

Purpose

This study guide is designed to help you prepare for the AZ-104, Microsoft Azure Administrator, exam.

- This study guide includes links to [Microsoft Learn](#) online training modules. Modules may be applicable for more than one objective. If you search the training you will likely find other modules that are of interest.
- This study guide will get you started preparing for your certification, but no single document can fully prepare you for the exam. Be sure your study time includes hands-on experience with the product.

Audience Profile

The Azure Administrator implements, manages, and monitors identity, governance, storage, compute, and virtual networks in a cloud environment. The Azure Administrator will provision, size, monitor, and adjust resources as appropriate.

Candidates should have a minimum of six months of hands-on experience administering Azure. Candidates should have a strong understanding of core Azure services, Azure workloads, security, and governance. Candidates for this exam should have experience in using PowerShell, the Command Line Interface, Azure Portal, and ARM templates.

Skills measured

Note: The bullets that appear below each of the skills measured are intended to illustrate how we are assessing that skill. This list is NOT definitive or exhaustive.

Note: In most cases, exams do NOT cover preview features, and some features will only be added to an exam when they are GA (General Availability).

General study resources

- [AZ-104: Manage identities and governance in Azure - Learn | Microsoft Docs](#)
- [AZ-104: Implement and manage storage in Azure - Learn | Microsoft Docs](#)
- [AZ-104: Configure and manage virtual networks for Azure administrators - Learn | Microsoft Docs](#)
- [AZ-104: Deploy and manage Azure compute resources - Learn | Microsoft Docs](#)
- [AZ-104: Monitor and back up Azure resources - Learn | Microsoft Docs](#)
- [Azure Documentation](#) . Stay informed on the latest products, tools, and features. Get information on pricing, partners, support, and solutions.
- [Azure forums](#) . The Azure forums are very active. You can search the threads for a specific area of interest. You can also browse categories like Azure Storage, Pricing and Billing, Azure Virtual Machines, and Azure Migrate.
- [Microsoft Learning Community Blog](#) . Get the latest information about the certification tests and exam study groups.

- [Microsoft Azure Blog](#) . Keep current on what's happening in Azure, including what's now in preview, generally available, news & updates, and more.

Prerequisite study references

If you are new to the Azure Administrator role these references can help you understand Azure fundamentals.

- [Azure Fundamentals part 1: Describe core Azure concepts \(AZ-900\) - Learn | Microsoft Docs](#)
- [Azure Fundamentals part 2: Describe core Azure services \(AZ-900\) - Learn | Microsoft Docs](#)
- [Azure Fundamentals part 3: Describe core solutions and management tools on Azure \(AZ-900\) - Learn | Microsoft Docs](#)
- [Azure Fundamentals part 4: Describe general security and network security features \(AZ-900\) - Learn | Microsoft Docs](#)
- [Azure Fundamentals part 5: Describe identity, governance, privacy, and compliance features \(AZ-900\) - Learn | Microsoft Docs](#)
- [AZ-104 Prerequisites for Azure administrators \(Learn\)](#)

Manage Azure identities and governance (15-20%)

Manage Azure AD objects

- Create users and groups
 - [Creating a new user in Azure AD](#)
 - [Create a basic group and add members using Azure Active Directory](#)
 - [Add or delete users using Azure Active Directory](#)
 - [Learn - Create Azure users and groups in Azure Active Directory](#)
- Create administrative units
 - [Administrative units in Azure Active Directory | Microsoft Docs](#)
- Manage user and group properties
 - [Edit your group information using Azure Active Directory](#)
 - [Add or update a user's profile information using Azure Active Directory](#)
 - [Learn - Manage users and groups in Azure Active Directory](#)
- Manage device settings
 - [How to manage devices using the Azure portal | Microsoft Docs](#)
- Perform bulk user updates
 - [Bulk create users in Azure Active Directory](#)
 - [Learn - Manage users and groups in Azure Active Directory](#)
- Manage guest accounts

- [What is guest user access in Azure Active Directory B2B?](#)
 - [Manage guest access with Azure AD access reviews](#)
 - [Quickstart: Add guest users to your directory in the Azure portal](#)
 - [Learn - Create Azure users and groups in Azure Active Directory](#)
- Configure Azure AD join
 - [How to: Plan your Azure AD join implementation](#)
 - [Tutorial: Configure hybrid Azure Active Directory join for managed domains](#)
 - [Learn - Manage device identity with Azure AD join and Enterprise State Roaming](#)
- Configure self-service password reset
 - [Plan an Azure Active Directory self-service password reset](#)
 - [How it works: Azure AD self-service password reset](#)
 - [Licensing requirements for Azure AD self-service password reset](#)
 - [Learn - Allow users to reset their password with Azure Active Directory self-service password reset](#)

Manage role-based access control (RBAC)

- Create a custom role
 - [Custom roles for Azure resources](#)
 - [Learn - Create custom roles for Azure resources with role-based access control](#)
- Provide access to Azure resources by assigning roles (subscriptions, resource groups, resources)
 - [What is role-based access control \(RBAC\) for Azure resources?](#)
 - [Add or remove role assignments using Azure RBAC and the Azure portal](#)
 - [List role definitions in Azure RBAC](#)
 - [Learn - Secure your Azure resources with role-based access control](#)
- Interpret access assignments
 - [List role assignments using Azure RBAC and the Azure portal](#)
 - [Understand deny assignments for Azure resources](#)
 - [Learn - Manage access to an Azure subscription by using Azure role-based access control](#)

Manage subscriptions and governance

- Configure Azure policies
 - [What is Azure Policy?](#)
 - [Quickstart: Create a policy assignment to identify non-compliant resources](#)
 - [Tutorial: Create and manage policies to enforce compliance](#)
 - [Learn - Apply and monitor infrastructure standards with Azure Policy](#)

- [Learn - Build a cloud governance strategy on Azure](#)
- Configure resource locks
 - [Lock resources to prevent unexpected changes](#)
 - [Learn - Control and organize Azure resources with Azure Resource Manager](#)
- Apply and manage tags on resources
 - [Use tags to organize your Azure resources](#)
 - [Learn - Control and organize Azure resources with Azure Resource Manager](#)
- Manage resource groups
 - [Manage Azure Resource Manager resource groups by using the Azure portal](#)
 - [Learn - Move Azure resources to another resource group](#)
- Manage subscriptions
 - [Create an additional Azure subscription](#)
 - [Change your Azure subscription to a different offer](#)
 - [Transfer billing ownership of an Azure subscription to another account](#)
- Manage costs
 - [What is Azure Cost Management and Billing?](#)
 - [Quickstart: Explore and analyze costs with cost analysis](#)
 - [Learn - Analyze costs and create budgets with Azure Cost Management](#)
 - [Learn - Predict costs and optimize spending for Azure](#)
- Configure management groups
 - [Create management groups for resource organization and management](#)
 - [Manage your resources with management groups](#)

Implement and manage storage (15-20%)

Secure storage

- Configure network access to storage accounts
 - [Introduction to Azure Storage](#)
 - [Configure Azure Storage firewalls and virtual networks](#)
 - [Learn - Secure access to your storage account](#)
- Create and configure storage accounts
 - [Storage account overview](#)
 - [Create an Azure Storage account](#)
 - [Upgrade to a general-purpose v2 storage account](#)
 - [Learn - Create an Azure Storage account](#)

- Generate shared access signature
 - [Delegate access with a shared access signature](#)
 - [Grant limited access to Azure Storage resources using shared access signatures \(SAS\)](#)
 - [Learn - Control access to Azure Storage with shared access signatures](#)
 - [Learn - Secure your Azure Storage](#)
- Manage access keys
 - [Manage storage account access keys](#)
 - [Learn - Secure your Azure Storage](#)
- Configure Azure AD authentication for a storage account
 - [Use Azure AD Domain Services to authorize access to file data over SMB | Microsoft Docs](#)
- Configure access to Azure Files
 - [Use Azure AD Domain Services to authorize access to file data over SMB | Microsoft Docs](#)

Manage storage

- Export from Azure job
 - [Use the Azure Import/Export service to export data from Azure Blob storage](#)
 - [Learn - Export large amounts of data from Azure by using Azure Import/Export](#)
- Import into Azure job
 - [Use the Azure Import/Export service to import data to Azure Blob Storage](#)
 - [Learn - Move large amounts of data to the cloud by using Azure Data Box family](#)
 - [Get started with Storage Explorer](#)
 - [Learn - Upload, download, and manage data with Azure Storage Explorer](#)
- Install and use Azure Storage Explorer
 - [Get started with Storage Explorer | Microsoft Docs](#)
 - [Upload, download, and manage data with Azure Storage Explorer - Learn | Microsoft Docs](#)
- Copy data by using AZCopy
 - [Get started with AzCopy](#)
 - [Learn - Copy and move blobs from one container or storage account to another from the command line and in code](#)
- Implement Azure storage replication
 - [Azure Storage redundancy](#)
 - [Learn - Make your application storage highly available with read-access geo-redundant storage](#)

- Configure blob object replication
 - [Configure object replication - Azure Storage | Microsoft Docs](#)

Configure Azure files and Azure blob storage

- Create an Azure file share
 - [What is Azure Files?](#)
 - [Create an Azure file share](#)
 - [Quickstart: Create and manage Azure file shares with the Azure portal](#)
 - [Learn - Store and share files in your app with Azure Files](#)
- Create and configure Azure File Sync service
 - [Planning for an Azure File Sync deployment](#)
 - [Tutorial: Extend Windows file servers with Azure File Sync](#)
 - [Learn - Extend your on-premises file share capacity using Azure File Sync](#)
 - [Learn - Create and configure Azure File Sync service](#)
- Configure Azure blob storage
 - [What is Azure Blob storage?](#)
 - [Quickstart: Upload, download, and list blobs with the Azure portal](#)
 - [Learn - Gather metrics from your Azure Blob Storage containers](#)
- Configure storage tiers
 - [Azure Blob storage: hot, cool, and archive access tiers](#)
 - [Learn - Optimize storage performance and costs using Blob storage tiers](#)
- Configure blob lifecycle management
 - [Tip 305 - How to automatically manage Azure Blob Storage lifecycle | Azure Tips and Tricks \(microsoft.github.io\)](#)
 - [Optimize costs by automating Azure Blob Storage access tiers | Microsoft Docs](#)

Deploy and manage Azure compute resources (20-25%)

Automate deployment of VMs by using ARM templates

- Modify Azure Resource Manager (ARM) template
 - [Azure Resource Manager templates overview](#)
 - [Extend Azure Resource Manager template functionality](#)
 - [Tutorial: Create and deploy your first Azure Resource Manager template](#)
 - [Learn - Build Azure Resource Manager templates](#)
- Configure VHD template

- [Create a VM from a VHD by using the Azure portal](#)
 - [Learn - Deploy Azure virtual machines from VHD templates](#)
- Deploy from template
 - [Quickstart: Create and deploy ARM templates by using the Azure portal](#)
- Save a deployment as an ARM template
 - [Download the template for a VM](#)
 - [Single and multi-resource export to a template in Azure portal](#)
- Deploy VM extensions
 - [Custom Script Extension for Windows](#)
 - [Use the Azure Custom Script Extension Version 2 with Linux virtual machines](#)
 - [Learn - Automate the configuration of Windows Server IaaS Virtual Machines](#)
 - [Learn - Protect your virtual machine settings with Azure Automation State Configuration](#)

Configure VMs

- Configure Azure Disk Encryption
 - [Azure Disk Encryption for Linux VMs](#)
 - [Azure Disk Encryption for Windows VMs](#)
 - [Learn - Introduction to securing data at rest on Azure](#)
 - [Learn - Secure your Azure virtual machine disks](#)
- Move VMs from one resource group to another
 - [Move a Windows VM to another Azure subscription or resource group](#)
- Manage VM sizes
 - [Sizes for Linux virtual machines in Azure](#)
 - [Sizes for Windows virtual machines in Azure](#)
 - [Resize a Windows VM](#)
- Add data disks
 - [Attach a managed data disk to a Windows VM by using the Azure portal](#)
 - [Use the portal to attach a data disk to a Linux VM](#)
 - [Learn - Choose the right disk storage for your virtual machine workload](#)
 - [Learn - Add and size disks in Azure virtual machines](#)
- Configure networking
 - [Virtual networks and virtual machines in Azure](#)
 - [Learn - Configure the network for your virtual machines](#)

- Redeploy VMs
 - [Redeploy Windows virtual machine to new Azure node](#)
 - [Redeploy Linux virtual machine to new Azure node](#)
 - [Learn - Create a Linux virtual machine in Azure](#)
 - [Learn - Create a Windows virtual machine in Azure](#)
- Configure high availability
 - [Availability options for virtual machines in Azure](#)
 - [Manage the availability of Windows virtual machines in Azure](#)
 - [Microsoft Azure Well-Architected Framework - Reliability](#)
 - [Learn - Implement scale and high availability with Windows Server VM](#)
- Deploy and configure scale sets
 - [What are virtual machine scale sets?](#)
 - [Quickstart: Create a virtual machine scale set in the Azure portal](#)
 - [Learn - Build a scalable application with virtual machine scale sets](#)

Create and configure containers

- Configure sizing and scaling for ACI
 - [What is Azure Container Instances?](#)
 - [Quickstart: Deploy a container instance in Azure using the Azure portal](#)
 - [Learn - Introduction to Docker containers](#)
 - [Learn - Run Docker containers with Azure Container Instances](#)
 - [Learn - Build a containerized web application with Docker](#)
- Configure container groups for ACI
 - [Introduction to container groups - Azure Container Instances | Microsoft Docs](#)
- Configure storage, scaling, networks, and upgrades for AKSv (combined)
 - [Azure Kubernetes Service \(AKS\)](#)
 - [Quickstart: Deploy an Azure Kubernetes Service \(AKS\) cluster using the Azure portal](#)
 - [Learn - Introduction to Azure Kubernetes Service](#)
 - [Learn - Azure Kubernetes Service Workshop](#)

Create and configure App Service

- Create and scale and App Service plan (combined)
 - [Azure App Service plan overview](#)
 - [Manage an App Service plan in Azure](#)
 - [Learn - Scale an App Service web app to efficiently meet demand with App Service scale up and scale out](#)

- Create, secure, backup, network, custom domain names for App Services (combined)
 - [App Service overview](#)
 - [Configure an App Service app in the Azure portal](#)
 - [Learn - Host a web application with Azure App Service](#)
 - [Learn - Stage a web app deployment for testing and rollback by using App Service deployment slots](#)
 - [Learn - Dynamically meet changing web app performance requirements with autoscale rules](#)
 - [Learn - Deploy and run a containerized web app with Azure App Service](#)

Configure and manage virtual networking (25-30%)

Implement and manage virtual networking

- Create and configure virtual networks including peering
 - [Virtual network peering overview](#)
 - [Create, change, or delete a virtual network peering](#)
 - [Azure Virtual Network frequently asked questions \(FAQ\) VNet Peering](#)
 - [Tutorial: Connect virtual networks with virtual network peering using the Azure portal](#)
 - [Create a virtual network peering – different deployment models, same subscription](#)
 - [Learn - Distribute your services across Azure virtual networks and integrate them by using virtual network peering](#)
- Configure private and public IP addresses, network routes, network interface, subnets, and virtual network (combined)
 - [What is Azure Virtual Network?](#)
 - [Quickstart: Create a virtual network using the Azure portal](#)
 - [Virtual network traffic routing](#)
 - [Networking limits](#)
 - [Create, change, or delete a public IP address](#)
 - [Add, change, or remove IP addresses for an Azure network interface](#)
 - [Associate a public IP address to a virtual machine](#)
 - [Subnet extension](#)
 - [Virtual network traffic routing](#)
 - [Add network interfaces to or remove network interfaces from virtual machines](#)
 - [Learn - Design an IP addressing schema for your Azure deployment](#)
 - [Learn - Implement Windows Server IaaS VM IP addressing and routing](#)
 - [Learn - Manage and control traffic flow in your Azure deployment with routes](#)
 - [Learn - Networking Fundamentals Principals](#)
- Configure Azure DNS including custom DNS and private and public DNS zones
 - [What is Azure DNS?](#)

- [What is Azure Private DNS?](#)
- [Quickstart: Create an Azure DNS zone and record using the Azure portal](#)
- [Learn - Host your domain on Azure DNS](#)
- [Learn - Implement DNS for Windows Server IaaS VMs](#)
- [Learn - Secure Windows Server DNS](#)
- [Name resolution for resources in Azure virtual networks](#)
- [Add your custom domain name using the Azure Active Directory portal](#)
- [Use Azure DNS to provide custom domain settings for an Azure service](#)

- [Tutorial: Host your domain in Azure DNS](#)
- [Quickstart: Create an Azure private DNS zone using the Azure portal](#)

Secure access to virtual networks

- Create security rules
 - [Network Security Groups](#)
 - [Create, change, or delete a network security group](#)
 - [Tutorial: Filter network traffic with a network security group using the Azure portal](#)
- Associate an NSG to a subnet or network interface
 - [Learn - Secure and isolate access to Azure resources by using network security groups and service endpoints](#)
- Evaluate effective security rules
 - [Diagnose a virtual machine network traffic filter problem](#)
 - [Learn - Troubleshoot inbound network connectivity for Azure Load Balancer](#)
- Deploy and configure Azure Firewall
 - [Azure Firewall documentation](#)
 - [Tutorial: Deploy and configure Azure Firewall using the Azure portal](#)
 - [Learn - Introduction to Azure Firewall](#)
 - [Introduction to Azure Firewall Manager - Learn | Microsoft Docs](#)
- Deploy and configure Azure Bastion Service
 - [Azure Bastion documentation](#)
 - [Learn - Connect to virtual machines through the Azure portal by using Azure Bastion](#)

Configure load balancing

- Configure Application Gateway

- [Application Gateway configuration overview](#)
 - [Quickstart: Direct web traffic with Azure Application Gateway - Azure portal](#)
 - [Learn - Load balance your web service traffic with Application Gateway](#)
 - [Introduction to Azure Web Application Firewall - Learn | Microsoft Docs](#)
- Configure an internal or public load balancer
 - [What is Azure Load Balancer?](#)
 - [Azure Load Balancer Components](#)
 - [Tutorial: Balance internal traffic load with a Basic load balancer in the Azure portal](#)
 - [Learn - Improve application scalability and resiliency by using Azure Load Balancer](#)
- Troubleshoot load balancing
 - [Quickstart: Create a Load Balancer to load balance VMs using the Azure portal](#)
 - [Tutorial: Load balance internet traffic to VMs using the Azure portal](#)
 - [Troubleshoot Azure Load Balancer](#)

Monitor and troubleshoot virtual networking

- Monitor on-premises connectivity
 - [Diagnose on-premises connectivity via VPN gateways](#)
- Use Network Performance Monitor
 - [Network Performance Monitor solution: Performance monitoring](#)
- Use Network Watcher
 - [What is Azure Network Watcher?](#)
 - [Learn - Monitor and troubleshoot your end-to-end Azure network infrastructure by using network monitoring tools](#)
- Troubleshoot external networking
 - [Troubleshoot connections with Azure Network Watcher using the Azure portal](#)
- Troubleshoot virtual network connectivity
 - [Troubleshooting connectivity problems between Azure VMs](#)

Integrate an on-premises network with an Azure virtual network

- Create and configure Azure VPN Gateway
 - [What is a VPN Gateway?](#)
 - [Create a route-based VPN gateway using the Azure portal](#)

- [Learn - Connect your on-premises network to Azure with VPN Gateway](#)
 - [Create a Site-to-Site connection in the Azure portal](#)
- Configure ExpressRoute
 - [ExpressRoute overview](#)
 - [Tutorial: Create and modify an ExpressRoute circuit](#)
 - [Learn - Connect your on-premises network to the Microsoft global network by using ExpressRoute](#)
 - [Learn - Configure the network for your virtual machines](#)
- Configure Azure Virtual WAN
 - [About Azure Virtual WAN](#)
 - [Tutorial: Create a Site-to-Site connection using Azure Virtual WAN](#)
 - [Learn - Introduction to Azure Virtual WAN](#)

Monitor and back up Azure resources (10-15%)

Monitor resources by using Azure Monitor

- Configure and interpret metrics (Analyze metrics across subscriptions)
 - [Metrics in Azure Monitor](#)
 - [Quickstart: Monitor an Azure resource with Azure Monitor](#)
 - [Learn - Monitor and report on security events in Azure AD](#)
 - [Learn - Monitor performance of virtual machines by using Azure Monitor for VMs](#)
 - [Learn - Monitor, diagnose, and troubleshoot your Azure storage](#)
 - [Learn - Design a holistic monitoring strategy on Azure](#)
 - [Learn - Monitor the health of your Azure virtual machine by collecting and analyzing diagnostic data](#)
- Configure Azure Monitor logs
 - [Get started with Log Analytics in Azure Monitor](#)
 - [Manage access to log data and workspaces in Azure Monitor](#)
 - [Create a Log Analytics workspace in the Azure portal](#)
 - [Create diagnostic setting to collect resource logs and metrics in Azure](#)
 - [Learn - Analyze your Azure infrastructure by using Azure Monitor logs](#)
- Query and analyze logs (Create a query, Save a query to the dashboard, Interpret graphs)
 - [Overview of log queries in Azure Monitor](#)
 - [Get started with log queries in Azure Monitor](#)
- Set up alerts and actions

- [Create, view, and manage metric alerts using Azure Monitor](#)
 - [Metric Alerts with Dynamic Thresholds in Azure Monitor](#)
 - [Create Metric Alerts for Logs in Azure Monitor](#)
 - [Learn - Improve incident response with alerting on Azure](#)
- Configure Application Insights
 - [Manage Application Insights resources using PowerShell](#)
 - [Learn - Capture and view page load times in your Azure web app with Application Insights](#)

Implement backup and recovery

- Configure and review backup reports
 - [Configure Azure Backup reports](#)
- Perform backup and restore operations by using Azure Backup Service
 - [Back up a virtual machine in Azure](#)
 - [Restore a disk and create a recovered VM in Azure](#)
 - [Learn - Implement hybrid backup and recovery with Windows Server IaaS](#)
 - [Learn - Protect your virtual machines by using Azure Backup](#)
- Create a Recovery Services Vault (Use soft delete to recover Azure VMs)
 - [Recovery Services vaults overview](#)
 - [Create a Recovery Services vault](#)
 - [Soft delete for virtual machines](#)
- Create and configure backup policy
 - [Manage Azure VM backups with Azure Backup service](#)
- Perform site-to-site recovery by using Azure Site Recovery
 - [About Site Recovery](#)
 - [Set up disaster recovery of on-premises VMware virtual machines or physical servers to a secondary site](#)
 - [Learn - Protect your Azure infrastructure with Azure Site Recovery](#)
 - [Learn - Protect your on-premises infrastructure from disasters with Azure Site Recovery](#)

Happy learning!

Azure Administrator Courseware Team