DevOps Basics

DevOps is a mixture of development and ops, sometimes including CI/CD, Agile planning, and monitoring applications.

Used because of it's easy delivery of software and for benefits of reliability, security, and stability.

DevOps also help deliver small results in frequent loops so that major projects can be completed in minor chunks increasing productivity.

Azure DevOps Services:
Azure Boards
Azure Pipelines
Azure Repos
Azure Artifacts
Azure Test Plans}

Cloud Deployment Models

Public Cloud	The infrastructure is owned by your cloud provider and the server that you are using could be a multi-tenant system.
Private Cloud	The infrastructure is owned by you or your cloud provider gives you that service exclusively. Example: Hosting your website on your servers, or hosting your website with the cloud provider on a dedicated server.
Hybrid Cloud	When you use both Public Cloud, Private Cloud together, it is called Hybrid Cloud. For Example: Using your in-house servers for confidential data, and the public cloud for hosting your company's public facing website. This type of setup would be a hybrid cloud.

Service Types Comparison

	Advantages	Disadvatages
Public	+ High Scalability/-Agility + PAYG (No CapEx, OpEx model) + Not responsible for hardware maintenance + Minimal technical knowledge required	- May not be able to meet specific security requirements - May not be able to meet specific compliance requirements - You don't own the hardware and may not be able to manage them as you wish

Service Types Comparison (cont)

Private	+ You have complete control + Can meet strict security and compliance requirements	- Upfront CapEx costs - Owning equipment limits agility to scale - Requires high technical knowledge
Hybrid	+ Advantages of both Public and Private	- Can be more expensive than selecting one deployment model - Can be more complicated to set up and manage

Azure Networking Services

Virtual Network	Connects VMs to incoming Virtual Private Network (VPN) connections
Load Balancer	Balances inbound and outbound connections to applications or service endpoint
VPN Gateway	Accesses Azure Virtual Networks through high-performance VPN gateways
Application Gateway	Optimizes app server farm delivery while increasing application security
Content Delivery Network	Delivers high-bandwidth content to customers globally

Azure Databases

CosmosDB	Globally distributed database that supports NoSQL options
Azure SQL Database	Fully managed relational database with auto-scale, integral intelligence, and robust security
Azure Database Migration Service	Migrates your databases to the cloud with no application code changes

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Azure Databases (cont)

Azure SQL Data Warehouse	Fully managed data warehouse with integral security at every level of scale at no extra cost

Web Architecture Best Practices

System flexibility

Component reusability

Clarity and well-thought structure of your code

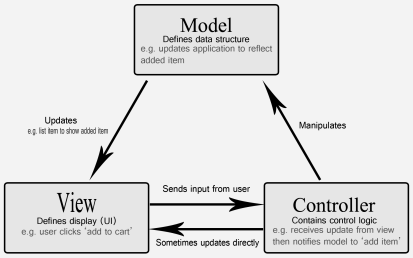
Scalability

Stability and reliability

Easy bug-detection

Performance level regarding your system as a whole

MVC Architecture



Optimize SQL Stored Procedure

Use SET NOCOUNT ON - Suppresses network messages and decreases traffic

Use fully qualified procedure name - A fully qualified object name is database.schema.objectname

Using IF EXISTS AND SELECT 1 - If checking the existing record, don't need to return column names

Keep transaction short and crisp - The longer the transaction the longer the locks will be held based on isolation level. This may result in deadlocks and blocking.

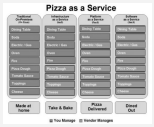
Azure Pipelines

Tasks	Get resources, Restore, Build, Test, Publish Artifacts
Triggers	Enable CI, Add branches
Variables	Add environment variables or groups

Service Types

IAAS	PAAS	SAAS
Infrastructure as a Service	Platform as a Service	Software as a Service
Raw hardware that can be configured.	Platform to publish without giving access to software or OS	Software to use without purchase.
Example: Azure VM	Example: Web Apps	Example: Dropbox

Pizza as a Service



Azure Storage Services

Blob Storage	Storage service for very large objects, such as video files or bitmaps
Disk Storage	Provides disks for virtual machines, applications, and other services.
File Storage	Azure Files offers fully-managed file shares in the cloud.
Archive Stroage	Storage facility for data that is rarely accessed.

Azure Compute Services

Virtual Machines	Emulate physical computers. Include virtual processor, memory, storage and networking resources. VMs host and OS and can be logged into through remote client
VM Scale Sets	Can use to deploy and manage a set of identical VMs. With all VMs configured the same, virtual machine scale sets are designed to support true autoscale. As demand goes up, more VM instances can be added. As demand goes down, VM instances can be removed. The process can be manual, automated, or a combination of both.

Azure Compute Services (cont)

Containers/Kubernetes	Can use to deploy and manage containers. Containers are lightweight, virtualized application environments. They're designed to be quickly created, scaled out, and stopped dynamically. You can run multiple instances of a containerized application on a single host machine.
App Service	Quickly build, deploy, and scale enterprise-grade web, mobile, and API apps running on any platform. You can meet rigorous performance, scalability, security, and compliance requirements while using a fully managed platform to perform infrastructure maintenance. App Service is a platform as a service (PaaS) offering.
Functions	Functions are ideal when you're concerned only about the code running your service and not the underlying platform or infrastructure. They're commonly used when you need to perform work in response to an event (often via a REST request), timer, or message from another Azure service, and when that work can be completed quickly, within seconds or less.

User Session Management

Set secure/HttpOnly flags on your cookies. Avoid sending delicate traffic and tokens across an unencrypted channel.

Generate new session cookies. All new session tokens should be generated at every session as soon as a consumer visits the application, verifies the correct credentials, and logs out of their account. A cookie should expire if the account is inactive for an extended period of time, and you should bind the consumer to re-authenticate.

Configure session cookies properly. Session tokens should be extended, random, and uncommon. These properties can ensure that an attacker cannot guess or brute force the session token's value.

Caching

Caching is a common technique that aims to improve the performance and scalability of a system. It does this by temporarily copying frequently accessed data to fast storage that's located close to the application.

Distributed applications typically implement either or both of the following strategies when caching data:

Using a **private cache**, where data is held locally on the computer that's running an instance of an application or service.

Using a **shared cache**, serving as a common source that can be accessed by multiple processes and machines.

The key to using a cache effectively lies in determining the most appropriate data to cache, and caching it at the appropriate time.

Caching typically works well with data that is immutable or that changes infrequently. Examples include reference information such as product and pricing information in an e-commerce application, or shared static resources that are costly to construct.

Caching is typically less useful for dynamic data.

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