

HPE Digital Learner Developing and Implementing MSFT Azure Solutions (Intermediate) Content Pack

HPE Content Pack number	CP012
Content Pack length	36 Hours
Content Pack category	Category 2
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This self-paced eLearning Content Pack represents a comprehensive training series for those individuals that are transforming to a cloud architect role, are focused around implementing an Azure public cloud environment, or are required to manage the various technology elements that are inherent to a typical Microsoft Azure operational landscape.

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Audience

- IT professionals responsible for managing Microsoft Azure
- Professionals who are preparing to take the 70-532: Developing Microsoft Azure Solutions certification exam, and who are experienced in designing, programming, implementing, automating and monitoring Microsoft Azure cloud platform solutions; exam candidates should also be adept at using development tools, techniques and design methodologies associated with the design of scalable and resilient cloud-based solutions.

Content Pack objectives

This Content Pack provides the information necessary to plan, design and implement a Microsoft Azure public cloud environment as part of an overall hybrid cloud strategy. This training represents a comprehensive and detailed set of courses that are spread across a subset of critical technology areas required to successfully plan and implement a typical Microsoft Azure public cloud environment. Areas of interest include planning and implementation concepts for Azure virtual machines, storage, databases, communications/messaging, active directory, IoT, web-apps, API management, networking, automation, security and disaster recovery. This training will enable the student to transition to the cloud architect and/or operational role and will also assist with the path to Microsoft Certification.

Detailed Content Pack outline

Creating Virtual Machines (VMs) and Workloads

There are a multitude of considerations when implementing virtual machines (VMs) in Azure. This course covers best practices to follow when deploying workloads on an Azure VM, and also how to create and configure VM images in Azure.

- Describe workload identification and selection
- Create a Windows Server virtual machine
- Create a Linux virtual machine
- Create a Windows SQL Server virtual machine
- Describe VM images and VHDs
- Upload an existing VM to Azure
- Create a VM from an existing disk (classic mode)
- Create a VM from an existing disk (resource manager mode)
- Create a VM and manage VHDs

Managing Azure VMs

There are different methods and tools available when it comes to configuring Azure virtual machines. In this course, you will explore some of these methods, including using PowerShell, Puppet, and Chef as you prepare for exam 70-532.

- Describe Azure VM configuration
- Automate Azure VM configuration using VM Agent (custom PowerShell script extensions)
- Describe the use of PowerShell DSC to configure Azure VMs
- Create an automation account on Azure portal
- Automate Azure VM configuration using PowerShell DSC
- Configure Puppet on Azure VMs
- Deploy a Puppet cluster on Azure
- Write modules for Puppet Enterprise
- Utilize Puppet to configure Azure VMs
- Describe the use of Chef to configure Azure VMs
- Configure a hosted chef account for managing virtual machines
- Configure Chef for Azure Resource Manager
- Configure Azure virtual machines using Chef
- Enable remote VM debugging
- Create and manage Azure virtual machines

Configuring Azure VM Networking

Azure virtual machines (VMs) can be configured to meet the needs of most networked environments. In this course, you will explore the basic VM networking configurations.

- Configure a VM to permit public access
- Configure a VM with a static IP address
- Configure public IP addressing
- Describe when to use user defined routes
- Configure external and internal load balancing with HTTP and TCP health probes
- Describe network security groups
- Configure DSR
- Describe VM firewall configuration
- Design and implement Application Gateway
- Configure network settings for Azure virtual machines

Azure VM Scaling and Storage

Automatic scaling is a cost-effective method of maintaining performance levels. In this course, you will learn about scaling virtual machines (VMs) to meet the demands of a growing environment and also look at VM storage.

- Manually configure Azure VM scaling
- Describe Azure VM scale sets
- Configure scale sets
- Describe and configure VM auto scale
- Plan storage capacity
- Configure geo-replication
- Configure disk caching
- Implement ARM VMs configured with Standard Storage
- Implement ARM VMs configured with Premium Storage
- Configure shared storage using Azure File service
- Scale and monitor Azure VMs and design and implement Azure storage

Azure VM Monitoring and Availability

Monitoring VM performance helps ensure an environment runs optimally, while availability helps avoid downtime. In this course, you will explore the basics of VM monitoring and diagnostics as well as availability sets used for redundancy.

- Describe VM monitoring and diagnostic techniques
- Configure VM monitoring and diagnostics
- Configure diagnostics
- Configure virtual machine endpoints
- Configure alerts
- Describe and view VM operational metrics and logs
- Configure metrics
- Describe Azure availability sets
- Configure availability sets
- Add a new VM to an existing availability set
- Use PowerShell to create an availability set
- Configure multiple virtual machines in an availability set for redundancy
- Configure application tiers into separate availability sets
- Describe the load balancer feature
- Configure the load balancer with availability sets
- Use multiple storage accounts for each availability set
- Monitor and diagnose Azure cloud services and Azure virtual machines

Azure Blob Storage

Azure Blob storage is a service that allows unstructured data to be stored in the cloud as objects or blobs. This course covers how to create, manage, and secure blobs and files in Azure.

- Describe Azure Storage
- Configure storage accounts, blobs and containers
- Read blob data
- Describe data storage methods including blocks and page blobs, and describe data streaming
- Describe secure access to blobs
- Describe the asynchronous copying of blobs
- Configure Azure CDN
- Design and create blob hierarchies
- Describe custom domains
- Describe blob scaling
- Describe Azure File Storage

Azure Storage Tables and Queues

Azure table storage provides fast and cost-effective access to data for all kinds of applications. In this course, you will dive deeper into storage tables and queues.

- Describe table storage and create a NoSQL table
- Manipulate individual table records
- Use OData to access table records
- Describe table partition design, management and scaling
- Scale tables and partitions
- Add and process messages
- Retrieve a batch of messages
- Scale queues
- Implement and manage Azure blobs, tables, queues and files

Managing and Monitoring Azure Storage

Azure Storage is a durable, highly available and scalable cloud storage solution. In this course, you will learn more about Azure Storage and storage access management.

- Describe shared access signatures (SAS)
- Create an SAS token (blobs)
- Create an SAS token (queues)
- Create an SAS token (tables)
- Describe stored access policies
- Create and apply stored access policies
- Describe storage account keys and regenerate account keys
- Describe CORS
- Describe metrics associated with Azure Storage
- Configure storage metrics and retention
- Configure storage logging and retention
- View Azure Storage logs
- Configure Azure Storage access, monitor storage and implement Azure SQL databases

Azure SQL Database and Caching

Azure SQL Database is a cloud service providing performance, scalability and protection. Azure caching can help build highly scalable and responsive applications. This course covers Azure SQL Database implementation and cache management.

- Describe the Azure SQL Database service
- Choose the appropriate Azure SQL service
- Describe Azure SQL Database business continuity and disaster recovery options
- Configure point-in-time restore
- Configure secondary replicated databases
- Import and export an SQL database
- Describe SQL database monitoring and scaling in Azure
- Describe Azure Redis Cache
- Create a new Redis Cache
- Manage Redis Cache
- Describe cache tiers
- Implement data persistence
- Implement security and network isolation
- Configure cluster performance
- Design and implement an Azure caching strategy

Implementing Communication and Messaging Strategies

Azure can offer secure communications between on premises networks and the cloud and a reliable cloud messaging service between applications and services. In this course, you will learn to implement communication and messaging strategies.

- Implement hybrid connections
- Leverage site-to-site
- Create a site-to-site VPN
- Configure a site-to-site connection using PowerShell
- Describe the site-to-site connectivity page
- Create a site-to-site express route
- Describe the virtual network address spaces page

Azure Active Directory and Collaboration

Azure Active Directory is Microsoft's identity and access management cloud solution. This course covers how to manage and optimize Azure Active Directory as well as Azure Active Directory B2C and B2B.

- Describe Azure AD
- Create Azure AD directory, users and groups
- Work with the various administrative roles
- Register an application with Azure AD and view integration endpoints
- Describe WS-Federation process for browser-based applications
- Describe SAML 2.0 Protocol (SAML-P) authentication
- Describe OpenID Connect authentication
- Describe how OAuth 2.0 can be used to access resources using tokens
- Describe the use of the Graph API to query Azure directories
- Configure and use the Graph API
- Describe social identity provider authentication
- Design and implement .NET MVC apps that leverage social identity provider authentication
- Design and implement Web API apps that leverage social identity provider authentication
- Design and implement Windows Desktop apps that leverage social identity provider authentication
- Describe partner-managed identities
- Describe the B2B collaboration process
- Configure and modify Azure networks and integrate Azure applications into Azure Active Directory

Developing and Implementing IoT Solutions: Cloud Implementation Using Azure IoT

In this course, you will explore IoT and cloud capabilities, the value of cloud for emulating IoT, and Azure IoT capabilities, including setting up IoT Hub and registering devices to Hub for tracking.

- Implement serial communication between Pi and Arduino
- Identify the essential capabilities and benefits of IoT with cloud implementation
- Illustrate the capabilities and features afforded by AWS IoT
- Illustrate the reference architecture and capabilities of Azure IoT
- Demonstrate the suite capabilities of Azure IoT
- Illustrate the essential capabilities provided by IoT Hub
- Create IoT Hub services
- Demonstrate how to configure IoT Hub to register and track devices

Developing and Implementing IoT Solutions: Azure IoT Hub

In this course, you will discover the advanced capabilities of IoT on the cloud. It also covers the concepts of data streaming and analytics using IoT Hub.

- Demonstrate how to configure messaging to relay data to and from Azure
- Implement stream analytics on IoT Hub
- Implement live monitoring of incoming data
- Configure data threshold values to generate alerts
- Illustrate the remote diagnostic capability on IoT devices
- Demonstrate how to configure and utilize Azure IoT online simulator
- Manage devices using Node.js
- Identify the sensory modules and devices to facilitate productive utilization from the perspective of IoT
- Demonstrate how to construct Azure Stream Analytics jobs

Designing Web Apps

Azure App Service can be used to develop and host web applications. This course covers the basics of creating and managing Web Apps in Azure.

- Define and manage App Service plans
- Configure Web App settings
- Configure Web App certificates
- Configure custom domains
- Manage Web Apps using the API, PowerShell and Xplat-CLI
- Implement monitoring and analytics
- Implement diagnostics
- Implement WebJobs
- Design and configure Web Apps for scale and resilience
- Monitor and diagnose Web Apps

Azure Functions and API Management

Azure Functions make it easy to run small pieces of code in the cloud. In this course, you will explore different Azure Functions as well as API management.

- Create Azure functions
- Implement Webhook functions
- Create event processing functions
- Implement Azure-connected functions
- Create and manage APIs
- Configure API management policies
- Protect APIs with rate limits
- Improve performance by adding caching
- Monitor APIs
- Customize the Developer Portal

Designing and Implementing Azure Apps

Azure API Management enables APIs to be quickly published to internal and external consumers. This course covers how to create, manage and secure API, logic and mobile apps.

- Create and deploy API apps
- Use Swashbuckle
- Use Swagger API metadata
- Monitor API apps
- Create logic apps that connect to SaaS services
- Create a logic app with B2B capabilities
- Create a logic app with XML capabilities
- Trigger a logic app from another app
- Use visual studio to manage logic apps
- Monitor logic apps
- Create a mobile app
- Add offline sync to a mobile app
- Add authentication to a mobile app
- Add push notifications to a mobile app
- Implement API management

Azure Service Fabric Apps

Service Fabric is used to build always-on, scalable, distributed applications in Azure. This course covers the basics of Service Fabric applications, as well as how to monitor, migrate and scale apps.

- Create a Service Fabric application
- Describe application life cycle management
- Provide an overview of actors
- Add a web front end to a Service Fabric application
- Monitor Service Fabric apps
- Diagnose Service Fabric apps
- Migrate apps from cloud services
- Create, secure, upgrade and scale a Service Fabric cluster in Azure
- Scale a Service Fabric app at the partition level
- Scale a Service Fabric app at the service name level
- Implement availability of Service Fabric services
- Monitor and diagnose Service Fabric apps

Azure Storage and the Azure Environment

Deploying and managing Azure components requires first understanding how those pieces work together. Domain #3 of the 70-533 exam tests candidates' understanding of how to best implement Azure storage solutions.

- List cloud characteristics
- Describe the components comprising the Azure infrastructure
- List Azure offerings
- Sign up for an Azure subscription
- List Azure management tools
- Navigate through the Azure portal
- Describe the role of PowerShell in Azure
- Use PowerShell to connect to an Azure subscription
- Use Azure CLI to connect to an Azure subscription
- Use Visual Studio to connect to an Azure subscription
- Describe Azure storage options
- Describe Azure storage account access
- Create an Azure storage account
- Create a Shared Access Signature for storage account access
- List the various types of Azure storage and when they should be used
- Use Azure Blob storage
- Use Azure File Service to map a network drive
- List tools that can be used with Azure storage
- Use various Azure storage tools
- Recall Azure management tools and how they are used

Azure Networking

Domain #5 of the 70-533 exam will test your ability to configure Azure networking components to allow connectivity within and to the Azure cloud.

- Describe Azure networking components
- Define how Azure uses virtual networks
- Identify the role of Azure virtual subnets
- Use the portal to create a virtual network and subnet
- Use PowerShell to create a virtual network and subnet
- Use the Azure CLI to add a virtual subnet to an existing virtual network
- Describe how network interfaces and IP addresses are configured
- Use the Azure Portal to configure a public static IP address for a virtual machine
- Describe the purpose of Azure DNS
- Use the Azure Portal to configure Azure DNS
- List various ways to link cloud and on-premises networks
- Recognize when the ExpressRoute feature should be used
- Describe the purpose of a point-to-site VPN
- Use makecert.ext to create required certificates
- Use the portal to create a point-to-site VPN link
- Connect to an Azure VPN from Windows
- Identify the purpose of user-defined routes
- Use the Azure portal to create a user-defined route
- Define when forced tunneling should be used
- Recall Azure network components and their purpose

Azure Active Directory and Authentication

Domain #4 of the 70-533 exam focuses on Azure Active Directory. In this course, you will learn about users and groups in Azure Active Directory as well as how to synchronize on-premises users to Azure AD. Then you will gain experience configuring Azure AD authentication.

- Describe how Azure AD can benefit an organization
- Differentiate features between Azure AD editions
- Apply RBAC to delegate Azure management permissions
- Configure Azure AD
- Connect to an Azure AD instance using the tenant ID
- Configure Azure RBAC assignments
- Use the UI, PowerShell and Azure CLI to manage users
- Use the UI, PowerShell and Azure CLI to manage groups
- Describe the purpose of Azure AD Connect
- Join a Windows 10 station to Azure Active Directory
- Deploy a custom domain controller running in an Azure VM
- Configure self-service password reset
- Describe types of authentication and how they relate to Azure AD
- Describe when to use Federation and the Web Application Proxy
- Synchronize on-premises user accounts with Azure AD
- Verify Single Sign-On for a Windows 10 station
- Enable Facebook SSO for Azure AD users
- Enable Google ID SSO for Azure AD users
- Enhance Azure AD security by enabling MFA
- Manage Azure AD users and groups

Azure SQL DB and ARM Templates

This course illustrates when to use hosted Azure SQL DB and how to manage it per 70-533 Domain #3. You will also learn how to provision ARM templates per Domain #6.

- Describe when Azure SQL DB should be used
- Implement Azure SQL DB replication
- Describe Azure SQL DB management tools
- Deploy Azure SQL DB using the portal
- Use SQL Server Management Studio to connect to Azure SQL DB
- Use PowerShell cmdlets to view Azure SQL DB
- Use the Azure CLI to view Azure SQL DB
- Migrate on-premises SQL to Azure SQL DB
- List various levels of security to Azure SQL objects
- Set server and database security settings
- Determine how resources are managed with ARM
- Compare the options available in ARM policies
- Configure a policy for ARM management
- Create a template for ARM deployment of resources
- Use various methods of deploying an ARM template
- Configure Azure SQL and ARM templates

Azure App Services

In this course, you will learn what Azure App Services is used for as well as how to deploy various types of services. You will also get hands-on experience deploying and managing web apps which is required per 70-533 Domain #1.

- Define how deployment slots are used
- Deploy a web app to a deployment slot
- List common web app settings
- Work with Visual Studio to create and deploy an ASP.Net web app
- Use PowerShell to manage a web app
- Distinguish webjob triggers
- Use the portal to create an on-demand WebJob
- Identify how Azure provides scalability and resilience for app services
- Enable autoscaling for an ASP.Net web app
- Describe the purpose of monitoring app services using Kudu
- Use Kudu to view diagnostic information
- Use Visual Studio to create and deploy an ASP.Net web app

Automation and High Availability

Domain #1 of the 70-533 exam will test your ability to scale web apps to ensure Azure services are always available and perform optimally. Domain #2 focuses on virtual machine management including using a variety of automation methods.

- Describe the need for automation in cloud environments
- List tools used for Azure automation
- Use the portal to create an Azure automation account
- Define how runbooks are used to automate Azure administrative tasks
- Use the portal to create a runbook
- Describe how to standardize configurations using DSC
- Ensure the IIS web server role is installed in Azure Windows VMs
- Recognize how the Chef VM extension is used for configuration management
- Recognize how the Puppet VM extension is used for configuration management
- Describe the need for high availability and solutions
- Use the portal to resize an existing virtual machine
- Use the portal to create a virtual machine scale set
- Use the portal to configure a virtual machine scale set
- Identify when Azure Load Balancer should be used
- Describe the benefit on the load balancer when using direct server return
- Use Azure Load Balancer for VMs in the same region
- Identify when the Azure Traffic Manager should be used
- Use Traffic Manager for VMs in different regions
- Use DSC to ensure Windows VM configurations are consistent

Azure Security and Monitoring

Domains #1, 2 and 3 of the 70-533 exam require exam candidates to have skills related to monitoring various Azure components including configuring alerts and email notifications. This course will cover various Azure security mechanisms included in all 70-533 exam domains.

- Define the reasons for Azure security measures
- Describe how Azure drive encryption works
- Use PowerShell to encrypt an Azure VM disk
- Describe how the Azure Key Vault is used
- Use PowerShell to create an Azure Key Vault
- Recognize the purpose of network security groups
- Use the portal to configure a network security group
- Use PowerShell to configure a network security group
- Define the relevance of monitoring
- List multiple ways logs can be accessed
- Enable remote debugging for an Azure web app
- Enable the VM agent for monitoring and boot diagnostics
- Add metrics and alerts to monitor a web app
- Add metrics and alerts to monitor Azure storage
- Work with storage account logs
- Add metrics and alerts to monitor Azure SQL DB
- Encrypt a VM disk and enable monitoring

Azure Backup and Recovery

Disaster recovery is proactive planning. In this course, you will learn how to back up Azure data as well as how to plan Azure site recovery per exam 70-533 Domain #3.

- Describe recovery principles for IT cloud services
 - Describe how Azure Backup works with the Backup vault
 - Install Backup agent and register hosts with Azure Backup vault
 - Recognize when to use Azure Site Recovery options
 - List options for saving copies of Azure SQL databases
 - Export a copy of an Azure SQL DB
 - Configure the Azure Backup agent and export SQL DB
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