

# Study Guide

## Exam AZ-104: Microsoft Azure Administrator

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# Purpose of this document

This study guide should help you understand what to expect on *Exam AZ-104: Microsoft Azure Administrator*, and includes a summary of the topics the exam might cover and links to additional resources. The information and materials in this document should help you focus your studies as you prepare for the exam.

## Certification

### Certification journey

For an overview of attaining Microsoft Certification, including prerequisites (if any) and additional resources, explore [The journey to Microsoft Certified: Azure Administrator Associate](#).

### Certification renewal

Once you earn your certification, don't let it expire. When you have an active certification that's expiring within six months, you should renew it—at no cost—by passing a [renewal assessment on Microsoft Learn](#). Remember to renew your certification annually if you want to retain it.

To identify which certifications are available for you to renew, visit your Certifications in your Microsoft Learn profile:

- Ensure your certification profile is connected to your Learn profile.
- Expect an email that directs you to the applicable assessment that you must pass on Microsoft Learn. You'll receive this email as soon as you have a certification that you're eligible to renew.
- When you pass an online assessment, your certification will extend by one year from the current expiration date.
- To help prepare for the assessment, explore the collection of free modules on the certification renewal page.

## About the exam

[Exam AZ-104: Microsoft Azure Administrator](#) is required to earn the [Azure Administrator Associate certification](#).

This exam measures your ability to accomplish the following technical tasks: manage Azure identities and governance; implement and manage storage; deploy and manage Azure compute resources; configure and manage virtual networking; and monitor and back up Azure resources.

As an exam candidate, you should have subject matter expertise implementing, managing, and monitoring an organization's Microsoft Azure environment. A candidate for this exam should have at least six months of direct experience administering Azure, along with a strong understanding of core Azure services, Azure workloads, security, and governance. In addition, this role should have experience using PowerShell, Azure CLI, Azure portal, and Azure Resource Manager templates.

## Passing score

A passing score is 700. [Learn more about exam scoring and score reports.](#)

## What to expect on the exam

Are you new to Microsoft certification exams? You can explore the exam environment by visiting our [exam sandbox](#). We created the sandbox so you have an opportunity to experience an exam before you take it. In the sandbox, you can interact with different question types, such as *build list*, *case studies*, and others that you might encounter in the user interface when you take an exam. Additionally, it includes the introductory screens, instructions, and help topics related to the different types of questions that your exam might include. It also includes the non-disclosure agreement that you must accept before you can launch the exam.

## Prepare to take the exam

There are several points to consider, or pursue, as you prepare for an exam. The following sections detail those points.

## Request accommodations

We're committed to ensuring all learners are set up for success. If you use assistive devices, require extra time, or need modification to any part of the exam experience, you can request an accommodation. We encourage you to learn more about available accommodations and how to obtain them by [visiting this page](#).

## Take practice tests

Taking a practice test is a great way to know whether you're ready to take the exam or if you need to study a bit more. Subject-matter experts write the Microsoft Official Practice Tests, which are designed to assess all exam objectives. Take the [AZ-104: Microsoft Azure Administrator Microsoft Official Practice Test](#).

## Objective domain: skills the exam measures

The English language version of this exam will be updated on July 28, 2022. If you're taking this exam's English version on or before this date, the following Skills Measured is what you should study. If you want to review changes to the future version, scroll to the end of this document.

Some exams are localized into other languages, and those are updated approximately eight weeks after the English version is released. Other available languages are listed in the **Schedule Exam** section of the **Exam Details** webpage. If the exam isn't available in your preferred language, you can request an additional 30 minutes to complete the exam.

### Note

The bullets that follow each of the skills measured are intended to illustrate how we are assessing that skill. Related topics may be covered in the exam.

### Note

Most questions cover features that are general availability (GA). The exam may contain questions on Preview features if those features are commonly used.

## Skills measured

- Manage Azure identities and governance (15–20%)
- Implement and manage storage (15–20%)
- Deploy and manage Azure compute resources (20–25%)
- Configure and manage virtual networking (25–30%)
- Monitor and back up Azure resources (10–15%)

## Functional groups

### Manage Azure identities and governance (15–20%)

#### Manage Azure Active Directory (Azure AD) objects

- Create users and groups
- Create administrative units
- Manage user and group properties
- Manage device settings
- Perform bulk user updates
- Manage guest accounts
- Configure Azure AD join
- Configure self-service password reset

#### Manage role-based access control (RBAC)

- Create a custom role
- Provide access to Azure resources by assigning roles at different scopes
- Interpret access assignments

#### Manage subscriptions and governance

- Configure Azure policies
- Configure resource locks
- Apply and manage tags on resources
- Manage resource groups
- Manage subscriptions

- Manage costs
- Configure management groups

## **Implement and manage storage (15–20%)**

### **Secure storage**

- Configure network access to storage accounts
- Create and configure storage accounts
- Generate shared access signature (SAS) tokens
- Manage access keys
- Configure Azure AD authentication for a storage account
- Configure access to Azure Files

### **Manage storage**

- Export from Azure job
- Import into Azure job
- Install and use Azure Storage Explorer
- Copy data by using AZCopy
- Implement Azure Storage replication
- Configure blob object replication

### **Configure Azure files and Azure Blob Storage**

- Create an Azure file share
- Create and configure Azure File Sync service
- Configure Azure Blob Storage
- Configure storage tiers
- Configure blob lifecycle management

## **Deploy and manage Azure compute resources (20–25%)**

### **Automate deployment of virtual machines (VMs) by using Azure Resource Manager templates**

- Modify an Azure Resource Manager template
- Configure a virtual hard disk (VHD) template
- Deploy from a template
- Save a deployment as an Azure Resource Manager template
- Deploy virtual machine extensions

### **Configure VMs**

- Configure Azure Disk Encryption
- Move VMs from one resource group to another

- Manage VM sizes
- Add data disks
- Configure networking
- Redeploy VMs
- Configure high availability
- Deploy and configure virtual machine scale sets

## **Create and configure containers**

- Configure sizing and scaling for Azure Container Instances
- Configure container groups for Azure Container Instances
- Configure storage for Azure Kubernetes Service (AKS)
- Configure scaling for AKS
- Configure network connections for AKS
- Upgrade an AKS cluster

## **Create and configure Azure App Service**

- Create an App Service plan
- Configure scaling settings in an App Service plan
- Create an App Service
- Secure an App Service
- Configure custom domain names
- Configure backup for an App Service
- Configure networking settings
- Configure deployment settings

## **Configure and manage virtual networking (25–30%)**

### **Implement and manage virtual networking**

- Create and configure virtual networks, including peering
- Configure private and public IP addresses
- Configure user-defined network routes
- Implement subnets
- Configure endpoints on subnets
- Configure private endpoints
- Configure Azure DNS, including custom DNS settings and private or public DNS zones

### **Secure access to virtual networks**

- Create security rules
- Associate a network security group (NSG) to a subnet or network interface
- Evaluate effective security rules
- Implement Azure Firewall

- Implement Azure Bastion

## **Configure load balancing**

- Configure Azure Application Gateway
- Configure an internal or public load balancer
- Troubleshoot load balancing

## **Monitor and troubleshoot virtual networking**

- Monitor on-premises connectivity
- Configure and use Azure Monitor for Networks
- Use Azure Network Watcher
- Troubleshoot external networking
- Troubleshoot virtual network connectivity

## **Integrate an on-premises network with an Azure virtual network**

- Create and configure Azure VPN Gateway
- Create and configure Azure ExpressRoute
- Configure Azure Virtual WAN

## **Monitor and back up Azure resources (10–15%)**

### **Monitor resources by using Azure Monitor**

- Configure and interpret metrics
- Configure Azure Monitor logs
- Query and analyze logs
- Set up alerts and actions
- Configure Application Insights

### **Implement backup and recovery**

- Create a Recovery Services vault
- Create a Backup vault
- Create and configure backup policy
- Perform backup and restore operations by using Azure Backup
- Perform site-to-site recovery by using Azure Site Recovery
- Configure and review backup reports

# **Corresponding learning paths and modules**

The design of learning paths and modules should teach you how to perform a role and will help you study for the applicable exam. However, learning paths aren't always in the same order as an exam's

“skills measured” list. Therefore, we’ve created a convenient table that links the skills measured to specific paths and modules.

Exam skills measured	Links to learning paths
<b>Manage Azure identities and governance (15–20%)</b>	<a href="#">AZ-104 Learning Path: Manage identities and governance in Azure</a> <ul style="list-style-type: none"> <li>• <a href="#">Configure Azure Active Directory</a></li> <li>• <a href="#">Configure user and group accounts</a></li> <li>• <a href="#">Configure subscriptions</a></li> <li>• <a href="#">Configure Azure policy</a></li> <li>• <a href="#">Configure role-based access control</a></li> <li>• <a href="#">Create Azure users and groups in Azure Active Directory</a></li> <li>• <a href="#">Secure your Azure resources with Azure role-based access control (Azure RBAC)</a></li> <li>• <a href="#">Allow users to reset their password with Azure Active Directory self-service password reset</a></li> </ul>
<b>Implement and manage storage (15–20%)</b>	<a href="#">AZ-104 Learning Path: Implement and manage storage in Azure</a> <ul style="list-style-type: none"> <li>• <a href="#">Configure storage accounts</a></li> <li>• <a href="#">Configure blob storage</a></li> <li>• <a href="#">Configure storage security</a></li> <li>• <a href="#">Configure Azure files and Azure File Sync</a></li> <li>• <a href="#">Configure storage with tools</a></li> <li>• <a href="#">Create an Azure Storage account</a></li> <li>• <a href="#">Control access to Azure Storage with shared access signatures</a></li> <li>• <a href="#">Upload, download, and manage data with Azure Storage Explorer</a></li> </ul>
<b>Deploy and manage Azure compute resources (20–25%)</b>	<a href="#">AZ-104 Learning Path: Deploy and manage Azure compute resources</a> <ul style="list-style-type: none"> <li>• <a href="#">Configure virtual machines</a></li> <li>• <a href="#">Configure virtual machine availability</a></li> <li>• <a href="#">Configure virtual machine extensions</a></li> <li>• <a href="#">Configure app service plans</a></li> <li>• <a href="#">Configure Azure App Services</a></li> <li>• <a href="#">Configure Azure Container Instances</a></li> <li>• <a href="#">Configure Azure Kubernetes Service</a></li> </ul>



Exam skills measured	Links to learning paths
<b>Configure and manage virtual networking (25–30%)</b>	<ul style="list-style-type: none"> <li>• <a href="#">Manage virtual machines with the Azure CLI</a></li> <li>• <a href="#">Create a Windows virtual machine in Azure</a></li> <li>• <a href="#">Host a web application with Azure App Service</a></li> <li>• <a href="#">Protect your virtual machine settings with Azure Automation State Configuration</a></li> </ul> <hr/> <p><a href="#">AZ-104 Learning Path: Configure and manage virtual networks for Azure administrators</a></p> <ul style="list-style-type: none"> <li>• <a href="#">Configure virtual networks</a></li> <li>• <a href="#">Configure network security groups</a></li> <li>• <a href="#">Configure Azure Firewall</a></li> <li>• <a href="#">Configure Azure DNS</a></li> <li>• <a href="#">Configure virtual network peering</a></li> <li>• <a href="#">Configure VPN Gateway</a></li> <li>• <a href="#">Configure ExpressRoute and Virtual WAN</a></li> <li>• <a href="#">Configure network routing and endpoints</a></li> <li>• <a href="#">Configure Azure Load Balancer</a></li> <li>• <a href="#">Configure Azure Application Gateway</a></li> <li>• <a href="#">Design an IP addressing schema for your Azure deployment</a></li> <li>• <a href="#">Distribute your services across Azure virtual networks and integrate them by using virtual network peering</a></li> <li>• <a href="#">Host your domain on Azure DNS</a></li> <li>• <a href="#">Manage and control traffic flow in your Azure deployment with routes</a></li> <li>• <a href="#">Improve application scalability and resiliency by using Azure Load Balancer</a></li> </ul> <hr/>
<b>Monitor and back up Azure resources (10–15%)</b>	<p><a href="#">AZ-104 Learning Path: Monitor and back up Azure resources</a></p> <ul style="list-style-type: none"> <li>• <a href="#">Configure file and folder backups</a></li> <li>• <a href="#">Configure virtual machine backups</a></li> <li>• <a href="#">Configure Azure Monitor</a></li> <li>• <a href="#">Configure Azure alerts</a></li> <li>• <a href="#">Configure Log Analytics</a></li> <li>• <a href="#">Configure Network Watcher</a></li> <li>• <a href="#">Improve incident response with alerting on Azure</a></li> </ul> <hr/>

Exam skills measured	Links to learning paths
	<ul style="list-style-type: none"> <li><a href="#">Analyze your Azure infrastructure by using Azure Monitor logs</a></li> <li><a href="#">Monitor performance of virtual machines by using Azure Monitor VM Insights</a></li> </ul>

## Additional study resources

We offer several resources to help you prepare for the exam and stay current and engaged with the Microsoft Azure community. These resources range from formal training to blogs and even interviews with Microsoft team members.

Study resource link	Resource description
<a href="#">Course AZ-104T00: Microsoft Azure Administrator</a>	Take a four-day, instructor-led course that teaches IT Professionals how to manage their Azure subscriptions, secure identities, administer the infrastructure, configure virtual networking, connect Azure and on-premises sites, manage network traffic, implement storage solutions, create and scale virtual machines, implement web apps and containers, back up and share data, and monitor your solution.
<a href="#">Exam Prep Videos</a>	Visit our Exam Readiness Zone for short videos on strategies and tips to prepare for the exam.
<a href="#">Azure documentation</a>	Stay informed on the latest products, tools, and features, and get information on pricing, partners, support, solutions, and more.
<a href="#">Azure Community Support</a>	Ask questions, get answers, and connect with Microsoft engineers and Azure community experts.
<a href="#">Microsoft Learn Community Blog</a>	Get the latest information about certification tests and exam study groups.
<a href="#">Azure Fridays</a>	Scott Hanselman, Partner Program Manager, speaks with Azure engineers as they demo capabilities and share insights.

Study resource link	Resource description
<a href="#">Microsoft Azure Blog</a>	Keep current on what's happening in Azure, including what's in preview and what's generally available, along with Azure news, updates, and much more.

## Detailed exam changes

Our exams are updated periodically to reflect skills that are required to perform a role. The following Objective Domain depicts the additions, deletions, and modifications to the exam.

Objective	Changes
Audience Profile	Major Revision
Manage Azure AD objects	Major Revision
Manage role-based access control (RBAC)	Minor Revision
Manage Azure subscriptions and governance	Minor Revision
Secure Storage	Major Revision
Manage storage	Major Revision
Configure Azure files and Azure blob storage	Minor Revision
Automate deployment of virtual machines (VMs) by using ARM templates	Minor Revision
Configure VM	Major Revision
Implement and manage virtual networks	Major Revision
Secure access to virtual networks	Minor Revision
Configure load balancing	Minor Revision
Monitor and troubleshoot virtual networking	Minor Revision
Integrate on-premises network with an Azure virtual network	Minor Revision
Monitor resources with Azure Monitor	Minor Revision
Implement backup and recovery	Minor Revision

## Audience Profile

Candidates for this exam should have subject matter expertise in implementing, managing, and monitoring an organization's Microsoft Azure environment, including virtual networks, storage, compute, identity, security, and governance.

An Azure administrator often serves as part of a larger team dedicated to implementing an organization's cloud infrastructure. Azure administrators also coordinate with other roles to deliver Azure networking, security, database, application development, and DevOps solutions.

Candidates for this exam should be familiar with operating systems, networking, servers, and virtualization. In addition, professionals in this role should have experience using PowerShell, Azure CLI, the Azure portal, and Azure Resource Manager templates (ARM templates).

## Skills Measured

- Manage Azure identities and governance (15–20%)
- Implement and manage storage (15–20%)
- Deploy and manage Azure compute resources (20–25%)
- Configure and manage virtual networking (20–25%)
- Monitor and maintain Azure resources (10–15%)

## Functional groups

### Manage Azure identities and governance (15—20%)

#### Manage Azure Active Directory (Azure AD) objects

- Create users and groups
- Manage licenses in Azure AD
- Create administrative units
- Manage user and group properties
- Manage device settings and device identity
- Perform bulk updates
- Manage guest accounts
- Configure self-service password reset

#### Manage access control

- Create custom role-based access control (RBAC) and Azure AD roles
- Provide access to Azure resources by assigning roles at different scopes
- Interpret access assignments

#### Manage Azure subscriptions and governance

- Configure and manage Azure Policy
- Configure resource locks
- Apply and manage tags on resources
- Manage resource groups
- Manage subscriptions
- Manage costs by using alerts, budgets, and recommendations
- Configure management groups

### Implement and manage storage (15—20%)

#### Configure access to storage

- Configure network access to storage accounts
- Create and configure storage accounts
- Generate shared access signature tokens
- Configure stored access policies
- Manage access keys

- Configure Azure AD authentication for a storage account
- Configure storage encryption

## **Manage data in Azure storage accounts**

- Create import and export jobs
- Manage data by using Azure Storage Explorer and AzCopy
- Implement Azure Storage redundancy
- Configure object replication

## **Configure Azure Files and Azure Blob Storage**

- Create an Azure file share
- Configure Azure Blob Storage
- Configure storage tiers
- Configure blob lifecycle management

## **Deploy and manage Azure compute resources (20—25%)**

### **Automate deployment of resources by using templates**

- Modify an ARM template
- Deploy a template
- Save a deployment as an ARM template
- Deploy virtual machine (VM) extensions

### **Create and configure VMs**

- Create a VM
- Manage images by using the Azure Compute Gallery
- Configure Azure Disk Encryption
- Move VMs from one resource group to another
- Manage VM sizes
- Add data disks
- Configure VM network settings
- Configure VM availability options
- Deploy and configure VM scale sets

### **Create and configure containers**

- Configure sizing and scaling for Azure Container Instances
- Configure container groups for Azure Container Instances
- Configure storage for Azure Kubernetes Service (AKS)
- Configure scaling for AKS
- Configure network connections for AKS
- Upgrade an AKS cluster

### **Create and configure an Azure App Service**

- Create an App Service plan
- Configure scaling settings in an App Service plan
- Create an App Service

- Secure an App Service
- Configure custom domain names
- Configure backup for an App Service
- Configure networking settings
- Configure deployment settings

## **Configure and manage virtual networking (20—25%)**

### **Configure virtual networks**

- Create and configure virtual networks and subnets
- Create and configure virtual network peering
- Configure private and public IP addresses
- Configure user-defined network routes
- Configure Azure DNS

### **Configure secure access to virtual networks**

- Create and configure network security groups (NSGs) and application security groups (ASGs)
- Evaluate effective security rules
- Implement Azure Bastion
- Configure service endpoints on subnets
- Configure private endpoints

### **Configure load balancing**

- Configure Azure Application Gateway
- Configure an internal or public load balancer
- Troubleshoot load balancing

### **Monitor virtual networking**

- Monitor on-premises connectivity
- Configure and use Azure Monitor for networks
- Use Azure Network Watcher
- Troubleshoot external networking
- Troubleshoot virtual network connectivity

## **Monitor and maintain Azure resources (10—15%)**

### **Monitor resources by using Azure Monitor**

- Configure and interpret metrics
- Configure Azure Monitor Logs
- Query and analyze logs
- Set up alerts and actions
- Configure monitoring of VMs, storage accounts, and networks by using VM insights

### **Implement backup and recovery**

- Create an Azure Recovery Services vault
- Create an Azure Backup vault

- Create and configure backup policy
- Perform backup and restore operations by using Azure Backup
- Configure Azure Site Recovery for Azure resources
- Perform failover to a secondary region by using Azure Site Recovery
- Configure and review backup reports