# [Deploy and Configure Infrastructure (25-30%)](https://www.microsoft.com/en-us/learning/exam-az-300.aspx#syllabus-1)

## Analyze resource utilization and consumption

*May include but not limited to: Configure diagnostic settings on resources; create baseline for resources; create and rest alerts; analyze alerts across subscription; analyze metrics across subscription; create action groups; monitor for unused resources; monitor spend; report on spend; utilize Log Search query functions; view alerts in Azure Monitor logs*

Configure diagnostic settings on resources;

* [Automatically enable Diagnostic Settings at resource creation using a Resource Manager template](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-enable-diagnostic-logs-using-template)
* [MANAGING MULTIPLE AZURE DIAGNOSTIC SETTINGS USING AZURE CLI INSTEAD OF POWERSHELL](http://techgenix.com/azure-diagnostic-settings/)
* [Collect and consume log data from your Azure resources](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-overview-of-diagnostic-logs)
* [What is Azure Diagnostics extension](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/azure-diagnostics)
* [Monitoring data collected by Azure Monitor](https://docs.microsoft.com/en-us/azure/monitoring/monitoring-data-collection)

create baseline for resources; monitor spend; report on spend;

* [Manage Azure resources with these top tips of 2017](https://searchcloudcomputing.techtarget.com/feature/Manage-Azure-resources-with-these-top-tips-of-2017)
* [Use Cloudyn reports](https://docs.microsoft.com/en-us/azure/cost-management/use-reports)
* [Prevent unexpected charges with Azure billing and cost management](https://docs.microsoft.com/en-us/azure/billing/billing-getting-started)

create and rest alerts;

analyze alerts across subscription;

* [Prevent unexpected charges with Azure billing and cost management](https://docs.microsoft.com/en-us/azure/billing/billing-getting-started)

analyze metrics across subscription;

* [Azure Monitor Metrics Explorer](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-metric-charts)

create action groups; monitor for unused resources;

* [Create and manage action groups in the Azure portal](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-action-groups?toc=/azure/azure-monitor/toc.json)

utilize Log Search query functions; view alerts in Log Analytics

* [Log Analytics Examples](https://github.com/MicrosoftDocs/LogAnalyticsExamples/tree/master/log-analytics)

## Create and configure storage accounts

*May include but not limited to: Configure network access to the storage account; create and configure storage account; generate shared access signature; install and use Azure Storage Explorer; manage access keys; monitor activity log by using Azure Monitor logs; implement Azure storage replication*

* Configure network access to the storage account;
  + [Configure Azure Storage firewalls and virtual networks](https://docs.microsoft.com/en-us/azure/storage/common/storage-network-security)
* create and configure storage account;
  + [Create a storage account](https://docs.microsoft.com/en-us/azure/storage/common/storage-create-storage-account)
  + [Introduction to Azure Storage](https://docs.microsoft.com/en-us/azure/storage/common/storage-introduction)
* generate shared access signature; manage access keys;
  + [Using shared access signatures (SAS)](https://docs.microsoft.com/en-us/azure/storage/common/storage-dotnet-shared-access-signature-part-1)
  + [Shared Access Signatures, Part 2: Create and use a SAS with Blob storage](https://docs.microsoft.com/en-us/azure/storage/blobs/storage-dotnet-shared-access-signature-part-2)
* install and use Azure Storage Explorer;
  + [Gestarted with Storage Explorer](https://docs.microsoft.com/en-us/azure/vs-azure-tools-storage-manage-with-storage-explorer?tabs=windows)
* monitor activity log by using Log Analytics;
  + [Storage Analytics](https://docs.microsoft.com/en-us/rest/api/storageservices/storage-analytics)
* implement Azure storage replication
  + [Azure Storage replication](https://docs.microsoft.com/en-us/azure/storage/common/storage-redundancy)

## Create and configure a Virtual Machine (VM) for Windows and Linux

*May include but not limited to:* Configure high availability; configure monitoring, networking, storage, and virtual machine size; deploy and configure scale sets

Configure high availability;

* [Understanding Azure Availability Sets](https://www.petri.com/understanding-azure-availability-sets)
* [Tutorial: Create and deploy highly available virtual machines with Azure PowerShell](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/tutorial-availability-sets)
* [Manage the availability of Windows virtual machines in Azure](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/manage-availability)
* [Regions and availability for virtual machines in Azure](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/regions-and-availability)
* [Design for Virtual Machines with High Availability Using Azure](https://dzone.com/articles/design-for-virtual-machines-with-high-availability)
* [High availability in Azure](https://4sysops.com/archives/high-availability-in-azure/)

configure monitoring, networking, storage, and virtual machine size;

* [How to monitor virtual machines in Azure](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/monitor)
* [Rich insights for virtual machines from Azure Monitor](https://azure.microsoft.com/en-ca/blog/rich-insights-for-virtual-machines-from-azure-monitor/)
* [Microsoft Azure Virtual Machine Monitoring with Azure Diagnostics Extension](https://azure.microsoft.com/en-us/blog/windows-azure-virtual-machine-monitoring-with-wad-extension/)
* <https://docs.microsoft.com/en-us/azure/virtual-machines/windows/tutorial-monitoring>

Configure VM size

* [Resize virtual machines](https://azure.microsoft.com/en-ca/blog/resize-virtual-machines/)
* [Resize a Windows VM](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/resize-vm) (Powershell)
* [Notes on changing Azure VM size](https://thuansoldier.net/6515/)
* <https://blogs.msdn.microsoft.com/madan/2016/09/28/resize-azure-resource-manager-arm-vm-os-data-disk-using-azure-portal/>
* [How to expand the OS drive of a virtual machine](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/expand-os-disk)
* [Expand virtual hard disks on a Linux VM with the Azure CLI](https://docs.microsoft.com/en-us/azure/virtual-machines/linux/expand-disks)

Configure Networking

* [Overview of Windows virtual machines in Azure](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/overview)
* [Quickstart: Create a Windows virtual machine in the Azure portal](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/quick-create-portal)
* [Tutorial: Create and Manage Windows VMs with Azure PowerShell](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/tutorial-manage-vm)

deploy and configure scale sets

* [Understanding Azure Virtual Machine Scale Sets (Part 1)](https://www.itprotoday.com/microsoft-azure/understanding-azure-virtual-machine-scale-sets-part-1)
* [Understanding Azure Virtual Machine Scale Sets (Part 2)](https://www.itprotoday.com/industry-perspectives/understanding-azure-virtual-machine-scale-sets-part-2)
* [Virtual Machine Scale Sets](https://azure.microsoft.com/en-ca/services/virtual-machine-scale-sets/)
* [What are virtual machine scale sets?](https://docs.microsoft.com/en-us/azure/virtual-machine-scale-sets/overview)
* [Quickstart: Create a virtual machine scale set in the Azure portal](https://docs.microsoft.com/en-us/azure/virtual-machine-scale-sets/quick-create-portal)

## Automate deployment of Virtual Machines (VMs)

*May include but not limited to:* Modify Azure Resource Manager template; configure location of new VMs; configure VHD template; deploy from template; save a deployment as an Azure Resource Manager template; deploy Windows and Linux VMs

Modify Azure Resource Manager (ARM) template; save a deployment as an ARM template;

* [Create a Windows virtual machine from a Resource Manager template](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/ps-template)
* [Azure Quickstart Templates](https://github.com/Azure/azure-quickstart-templates) see 101-vm-\*

configure location of new VMs;

configure VHD template; deploy from template;

* [Creating Virtual Machine Templates in VMM](https://docs.microsoft.com/en-us/previous-versions/system-center/virtual-machine-manager-2007/bb963734(v=technet.10))
* [How to Create a Template from a Virtual Hard Disk](https://docs.microsoft.com/en-us/previous-versions/system-center/virtual-machine-manager-2008-r2/cc956136(v=technet.10))
* [How to Create a Virtual Machine Template](https://docs.microsoft.com/en-us/previous-versions/system-center/virtual-machine-manager-2007/bb740832(v=technet.10))

deploy Windows and Linux VMs

## Implement solutions that use virtual machines (VM)

*May include but not limited to:* Provision VMs; create Azure Resource Manager templates; configure Azure Disk Encryption for VMs

create Azure Resource Manager templates

* [Create a Windows virtual machine from a Resource Manager template](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/ps-template)
* [Azure Quickstart Templates](https://github.com/Azure/azure-quickstart-templates) see 101-vm-\*

## Create connectivity between virtual networks

*May include but not limited to:* Create and configure VNET peering; create and configure VNET to VNET; verify virtual network connectivity; create virtual network gateway

Create and configure VNET peering;

* [Virtual network peering](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-peering-overview)
* [Tutorial: Connect virtual networks with virtual network peering using the Azure portal](https://docs.microsoft.com/en-us/azure/virtual-network/tutorial-connect-virtual-networks-portal)
* [Create, change, or delete a virtual network peering](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-manage-peering)
* <https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-peering-gateway-transit?toc=%2fazure%2fvirtual-network%2ftoc.json>

create and configure VNET to VNET;

* [Configure a VNet-to-VNet VPN gateway connection using the Azure portal](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-howto-vnet-vnet-resource-manager-portal)
* [What is VPN Gateway?](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-vpngateways)

verify virtual network connectivity;

* [Verify a VPN Gateway connection](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-verify-connection-resource-manager)

create virtual network gateway

* [What is VPN Gateway?](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-vpngateways)
* [Create and manage a VPN gateway](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-tutorial-create-gateway-powershell)
* [New-AzureRmLocalNetworkGateway](https://docs.microsoft.com/en-us/powershell/module/azurerm.network/new-azurermlocalnetworkgateway?view=azurermps-6.13.0)

## Implement and manage virtual networking

*May include but not limited to: Configure private and public IP addresses, network routes, network interface, subnets, and virtual network*

Configure Private IP address:

* [Configure private IP addresses for a virtual machine using the Azure portal](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-networks-static-private-ip-arm-pportal)

Configure Public IP address:

* [Create a virtual machine with a static public IP address using the Azure portal](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-deploy-static-pip-arm-portal)

Network interface, subnets,

* [Create, change, or delete a network interface](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-network-interface)
* [Add, change, or delete a virtual network subnet](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-manage-subnet)

Configure Routing:

* [Virtual network traffic routing](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-networks-udr-overview)

IP Addressing VNET:

* [IP address types and allocation methods in Azure](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-ip-addresses-overview-arm)

## Manage Azure Active Directory (AD)

*May include but not limited to: Add custom domains; configure Azure AD Identity Protection, Azure AD Join, and Enterprise State Roaming; configure self-service password reset; implement conditional access policies; manage multiple directories; perform an access review*

Add custom domains;

* [How to: Add your custom domain name using the Azure Active Directory portal](https://docs.microsoft.com/en-us/azure/active-directory/fundamentals/add-custom-domain)
* [Managing custom domain names in your Azure Active Directory](https://docs.microsoft.com/en-us/azure/active-directory/users-groups-roles/domains-manage)

Configure self-service password reset;

* [How it works: Azure AD self-service password reset](https://docs.microsoft.com/en-us/azure/active-directory/authentication/concept-sspr-howitworks)
* [How to successfully roll out self-service password reset](https://docs.microsoft.com/en-us/azure/active-directory/authentication/howto-sspr-deployment)
* [Quickstart: Self-service password reset](https://docs.microsoft.com/en-us/azure/active-directory/authentication/quickstart-sspr)
* [Password management frequently asked questions](https://docs.microsoft.com/en-us/azure/active-directory/authentication/active-directory-passwords-faq)

implement conditional access policies;

* [What is conditional access in Azure Active Directory?](https://docs.microsoft.com/en-us/azure/active-directory/conditional-access/overview)
* [Azure Active Directory conditional access settings reference](https://docs.microsoft.com/en-us/azure/active-directory/conditional-access/technical-reference)
* [Azure AD Conditional Access Documentation](https://docs.microsoft.com/en-us/azure/active-directory/conditional-access/)

Manage multiple directories;

* [Creating and Managing Multiple Windows Azure Active Directories](https://techcommunity.microsoft.com/t5/Azure-Active-Directory-Identity/Creating-and-Managing-Multiple-Windows-Azure-Active-Directories/ba-p/243428)
* [Manage your Azure Active Directory tenant](https://docs.microsoft.com/en-us/azure/active-directory/fundamentals/active-directory-administer)

Configure Azure AD Identity Protection, Azure AD Join, and Enterprise State Roaming

* [What is Azure Active Directory Identity Protection?](https://docs.microsoft.com/en-us/azure/active-directory/identity-protection/overview)
* [Enabling Azure Active Directory Identity Protection](https://docs.microsoft.com/en-us/azure/active-directory/identity-protection/enable)
* [Azure Active Directory Identity Protection](https://azure.microsoft.com/en-ca/resources/videos/azure-active-directory-identity-protection/)
* [Azure AD Join](https://aadguide.azurewebsites.net/aadjoin/)
* [HOW TO JOIN A WINDOWS 10 COMPUTER TO YOUR AZURE ACTIVE DIRECTORY](https://tech.xenit.se/join-windows-10-computer-azure-active-directory/)
* [What is enterprise state roaming?](https://docs.microsoft.com/en-us/azure/active-directory/devices/enterprise-state-roaming-overview)
* [Enable Enterprise State Roaming in Azure Active Directory](https://docs.microsoft.com/en-us/azure/active-directory/active-directory-windows-enterprise-state-roaming-enable)

Perform an access review

* [Azure AD access reviews](https://docs.microsoft.com/en-us/azure/active-directory/governance/access-reviews-overview)
* [Review access with Azure AD access reviews](https://docs.microsoft.com/en-us/azure/active-directory/governance/perform-access-review)
* [Manage user access with Azure AD access reviews](https://docs.microsoft.com/en-us/azure/active-directory/governance/manage-user-access-with-access-reviews)

## Implement and manage hybrid identities

*May include but not limited to: Install and configure Azure AD Connect; configure federation and single sign-on; manage Azure AD Connect; manage password sync and writeback*

Prepare of AD Connect Synchronization

* [Install and run the Office 365 IdFix tool](https://docs.microsoft.com/en-us/office365/enterprise/install-and-run-idfix)
* [Prepare directory attributes for synchronization with Office 365 by using the IdFix tool](https://docs.microsoft.com/en-us/office365/enterprise/prepare-directory-attributes-for-synch-with-idfix)
* [Azure AD Connect sync: Operational tasks and consideration](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-sync-operations) (see details about staging mode)

configure federation and single sign-on;

* [Azure Active Directory Seamless Single Sign-On](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-sso)
* [How to configure federated single sign-on for an Azure AD Gallery application](https://docs.microsoft.com/en-us/azure/active-directory/application-config-sso-how-to-configure-federated-sso-gallery)
* [What is application access and single sign-on with Azure Active Directory?](https://docs.microsoft.com/en-us/azure/active-directory/manage-apps/what-is-single-sign-on)

Install and configure Azure AD Connect;

* [Getting started with Azure AD Connect using express settings](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-install-express)
* [Custom installation of Azure AD Connect](https://docs.microsoft.com/en-us/azure/active-directory/connect/active-directory-aadconnect-get-started-custom)

AAD Pass-through Authentication

* [User sign-in with Azure Active Directory Pass-through Authentication](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-pta)
* [Azure Active Directory Pass-through Authentication: Quick start](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-pta-quick-start)

Manage Azure AD Connect;

* [Implement password hash synchronization with Azure AD Connect sync](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-password-hash-synchronization)
* [Enable password synchronization to Azure Active Directory Domain Services](https://docs.microsoft.com/en-us/azure/active-directory-domain-services/active-directory-ds-getting-started-password-sync-synced-tenant)
* [How-to: Configure password writeback](https://docs.microsoft.com/en-us/azure/active-directory/authentication/howto-sspr-writeback)

Azure AD Connect Health

* [Hybrid identity and Microsoft identity solutions](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/whatis-hybrid-identity)
* [Azure AD Connect Health Agent Installation](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-health-agent-install)

Azure AD Connect - Filtering / Objects not replicated

* [ONE OR MORE ON-PREMISE AD OBJECTS DON'T SYNC TO OFFICE 365 (AAD)](https://www.techtask.com/one-or-more-on-premise-ad-objects-dont-sync-to-office-365-aad/?doing_wp_cron=1540865304.4335451126098632812500)
* [Azure AD Connect sync: Understanding the default configuration](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/concept-azure-ad-connect-sync-default-configuration)Especially
  + IsPresent([isCriticalSystemObject]). Ensure many out-of-box objects in Active Directory, such as the built-in administrator account, are not synchronized.

Home Realm Discovery

* [Home Realm Discovery Customization](https://docs.microsoft.com/en-us/windows-server/identity/ad-fs/operations/home-realm-discovery-customization)
* [Configure Azure Active Directory sign in behavior for an application by using a Home Realm Discovery policy](https://docs.microsoft.com/en-us/azure/active-directory/manage-apps/configure-authentication-for-federated-users-portal)

Active Directory Federation Services

* [What is ADFS?](https://www.okta.com/blog/2018/06/what-is-adfs/)
* [Active Directory Federation Services](https://en.wikipedia.org/wiki/Active_Directory_Federation_Services)

# [Implement Workloads and Security (20-25%)](https://www.microsoft.com/en-us/learning/exam-az-300.aspx#syllabus-2)

## Migrate servers to Azure

*May include but not limited to: Migrate by using Azure Site Recovery; migrate using P2V; configure storage; create a backup vault; prepare source and target environments; backup and restore data; deploy Azure Site Recovery agent; prepare virtual network*

Migrate by using Azure Site Recovery (ASR);

* [Migrate on-premises machines to Azure](https://docs.microsoft.com/en-us/azure/site-recovery/migrate-tutorial-on-premises-azure)
* [Migrate Azure VMs to another region](https://docs.microsoft.com/en-us/azure/site-recovery/azure-to-azure-tutorial-migrate?fbclid=IwAR3y38ngtkKwc39Y7PO0dg2CHf7uxx_Z1KdE0n_FcIAm6KiBa_99mlSBbwo)
* [Prepare Azure resources for disaster recovery of on-premises machines](https://docs.microsoft.com/en-us/azure/site-recovery/tutorial-prepare-azure)
* [Set up disaster recovery to Azure for on-premises physical servers](https://docs.microsoft.com/en-us/azure/site-recovery/physical-azure-disaster-recovery)
* [Set up disaster recovery of on-premises Hyper-V VMs to Azure](https://docs.microsoft.com/en-us/azure/site-recovery/hyper-v-azure-tutorial)

migrate using P2V; (ASR is preferred)

1. [The way to migrate to Hyper-V / Azure : Introduction](http://social.technet.microsoft.com/wiki/contents/articles/30218.the-way-to-migrate-to-hyper-v-azure-introduction.aspx)
2. [The way to migrate  VMware to Hyper-V: SCVMM V2V](http://social.technet.microsoft.com/wiki/contents/articles/30215.the-way-to-migrate-vmware-to-hyper-v-scvmm-v2v.aspx)
3. [The way to migrate VMware/Physical to  Hyper-V / Azure: MVMC/MAT](http://social.technet.microsoft.com/wiki/contents/articles/30217.the-way-to-migrate-vmwarephysical-to-hyper-v-azure-mvmcmat.aspx)
4. [The way to migrate from anywhere to Azure: Migration Accelerator (MA)](http://social.technet.microsoft.com/wiki/contents/articles/30216.the-way-to-migrate-from-anywhere-to-azure-migration-accelerator-ma.aspx)

<https://docs.microsoft.com/en-us/azure/site-recovery/hyper-v-azure-support-matrix>

<https://docs.microsoft.com/en-us/azure/site-recovery/hyper-v-vmm-network-mapping>

Configure storage;

* [Can I replicate over a site-to-site VPN to Azure?](https://docs.microsoft.com/en-us/azure/site-recovery/site-recovery-faq#can-i-replicate-over-a-site-to-site-vpn-to-azure)
* [If I replicate to Azure what kind of storage account do I need?](https://docs.microsoft.com/en-us/azure/site-recovery/site-recovery-faq#if-i-replicate-to-azure-what-kind-of-storage-account-do-i-need)
* [Is replication data sent to the Site Recovery service?](https://docs.microsoft.com/en-us/azure/site-recovery/site-recovery-faq#is-replication-data-sent-to-the-site-recovery-service)

create a backup vault;

* [Monitor and manage Recovery Services vaults](https://docs.microsoft.com/en-us/azure/backup/backup-azure-manage-windows-server)

prepare source and target environments;

backup and restore data;

deploy Azure Site Recovery (ASR) agent;

* [Best Practices: How to deploy Azure Site Recovery Mobility Service](https://azure.microsoft.com/en-ca/blog/azure-site-recovery-best-practice-how-to-deploy-mobility-service/)
* [Install the Mobility service for disaster recovery of VMware VMs and physical servers](https://docs.microsoft.com/en-us/azure/site-recovery/vmware-azure-install-mobility-service)

prepare virtual network

## Configure serverless computing

*May include but not limited to: Create and manage objects; manage a Logic App resource; manage Azure Function app settings; manage Event Grid; manage Service Bus*

*Manage a Logic App resource;*

* [*What is Azure Logic Apps?*](https://docs.microsoft.com/en-us/azure/logic-apps/logic-apps-overview)
* [*Manage logic apps with Visual Studio*](https://docs.microsoft.com/en-us/azure/logic-apps/manage-logic-apps-with-visual-studio)
* [*Create Azure Resource Manager templates for deploying logic apps*](https://docs.microsoft.com/en-us/azure/logic-apps/logic-apps-create-deploy-template)
* [*Simple enterprise integration*](https://docs.microsoft.com/en-us/azure/architecture/reference-architectures/enterprise-integration/simple-enterprise-integration)
* [*Common scenarios, examples, tutorials, and walkthroughs for Azure Logic Apps*](https://docs.microsoft.com/en-us/azure/logic-apps/logic-apps-examples-and-scenarios)

*Manage Azure Function app settings;*

* [*How to manage a function app in the Azure portal*](https://docs.microsoft.com/en-us/azure/azure-functions/functions-how-to-use-azure-function-app-settings)
* [*How to target Azure Functions runtime versions*](https://docs.microsoft.com/en-us/azure/azure-functions/set-runtime-version)
* [*An introduction to Azure Functions*](https://docs.microsoft.com/en-us/azure/azure-functions/functions-overview)
* [*Durable Functions overview*](https://docs.microsoft.com/en-us/azure/azure-functions/durable/durable-functions-overview)
* [*Compare Flow, Logic Apps, Functions, and WebJobs*](https://docs.microsoft.com/en-us/azure/azure-functions/functions-compare-logic-apps-ms-flow-webjobs?toc=%2fazure%2fazure-functions%2fdurable%2ftoc.json)

*Tutorials:*

* [*Fan-in/fan-out*](https://docs.microsoft.com/en-us/azure/azure-functions/durable/durable-functions-cloud-backup)
* [*Monitors*](https://docs.microsoft.com/en-us/azure/azure-functions/durable/durable-functions-monitor)
* [*Human interaction*](https://docs.microsoft.com/en-us/azure/azure-functions/durable/durable-functions-phone-verification)
* [*Publish to Event Grid*](https://docs.microsoft.com/en-us/azure/azure-functions/durable/durable-functions-event-publishing)

*manage Event Grid;*

* [*An introduction to Azure Event Grid*](https://docs.microsoft.com/en-us/azure/event-grid/overview)
* [*Introducing Azure Event Grid*](https://azure.microsoft.com/en-ca/resources/videos/introducing-azure-event-grid/)
* [*Event Grid (Sales Page)*](https://azure.microsoft.com/en-ca/services/event-grid/)
* [*Choose between Azure services that deliver messages*](https://docs.microsoft.com/en-us/azure/event-grid/compare-messaging-services)
* *Concepts*
  + [*Event Grid concepts*](https://docs.microsoft.com/en-us/azure/event-grid/concepts)
  + [*Security and authentication*](https://docs.microsoft.com/en-us/azure/event-grid/security-authentication)
  + [*Delivery and retry*](https://docs.microsoft.com/en-us/azure/event-grid/delivery-and-retry)
  + [*Event filtering*](https://docs.microsoft.com/en-us/azure/event-grid/event-filtering)
  + [*Event Domains*](https://docs.microsoft.com/en-us/azure/event-grid/event-domains)
  + [*Event sources*](https://docs.microsoft.com/en-us/azure/event-grid/event-sources)
  + [*Event handlers*](https://docs.microsoft.com/en-us/azure/event-grid/event-handlers)

*Manage Service Bus*

* [*What is Azure Service Bus?*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-messaging-overview)
* [*Choose between Azure services that deliver messages*](https://docs.microsoft.com/en-us/azure/event-grid/compare-messaging-services?toc=%2Fen-us%2Fazure%2Fservice-bus-messaging%2FTOC.json&bc=%2Fen-us%2Fazure%2Fbread%2Ftoc.json)
* [*Queues, topics, and subscriptions*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-queues-topics-subscriptions)
  + [*Messages, payloads, and serialization*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-messages-payloads)
  + [*Message transfers, locks, and settlement*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/message-transfers-locks-settlement)
  + [*Message sequencing and timestamps*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/message-sequencing)
  + [*Message expiration (Time to Live)*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/message-expiration)
  + [*Message handling using Azure Event Grid*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-to-event-grid-integration-concept)
  + [*Azure Event Grid examples*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-to-event-grid-integration-example)

[*Best practices for insulating applications against Service Bus outages and disasters*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-outages-disasters)

[*Best Practices for performance improvements using Service Bus Messaging*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-performance-improvements)

[*Storage queues and Service Bus queues - compared and contrasted*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-azure-and-service-bus-queues-compared-contrasted)

## Implement application load balancing

*May include but not limited to: Configure application gateway and load balancing rules; implement front end IP configurations; manage application load balancing*

*Configure application gateway and load balancing rules;*

* [*Application Gateway*](https://azure.microsoft.com/en-us/services/application-gateway/)
* [*What is Azure Application Gateway?*](https://docs.microsoft.com/en-us/azure/application-gateway/overview)
* [*Create an application gateway with an internal load balancer (ILB)*](https://docs.microsoft.com/en-us/azure/application-gateway/application-gateway-ilb-arm)
* [*Frequently asked questions for Application Gateway*](https://docs.microsoft.com/en-us/azure/application-gateway/application-gateway-faq)

*implement front end IP configurations;*

* [*Create an application gateway with an internal load balancer (ILB)*](https://docs.microsoft.com/en-us/azure/application-gateway/application-gateway-ilb-arm)

*manage application load balancing*

* [*Azure Application Gateway uses the Load Balancer*](https://blogs.msdn.microsoft.com/ukhybridcloud/2018/03/27/azure-application-gateway-uses-the-load-balancer/)

## Integrate on-premises network with Azure virtual network

*May include but not limited to: Create and configure Azure VPN Gateway; create and configure site to site VPN; configure ExpressRoute; verify on-premises connectivity; manage on-premises connectivity with Azure*

*Create and configure Azure VPN Gateway;*

* [*What is VPN Gateway?*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-vpngateways)
* [*Create and manage a VPN gateway*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-tutorial-create-gateway-powershell)
* [*New-AzureRmLocalNetworkGateway*](https://docs.microsoft.com/en-us/powershell/module/azurerm.network/new-azurermlocalnetworkgateway?view=azurermps-6.13.0)

*Concepts*

* [*Planning and design for VPN Gateway*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-plan-design)
* [*About VPN Gateway settings*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-vpn-gateway-settings)
* [*About VPN devices*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-vpn-devices)
* [*About cryptographic requirements*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-compliance-crypto)
* [*About BGP and VPN Gateway*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-bgp-overview)
* [*About highly available connections*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-highlyavailable)
* [*About Point-to-Site connections*](https://docs.microsoft.com/en-us/azure/vpn-gateway/point-to-site-about)
* [*About Point-to-Site VPN routing*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-point-to-site-routing)
* [*About zone-redundant gateways for Availability Zones*](https://docs.microsoft.com/en-us/azure/vpn-gateway/about-zone-redundant-vnet-gateways)

*create and configure site to site VPN;*

* [*Create and manage S2S VPN connections*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-tutorial-vpnconnection-powershell)

*configure Express Route;*

* [*Configure ExpressRoute and Site-to-Site coexisting connections using PowerShell*](https://docs.microsoft.com/en-us/azure/expressroute/expressroute-howto-coexist-resource-manager?toc=%2fazure%2fvpn-gateway%2ftoc.json)

*verify on premises connectivity;*

* [*Configuring and validating VNet or VPN connections*](https://support.microsoft.com/en-gb/help/4032151/configuring-and-validating-vnet-or-vpn-connections)
* [*Diagnose on-premises connectivity via VPN gateways*](https://docs.microsoft.com/en-us/azure/network-watcher/network-watcher-diagnose-on-premises-connectivity)
* [*How to validate VPN throughput to a virtual network*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-validate-throughput-to-vnet)
* [*iPerf - The ultimate speed test tool for TCP, UDP and SCTP*](https://iperf.fr/iperf-doc.php)
* [*Troubleshooting: Azure Site-to-Site VPN disconnects intermittently*](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-troubleshoot-site-to-site-disconnected-intermittently)

*manage on-premise connectivity with Azure*

* [*Connect an on-premises network to a Microsoft Azure virtual network*](https://docs.microsoft.com/en-us/office365/enterprise/connect-an-on-premises-network-to-a-microsoft-azure-virtual-network)

## Manage role-based access control (RBAC)

*May include but not limited to: Create a custom role; configure access to Azure resources by assigning roles; configure management access to Azure; troubleshoot RBAC; implement RBAC policies; assign RBAC roles*

*Create a custom role;*

* [*Custom roles in Azure*](https://docs.microsoft.com/en-us/azure/role-based-access-control/custom-roles)

*configure access to Azure resources by assigning roles;*

*configure management access to Azure; assign RBAC roles*

* [*Manage access using RBAC and the Azure portal*](https://docs.microsoft.com/en-us/azure/role-based-access-control/role-assignments-portal)
* [*Manage access using RBAC and Azure Resource Manager templates*](https://docs.microsoft.com/en-us/azure/role-based-access-control/role-assignments-template)

*troubleshoot RBAC;*

* [*Troubleshoot RBAC in Azure*](https://docs.microsoft.com/en-us/azure/role-based-access-control/troubleshooting)

*implement RBAC policies;*

* [*What is role-based access control (RBAC)?*](https://docs.microsoft.com/en-us/azure/role-based-access-control/overview)

## Implement Multi-Factor Authentication (MFA)

*May include but not limited to: Enable MFA for an Azure tenant; configure user accounts for MFA; configure fraud alerts; configure bypass options; configure trusted IPs; configure verification methods; manage role-based access control (RBAC); implement RBAC policies; assign RBAC Roles; create a custom role; configure access to Azure resources by assigning roles; configure management access to Azure*

*Enable MFA for an Azure tenant;*

* [*Deploy cloud-based Azure Multi-Factor Authentication*](https://docs.microsoft.com/en-us/azure/active-directory/authentication/howto-mfa-getstarted)
* [*Configure Azure Multi-Factor Authentication settings*](https://docs.microsoft.com/en-us/azure/active-directory/authentication/howto-mfa-mfasettings)
* [*Which version of Azure MFA is right for my organization?*](https://docs.microsoft.com/en-us/azure/active-directory/authentication/concept-mfa-whichversion)
* [*Configure Azure Multi-Factor Authentication settings*](https://docs.microsoft.com/en-us/azure/active-directory/authentication/howto-mfa-mfasettings)

*Configure user accounts for MFA;*

* [*Enforce multi-factor authentication (MFA) for subscription administrators*](https://docs.microsoft.com/en-us/azure/security/azure-security-global-admin)
* [*Tutorial: Complete an Azure Multi-Factor Authentication pilot roll out*](https://docs.microsoft.com/en-us/azure/active-directory/authentication/tutorial-mfa-applications)
* [*Manage app passwords for two-step verification*](https://docs.microsoft.com/en-us/azure/active-directory/user-help/multi-factor-authentication-end-user-app-passwords)

*configure fraud alerts;*

* [*Fraud alert*](https://docs.microsoft.com/en-us/azure/active-directory/authentication/howto-mfa-mfasettings#fraud-alert)

*configure bypass options;*

* [*One-time bypass*](https://docs.microsoft.com/en-us/azure/active-directory/authentication/howto-mfa-mfasettings#one-time-bypass)
* [*Azure Conditional Access with “Skip MFA for Requests From Federated users on my intranet” option – Scenarios*](http://azuredummies.com/2017/10/09/azure-conditional-access-with-skip-mfa-for-requests-from-federated-users-on-my-intranet-option-scenarios/comment-page-1/)
* [*Bypass Azure MFA and Azure AD Connect Pass-Through Authentication*](https://techcommunity.microsoft.com/t5/Azure-Active-Directory/Bypass-Azure-MFA-and-Azure-AD-Connect-Pass-Through/td-p/109309)

*configure trusted IPs;*

* [*What is the location condition in Azure Active Directory conditional access?*](https://docs.microsoft.com/en-us/azure/active-directory/conditional-access/location-condition)
* [*Trusted IPs*](https://docs.microsoft.com/en-us/azure/active-directory/authentication/howto-mfa-mfasettings#trusted-ips)

*configure verification methods; manage role-based access control (RBAC);*

* [*Verification methods*](https://docs.microsoft.com/en-us/azure/active-directory/authentication/howto-mfa-mfasettings#verification-methods)
* [*What is conditional access in Azure Active Directory?*](https://docs.microsoft.com/en-us/azure/active-directory/conditional-access/overview)

# [Create and Deploy Apps (5-10%)](https://www.microsoft.com/en-us/learning/exam-az-300.aspx#syllabus-4)

## Create web apps by using PaaS

*May include but not limited to: Create an Azure App Service Web App; create documentation for the API; create an App Service Web App for containers; create an App Service background task by using WebJobs; enable diagnostics logging*

*Create an Azure App Service Web App;*

* [*CLI samples for Azure App Service*](https://docs.microsoft.com/en-us/azure/app-service/app-service-cli-samples)
* [*Create an App Service app and deploy code to a staging environment using Azure CLI*](https://docs.microsoft.com/en-us/azure/app-service/scripts/app-service-cli-deploy-staging-environment)

*create documentation for the API;*

* [*Announcing Azure Functions OpenAPI (Swagger) support preview*](https://blogs.msdn.microsoft.com/appserviceteam/2017/03/30/announcing-functions-swagger-support/)

*create an App Service Web App for containers;*

* [*Web App for Containers*](https://azure.microsoft.com/en-gb/services/app-service/containers/)
* [*App Service on Linux Documentation*](https://docs.microsoft.com/en-us/azure/app-service/containers/)
* [*Create a multi-container (preview) app using a Docker Compose configuration*](https://docs.microsoft.com/en-us/azure/app-service/containers/quickstart-multi-container)
* [*Tutorial: Create a multi-container (preview) app in Web App for Containers*](https://docs.microsoft.com/en-us/azure/app-service/containers/tutorial-multi-container-app)

*create an App Service background task by using WebJobs;*

* [*azure-webjobs-sdk*](https://github.com/Azure/azure-webjobs-sdk/wiki)
* [*Introducing Windows Azure WebJobs*](https://www.hanselman.com/blog/IntroducingWindowsAzureWebJobs.aspx)
* [*Get started with the Azure WebJobs SDK for event-driven background processing*](https://docs.microsoft.com/en-us/azure/app-service/webjobs-sdk-get-started)
* [*Develop and deploy WebJobs using Visual Studio - Azure App Service*](https://docs.microsoft.com/en-us/azure/app-service/websites-dotnet-deploy-webjobs)
* [*Run Background tasks with WebJobs in Azure App Service*](https://docs.microsoft.com/en-us/azure/app-service/web-sites-create-web-jobs)

*enable diagnostics logging; Configure diagnostic settings on resources;*

## Design and develop apps that run in containers

*May include but not limited to: Configure diagnostic settings on resources; create a container image by using a Docker file; create an Azure Kubernetes Service; publish an image to the Azure Container Registry; implement an application that runs on an Azure Container Instance; manage container settings by using code*

* [*Choose the cloud platform designed for your container needs*](https://azure.microsoft.com/en-gb/overview/containers/)
* [*Azure for Containers*](https://docs.microsoft.com/en-us/azure/containers/)
* [*Kubernetes: Hands On With Microservices*](https://azurecitadel.com/cloud-native/kubernetes/)

*create a container image by using a Docker file;*

* [*Getting Started with Docker and Azure Container Services*](https://blogs.msdn.microsoft.com/uk_faculty_connection/2016/09/23/getting-started-with-docker-and-container-services/)
* [*Deploy your app on Docker for Azure*](https://docs.docker.com/docker-for-azure/deploy/)

*create an Azure Container Service (ACS/AKS);*

* [*Azure Container Service (AKS): A Detailed Guide to Setting Up Your First Cluster with Kubernetes*](https://stackify.com/azure-container-service-kubernetes/)
* [*Azure Kubernetes Service (AKS)*](https://azure.microsoft.com/en-gb/services/kubernetes-service/)

*publish an image to the Azure Container Registry;*

* [*Push your first image to a private Docker container registry using the Docker CLI*](https://docs.microsoft.com/en-us/azure/container-registry/container-registry-get-started-docker-cli)
* [*1 - Build images in Azure*](https://docs.microsoft.com/en-us/azure/container-registry/container-registry-tutorial-quick-task)
* [*2 - Automate image builds*](https://docs.microsoft.com/en-us/azure/container-registry/container-registry-tutorial-build-task)
* [*3 - Base image update builds*](https://docs.microsoft.com/en-us/azure/container-registry/container-registry-tutorial-base-image-update)

*implement an application that runs on an Azure Container Instance;*

* [*Container Instances*](https://azure.microsoft.com/en-gb/services/container-instances/)
* [*1 - Create container image*](https://docs.microsoft.com/en-us/azure/container-instances/container-instances-tutorial-prepare-app)
* [*2 - Create container registry*](https://docs.microsoft.com/en-us/azure/container-instances/container-instances-tutorial-prepare-acr)
* [*3 - Deploy application*](https://docs.microsoft.com/en-us/azure/container-instances/container-instances-tutorial-deploy-app)
* [*Code samples*](https://azure.microsoft.com/resources/samples/?sort=0&term=aci)
* [*Resource Manager templates*](https://docs.microsoft.com/en-us/azure/container-instances/container-instances-samples-rm)
* [*Quickstart: Run a container application in Azure Container Instances with the Azure CLI*](https://docs.microsoft.com/en-us/azure/container-instances/container-instances-quickstart)
* [*Deploy and connect to a Docker container in an Azure cluster*](https://azure.microsoft.com/en-gb/resources/samples/container-service-python-manage/)

*manage container settings by using code*

# [Implement Authentication and Secure Data (5-10%)](https://www.microsoft.com/en-us/learning/exam-az-300.aspx#syllabus-5)

## Implement authentication

*May include but not limited to: Implement authentication by using certificates, forms-based authentication, tokens, or Windows-integrated authentication; implement multi-factor authentication by using Azure AD; implement OAuth2 authentication; implement Managed identities for Azure resources Service Principal authentication*

* [*Authentication and authorization in Azure App Service*](https://docs.microsoft.com/en-us/azure/app-service/overview-authentication-authorization)
* [*Azure Websites Authentication/Authorization*](https://azure.microsoft.com/en-gb/blog/azure-websites-authentication-authorization/)
* [*Expanding App Service Authentication/Authorization*](https://azure.microsoft.com/en-us/blog/announcing-app-service-authentication-authorization/)

*Implement authentication by using certificates,*

* [*Get started with certificate-based authentication in Azure Active Directory*](https://docs.microsoft.com/en-us/azure/active-directory/authentication/active-directory-certificate-based-authentication-get-started)
* [*Certificate credentials for application authentication*](https://docs.microsoft.com/en-us/azure/active-directory/develop/active-directory-certificate-credentials)
* [*Authenticating to Azure AD in daemon apps with certificates*](https://azure.microsoft.com/en-us/resources/samples/active-directory-dotnet-daemon-certificate-credential/)

*Implement authentication by using forms-based authentication, tokens, or Windows-integrated authentication;*

* [*Azure ASP.NET Web Application With Forms-Based Authentication*](https://social.technet.microsoft.com/wiki/contents/articles/4977.azure-asp-net-web-application-with-forms-based-authentication.aspx)
* [*What is authentication?*](https://docs.microsoft.com/en-us/azure/active-directory/develop/authentication-scenarios)

*Implement authentication by using tokens; implement OAuth2 authentication;*

* [*Claims in Azure AD security tokens*](https://docs.microsoft.com/en-us/azure/active-directory/develop/authentication-scenarios#claims-in-azure-ad-security-tokens)
* [*Authorize access to Azure Active Directory web applications using the OAuth 2.0 code grant flow*](https://docs.microsoft.com/en-us/azure/active-directory/develop/v1-protocols-oauth-code)
* [*v2.0 Protocols - OAuth 2.0 authorization code flow*](https://docs.microsoft.com/en-us/azure/active-directory/develop/v2-oauth2-auth-code-flow)
* [*Understanding the OAuth2 implicit grant flow in Azure Active Directory (AD)*](https://docs.microsoft.com/en-us/azure/active-directory/develop/v1-oauth2-implicit-grant-flow)
* [*How to authorize developer accounts using OAuth 2.0 in Azure API Management*](https://docs.microsoft.com/en-us/azure/api-management/api-management-howto-oauth2)
* [*Azure Active Directory — Authentication OAuth 2.0 — Type Password*](https://medium.com/nearsoft-solutions/azure-active-directory-authentication-oauth-2-0-type-password-e119f9a5ad4c)

*implement multi-factor authentication by using Azure AD;*

* *See links in MFA section*

*implement Managed Service Identity (MSI) Service Principal authentication*

* [*Keep credentials out of code: Introducing Azure AD Managed Service Identity*](https://azure.microsoft.com/en-us/blog/keep-credentials-out-of-code-introducing-azure-ad-managed-service-identity/)
* [*What is managed identities for Azure resources?*](https://docs.microsoft.com/en-us/azure/active-directory/managed-identities-azure-resources/overview)
* [*How to use managed identities for App Service and Azure Functions*](https://docs.microsoft.com/en-us/azure/app-service/overview-managed-identity)
* [*Understanding Azure MSI (Managed Service Identity) tokens & caching*](https://blogs.msdn.microsoft.com/azuredev/2018/07/23/understanding-azure-msi-managed-service-identity-tokens-caching/)
* [*Azure AD managed identities for Azure resources documentation*](https://docs.microsoft.com/en-us/azure/active-directory/managed-identities-azure-resources/)

## Implement secure data solutions

*May include but not limited to: Encrypt and decrypt data at rest and in transit; encrypt data with Always Encrypted; implement Azure Confidential Compute and SSL/TLS communications; create, read, update, and delete keys, secrets, and certificates by using the KeyVault API*

*Encrypt and decrypt data at rest and in transit;*

* [*How Does Azure Encrypt Data?*](https://cloudacademy.com/blog/how-does-azure-encrypt-data/)
* [*Azure encryption overview*](https://docs.microsoft.com/en-us/azure/security/security-azure-encryption-overview)
* [*Azure Data Encryption-at-Rest*](https://docs.microsoft.com/en-us/azure/security/azure-security-encryption-atrest)
* [*Azure Storage Service Encryption for data at rest*](https://docs.microsoft.com/en-us/azure/storage/common/storage-service-encryption)

*encrypt data with Always Encrypted;*

* [*Transparent data encryption or always encrypted?*](https://azure.microsoft.com/en-us/blog/transparent-data-encryption-or-always-encrypted/)
* [*Always Encrypted: Protect sensitive data and store encryption keys in the Windows certificate store*](https://docs.microsoft.com/en-us/azure/sql-database/sql-database-always-encrypted)
* [*Always Encrypted: Protect sensitive data and store encryption keys in Azure Key Vault*](https://docs.microsoft.com/en-us/azure/sql-database/sql-database-always-encrypted-azure-key-vault)

*implement Azure Confidential Compute and SSL/TLS communications;*

* [*Azure Data Security and Encryption Best Practices*](https://docs.microsoft.com/en-us/azure/security/azure-security-data-encryption-best-practices)
* [*Introducing Azure confidential computing*](https://azure.microsoft.com/en-us/blog/introducing-azure-confidential-computing/)
* [*Azure confidential computing*](https://azure.microsoft.com/en-us/solutions/confidential-compute/)

*create, read, update, and delete keys, secrets, and certificates by using the KeyVault API*

* [*What is Azure Key Vault?*](https://docs.microsoft.com/en-us/azure/key-vault/key-vault-overview)
* [*Set and retrieve a secret - CLI*](https://docs.microsoft.com/en-us/azure/key-vault/quick-create-cli)
* [*Set and retrieve a secret - PowerShell*](https://docs.microsoft.com/en-us/azure/key-vault/quick-create-powershell)
* [*Set and retrieve a secret - Portal*](https://docs.microsoft.com/en-us/azure/key-vault/quick-create-portal)
* [*Set and retrieve a secret - .NET*](https://docs.microsoft.com/en-us/azure/key-vault/quick-create-net)
* [*Set and retrieve a secret - Node.js*](https://docs.microsoft.com/en-us/azure/key-vault/quick-create-node)
* [*Code Samples - Azure Keyvault*](https://azure.microsoft.com/en-us/resources/samples/?service=key-vault&sort=0)
* [*Tutorial: Use Azure Key Vault from a web application*](https://docs.microsoft.com/en-us/azure/key-vault/key-vault-use-from-web-application)

# [Develop for the Cloud and for Azure Storage (20-25%)](https://www.microsoft.com/en-us/learning/exam-az-300.aspx#syllabus-6)

## Develop solutions that use Cosmos DB storage

*May include but not limited to: Create, read, update, and delete data by using appropriate APIs; implement partitioning schemes; set the appropriate consistency level for operations*

Configure an app or service to send emails, Event Grid, and the Azure Relay Service;

* [*Azure Service Bus to Azure Event Grid integration examples*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-to-event-grid-integration-example)
* [*Queues, topics, and subscriptions*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-queues-topics-subscriptions)
* [*Messages, payloads, and serialization*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-messages-payloads)
* [*Message transfers, locks, and settlement*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/message-transfers-locks-settlement)
* [*Message sequencing and timestamps*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/message-sequencing)
* [*Message expiration (Time to Live)*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/message-expiration)
* [*Message handling using Azure Event Grid*](https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-to-event-grid-integration-concept)
* [*Tutorial: Route custom events to Azure Relay Hybrid Connections with Azure CLI and Event Grid*](https://docs.microsoft.com/en-us/azure/event-grid/custom-event-to-hybrid-connection)
* [*Azure Service Bus now integrates with Azure Event Grid!*](https://azure.microsoft.com/en-gb/blog/azure-service-bus-now-integrates-with-azure-event-grid/)

*create and configure Notification Hub, Event Hub, and Service Bus;*

* [*What is Azure Notification Hubs?*](https://docs.microsoft.com/en-us/azure/notification-hubs/notification-hubs-push-notification-overview)
* [*Azure Notification Hubs Documentation*](https://docs.microsoft.com/en-us/azure/notification-hubs/)
* [*Azure Service Bus Event Hubs 101 with Dan Rosanova*](https://azure.microsoft.com/en-gb/resources/videos/azure-service-bus-event-hubs-101-with-dan-rosanova/)
* [*Events, Data Points, and Messages - Choosing the right Azure messaging service for your data*](https://azure.microsoft.com/en-gb/blog/events-data-points-and-messages-choosing-the-right-azure-messaging-service-for-your-data/)

*configure queries across multiple products*

* [*Integration Services Seamlessly integrate apps, data and processes for your enterprise*](https://azure.microsoft.com/en-gb/product-categories/integration/)
* [*Collaboration and federation: Azure Service Bus Messaging on-premises futures*](https://azure.microsoft.com/en-us/blog/collaboration-and-federation-azure-service-bus-messaging-on-premises-futures/)

## Develop solutions that use a relational database

*May include but not limited to: Provision and configure relational databases; configure elastic pools for Azure SQL Database; create, read, update, and delete data tables by using code*

## Configure a message-based integration architecture

*May include but not limited to: Configure an app or service to send emails, Event Grid, and the Azure Relay Service; create and configure Notification Hub, Event Hub, and Service Bus; configure queries across multiple products*

## Develop for autoscaling

*May include but not limited to: Implement autoscaling rules and patterns (schedule, operational/system metrics, code that addresses singleton application instances); implement code that addresses transient state*

Implement autoscaling rules and patterns (schedule, operational/system metrics, code that addresses singleton application instances);

* [Azure AutoScale Dynamically scale apps to meet changing demand](https://azure.microsoft.com/en-gb/features/autoscale/)
* [Overview of autoscale in Microsoft Azure Virtual Machines, Cloud Services, and Web Apps](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-overview-autoscale)
* [Cloud Best Practices - Autoscaling](https://docs.microsoft.com/en-us/azure/architecture/best-practices/auto-scaling)
* [Autoscaling Guidance](https://msdn.microsoft.com/library/dn589774.aspx)
* [Automatically scale virtual machines in Azure](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/autoscale)

implement code that addresses transient state

* [Transient Fault Handling (Building Real-World Cloud Apps with Azure)](https://docs.microsoft.com/en-us/aspnet/aspnet/overview/developing-apps-with-windows-azure/building-real-world-cloud-apps-with-windows-azure/transient-fault-handling)
* [Transient fault handling](https://docs.microsoft.com/en-us/azure/architecture/best-practices/transient-faults)
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