**Azure Fundamentals part 6: Describe Azure cost management and service level agreements**

# Compare costs by using the Total Cost of Ownership Calculator

# What's the Total Cost of Ownership (TCO) Calculator?

# Helps you estimate the cost savings of operating your solution on Azure over time

# With the TCO Calculator, you enter the details of your on-premises workloads

# Then review the suggested industry average cost

# How does the TCO Calculator work?

# Working with the TCO Calculator involves three steps:

# Define your workload: Servers, Databases, Storage and networking

# Adjust assumptions: Check on-premises licenses, try save money re-using licenses in Azure

# View the report

# View the report

# Choose a time frame between one and five years. The TCO Calculator generates a report

# Purchase Azure services

# What types of Azure subscriptions can I use?

# Azure offers both free and paid subscription:

# Free Trial: provides you with 12 months of popular free services. More than 25 services that are always free.

# Pay-as-you-go:

# Member Offers

# How do I purchase Azure services?

# Through an Enterprise agreement: For larger customers. Committed to paying a fee for 3 years.

# Directly from the web: Purchase the services from the Azure Portal. You are billed monthly.

# Through a Cloud Solutions Provider: Is a Microsoft Partner

# What factors affect cost?

# Resource Type: Depends on the type of resource or how you customize it. For example blob storage standard or premium.

# Usage Meters: When you provision a resource, Azure creates meters to track usage of that resource. User uses this to generate reports. Similar to an electricity meter. For example CPU time, Time spent on public IP Address, in-coming network and disk size.

# Resource Usage: In Azure you pay for what you use. In Azure, you can delete or deallocate a VM. If you delete a VM you save costs on compute, but still pay for the data stored.

# Azure Subscription Types:

# Azure Marketplace: You can purchase Azure based services.

# Does location or network traffic affect cost?

# Azure infrastructure is distributed globally

# You can install services closest to your customers

# Different regions can have different associated prices

# Zones for billing of network traffic

# Some inbound data transfer in Azure are free

# Outbound data transfers are based on zones

# Zones:

# Zone 1: AUZ, West US, Canada, Europe

# Zone 2: Japan, Korea

# Zone 3: SA

# DE Zone: Germany

# How can I estimate the total cost?

# The Pricing calculator displays Azure products in categories.

# Options that you can configure in the Pricing calculator:

# Region

# Tier: Free or Basic tier

# Billing Options

# Support Options: Additional support pricing

# Programs and Offers:

# Azure Dev/Test Pricing: Pricing available for development and test workloads

# Manage and minimize total cost on Azure

# Understand estimated costs before you deploy:

# To help you plan your solution on Azure, carefully consider the products, services, and resources you need

# Calculate your projected costs by using the Pricing calculator and the Total Cost of Ownership (TCO) Calculator

# Use Azure Advisor to monitor your usage:

# Azure Advisor identifies unused or underutilized resources. Then makes suggestions.

# Recommendations are sorted by impact: high, medium, or low.

# Use spending limits to restrict your spending

# Use spending limits to prevent accidental overruns.

# If you have configured a spending limit, Azure suspends your subscription until a new billing period begins

# These can be quotas or limits

# Use Azure Reservations to prepay

# Azure Reservations offers discounted prices on certain Azure services

# Azure Reservations can save you up to 72 percent

# Choose low-cost locations and regions

# Azure products and services costs vary in different locations and regions. Use them in regions that cost the least.

# Some resources are metered and billed according to how much outgoing (egress) network bandwidth they consume.

# Use Azure Cost Management + Billing to control spending

# Free service that helps you understand your Azure bill, manage your account and subscriptions, monitor and control Azure spending

# Azure Cost Management + Billing features include:

# Reporting

# Data Enrichment

# Budgets

# Alerting

# Recommendations

# Apply tags to identify cost owners

# Tags help you manage costs associated with the different groups of Azure products and resources

# Tags make it easier to identify groups

# Resize underutilized virtual machines

# A common recommendation that you'll find from Azure Cost Management + Billing and Azure Advisor is to resize or shut down VMs that are underutilized or idle

# Deallocate virtual machines during off hours

# If you have VM workloads that are only used during certain periods, but you're running them every hour of every day, you're wasting money

# Shutdown these VMs when not in use

# Excellent strategy for development and testing environments

# Delete unused resources

# If you are not using a resource you should shut it down

# For example POC

# Environments should be reviewed regularly to check for unused resources.

# Migrate from IaaS to PaaS services

# When first moving to the cloud, IaaS is the most natural.

# As time goes on, it reduces costs to move to PaaS.

# Save on licensing costs

# Choose a cost effective OS

# User Azure Hybrid Benefit to repurpose software licenses:

# Repurpose Windows Server or SQL Server for VMs on Azure.

# Knowledge Check

# https://docs.microsoft.com/en-us/learn/modules/plan-manage-azure-costs/7-knowledge-check

# What are service-level agreements (SLAs)?

# A service-level agreement (SLA) is a formal agreement between a service company and the customer

# Related as a percentage

# Normally 99%, 99.9%, 99.5%. 99.99% virtually impossible and very expensive

# Why are SLAs important?

# Helps you understand what guarantees you can expect

# Where can I access SLAs for Azure services?

# You can access SLAs from Service Level Agreements

# What's in a typical SLA?

# A typical SLA breaks down into these sections:

# Introduction

# Includes what to expect, scope and renewals

# General Terms

# Terms so that both parties have a consistent vocabulary

# Also includes submitting a claim and receiving a claim

# SLA Details

# Performance commitments measured as a percentage. Ranges from 99.9% to 99.99%

# Focuses on uptime

# How do percentages relate to total downtime?

# Downtime refers to the time duration that the service is unavailable

# What are service credits?

# A service credit is the percentage of the fees you paid that are credited back to you according to the claim approval process

# Credits typically increase as uptime decreases

# < 99.99 – 10%

# < 99% – 25%

# < 95% - 100%

# What's the SLA for free services?

# Free products don’t have SLA

# How do I know when there's an outage?

# Azure status provides a global view of the health of Azure services and regions

# Azure status provides an RSS feed of changes

# How can I request a service credit from Microsoft?

# Need to file a claim with Microsoft

# If you use a CSP, your CSP typically manages the claims process

# Each SLA specifies the timeline by which you must submit your claim

# Define your application SLA

# An application SLA defines the SLA requirements for a specific application

# Scenario: Special orders section for Tailwind Traders

# Business impact: If the Special Orders application goes down, what would the business impact be? Customers can’t place new orders and go to competitors?

# Usage Patterns: Define when and how users access the application. If the application went down in the middle of the night there would be little impact. But this might be different for different areas of the business?

# Design your application to meet your SLA

# Identify your workloads

# A workload is a distinct capability or task that's logically separated from other tasks

# Each workload defines:

# Availability

# Scalability

# Data consistency

# Disaster recovery

# Combine SLAs to compute the composite SLA

# The process of combining SLAs helps you compute the composite SLA for a set of services

# For example:

# In the example there where two VM

# VM \* VM \* SQL DB \* Load Balancer

# 99.9% \* 99.9% \* 99.99% \* 99.99%

# Composite SLA = 99.78%

# What happens when the composite SLA doesn't meet your needs?

# Choose customization options that fit your required SLA

# DISKS: Choose HDD or SSD. SLA for single VM would be 95%, 99.5% or 99.9%

# TIERS: Standard tier SLA for Azure Automation is 99.9%

# Build availability requirements into your design

# To improve the availability of the application, avoid having any single points of failure

# For example, instead of having more VM have more instances of the same VM.

# An availability zone is a unique physical location within an Azure region

# Use zones so that your other instances are unaffected

# Deploying two or more instances of an Azure virtual machine across two or more availability zones raises the virtual machine SLA to 99.99 percent

# Calculation with new VM changes:

# Include redundancy to increase availability

# Redundancy is having duplicate components across several regions

# To achieve maximum availability in your application, add redundancy to every single part of the application

# Very high performance is difficult to achieve

# Performance targets above 99.99 percent are very difficult to achieve

# Your application must be able to self-diagnose and self-heal during an outage

# Access preview services and preview features

# What is the service lifecycle?

# Defines how every Azure service is released for public use

# Every Azure service starts in the development phase.

# Next, the service is released to the public preview phase

# After a new Azure service is validated and tested, it's released to all customers as a production-ready service. This is known as general availability (GA)

# How can I access preview services?

# You can access preview services from the Azure portal

# Scenario: https://docs.microsoft.com/en-us/learn/modules/choose-azure-services-sla-lifecycle/6-knowledge-check