

AZ-040

Automate Administration with PowerShell



Learning Path 9: Manage cloud resources by using Windows PowerShell

Modules

Learning objectives


- [Review the Azure PowerShell module](#)
- [Review the features and tools for Azure Cloud Shell](#)
- [Manage Azure resources with Windows PowerShell](#)

Az

Az.compute
Az.account
...

Agenda



- LP 1 Get started with Windows PowerShell
- LP 2 Maintain system administration tasks in Windows PowerShell
- LP 3 Work with the Windows PowerShell pipeline
- LP 4 Work with PowerShell providers and PowerShell drives in Windows PowerShell
- LP 5 Querying management information by using CIM and WMI
- LP 6 Use variables, arrays, and hash tables in Windows PowerShell scripts
- LP 7 Create and modify scripts by using Windows PowerShell
- LP 8 Administer remote computers by using Windows PowerShell
- LP 9 Manage cloud resources by using Windows PowerShell 
- LP 10 Manage Microsoft 365 services by using Windows PowerShell
- LP 11 Create and manage background jobs and scheduled jobs in Windows PowerShell

Overview



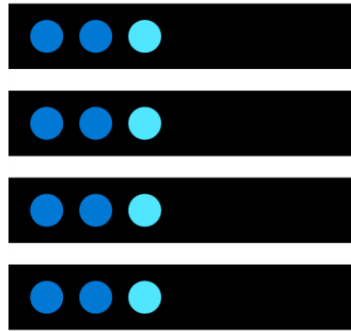
Besides managing local resources, you can also use Windows PowerShell to manage cloud resources, such as Azure platform or Microsoft 365. To manage cloud-based resources, you need to install additional modules for Windows PowerShell. In this Learning Path, you'll learn how to install modules necessary for cloud services management to Windows PowerShell, and you'll also learn how to use PowerShell commands to perform some simple administrative tasks on cloud resources such as Azure virtual machines (VMs), Azure storage accounts, and Azure subscriptions. You'll also learn how to use Azure Cloud Shell environment to perform PowerShell based on Bash based administration directly from Azure portal.

Modules:

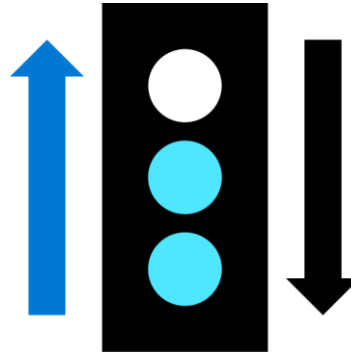
- Review the Azure PowerShell module
- Review the features and tools for Azure Cloud Shell
- Manage Azure resources with Windows PowerShell

What is cloud computing?

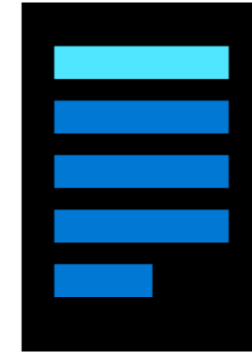
Cloud computing is the delivery of computing services over the internet, enabling faster innovation, flexible resources, and economies of scale.



Compute



Networking



Storage

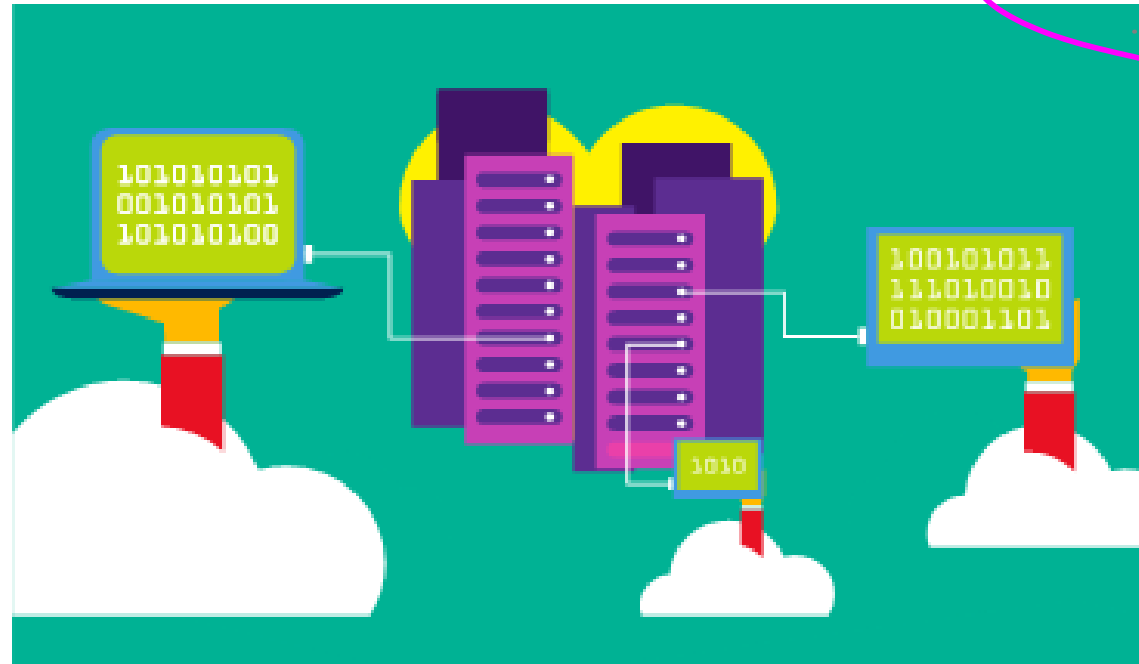
Public cloud

- Owned by cloud services or hosting provider.
- Provides resources and services to multiple organizations and users.
- Accessed via secure network connection (typically over the internet).

2008 AWS
2011 Windows Azure 😞
2013 Azure (ARM) 😊



GCP Google
....



Microsoft
Bicep
Terraform
HCL

Hybrid Cloud

Private cloud

- Organizations create a cloud environment in their datacenter.
- Organizations are responsible for operating the services they provide.
- Does not provide access to users outside of the organization.



Compare CapEx vs. OpEx

Invest. Kosten

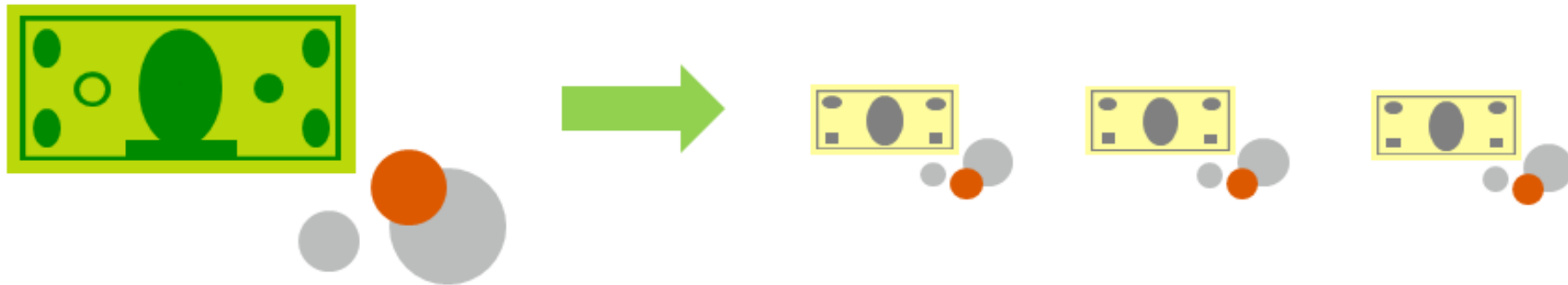
Capital expenditure (CapEx)

- The upfront spending of money on physical infrastructure.
- Costs from CapEx have a value that reduces over time.

Betriebskosten

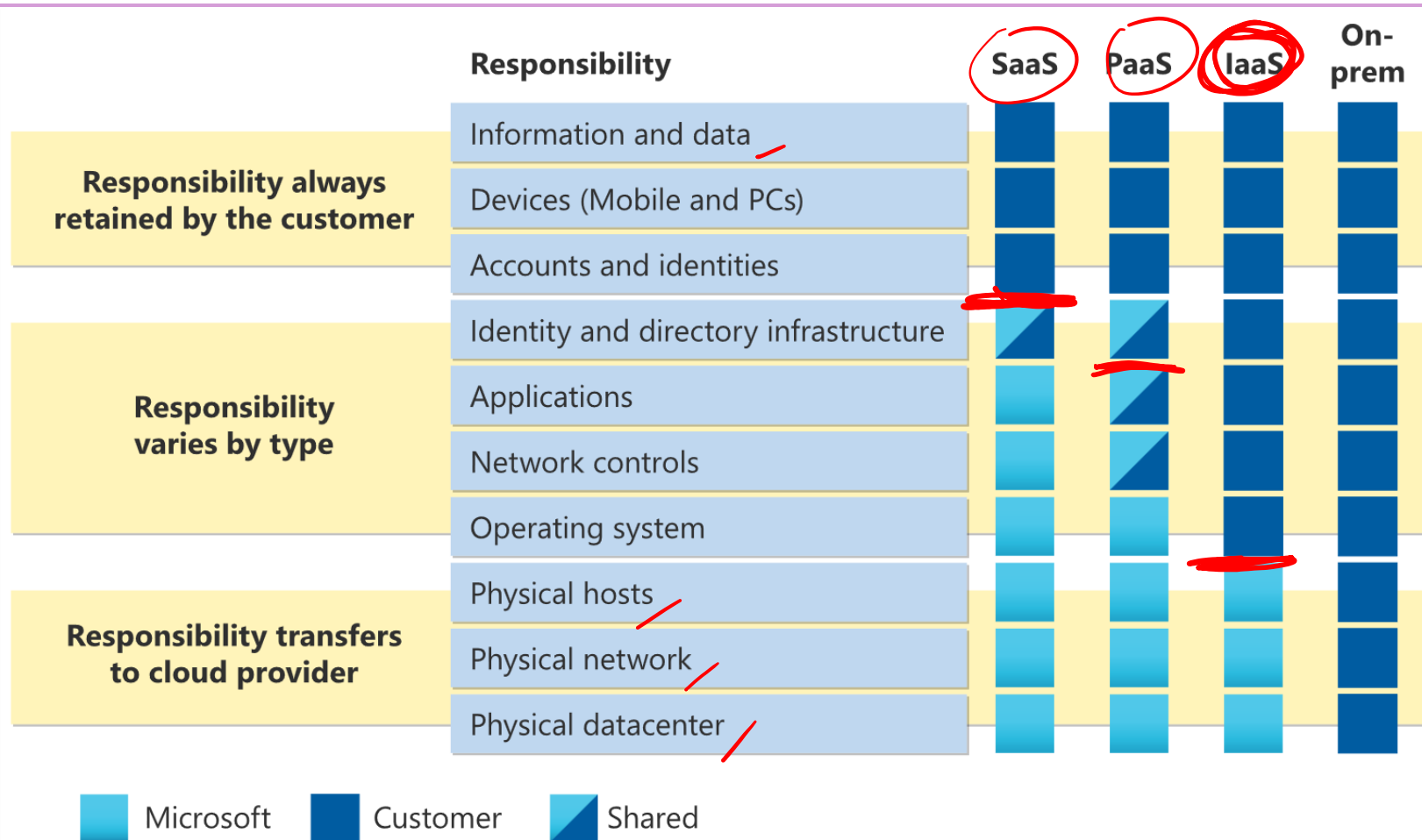
Operational expenditure (OpEx)

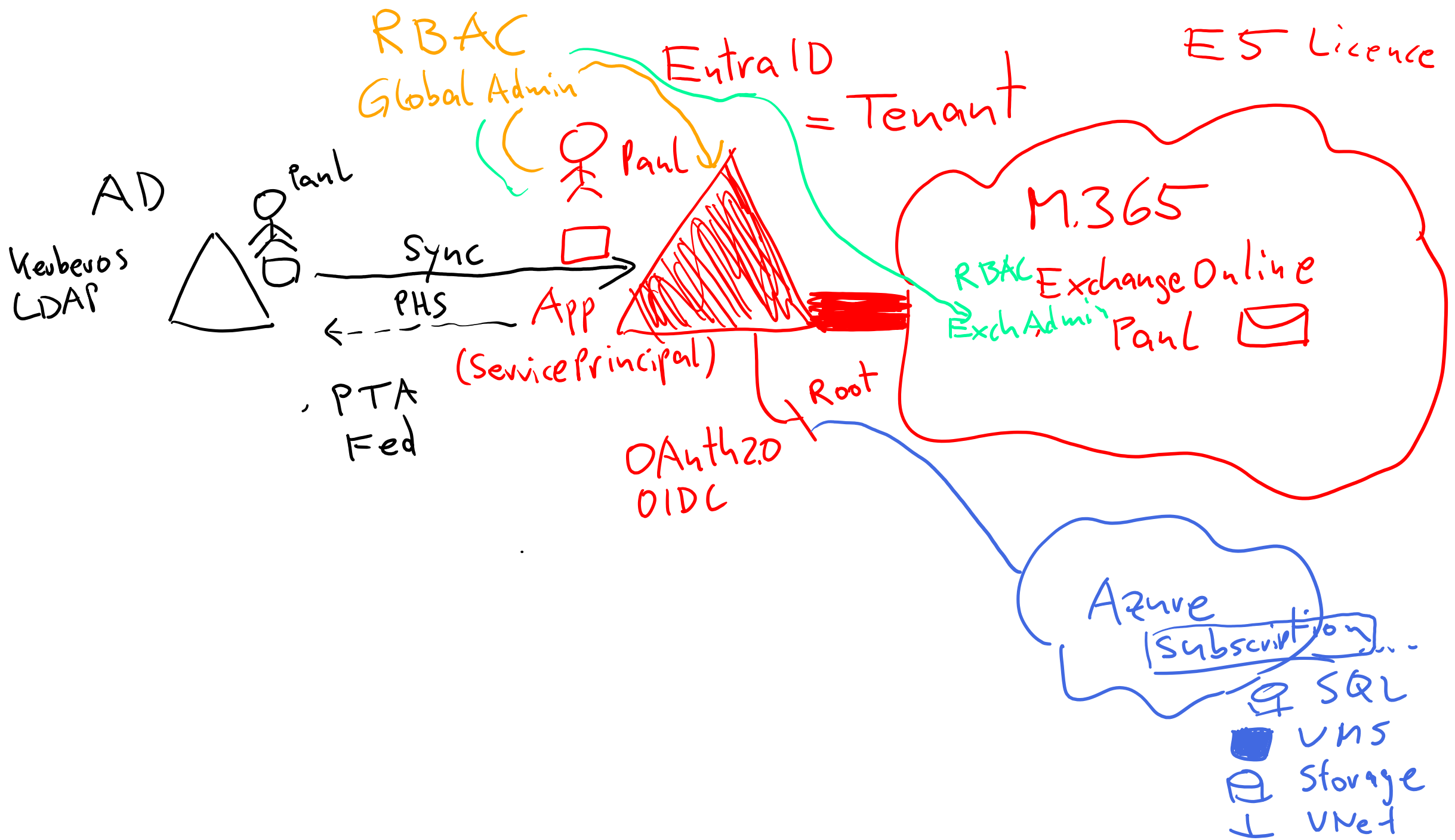
- Spend on products and services as needed, pay-as-you-go.
- Get billed immediately.



Shared responsibility model

App Service
VM





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Regions = Location

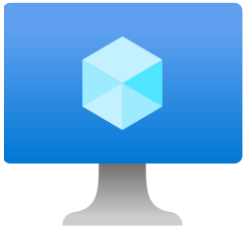
Azure offers more global regions than any other cloud provider with 60-plus regions representing over 140 countries



- Regions are made up of one or more datacenters in close proximity.
- They provide flexibility and scale to reduce customer latency.
- Regions preserve data residency with a comprehensive compliance offering.

Azure resources

Azure **resources** are components like storage, virtual machines, and networks that are available to build cloud solutions.



Virtual machines



Storage accounts

Blobs
(container)
Files
(share)



Virtual networks



App services



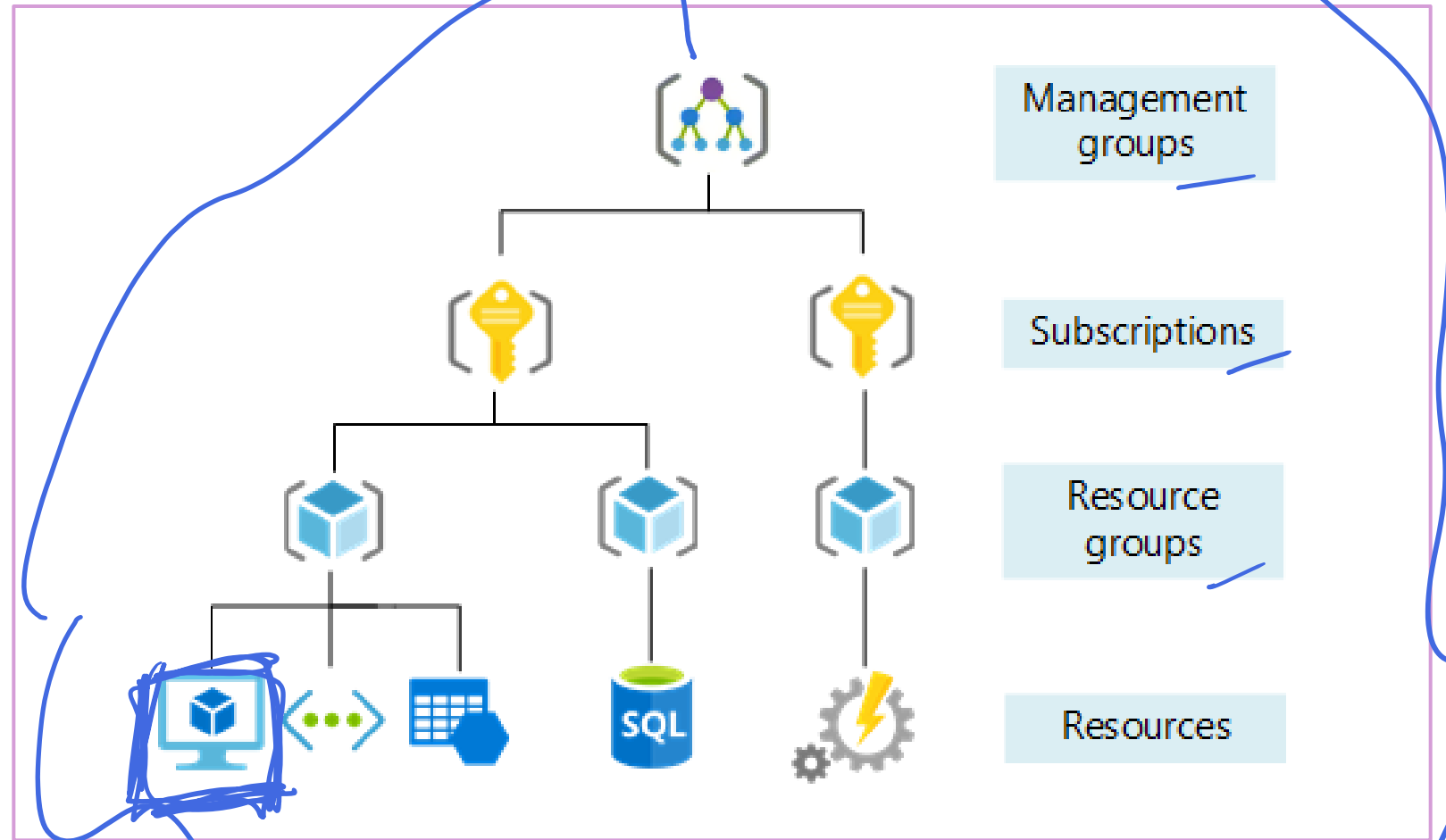
SQL databases



Functions

Management groups

- Management groups can include multiple Azure subscriptions.
- Subscriptions inherit conditions applied to the management group.
- 10,000 management groups can be supported in a single directory.
- A management group tree can support up to six levels of depth.



Azure compute services

Azure **compute** is an on-demand service that provides computing resources such as disks, processors, memory, networking, and operating systems.



Virtual
Machines

IaaS



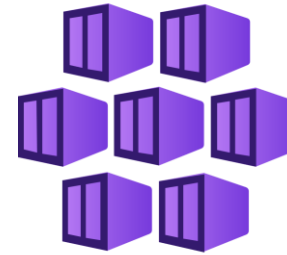
App
Services

PaaS



Container
Instances

CaaS



Azure Kubernetes
Services (AKS)



Azure Virtual
Desktop

VDI

Review the Azure PowerShell module



Module overview



You can manage Azure resources by using the Azure portal, which is usually the most common administration method. However, for some tasks, PowerShell is more convenient. In this Module, you'll learn about the Azure PowerShell environment and the Az module for Windows PowerShell. Also, you'll learn about ways to manage Microsoft Entra ID by using PowerShell modules.

Units include:

- Azure PowerShell overview
- What is the Azure Az PowerShell module?
- Installing the Azure Az PowerShell module
- Migrate Azure PowerShell from AzureRM to Az
- What are the Microsoft Azure Active Directory Module for Windows PowerShell and Azure Active Directory PowerShell for Graph modules?

Azure PowerShell overview



- Azure PowerShell is a set of cmdlets for managing Azure resources directly from the PowerShell command line.
- It's a module that you add to Windows PowerShell or PowerShell Core.
- Azure PowerShell works with PowerShell 5.1 on Windows, PowerShell 7.0.6 LTS, and PowerShell 7.1.3 or newer on all platforms.
- You can use Azure PowerShell in your browser with Azure Cloud Shell, or install it on your local machine on Windows, MacOS, or Linux.

What is the Azure Az PowerShell module?

- The Az PowerShell module is a set of cmdlets for managing Azure resources directly from PowerShell.
- The Az PowerShell module is the successor of the AzureRM module and is the current version to use for interacting with Azure.
- The Az PowerShell module features:
 - Security and stability.
 - Support for all Azure services.
 - New capabilities.
- You can log issues or feature requests for the Az module directly on the GitHub repository, or through Microsoft support if you have a support contract.

Installing the Azure Az PowerShell module

- You can install the Azure Az PowerShell module by using one of the following methods:
 - The **Install-Module** cmdlet
 - Azure PowerShell MSI
 - Az PowerShell Docker container
 - To install the Az module, run the following command:
- Install-Module -Name Az -Scope CurrentUser -Repository PSGallery -Force**
- To sign in to Azure from Azure PowerShell, run the following command:

Connect-AzAccount

Migrate Azure PowerShell from AzureRM to Az

- Scripts created for the AzureRM cmdlets won't automatically work with the Az module.
- To make the transition easier, the AzureRM to Az migration toolkit was developed.
- Instead of using **AzureRm** or **Azure** in cmdlet names, you use **Az** cmdlets.
- Automatic migration is the recommended option for migrating from AzureRM to the Az PowerShell module.
- Install the AzureRM to Az migration toolkit by using the following command:

Install-Module -Name Az.Tools.Migration

What are the Microsoft Azure Active Directory Module for Windows PowerShell and Azure Active Directory PowerShell for Graph modules?

- You can use the Azure Active Directory Module for Windows PowerShell cmdlets for Microsoft Entra ID administrative tasks such as user management, domain management, and configuring single sign-on.
- Microsoft is replacing the Azure Active Directory Module for Windows PowerShell with Active Directory PowerShell for Graph.
- To install Azure Active Directory Module for Windows PowerShell, use the following command:

Install-Module MSOnline

- To install Azure Active Directory PowerShell for Graph, use the following command:

Install-Module AzureAD or Install-module AzureADPreview

Review the features and tools for Azure Cloud Shell



Module overview



Instead of using the locally installed PowerShell module for managing Azure resources, you can use the Azure Cloud Shell environment. The Azure Cloud Shell environment enables you to use the PowerShell or Bash environment and commands to manage Azure resources. Azure Cloud Shell is available in the Azure portal and in the Microsoft 365 admin portal. In this Module, you'll learn about Cloud Shell and its features.

Units include:

- Cloud Shell overview
- Features and tools for Azure Cloud Shell
- Demonstration: Use Cloud Shell

Cloud Shell overview



- Azure Cloud Shell is an interactive, browser-accessible shell for managing Azure resources.
- You can use Cloud Shell to work untethered from a local machine in a way only the cloud can provide.
- You can access the Cloud Shell in three ways:
 - Direct link. Open a browser and refer to **<https://shell.azure.com>**.
 - Azure portal. Select the Cloud Shell icon on the Azure portal.
 - Code snippets.
- After first launch, you can use the shell type drop-down control to switch between **Bash** and **PowerShell**.

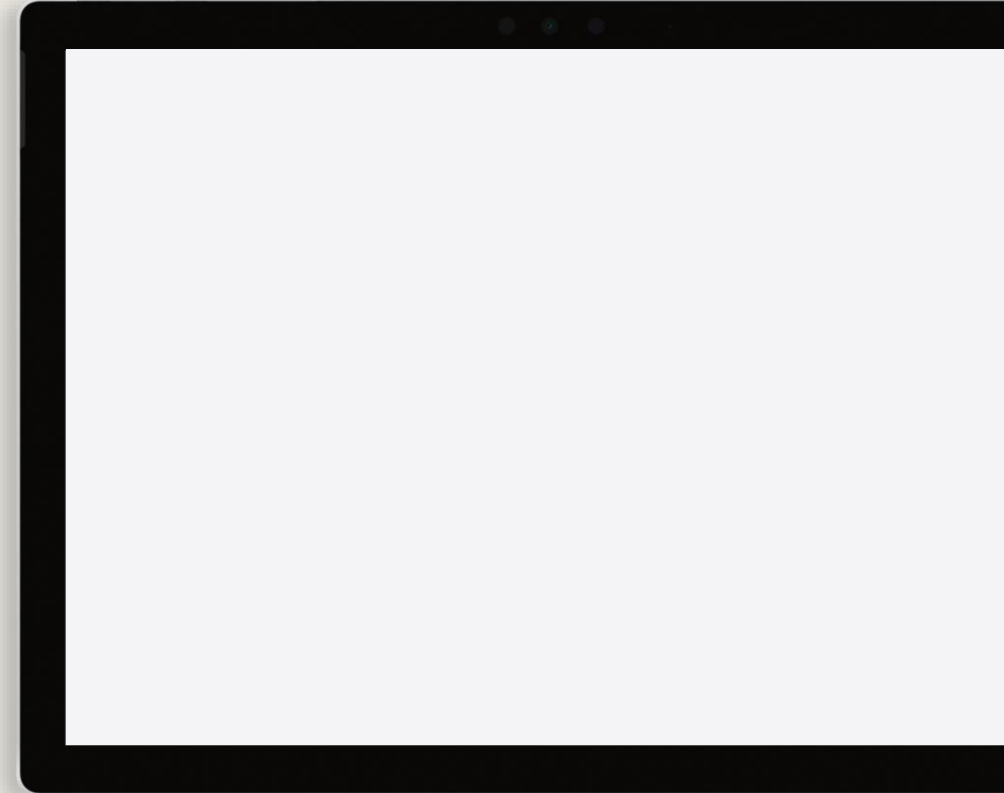
Features and tools for Azure Cloud Shell

The main features of Azure Cloud Shell are:

- Secure automatic authentication.
- \$HOME persistence across sessions.
- Azure drive (Azure:).
- Ability to manage Exchange Online.
- Deep integration with open-source tooling.

Demonstration: Use Cloud Shell

In this demonstration, you'll learn how to experiment with Azure Cloud Shell.



Manage Azure resources with Windows PowerShell



Module overview



Azure virtual machines (VMs) provide a fully configurable and flexible computing environment. You can create and manage these VMs by using the Azure portal, Windows PowerShell with the Az module, or the Cloud Shell environment. In this Module, you'll learn how to create and manage Azure VMs by using PowerShell. Finally, you'll learn about managing Azure storage accounts and Azure subscriptions with PowerShell.

Units:

- Creating Azure VMs with Windows PowerShell
- Managing Azure VMs with Windows PowerShell
- Managing storage with Azure PowerShell
- Managing Azure subscriptions with Azure PowerShell

Creating Azure VMs with Windows PowerShell

- To create a new Azure VM with PowerShell commands, you can use your locally installed Windows PowerShell with Az module or the Cloud Shell environment available in the Azure portal.
- When using locally installed PowerShell, you first need to use the **Connect-AzAccount** command to authenticate.
- To create and use a new Azure VM, you should:
 1. Create a resource group.
 2. Run the **New-AzVM** command with the configuration parameters.
 3. Find the public IP address.
 4. Connect to the Azure VM.

GCM - Noun Az VM

Managing Azure VMs with Windows PowerShell

The most common management tasks for Azure VMs are:

- Modifying VM size profile with the **Get-AzVMSize** and **Update-AzVM** commands.
- Starting and stopping the VM with the **Start-AzVM** and **Stop-AzVM** commands.
- Adding or modifying disks to the Azure VM.

Managing storage with Azure PowerShell

- Azure PowerShell allows you to manage Azure-related storage.
- Before you start managing your storage, you should first create a storage account by using **New-AzStorageAccount**.
- You can use the **Set-AzStorageAccount** cmdlet to modify an Azure Storage account.

Managing Azure subscriptions with Azure PowerShell

- In Azure PowerShell, accessing the resources for a subscription requires changing the subscription associated with your current Azure session.
- To change subscriptions, you need to first retrieve an Azure PowerShell Context object with **Get-AzSubscription** and then change the current context with **Set-AzContext**.

Lab – Azure resource management with PowerShell



Lab: Azure resource management with PowerShell



- **Exercise 1:** Activating the Azure subscription and installing the PowerShell Az module
- **Exercise 2:** Using Azure Cloud Shell
- **Exercise 3:** Managing Azure resources with Azure PowerShell

Sign-in information for the exercises:

Virtual machines:

- **AZ-040T00A-LON-DC1**
- **AZ-040T00A-LON-CL1**

User name: **Adatum\Administrator**

Password: **Pa55w.rd**

Lab scenario



You're a system administrator for the London branch office of Adatum Corporation. You need to evaluate the Azure platform to run VMs and other resources for your company. As a part of your evaluation, you also want to test PowerShell administration of Azure-based resources.

Lab-review questions



- Why did you have to use the **Set-ExecutionPolicy** command before installing the Az module for PowerShell?
- What is the purpose of the **Connect-AzAccount** command?
- When you were creating a new VM by using PowerShell, what was the purpose of using the **Get-Credential** command?

Lab-review answers



- Why did you have to use the **Set-ExecutionPolicy** command before installing the Az module for PowerShell?
You need to set the PowerShell execution policy to **RemoteSigned** value, so you can pull and install modules from PowerShell Gallery.
- What is the purpose of the **Connect-AzAccount** command?
You need to run the **Connect-AzAccount** command to authenticate to your Azure tenant that you want to manage.
- When you were creating a new VM by using PowerShell, what was the purpose of using the **Get-Credential** command?
 - You used this command to define local admin credentials for the new Azure VM.

References

[Quickstart: Automatically migrate PowerShell scripts from AzureRM to the Az PowerShell module](#)

[Install Azure Active Directory PowerShell for Graph](#)

[AzureAD](#)

[MSOnline](#)

[New-AzVM](#)

[Az.Storage](#)



Learning Path Recap

In this learning path, we:

- Learned how to install the necessary modules for cloud services management and perform simple administrative tasks on cloud resources.
- Explored the Azure Cloud Shell environment for performing PowerShell-based or Bash-base administration directly from the Azure portal.
-

End of presentation

