

## CHAPTER 10

# App Service Environments

Implementing security in some applications requires full isolation from other resources. Azure app service environments (ASE) provide a dedicated fully isolated environment to deploy Windows and Linux web apps, docker containers, and function apps. Essentially, app service apps can run in full isolation, with isolated higher network security and access, high scalability, high memory utilization, and catering for higher requests per second, in an app service environment.

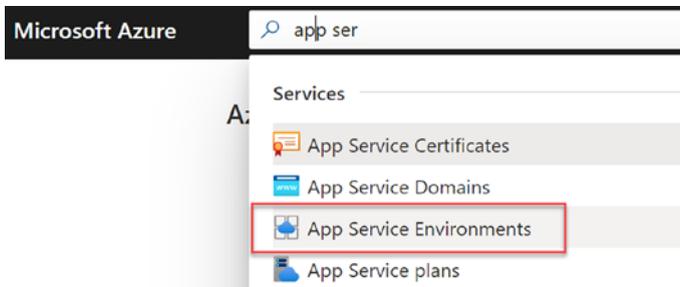
App service environment deployed apps are already in a virtual network without you having to do any additional configurations. Your ASE is a single tenant system that is not shared with anyone else providing isolation fully to your apps. You can even demand that your ASE be deployed into dedicated hardware to have complete isolation.

Version 3 of ASE supports creating up to 200 app service plans, and version 2 supports up to 100 plans. Apps in ASE can access resources in the virtual network of the ASE without you having to perform any additional configurations. With ASE version 3 you can deploy as a zone redundant as well.

## Lesson 10.1: Setting Up Azure App Service Environment

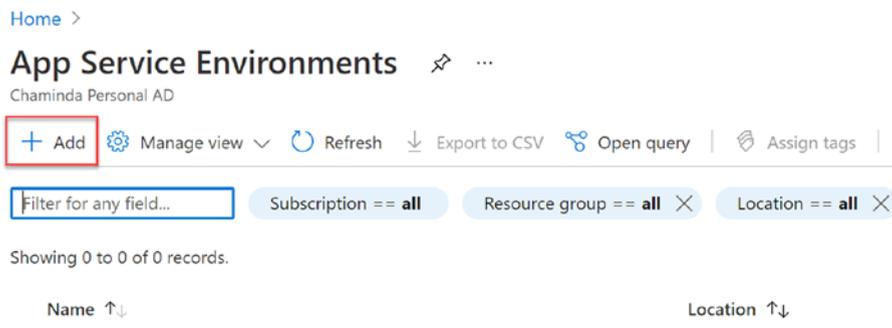
With the brief understanding we have about app service environments (ASEs), let's get started by setting up an ASE.

In Azure portal you can search for app service environments (see Figure 10-1).



**Figure 10-1.** Searching for ASEs

You can click on Add to get started, creating your first ASE (see Figure 10-2).



**Figure 10-2.** Adding ASE

In the basic information page of ASE, select an existing resource group or provide a name to create a new resource group. A name for ASE should be provided. You can select the virtual IP of ASE to be internal, which would create it as an internal load-balancer endpoint (see Figure 10-3).

## Create App Service Environment

Basics   Hosting   Networking   Tags   Review

The App Service Environment is a single-tenant deployment environment for apps in an App Service Environment can access resources in configuration. Network security can be applied around the App Service Environment configured on each app. [Learn more](#)

### Project Details

Select a subscription to manage deployed resources and costs, and manage all your resources.

Subscription \* ⓘ  ▼

Resource Group \* ⓘ  ▼ [Create new](#)

### Instance Details

The name of the App Service Environment is used in the domain name that determines if your apps are internet accessible or only accessible when deployed into the App Service Environment.

App Service Environment Name \* ⓘ  ▼ ✓

Virtual IP  **Internal:** The App Service Environment is accessible only through the internal IP address.  **External:** The App Service Environment is accessible through the public IP address.

▼

**Figure 10-3.** Creating ASE basics

If you switch virtual IP to external, notice the change in address of the ASE suffix (see Figure 10-4). Let's proceed with External for virtual IP.

The screenshot shows a configuration form for an App Service Environment. The 'App Service Environment Name' field contains 'ase-demo01' and has a green checkmark. Below it, the 'Virtual IP' section has two radio button options: 'Internal: The endpoint is an internal load balancer (ILB ASE)' and 'External: Exposes the ASE-hosted apps on an internet-accessible IP address'. The 'External' option is selected with a blue dot. A red box highlights the 'Virtual IP' section. The domain suffix '.azurewebsites.net' is visible to the right of the form.

**Figure 10-4.** External virtual IP

In the hosting page, you can select to deploy the ASE to dedicated hosts. Normally ASE is deployed on VMs, which are provisioned on multitenant hypervisors. If you choose to enable dedicated hosts it will deploy on dedicated hardware. However, zone redundancy would not be available for dedicated hosts, and dedicated hosts always be deployed as a pair to ensure redundancy. While deploying the ASE in normal mode you can choose to deploy as a zone redundant (see Figure 10-5).

## Create App Service Environment

Basics **Hosting** Networking Tags Review + create

Zone redundancy is not available in host group deployments.

### Host group

App Service Environments can be deployed to a host group for

Host group deployment

**Enabled:** Two ASEs. Just your

**Disabled:** You

### Zone redundancy

An App Service Environment can be deployed as a zone redundant deployment is a deployment time only decision. You can't make an ASE zone redundant [link](#)

Zone redundancy

**Enabled:** Your minimum App. The

**Disabled:** You dant. The minimum App.

Review + create

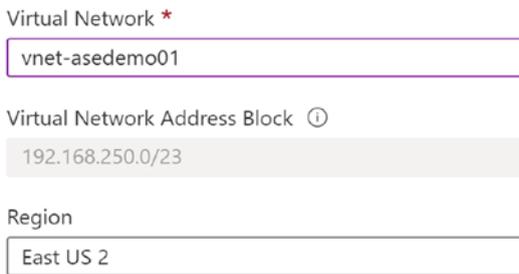
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**Figure 10-5.** ASE hosting

We can create a new virtual network for the ASE. You need to provide a name and region. The address block will be automatically selected (see Figure 10-6).

## Create Virtual Network



Virtual Network \*

vnet-asedemo01

Virtual Network Address Block ⓘ

192.168.250.0/23

Region

East US 2

**Figure 10-6.** ASE vNet

We need to define a subnet name as well for the ASE. In the subnet the address block will be with /24 CIDR providing 256 addresses in the subnet of the ASE (see Figure 10-7).

## Create Subnet ×

Subnet Name \*  ✓

Subnet Delegation ⓘ  
Microsoft.Web/hostingEnvironments

Virtual Network Address Block  
 ✓  
Range: 192.168.250.0 - 192.168.251.255

Subnet Address Block \* ⓘ  
 ✓  
Range: 192.168.250.0 - 192.168.250.255

Existing Subnets

Subnet Name	Address Range
There are no existing subnets in this virtual network	

**Figure 10-7.** Subnet for ASE

You can provide tags for the ASE of required and review all configurations before creating the ASE. Click on the create button to create the ASE (see Figure 10-8).

# Create App Service Environment v3 ...

Basics   Hosting   Networking   Tags   Review + create

## Summary



**App Service Environment**  
by Microsoft

**Cost:**  
[Pricing details](#)

## ASE Details

Subscription	Microsoft Azure Sponsorship
Resource Group	rg-asedemo01
App Service Environment name	ase-demo01
Virtual IP Type	External
Domain	ase-demo01.p.azurewebsites.net
Host group deployment	Disabled
Zone redundancy	Disabled
Tags	--

## Networking

Virtual Network	(New) vnet-asedemo01
Subnet	(New) snet-asedemo01
Region	East US 2

Create

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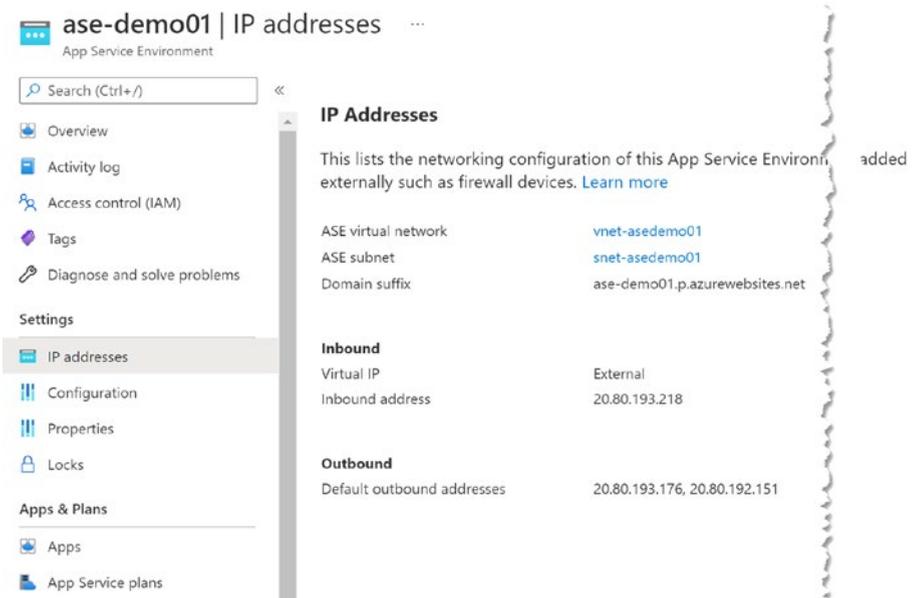
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[Download a template for automation](#)

**Figure 10-8.** *Creating ASE*

It might take an hour or two to get your ASE deployment to complete. Let's explore the created ASE.

In the IP addresses blade, we can see that the inbound IP address and the outbound IP addresses are defined and virtual network and subnet association are visible (see Figure 10-9).



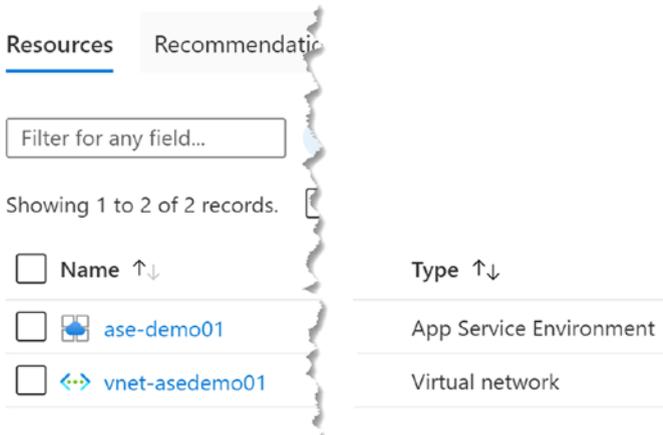
**Figure 10-9.** ASE IP addresses

If we check the Apps or App Service plans blades, we will see that no apps or plans have been added yet. The same information is shown in the overview page of the ASE (see Figure 10-10).

Subdomain Name : ase-demo01.p.azurewebsites.net  
Virtual Network : [vnet-asedemo01](#)  
Subnet : [snet-asedemo01](#)  
App Service plans : 0  
App(s) / Slots : 0 / 0  
Zone redundant : Disabled

**Figure 10-10.** ASE overview

If we have a look at the resource group where we have set up the ASE, we can see that the ASE and the virtual network are available as resources (see Figure 10-11).

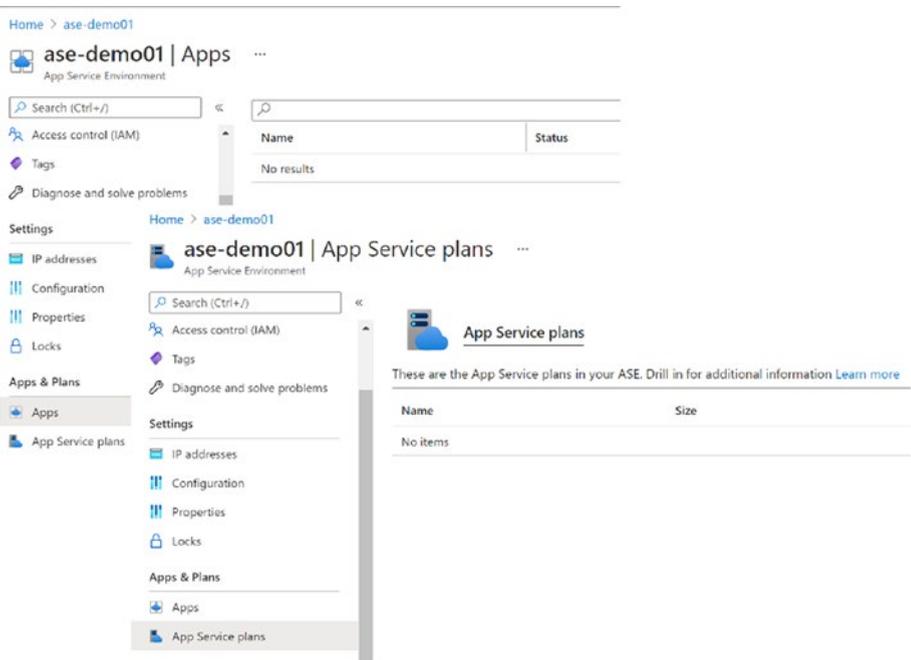


**Figure 10-11.** Resources

We have discussed the steps in setting up an ASE in this lesson.

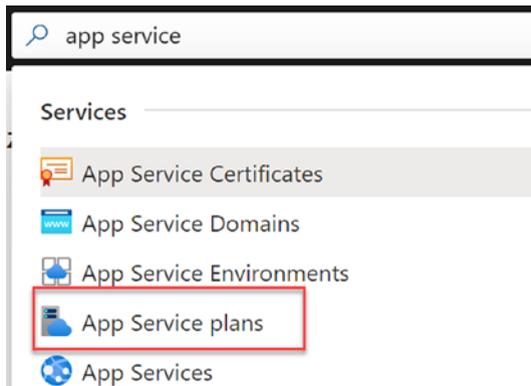
## Lesson 10.2: Creating Apps in App Service Environment

In the previous lesson we have created an ASE. The next step is to understand how we can deploy app service plans and apps to the ASE. If you explore the apps or app service plan blades on ASE, you will not see a way to add your apps or plans to ASE from those blades (see Figure 10-12).



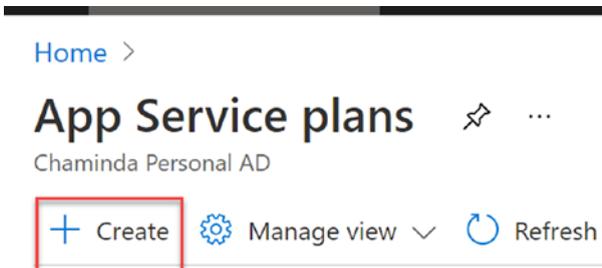
**Figure 10-12.** App service plans and apps in ASE

Let's get started with creating an app service plan in the ASE to understand the steps. Search for an app service plan and click on app service plans in the Azure portal (see Figure 10-13).



**Figure 10-13.** Searching app service plans

Click create to get started with app service plan creation (see Figure 10-14).



**Figure 10-14.** Creating app service plan

In the app service plan create window, instead of selecting the general Azure region, you need to select your ASE as the region. The resource group can be the same resource group your ASE is created in, or it can be a different resource group within the subscription of your ASE (see Figure 10-15).

## Create App Service Plan ...

**Basics** Tags Review + create

App Service plans give you the flexibility to allocate specific apps to a given set of Azure resource utilization. This way, if you want to save money on your testing multiple apps. [Learn more](#)

### Project Details

Select a subscription to manage deployed resources and costs. Use resource groups to organize and manage all your resources.

Subscription \* ⓘ

Microsoft Azure Sponsorship



Resource Group \* ⓘ

rg-asedemo01

[Create new](#)

### App Service Plan details

Name \*

plan-demoplan01

Operating System \*

Linux  Windows

Region \*

ase-demo01 (East US 2)

### Pricing Tier

App Service plan pricing tier determines the location, features, cost and compute resources for your app. [Learn more](#)

Sku and size \*

**Isolated V2 I1V2**

195 minimum ACU/vCPU, 8 GB memory

[Change size](#)

[Review + create](#)

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Next : Tags >

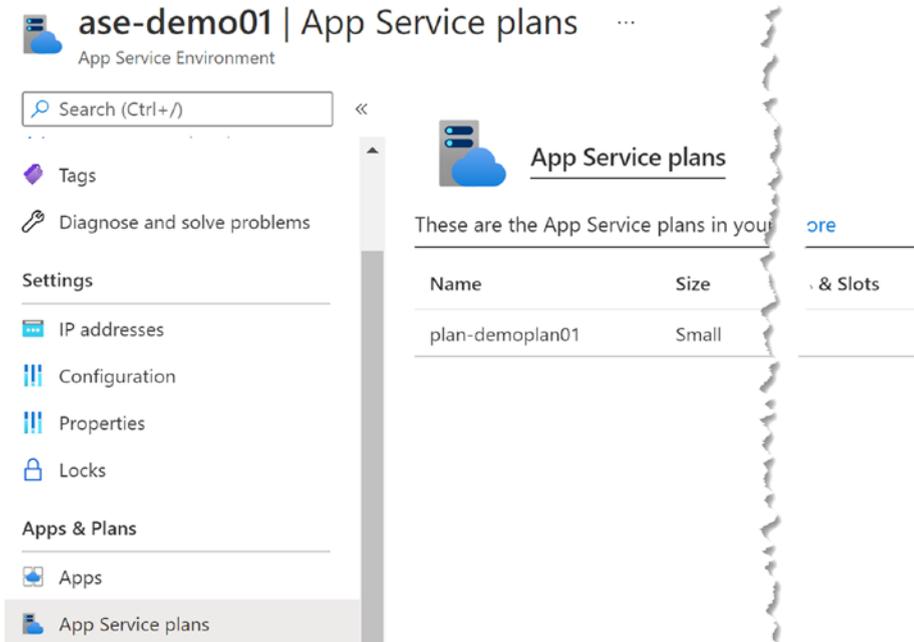
**Figure 10-15.** Planning in ASE

Click on change size in the app service plan create window (see Figure 10-15), and you will be able to see you are only allowed to select the pricing options in Isolated plans, because ASE is an isolated environment (see Figure 10-16).



**Figure 10-16.** ASE plan sizes

Proceed with your review and create the plan. You will be able to see the plan appear in your ASE (see Figure 10-17).



**Figure 10-17.** App service plan in ASE

Now let's see how we can create an app in ASE. You can even create the app in a different resource group from ASE resource group within the subscription. Similar to the app service plan, you need to select the region as ASE in the new app. Once you select ASE as the region you can utilize the previously created app service plan in ASE, or create a new plan with a different isolated size if necessary (see Figure 10-18).

## Create Web App ...

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* ⓘ  ▼

Resource Group \* ⓘ  ▼

[Create new](#)

### Instance Details

Need a database? [Try the new Web + Database experience.](#) ↗

Name \*  ✓ .ase-demo01.p.azurewebsites.net

Publish \*  Code  Docker Container

Runtime stack \*  ▼

Operating System \*  Linux  Windows

Region \*  ▼

**i** Not finding your App Service Plan? Try a different region.

### App Service Plan

App Service plan pricing tier determines the location, features, cost and compute resources associated with your app. [Learn more](#) ↗

Linux Plan (ase-demo01) \* ⓘ  ▼

[Create new](#)

Skus and size \* **Isolated V2 I1V2**  
195 minimum ACU/vCPU, 8 GB memory

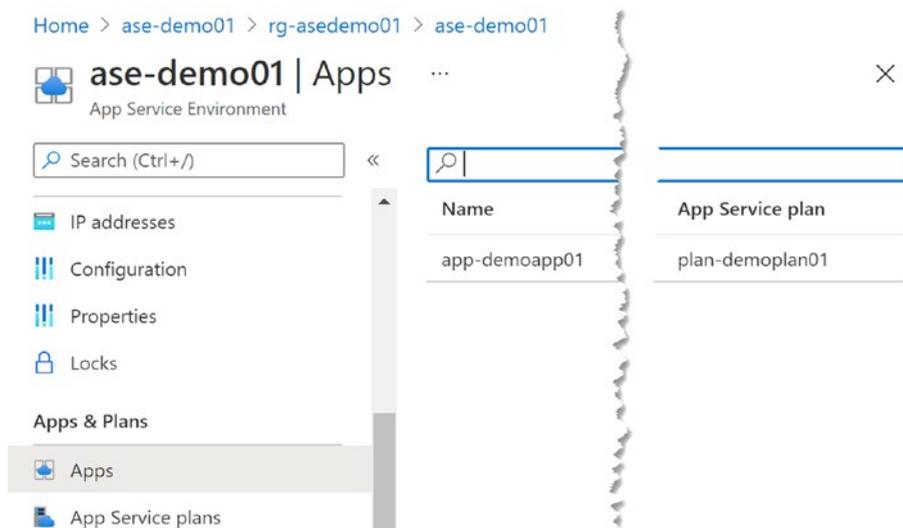
[Review + create](#)

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**Figure 10-18.** *Creating web app in ASE*

Once the app is created, you can see that it is available in the ASE (see [Figure 10-19](#)).



**Figure 10-19.** App in ASE

We have explored the steps to add an app service plan and web app to ASE. You can even add a function app using similar steps to the app service environment. In a function app create page, you can select the ASE as the region (see Figure 10-20).

Home > ase-demo01 > rg-asedemo01 > Create a resource > Function

## Create Function App ...

**Basics**   Hosting   Monitoring   Tags   Review + create

Create a function app, which lets you group functions as a logical unit for ease of resources. Functions lets you execute your code in a serverless environment and publish a web application.

### Project Details

Select a subscription to manage deployed resources and costs. Use resource groups to manage all your resources.

Subscription \* ⓘ

Microsoft Azure Sponsorship

Resource Group \* ⓘ

rg-asedemo01

[Create new](#)

### Instance Details

Function App name \*

func-demo001

Publish \*

Code    Docker Container

Runtime stack \*

.NET

Version \*

3.1

Region \*

ase-demo01 (East US 2)

**Review + create**

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**Figure 10-20.** Creating function app in ASE

In the hosting tab you can select the existing app service plan that is in the ASE, or create a new plan with isolated pricing (see Figure 10-21).

Home > ase-demo01 > rg-asedemo01 > Create a resource > Function App >

## Create Function App

Basics **Hosting** Monitoring Tags Review + create

### Storage

When creating a function app, you must create or link to a general-purpose Azure Storage account for blobs, Queue, and Table storage.

Storage account \*    
[Create new](#)

### Operating system

The Operating System has been recommended for you based on your selection of runtime stack.

Operating System \*  Linux  Windows

### Plan

The plan you choose dictates how your app scales, what features are enabled, and how it is billed.

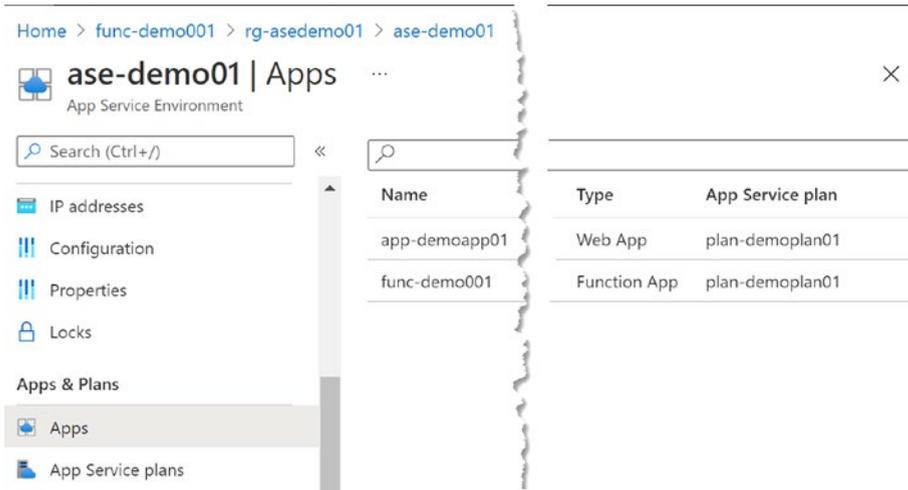
Plan type \* ⓘ    
 ⓘ Not finding your plan? Try a different region or check the docs tab.

Linux Plan (ase-demo01) \* ⓘ    
[Create new](#)

Sku and size \*    
 195 minimum ACU/vCPU, 8 GB memory

**Figure 10-21.** Function app hosting in ASE

The created function app is also available in the Apps list of the ASE (see Figure 10-22).



**Figure 10-22.** Apps in ASE

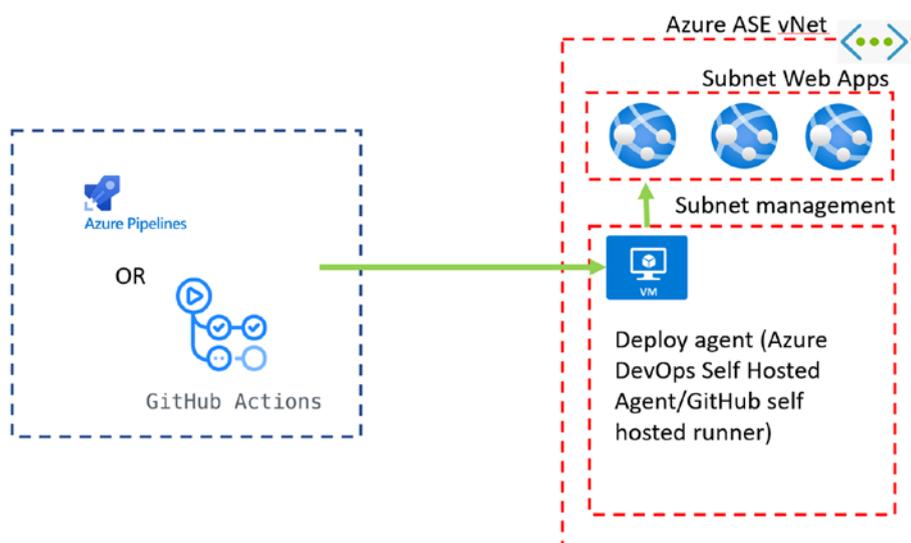
In this lesson, we have explored how to create apps in the app service environment.

## Lesson 10.3: Deploying Apps in App Service Environment

In the previous lesson we have created apps in an ASE. Because an ASE is an isolated environment deploying applications, how we should be deploying applications to the app service environment is something worth exploring. In this lesson let's try to understand the steps in deploying a web app to an app hosted in ASE.

You are allowed to deploy to an app in ASE only within the virtual network of the ASE. Therefore, it is mandatory that your deployment

pipeline actions are getting executed within the virtual network of ASE. In order to achieve this requirement, you need to deploy a self-hosted deployment agent to your ASE virtual network. You can set up a virtual machine in a subnet of the virtual network of the ASE. Then that virtual machine can be deployed with, for example, Azure DevOps hosted agent if you are using Azure DevOps to create your deployment pipelines. If it is GitHub, you can set up a self-hosted GitHub action runner in the virtual machine (see Figure 10-23).



**Figure 10-23.** Application deployment for ASE apps

You need to allow the self-hosted agent or runner machine to have access to Azure DevOps or GitHub in order to obtain the packages to deploy and instructions to deploy based on the pipeline setup for deployment. The virtual machine in the same virtual network of the ASE will be able to reach the deployment URLs of the web apps to deploy the packages supplied by the deployment pipeline.

As you can see from the level of isolation required even for deploying to Apps in ASE, it is pretty much secure. Unlike public web apps, the web apps in ASE will be fully secured in isolation inside a virtual network by default. If a VPN is made from the ASE virtual network to your corporate network, the web apps in ASE will only be available within your corporate network boundary. For this setup ideally you should deploy the ASE with only an internal IP load balancer, as opposed to what we have done in lesson 2 of this chapter.

Even when you want to expose the web app in ASE publicly, it is recommended that you deploy load balancer with only internal IP and then add an application gateway web application firewall (WAF) to protect and expose it to the public with an additional layer of security.

In this lesson we have discussed the deployment consideration in web apps in an ASE.

## Summary

In this chapter we have discussed the fully isolated app service environment deployment option in Azure to deploy web and function apps. We also explored how to set up ASE and set up apps inside ASE. The deployment considerations were described to give you an idea of the secure nature of the ASE-based web apps.

In this book, we have explored the security aspect in Azure PaaS services with all the basic details required to get started. The service security aspects, limitations, and enhancing options to ensure your application and data surety is described throughout this book.