

CSCI 5902 - Fall 23 - Azure Tutorial

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Recap

- Demo: Pricing Calculator
- Demo: Storage Account Creation
- Demo: Static Website Hosting on Azure - Storage & Static Web Apps
- Demo: Azure File Share

T4 - Azure Compute Services

Azure Compute

Hosting model for the resources that your application runs on

Hosting Models

- Infrastructure as a Service(IaaS) - You provision VMs along with the associated networking and storage components. Allows software tools and applications as per your requirement. Microsoft manages infrastructure.
- Platform as a Service(PaaS) - Provides a managed hosting environment where you can deploy your application without needing to manage VMs or networking resources.
- Function as a Service(FaaS) - Lets you deploy your code to the service, which automatically runs it.

Services Available in Azure Compute

- Azure Supports wide range of computing solutions for development, testing, running applications & extending your datacenter.

- Azure Virtual Machines
- Azure App Service

- Azure Kubernetes Service
- Azure Container Instances

- Azure Container Apps
- Azure Functions

- Azure Red Hat Openshift

- Azure Spring Apps
- Azure Service Fabric
- Azure Batch

Compute Services(Contd.)

- **Azure Virtual Machine** - A service where you deploy and manage virtual machines (VMs) inside an Azure virtual network.
- **Azure App Service** - A managed service for hosting web apps, mobile app back ends, RESTful APIs, or automated business processes.
- **Azure Kubernetes Service** - A managed Kubernetes service for running containerized applications.
- **Azure Container Instances** - This service is a fast and simple way to run a container in Azure. You don't have to provision any VMs or adopt a higher-level service.

Compute Services(Contd.)

- **Azure Container Apps** - A managed service built on Kubernetes, which simplifies the deployment of containerized applications in a serverless environment.
- **Azure Functions** - A managed function as a service.
- **Azure Redhat Openshift** - A fully managed OpenShift cluster for running containers in production with Kubernetes.
- **Azure Spring Apps** - A managed service designed and optimized for hosting Spring Boot apps.
- **Azure Service Fabric** - A distributed systems platform that can run in many environments, including Azure or on-premises.
- **Azure Batch** - A managed service for running large-scale parallel and high-performance computing (HPC) applications.

Azure Virtual Machine

Azure VM

When to use Azure VM?

- VMs are ideal choice when you need:
 - Total control over the Operating System(OS)
 - Ability to run custom software.
 - To use custom hosting configurations.
- You are responsible for performing tasks, such as configuring, patching, and installing the software that runs on the VM.

VM Use Cases

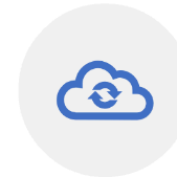
Examples of VM use cases



Development and Test - Azure virtual machines offer a quick and easy way to create a computer with specific configurations required to code and test an application



Applications in the cloud - Because demand for your application can fluctuate, it might make economic sense to run it on a VM in Azure. You pay for extra virtual machines when you need them and shut them down when you don't.



Extended Datacenter - virtual machines in an Azure virtual network can easily be connected to your organization's network

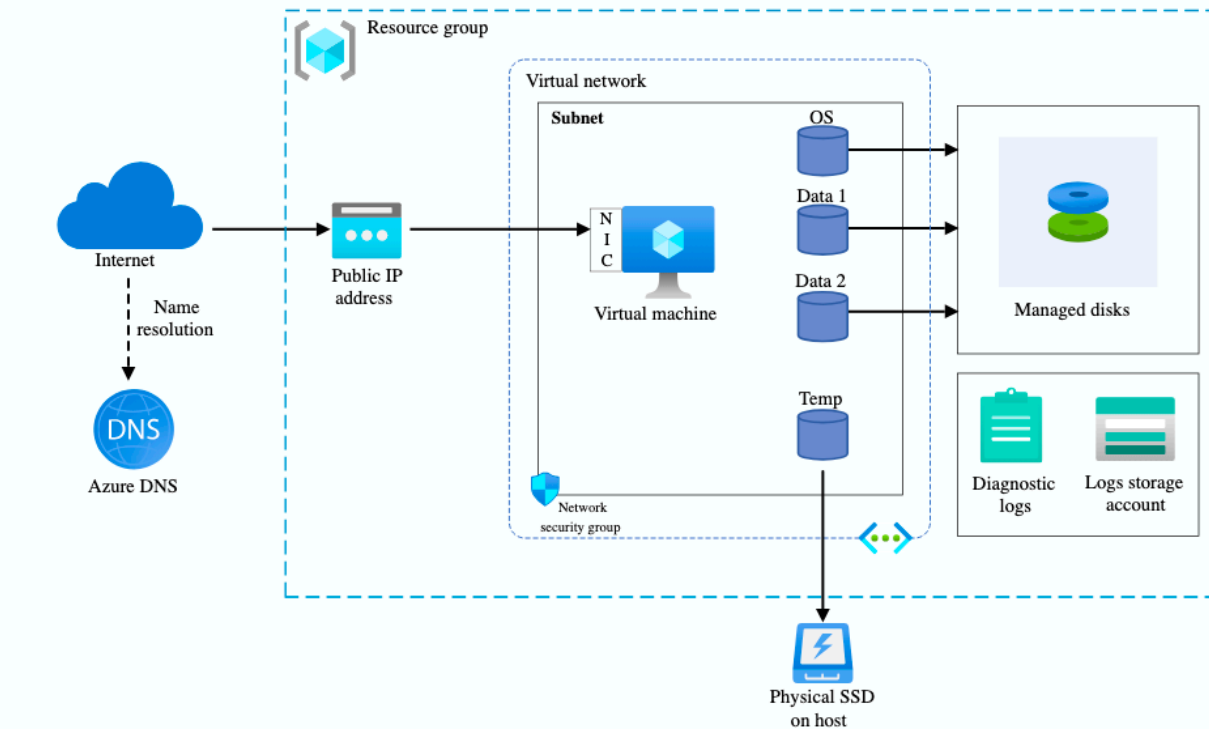
Design Considerations for VM

What do I need to think before creating VM?

There's always a multitude of design considerations when you build an application infra in Azure. Following aspects of VM are important:

- The names of your application resource
- The location where the resources are stored
- The size of the virtual machine
- The maximum number of virtual machines that can be created
- The operating system that the virtual machine runs
- The configuration of the virtual machine after it starts
- The related resources that the virtual machine need

Reference Architecture: VM in Azure



Availability Options for Virtual Machines

Availability Options for VM

- **Availability Zones** - Each Availability Zone has a distinct power source, network, and cooling. By designing your solutions to use replicated VMs in zones, you can protect your apps and data from the loss of a data center.
- **Virtual Machine Scale Sets** - Lets you create and manage a group of load balanced VMs. The number of VM instances can automatically increase or decrease in response to demand or a defined schedule. There's no cost for VM scale set, you're charged only for underlying VMs.
- **Availability Set** - It is a logical grouping of VMs that allows Azure to understand how your application is built to provide for redundancy and availability. Each Availability set can have 3 fault domains and 20 update domains.

What is the alternative option in AWS which provides similar capabilities as Availability Set and Scale Set?

Autoscaling Groups

How we achieve cluster placement group functionality in Azure?

Proximity Placement Group

Configuration options with VMs

- Custom Images
- Dedicated Hosts
- Spot VMs
- Reserved Instances
- Capacity Reservation
- Azure Hybrid Benefit
- Ephemeral OS disks

Azure VM Series

Further Reading

- <https://azure.microsoft.com/en-ca/pricing/details/virtual-machines/series/>

Azure App Service

App Service

- App service is fully managed platform as a service offering.
- Key features:
 - Multiple languages and frameworks
 - Managed production environment
 - Devops Optimization
 - Containerization support
 - High Scalability
 - Security and Compliance
 - Authentication
 - Extensive tools support

App Service is a PaaS offering, so how does the billing work for App Service?

App Service Plan

- An App Service always runs in an App Service plan.
- When you create an App service plan, a set of compute resources is created for that plan in that region. App Service plan defines:
 - Operating System
 - Region
 - Number of VM instances
 - Pricing Tier
 - Free, Shared, Basic, Standard, Premium, Isolated
- Free and shared tiers cannot scale out.

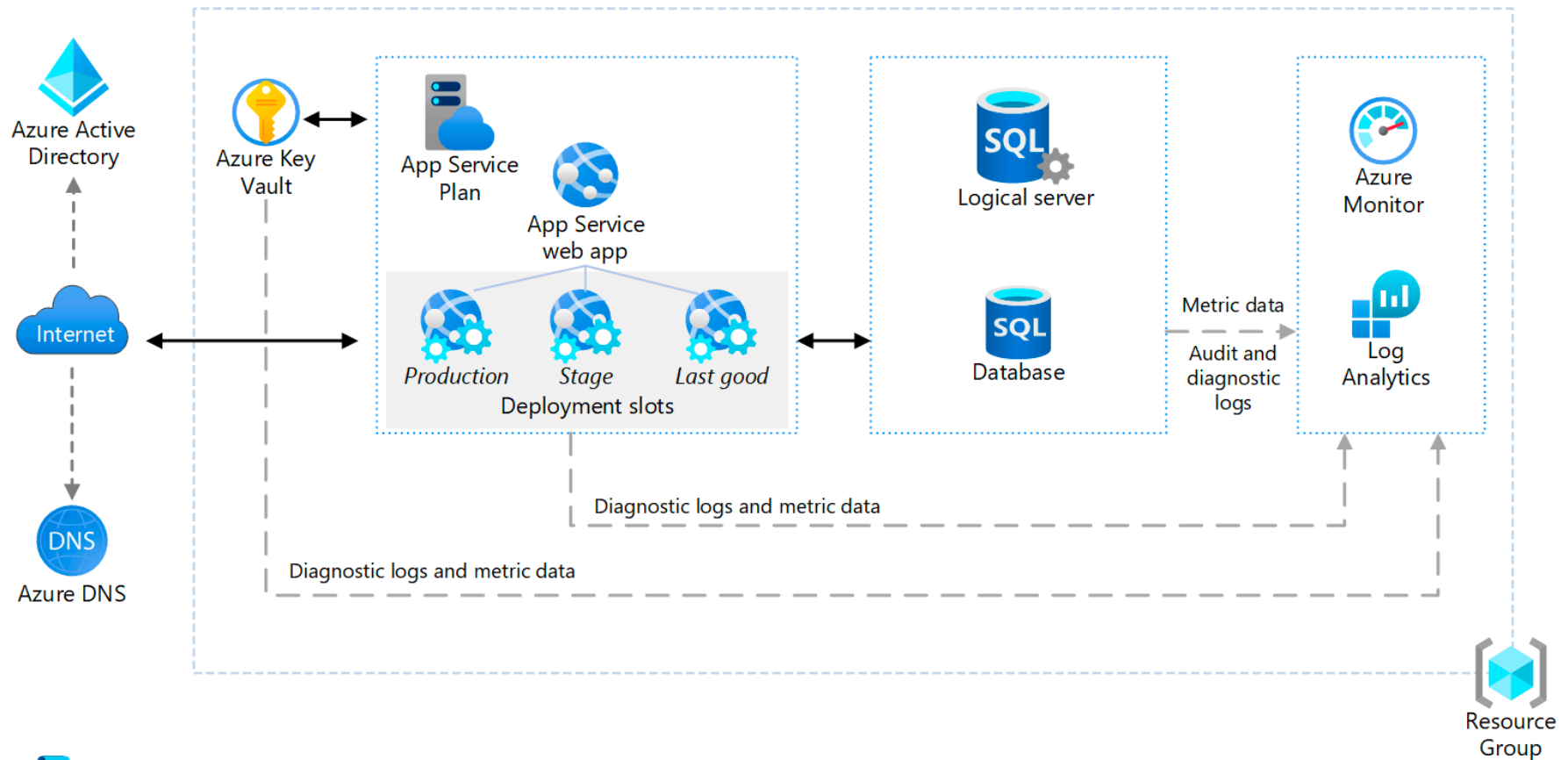
App Service - Configuration Options

- Change the plan
- Backup & restore
- Clone App
- Restore deleted app
- Move app between regions
- Move app between subscriptions

Can I run multi container app in App Service?

Web App for containers is the service which offers this capability and is a preview feature

Reference Architecture: App Service



With so many compute services to choose from, how do I select one for application hosting?



It's a wrap



References

- [1] <https://learn.microsoft.com/en-us/azure/architecture/guide/technology-choices/compute-decision-tree>
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- [3] <https://learn.microsoft.com/en-us/azure/architecture/web-apps/app-service/architectures/basic-web-app?tabs=cli>