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| OpenHack – Migrating Microsoft Workloads to Azure Attendee Takeaway |

# Overview

Microsoft’s OpenHack series is an immersive, hands-on, challenge-driven hack that brings technical resources across the eco-system to tackle scenarios influenced by common, real-world problems using Microsoft Platform capabilities and other industry-leading technologies.

The Migrating Microsoft Workloads to Azure OpenHack is a multi-day experience where attendees will assess, migrate, modernize, and optimize existing on-premises applications hosted in Windows Server 2008 R2 and Microsoft SQL Server 2008 R2 as they securely move to Microsoft Azure. This OpenHack simulates a real-world scenario, where multiple line-of-business applications reside on legacy infrastructure that is rapidly approaching end-of-support. These applications will first be migrated from legacy operating systems to Azure using a rehost methodology, introducing benefits such as increased resiliency and access to ongoing support for legacy operating systems. While each migration is different, attendees of this OpenHack will gain the knowledge necessary to perform migrations of applications and virtual machines using legacy Windows operating systems to Azure, modernize applications by transitioning from IaaS to PaaS services, and begin to gain insights into application performance and behaviors and how to secure organizational secrets.

# Technologies

Azure Migrate, Azure Database Migration Service, Data Migration Assistant, Azure Active Directory, Azure Active Directory Connect (AAD Connect), Azure Site Recovery, Azure Monitor/Log Analytics, Azure Networking, Azure Virtual Machines, Azure Storage, Azure DNS, Azure Traffic Manager, Azure Bastion, Azure Load Balancer, Azure Application Gateway

# Challenges

**Challenge 1: Establish your plan**

In this challenge, you learned how to plan for the migration of servers from on-premises to Azure, including how to rationalize the selection of migration tooling based on the source environment, how to design a naming convention and establish governance with Microsoft Azure, and how to design a network topology in Azure that supports segmentation between applications and services using native Azure network security resources. You used this plan to develop your foundational Azure infrastructure as you performed your migration.

**Learning objectives:**

* Plan a migration infrastructure
* Plan for hybrid identity
* Design for resiliency
* Design a network infrastructure
* Plan for governance

The following materials were given to you for this challenge:

* [Azure Virtual Datacenter: Lift and Shift Guide](https://azure.microsoft.com/mediahandler/files/resourcefiles/azure-virtual-datacenter-lift-and-shift-guide/Azure_Virtual_Datacenter_Lift_and_Shift_Guide.pdf)
* [Azure migration best practices](https://docs.microsoft.com/azure/architecture/cloud-adoption/migrate/azure-best-practices/)
* [Azure Migration Center](https://azure.microsoft.com/migration/) -[Buy a custom domain name for Azure App Service](https://docs.microsoft.com/azure/app-service/manage-custom-dns-buy-domain)
* [Cloud migration in the Cloud Adoption Framework](https://docs.microsoft.com/azure/architecture/cloud-adoption/migrate/)
* [Cloud migration strategies - Rehost](https://azure.microsoft.com/migration/get-started/#Rehost)
* [Group Policy Overview](https://docs.microsoft.com/previous-versions/windows/it-pro/windows-server-2012-r2-and-2012/)
* [How Azure pricing works](https://azure.microsoft.com/pricing/)
* [Naming conventions for Azure resources](https://docs.microsoft.com/azure/architecture/best-practices/naming-conventions)
* [Windows Server - Azure Migration Center](https://azure.microsoft.com/migration/windows-server/)

**Challenge 2: Assess workloads for migration**

In this challenge, you began to assess your on-premises environment using tools which provided automated discovery of server-to-server communication and helped you right-size your environment for performance and cost before you migrated. You learned how these tools can be used to assess on-premises Windows Server virtual machines in Hyper-V by installing and configuring any necessary software and agents. You also finalized the design of your Azure network, including planning for logical segmentation between applications and application tiers.

**Learning objectives:**

* Prepare for and assess virtualized on-premises environments
* Determine suitability of servers and workloads for fit in Azure
* Create formal assessments for business leaders which demonstrate cost and sizing

The following materials were given to you for this challenge:

* [About Azure Migrate](https://docs.microsoft.com/azure/migrate/migrate-services-overview)
* [Azure Migration Center](https://azure.microsoft.com/migration/)
* [Cloud migration in the Cloud Adoption Framework](https://docs.microsoft.com/azure/architecture/cloud-adoption/migrate/)
* [Cloud migration strategies - Rehost](https://azure.microsoft.com/migration/get-started/#Rehost)
* [Connect Windows computers to Azure Monitor](https://docs.microsoft.com/azure/azure-monitor/platform/agent-windows)
* [Deploying the OMS Agent Automatically](https://savilltech.com/2018/01/21/deploying-the-oms-agent-automatically/)
* [Installing OMS and Service Map Agents with PowerShell](https://blog.orneling.se/2017/06/installing-oms-and-service-map-agents-with-powershell/)

**Challenge 3: Implement hybrid identity**

In this challenge, you learned how to establish hybrid identity to allow for seamless control and access to on-premises and Azure resources after migration. With hybrid identity established, your customer was able to use a single identity to access on-premises applications and cloud services such as Azure, Office 365, and other sites on the internet. Identity and assessment management (IAM) controls for Azure resources were established which are needed during and after the migration.

**Learning objectives:**

* Plan hybrid identity
* Prepare on-premises environments for hybrid identity with Azure Active Directory
* Implement hybrid identity
* Implement identity access and management (IAM) using role-based access controls

The following materials were given to you for this challenge:

* [Add your custom domain name using the Azure Active Directory portal](https://docs.microsoft.com/azure/active-directory/fundamentals/add-custom-domain)
* [Azure AD Connect sync: Understand and customize synchronization](https://docs.microsoft.com/azure/active-directory/hybrid/how-to-connect-sync-whatis)
* [Buy a custom domain name for Azure App Service](https://docs.microsoft.com/azure/app-service/manage-custom-dns-buy-domain)
* [Choose the right authentication method for your Azure Active Directory hybrid identity solution](https://docs.microsoft.com/azure/security/azure-ad-choose-authn)
* [Designing your Hybrid Cloud Strategy: Identity and Access Management](https://azure.microsoft.com/resources/hybrid-cloud-identity/)
* [Hybrid identity documentation](https://docs.microsoft.com/azure/active-directory/hybrid/)
* [Prepare a non-routable domain for directory synchronization](https://docs.microsoft.com/office365/enterprise/prepare-a-non-routable-domain-for-directory-synchronization)
* [What is Azure AD Connect?](https://docs.microsoft.com/azure/active-directory/hybrid/whatis-azure-ad-connect)

**Challenge 4: Implement hybrid networking and resilient authentication**

In this challenge, you established the final pieces of your landing zone for your migration infrastructure by implementing connectivity between your on-premises environment and Azure. You also built out domain controllers in Azure for high-availability and resiliency should the network link between on-premises and Azure ever degrade or become unavailable. All the resources you built were secured using role-based access controls using identities and security groups that were synchronized to Azure in previous challenges.

**Learning objectives:**

* Design and implement site-to-site networking
* Design and implement highly available virtual machines

The following materials were given to you for this challenge:

* [Adding Subnets Active Directory Sites and Services: PowerShell](http://www.thatlazyadmin.com/adding-subnets-active-directory-sites-and-services-powershell/)
* [Azure & RRAS Site to Site VPN Setup (Azure Resource Manager)](http://www.buchatech.com/2016/09/azure-site-to-site-vpn-setup-azure-resource-manager/)
* [Create a Site-to-Site connection in the Azure portal](https://docs.microsoft.com/azure/vpn-gateway/vpn-gateway-howto-site-to-site-resource-manager-portal)
* [Best Practices for Domain Controller VMs in Azure](https://www.petri.com/best-practices-domain-controller-vms-azure)
* [Creating a Site-to-Site (S2S) VPN with Azure Resource Manager (ARM) and Windows 2012R2](https://scomandothergeekystuff.com/2016/09/19/creating-a-site-to-site-vpn-with-azure-resource-manager-arm-and-windows-2012r2/)
* [Extend your on-premises Active Directory domain to Azure](https://docs.microsoft.com/azure/architecture/reference-architectures/identity/adds-extend-domain)
* [Active Directory site](https://docs.microsoft.com/azure/architecture/reference-architectures/identity/adds-extend-domain#active-directory-site)
* [Active Directory operations masters](https://docs.microsoft.com/azure/architecture/reference-architectures/identity/adds-extend-domain#active-directory-operations-masters)
* [How To Configure Replication From On-Premise Domain Controller To Azure VM](https://vmarena.com/how-to-configure-replication-from-on-premise-domain-controller-to-azure-vm/)
* [Subnet Mask Cheat Sheet](https://dnsmadeeasy.com/support/subnet/)

**Challenge 5: Test migration**

In this challenge, you began to perform the migration of servers and applications to Azure using a rehost methodology. The migrations you performed were tested and validated in an isolated environment which did not impact production, allowing you to iterate and refine your migration process without fear of impacting existing workloads.

**Learning objectives:**

* Migrate workloads to Azure for isolated testing
* Ensure secure and segmented cloud networks for migrated workloads
* Secure migrated servers for remote access

The following materials were given to you for this challenge:

* [About Site Recovery](https://docs.microsoft.com/azure/site-recovery/site-recovery-overview)
* [Azure Migrate appliance](https://docs.microsoft.com/azure/migrate/migrate-appliance)
* [Azure VM Guest OS firewall is blocking inbound traffic](https://docs.microsoft.com/azure/virtual-machines/troubleshooting/guest-os-firewall-blocking-inbound-traffic)
* [Migrate servers running Windows Server 2008 to Azure - Limitations and known issues](https://docs.microsoft.com/azure/site-recovery/migrate-tutorial-windows-server-2008#limitations-and-known-issues)
* [Replication appliance](https://docs.microsoft.com/azure/migrate/migrate-replication-appliance)
* [Run a test migration](https://docs.microsoft.com/azure/migrate/tutorial-migrate-hyper-v#run-a-test-migration)
* [Run PowerShell scripts in your Windows VM with Run Command](https://docs.microsoft.com/azure/virtual-machines/windows/run-command)
* [The ultimate guide to connection strings in web.config](https://blog.elmah.io/the-ultimate-guide-to-connection-strings-in-web-config/)
* [What is Azure DNS?](https://docs.microsoft.com/azure/dns/dns-overview)
* [What is Azure Load Balancer?](https://docs.microsoft.com/azure/load-balancer/load-balancer-overview)
* [Windows Firewall Profiles](https://docs.microsoft.com/previous-versions/windows/desktop/ics/windows-firewall-profiles)

**Challenge 6: Finalize migration**

In this challenge, you performed your final migration to Azure by implementing the process you refined in the previous challenge, bringing your customer over to Azure for the target workloads. The migration was performed during a predefined outage window and did not impact the production environment in a manner which prevents failback to on-premises if the migration was unsuccessful. After your successful migration, you retired the on-premises servers and workloads and cleaned up your migration infrastructure.

**Learning objectives:**

* Perform final migrations of servers to Azure
* Implement failback mechanisms for seamless migration
* Design and implement resources to minimize downtime

The following materials were given to you for this challenge:

* [Migrate VMs](https://docs.microsoft.com/azure/migrate/tutorial-migrate-hyper-v#migrate-vms)
* [Run PowerShell scripts in your Windows VM with Run Command](https://docs.microsoft.com/azure/virtual-machines/windows/run-command)
* [What is Azure Load Balancer?](https://docs.microsoft.com/azure/load-balancer/load-balancer-overview)
* [What is Traffic Manager?](https://docs.microsoft.com/azure/traffic-manager/traffic-manager-overview)

**Challenge 7: Transition to platform database services**

In this challenge, you helped your customer increase the efficiency and agility for managing and developing applications based on legacy Microsoft SQL Server database workloads by implementing PaaS database services. To make this transition, you migrated the existing databases from Microsoft SQL Server to a compatible database platform service and configured the existing application to use PaaS databases securely.

**Learning objectives:**

* Migrate from IaaS SQL Server VMs to database platform services
* Assess databases for compatibility with database platform services
* Implement secure connectivity to PaaS services
* Configure platform services to meet backup and retention requirements

The following materials were given to you for this challenge:

* [An overview of Azure SQL Database security capabilities](https://docs.microsoft.com/azure/sql-database/sql-database-security-overview)
* [Azure Database Migration Guide](https://datamigration.microsoft.com/)
* [Choosing your database migration path to Azure](https://azure.microsoft.com/mediahandler/files/resourcefiles/choosing-your-database-migration-path-to-azure/Choosing_your_database_migration_path_to_Azure.pdf)
* [Migrate SQL Server to Azure SQL Database](https://datamigration.microsoft.com/scenario/sql-to-azuresqldb)
* [Overview of Data Migration Assistant](https://docs.microsoft.com/sql/dma/dma-overview)
* [What is Azure Database Migration Service?](https://docs.microsoft.com/azure/dms/dms-overview)
* [What is Azure SQL Database service?](https://docs.microsoft.com/azure/sql-database/sql-database-technical-overview)
* [What is role-based access control (RBAC) for Azure resources?](https://docs.microsoft.com/azure/role-based-access-control/overview)

**Challenge 8: Transition to platform web-hosting services**

In this challenge, you continued to improve the efficiency, scalability, and agility for the existing websites by migrating to PaaS services. In addition to migrating the websites and ensuring they were operable in the new environment; they were also secured to meet customer requirements. This included the implementation of SSL and using Azure identities to secure access to both Azure resources and one of the underlying websites.

**Learning objectives:**

* Migrate from IaaS web servers to platform web-hosting services
* Implement SSL with platform services for custom applications
* Minimize downtime with URL reuse and build on services already in use from IaaS implementations
* Implement Azure AD authentication to meet customer requirements.

The following materials were given to you for this challenge:

* [App Service overview](https://docs.microsoft.com/en-us/azure/app-service/overview)
* [Buy and configure an SSL certificate for Azure App Service](https://docs.microsoft.com/azure/app-service/web-sites-purchase-ssl-web-site)
* [Configure your App Service app to use Azure Active Directory sign-in](https://docs.microsoft.com/azure/app-service/configure-authentication-provider-aad)
* [Decision tree for Azure compute services](https://docs.microsoft.com/azure/architecture/guide/technology-choices/compute-decision-tree)
* [Introducing the App Service Migration Assistant for ASP.NET applications](https://azure.microsoft.com/blog/introducing-the-app-service-migration-assistant-for-asp-net-applications/)
* [Migrate to Azure App Service](https://appmigration.microsoft.com/)

**Challenge 9: Secure, optimize, and operate**

In this challenge, you learned how to optimize the current deployment by implementing elastic scale in your websites and how to secure your PaaS workloads through encryption of relational data with customer-managed keys and using an HSM to protect your application secrets. You also learned how to implement real-time performance monitoring for your websites and how to implement alerting for degradations in service health within the Azure platform.

**Learning objectives:**

* Implement security features of PaaS services, including protecting application secrets
* Implement at-rest encryption for database platform services using customer-managed keys (CMK)
* Implement elastic scale for web applications with autoscale
* Configure performance insights for web applications hosted in Azure
* Configure Azure platform service health alerts

The following materials were given to you for this challenge:

* [Application performance FAQs for Web Apps in Azure](https://docs.microsoft.com/azure/app-service/faq-availability-performance-application-issues)
* [Azure database security best practices](https://docs.microsoft.com/azure/security/azure-database-security-best-practices)
* [Azure Data Encryption-at-Rest](https://docs.microsoft.com/azure/security/fundamentals/encryption-atrest)
* [Azure Monitor overview](https://docs.microsoft.com/azure/azure-monitor/overview)
* [Azure portal overview](https://docs.microsoft.com/azure/azure-portal/azure-portal-overview)
* [Monitor Azure App Service performance](https://docs.microsoft.com/azure/azure-monitor/app/azure-web-apps)
* [Scale up an app in Azure](https://docs.microsoft.com/azure/app-service/web-sites-scale)
* [What is Azure Key Vault?](https://docs.microsoft.com/azure/key-vault/key-vault-whatis)
* [What is Azure Service Health?](https://docs.microsoft.com/azure/service-health/overview)