Week 3

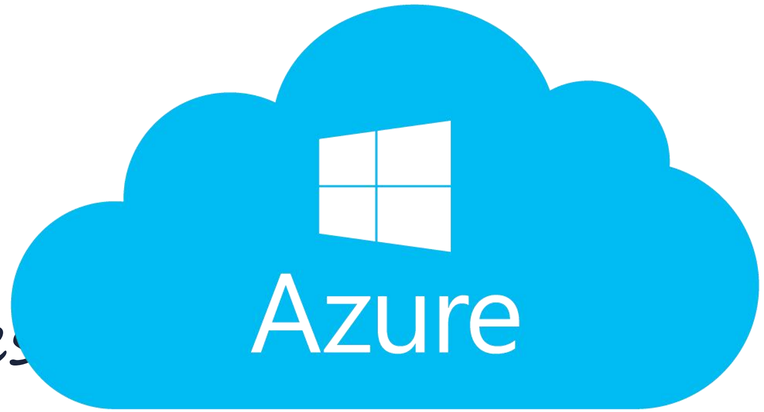
What is Azure

Introduction

- other companies be successful with the cloud, and fortune 90% companies run their business on Microsoft power
- Cloud power your everyday life, and it's often present in ways you don't even realize

- You will learn :
  - Learn what Microsoft Azure is and how it relates to cloud computing
  - Deploy and configure a web server
  - Learn how to scale up your server to give you more compute power
  - Use Azure Cloud Shell to

What is Azure



- Microsoft's cloud computing platform
- continually expanding set of cloud services
- continually expanding set of cloud services
- freedom to build, manage, and deploy applications

How does Azure work?

What is cloud computing

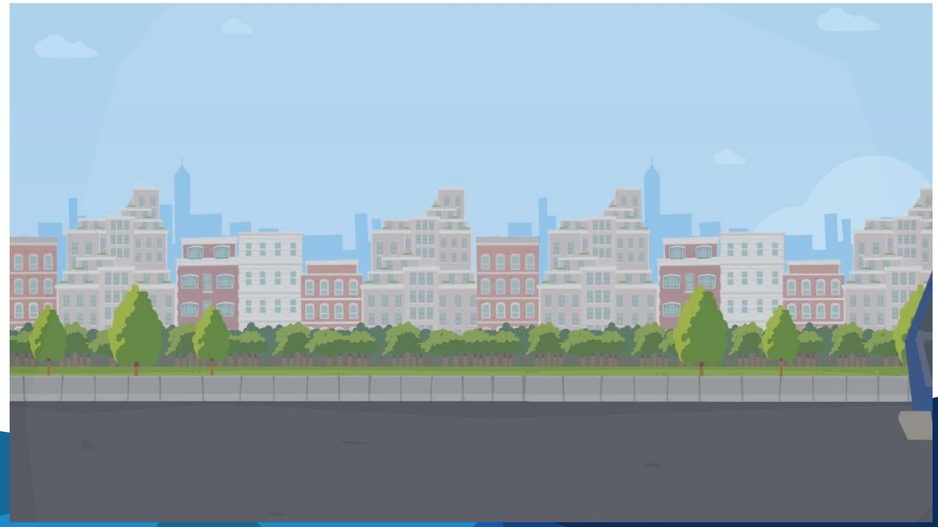
- delivery of computing services over the Internet using a pay-as-you-go pricing model
- rent them for the time that you need them
- takes care of maintaining the underlying infrastructure for you
- enables you to quickly solve your toughest business challenges and bring cutting edge solutions

Why should move to cloud?

- helps you move faster and innovate
- In our ever-changing digital world, two trends emerge:
  - Teams are delivering new features to their users at record speeds
  - End users expect an increasingly rich and immersive experience
- Releases are now often scheduled in terms of days or weeks.

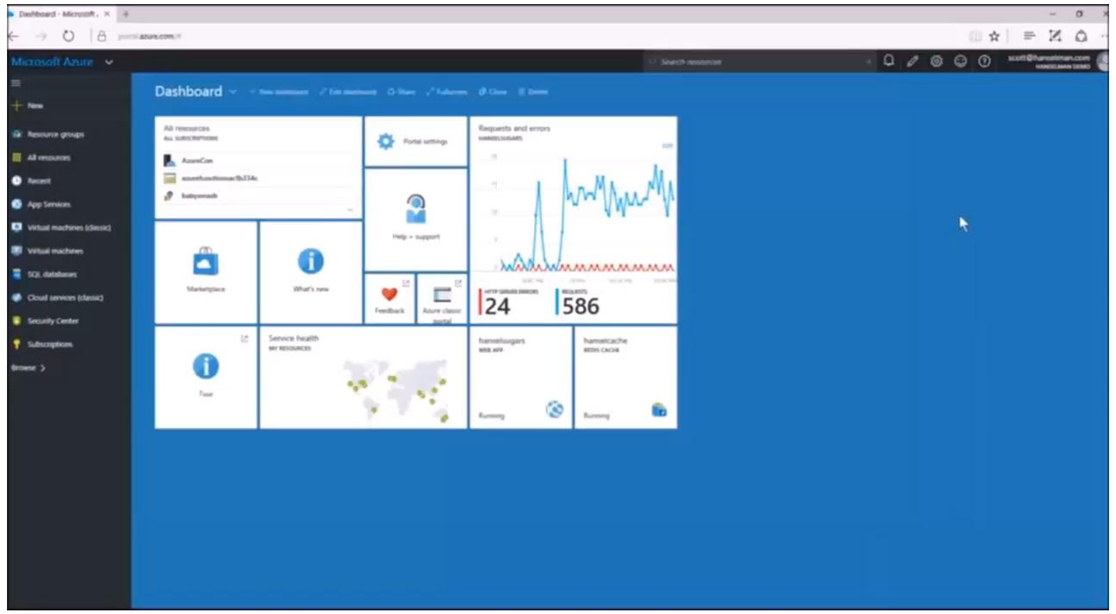
Why should move to cloud?

- The cloud provides on-demand access to:
  - A nearly limitless pool of raw compute, storage, and networking components.
  - Speech recognition and other cognitive services that help make your application stand out from the crowd.
  - Analytics services that enable you to make sense of telemetry data coming back from your software and devices.

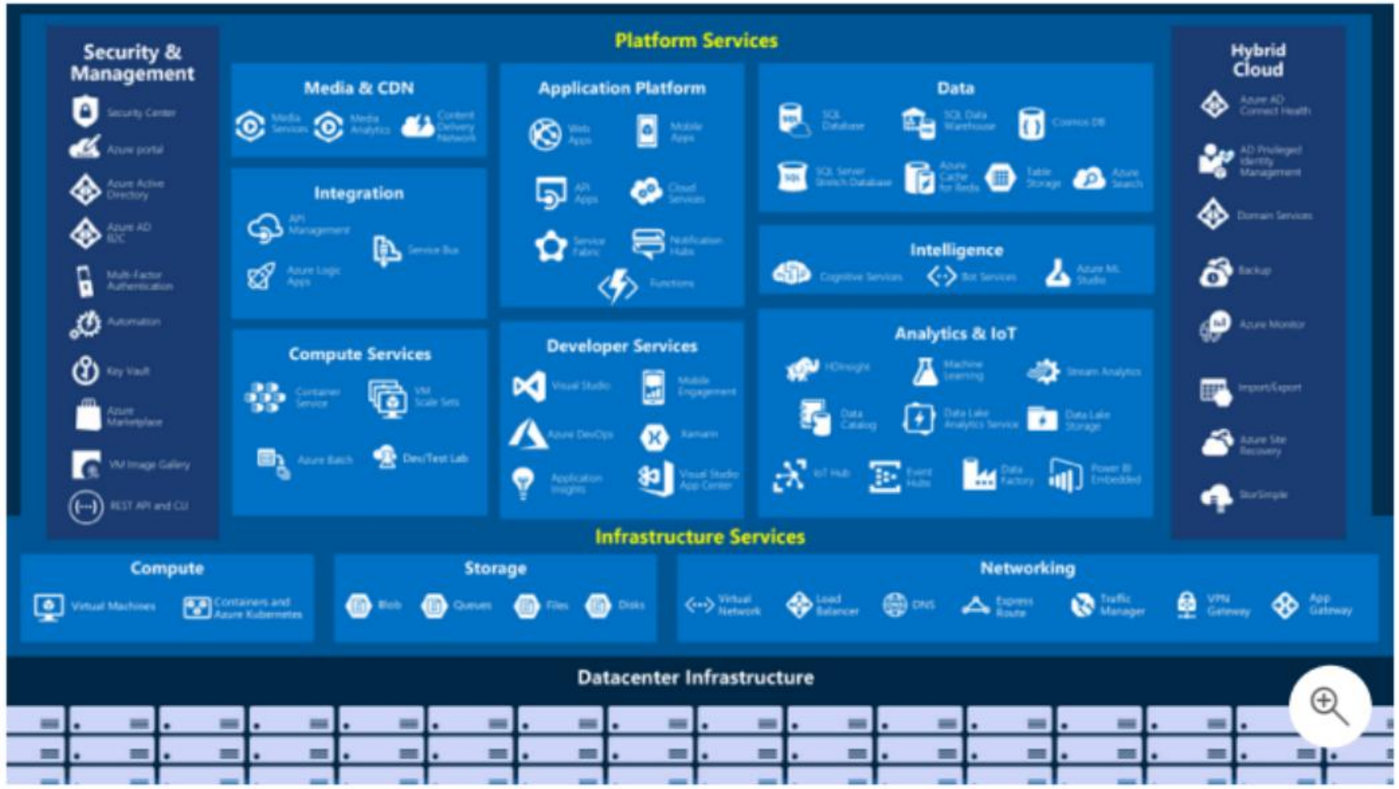


What can do on Azure

- Azure provides 100 services
- do everything from running your existing applications on virtual machines to exploring new software paradigms
- more than just "a different place to run your virtual machines".



Tour of Azure Services



- Most common services
  - Compute
  - Networking
  - Storage
  - Mobile
  - Databases
  - Web
  - Internet of Things
  - Big Data
  - Artificial Intelligence
  - DevOps

Compute

- often one of the primary reason
- provides a range of options for hosting applications and services

Service name	Service function
Azure Virtual Machines	Windows or Linux virtual machines (VMs) hosted in Azure
Azure Virtual Machine Scale Sets	Scaling for Windows or Linux VMs hosted in Azure
Azure Kubernetes Service	Enables management of a cluster of VMs that run containerized services
Azure Service Fabric	Distributed systems platform. Runs in Azure or on-premises
Azure Batch	Managed service for parallel and high-performance computing applications
Azure Container Instances	Run containerized apps on Azure without provisioning servers or VMs
Azure Functions	An event-driven, serverless compute service

Networking

Service name	Service function
Azure Virtual Network	Connects VMs to incoming Virtual Private Network (VPN) connections
Azure Load Balancer	Balances inbound and outbound connections to applications or service endpoints
Azure Application Gateway	Optimizes app server farm delivery while increasing application security
Azure VPN Gateway	Accesses Azure Virtual Networks through high-performance VPN gateways
Azure DNS	Provides ultra-fast DNS responses and ultra-high domain availability
Azure Content Delivery Network	Delivers high-bandwidth content to customers globally
Azure DDoS Protection	Protects Azure-hosted applications from distributed denial of service (DDOS) attacks
Azure Traffic Manager	Distributes network traffic across Azure regions worldwide
Azure ExpressRoute	Connects to Azure over high-bandwidth dedicated secure connections
Azure Network Watcher	Monitors and diagnoses network issues using scenario-based analysis
Azure Firewall	Implements high-security, high-availability firewall with unlimited scalability
Azure Virtual WAN	Creates a unified wide area network (WAN), connecting local and remote sites

Storage

Service name	Service function
Azure Blob storage	Storage service for very large objects, such as video files or bitmaps
Azure File storage	File shares that you can access and manage like a file server
Azure Queue storage	A data store for queuing and reliably delivering messages between applications
Azure Table storage	A NoSQL store that hosts unstructured data independent of any schema

- Share common characteristics:
  - Durable
  - Secure
  - Scalable
  - Managed
  - Accessible

Mobile

- create mobile apps backend services quickly and easily.
- E.g. adding corporate sign-in and then connecting to on-premises resources such as SAP, Oracle, SQL Server
- Other features of this service :
  - Offline data synchronization.
  - Connectivity to on-premises data.
  - Broadcasting push notifications.
  - Autoscaling to match business needs.

Database

- provides multiple database services to store a wide variety of data types and make it available to users instantly

Service name	Service function
Azure Cosmos DB	Globally distributed database that supports NoSQL options
Azure SQL Database	Fully managed relational database with auto-scale, integral intelligence, and robust security
Azure Database for MySQL	Fully managed and scalable MySQL relational database with high availability and security
Azure Database for PostgreSQL	Fully managed and scalable PostgreSQL relational database with high availability and security
SQL Server on VMs	Host enterprise SQL Server apps in the cloud
Azure Synapse Analytics	Fully managed data warehouse with integral security at every level of scale at no extra cost
Azure Database Migration Service	Migrates your databases to the cloud with no application code changes
Azure Cache for Redis	Caches frequently used and static data to reduce data and application latency
Azure Database for MariaDB	Fully managed and scalable MariaDB relational database with high availability and security

Web

Service Name	Description
Azure App Service	Quickly create powerful cloud web-based apps
Azure Notification Hubs	Send push notifications to any platform from any back end.
Azure API Management	Publish APIs to developers, partners, and employees securely and at scale.
Azure Cognitive Search	Fully managed search as a service.
Web Apps feature of Azure App Service	Create and deploy mission-critical web apps at scale.
Azure SignalR Service	Add real-time web functionalities easily.

- includes first-class support to build and host web apps and HTTP-based web services
- focus on web hosting

Internet of Things (IoT)

- able to access more information than ever before
- allows any item that's online- capable to access valuable information

Service Name	Description
IoT Central	Fully-managed global IoT software as a service (SaaS) solution that makes it easy to connect, monitor, and manage your IoT assets at scale
Azure IoT Hub	Messaging hub that provides secure communications between and monitoring of millions of IoT devices
IoT Edge	Push your data analysis models directly onto your IoT devices, allowing them to react quickly to state changes without needing to consult cloud-based AI

Big Data

Service Name	Description
Azure Synapse Analytics	Run analytics at a massive scale using a cloud-based Enterprise Data Warehouse (EDW) that leverages massive parallel processing (MPP) to run complex queries quickly across petabytes of data
Azure HDInsight	Process massive amounts of data with managed clusters of Hadoop clusters in the cloud
Azure Databricks	Collaborative Apache Spark–based analytics service that can be integrated with other Big Data services in Azure.

- referring to large volumes of data
- E.g. Data from weather systems, communications systems, genomic research, imaging platforms,

Artificial Intelligence (AI)

- based around a broad range of services, which is Machine Learning
- allows computers to use existing data to forecast future behaviors, outcomes, and trends
- learn without being explicitly programmed.

Service Name	Description
Azure Machine Learning Service	Cloud-based environment you can use to develop, train, test, deploy, manage, and track machine learning models. It can auto-generate a model and auto-tune it for you. It will let you start training on your local machine, and then scale out to the cloud
Azure Machine Learning Studio	Collaborative, drag-and-drop visual workspace where you can build, test, and deploy machine learning solutions using pre-built machine learning algorithms and data-handling modules

Artificial Intelligence (AI)

- closely related set of products are the cognitive services.
- pre-built APIs you can leverage in your applications. →

Service Name	Description
Vision	Image-processing algorithms to smartly identify, caption, index, and moderate your pictures and videos.
Speech	Convert spoken audio into text, use voice for verification, or add speaker recognition to your app.
Knowledge mapping	Map complex information and data in order to solve tasks such as intelligent recommendations and semantic search.
Bing Search	Add Bing Search APIs to your apps and harness the ability to comb billions of webpages, images, videos, and news with a single API call.
Natural Language processing	Allow your apps to process natural language with pre-built scripts, evaluate sentiment and learn how to recognize what users want.

Development and Operation(DevOps)

Service Name	Description
Azure DevOps	Azure DevOps Services (formerly known as Visual Studio Team Services, or VSTS), provides development collaboration tools including high-performance pipelines, free private Git repositories, configurable Kanban boards, and extensive automated and cloud-based load testing
Azure DevTest Labs	Quickly create on-demand Windows and Linux environments you can use to test or demo your applications directly from your deployment pipelines

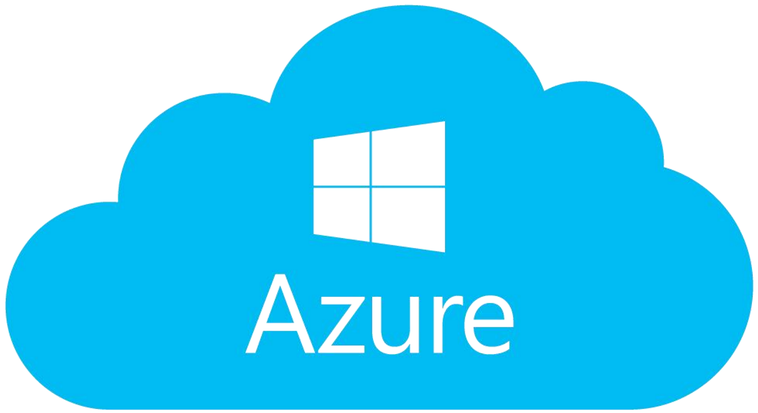
- create build and release pipelines that provide continuous integration, delivery, and deployment
- backlog items for tracking, automate infrastructure deployment and integrate a range of third-party tools and services

Exercise 1

Create a website hosted in Azure

Create a website hosted in Azure

- requires a sandbox to complete
- A sandbox gives you access to Azure resources.
- Subscription will not be charged
- Use for any other reason is prohibited, and may result in permanent loss of access to the sandbox
- Azure resources are being prioritized towards health and safety organizations
- Storage, backup, and recovery



What is an App Service

- HTTP-based service that enables you to build and host many types of web-based solutions without managing infrastructure.
- E.g. host web apps, mobile back ends, and RESTful APIs in several supported programming languages.

We aim to create a website in less than the time it takes to eat lunch. Therefore, we're not going to write any code and will instead deploy a predefined application from the Microsoft Azure Marketplace.

What is the Microsoft Azure Marketplace?

- online store that hosts applications that are certified and optimized to run in Azure.
- E.g. types of applications are available, ranging from AI + Machine Learning to Web applications.

We're going to use one of the WordPress application options from the Azure Marketplace for our website.

Creating resources in Azure

1. create a resource group to hold all the things that we need to create.
   - allows us to administer all the services, disks, network interfaces, and other elements that potentially make up our solution as a unit.
   - use the Azure portal to create and manage our solution's resource groups.

In the free Azure sandbox environment, you'll use the pre-created resource group [sandbox resource group name], and you don't need to do this step.

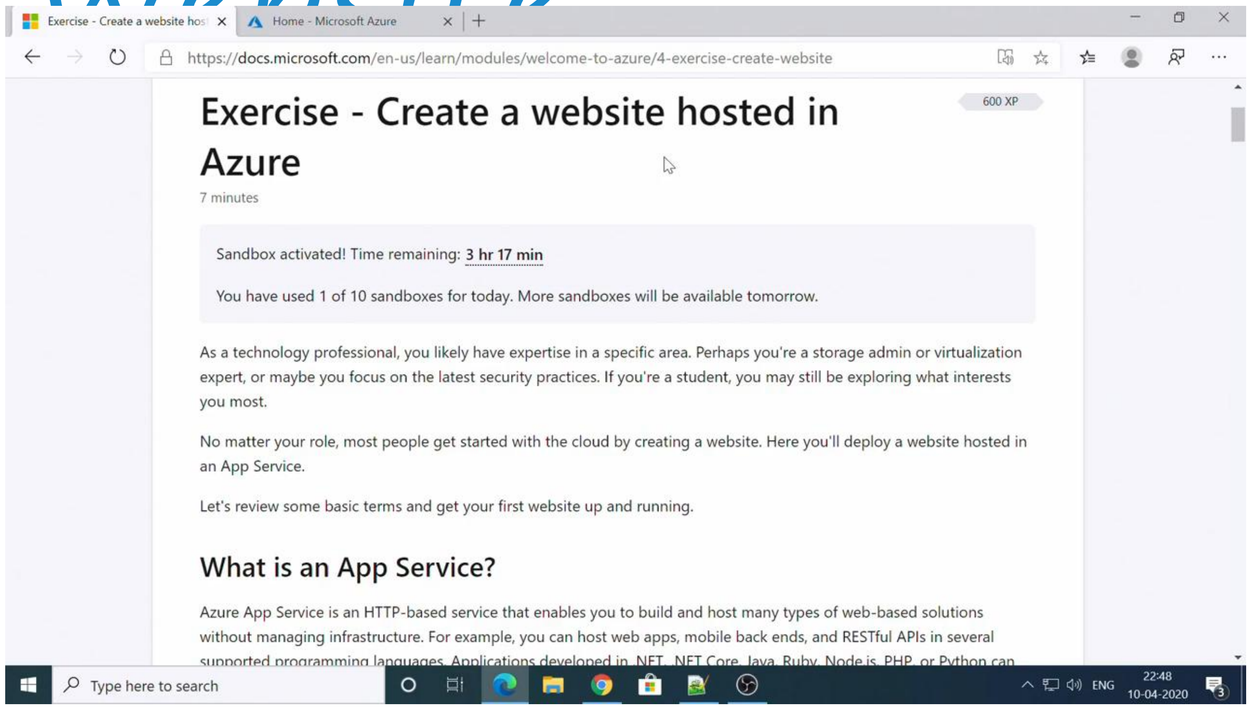
Choosing a location

- allows you to create resources in a subset of the Azure global regions.

- westus2
- southcentralus
- centralus
- eastus
- westeurope
- southeastasia
- japaneast
- brazilsouth
- australiasoutheast
- centralindia

Exercise 1

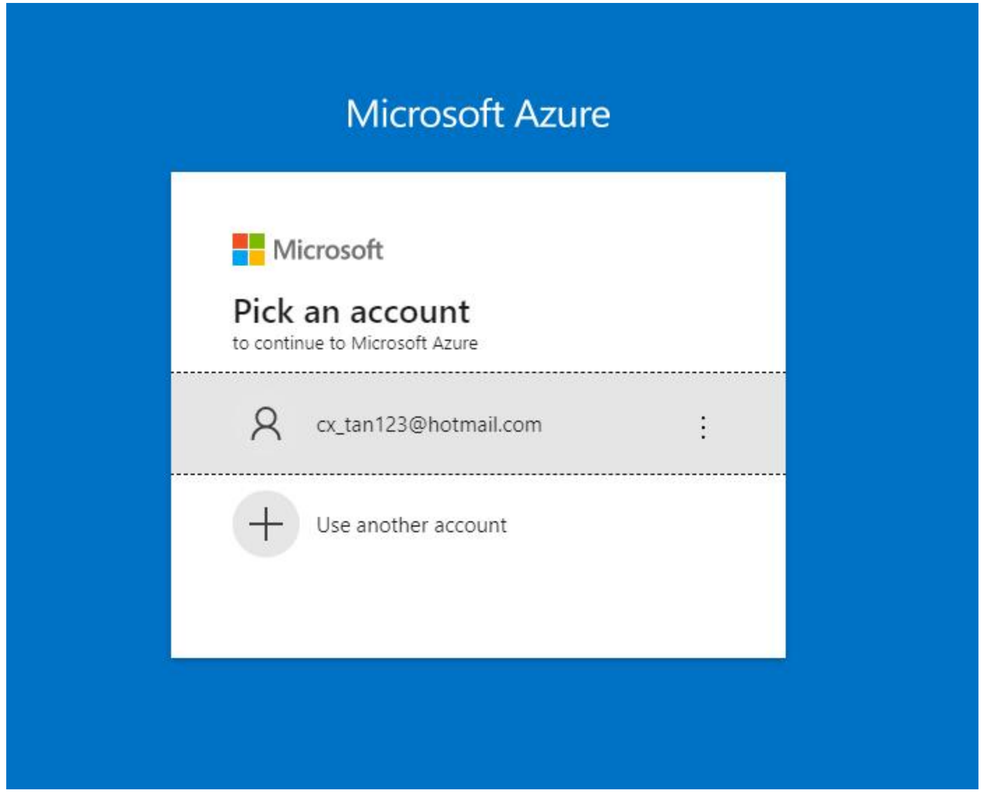
Create a WordPress Website



Exercise - Create a WordPress Website

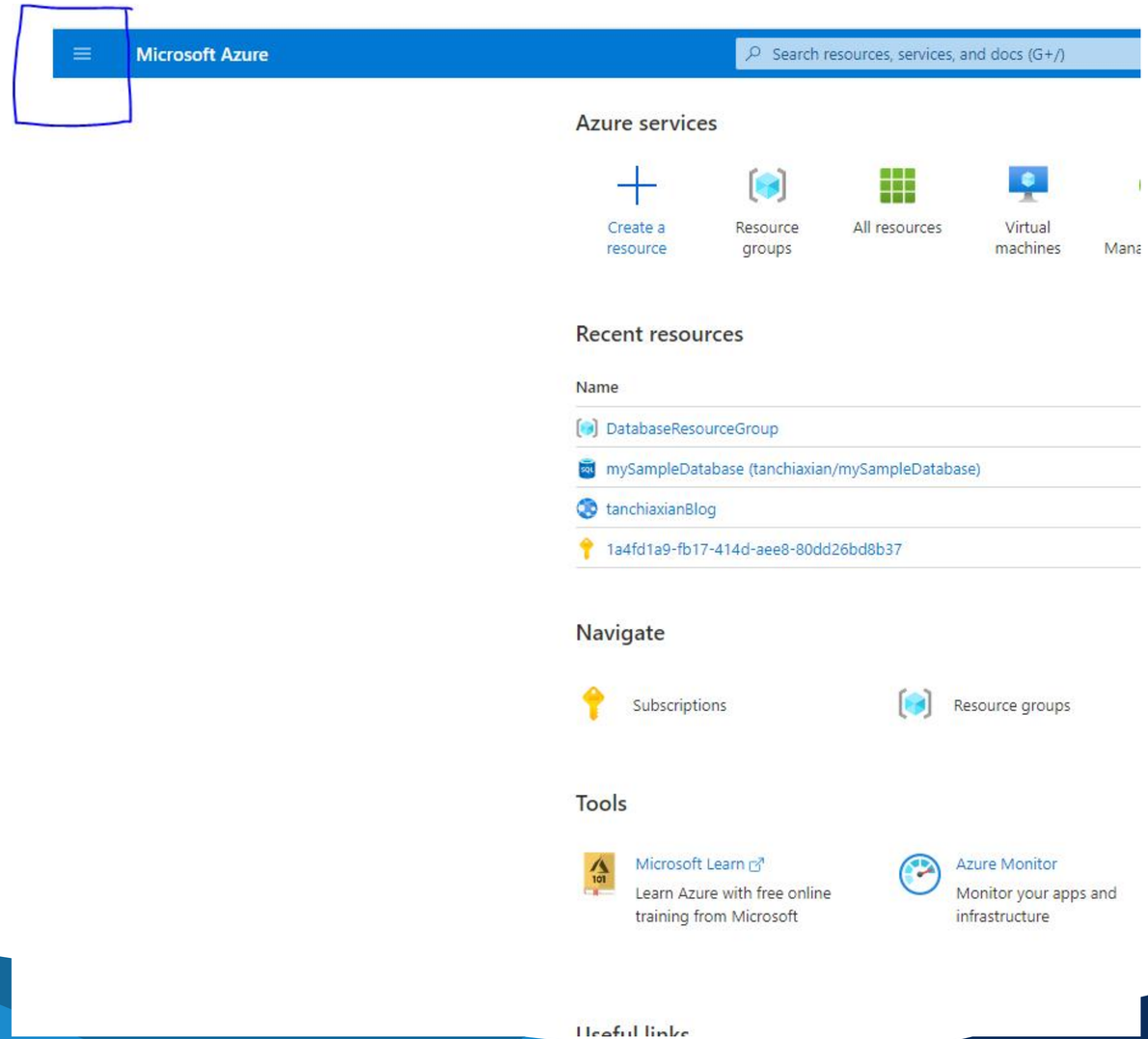
1. If you haven't already, verify that you have activated the sandbox above. Activating the sandbox will allocate the subscription and resource group you will use in this exercise. This step is required for any Microsoft Learn exercises that use a sandbox.

2. Sign in to the Azure portal using the same account you activated the sandbox with.



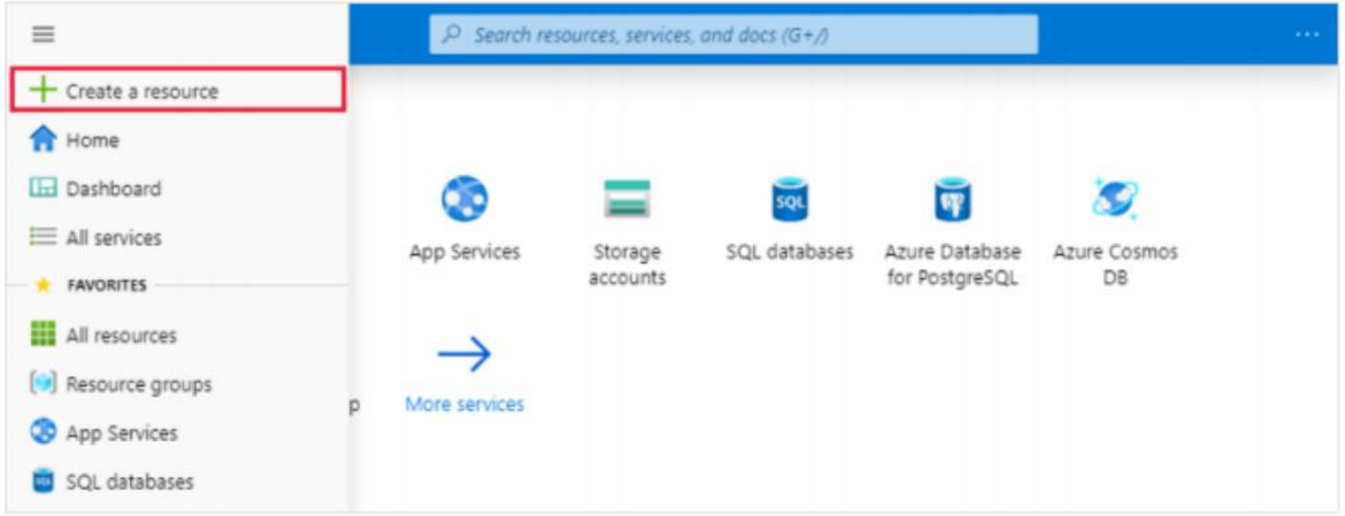
Exercise - Create a WordPress Website

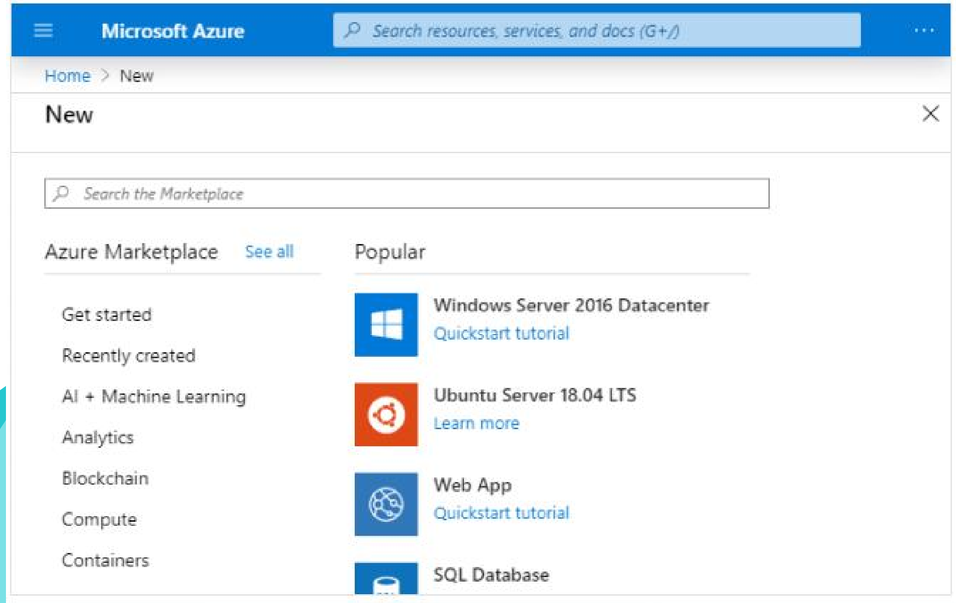
3. Expand the left-hand navigation panel.



Exercise - Create a WordPress Website

4. From the top of the Azure portal navigation list, select Create Resource

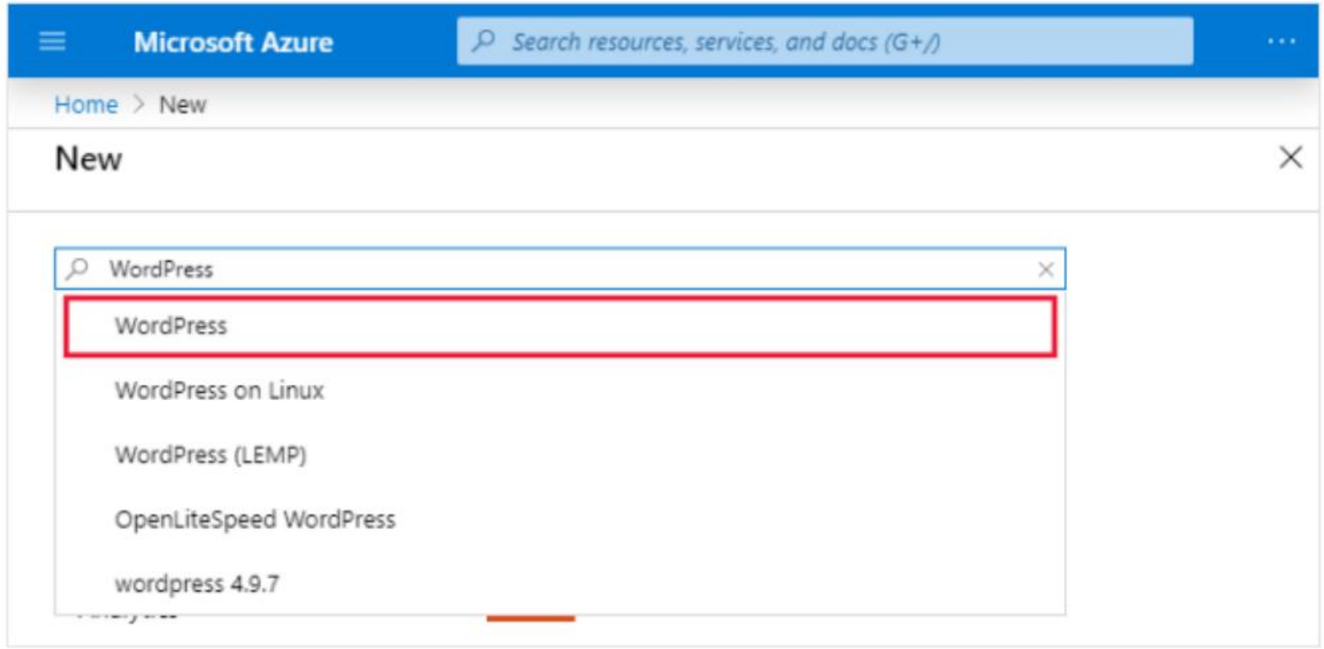




Option task will bring you to Azure Marketplace

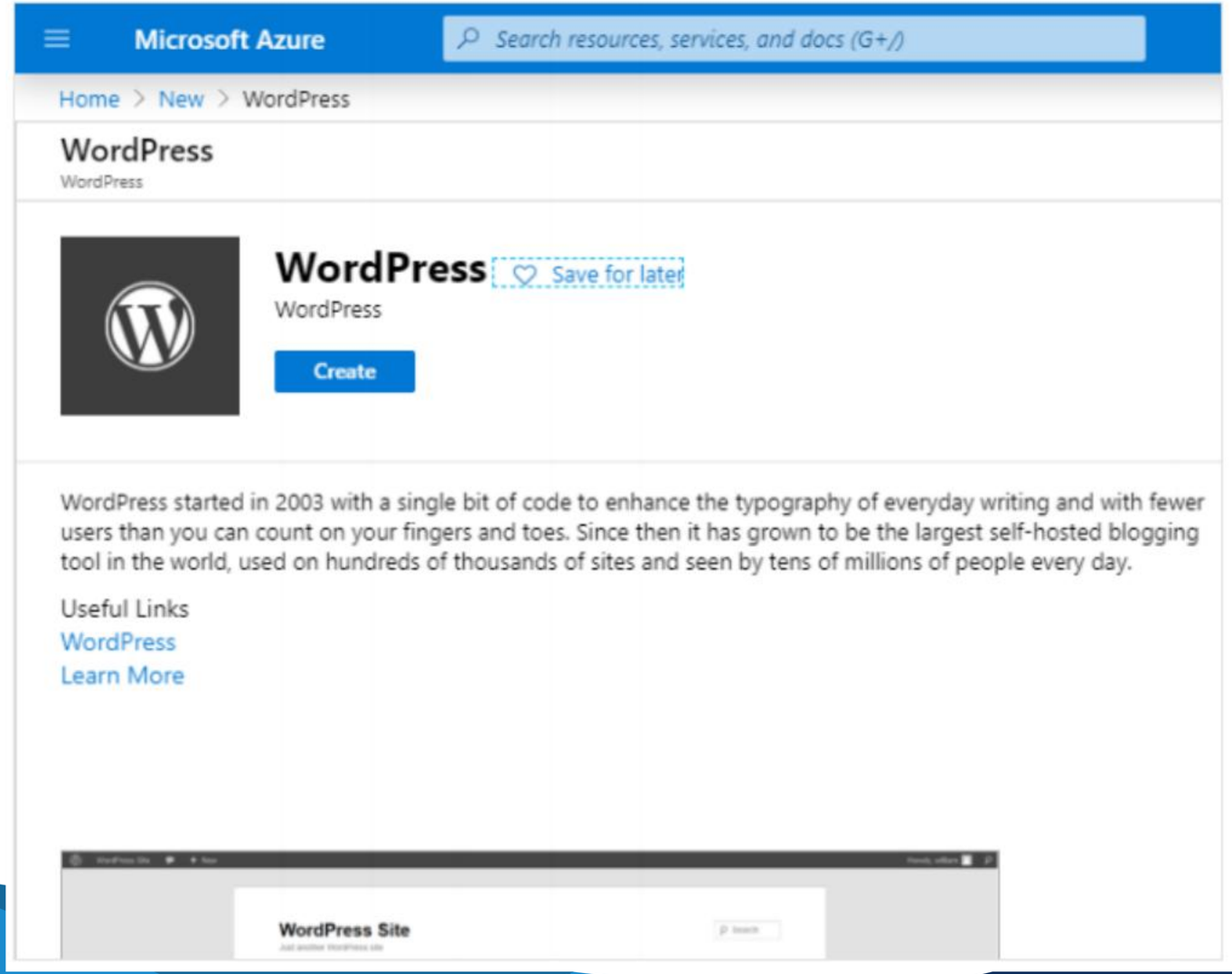
Exercise - Create a WordPress Website

5. In the Search the Marketplace box above the listed application options, type in WordPress.



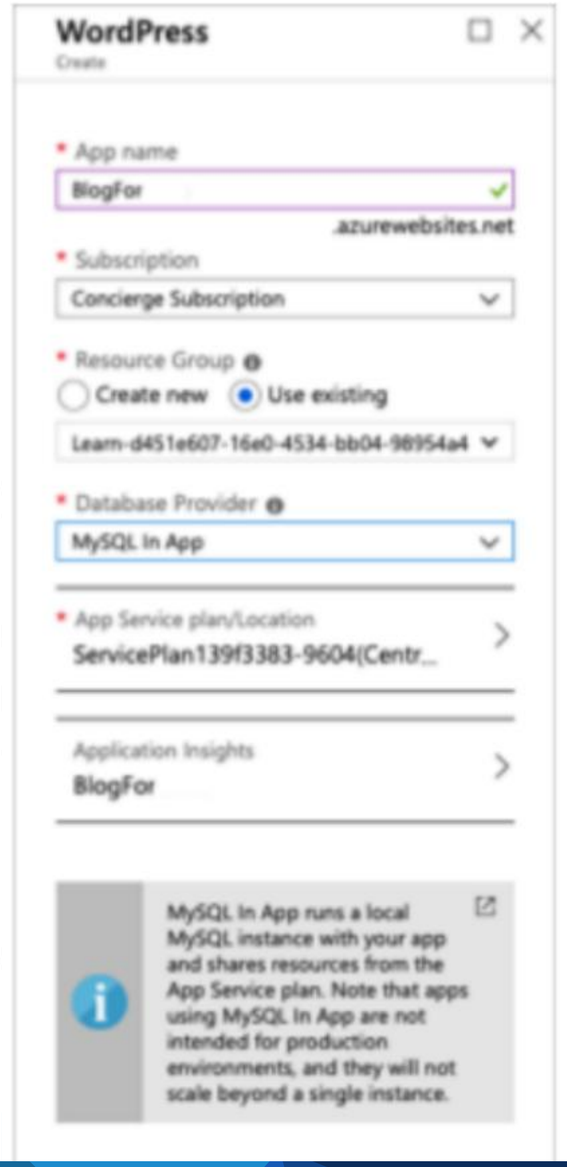
Exercise - Create a WordPress Website

6. Select **Create** to begin process to create a WordPress app.



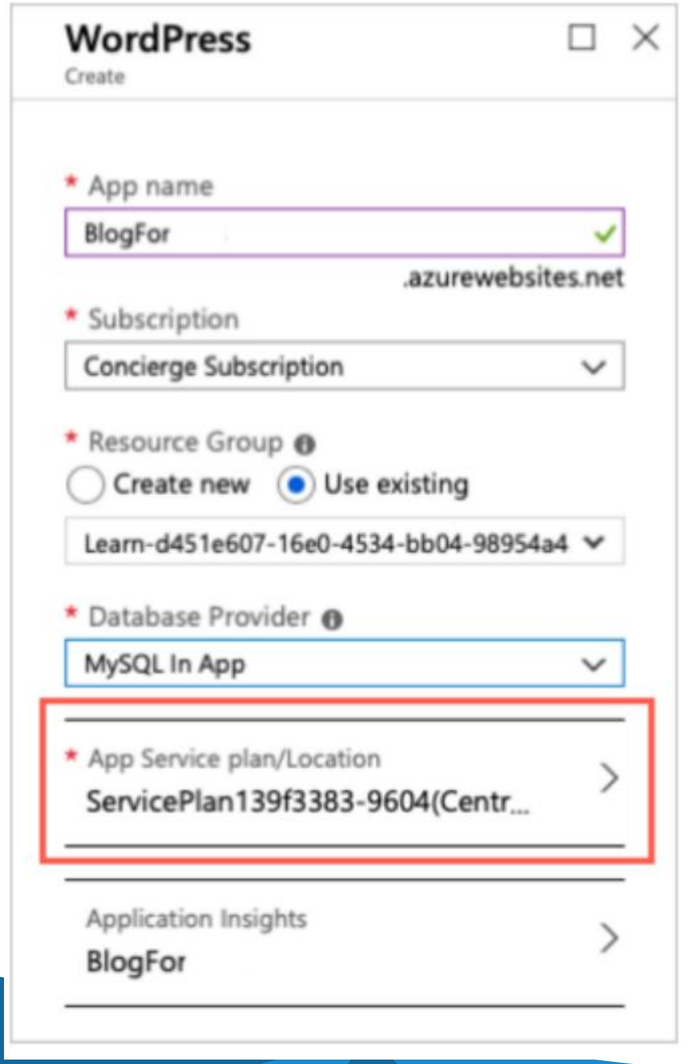
Exercise - Create a WordPress Website

1. Next, you're presented several options to configure your deployment. Enter the following information:
   - **App Name:** Choose a unique value for the App name. It
     of a Fully Qualified Domain Name (FQDN).
   - **Subscription:** Make sure the **Concierge Subscription** is s
   - **Resources Group:** Select the **Use existing** radio button,
     [sandbox resource group name] resource group from th
     list.
   - **Database Provider:** Select **MySQL in App.**
   - **App Service Plan/location:** You'll change the App Servi
     next step.
   - **Application Insights:** Leave at the default configuration



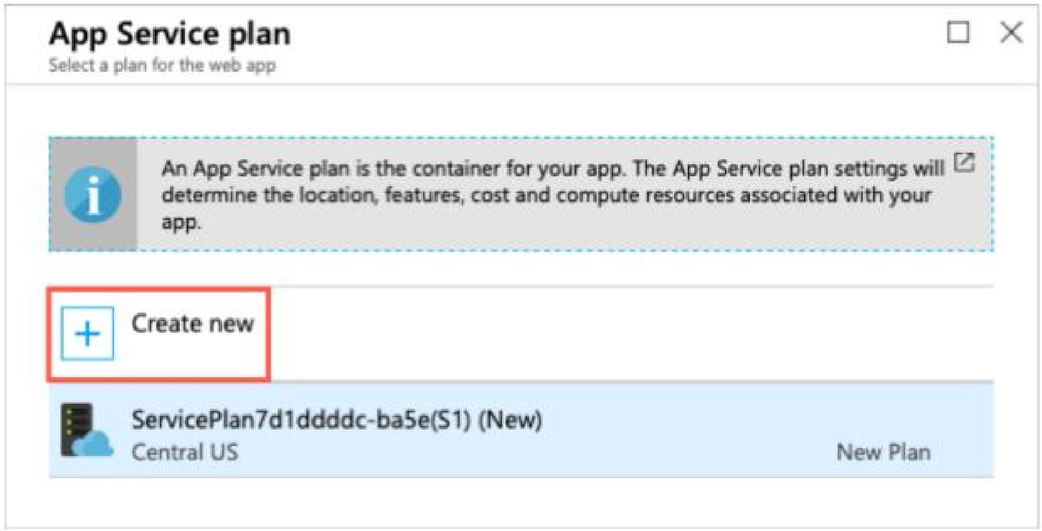
Exercise - Create a WordPress Website

8. Now let's configure the App Service plan to use a specific pricing tier. The App Service plan specifies the compute resources and location for the web app. Select App Service plan/location.



Exercise - Create a WordPress Website

9. In the **App Service plan** panel, select **Create new**.

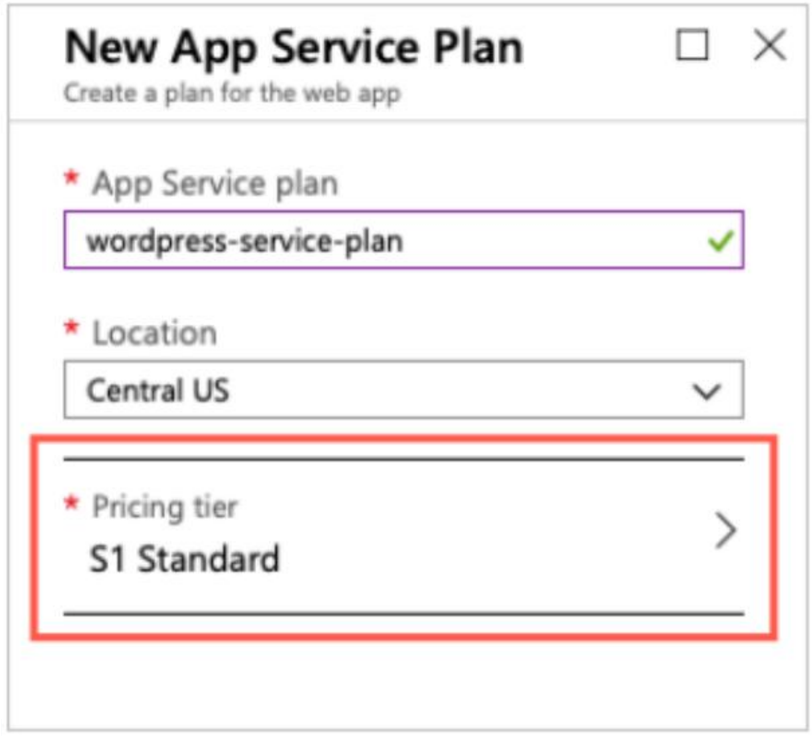


10. In the **New App Service plan** panel, enter a **name** for the new service plan.

Exercise - Create a WordPress Website

11. For **Location**, pick **Central US** to make sure we pick a region that allows the service plan you will pick. Normally, you would pick the region that is closest to your customers while offering the services you need.

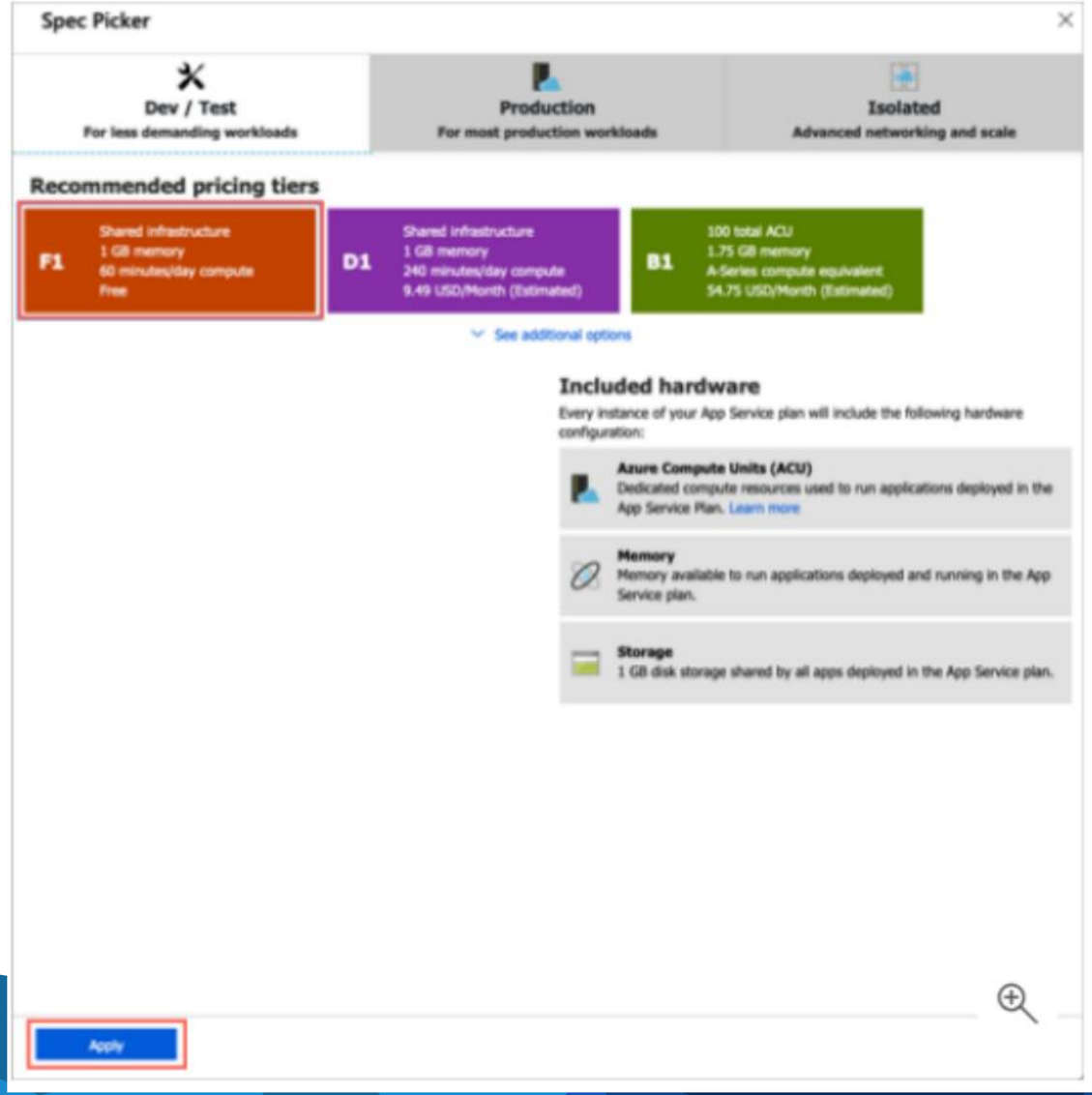
12. Select **Pricing tier** to see the performance and feature options of the various types of service plans.



Exercise - Create a WordPress Website

13. The **Spec Picker** allows us to select a new pricing tier for our application. This screen opens to the Production tab, with the S1 pricing tier selected. We'll select a new pricing tier from the Dev / Test tab for our website.

Select the **Dev / Test** tab and select the **F1** pricing tier. Then select **Apply**.



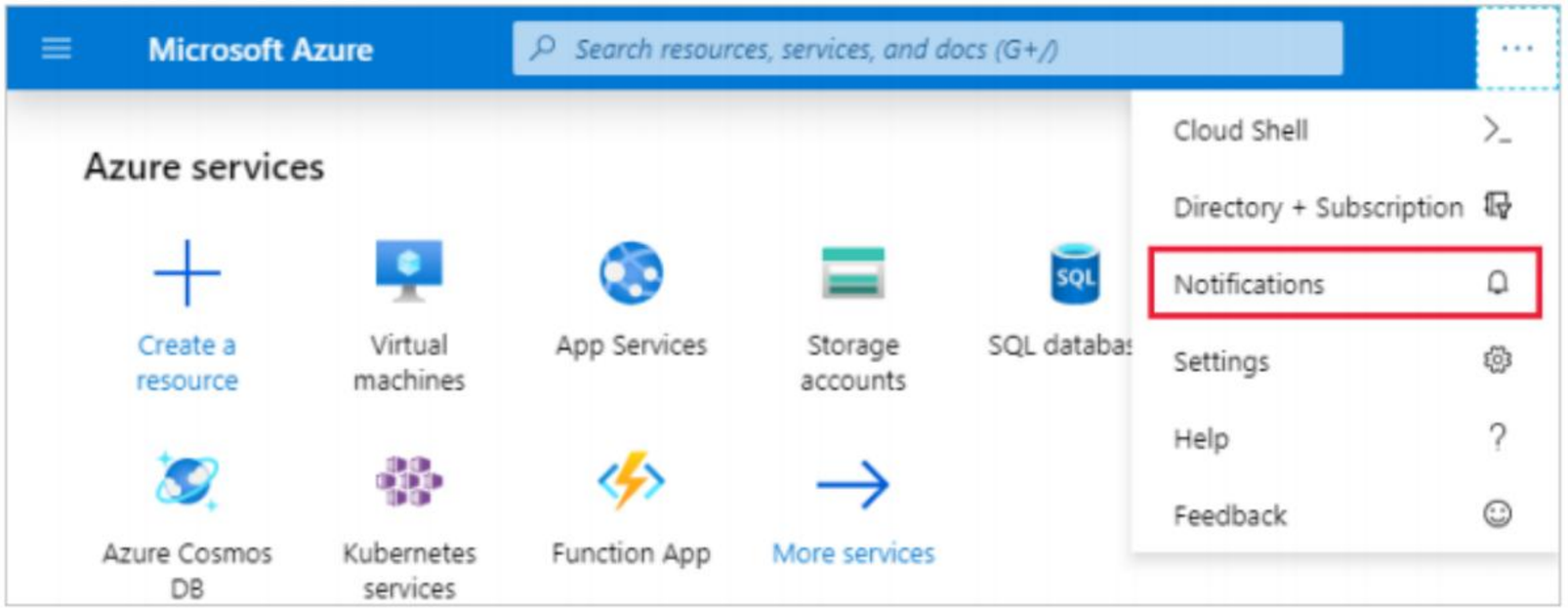
Exercise - Create a WordPress Website

14. Back on the New App Service plan panel, select OK to create the new plan and close the panel.

15. Finally, select the Create button to start the deployment of your new site.

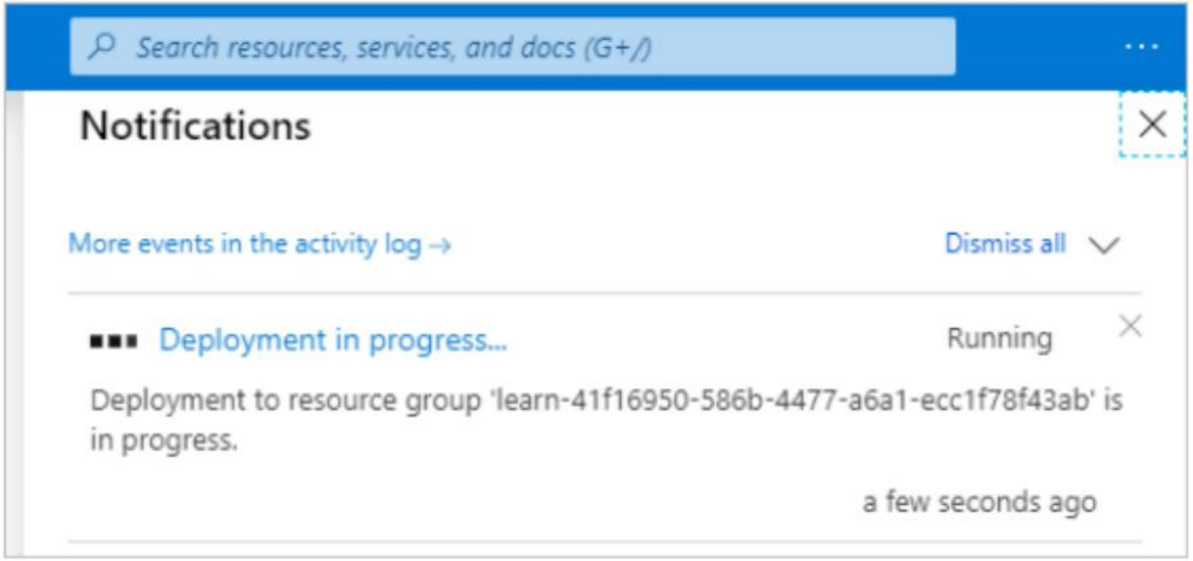
Verify your website is running

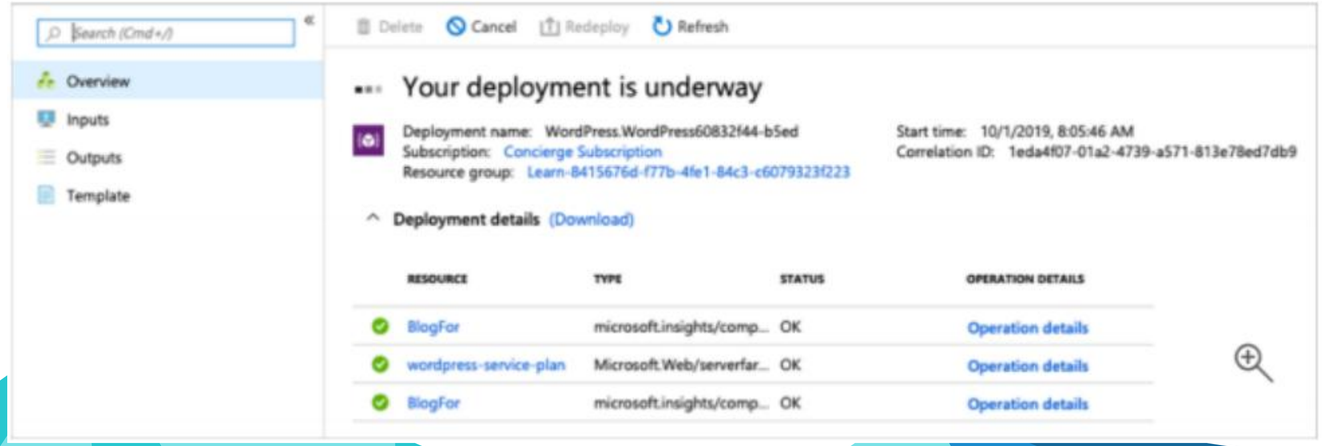
1. Select the **notification bell** icon at the top of the portal. If your browser window width is smaller, it may be shown when you click on the ellipsis (...) icon at the top right



Verify your website is running

2. Select Deployment in progress... to see the details about all the resources that are created.

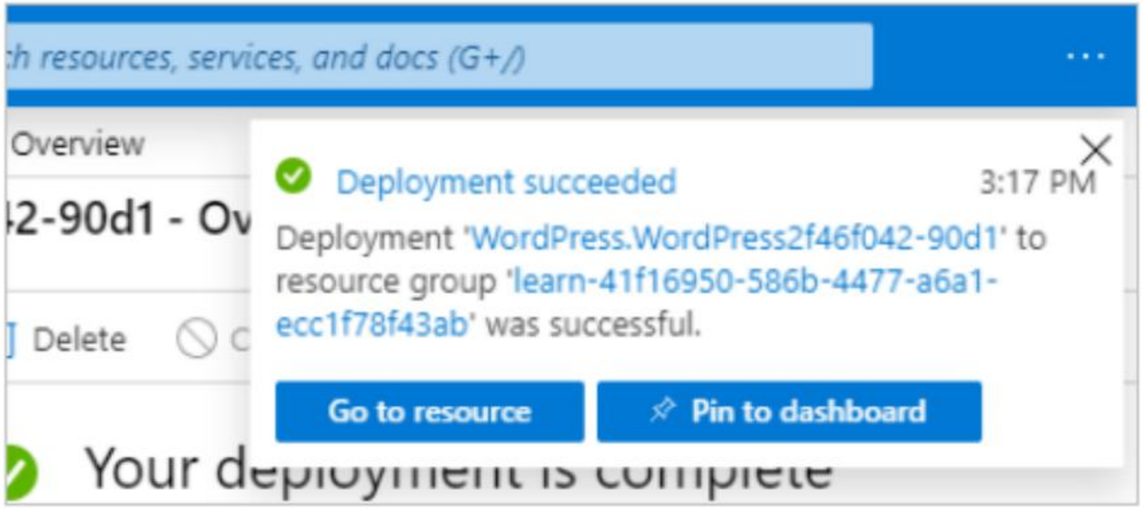




Notice how resources are listed as they're created and the status changes to a green check as each component in the deployment completes.

Verify your website is running

3. Once the deployment status message change to **Your deployment is complete**, you'll notice the status in the notification dialogue changes to **Deployment succeeded**. Select **Go to resource** to navigate to the App Service overview.



Verify your website is running

4. Find the URL in the Overview section.

Copy the **URL** information. Open a new tab in your browser and use the information to browse to your new WordPress site. You can now configure your WordPress website and add content.

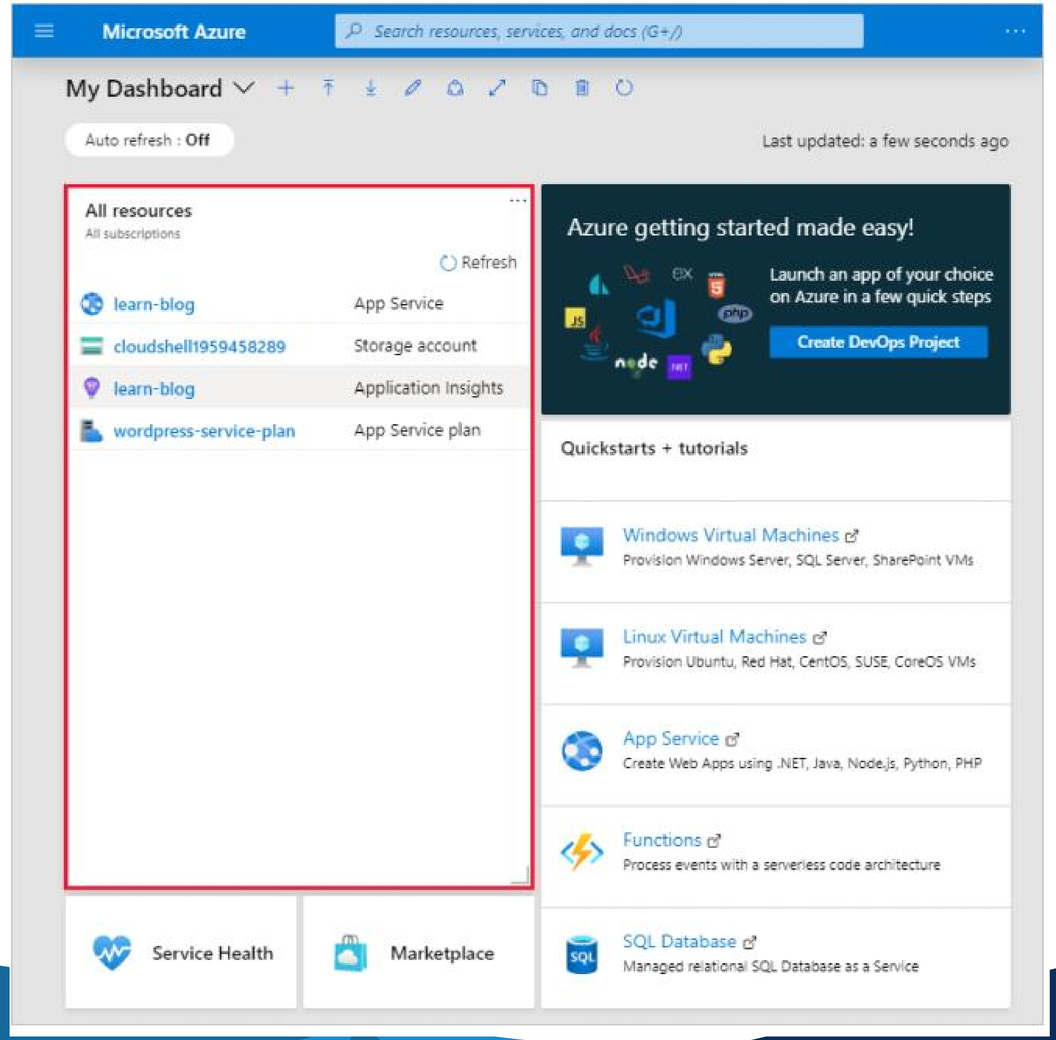
Exercise 2

Configure an App Service

Exercise 2 – Configure an App Service

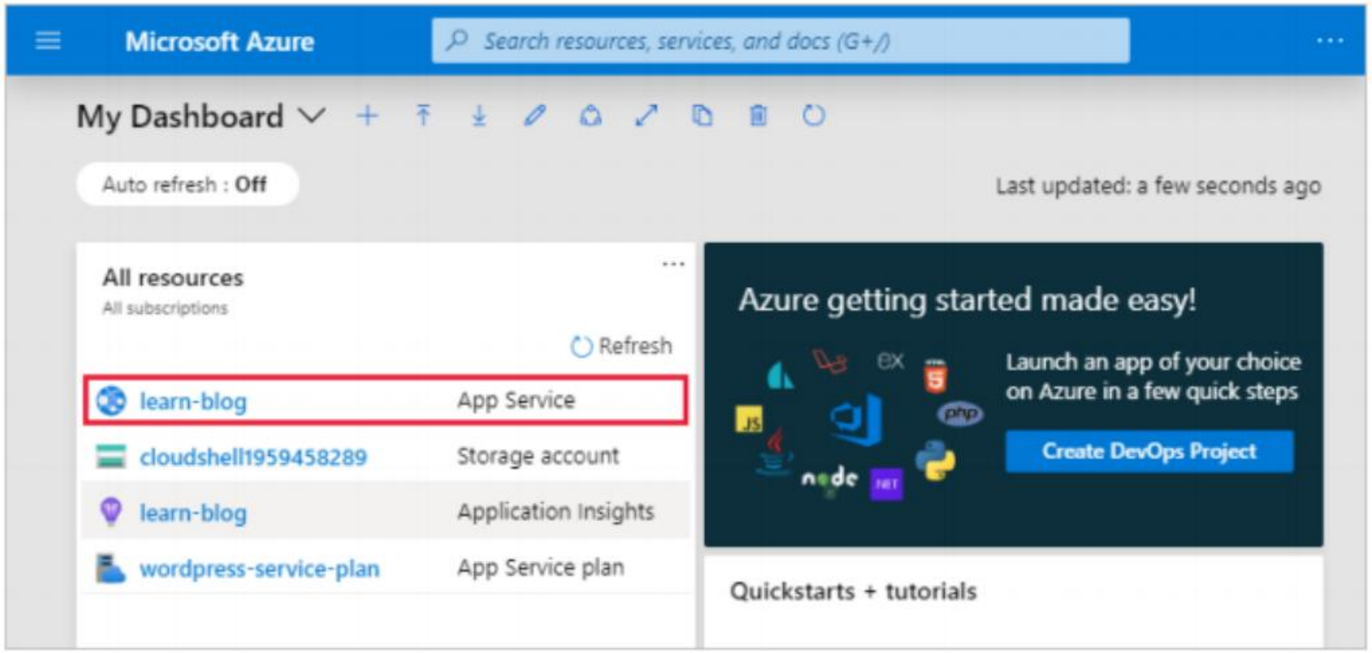
1. Open the Azure Portal and Login.

2. From the left-hand navigation menu, select **Dashboard** to access a list of all resources in your subscription. You may have to click the menu icon to show the navigation choices.



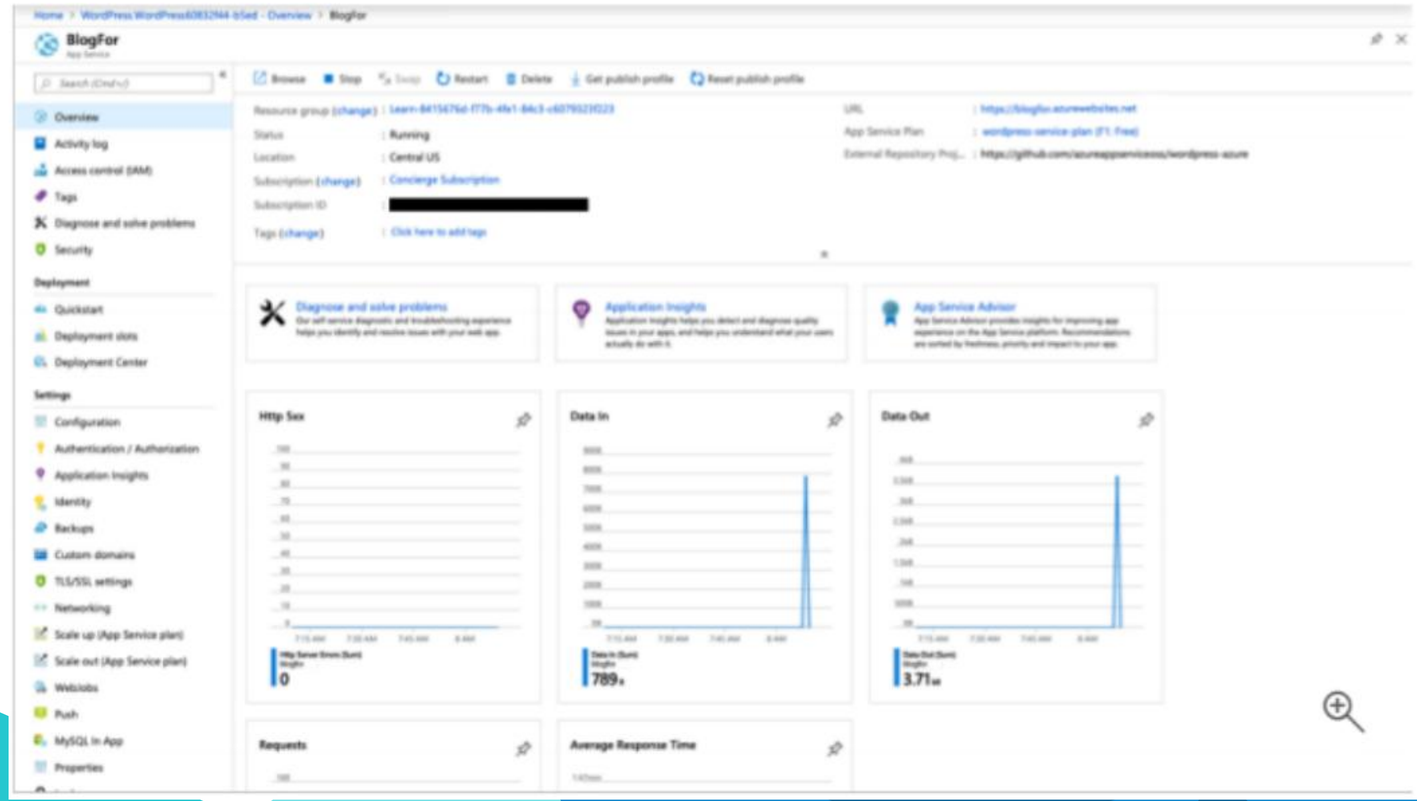
Exercise 2 – Configure an App Service

3. Select the **App Service** with the name you chose it in the previous exercise



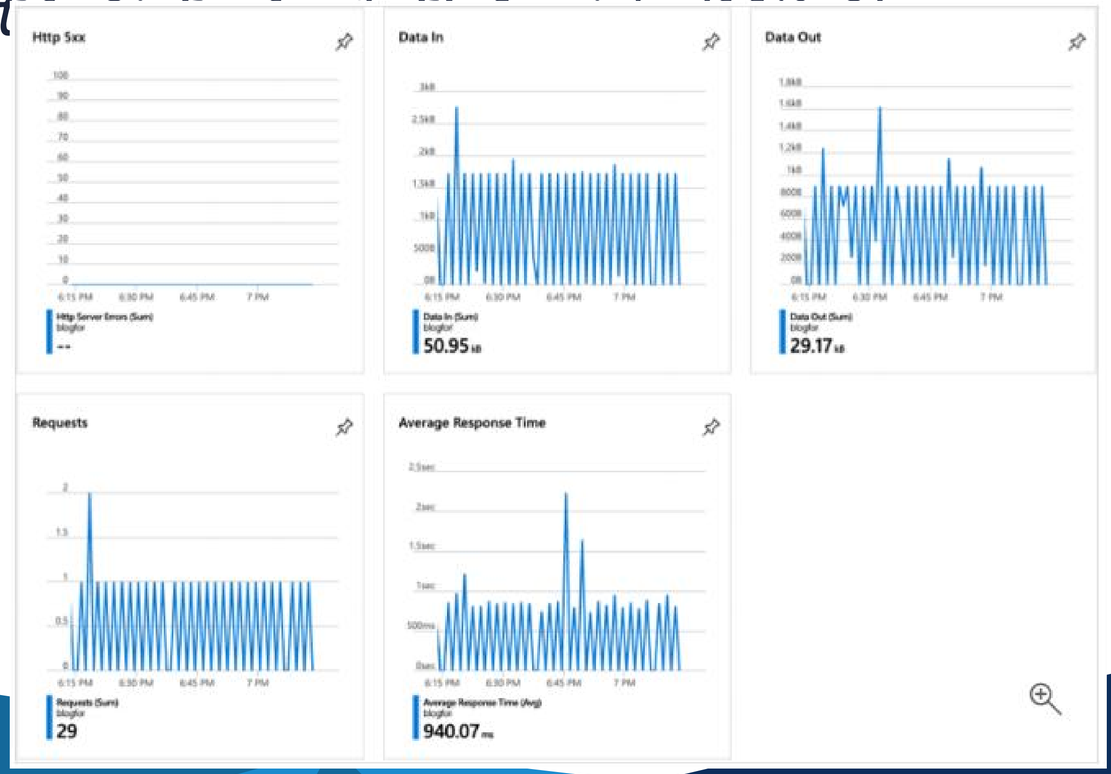
Exercise 2 – Configure an App Service

3. By default, the app service's overview is displayed, if not select **Overview**.



Exercise 2 – Configure an App Service

3. Scroll down in the overview view to where you can see the graphs for your newly created website. These graphs provide statistics about the number of requests received by our website, the amount of data in, dat[illegible] errors encountered on the site.



What is scale

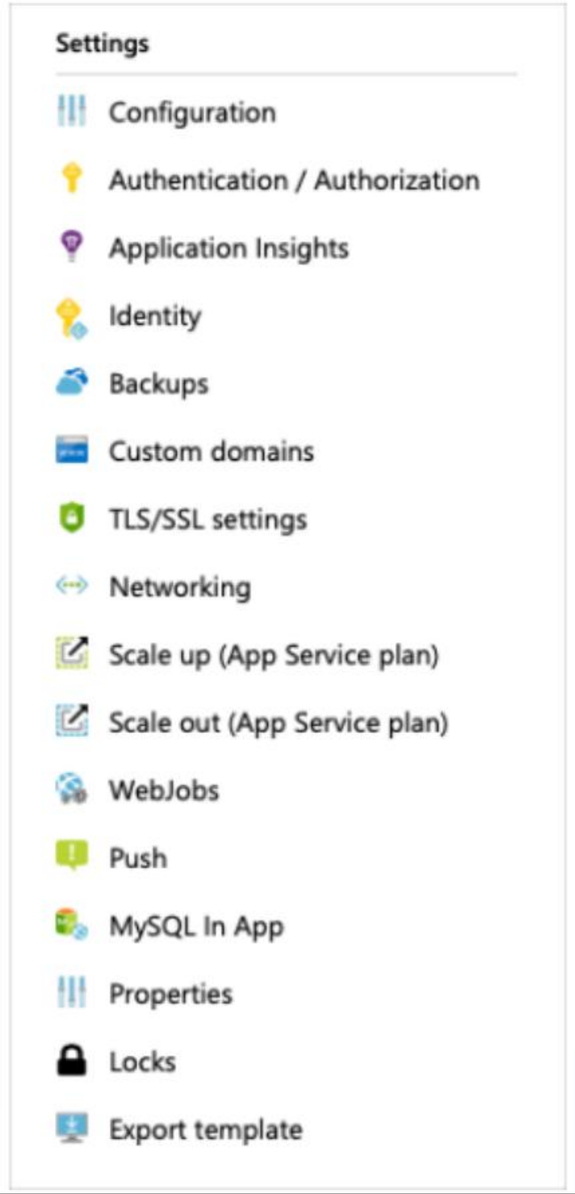
- adding network bandwidth, memory, storage, or compute power to achieve better performance
- **Scaling up** and **Scaling out**
- **Scaling up**
  - also known as vertical scaling
  - increase the memory, storage, or compute power on an existing virtual machine
- **Scaling Out**
  - also known as horizontal scaling
  - add extra virtual machines to power your application

Change the App Service Configuration

- App Services has many configurable options available and groups these options in sections of functionality.
- first section displayed is a group of common options

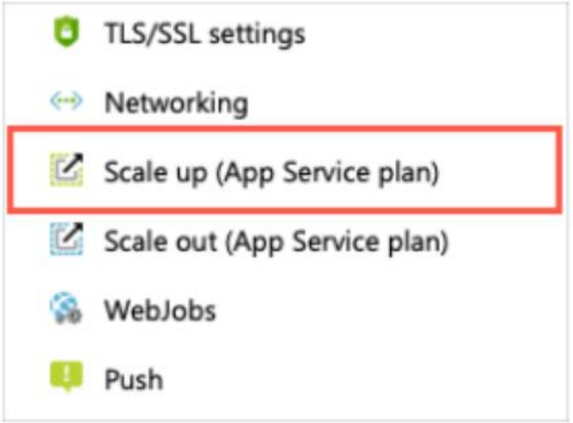
- E.g.

  The **Settings** section gives you access to configure various aspects such as application settings, backups, custom domains, TLS/SSL settings, options to scale up the resources of the application, and so on.



Scale up your App Service

1. In the **Settings** configuration section for your app service, select **Scale up (App service plan)**.



Category	Description
Dev / Test	This category is ideal for less demanding workloads. This category is predominantly focused on providing shared infrastructure. In this category, you have additional features that become available to the App Service application. For example, Custom domains / SSL and manual scale.
Production	This category is ideal for more demanding workloads. In this category, you'll also notice added features such as staging slots, daily backups, and a traffic manager.
Isolated	This category is ideal for workloads that require advanced networking and fine-grained scaling.

2. Notice that there are three workload categories to choose from in the configuration pane. These three categories make it easier to decide the type of workload we'll run.

Exercise 3

Access an App Service using Azure Cloud Shell

What is Azure Cloud Shell

- browser-based command-line experience for managing and developing Azure resources
- provides two experiences, Bash and PowerShell
- access to the Azure command-line interface called Azure CLI and to Azure PowerShell.

For learning purposes, here we will use the Azure CLI to start and stop the WordPress site we created earlier.

Exercise 3 – Access an App Service using Azure Cloud Shell

In this exercise, you'll use the Cloud Shell window shown side by side with the exercise instructions.

For this exercise, we'll use the Cloud Shell experience as part of our sandbox implementation.

Exercise 3 – Access an App Service using Azure Cloud Shell

1. use the *az account list* list command. To make sure we work with the correct Azure subscription before we change any settings

Azure CLICopy

```
az account list --output table
```

2. run the *az group list* command to list all the resources group in a subscription

Azure CLICopy

```
az group list --output table
```

Exercise 3 – Access an App Service using Azure Cloud Shell

3. Use *az resource list* command to list all the resources in the [sandbox resource group name]
Use *--resource-type* we can filter the result to include only the resource
information related to websites.

Azure CLICopy

```
az resource list \
    --resource-group [sandbox resource group name] \
    --resource-type Microsoft.Web/sites
```

Exercise 3 – Access an App Service using Azure Cloud Shell

Example of output:


```
{
"id": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-
xxxxxxxxxxx/resourceGroups/[sandbox resource group
name]/providers/Microsoft.Web/sites/BlogFor",
"identity": null,
"kind": "app",
"location": "centralus",
"managedBy": null,
"name": "MyWebApp",
"plan": null,
"properties": null,
"resourceGroup": "[sandbox resource group name]",
"sku": null,
"tags": null,
"type": "Microsoft.Web/sites"
}
```


Copy the value of *name*. We'll use it in the next steps to first stop and then start our website.

Exercise 3 – Access an App Service using Azure Cloud Shell

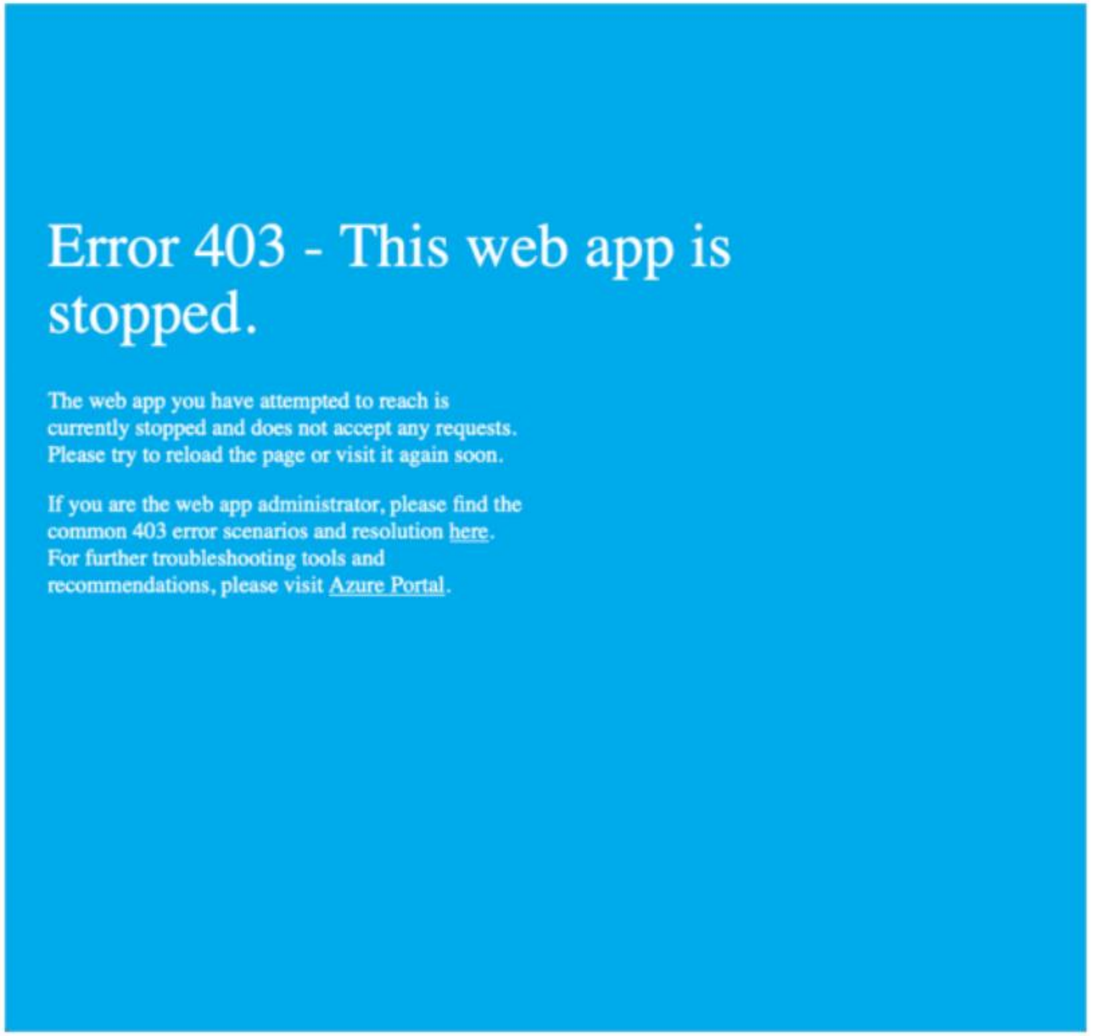
4. use the *az webapp stop* command to stop the web application running in our app service. Replace <web app name>with the name of your web app you copied

Azure CLICopy

```
az webapp stop \
    --resource-group [sandbox resource group name] \
    --name <web app name>
```

Exercise 3 – Access an App Service using Azure Cloud Shell

5. find the URL to the site in the overview of the App service in the portal and open the website in a new browser tab. You'll see a message in your browser that reads:



Exercise 3 – Access an App Service using Azure Cloud Shell

6. start the web app by running the *az webapp start* command. Replace <web app name> with the name of your web app you copied

Azure CLICopy

```
az webapp start \
    --resource-group [sandbox resource group name] \
    --name <web app name>
```

7. Refresh the page, your website will be available after a couple of seconds.

Check your knowledge

1. What is Azure?

A. Microsoft's cloud computing platform, which provides computepower, storage, and services over the Internet using a pay-as-you-go pricing model.
B. A single data center located in Redmond, Washington.
C. A hosting environment specifically for virtual machines

Check your knowledge

2. Which of the following is an example of an Azure application platform?

A. Azure App Service
B. Azure Load Balancer
C. Azure Table Storage
D. Azure Cache for Redis

Check your knowledge

3. When should you scale out your deployment?

A. When your application or service requires a more powerful CPU or more memory to fun faster
B. When you need additional virtual machines to speed up your application.
C. When you're using excess capacity that you don't need.

Week 3

Summary

Summary

- how Azure works and how easy it is to bring up a system.
- Azure provides services that can help transform the way your organization delivers new features

Clean Up

- The sandbox automatically cleans up your resources when you're finished with this module
- left running can cost you money.
- delete resources individually or delete the resource group to delete the entire set of resources