<https://www.certbolt.com/microsoft-certification-dumps>

<http://www.examsdocs.com/?option=com_content&view=article&examcode=az-300&gclid=CjwKCAjwh472BRAGEiwAvHVfGpW1H558PaMHHiQz7O0eLDVytH6wV_U2Ts-dktsPx5S9bZEhENXMpxoCJF0QAvD_BwE>

<https://www.itexams.com/exam/AZ-300>

<https://www.whizlabs.com/learn/course/microsoft-azure-az-300/>

Microsoft AZ-300 Questions & Answers

Exam Name: Microsoft Azure Architect Technologies

Order Date: May 19, 2020

Expiration Date: Jun 18, 2020

Authorization Code:

14AE-9EE7-3516-7507

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206D-17D4-B736-EA41

Microsoft AZ-300 Questions & Answers

Exam Name: Microsoft Azure Architect Technologies

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Microsoft AZ-103 Questions & Answers

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<https://quizlet.com/ch/482793011/az300-flash-cards/>

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<https://www.examtopics.com/exams/microsoft/az-300/view/1/>

<https://blog.pragmaticworks.com/topic/azure>

<https://blog.pragmaticworks.com/topic/azure-every-day>

<https://medium.com/@zaab_it/azure-app-service-plan-tiers-f07d5e22297a>

Outline: Azure Architect Technologies (AZ300)

**Day 1:**

**Module 1: Managing Azure Subscriptions and Resources**

In this module you will explore Azure monitoring capabilities using Azure alerts, Azure activity logs, and Log Analytics. You will learn to query, analyze, and interpret the data viewed in Log Analytics.

After completing this module, students will be able to:

* Managing Azure Subscriptions and Resources

**Module 2: Implementing and Managing Storage**

In this module you will learn about Azure storage accounts, data replication, how to use Azure Storage Explorer, and monitor storage.

After completing this module, students will be able to:

* Implementing and Managing Storage

**Module 3: Deploying and Managing Virtual Machines (VMs)**

In this module you will learn how to do the following:

* Create Virtual Machines (VM)s within the Azure Portal
* Create Virtual Machines (VM)s using Azure PowerShell
* Create Virtual Machines (VM)s using ARM templates
* Deploy Linux Virtual Machines (VM)s
* Monitor Virtual Machines (VM)s

Additionally, you will learn how to protect data using backups at regular intervals, whether by snapshot, Azure Backup, or Azure Site Recovery.

After completing this module, students will be able to:

* Deploying and Managing VMs

**Module 4: Configuring and Managing Virtual Networks**

In this module you will create and implement virtual networks using the Azure Portal as well as Azure PowerShell and CLI. You will receive and overview on how to assign IP addresses to Azure resources to communicate with other Azure resources, your on-premises network, and the Internet.  
**Lessons**

* Network routing using routing tables and algorithms
* Inter-site connectivity using VNet-to-VNet connections and VPNs
* Virtual network peering for regional and global considerations
* Gateway transit

After completing this module, students will be able to:

* Configuring and Managing Virtual Networks

**Module 5: Managing Identities**

This module covers Azure Active Directory (Azure AD) for IT Admins and Developers with a focus on the Azure AD multi-tenant cloud-based directory and identity management service.

**Lessons**

* Role-Based Access Control (RBAC)
* built-in roles
* Self-Service Password Reset (SSPR)
* authentication methods for password reset

After completing this module, students will be able to:

* Managing Identities using Azure Active Directory

**Day 2:**

**Module 1: Evaluating and Performing Server Migration to Azure**

This module covers migrating workloads to a new environment, whether it be another datacenter, or to a public cloud, and setting clear goals for the migration. Goals include both technology-focused and business-focused goals for migrations, and the benefits to an organization’s business. Activities include components of the Azure migration process: creating a project, creating a collector, assessing readiness, and estimating costs. Additionally, you will receive and overview of Azure Site Recovery (ASR) that includes and end-to-end scenarios.

After completing this module, students will be able to:

* Evaluating and Performing Server Migration to Azure

**Module 2: Implementing and Managing Application Services**

This module includes the following topics:

* Deploying Web Apps
* Managing Web Apps
* App Service Security
* Serverless Computing Concepts
* Managing Event Grid
* Managing Service Bus
* Managing Logic App

After completing this module, students will be able to:

* Implementing and Managing Application Services

**Module 3: Implementing Advanced Virtual Networking**

This module includes the following topics:

* Azure Load Balancer
* Azure Application Gateway
* Site-to-Site VPN Connections

As well as an overview of ExpressRoute which allows companies to extend on-premises networks into the Microsoft cloud over a dedicated private connection facilitated by a connectivity provider.

After completing this module, students will be able to:

* Implementing Advanced Virtual Networking.

**Module 4: Securing Identities**

This module includes the following topics with an emphasis on identity and roles:

* Azure AD Identity Protection
* Azure Domains and Tenants
* Azure Users and Groups
* Azure Roles

As well as an overview of Azure AD integration options that focuses on Azure AD Connect to integrate on-premises directories with Azure Active Directory.

After completing this module, students will be able to:

* Securing Identities using Azure AD.

**Day 3:**

**Module 1: Selecting Compute and Storage Solutions**

This module includes the following topics:

* Azure Architecture Center
* Cloud design patterns
* Competing consumers pattern
* Cache-aside pattern

As well as sharding patterns to divide a data store into horizontal partitions, or shards. Each shard has the same schema but holds its own distinct subset of the data.

After completing this module, students will be able to:

* Design and Connectivity Patterns

**Module2: Hybrid Networking**This module includes the following topics:

* Site-to-site connectivity
* Point-to-site connectivity
* Combining site-to-site and point-to-site connectivity
* Virtual network–to–virtual network connectivity

As well as connecting across cloud providers for failover, backup, or even migration between providers such as AWS.

After completing this module, students will be able to:

* Hybrid Networking

**Module 3: Measuring Throughput and Structure of Data Access**

This module includes the following topics:

* DTUs – Azure SQL Database
* RUs – Azure Cosmos DB
* Structured and unstructured data
* Using structured data stores

After completing this module, students will be able to:

* Address Durability of Data and Caching
* Measure Throughput and Structure of Data Access

**Day 4:**

**Module 1: Creating Web Applications using PaaS**  
This module provides and overview of Azure App Service Web Apps for hosting web applications, REST APIs, and a mobile back end. Topics include the following:

* Using shell commands to create an App Service Web App
* Creating Background Tasks
* Using Swagger to document an API

As well as an explanation of how Logic Apps help to build solutions that integrate apps, data, systems, and services across enterprises or organizations by automating tasks and business processes as workflows.

After completing this module, students will be able to:

* Use shell commands to create an App Service Web App
* Create Background Tasks
* Use Swagger to document an API

**Module 2: Creating Apps and Services Running on Service Fabric**

This module provides an overview of Azure Service Fabric as a distributed systems platform that makes it easy to package, deploy, and manage scalable and reliable microservices and containers. This module also addresses the challenges in developing and managing cloud native applications. Additional topics include:

* Creating a reliable service
* Creating a Reliable Actors app
* Working with Reliable collections

After completing this module, students will be able to:

* Create a reliable service
* Create a Reliable Actors app
* Hands-on with Reliable collections

**Module 3: Using Azure Kubernetes Service This module focuses on the Azure**

Kubernetes Service (AKS) for deploying and managing a Kubernetes cluster in Azure. Topics include how to reduce operational overhead of managing Kubernetes by offloading much of that responsibility to Azure, such as health monitoring and maintenance. Additional topics include:

* Azure Container Registry
* Azure Container Instances

After completing this module, students will be able to:

* Understand the Azure Container Registry
* Use Azure Container instances

**Day 5:**

**Module 1: Developing Long-Running Tasks and Distributed Transactions**  
Topics for this module include:

* Implementing large-scale, parallel, and high-performance apps using batches
* HPC using Microsoft Azure Virtual Machines
* Implementing resilient apps by using queues

As well as, implementing code to address application events by using webhooks. Implementing a webhook gives an external resource a URL for an application. The external resource then issues an HTTP request to that URL whenever a change is made that requires the application to take an action.

**Module 2: Configuring a Message-Based Integration Architecture**  
Lessons

* Configure an app or service to send emails
* Configure an event publish and subscribe model
* Configure the Azure Relay service
* Configure apps and services with Microsoft Graph

After completing this module, students will be able to:

* How to configure a message-based integration architecture

**Module 3: Developing for Asynchronous Processing**  
Lessons

* Implement parallelism, multithreading, and processing
* Implement Azure Functions and Azure Logic Apps
* Implement interfaces for storage or data access
* Implement appropriate asynchronous computing models
* Implement autoscaling rules and patterns

After completing this module, students will be able to:

* Understand how to Develop for Asynchronous Processing

**Module 4: Developing for Autoscaling**  
Lessons

* Implementing autoscaling rules and patterns
* Implementing code that addresses singleton application instances
* Implementing code that addresses a transient state

After completing this module, students will be able to:

* Begin creating apps for Autoscaling

**Module 5: Developing Azure Cognitive Services Solutions**  
Lessons

* Developing Solutions using Computer Vision
* Developing solutions using Bing Web Search
* Developing solutions using Custom Speech Service
* Developing solutions using QnA Maker

After completing this module, students will be able to:

* Understand Azure Cognitive Services Solutions

***Module 6: Develop for Azure Storage***

***Lessons***

* Develop Solutions that use Azure Cosmos DB Storage
* Develop Solutions that use a Relational Database
* Modeling a Database by using Entity Framework Core
* Develop Solutions that use Microsoft Azure Blob Storage
* Manipulating Blob Container Properties in .NET

After completing this module, students will be able to:

* Understand Azure Storage services such as blobs and Cosmos DB

**1 - MANAGING AZURE SUBSCRIPTIONS AND RESOURCES**

**2 - IMPLEMENTING AND MANAGING STORAGE**

**3 - DEPLOYING AND MANAGING VIRTUAL MACHINES (VMS)**

 Create Virtual Machines (VM)s within the Azure Portal

 Create Virtual Machines (VM)s using Azure PowerShell

 Create Virtual Machines (VM)s using ARM templates

 Deploy Linux Virtual Machines (VM)s

 Monitor Virtual Machines (VM)s

**4 - CONFIGURING AND MANAGING VIRTUAL NETWORKS**

 Network routing using routing tables and algorithms

 Inter-site connectivity using VNet-to-VNet connections and VPNs

 Virtual network peering for regional and global considerations

 Gateway transit

**5 - MANAGING IDENTITIES**

* Role-Based Access Control (RBAC)
* built-in roles
* Self-Service Password Reset (SSPR)
* authentication methods for password reset

**6 - EVALUATING AND PERFORMING SERVER MIGRATION TO AZURE**

* Access
* Migrate
* Optimize
* Secure and Manage

Learn more about Azure Backup at <https://azure.microsoft.com/en-us/services/backup/>

Check out Azure Site Recovery at <https://azure.microsoft.com/en-us/services/site-recovery/>

<https://docs.microsoft.com/en-us/azure/migrate/>

# [Azure App Service migration assessment](https://aka.ms/AppMigrate)

<https://appmigration.microsoft.com/>

# Data Migration Assistant

<https://docs.microsoft.com/en-in/sql/dma/dma-overview?view=sql-server-2017>

# Microsoft migration tools and services

<https://datamigration.microsoft.com/>

<https://docs.microsoft.com/en-us/azure/migrate/tutorial-prepare-vmware>

Service Fabric

<https://www.youtube.com/watch?v=OkVpywVTHR0&list=PLalrWAGybpB_dBdtvLXUjOFp78X97lren&index=4>

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**Resource**

Azure Backup overview

<https://docs.microsoft.com/en-us/azure/backup/backup-introduction-to-azure-backup>

Azure Site Recovery overview

<https://docs.microsoft.com/en-us/azure/site-recovery/site-recovery-overview>

Azure Site Recovery video

<https://azure.microsoft.com/en-us/resources/videos/azure-friday-azure-site-recovery-anderson/>

Back up VMware server to Azure

<https://docs.microsoft.com/azure/backup/backup-azure-backup-server-vmware>

Back up SQL Server to Azure with Azure Backup Server

<https://docs.microsoft.com/azure/backup/backup-azure-exchange-mabs>

Back up a SharePoint farm to Azure

<https://docs.microsoft.com/azure/backup/backup-azure-backup-sharepoint-mabs>

Back up SQL Server to Azure with Azure Backup Server

<https://docs.microsoft.com/en-us/azure/backup/backup-azure-sql-mabs>

Azure datacenters overview

<https://azure.microsoft.com/en-us/overview/datacenters/>

Designing resilient applications for Azure

<https://docs.microsoft.com/en-us/azure/architecture/resiliency/index>

Recovering from a region-wide disruption

<https://docs.microsoft.com/en-us/azure/architecture/resiliency/recovery-loss-azure-region>

Adam Marczak

<https://www.youtube.com/channel/UCdmEIMC3LBil4o0tjaTbj0w/videos>

**7 - IMPLEMENTING AND MANAGING APPLICATION SERVICES**

 Deploying Web Apps

 Managing Web Apps

 App Service Security

 Server-less Computing Concepts

 Managing Event Grid

 Managing Service Bus

 Managing Logic App

**8 - IMPLEMENTING ADVANCED VIRTUAL NETWORKING**

 Azure Load Balancer

 Azure Application Gateway

 Site-to-Site VPN Connections

**9 - SECURING IDENTITIES**

 Azure AD Identity Protection

 Azure Domains and Tenants

 Azure Users and Groups

 Azure Roles

**10 - SELECTING COMPUTE AND STORAGE SOLUTIONS**

 Azure Architecture Center

 Cloud design patterns

 Competing consumers pattern

 Cache-aside pattern

**11 - HYBRID NETWORKING**

 Site-to-site connectivity

 Point-to-site connectivity

 Combining site-to-site and point-to-site connectivity

 Virtual network–to–virtual network connectivity

**12 - MEASURING THROUGHPUT AND STRUCTURE OF DATA ACCESS**

 DTUs – Azure SQL Database

 RUs – Azure Cosmos DB

 Structured and unstructured data

 Using structured data stores

**13 - CREATING WEB APPLICATIONS USING PAAS**

 Using shell commands to create an App Service Web App

 Creating Background Tasks

 Using Swagger to document an API

**14 - CREATING APPS AND SERVICES RUNNING ON SERVICE FABRIC**

 Overview of Azure Service Fabric

 Creating a reliable service

 Creating a Reliable Actors app

 Working with Reliable collections

**15 - USING AZURE KUBERNETES SERVICE THIS MODULE FOCUSES ON THE AZURE**

 How to reduce operational overhead

 Azure Container Registry

 Azure Container Instances

**16 - IMPLEMENTING AUTHENTICATION**

 Implementing authentication in applications (certificates, Azure AD, Azure AD Connect, token-based)

 Implementing multi-factor authentication

<https://azurecitadel.com/infra/vdc/#labs>

 Claims-based authorization

 Role-based access control (RBAC) authorization

**17 - IMPLEMENTING SECURE DATA**

 End-to-end encryption

 Implementing Azure confidential computing

 Implementing SSL and TLS communications

 Managing cryptographic keys in Azure Key Vault

**18 - DEVELOPING LONG-RUNNING TASKS AND DISTRIBUTED TRANSACTIONS**

 Implementing large-scale, parallel, and high

 performance apps using batches

 HPC using Microsoft Azure Virtual Machines

 Implementing resilient apps by using queues

**19 - CONFIGURING A MESSAGE-BASED INTEGRATION ARCHITECTURE**

 Configure an app or service to send emails

 Configure an event publish and subscribe model

 Configure the Azure Relay service

 Configure apps and services with Microsoft Graph

**20 - DEVELOPING FOR ASYNCHRONOUS PROCESSING**

 Implement parallelism, multithreading, and processing

 Implement Azure Functions and Azure Logic Apps

 Implement interfaces for storage or data access

 Implement appropriate asynchronous computing models

 Implement auto-scaling rules and patterns

**21 - DEVELOPING FOR AUTOSCALING**

 Implementing auto-scaling rules and patterns

 Implementing code that addresses singleton application instances

 Implementing code that addresses a transient state

**22 - DEVELOPING AZURE COGNITIVE SERVICES SOLUTIONS**

 Developing Solutions using Computer Vision

 Developing solutions using Bing Web Search

 Developing solutions using Custom Speech Service

 Developing solutions using QnA Maker

IMP

<https://ravikirans.com/az-300-azure-exam-study-guide/>

<https://github.com/shrasool/Azure-Solutions-Architect-Expert-Exam>

<https://www.youtube.com/watch?v=Yk9D496oZr0>

DevOps

<https://www.youtube.com/watch?v=h8iWRcmUE4M>

Architecture

<https://docs.microsoft.com/en-us/azure/architecture/architectures/>

Learn

<https://docs.microsoft.com/en-us/learn/#!q=Azure&lang=1033>

AKS

<https://docs.microsoft.com/en-in/azure/aks/tutorial-kubernetes-prepare-app>

<https://www.youtube.com/watch?v=OThMULG325o>

<https://www.youtube.com/watch?v=BBBbr2WgBYE>

We have covered the following topics in this guide along with step by step lab exercises:  
01. Cloud Computing Introduction  
02. Cloud Service Providers  
03. Types of Cloud  
04. Cloud Offering Classes  
05. Microsoft Azure Introduction  
06. Getting Started with Free Azure Subscription  
07. Getting Familiarized with Azure Portal Options  
08. Getting Azure Subscription Details  
09. Creating Administrative Users for Azure Cloud Management  
10. Enable Multi-Factor Authentication for Azure Accounts  
11. Azure Pricing Calculator  
12. Introduction Azure Virtual Network (vNet)  
13. Creating an Azure Virtual Network  
14. Introduction to Azure Resource Groups  
15. Managing Resource Groups  
16. Introduction Azure Virtual Machines  
17. Understanding Azure VM Series Types  
18. Creating Azure Virtual Machine  
19. Connecting Azure Virtual Machines  
20. Detailed Explanation of Azure Virtual Machine Options  
21. Configure Disk in Azure Virtual Machine  
22. Capturing VM Image in Azure Cloud  
23. Creating Azure VM from Captured Image  
24. Importing and Exporting Azure Virtual Machine  
25. Azure Network Security Group (NSG)67  
26. Creating and Applying NSG for Azure Virtual Network  
27. Managing Azure Storage Services  
28. Working with Azure Storage Explorer  
29. Managing Azure Storage Using Azure CLI  
30. Working with Azure Files Share  
31. Mounting Azure Files Share  
32. Azure Database Storage Services  
33. Creating and Using Azure SQL Database  
34. Restoring Azure SQL Database  
35. Exporting Importing SQL Databases  
36. Azure Active Directory  
37. Azure Marketplace  
38. Working with Azure VPN Gateways  
39. Creating a Windows Server Virtual Machine  
40. Connecting Your Windows VM Using P2S VPN Gateway Securely  
41. Configuring vNet Peering Between Azure Virtual Networks  
42. Working with Load Balancers in Azure Cloud  
43. Configuring Azure Load Balancer  
44. Configuring VM Scale Set in Azure Cloud  
45. Configuring Application Gateway in Azure Cloud  
46. Configuring WAF in Azure Cloud  
47. Working with Azure Cloud Management Tools  
48. Managing Azure Account Using PowerShell  
49. Scheduling Auto and Stop Azure VMs

### Q4) What is scale a cloud service?

**Ans:**A cloud service is scaled out by increasing the number of role instances (virtual machines) deployed for a role. A cloud service is scaled in by decreasing role instances. In the Preview Management Portal, you can also scale a linked SQL Database instance, by changing the SQL Database edition and the maximum database size, when you scale your service roles.

### Q5) What is a web role?

**Ans:**A web role provides a dedicated Internet Information Services (IIS) web-server used for hosting front-end web applications.

### Q6) What is a worker role?

**Ans:**Applications hosted within worker roles can run asynchronous, long-running or perpetual tasks independent of user interaction or input.

### Q7) What is a role instance?

**Ans:**A role instance is a virtual machine on which the application code and role configuration run. A role can have multiple instances, defined in the service configuration file.

### Q8) What is a guest operating system?

**Ans:**The guest operating system for a cloud service is the operating system installed on the role instances (virtual machines) on which your application code runs.

### Q10) What is deployment environments?

**Ans:**Azure offers two deployment environments for cloud services: a staging environment in which you can test your deployment before you promote it to the production environment. The two environments are distinguished only by the virtual IP addresses (VIPs) by which the cloud service is accessed. In the staging environment, the cloud service’s globally unique identifier (GUID) identifies it in URLs (GUID.cloudapp.net). In the production environment, the URL is based on the friendlier DNS prefix assigned to the cloud service (for example, myservice.cloudapp.net).

##### 

### Q11) What is a service definition file?

**Ans:**The cloud service definition file (.csdef) defines the service model, including the number of roles.

### Q12) What is a service configuration file?

**Ans:**The cloud service configuration file (.cscfg) provides configuration settings for the cloud service and individual roles, including the number of role instances.

### Q13) What is a service package?

**Ans:**The service package (.cspkg) contains the application code and the service definition file.

### Q15) What is Azure Diagnostics?

**Ans:**Azure Diagnostics is the API that enables you to collect diagnostic data from applications running in Azure. Azure Diagnostics must be enabled for cloud service roles in order for verbose monitoring to be turned on.

### Q16) What is Azure Service Level Agreement (SLA)?

**Ans:**The Service Level Agreement (SLA) describes Microsoft’s commitments for uptime and connectivity.

**Azure SLA (Service Level Agreement)**is the agreement or guarantee that Azure gives its end customers at the “service level”, regarding the uptime/connectivity over the period of usage.

The Azure Compute SLA guarantees that, when you deploy two or more role instances for every role, access to your cloud service will be maintained at least 99.95 percent of the time. Also, detection and corrective action will be initiated 99.9 percent of the time when a role instance’s process is not running.

### Q20. Explain traffic manager benefits in Azure?

Ans. The major benefits offered by the traffic manager in Azure are:

* Distribution of traffic based on several traffic-routing methods.
* Continuous monitoring of endpoint health and automatic failover when endpoints fail.

### Q21. What is a break-fix issue?

**Ans.** In Azure, break-fix issues are referred to as technical problems. It is an industry term used when “work involved in supporting a technology when it fails its normal course of action”.

### Q22. What is Azure Active Directory and how it is used?

**Ans.** Microsoft offers Azure active directory, a fully managed multi-tenant service that implements identity and access capabilities for applications running in Azure as well as applications operating in the on-premises environment. It is used for providing single sign-on and multi-factor authentication to help users from protecting attacks.

### Q23. What is an Availability Set?

**Ans.** Availability Set is a logical grouping capability majorly employed for separating VM sources from each other when they are deployed. They are used for building reliable cloud solutions. The VMs placed in the Availability set are run across various physical servers, storage units, compute racks, and network switches in Azure. If any failure occurs, only VMs subset is affected, and the overall solution stays operational.

### Q26. Explain Azure Resource Manager?

Ans. Azure Resource Manager is used for provisioning management and deployment services in Azure. Management layer is used for updating and deleting resources in Azure subscription. You can organize related resources in resource groups and deploy your resources with JSON templates.

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[Explore Curriculum](https://mindmajix.com/microsoft-azure-training" \l "curriculum" \t "_blank)

### Q27. What is a Fault Domain?

**Ans.** A Fault domain represents the group of the underlying hardware that shares a common power source and network switch. Every fault domain comprises some racks and each contains a virtual machine. When you create virtual machines within an availability set, your virtual machines are automatically distributed across the fault domains in the Azure platform.

### Q28. What are Update Domains?

**Ans.** The updated domain represents the group of the underlying hardware that can be rebooted or can withstand maintenance at the same time. When you create virtual machines within an availability set, your virtual machines are automatically distributed across the update domains by the Azure platform. This ensures that atleast one instance of your applications always remains working when the Azure platform is under periodic maintenance.

### Q29. What is the difference between Azure Service Bus Queues and Storage Queues?

**Ans.** Two types of queue mechanisms are supported by Azure: Storage queues and Service Bus queues.

Storage queues: These are the part of the Azure storage infrastructure, features a simple REST-based GET/PUT/PEEK interface. Provides persistent and reliable messaging within and between services.

Service Bus queues: These are the part of a broader Azure messaging infrastructure that helps to queue as well as publish/subscribe, and more advanced integration patterns.

### Q30. Explain Azure Service Fabric.

**Ans.** Azure Service Fabric is a distributed platform designed by Microsoft to facilitate the development, deployment and management of highly scalable and customizable applications. The applications created in this environment consists of detached microservices that communicate with each other through service application programming interfaces.

### Q31. Define the Azure Redis Cache.

**Ans.** Azure Redis Cache is an open-source and in-memory Redis cache that helps web applications to fetch data from a backend data source into cache and server web pages from the cache to enhance the application performance. It provides a powerful and secure way to cache the application’s data in the Azure cloud.

### Q32. Explain the types of services you can build with the Service Fabric.

**Ans.** Majorly, two types of services you can build on Service Fabric:

* Stateless Services - No state is stored in the service. The longer-term state is stored in an external database. This is the typical application/data layer approach to build services.
* Stateful Services - The state is stored in the service. Allows the state to persist without the need for an external database.

### Q46) How to design applications to handle connection failure in Windows Azure?

**Ans:**The Transient Fault Handling Application Block supports various standard ways of generating the retry delay time interval, including fixed interval, incremental interval (the interval increases by a standard amount), and exponential back-off (the interval doubles with some random variation).

### Q48) What is Blob?

**Ans:**BLOB stands for Binary Large Object. Blob is a file of any type and size.  
The Azure Blob Storage offers two types of blobs –

1. Block Blob
2. Page Blob

URL format: Blobs are addressable using the following URL format:

### Q49) What is the difference between Block Blob vs Page Blob?

**Ans:**

**Block blobs** are for your discrete storage objects like jpg's, log files, etc. that you'd typically view as a file in your local OS.

**Page blobs** are for random read/write storage, such as VHD's (in fact, **page blobs** are what's used for **Azure** Virtual Machine disks)

Block blobs are comprised of blocks, each of which is identified by a block ID.  
You create or modify a block blob by uploading a set of blocks and committing them by their block IDs.  
If you are uploading a block blob that is no more than 64 MB in size, you can also upload it in its entirety with a single Put Blob operation. -Each block can be a maximum of 4 MB in size. The maximum size for a block blob in version 2009-09-19 is 200 GB or up to 50,000 blocks.

Page blobs are a collection of pages. A page is a range of data that is identified by its offset from the start of the blob. To create a page blob, you initialize the page blob by calling Put Blob and specifying its maximum size.  
-The maximum size for a page blob is 1 TB. A page written to a page blob may be up to 1 TB in size.  
what to use block blobs for streaming video. “The application must provide random read/write access” which is supported by Page Blobs

### Q51) What is the dead letter queue?

**Ans:**

1. Messages are placed on the dead-letter sub-queue by the messaging system in the following scenarios.
2. When a message expires and dead-lettering for expired messages is set to true in a queue or subscription.
3. When the max delivery count for a message is exceeded on a queue or subscription.
4. When a filter evaluation exception occurs in a subscription and dead-lettering is enabled on filter evaluation exceptions.

### Q52) What is swap deployments?

**Ans:**To promote a deployment in the Azure staging environment to the production environment, you can “swap” the deployments by switching the VIPs by which the two deployments are accessed. After the deployment, the DNS name for the cloud service points to the deployment that had been in the staging environment.

### Q53) What is minimal vs. verbose monitoring?

**Ans:**Minimal monitoring, which is configured by default for a cloud service, uses performance counters gathered from the host operating systems for role instances (virtual machines). Verbose monitoring gathers additional metrics based on performance data within the role instances to enable closer analysis of issues that occur during application processing. For more information

## What are the key characteristics exposed by Cloud Computing?

The key characteristics of cloud computing are given below-

### **Scalability and Elasticity**

Scalability allows you to handle the increasing workload by increasing the number of resources or its capacity-on-demand or based upon the usage of the resources.

Elasticity allows you to use or free, a resource capacity dynamically. It is measured based upon the speed as the resources are requested on-demand and the usage of the resources.

### **Maintenance**

Maintenance of a cloud computing application is easier, as it does not require to be installed on each user’s machine. Also, the applications which are deployed or running on the cloud, you don’t need to install on each system. Everyone can access it using the internet.

### **Reliability**

Your deployed application or database multiple copies are maintained by the cloud vendors, which makes well-designed cloud computing suitable for business continuity and disaster recovery.

### **Cost**

Cloud vendors always charge only for the usages and used storage. If a resource is not in use, you don’t need to pay extra cost for any unused resource.

### **Security**

All the created resources are secured by each cloud vendors. Even they are certified from various certification authorities that ensure your privacy and data security.

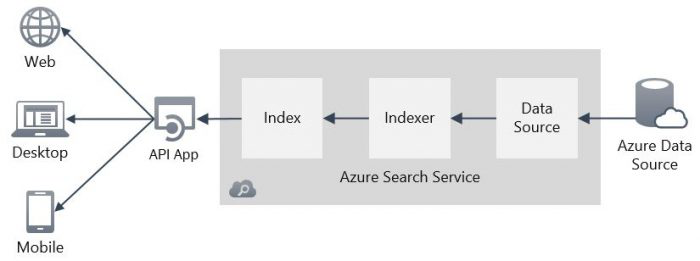
## What is Azure Cosmos DB?

Azure Cosmos DB is a Planet-scale, Globally Distributed Database provided by Azure. It is Schema-agnostic and hence considered a NoSQL database. Cosmos DB provides Incredibly Low Latency in the order of Milliseconds. Cosmos DB supports a wide range of APIs including SQL, MongoDB, Cassandra, Graph, Table etc.



## What is Azure Search?

Azure Search is a Search-as-a-Solution hosted & managed by Azure. Azure Search allows Developers to build Search Experience over multiple sources of content in web, mobile & enterprise applications queryable with a REST API interface.



Azure Search itself takes care of Index creation, Service availability, Scaling and Service updates.

# AZURE FIREWALL VS NETWORK SECURITY GROUP (NSG)

SEPTEMBER 5, 2019BY [RICHARD BURRS](https://darawtechie.com/author/rburrs/)

[[](https://darawtechiedotcom.files.wordpress.com/2019/09/fwnsg.png)](https://darawtechiedotcom.files.wordpress.com/2019/09/fwnsg.png)

An important Security measure when running workloads in Azure or any Cloud service is to control the type of traffic that flows in and out of resources.  The resources can be virtual machines running a SQL database, web applications or domain services.

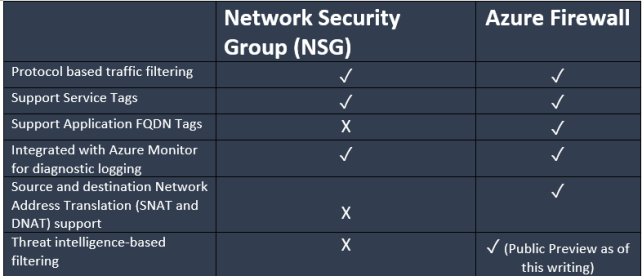
In Azure, there are two security features that can be used to manage both inbound and outbound traffic to resources:  Azure Firewall and Network Security Groups (NSGs).  In this article, I’m going to show how the two compare to each other and can be used together to protect traffic to resources in Azure.

**Azure Firewall and NSG Overview**  
Lets start with Network Security Groups.  An NSG filters traffic at the network layer and consists of security rules that allows or denies traffic based on 5-tuple information:  
1. Protocol – such as TCP, UDP, ICMP  
2. Source – IP address,  
3. Source port  
4. Destination  
5. Destination port

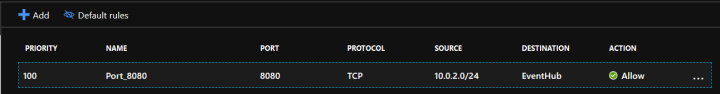
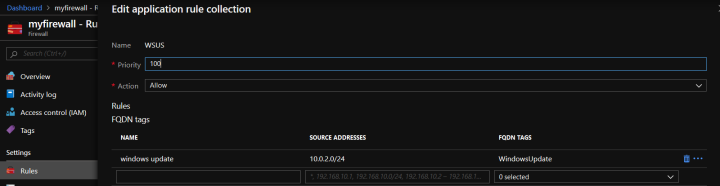
You can associate an NSG with a subnet or the network interface of an Azure VM.  Fun fact – in your mother’s Azure (the old classic model), it was possible to link an NSG to a VM as well as subnet.  In accordance with Best practices, it’s recommended to scope NSGs at the subnet level or network interface, not both. This can make it complicated when having to troubleshoot network issues.  Also, the same NSG can be applied to multiple subnets.

You can probably imagine how NSG rules can become difficult to manage in large environments that contain multiple subnets and virtual machines. Who wants to manually input rules allowing traffic to individual IP addresses?  This is where Application Security Groups (ASGs) come to the rescue.  An ASG is a logical grouping of virtual machines that allows you to apply security rules at scale.  For example, if you have a group of VM’s serving a web application, the VM’s can be placed in an ASG called “webappvms”.  The webappvms group can then be added to a rule within an NSG allowing HTTP (TCP) traffic over port 80.  This alleviates the need to add individual IP addresses to the security rule.

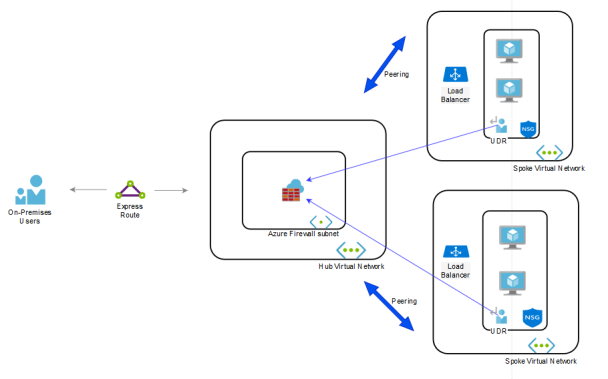
Azure Firewall is a highly available, managed firewall service that filters network and application level traffic.  It has the ability to process traffic across subscriptions and VNets that are deployed in a hub-spoke model.  Azure Firewall is priced in two ways: 1) $1.25/hour of deployment, regardless of scale and 2) $0.016/GB of data processed.

**Azure Firewall and NSG Comparison**  
An NSG is a firewall, albeit a very basic one.  It’s a software defined solution that filters traffic at the Network layer.  However, Azure Firewall is more robust.  It’s a managed firewall service that can filter and analyze L3-L4 traffic, as well as L7 application traffic.  Azure Firewall provides the same capabilities as an NSG, plus more. The following chart offers a comparative illustration of each solution:  
[](https://darawtechiedotcom.files.wordpress.com/2019/09/fw-vs-nsg2.png)

Here are some definitions if you’re not familiar with all of the features listed in the above chart:

* Service Tags – these are labels that represent a range of IP addresses for particular services such as Azure Key Vault, Data Lake, Container Registry, etc.  These are managed by Microsoft and cannot be customized.  You can learn more about them [here](https://docs.microsoft.com/en-us/azure/virtual-network/security-overview#service-tags). As an example, here’s a Service tag I have configured for Event Hub in an outbound NSG rule.  This same rule can also be created in Azure Firewall.  
  [](https://darawtechiedotcom.files.wordpress.com/2019/09/nsg-service-tag.png)
* FQDN Tags – represent a group of fully qualified domain names of Microsoft services such as Windows Update or Azure Backup.  Like Service tags, they are maintained by Microsoft and cannot be customized.  There are a significantly fewer number of  FQDN tags than Service tags.  Go [here](https://docs.microsoft.com/en-us/azure/firewall/fqdn-tags) to see the list of FQDN tags. Here’s an example of FQDN tag I have for Windows Update in my Azure Firewall application rule.  This allows you to avoid creating multiple application rules for each of the numerous Windows Update endpoints.  One tag to rule them all!  
  [](https://darawtechiedotcom.files.wordpress.com/2019/09/fw-fqdn-tag.png)
* SNAT – Source Network Address Translation is a feature of Azure Firewall. It’s possible to configure Azure Firewall with a Public IP address (PIP) that can be used to masked the IP address of Azure Resources that are sending out via the Firewall.
* DNAT – Source Destination Address Translation is used to translate incoming traffic to the firewall’s Public IP to the Private IP addresses of the VNet.

**Azure Firewall and NSG in Conjuction**  
NSGs and Azure Firewall work very well together and are not mutually exclusive or redundant.  You typically want to use NSGs when you are protecting network traffic in or out of a subnet.  An example would be a subnet that contains VMs that require RDP access (TCP over 3389) from a Jumpbox. Azure Firewall is the solution for filtering traffic to a VNet from the outside.  For this reason, it should be deployed in it’s own VNet and isolated from other resources.  Azure Firewall is a highly available solution that automatically scales based on its workload.  Therefore, it should be in a /26 size subnet to ensure there’s space for additional VMs that are created when it’s scaled out.

A scenario to use both would be a Hub-spoke VNet environment with incoming traffic from the outside.  Consider the following diagram:  
[](https://darawtechiedotcom.files.wordpress.com/2019/09/hub-spoke.png)

The above model has Azure Firewall in the Hub VNet which has peered connections to two Spoke VNets.  The Spoke Vnets are not directly connected, but their subnets contain a User Defined Route (UDR) that points to the Azure Firewall, which serves as a gateway device.  Also, Azure Firewall is public facing and is responsible for protecting inbound and outbound traffic to the VNet.  This is where features like Application rules, SNAT and DNaT come in handy.  If you have a simple environment, then NSGs should be sufficient for network protection.

The following links are to Microsoft docs that provide detailed information about Azure Firewall and Network Security Groups and were used as source material for this article:

# **Microsoft Azure Advisor: What It Is, and How It Can Benefit Your Business**

Microsoft Azure offers a [full suite of cloud services](https://azure.microsoft.com/en-us/solutions/) for virtually every business application.  Users can find solutions for everything from digital marketing to e-commerce, SAP, DevOps, monitoring, business intelligence, analytics, disaster recovery, hybrid integration and data backup.  Although Azure makes it easy to subscribe to these services, configuring them to run applications can be a challenge. As part of our [Azure consulting](https://appliedi.net/managed-azure-cloud-support-services/)service, we help you figure out how to leverage technology to drive business success and leveraging Azure Advisor is one of the tools we use to accomplish this.

**What Is Azure Advisor?**

Azure Advisor is a new Microsoft Azure service which provides personalized recommendations based on individual user needs.  As [Microsoft](https://docs.microsoft.com/en-us/azure/advisor/advisor-overview) explains:

“Advisor is a personalized cloud consultant that helps you follow best practices to optimize your Azure deployments. It analyzes your resource configuration and usage telemetry and then recommends solutions that can help you improve the cost effectiveness, performance, high availability, and security of your Azure resources.”

**What Does Azure Advisor Do for Businesses?**

Essentially, Azure Advisor takes the guesswork out of optimizing your Azure deployments.  Specifically, Azure will:

* Provide your business with highly-personalized recommendations and best practices which are both actionable and proactive;
* Help you find ways to reduce costs related to your Azure service subscriptions; and
* Improve the performance, security, and availability of resources you use.

**What Kinds of Recommendations Does Advisor Provide?**

Advisor recommendations are of 4 basic kinds: (1) high availability; (2) security; (3) performance; and (4) cost:

**1.  High Availability Recommendations**

[High availability recommendations](https://docs.microsoft.com/en-us/azure/advisor/advisor-high-availability-recommendations) ensure the continuity of your business-critical applications.  Specifically, Advisor will:

* **Identify virtual machines not part of an availability set and recommend moving them to an availability set**: To ensure redundancy and that at least one virtual machine is available during planned or unplanned maintenance events and outages, Advisor will recommend that you include 2 or more virtual machines in each availability set.
* **Identify application gateway instances that are not configured for fault tolerance**: this ensures the business continuity of critical applications which are not powered by application gateways, and that your application gateway instances are configured with regard to service level agreement (SLA) requirements.
* **Improve the performance of virtual machine disks**: Advisor will identify virtual machines associated with standard disks and recommend upgrading them to premium disks.  This will ensure high-performance, low-latency disk support for virtual machines that run I/O-intensive workloads.
* **Prevent accidental deletion of virtual machine data**: specifically, Advisor will identify any virtual machines in which backup is not enabled and recommend enabling backup.  This ensures that critical data will be available and protects you from corruption or accidental deletion of these data.

**[RELATED  When Azure Service Issues Impact You - Azure Service Health](https://www.appliedi.net/blog/when-azure-service-issues-impact-you-azure-service-health/" \t "_blank)**

**2.  Security Recommendations**

Advisor integrates with the Azure Security Center to provide critical [security recommendations](https://docs.microsoft.com/en-us/azure/advisor/advisor-security-recommendations), helping you prevent, detect and respond to security threats.  It will periodically analyze the security of all your Azure resources and make recommendations which help you implement whatever controls you need.

**3.  Performance Recommendations**

[Performance recommendations](https://docs.microsoft.com/en-us/azure/advisor/advisor-performance-recommendations) are designed to improve the speed and responsiveness of business-critical applications.  Specifically, Advisor will:

* **Improve database performance**: Advisor integrates with SQL Database Advisor.  It will assess the performance of the database by analyzing your usage history and make recommendations to optimize running the typical database workload.
* **Improve Redis Cache performance**: Advisor will find Redis Cache instances in which performance is negatively affected because of server load, network bandwidth or high memory usage and make recommendations to prevent any potential problems.
* **Improve App Service performance**: Advisor will identify circumstances in which memory or CPU are exhausted by app runtimes, and those in which the collocation of resources can boost performance and reduce costs. Advisor will make appropriate recommendations for improvement.

**4.  Cost Recommendations**

Advisor can find underutilized resources to help you reduce the overall cost of your Azure services.  Advisor will:

* **Help you reduce virtual machine costs**:  specifically, Advisor will monitor your virtual machine usage over a 14-day period and designate any virtual machines whose CPU utilization is 5% or less and whose network usage is 7 MB or less for at least 4 days as “low-utilization.”  It will then display an estimated cost for continuing to run those virtual machines, providing you with the information you need to decide if you want to shut them down or resize them.
* **Identify cost-effective solutions for managing multiple SQL databases**:  Advisor will find SQL server instances which can benefit from the creation of [elastic database pools](https://docs.microsoft.com/en-us/azure/sql-database/sql-database-elastic-pool).  This provides cost-effective solutions for managing the performance goals of databases which have different usage patterns.

**How to Get Started with Advisor**

To [get started with Advisor](https://docs.microsoft.com/en-us/azure/advisor/advisor-get-started), you’ll need to understand how to (1) access recommendations; (2) implement recommendations; (3)n search for recommendations; and (4) “snooze” or dismiss recommendations:

**1.  How to Access Advisor Recommendations;**

After subscribing to Advisor, you (as subscription owner) will need to register your subscription by launching the Advisor dashboard and clicking on the “get recommendations” button.  After this one-time operation is completed, you can access recommendations as owner, contributor or reader.

After you sign into the [Azure portal](https://portal.azure.com/), click on “more services” in the left pane.  In the service menu pane, you’ll see “monitoring and management.”  Click on “Azure Advisor” to display the Advisor dashboard.  Then choose the Azure subscription for which you want recommendations.  You can then select the kind of recommendations you want, for example, high availability, security, performance or cost.

Recommendations are presented with either inline actions or links to documentation.  When you click on an inline action recommendation, Advisor will present a “guided user journey” which outlines the steps necessary to implement that recommendation.  When you click on a documentation link, Advisor will display documentation which explains how you can manually implement the necessary action.

**2.  How to Implement Advisor Recommendations**

Implementing solutions based on Advisor recommendations is straightforward and presented in an intuitive, step-wise fashion.  After you sign in to the Azure portal, click on Azure Advisor.  On the Advisor recommendations dashboard, you need to click on “get recommendations.”  You’ll see a list of recommendations (as either inline actions or documentation links, as noted above), from which you’ll choose the one you want and click on it.  Carefully review the relevant information regarding the actions you need to perform either to resolve a particular issue or to take advantage of a cost-saving opportunity.

**3.  How to Search for Advisor Recommendations**

Advisor provides a robust search functionality, making it possible for you to quickly find the specific recommendations you need.  Advisor will let you search for recommendations based on a particular subscription, resource group or status.  After filtering based on your search criteria, you can display Advisor recommendations by clicking on “get recommendations.”

**4.  How to Dismiss or “Snooze” Advisor Recommendations**

There will be times when you’ll want to dismiss a particular recommendation or delay its implementation.  After you start Advisor, click on “get recommendations.”  Review listed recommendations and click on the one in which you’re interested.  If you want to delay implementation, click on “snooze” and designate a snooze time period.  If you want to dismiss the recommendation, click on “never.”

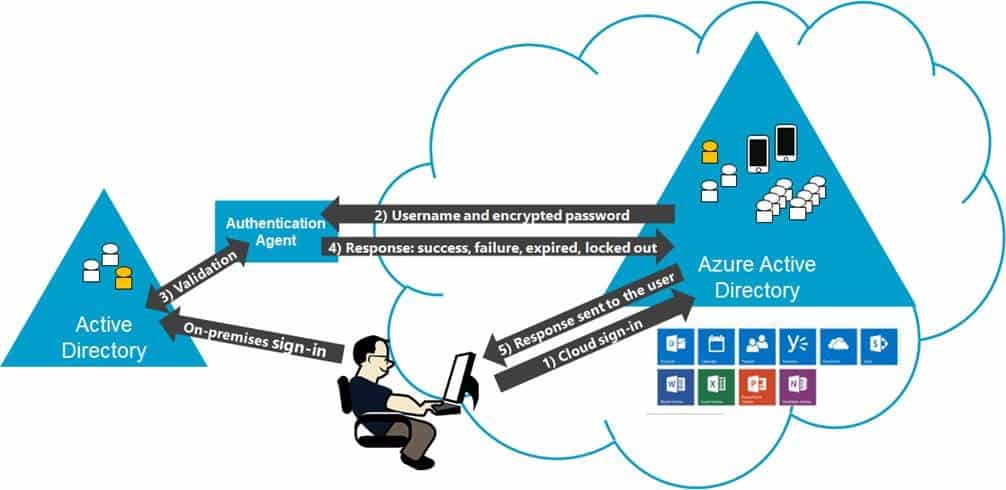
**Conclusion**

Azure Advisor is one of the many cloud-based business applications which can help you run your business more efficiently and achieve your key objectives.  IaaS services such as Azure are an important component of your overall cloud strategy, but they’re only one.  To implement a comprehensive and effective cloud strategy, you need to partner with cloud hosting experts with the kind of knowledge and experience that best ensure your success.

To learn more about the ways our VPS cloud server, clustered cloud server, dedicated server, and website hosting services can help you achieve your key objectives and grow your business, [contact us](http://www.appliedi.net/contactus/) today.

# **What is pass-through authentication?**

Pass-through authentication (PTA) is a feature of[**Azure AD Connect**](https://oxfordcomputertraining.com/glossary/azure-ad-connect/). It involves a simple service in the form of an agent running on one or several on-premises domain-joined servers, which validates a user’s sign-on on behalf of [**Azure AD**](https://oxfordcomputertraining.com/glossary/what-is-azure-ad/) directly with the on-premises Active Directory (AD). The password need not be present in Azure AD (in any form). The agent connects outbound to Azure AD and listens for authentication requests, so it only requires outbound ports to be open.



This service can be used when on-premises validation is required, for example when a policy, regulation or law doesn’t allow synchronization of password hashes, which is Microsoft’s favoured approach when using Azure AD Connect. It also has the advantage that any on-premises polices, such as working hours restrictions, can be evaluated during authentication to cloud services.

The PTA user experience is of the same sign-on (and sometimes single sign-on – see [SSSO](https://oxfordcomputertraining.com/glossary/what-is-seamless-single-sign-on/)) when using AD and Azure AD. The user enters the same username and password whether authenticating on-premises or in the cloud.

<https://www.slideshare.net/jamserra/relational-databases-vs-nonrelational-databases>

<https://azure.microsoft.com/en-us/blog/a-technical-overview-of-azure-cosmos-db/>

<https://www.red-gate.com/simple-talk/cloud/cloud-data/overview-of-azure-cosmos-db/>

<https://www.red-gate.com/simple-talk/sql/nosql-databases/introduction-to-sql-for-cosmos-db/>

<https://www.blue-granite.com/blog/10-things-to-know-about-azure-data-lake-storage-gen2>

<https://www.ifi.tech/2019/08/08/all-you-need-to-know-about-azure-firewall/>

<https://azure.microsoft.com/en-in/blog/azure-load-balancer-new-distribution-mode/>

LABS

<https://www.youtube.com/watch?v=XFJYH4J6kN0&list=PL4ZP0JmH05bTMKp5p_PIponQTshu33rf3>

<https://www.youtube.com/watch?v=Xhwt8nNcTNk&list=PLmmVbuBtwkhnGZs44xyt0m4Z3sZBoHGo0>

<https://www.youtube.com/watch?v=gRFdx2u-zkM&list=PLkchPR_4TgGVQfBQTGcT-cRvoJDmIQXXB>

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  + [Create and configure storage accounts](https://github.com/shrasool/Azure-Solutions-Architect-Expert-Exam/blob/master/AZ-300/README.md#create-and-configure-storage-accounts)
  + [Create and configure a Virtual Machine (VM) for Windows and Linux](https://github.com/shrasool/Azure-Solutions-Architect-Expert-Exam/blob/master/AZ-300/README.md#create-and-configure-a-virtual-machine-vm-for-windows-and-linux)
  + [Automate deployment of Virtual Machines (VMs)](https://github.com/shrasool/Azure-Solutions-Architect-Expert-Exam/blob/master/AZ-300/README.md#automate-deployment-of-virtual-machines-vms)
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  + [Implement and manage virtual networking](https://github.com/shrasool/Azure-Solutions-Architect-Expert-Exam/blob/master/AZ-300/README.md#implement-and-manage-virtual-networking)
  + [Manage Azure Active Directory (AD)](https://github.com/shrasool/Azure-Solutions-Architect-Expert-Exam/blob/master/AZ-300/README.md#manage-azure-active-directory-ad)
  + [Implement and manage hybrid identities](https://github.com/shrasool/Azure-Solutions-Architect-Expert-Exam/blob/master/AZ-300/README.md#implement-and-manage-hybrid-identities)
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  + [Implement application load balancing](https://github.com/shrasool/Azure-Solutions-Architect-Expert-Exam/blob/master/AZ-300/README.md#implement-application-load-balancing)
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  + [Create app or service that runs on Service Fabric](https://github.com/shrasool/Azure-Solutions-Architect-Expert-Exam/blob/master/AZ-300/README.md#create-app-or-service-that-runs-on-service-fabric)
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## Deploy and Configure Infrastructure (25-30%)

### Analyze resource utilization and consumption

* [configure diagnostic settings on resources](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/azure-diagnostics?toc=/azure/azure-monitor/toc.json); [Alternate link](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-overview-of-diagnostic-logs#resource-diagnostic-settings)
* [create baseline for resources](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-alerts-dynamic-thresholds?toc=/azure/azure-monitor/toc.json); [Alternate](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-enable-diagnostic-logs-using-template?toc=/azure/azure-monitor/toc.json)
* [create and rest alerts](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/alert-metric)
* [analyze alerts across subscription](https://docs.microsoft.com/en-us/azure/log-analytics/log-analytics-activity-logs-subscriptions)
* [analyze metrics across subscription](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-metric-charts); [Alternate link](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-overview-unified-alerts?toc=/azure/azure-monitor/toc.json)
* [create action groups](https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-action-groups)
* [monitor for unused resources](https://docs.microsoft.com/en-us/azure/cost-management/dashboards)
* [monitor spend](https://docs.microsoft.com/en-us/azure/billing/billing-getting-started)
* [report on spend](https://docs.microsoft.com/en-us/azure/billing/billing-download-azure-invoice-daily-usage-date)
* [utilize Log Search query functions](https://docs.microsoft.com/en-us/azure/log-analytics/log-analytics-tutorial-viewdata)
* [view alerts in Log Analytics](https://docs.microsoft.com/en-us/azure/log-analytics/log-analytics-solution-alert-management)

### Create and configure storage accounts

* [configure network access to the storage account](https://docs.microsoft.com/en-us/azure/storage/common/storage-network-security)
* [create](https://docs.microsoft.com/en-us/azure/storage/common/storage-quickstart-create-account?tabs=portal) and [configure storage account](https://docs.microsoft.com/en-us/azure/storage/common/storage-introduction)
* [generate shared access signature](https://docs.microsoft.com/en-gb/azure/storage/blobs/storage-dotnet-shared-access-signature-part-2)
* [install](https://azure.microsoft.com/en-us/features/storage-explorer/) and use [Azure Storage Explorer](https://docs.microsoft.com/en-us/azure/vs-azure-tools-storage-manage-with-storage-explorer?tabs=macos)
* [manage access keys](https://docs.microsoft.com/en-us/azure/key-vault/key-vault-ovw-storage-keys)
* [monitor activity log by using Log Analytics](https://docs.microsoft.com/en-us/azure/log-analytics/log-analytics-azure-storage-iis-table?toc=/azure/azure-monitor/toc.json)
* [implement 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

* [configure high availability](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/manage-availability); ADDITIONAL: [Linux HA](https://docs.microsoft.com/en-us/azure/virtual-machines/linux/tutorial-availability-sets)
* [configure monitoring, networking, storage, and virtual machine size](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/tutorial-monitoring); ADDITIONAL: [Linux monitoring](https://docs.microsoft.com/en-us/azure/virtual-machines/linux/tutorial-monitoring)
* [deploy and configure scale sets](https://docs.microsoft.com/en-us/azure/virtual-machine-scale-sets/virtual-machine-scale-sets-deploy-app)

### Automate deployment of Virtual Machines (VMs)

* [modify Azure Resource Manager (ARM) template](https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-manager-quickstart-create-templates-use-the-portal)
* [configure location of new VMs](https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-manager-templates-resources#location)
* [configure VHD template](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/prepare-for-upload-vhd-image)
* [deploy from template](https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-template-deploy)
* [save a deployment as an ARM template](https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-manager-export-template)
* [deploy Windows and Linux VMs](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/tutorial-automate-vm-deployment); ADDITIONAL: [Windows](https://docs.microsoft.com/en-us/azure/virtual-machines/windows/powershell-samples); [Linux](https://docs.microsoft.com/en-us/azure/virtual-machines/linux/cli-samples); [Azure deployment sample repo](https://github.com/Azure/azure-quickstart-templates/tree/master/101-vm-simple-linux)

### Create connectivity between virtual networks

* [create and configure VNET peering](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-manage-peering)
* [create and configure VNET to VNET](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-peering-overview); ADDITIONAL: [Sample template](https://github.com/Azure/azure-quickstart-templates/tree/master/201-vnet-to-vnet-peering)
* [verify virtual network connectivity](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-howto-site-to-site-resource-manager-portal#VerifyConnection)
* [create virtual network gateway](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-vnet-vnet-rm-ps) [Overview](https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-vpngateways)

### Implement and manage virtual networking

* [configure private and public IP addresses, network routes, network interface, subnets, and virtual network](https://docs.microsoft.com/en-us/azure/virtual-network/manage-virtual-network); ADDITIONAL: [Planning](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-vnet-plan-design-arm?toc=%2fazure%2fnetworking%2ftoc.json)

### Manage Azure Active Directory (AD)

* [add custom domains](https://docs.microsoft.com/en-us/azure/active-directory/fundamentals/add-custom-domain)
* configure Azure AD [Identity Protection](https://docs.microsoft.com/en-us/azure/active-directory/identity-protection/enable), Azure [AD Join](https://docs.microsoft.com/en-us/azure/active-directory/devices/azureadjoin-plan), and [Enterprise State Roaming](https://docs.microsoft.com/en-us/azure/active-directory/active-directory-windows-enterprise-state-roaming-overview)
* [configure self-service password reset](https://docs.microsoft.com/en-us/azure/active-directory/authentication/concept-sspr-howitworks)
* [implement conditional access policies](https://docs.microsoft.com/en-us/azure/active-directory/conditional-access/app-based-mfa)
* [manage multiple directories](https://docs.microsoft.com/en-us/azure/active-directory/fundamentals/active-directory-administer#how-can-i-add-and-manage-multiple-directories)
* [perform an access review](https://docs.microsoft.com/en-us/azure/active-directory/governance/perform-access-review)

### Implement and manage hybrid identities

* [install](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-install-roadmap) and configure [Azure AD Connect](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/whatis-hybrid-identity#install-azure-ad-connect)
* [configure federation](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-fed-management) and [single sign-on](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-sso)
* [manage Azure AD Connect](https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-post-installation)
* [manage password sync and writeback](https://docs.microsoft.com/en-us/azure/active-directory/authentication/howto-sspr-writeback)

## Implement Workloads and Security (20-25%)

### Migrate servers to Azure

* migrate by using Azure Site Recovery (ASR)
* migrate using P2V
* configure storage
* create a backup vault
* prepare source and target environments
* backup and restore data
* deploy Azure Site Recovery (ASR) agent
* prepare virtual network

### Configure serverless computing

* create and manage objects
* manage a Logic App resource
* manage Azure Function app settings
* manage Event Grid
* manage Service Bus

### Implement application load balancing

* configure application gateway and load balancing rules
* implement front end IP configurations
* manage application load balancing

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

* create and configure Azure VPN Gateway
* create and configure site to site VPN
* configure Express Route
* verify on-premises connectivity
* manage on-premises connectivity with Azure

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

* 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

### Implement Multi-Factor Authentication (MFA)

* 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

## Architect Cloud Technology Solutions (5-10%)

### Select an appropriate compute solution

* leverage appropriate design patterns
* select appropriate network connectivity options
* design for hybrid topologies

### Select an appropriate integration solution

* address computational bottlenecks, state management, and OS requirements
* provide for web hosting if applicable
* evaluate minimum number of nodes

### Select an appropriate storage solution

* validate data storage technology capacity limitations
* address durability of data
* provide for appropriate throughput of data access
* evaluate structure of data storage
* provide for data archiving, retention, and compliance

## Create and Deploy Apps (5-10%)

### Create web applications by using PaaS

* create an Azure app service web app by using Azure CLI, PowerShell, and other tools
* create documentation for the API by using open source and other tools
* create an App Service Web App for containers
* create an App Service background task by using WebJobs

### Create app or service that runs on Service Fabric

* develop a stateful Reliable Service and a stateless Reliable Service
* develop an actor-based Reliable Service
* write code to consume Reliable Collections in your service

### Design and develop applications that run in containers

* configure diagnostic settings on resources
* create a container image by using a Docker file
* create an Azure Container Service (ACS/AKS) cluster by using the Azure CLI and Azure Portal
* publish an image to the Azure Container Registry
* implement an application that runs on an Azure Container Instance
* implement container instances by using Azure Container Service (ACS/AKS), Azure Service Fabric, and other tools
* manage container settings by using code

## Implement Authentication and Secure Data (5-10%)

### Implement authentication

* implement authentication by using certificates, forms-based authentication, tokens, Windows-integrated authentication
* implement multi-factor authentication by using Azure AD options

### Implement secure data solutions

* encrypt and decrypt data at rest
* encrypt data with Always Encrypted
* implement Azure Confidential Compute and SSL/TLS communications
* manage cryptographic keys in the Azure Key Vault

## Develop for the Cloud (20-25%)

### Develop long-running tasks

* implement large-scale, parallel, and high-performance apps by using batches
* implement resilient apps by using queues
* implement code to address application events by using web hooks
* address continuous processing tasks by using web jobs

### Configure a message-based integration architecture

* configure an app or service to send emails, Event Grid, and the Azure Relay Service
* create and configure a Notification Hub, an Event Hub, and a Service Bus
* configure queries across multiple products
* configure an app or service with Microsoft Graph

### Develop for asynchronous processing

* implement parallelism, multithreading, processing, durable functions, Azure logic apps, interfaces with storage, interfaces to data access, and appropriate asynchronous compute models

### Develop for autoscaling

* implement autoscaling rules and patterns (schedule, operational/system metrics, code that addresses singleton application instances, and code that addresses transient state

### Implement distributed transactions

* identify tools to implement distributed transactions (e.g., ADO.NET, elastic transactions, multi-database transactions)
* manage transaction scope
* manage transactions across multiple databases and servers

### Develop advanced cloud workloads

* develop solutions by using intelligent algorithms that identify items from images and videos
* develop solutions by using intelligent algorithms related to speech, natural language processing, Bing Search, and recommendations and decision making
* create and integrate bots
* integrate machine learning solutions in an app
* create and implement IoT solutions

Migration

<https://docs.microsoft.com/en-us/azure/migrate/tutorial-migrate-physical-virtual-machines>

# **Configure a Site to Site VPN in Microsoft Azure**

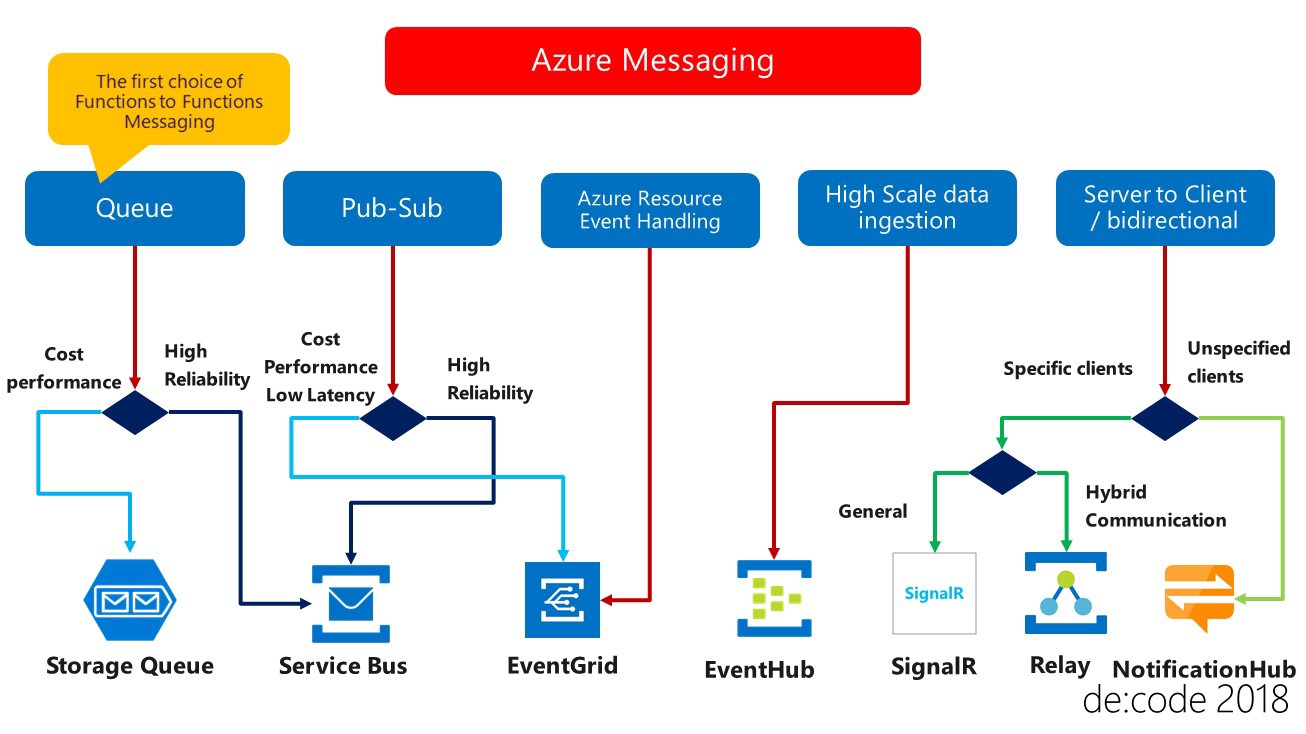
Steps Required in Azure

1. Create a Resource group in Azure
2. Create A vNET
3. Create a getaway Subnet
4. Create a Local Network Gateway
5. Create Public IP Address
6. Create a Virtual Network Gateway
7. Create a Connection Object in Azure

Steps required on-premises

1. Install and configure the RRAS role
2. Ping test Azure and On-Premises VMs

NETWORK



### **Chapter 1: Introduction to Azure**

This chapter lays a foundation for you to easily grasp the technology behind Azure cloud platform. Cloud computing started gaining traction as Virtualization became common and you will learn Virtualization at the outset.  
  
We begin with the basics and quickly move on to Azure Platform services and purpose of each service, Cloud Computing Service Delivery Models - IaaS, PaaS and SaaS, components of Windows Azure platform - Windows Azure OS, Azure App Fabric and SQL Database.  
  
Important topics covered in this chapter are Fabric Controller which is similar to the kernel of a traditional OS, role of FC, AppFabric services which are middleware services, Brokered Messaging Pattern and Relayed Messaging Pattern, Roles of Service Bus Queues and Service Bus Topics in a Hybrid cloud environment, Azure Execution Models for running applications such as Windows Azure Virtual Machines, App Service Web Apps and Cloud Services.

1. Introduction to Cloud Computing
2. What does Cloud Computing mean for the developer
3. Cloud for Companies
4. Why should companies move to Cloud
5. Drawbacks of Cloud Computing
6. Virtualization
7. Windows Azure Platform
8. Azure Platform Services
   * Compute services
   * Data management services
   * Network services
   * Developer services
   * Messaging and integration services
   * Backup services
   * Media services
9. Why is Azure a Flexible platform?
10. Cloud Computing Service Delivery Models
    * Infrastructure as a Service (IaaS)
    * Platform as a Service (PaaS)
    * Software as a Service (SaaS)
11. Cloud Delivery models and Users
12. Components of Azure platform
    * Windows Azure OS
    * Azure App Fabric
    * SQL Database
13. Key components of Azure OS
    * Compute service
    * Storage service
    * Fabric
    * Fabric Controller
14. Windows Azure AppFabric
    * Azure Service Bus
    * Brokered Messaging Pattern
    * Service Bus Queues
    * Service Bus Topics
    * Access Control Service
    * Claims-Based Identity
15. Azure Execution Models
    * Azure Virtual Machines
    * App Service Web Apps
    * Cloud Services

### **Chapter 2: Create and Manage Virtual Machines**

Virtual Machines are the building blocks of any cloud platform and in this chapter you will learn everything about Azure VMs.  
  
Important topics covered in this chapter are scenarios in which we can use Azure VMs, create a Virtual Machine running Windows in Azure and connect to Virtual Machines remotely, Understanding Images and Disks, create a disk from VHD, attaching a Data disk to a Windows Virtual Machine, create an image from VM which is running in Azure, set up load-balancing across two VMs within Azure, set up Endpoints to a Virtual Machine, configuring Availability Set for Virtual Machines, Fault Domains and Update Domains in Azure Virtual Machines, Load Balancer with Availability Sets and setting up Auto-Scaling in Virtual Machines based on metrics.

1. What is a Virtual Machine?
2. Why do we need Azure Virtual Machines
3. Commonly used scenarios to use Azure VMs
4. Virtual Machines Billing
5. How to Create Virtual Machine running Windows in Azure
6. Understanding Images and Disks
7. Images
8. Disks
   * OS Disk
   * Data Disk
   * Temporary Disk
9. Attaching a Data disk to a Windows Virtual Machine
10. Connect to a Windows Virtual Machine remotely and initialize a new data disk in Windows Server
11. How to Attach an existing disk
12. Create Storage Account and upload the .vhd file to the storage account
13. How to create a disk from VHD
14. How to create an image from VM which is running in Azure
15. How to set up load-balancing across two VMs within Azure
16. Understanding Azure IaaS Cloud Services
17. How to Set up Endpoints to a Virtual Machine
18. How to configure a load-balanced set
19. Understanding and Configuring Availability Set for Virtual Machines
20. Fault Domains and Update Domains in Azure Virtual Machines
21. Configure each application tier into separate Availability Sets
22. Combine Load Balancer with Availability Sets
23. Auto-Scaling in Virtual Machines
24. Settings for scaling by CPU utilization
25. Settings for queue utilization

### **Chapter 3: Design and Implement Cloud Services**

Cloud Services which are the core of design and implementation of Azure applications get the maximum attention.  
  
Important topics covered in this chapter are Azure Cloud Service scenarios, understanding of web role and worker role from a development perspective and runtime environment, set up the Development Environment to build Cloud Services, create a Cloud Service Application in Visual Studio and run the Cloud Service Application locally, deploy Cloud Service and Access the instances of web roles and worker roles remotely, Azure Fault Domains and Upgrade Domains in Cloud Service, upgrade Cloud Service deployments, update a Cloud Service role or deployment, VIP Swap Deployment, configure the roles of an Azure Cloud Service using the Role Designer, configure the Endpoints, VM Size, Setting Instances Count to a Web role and Worker role, Windows Azure Caching options, In-Role Cache, Azure Managed Cache Service, Store ASP.Net Session State in the Cache, Handling configuration changes with Azure service runtime events and Lifecycle of a role instance.

1. Introduction to Cloud Services
2. Azure Cloud Service scenarios
   * Scalable web application with background processing scenario
   * Parallel processing application scenario
3. Cloud Service development and deployment
4. What is a web role and worker role from a development perspective?
5. What is a web role and worker role in Cloud Service runtime environment?
6. Set up the development environment to build Cloud Services
7. How to create a Cloud Service in Azure
8. How to create a Cloud Service application in visual studio
9. Run the Cloud Service application locally
10. Deploy Cloud Service
11. Display the instances of web roles, worker roles of the Cloud Service
12. Azure fault domains and upgrade domains in Cloud Service
13. Access instances of web roles and worker roles remotely
14. How to upgrade Cloud Service deployments
15. How to update a Cloud Service role or deployment
16. VIP Swap Deployment
17. How to configure the roles for an Azure Cloud Service
18. Sample service definition file - ServiceDefinition.csdef
19. Sample service configuration file - ServiceConfiguration.cscfg
20. Configure the Cloud Service using the role designer
    * Setting VM Size
    * Setting instances count
    * Manage settings
21. Cloud Service endpoints
    * Input end point
    * Internal end point
    * InstanceInput end point
    * Configure the endpoints to a web role
    * Configure the endpoints to a worker role
22. Setting up local storage
23. Windows Azure caching options
24. How to use In-Role cache for Azure cache
25. Co-located caching option
26. Dedicated caching option
27. Configure a co-located role cache cluster
28. Configure the cache clients
29. Create a DataCache Object and add and retrieve an object from the cache
30. Configure a dedicated In-Role cache cluster
31. Named cache settings section
32. Specify the expiration type and eviction policy of an object in the cache
33. How to use Azure managed cache service
34. How To store ASP.NET session state in the cache
35. Handling configuration changes with Azure service runtime events
    * Changing event
    * Changed event
36. Lifecycle of a role instance
    * OnStart()
    * Run()
    * OnStop()
37. How to respond to storage account configuration change with Azure service runtime events

### **Chapter 4: Windows Azure Storage**

Storage of data is the backbone of any application and it is the same with Azure applications too. Microsoft has provided highly sophisticated and easy to use storage features in Azure. Primarily, Azure storage is designed to store non-relational data. You will learn why this is so in this chapter. Azure Storage is built on three storage services, Blob storage, Table storage and Queue storage.  
  
The chapter begins with teaching why cloud applications need consistent, durable, and scalable storage service.  
  
Important topics covered in this chapter are create a Storage Account, explore Storage Account Endpoints, understanding Partitioning of tables in Table Storage, PartitionKey and Scalability, PartitionKey and Entity Group Transactions, access a Table Storage Service from an Application, create a Table, add an entity to a Table, querying the Table, partition size in Azure Table storage, typical query types for Table storage, using Blob Storage and Queue storage in a Cloud Service application.

1. Azure Storage
2. Why Azure cloud applications need consistent, durable, and scalable storage service
3. Features of Azure Storage
4. Azure Storage Services
   * Blob Storage
   * Table Storage
   * Queue Storage
5. Storage options in Azure Storage Services and Amazon Web services
6. How do you address a resource in the Azure Storage
7. Addressing Local Storage Resources
8. How to create a Storage Account
9. Storage Account Endpoints
10. URLs for accessing objects in a Storage Account
11. Storage Account Monitoring
12. Storage Access Keys
13. Why two Storage Access Keys
14. Azure Table Storage
15. Table Service Components
16. Understanding Partitioning of tables
17. PartitionKey and Scalability
18. Partitions in Azure Storage
19. PartitionKey and Entity Group Transactions
20. How to Access a Table Storage Service from an Application
21. Windows Azure Storage Client Library (SCL) for .NET
22. How to Create a Table
23. Add an entity to a Table
24. Delete Table
25. Delete Entity
26. Replace Entity
27. Merge Entity
28. Insert-or-Merge Entity
29. Insert or Replace Entity
30. Querying the Table
31. Partitions and Queries
32. Role of Partition server
33. How to insert a batch of entities
34. How to retrieve all entities in a partition
35. How to retrieve a range of entities in a partition
36. How to query a subset of entity properties
37. Partition size in Azure Table storage
38. Typical query types for Table storage
39. Windows Azure Blob Storage
40. How to use Azure Blob Storage Service in a Cloud Service application
41. Configure the application to use storage emulator
42. How to create a container and upload a blob using the Server explorer
43. Add Blobs to the Container
44. How to use the Azure Blob Storage Service in .NET
45. Retrieving a connection string from Azure service configuration file
46. How to create a container and set the permission at container level for public access
47. Delete Blob Container
48. List Blob Containers
49. List All Blobs
50. List All Blobs which start with Specified Prefix
51. Windows Azure Queue Service
52. Walk through to use the Queue service
53. How to Create a Queue
54. Write a message in the queue using web role
55. Access the message from Worker role
56. Delete the message
57. Update the message

### **Chapter 5: Windows Azure SQL Database**

Many corporates are moving a part or entire IT infrastructure to Azure cloud and may find it necessary to continue using relational database for their database needs. In such a scenario, SQL Database is an option.  
  
Important topics covered in this chapter are key benefits of SQL Database service, two models of using SQL Server in the cloud, choosing between SQL Server in Windows Azure VM & Windows Azure SQL Database, configure SQL Database server, configure the Firewall, write T-SQL script to create Tables and add data in SQL database server, connect to SQL Database instance with SQL Server Management Studio, use SQL Database in an Application, connect to a SQL Database with ADO.Net and build a Windows Azure Application that works with SQL Database.

1. Key Benefits of SQL Database Service
2. Two models of using SQL server in the cloud
3. IaaS - You can run SQL server on an Azure Virtual machine
4. PaaS - SQL Database
5. Choosing between SQL Server in Azure VM & Windows Azure SQL Database
6. SQL Data Sync
7. SQL Data Reporting using Virtual Machines
8. Azure SQL Database - Data Access
9. Create and Configure SQL Database server in the Cloud
10. Configure the Firewall
11. Use T-SQL script to create Tables and add data in SQL database server
12. Connecting SQL Database instance with SQL Server Management Studio
13. Creating Logins and Users
14. Assigning Access Rights
15. How to use Windows Azure SQL Database (instance) in an Application
16. Connecting to a SQL Database with ADO.Net
17. Build a Azure Application that works with SQL Database

### **Chapter 6: Create Windows Azure application with Tables, Blobs and Queues**

While chapter:- 3 gives you all that is required to understand and use storage services, this chapter ensures that you know how to use the services when developing Azure applications.  
  
The multi-tier application development exercise shown here uses all the three services, Tables, Blobs and Queues.  
  
Important topics covered in this chapter are create the Cloud Service project, create a Data Model for Entities in Table Storage, create the context class to access the table using WCF Data Services, develop Web Role to display and accept the Item entries and develop Worker Role to perform background processing with Queues.

1. Creating the Cloud Service project
2. Creating a Data Model for Entities in Table Storage
3. Create the context class to access the table using WCF Data Services
4. Develop Front end to display and accept the Item entries
5. Background Processing with Worker Roles and Queues

### **Chapter 7: Azure Service Bus**

Most books on Azure give inadequate coverage to Azure Service Bus which is an important topic. You will find that Azure Service Bus is covered in detail in this book. I have considered a multi-tier Azure application as the basis and explained Azure Service Bus.  
  
Important topics covered in this chapter are introduction to Azure Service Bus, Service Bus Queues, context for usage of Service Bus Queues, create a Service Bus namespace and obtain the default management credentials for the namespace, configure the application to use Service Bus, set up a Service Bus connection string in the configuration file of a web role, create a queue, send messages to the queue, receive messages from the queue, Service Bus Topics, create a topic, create a subscription, create a subscription with the default filter, create subscriptions with filters, send messages to a topic and receive messages from a subscription.

1. Introduction to Azure Service Bus
2. Service Bus Queues
3. Context for usage of Service Bus Queues
4. Using Azure Service Bus Queues in a multi-tier Azure application
5. Create a Service Bus namespace
6. Obtain the default management credentials for the namespace
7. Configure the application to use Service Bus
8. Add the Service Bus NuGet package to get the Service Bus APIs
9. Set up a Service Bus connection string in the configuration file of a web role
10. Create a queue
11. Send messages to the queue
12. Receive messages from the queue
13. Service Bus Topics
14. Create a topic
15. Create a subscription
16. Create a subscription with the default filter
17. Create subscriptions with filters
18. Send messages to a topic
19. Receive messages from a subscription