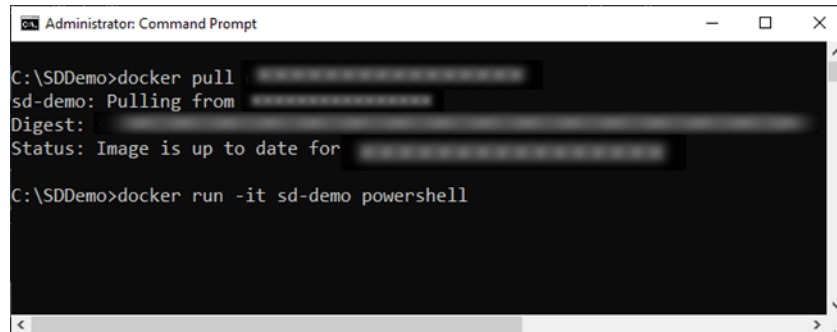
10. Monitor the deployment and wait for it to complete

```
Administrator: Command Prompt - docker run -it sd-demo powershell
VERBOSE: POST https://sddemo01functionapp.scm.appservice.westus.stackpoc.com/api/zipdeploy with -1-byte payload
VERBOSE: received 0-byte response of content type
AzureStack Resource Deployment completed successfully.
You can begin testing...

PS C:\SDDemo>
```

11. Navigate to the C:\SDDemo\AzureStack folder
cd C:\SDDemo\AzureStack

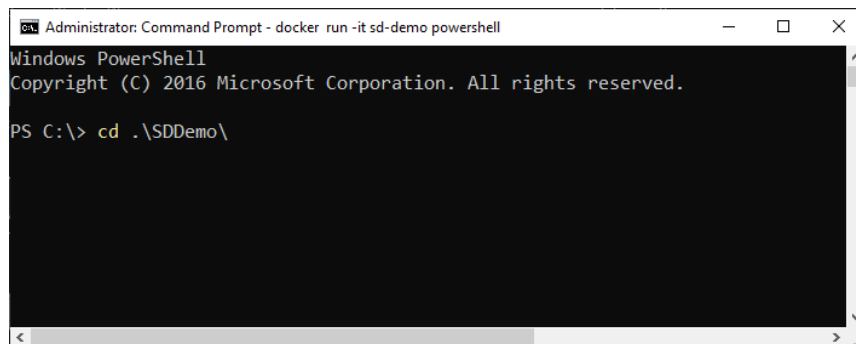
13. Run the docker container
`docker run -it hybrid-demo-azurestack-v2 powershell`



```
Administrator: Command Prompt
C:\SDDemo>docker pull sd-demo
sd-demo: Pulling from 
Digest: 
Status: Image is up to date for 

C:\SDDemo>docker run -it sd-demo powershell
```

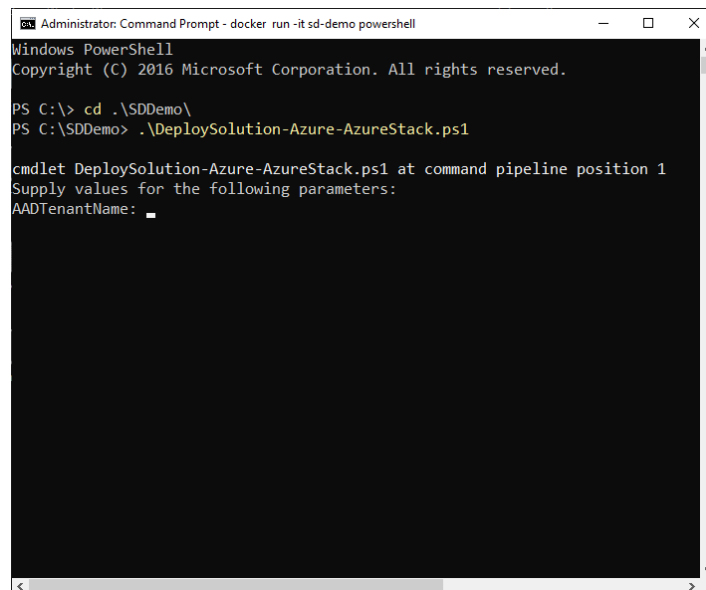
14. Navigate to the SDDemo folder
`cd .\SDDemo\`



```
Administrator: Command Prompt - docker run -it sd-demo powershell
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

PS C:\> cd .\SDDemo\
```

15. Run the deploy script
`.\DeploySolution-AzureStack.ps1`



```
Administrator: Command Prompt - docker run -it sd-demo powershell
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

PS C:\> cd .\SDDemo\
PS C:\SDDemo> .\DeploySolution-Azure-AzureStack.ps1

cmdlet DeploySolution-Azure-AzureStack.ps1 at command pipeline position 1
Supply values for the following parameters:
AADTenantName: 
```


16. Provide all the input parameters

Note: The parameters will be similar to the following:

AADTenantName	mydomain.onmicrosoft.com
TenantARMEndpoint	https://management.westus.mytenant.com/
AzureStackApplicationId	XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX
AzureStackApplicationSecret	XX
AzureStackTenantId	XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX
ResourcePrefix	SDDemo

```
Administrator: Command Prompt - docker run -it sd-demo powershell
PS C:\> cd .\SDDemo\
PS C:\SDDemo> .\DeploySolution-Azure-AzureStack.ps1

cmdlet DeploySolution-Azure-AzureStack.ps1 at command pipeline position 1
Supply values for the following parameters:
AADTenantName: sample
TenantARMEndpoint: sample
AzureApplicationId: sample
AzureApplicationSecret: sample
AzureTenantId: sample
AzureStackApplicationId: sample
AzureStackApplicationSecret: sample
AzureStackTenantId: sample
resourcePrefix: sddemo_
```

17. If prompted, enter the Region for the deployment and Application Insights

```
Administrator: Command Prompt - docker run -it sd-demo powershell
Please select a Region for the Azure resources from below. Enter the number from the list.
1 - eastasia
2 - southeastasia
3 - centralus
4 - eastus
5 - eastus2
6 - westus
7 - northcentralus
8 - southcentralus
9 - northeurope
10 - westeurope
11 - japanwest
12 - japaneast
13 - brazilsouth
14 - australiaeast
15 - australiasoutheast
16 - southindia
17 - centralindia
18 - westindia
19 - canadacentral
20 - canadaeast
21 - uksouth
22 - ukwest
23 - westcentralus
24 - westus2
25 - koreacentral
26 - koreasouth
27 - francecentral
28 - francesouth
29 - australiacentral
30 - australiacentral2
31 - southafricanorth
32 - southafricawest
Region: 24_
```

18. Type "Y" to allow the NuGet provider to be installed

```
Administrator: Command Prompt - docker run -it sd-demo powershell
- AzureStackApplicationSecret
- AzureStackTenantId

cmdlet DeploySolution-Azure-AzureStack.ps1 at command pipeline position 1
Supply values for the following parameters:
resourcePrefix: sddemo01

NuGet provider is required to continue
PowerShellGet requires NuGet provider version '2.8.5.201' or newer to
interact with NuGet-based repositories. The NuGet provider must be
available in 'C:\Program Files\PackageManagement\ProviderAssemblies' or
'C:\Users\ContainerAdministrator\AppData\Local\PackageManagement\ProviderAs
semblies'. You can also install the NuGet provider by running
'Install-PackageProvider -Name NuGet -MinimumVersion 2.8.5.201 -Force'. Do
you want PowerShellGet to install and import the NuGet provider now?
[Y] Yes [N] No [S] Suspend [?] Help (default is "Y"):
```

19. Monitor the deployment and wait for it to complete

```
Administrator: Command Prompt - docker run -it sd-demo powershell
VERBOSE: POST https://sddemo01functionapp.scm.appservice.westus.stackpoc.com/api/zipdeploy with -1-byte payload
VERBOSE: received 0-byte response of content type
AzureStack Resource Deployment completed successfully.
You can begin testing...

PS C:\SDDemo>
```

20. Verify the Azure Resources have been deployed







+ Add
Edit columns
Delete resource group
Refresh
Move
Assign tags
Delete

Subscription (change)
Visual Studio Ultimate with MSDN
Subscription ID
Tags (change)
Click here to add tags

Deployments
No deployments

Filter by name...
All types
All locations
No grouping

6 items
☐ Show hidden types

<input type="checkbox"/>	NAME	TYPE	LOCATION
<input type="checkbox"/>	 sdv2demo01sqlserver	SQL server	West US 2
<input type="checkbox"/>	 sdv2demo01db (sdv2demo01sqlserver/sdv2demo01db)	SQL database	West US 2
<input type="checkbox"/>	 sdv2demo01stg	Storage account	West US 2
<input type="checkbox"/>	 sdv2demo01WebApp	Application Insights	West US 2
<input type="checkbox"/>	 sdv2demo01WebApp	App Service	West US 2
<input type="checkbox"/>	 sdv2demo01WebAppappserver	App Service plan	West US 2






21. Verify the AzureStack Resources have been deployed

Subscription (change) Subscription ID Deployments No deployments

Tags (change) Click here to add tags

Filter by name... All types No grouping

5 items ☐ Show hidden types

NAME	TYPE	LOCATION
 sdv2demo01functionapp	App Service plan	westus
 sdv2demo01functionapp	App Service	westus
 sdv2demo01stg	Storage account	westus
 sdv2demo01WebApp	App Service	westus
 sdv2demo01WebAppappserver	App Service plan	westus

22. Verify the data is available from AzureStack and Azure WebApps

THIS PAGE LOADED FROM Azure Call us now 1-800-555-5555

Northwind Health HOME DOCTORS FACILITIES DATA APPLY NOW CREATE AN ACCOUNT LOG IN

EnrollmentID	InsurancePlanID	SubscriberID	PlanYear	ConfirmationCode	TimeStamp	FirstName	MiddleName	LastName	AddressLine1
1	2	1	2019	GE8FQ8A00	3/12/2019 8:44:12 PM	Mandy		Moss	123 Mockingbird Ln
2	4	2	2019	673RQV0R82	3/12/2019 6:46:26 PM	Mandy		Moss	123 Mockingbird Ln
3	1	3	2019	ICEBKQ5K5N	3/12/2019 7:14:34 PM	Mandy		Moss	123 Mockingbird Ln

NON-DISCRIMINATION Northwind Insurance complies with applicable federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex.

NORTHWIND INSURANCE Northwind Insurance is an independent licensee of the WellHealth network. 1800-555-5555

OUR LOCATION 1 Northwind Plaza Redmond, WA 98052 FOLLOW US

THIS PAGE LOADED FROM AzureStack Call us now 1-800-555-5555

Northwind Health HOME DOCTORS FACILITIES DATA APPLY NOW CREATE AN ACCOUNT LOG IN

EnrollmentID	InsurancePlanID	SubscriberID	PlanYear	ConfirmationCode	TimeStamp	AddressLine1	AddressLine2	AlimonyChildSupport
1	2	1	2019	GE8FQ8A00	3/12/2019 6:44:12 PM	123 Mockingbird Ln		0
2	4	2	2019	673RQV0R82	3/12/2019 6:46:26 PM	123 Mockingbird Ln		0
3	1	3	2019	ICEBKQ5K5N	3/12/2019 7:14:34 PM	123 Mockingbird Ln		0

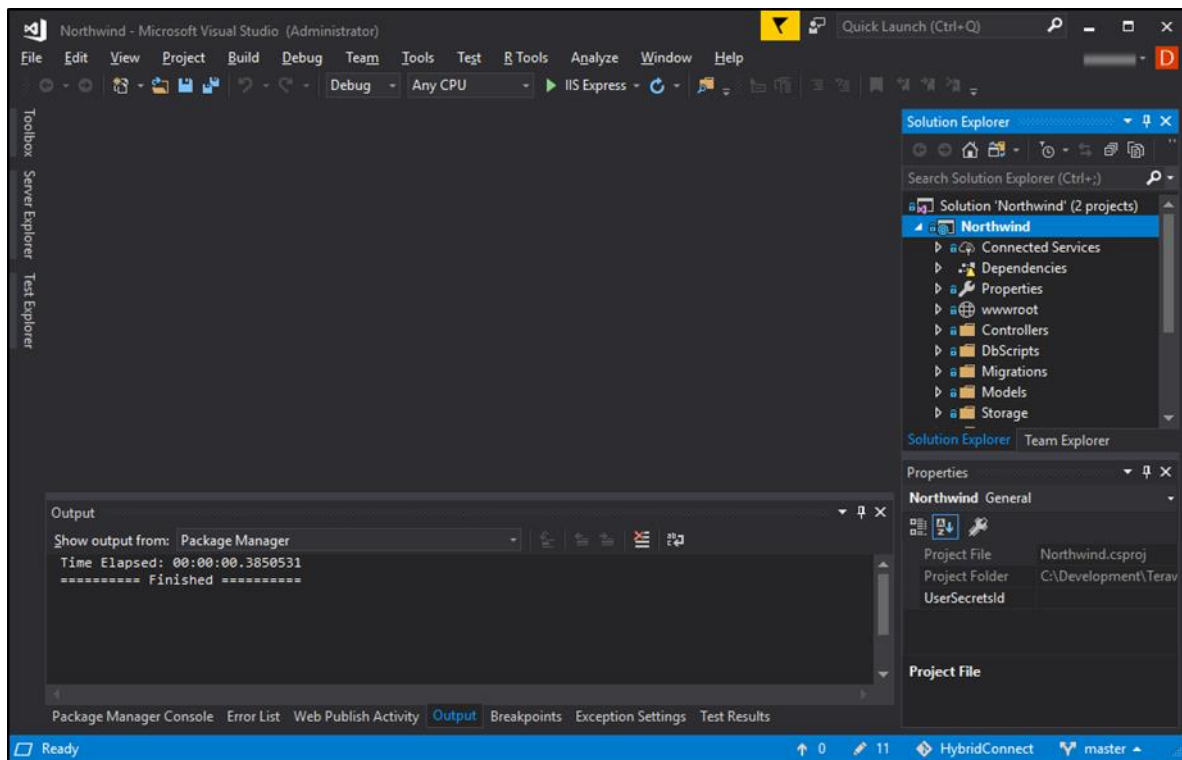
NON-DISCRIMINATION Northwind Insurance complies with applicable federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex.

NORTHWIND INSURANCE Northwind Insurance is an independent licensee of the WellHealth network. 1800-555-5555

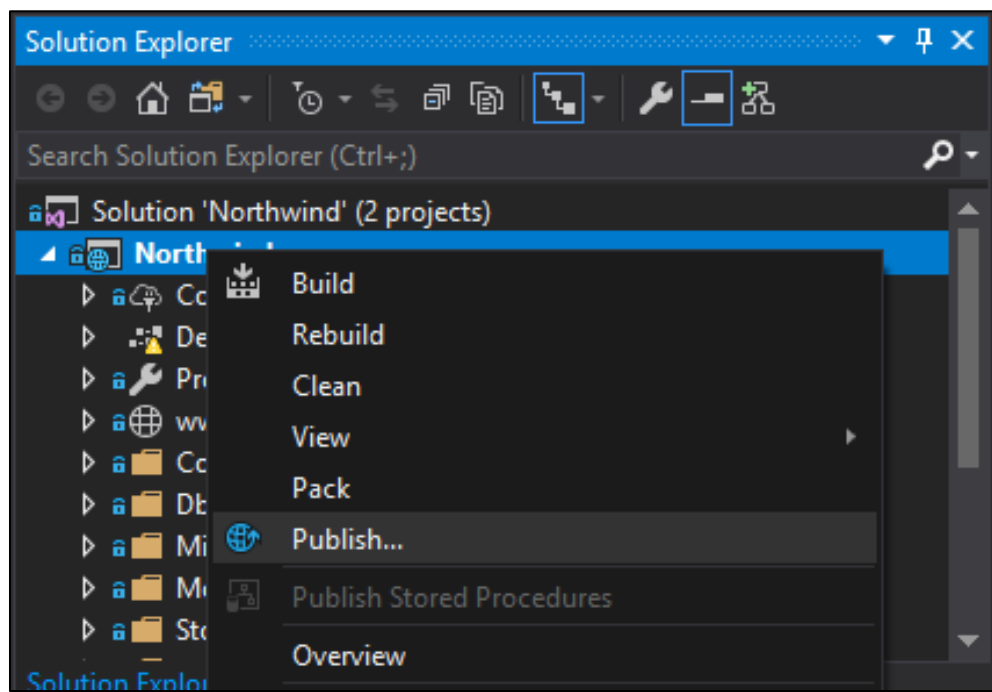
OUR LOCATION 1 Northwind Plaza Redmond, WA 98052 FOLLOW US

Deploying from Visual Studio

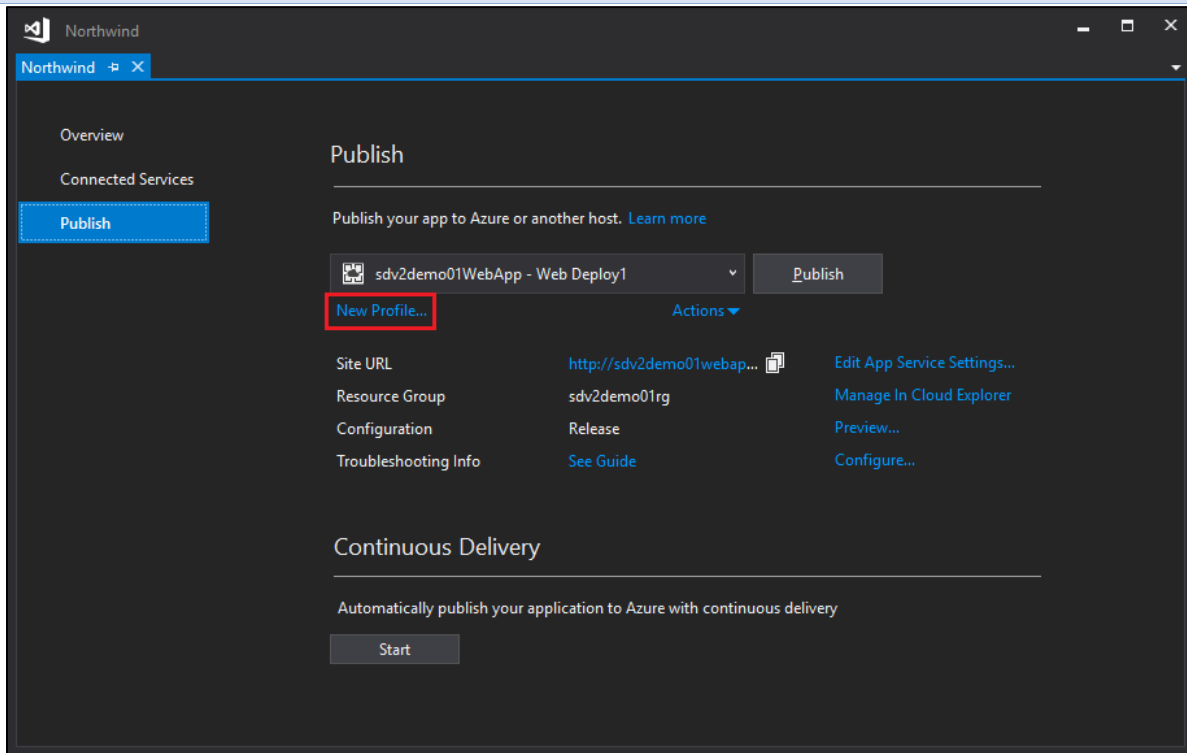
1. Open the Northwind.sln solution



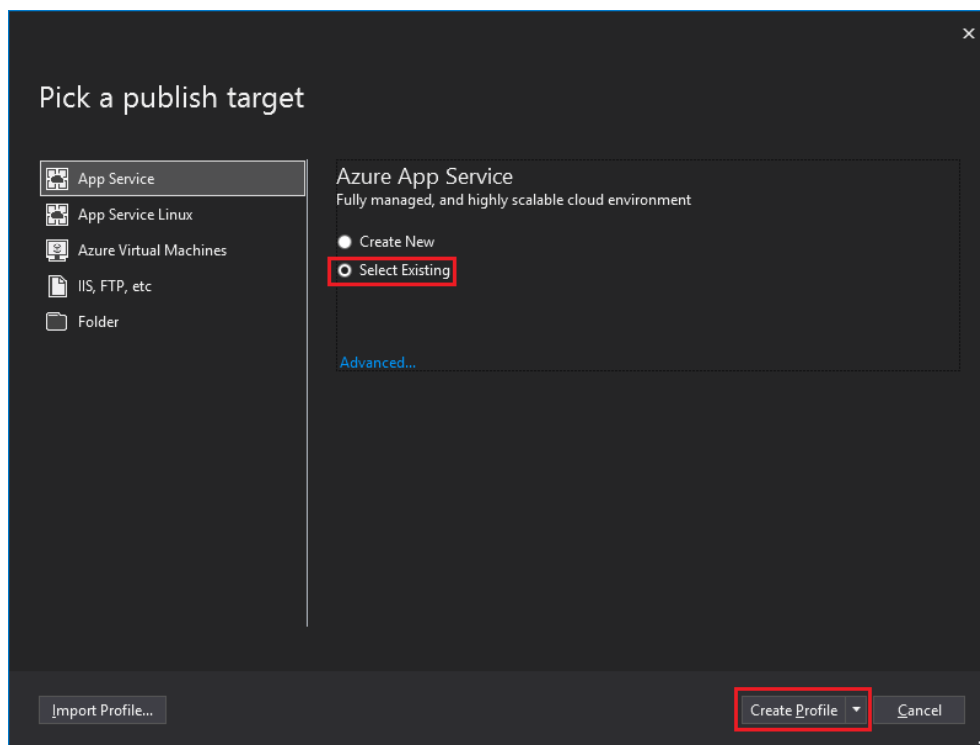
2. Right-click on the Northwind project and select "Publish..."



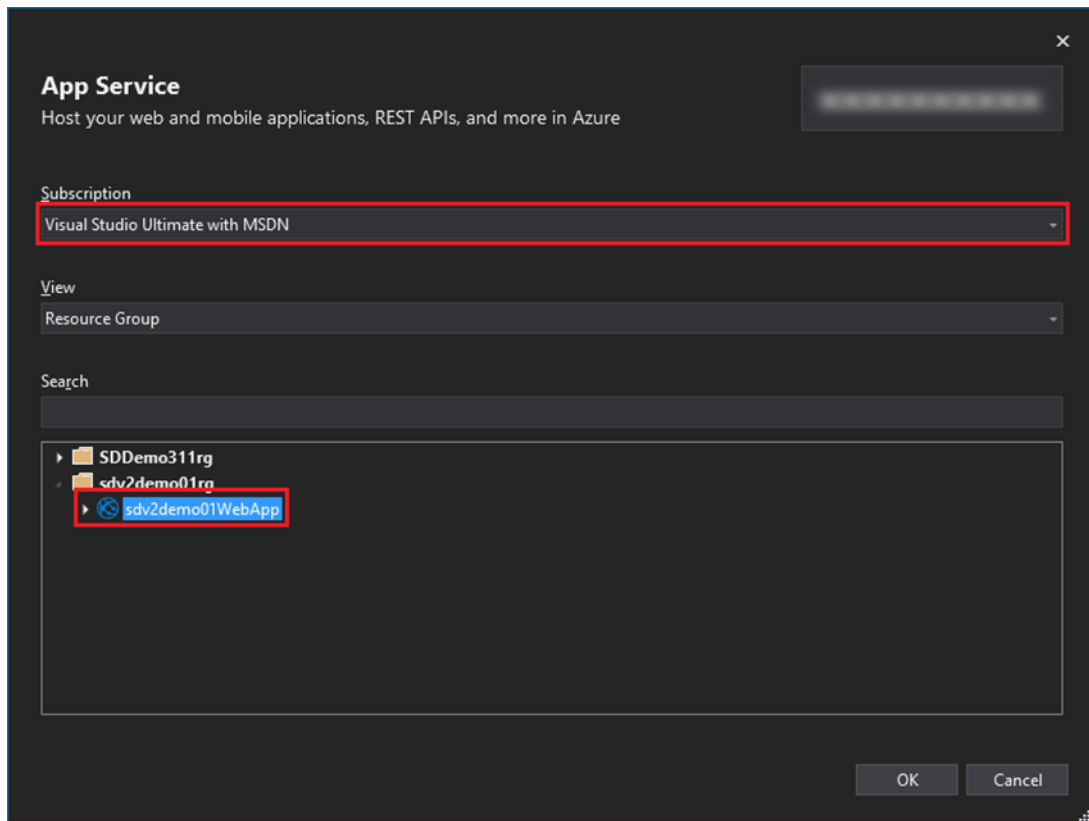
3. Click the “New Profile...” link



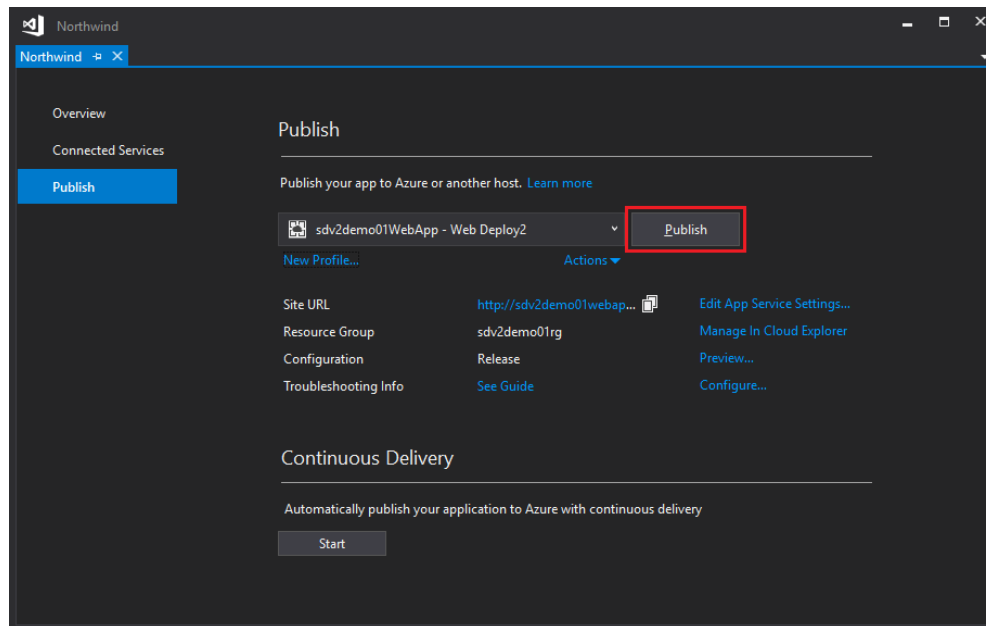
4. Click “Select Existing,” then click the “Create Profile” button



5. Select the appropriate subscription and select the resource group and web app to deploy to



6. Click the "Publish" button



7. Wait for the Website to open in your browser when publishing completes