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

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.

*Realize Technology Value with Training, IDC Infographic 2037, Sponsored by HPE, October 2017
## 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.

| Create a Windows Server virtual machine | Describe workload identification and selection |
| Create a Linux virtual machine | Describe VM images and VHDS |
| Create a Windows SQL Server virtual machine | Upload an existing VM to Azure |

### 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 | Write modules for Puppet Enterprise |
| Automate Azure VM configuration using VM Agent (custom PowerShell script extensions) | Utilize Puppet to configure Azure VMs |
| Describe the use of PowerShell DSC to configure Azure VMs | Describe the use of Chef to configure Azure VMs |
| Create an automation account on Azure portal | Configure a hosted chef account for managing virtual machines |
| Automate Azure VM configuration using PowerShell DSC | Configure Chef for Azure Resource Manager |
| Configure Puppet on Azure VMs | Configure Azure virtual machines using Chef |
| Deploy a Puppet cluster on Azure | 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 | Describe network security groups |
| Configure a VM with a static IP address | Configure DSR |
| Configure public IP addressing | Describe VM firewall configuration |
| Describe when to use user defined routes | Design and implement Application Gateway |
| Configure external and internal load balancing with HTTP and TCP health probes | 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 | Configure disk caching |
| Configure Azure VM scale sets | Implement ARM VMs configured with Standard Storage |
| Configure scale sets | Implement ARM VMs configured with Premium Storage |
| Describe and configure VM auto scale | Configure shared storage using Azure File service |
| Plan storage capacity | Scale and monitor Azure VMs and design and implement Azure storage |
| Configure geo-replication | |

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

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

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

### 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.

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

### 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.

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