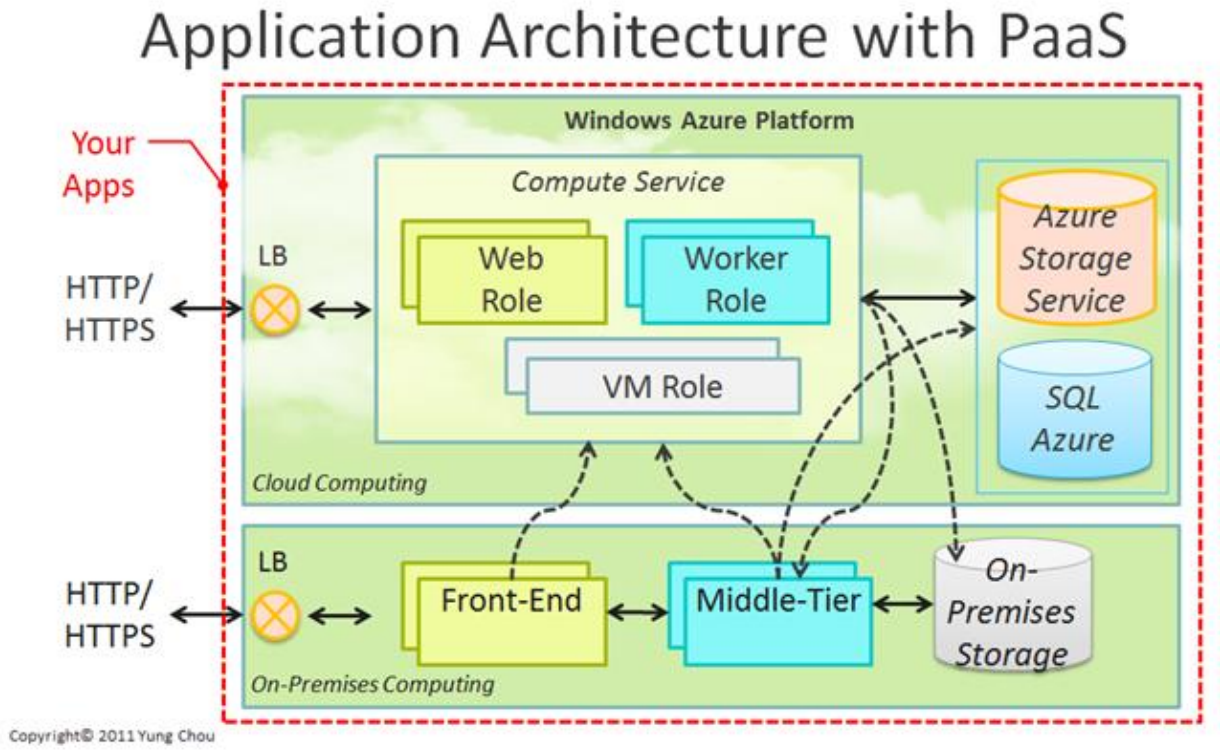
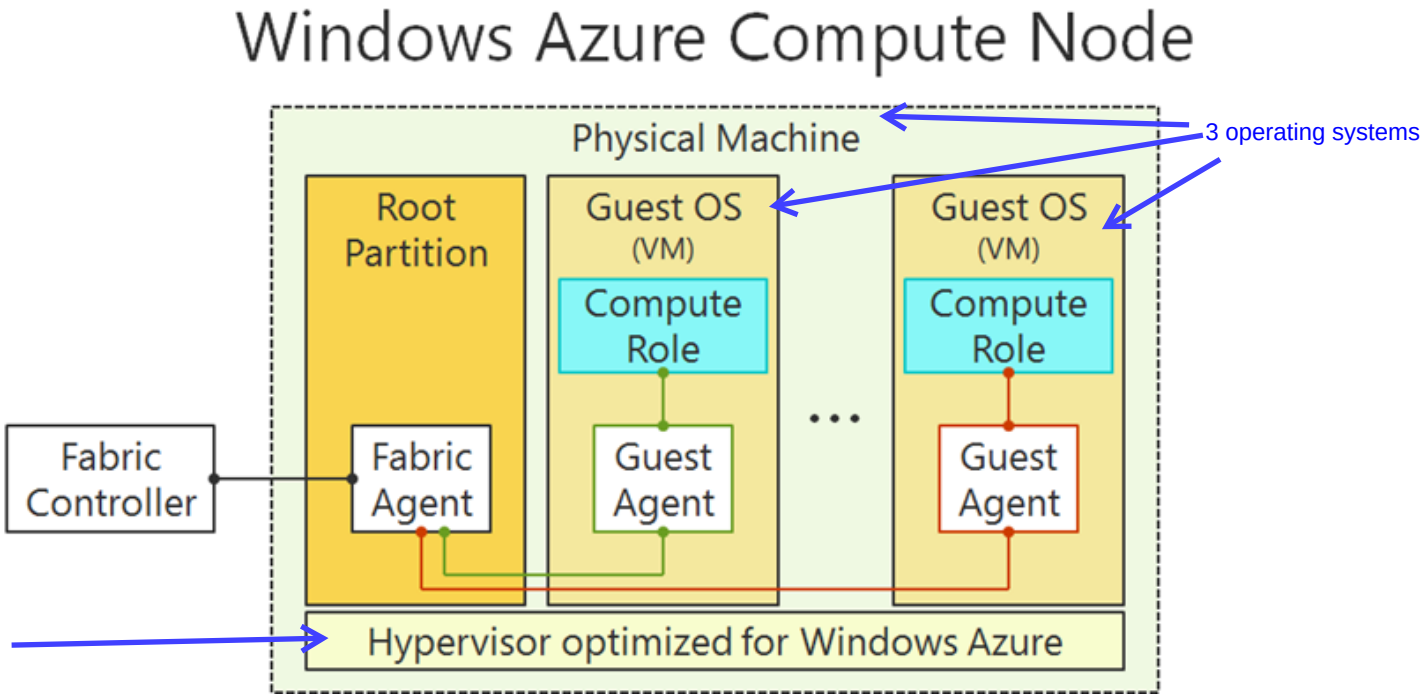
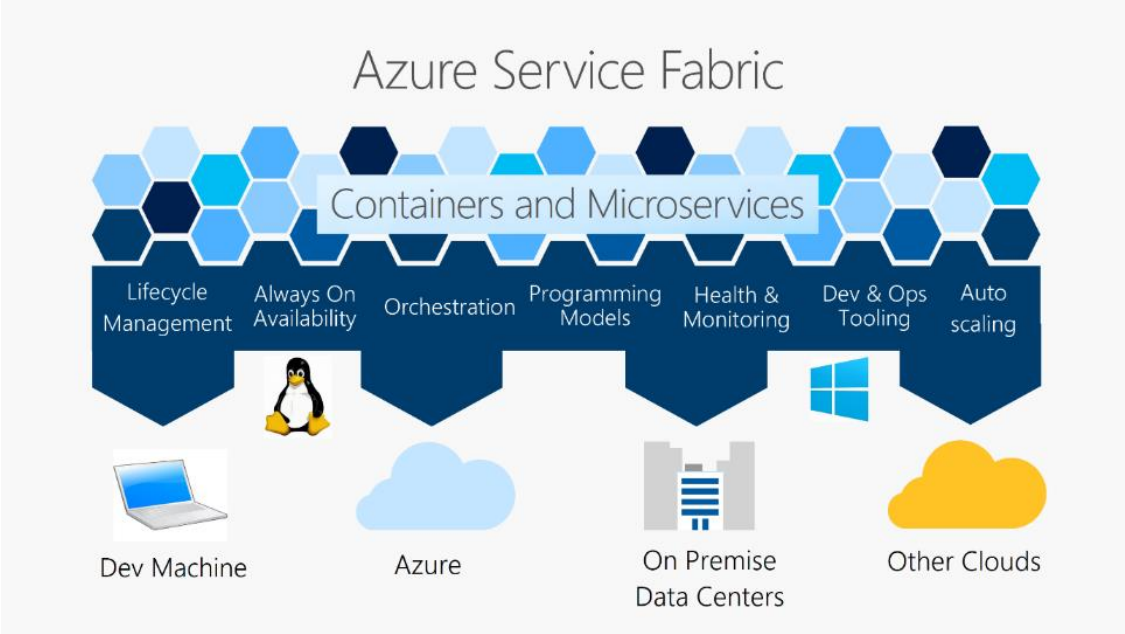
Microsoft Azure: https://social.technet.microsoft.com/wiki/contents/articles/4373.microsoft-azure.aspx

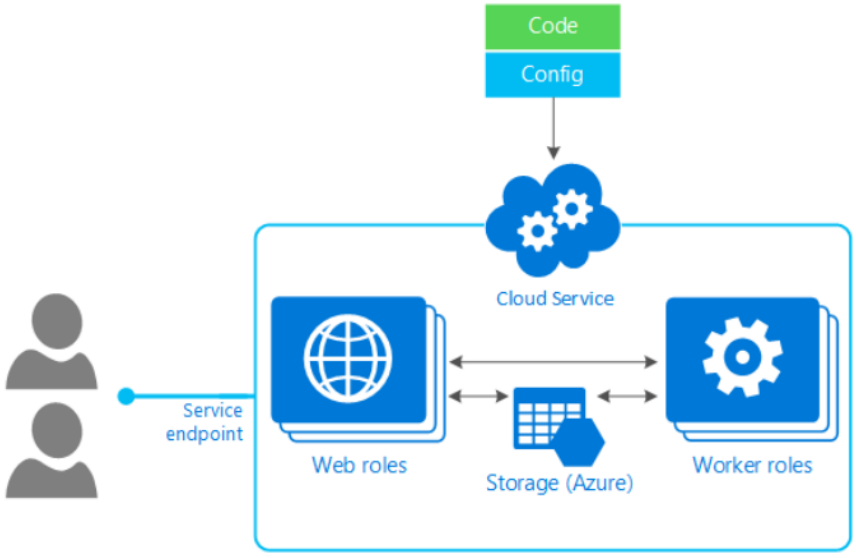






Overview of Azure Cloud Services

1. https://docs.microsoft.com/en-us/azure/cloud-services/cloud-services-choose-me
2. Web roles are Windows Server VMs with IIS enabled
    a. For web applications hosted in IIS.
3. Worker roles are Windows Server VMs with IIS disabled (and you could manually enable it)
    a. For processes that can do some work (i.e. automatically compress uploaded images, do stuff whenever something changes in your database, get new messages from queue and process, etc)
4. Virtual Machines are Windows or Linux images created in Azure, stored as a vhd in your own storage, and have several enhancements over VM role. For example: since the vhd is in your own storage account, you can easily create an image template from your vhd, copy it to a new vhd, or even upload it to VM Depot (Linux only).
5. VM roles are Windows Server 2008 images you construct locally via Hyper-V and upload to Azure (and are now discontinued and no longer available as of May 31, 2013)



- Get started with Azure – Go Here and really look around….
  - https://docs.microsoft.com/en-us/azure/index?view=azure-cli-latest#pivot=get-started&panel=get-started1

Azure "Containers"

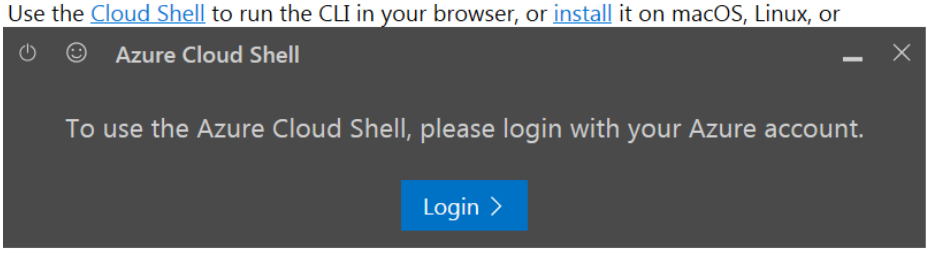
6. Account
7. Subscription
   a. Organizations can use subscriptions to manage costs and creation of resource by users, teams, projects, or using many other strategies
   b. Add or change Azure subscription administrators
      i. https://docs.microsoft.com/en-us/azure/billing/billing-add-change-azure-subscription-administrator
8. Resource Group
   a. https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-portal#manage-resource-groups
9. Network security group
   a. https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitor-quick-audit-notify-action-in-subscription#create-a-network-security-group
10. Azure Active Directory (Azure AD).
    a. Azure AD stores user name, passwords, profile data, and other information. Azure AD users are segmented into tenants.
    b. A tenant is a logical construct that represents a secure, dedicated instance of Azure AD typically associated with an organization.
       i. https://docs.microsoft.com/en-us/azure/architecture/cloud-adoption-guide/adoption-intro/tenant-explainer
11. Database
    a. Tutorial: Design your first Azure SQL database using SSMS:
       i. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-design-first-database
12. Storage
    a. Discussion leads to diff ways of labs...
       i. https://docs.microsoft.com/en-us/azure/storage/
    b. QuickStart: Create a storage account:
       i. https://docs.microsoft.com/en-us/azure/storage/common/storage-quickstart-create-account?tabs=portal
13. Virtual Machines – Servers with or without a web server… (worker vs. web roles)
    a. Tutorial: Create a Windows virtual machine in the Azure portal
       i. https://docs.microsoft.com/en-us/azure/virtual-machines/windows/quick-create-portal
    b. Tutorial: Create a Linux virtual machine with SQL Server 2017 installed
14. Azure Container Instances
    a. QuickStart: Run an application in Azure Container Instances:
       i. Create a Docker container in Azure and make its application available with a fully qualified domain name (FQDN). URL or URI - URN - http://mydomain.com
       ii. https://docs.microsoft.com/en-us/azure/container-instances/container-instances-quickstart-portal
15. QuickStart: Run SQL Server 2017 container images with Docker
    a. https://docs.microsoft.com/en-us/sql/linux/quickstart-install-connect-docker?view=sql-server-2017
16. space

- SQL Server Management Studio (SSMS)
  - Download SSMS
    - https://docs.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms?view=sql-server-2017
  - Tutorial: Connect to and query a SQL Server instance by using SQL Server Management Studio
    - https://docs.microsoft.com/en-us/sql/ssms/tutorials/connect-query-sql-server?view=sql-server-2017
  - Tutorial: Design your first Azure SQL database using SSMS:
    - https://docs.microsoft.com/en-us/azure/sql-database/sql-database-design-first-database
  - Use SQL Server Management Studio (SSMS) to connect to:
    1. Connect to a SQL Server instance
    2. Create a database ("TutorialDB")
    3. Create a table ("Customers") in your new database
    4. Insert rows into your new table
    5. Query the new table and view the results
    6. Use the query window table to verify your connection properties
    7. Change the server that your query window is connected to
  - Use the Azure portal and SQL Server Management Studio (SSMS) to:
    1. **Create a database in the Azure portal
    2. **Set up a server-level firewall rule in the Azure portal
    3. **Connect to the database with SSMS
    4. Create tables with SSMS
    5. Bulk load data with BCP
       - https://docs.microsoft.com/en-us/sql/tools/bcp-utility?view=sql-server-2017#examples
    6. Query that data with SSMS

Custom Installs & Tools 2 Use: Command Line & T-SQL of Things.. (CLTT – our own brand new acronym…!!)

1. Azure PowerShell
   a. Azure PowerShell provides a set of cmdlets that use the Azure Resource Manager model for managing your Azure resources.
   b. You can use it in your browser with Azure Cloud Shell, or you can install it on your local machine and use it in any PowerShell session.
   c. https://docs.microsoft.com/en-us/powershell/azure/overview?view=azurermps-6.4.0
2. The Azure CLI (Command Line Interface)
   a. A command-line tool for managing Azure resources – Try It online….

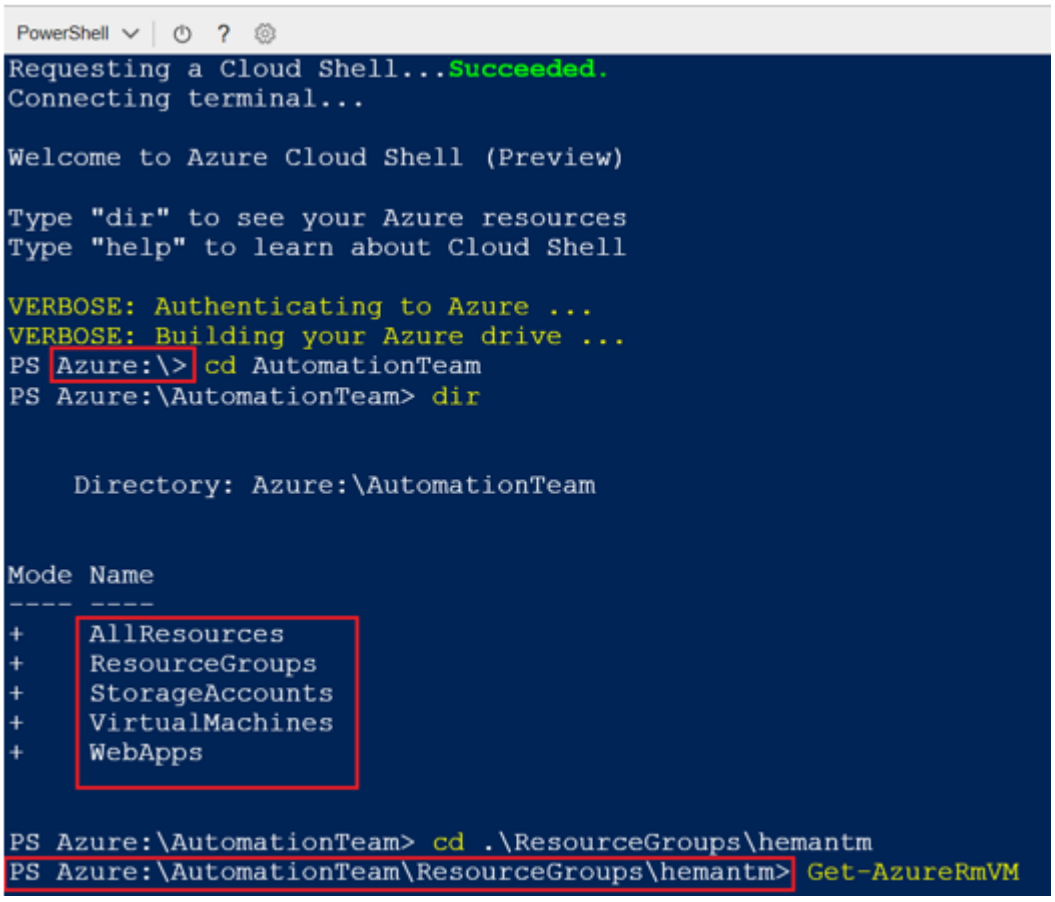
   b.



c. Install Azure CLI
    i. Gives you access to the CLI through the Windows Command Prompt (CMD) or PowerShell.
    ii. https://docs.microsoft.com/en-us/cli/azure/install-azure-cli?view=azure-cli-latest
d. Create a single Azure SQL database using the Azure CLI
    i. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-get-started-cli

3. Azure Cloud Shell
    a. Cloud Shell enables access to a browser-based command-line experience built with Azure management tasks in mind.
    b. Cloud Shell machines are temporary and require an Azure Files share to be mounted as **clouddrive** to persist your files.
    c. On first launch Cloud Shell prompts to create a resource group, storage account, and Azure Files share on your behalf. This is a one-time step and will be automatically attached for all sessions.
        i. https://docs.microsoft.com/en-us/azure/cloud-shell/overview

4. Azure drive (Azure:)
    a. PowerShell in Cloud Shell (Preview) starts you in Azure drive (Azure:).
    b. The Azure drive enables easy discovery and navigation of Azure resources such as Compute, Network, Storage etc. similar to filesystem navigation.
        i. https://docs.microsoft.com/en-us/azure/cloud-shell/features#azure-drive-azure
    c.



5. AzCopy
    a. AzCopy is a command-line utility designed for copying data to/from Microsoft Azure Blob, File, and Table storage, using simple commands designed for optimal performance.
    b. You can copy data between a file system and a storage account, or between storage accounts.
    c. AzCopy 5.1.1 Release
        i. https://azure.microsoft.com/en-us/blog/azcopy-5-1-release/
    d. Tutorial: Transfer data with the AzCopy on Windows
        i. https://docs.microsoft.com/en-us/azure/storage/common/storage-use-azcopy
    e. Tutorial: Move data to and from Azure Blob Storage using AzCopy
        i. https://docs.microsoft.com/en-us/azure/machine-learning/team-data-science-process/move-data-to-azure-blob-using-azcopy
    f. Tutorial: Transfer data with AzCopy on Linux
        i. https://docs.microsoft.com/en-us/azure/storage/common/storage-use-azcopy-linux
6. Azure Resource Manager
    a. With Resource Manager, you can create a template (in JSON format) that defines the infrastructure and configuration of your Azure solution. By using a template, you can repeatedly deploy your solution throughout its lifecycle and have confidence your resources are deployed in a consistent state.
    b. https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-overview
    c. Tutorial: Create and deploy your first Azure Resource Manager template
        i. https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-manager-create-first-template
7. Azure Container Instances (ACI):
8. Azure Container Registry
    a. A managed Docker container registry service used for storing private Docker container images.
    b. QuickStart: Create a container registry using the Azure portal
        i. Push a container image into the registry and finally deploy the container from your registry into Azure Container Instances (ACI).
        ii. https://docs.microsoft.com/en-us/azure/container-registry/container-registry-get-started-portal
9. Data Migration Assistant (DMA)
    a. Enables you to upgrade to a modern data platform by detecting compatibility issues that can impact database functionality on your new version of SQL Server.
    b. It recommends performance and reliability improvements for your target environment.
    c. https://www.microsoft.com/en-us/download/details.aspx?id=53595
10. Power BI Desktop
    a. Visually explore your data with a freeform drag-and-drop canvas, modern data visualizations, and simple report authoring.
    b. Tutorial: Getting started with Power BI Desktop
        i. How it works, demonstrates what it can do, and accelerates your ability to build robust data models — along with amazing reports — that amplify your business intelligence efforts.
        ii. https://docs.microsoft.com/en-us/power-bi/desktop-getting-started
11. Storage Explorer
    a. Easily manage the contents of your storage account with Azure Storage Explorer. Upload, download, and manage blobs, files, queues, tables, and Cosmos DB entities.
    b. Gain easy access to manage your virtual machine disks.
    c. Work with either Azure Resource Manager or classic storage accounts, plus manage and configure cross-origin resource sharing (CORS) rules.
        i. https://azure.microsoft.com/en-us/features/storage-explorer/

d. Tutorial: Get started with Storage Explorer
    i. https://docs.microsoft.com/en-us/azure/vs-azure-tools-storage-manage-with-storage-explorer?tabs=windows#connect-to-a-storage-account-or-service

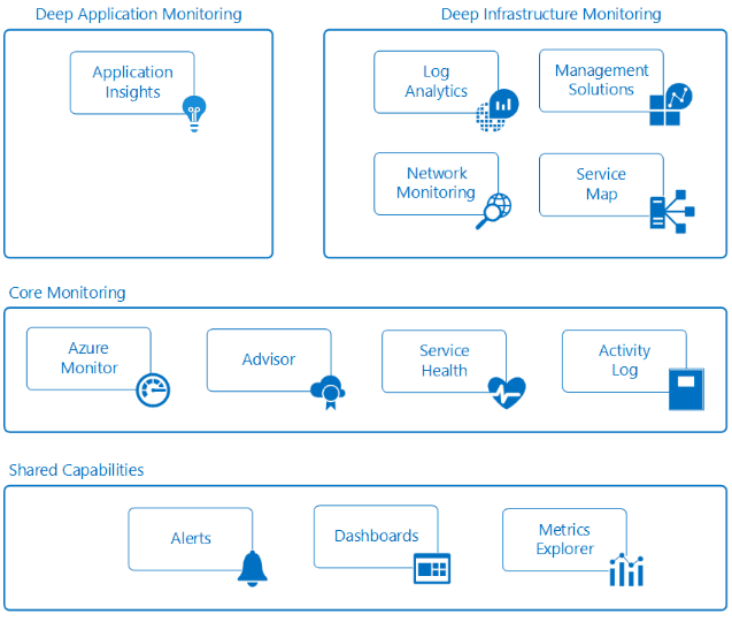
Task Tutorials:

** Part of the "Design your first Azure SQL database using SSMS" Tutorial….

1. **Firewall Rules
    a. To selectively grant access to just one of the databases in your Azure SQL server, you must create a database-level rule for the required database. Specify an IP address range for the database firewall rule that is beyond the IP address range specified in the server-level firewall rule, and ensure that the IP address of the client falls in the range specified in the database-level rule.
        i. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-firewall-configure
    b. Manage firewall rules using the Azure portal
        i. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-firewall-configure#manage-firewall-rules-using-the-azure-portal
2. Users/Groups
    a. Tutorial: Add new users to Azure Active Directory
        i. https://docs.microsoft.com/en-us/azure/active-directory/fundamentals/add-users-azure-active-directory
    b. Tutorial: Assign a role to a user
        i. https://docs.microsoft.com/en-us/azure/active-directory/fundamentals/active-directory-users-assign-role-azure-portal#assign-a-role-to-a-user
    c. Tutorial: Restore a deleted user
        i. https://docs.microsoft.com/en-us/azure/active-directory/fundamentals/active-directory-users-restore
3. ** Tutorial: Create an Azure SQL database in the Azure portal
    a. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-get-started-portal
4. **Connect SSMS
    a. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-connect-query-ssms
5. Create Virtual Machine (VM)
    a. Azure virtual machines (VMs) can be created through the Azure portal. This method provides a browser-based user interface to create VMs and their associated resources.
    b. Tutorial: Create a Windows virtual machine in the Azure portal
        i. https://docs.microsoft.com/en-us/azure/virtual-machines/windows/quick-create-portal
    c. To see your VM in action, you then RDP to the VM and install the IIS web server.
        i. https://docs.microsoft.com/en-us/azure/virtual-machines/windows/quick-create-portal#connect-to-virtual-machine
    d. Tutorial: Create and Manage Windows VMs with Azure PowerShell
        i. https://docs.microsoft.com/en-us/azure/virtual-machines/windows/tutorial-manage-vm
    e. Azure virtual machines use disks to store the VMs operating system, applications, and data. When creating a VM it is important to choose a disk size and configuration appropriate to the expected workload.
    f. Tutorial: Manage Azure disks with Azure PowerShell
        i. https://docs.microsoft.com/en-us/azure/virtual-machines/windows/tutorial-manage-data-disk
6. Azure Virtual Machine Agent (VM Agent)
    a. A secure, lightweight process that manages virtual machine (VM) interaction with the Azure Fabric Controller.

i. https://docs.microsoft.com/en-us/azure/virtual-machines/extensions/agent-windows

7. Azure Fabric Controller
    a. Fabric is the networking underpinnings of the Azure platform which uses high-speed connections and switches to connect nodes consisting of several servers together.
    b. The Fabric along with the Compute and Storage resources make up the Azure Platform.
    c. Fabrics are group of machines in Microsoft's datacenter which are aggregated by a switch. The group of these machines is called cluster.
        i. https://azure.microsoft.com/en-us/resources/videos/fabric-controller-internals-building-and-updating-high-availability-apps/
        ii. https://www.tutorialspoint.com/microsoft_azure/microsoft_azure_fabric_controller.htm
    d. Each cluster is managed and owned by a fabric controller.
        i. How are customer services updated without downtime?
        ii. Which updateability parameters can I tune to maximize performance and uptime?
        iii. Which types of hardware failures exist and how can I configure a service to make sure those are transparent?
        iv. How does Azure update its infrastructure and how does this impact my service?
        v. How does Azure compute resource allocation happen?
        vi. How can Azure customers build automation to implement custom update workflows?
    e. Fabric Controller and AppFabric
        i. https://blogs.technet.microsoft.com/yungchou/2010/12/30/cloud-computing-for-it-pros-46-fabric-controller-and-appfabric/
8. SQL Server database migration to Azure SQL Database
    a. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-cloud-migrate
9. SQL Data Sync
    a. A service built on Azure SQL Database that lets you synchronize the data you select bi-directionally across multiple SQL databases and SQL Server instances
        i. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-sync-data
    b. Tutorial: Set up SQL Data Sync
        i. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-get-started-sql-data-sync
10. Azure Recovery Services
    a. Site Recovery replicates workloads running on physical and virtual machines (VMs) from a primary site to a secondary location. When an outage occurs at your primary site, you fail over to secondary location, and access apps from there.
        i. https://docs.microsoft.com/en-us/azure/site-recovery/site-recovery-overview
11. Replication tutorials
    a. https://docs.microsoft.com/en-us/sql/relational-databases/replication/replication-tutorials?view=sql-server-2017
12. QuickStart: Enable replication for the Azure VM
    a. https://docs.microsoft.com/en-us/azure/site-recovery/azure-to-azure-quickstart#enable-replication-for-the-azure-vm
13. Active geo-replication
    a. Overview: Failover groups and active geo-replication
    b. Enables you to configure up to four readable secondary databases in the same or different data center locations (regions). Secondary databases are available for querying and for failover if there is a data center outage or the inability to connect to the primary database. The failover must be initiated manually by the application of the user.
        i. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-geo-replication-overview

14. Tutorial: Configure active geo-replication for Azure SQL Database in the Azure portal and initiate failover
    a. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-geo-replication-portal
15. Azure Backup
    a. Tutorial: Back up a virtual machine in Azure
        i. https://docs.microsoft.com/en-us/azure/backup/quick-backup-vm-portal
16. A Recovery Services vault is a logical container that stores the backup data for each protected resource, such as Azure VMs. When the backup job for a protected resource runs, it creates a recovery point inside the Recovery Services vault.
    a. https://docs.microsoft.com/en-us/azure/backup/quick-backup-vm-portal#enable-backup-on-a-vm
17. Monitoring Azure applications and resources
    a. Azure Monitor helps you track performance, maintain security, and identify trends.
    b. 

18. Azure Monitor landing page
    a. https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitoring-overview-azure-monitor#portal-overview-page
19. Monitoring and performance tuning:
    a. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-monitor-tune-overview
20. Tutorial: Create, view, and manage alerts using Azure Monitor
    a. https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitor-alerts-unified-usage
21. Azure Activity Log
    a. A history of subscription-level events in Azure. It offers information about who created, updated, or deleted what resources and when they did it.
    b. https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitor-quick-audit-notify-action-in-subscription
22. Azure Automation runbooks
    a. In a computer system or network, a runbook is a compilation of routine procedures and operations that the system administrator or operator carries out.
    b. Graphical and Graphical PowerShell Workflow runbooks are created and edited with the graphical editor in the Azure portal.
    c. QuickStart: Create an Azure Automation runbook
        i. https://docs.microsoft.com/en-us/azure/automation/automation-quickstart-create-runbook#create-runbook
23. QuickStart: Create an Azure Automation account

   i. https://docs.microsoft.com/en-us/azure/automation/automation-quickstart-create-account#create-automation-account
24. Tutorial – "Hello World": My first graphical runbook (requires Azure Automation Account)
    a. https://docs.microsoft.com/en-us/azure/automation/automation-first-runbook-graphical#create-runbook
25. Tutorial: Use Azure portal to create alerts for Azure SQL Database:
    a. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-insights-alerts-portal
26. Tutorial: Starting an Azure Automation runbook with a webhook
    a. A webhook allows you to start a particular runbook in Azure Automation through a single HTTP request. This allows external services such as Azure DevOps Services, GitHub, Azure Log Analytics, or custom applications to start runbooks without implementing a full solution using the Azure Automation API.
       i. https://docs.microsoft.com/en-us/azure/automation/automation-webhooks
27. Tutorial: Create an Autoscale Setting for Azure resources based on performance data or a schedule
    a. https://docs.microsoft.com/en-us/azure/monitoring-and-diagnostics/monitor-tutorial-autoscale-performance-schedule
28. Space

Docker

Docker is a platform for developers and sysadmins to develop, deploy, and run applications with containers. The use of Linux containers to deploy applications is called containerization. Containers are not new, but their use for easily deploying applications is.

Containerization is increasingly popular because containers are:

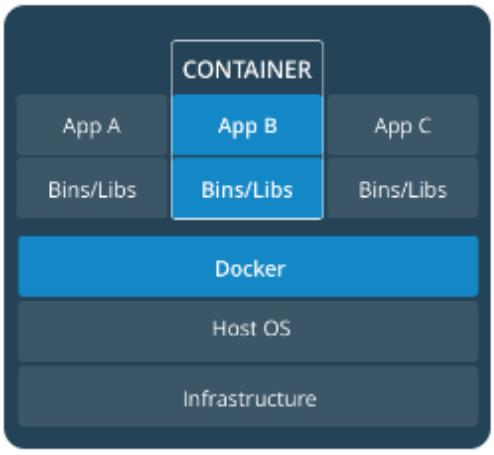
- Flexible: Even the most complex applications can be containerized.
- Lightweight: Containers leverage and share the host kernel.
- Interchangeable: You can deploy updates and upgrades on-the-fly.
- Portable: You can build locally, deploy to the cloud, and run anywhere.
- Scalable: You can increase and automatically distribute container replicas.
- Stackable: You can stack services vertically and on-the-fly.

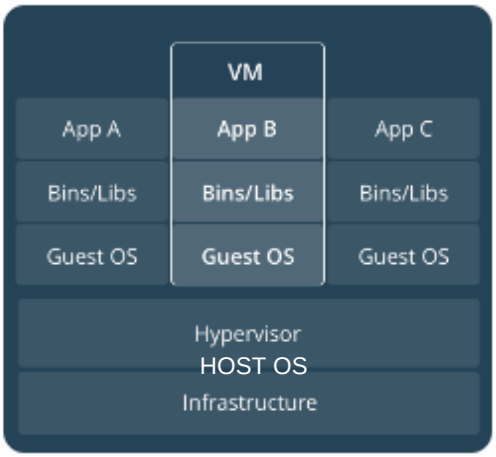
Images and containers

A container is launched by running an image. An image is an executable package that includes everything needed to run an application--the code, a runtime, libraries, environment variables, and configuration files.

A container is a runtime instance of an image--what the image becomes in memory when executed (that is, an image with state, or a user process). You can see a list of your running containers with the command, docker ps, just as you would in Linux.

Containers and virtual machines





A container runs natively on Linux and shares the kernel of the host machine with other containers. It runs a discrete process, taking no more memory than any other executable, making it lightweight.

By contrast, a virtual machine (VM) runs a full-blown "guest" operating system with virtual access to host resources through a hypervisor. In general, VMs provide an environment with more resources than most applications need.

Resources

1. Docker Containers
    a. Get started with Docker for Windows
    b. https://docs.docker.com/get-started/#docker-concepts
    c. https://docs.docker.com/docker-for-windows/
2. Feature comparison: Azure SQL Database versus SQL Server:
    a. https://docs.microsoft.com/en-us/azure/sql-database/sql-database-features
3. Azure Automation User Documentation:
    a. https://docs.microsoft.com/en-us/azure/automation/
4. Azure Storage Data Movement Library for .Net:
    a. https://github.com/Azure/azure-storage-net-data-movement
5. Use Azure DevTest Labs for developers:
    a. https://docs.microsoft.com/en-us/azure/lab-services/devtest-lab-developer-lab
6. space