# Microsoft Azure

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## Cloud computing

## Deep Dive

# Overview

**Cloud computing** is a new form of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources (e.g., computer networks, servers, storage, applications and services), which can be rapidly provisioned and released with minimal management effort. Basically, Cloud computing allows the users and enterprises with various capabilities to store and process their data in either privately owned cloud, or on a third-party server in order to make data accessing mechanisms much more easy and reliable. Data centers that may be located far from the user–ranging in distance from across a city to across the world. Cloud computing relies on sharing of resources to achieve coherence and economy of scale, similar to a utility (like the electricity grid) over an electricity network.

**Microsoft Azure** - is a cloud computing service created by Microsoft for building, testing, deploying, and managing applications and services through a global network of Microsoft-managed data centers.

Azure Cloud services can be accessed by software developers, cloud administrators and other enterprise IT professionals over the public internet or through a dedicated network connection. Azure Platform offers services for compute, storage, networking, big data, machine learning and the internet of things (IoT), as well as cloud management, security and developer tools.

## Objectives

This course teaches IT Professionals how to manage their Azure subscriptions, including access, policies, and compliance, as well as how to track and estimate service usage and related costs. Students also learn how cloud resources are managed in Azure through user and group accounts. Students learn how to grant appropriate access to Azure AD users, groups, and services through Role-based access control (RBAC). Students also discover the core monitoring tools and capabilities provided by Azure, including Azure Alerts and Activity Log. Students are then introduced to Log Analytics as a broad data analytics solution, and use this service to query and analyze operational data. Students then learn about the Azure Resource Manager deployment model, and how to work with resources, resource groups and ARM templates.

## Target audience

This course is for Azure Administrators. Azure Administrators manage the cloud services that span storage, networking, and compute cloud capabilities, with a deep understanding of each service across the full IT lifecycle. They take end-user requests for new cloud applications and make recommendations on services to use for optimal performance and scale, as well as provision, size, monitor and adjust as appropriate. This role requires communicating and coordinating with vendors. Azure Administrators use the Azure Portal and as they become more proficient they use PowerShell and the Command Line Interface.

## Day 1

Cloud computing is a new form of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources (e.g., computer networks, servers, storage, applications and services), which can be rapidly provisioned and released with minimal management effort.

### Module 1: Cloud Computing Overview

- What is cloud computing?
- Cloud Computing models: SaaS, PaaS, IaaS
- Cloud implementation models: Public, Private, Hybrid
- How to design cloud services?
- Planning and design
- Main services overview (Compute, Storage, DB, Network )
- Elasticity and scalability

### Module 2: Managing Azure Subscriptions

In this module, you'll learn about the components that make up an Azure subscription and how management groups are used to organize subscriptions into containers to allow you to control organizational governance and policy management across subscriptions. As well as learning about the different available types of subscription, you'll see how to apply tags to your Azure resources to logically organize them by categories.

Lessons

- Overview of Azure Subscriptions
- Billing
- Azure Policy

After completing this module, students will be able:

- Manage Azure subscriptions and billing, and implement Azure policies.

**Module 3: Access Management for Cloud Resources**

In this module you will learn the basics of role-based access control as it applies to users and groups. Focus on the administrator role and how it used in Azure.

Lessons

- Azure Users and Groups
- Role-based Access Control

After completing this module, students will be able:

- Implement access management with Azure users, groups, and role-based access control.

**Module 4: Monitoring and Diagnostics**

In this module, you learn about the Azure Monitor and the many capabilities to ensure your Azure architecture is working correctly. Monitoring skills are explained in this first course and then demonstrated in the following courses. The two main elements explained in this module are Azure Alerts and Azure Activity Log.

Lessons

- Exploring Monitoring Capabilities in Azure
- Azure Alerts
- Azure Activity Log

After completing this module, students will be able:

- Use Azure Monitor to configure Azure alerts and review the Azure Activity Log.

**Module 5: Log Analytics**

In this module, you will focus on Log Analytics. Log Analytics provides a way for you to collect, analyze, and query all types of connected data. It is a very powerful tool.

Lessons

- Introduction to Log Analytics
- Querying and Analyzing Log Analytics Data

After completing this module, students will be able:

- Query and analyze Log Analytics data.

**Module 5: Azure Resource Manager**

In this module, you will learn about how resources are organized into resource groups and how ARM templates are used to deploy those resources. This module introduces the concepts and then they are applied in the other courses.

Lessons

- ARM templates
- Resource Groups

After completing this module, students will be able:

- Deploy resources with ARM templates and organize Azure resources.

**Module 6: Azure Tips, Tricks, and Tools**

This last module is provided to help you get the most from your administrative tools. This include the Azure Portal, Cloud Shell, Azure CLI, Azure PowerShell, and Resource Explorer.

Lessons

- Azure Portal
- Azure Tools and Environment

After completing this module, students will be able:

- Optimize your use of Azure tools like the Azure portal, Azure PowerShell, Cloud Shell and the Azure CLI.

## Day 2

**Module 1: Overview of Azure Machines**

In this module, you'll will be introduced to Azure virtual machines. What are virtual machines and what operating systems are supported? How can you determine if your existing virtual machines can be supported in Azure? What pricing and sizing options are available

Lessons

- Azure Virtual Machines Overview
- Planning Considerations

After completing this module, students will be able to:

- Explain virtual machine usage cases, storage options, pricing, operating systems, networking capabilities, and general planning considerations.

## Module 2: Creating Virtual Machines

In this module, you will learn how to create and configure Windows virtual machines. You will practice in the Azure portal, in Azure PowerShell, and with ARM templates.

Lessons

- Overview of the Virtual Machine Creation Overview
- Creating Virtual Machines in the Azure Portal
- Creating Virtual Machines (PowerShell)
- Creating Virtual Machines using ARM Templates

After completing this module, students will be able to:

- Create Windows virtual machines in the Azure Portal, with Azure PowerShell, or using ARM Templates.

## Module 3: Deploying Virtual Machine Images

In this module, you will learn how to create custom virtual machines in Azure. For example, deploying a server image that is in your on-premises datacenter. You will also learn how to create and connect to Linux virtual machines.

Lessons

- Deploying Custom Images
- Deploying Linux Virtual Machines

After completing this module, students will be able to:

- Deploy custom server images and Linux virtual machines.

## Module 4: Configuring Virtual Machines

In this module, you will learn about the two main configuration areas for virtual machines: networking and storage. In the networking lesson, we will cover IP addressing, network interfaces, and network security groups. In the storage lesson, we will cover virtual machine disks, managed disks, attaching/detaching disks, and uploading disks.

Lessons

- Overview of Virtual Machine Configuration
- Virtual Machine Networking
- Virtual Machine Storage

After completing this module, students will be able to:

- Configure virtual machine networking and storage options.

## Module 5: Configuring Availability and Extensibility

In this module, you will learn how to keep your virtual machines highly available with update and fault domains, and availability sets. You will also learn how to use scale sets to increase and decrease the number of the virtual machines as the workload changes. Lastly, virtual machines can be extended through custom scripts and Desired State Configuration.

Lessons

- Virtual Machine Availability
- Virtual Machine Scalability
- Applying Virtual Machine Extensions

After completing this module, students will be able to:

- Implement virtual machine high availability, scalability, and custom scripts extensions.

## Module 6: Managing and Monitoring Virtual Machines

In this module, you will learn the very important tasks of backing up your virtual machines and monitoring their overall health. You will practice backing up and restoring virtual machines. You will learn about monitoring, diagnostics, and Azure Advisor.

Lessons

- Backup and Restore
- Monitoring Virtual Machines

After completing this module, students will be able to:

- Backup, restore, and monitor virtual machines.

## Day 3

### Module 1: Overview of Azure Storage

In this module, you'll learn about storage accounts – Standard and Premium – as well as storage endpoints and how to configure custom domain accounts. You'll have an opportunity to practice creating and managing storage accounts. The module also covers data replication and provides a comparison of the different available replication schemes. You'll be introduced to Azure Storage Explorer, a utility that lets you easily work with and manipulate Azure Storage data.

Lessons

- Azure storage accounts
- Data replication
- Azure Storage Explorer

After completing this module, students will be able to:

- Create Azure storage accounts for different data replication, pricing, and content scenarios.

### Module 2: Storage Services

In this module, you'll learn about the disks component of Azure Storage as it relates to virtual machines. Disks are how virtual machines store their VHD files. You will learn about the types of disks and storage and how Azure simplifies IaaS disk management by creating and managing the storage

accounts associated with the virtual machine disks. You will also learn about how Azure blob storage stores unstructured data in the cloud as objects, or blobs (BLOB = binary large object). And you'll explore Azure Files, which offers fully managed file shares in the cloud that are accessible via the Server Message Block (SMB) protocol. The other file storage options covered in the module are Tables and Queues for structured storage.

Lessons

- Virtual machine storage
- Blob storage
- Azure files
- Structured storage

After completing this module, students will be able to:

- Implement virtual machine storage, blob storage, Azure files, and structured storage.

**Module 3: Securing and Managing Storage**

In this module, discover how a shared access signature (SAS) can be used to provide delegated access to resources in storage accounts, allowing clients access to those resources with sharing the storage account keys. You'll also learn how to use Azure backup as a cloud-based solution for an existing on-premises or off-site backup and data protection solution. This module also covers Azure File Sync as a way to centralize an organization's file shares in Azure Files, and using Windows Server to cache the Azure file

share locally, thus enabling scenarios such as "lift and shift," backup and disaster recovery, and file archiving.

Lessons

- Shared access keys
- Azure backup
- Azure File Sync

After completing this module, students will be able to:

- Secure and manage storage with shared access keys, Azure backup, and Azure File Sync.

**Module 4: Storing and Accessing Data**

In this module, you'll learn about using a content delivery network (CDN) to deliver cached content that is stored on a distributed network of edge servers closer to end-users. You'll also learn how to transfer large amount of data to and from the cloud using the Azure Import/Export service.

Lessons

- Azure Content Delivery Network
- Import and Export service

After completing this module, students will be able to:

- Store and access data using Azure Content Delivery Network, and the Import and Export service.

### Module 5: Monitoring Storage

In this module, you will learn techniques for monitoring the health of Azure storage. With metrics and alerts you can check a variety of performance metrics and send notifications to your system administrator team. With the Activity Log you can search and query for specific events, even across subscriptions.

Lessons

- Metrics and Alerts
- Activity Log

After completing this module, students will be able to:

- Monitor Azure storage with metrics and alerts, and the Activity Log.

## Day 4

### Module 1: Azure Virtual Networks

In this module, you'll will be introduced to Azure virtual networks. What are virtual networks and how are they organized? How do you create and configure virtual networks with templates, PowerShell, CLI, or the Azure portal? What is the difference between public, private, static, and dynamic

IP addressing? How are system routes, routing tables, and routing algorithms used?

Lessons

- Introducing Virtual Networks
- Creating Azure Virtual Networks
- Review of IP Addressing
- Network Routing

After completing this module, students will be able to:

- Understand virtual networking components, IP addressing, and network routing options.

## Module 2: Azure DNS

In this module, you will learn about DNS basics and specifically implementing Azure DNS. In the DNS Basics lesson you will review DNS domains, zones, record types, and resolution methods. In the Azure DNS lesson, we will cover delegation, metrics, alerts, and DNS hosting schemes.

Lessons

- Azure DNS Basics
- Implementing Azure DNS

After completing this module, students will be able to:

- Implement Azure DNS domains, zones, record types, and resolution methods.

## Module 3: Securing Virtual Network Resources

In this module, you will learn primarily about Network Security Groups (NSGs) including NSG rules and NSG scenarios. You will also learn how to implement NSGs considering service endpoints, logging, troubleshooting, and other network traffic.

Lessons

- Introduction to Network Security Groups
- Implementing Network Security Groups and Service Endpoints

After completing this module, students will be able to:

- Configure network security groups, service endpoints, logging, and network troubleshooting.

## Module 4: Connecting Virtual Networks

In this module, you will learn about two specific types of intersite connectivity: VNet-to-VNet connections and VNet Peering. In both cases, you will learn when to choose which connectivity method, and how to implement and configure the method.

Lessons

- Intersite Connectivity (VNet-to-VNet Connections)
- Virtual Network Peering

After completing this module, students will be able to:

- Implement site connectivity schemas including VNet-to-VNet connections and virtual network peering.

## Day 5

**Module 1: Managing Azure Active Directory**

In this module, you'll will be introduced to Azure Active Directory. What is Azure Active Directory and how is it different from Active Directory Domain Services? What is Self-Service Password Reset and how is it configured? How can Azure AD Identity protection improve your security posture. How do you integrate SaaS applications with Azure AD?

Lessons

- Azure Active Directory Overview
- Self-Service Password Reset
- Azure AD Identity Protection
- Integrating SaaS Applications with Azure AD

After completing this module, students will be able to:

- Implement Azure Active Directory, Self-Service Password Reset, Azure AD Identity Protection, and integrated SaaS applications.

**Module 2: Managing Azure Active Directory Objects**

In this module, you will learn the basics of implementing Azure AD objects. These objects include domains and tenants, users and groups, roles, and devices. In each lesson you will practice how to configure these objects through the portal and with Azure PowerShell. The Azure roles lesson will be your introduction to role-based access control.

Lessons

- Azure Domains and Tenants
- Azure Users and Groups
- Azure Roles
- Managing Devices

After completing this module, students will be able to:

- Configure domains and tenants, users and groups, roles, and devices.

## Module 3: Implementing and Managing Hybrid Identities

In this module, you will learn how to integrate Active Directory with your existing infrastructure. You will learn about different authentication options like AD Connect, Single Sign On, and Pass-through authentication. You will also learn how to configure Azure AD Application Proxy and how it is used.

Lessons

- Azure Active Directory Integration Options
- Azure AD Application Proxy

After completing this module, students will be able to:

- Implement and manage Azure Active Directory integration options and Azure AD Application Proxy.

## Module 4: Security & Privacy

This Lesson is designed to introduce you to fundamental cloud computing and security concepts including access control and management, governance, logging, and encryption methods. It also covers security-related compliance protocols and risk management strategies, as well as procedures related to auditing your security infrastructure.

Lessons

- Security

- Privacy

## Module 5: Automation & Resource Management


Business-level automation within the Cloud has evolved over the last few years. Automation is a necessity in Cloud Processing. It is necessary for orchestration, which involves coordinating different automated processes and IT resources. This Lesson is designed to introduce you to fundamental cloud computing Configuration management and automation concepts using various tools


Lessons

- Configuration Management
- Inventory
- Track Changes
- Automation
- SDK Overview
- Command Line Interfaces