byteXL

# Azure Fundamentals
# UNIT- 5
# Azure Services

# Introduction

- Azure SLA, which stands for Service Level Agreement, is a commitment made by Microsoft for the availability and uptime of its cloud services and resources within the Azure cloud platform. SLAs define the level of service that customers can expect and provide a guarantee of reliability for Azure services. Microsoft Azure offers SLAs for a wide range of its services, including virtual machines, databases, storage, networking, and more.

# Azure Service Level Agreements

- **Availability Commitment**: Azure SLAs specify the minimum level of availability that Microsoft guarantees for a particular service. This is usually expressed as a percentage of uptime over a given time period, such as 99.9% uptime per month.
- **Downtime Allowance**: Azure SLAs also define the allowable downtime for a service. If the service experiences more downtime than the SLA allows, customers may be eligible for service credits.
- **Service Credits**: In the event that Azure services do not meet their SLA commitments, Microsoft may provide customers with service credits. These credits can be used to offset future Azure service charges
- **Service-Specific SLAs**: Different Azure services may have different SLAs. For example, Azure Virtual Machines may have a different SLA compared to Azure SQL Database or Azure Blob Storage. Customers should review the SLA for each specific service they are using.

# Azure Service Level Agreements

- **Exclusions**: SLAs often have certain exclusions or exceptions. These are situations where downtime is not counted against the SLA, such as planned maintenance or customer-initiated actions.
- **Monitoring and Reporting**: Azure actively monitors the health of its services, and customers can access service health status information through the Azure portal. This transparency helps customers track the performance and availability of their resources.

Azure's SLAs provide a level of assurance regarding the reliability of the platform, but they also require customers to configure the resources in a way that maximum availability, such as deploying the resources across multiple regions for redundancy

# SLAs for Azure Products and Services

- Performance targets are expressed as uptime and connectivity guarantees.
- Performance-targets range from 99.9% (three nines) to 99.99% (four nines).
- If a service fails to meet the guarantees, a percentage of the monthly service fees can be credited to you.

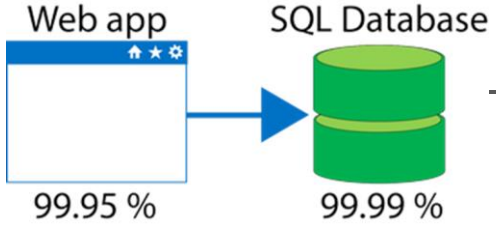
SLAs define Microsoft’s commitment to an Azure service or product.

Individual SLAs are available for each Azure product and service.

SLAs also define what happens if a service or product fails to meet the designated availability commitments.

# Composite SLAs

If the App Service has a 99.95% SLA, and the Azure SQL Database has a 99.99% SLA, what is the composite SLA for your application?




Composite SLA

9995 * .9999
= 99.94%

Notice the composite SLA is lower than the individual SLAs.
Improve the SLA by creating independent fallback paths

# Application SLAs

Customers should determine what SLA is needed for their application.
Know your workload requirements and usage patterns.
Design for resiliency and availability.
Establish availability metrics — mean time to recovery (MTTR) and mean time between failures (MTBF).
Establish recovery metrics — recovery time objective and recovery point objective (RPO).
Implement resiliency strategies.
Build in availability requirements

# Azure VM SLA

**Additional Definitions**:

“**Availability Set**” refers to two or more Virtual Machines deployed across different Fault Domains to avoid a single point of failure.

“**Availability Zone**” is a fault-isolated area within an Azure region, providing redundant power, cooling, and networking.

"**Azure Dedicated Host**" provides physical servers that host one or more Azure virtual machines with the (default) setting of autoReplaceOnFailure required for any SLA.

“**Data Disk**” is a persistent virtual hard disk, attached to a Virtual Machine, used to store application data.

"**Dedicated Host Group**" is a collection of Azure Dedicated Hosts deployed within an Azure region across different Fault Domains to avoid a single point of failure.

# Azure VM SLA

**Fault Domain**" is a collection of servers that share common resources such as power and network connectivity.

"**Operating System Disk**" is a persistent virtual hard disk, attached to a Virtual Machine, used to store the Virtual Machine's operating system.

"**Single Instance**" is defined as any single Microsoft Azure Virtual Machine that either is not deployed in an Availability Set or has only one instance deployed in an Availability Set.

"**Virtual Machine**" refers to persistent instance types that can be deployed individually or as part of an Availability Set or using a Dedicated Host Group. A virtual machine can be deployed in a multi-tenant environment in Azure or in an isolated, single-tenant environment using Azure Dedicated Hosts.

# Azure VM SLA

**Virtual Machine Connectivity**" is bi-directional network traffic between the Virtual Machine and other IP addresses using TCP or UDP network protocols in which the Virtual Machine is configured for allowed traffic. The IP addresses can be IP addresses in the same Cloud Service as the Virtual Machine, IP addresses within the same virtual network as the Virtual Machine or public, routable IP addresses.

**Uptime Calculation and Service Levels for Virtual Machines in Availability Zones**

"**Maximum Available Minutes**" is the total accumulated minutes during an Applicable Period that have two or more instances deployed across two or more Availability Zones in the same region. Maximum Available Minutes is measured from when at least two Virtual Machines across two Availability Zones in the same region have both been started resultant from action initiated by Customer to the time Customer has initiated an action that would result in stopping or deleting the Virtual Machines.

"**Downtime**" is the total accumulated minutes that are part of Maximum Available Minutes that have no Virtual Machine Connectivity in the region

# Azure VM SLA

"**Uptime Percentage**" for Virtual Machines in Availability Zones is calculated as Maximum Available Minutes less Downtime divided by Maximum Available Minutes in an Applicable Period for a given Microsoft Azure subscription. Uptime Percentage is represented by the following formula:

$$Monthly\ Uptime\ \% = \frac{(Maximum\ Available\ Minutes - Downtime)}{Maximum\ Available\ Minutes}\ x\ 100$$

# Azure Compute Services

**Service Credit**:

The following Service Levels and Service Credits are applicable to Customer's use of Virtual Machines deployed across two or more Availability Zones in the same region

| Uptime Percentage | Service Credit |
|---|---|
| < 99.9% | 10% |
| < 99% | 25% |
| < 95% | 100% |

# Azure VM SLA

**Uptime Calculation and Service Levels for Virtual Machines in an Availability Set or in the same Dedicated Host Group**

**Maximum Available Minutes**: The total accumulated minutes during an Applicable Period for all Internet facing Virtual Machines that have two or more instances deployed in the same Availability Set on in the same Dedicated Host Group. Maximum Available Minutes is measured from when at least two Virtual Machines in the same Availability Set, or same Dedicated Host Group, have both been started resultant from action initiated by you to the time you have initiated an action that would result in stopping or deleting the Virtual Machines.

**Downtime**: The total accumulated minutes that are part of Maximum Available Minutes that have no Virtual Machine Connectivity.

# Azure VM SLA

**Uptime Percentage**: for Virtual Machines is calculated as Maximum Available Minutes less Downtime divided by Maximum Available Minutes in an Applicable Period for a given Microsoft Azure subscription. Uptime Percentage is represented by the following formula:

$$Monthly\ Uptime\ \% = \frac{(Maximum\ Available\ Minutes - Downtime)}{Maximum\ Available\ Minutes}\ x\ 100$$

# Azure Service Level Agreements

Microsoft Azure offers Service Level Agreements (SLAs) for various Azure services to provide customers with a guarantee of service availability and reliability. These SLAs specify the level of uptime and performance that customers can expect from Azure services and offer compensation in the event of service downtime or unavailability beyond the defined thresholds. Here are some key Azure services with their corresponding SLAs:

1. **Azure Virtual Machines (VMs)**:
    - SLA: 99.95% monthly virtual machine uptime.
    - This SLA guarantees that virtual machines deployed in Azure will be available at least 99.95% of the time in a given month.
2. **Azure SQL Database**:
    - SLA: 99.99% availability for the premium tier and 99.95% for the basic and standard tiers.
    - Different service tiers have different availability guarantees.
3. **Azure Blob Storage**:
    - SLA: 99.9% availability for read-access geo-redundant storage (RA-GRS).
    - Azure Blob Storage offers redundancy options, and the SLA can vary depending on the redundancy type chosen

# Azure Service Level Agreements

4. **Azure App Service**:
    - SLA: 99.95% uptime for the App Service Environment.
    - App Service provides a platform for hosting web applications, mobile app backends, and RESTful APIs.
5. **Azure Functions**:
    - SLA: 99.95% uptime for the Azure Functions Premium plan.
    - The Azure Functions SLA guarantees high availability for serverless compute resources.
6. **Azure Kubernetes Service (AKS)**:
    - SLA: 99.95% uptime for the control plane.
    - The control plane is the management layer of AKS, ensuring the availability of the Kubernetes API server and other essential components.
7. **Azure Cosmos DB**:
    - SLA: Varies depending on the consistency level chosen, with the highest being 99.999% availability for the single-region write (eventual consistency) option.
    - Azure Cosmos DB provides a globally distributed, multi-model database service.

# Azure Service Level Agreements

8. **Azure Active Directory (Azure AD)**:
    - SLA: 99.9% availability for the Azure AD Basic and Premium service plans.
    - Azure AD is Microsoft's cloud-based identity and access management service.
9. **Azure Key Vault**:
    - SLA: 99.9% availability for the Azure Key Vault service.
    - Azure Key Vault is a secure secrets and keys management service.
10. **Azure Logic Apps**:
    - SLA: 99.9% availability for the Azure Logic Apps service.
    - Azure Logic Apps allows you to automate workflows and integrate various services and applications.

It's important to note that SLAs typically have certain conditions, exclusions, and limitations. Downtime caused by factors outside of Microsoft's control, such as customer misconfigurations or force majeure events, may not be covered by the SLA. Additionally, SLAs may provide service credits to customers if the guaranteed uptime is not met.

# Azure Service Lifecycle

Azure service lifecycles refer to the various stages that a Microsoft Azure service goes through from its initial development and introduction to its eventual retirement or replacement. Understanding the lifecycle of Azure services is important for Azure customers and administrators because it helps them plan for service adoption, updates, and eventual transitions to newer services. Here are the typical stages in the lifecycle of an Azure service:

1. **Development and Introduction**:
    - **Development Phase**: Microsoft Azure services are initially conceived, designed, and developed by Microsoft's engineering teams. During this phase, the service is created and undergoes extensive testing and quality assurance.
    - **Introduction**: Once development is complete, the service is introduced to the Azure platform and made available to customers. This marks the beginning of its public lifecycle.
2. **General Availability (GA)**:
    - **GA Phase**: This is the stage where the service is generally available to all Azure customers. It is considered mature and stable, and Microsoft provides support and SLAs for the service. Customers can start using it for production workloads.

# Azure Service Lifecycle

3. **Updates and Enhancements**:
    - **Active Development**: Azure services continue to receive updates, enhancements, and new features to meet evolving customer needs and to address security and performance issues. These updates may include bug fixes, performance improvements, and new functionality.
4. **Retirement and Deprecation**:
    - **Deprecation Notice**: Over time, Azure services may become outdated or redundant due to technology advancements or shifts in customer requirements. Microsoft typically provides advance notice (often several months to years) to customers about the deprecation of a service. During this period, customers are encouraged to plan for migration to alternative services.
    - **End of Life (EOL)**: After the deprecation period, the service is officially retired, and Microsoft may no longer provide support or updates for it. Customers are strongly advised to migrate their workloads to supported alternatives to avoid disruptions.

# Azure Service Lifecycle

**5. Migration and Transition**:
- **Migration Assistance**: Microsoft often provides tools, documentation, and guidance to help customers migrate from deprecated services to newer ones or to re-architect their applications.
- **Service Continuity**: Customers are responsible for ensuring the continuity of their services during migration. This may involve modifying configurations, updating code, and testing.

**6. Replacement and Successor Services**:
- In some cases, Microsoft may introduce new services that replace or offer similar functionality to deprecated services. Customers can consider adopting these successor services for their workloads.

**7. Archive and Historical Data**:
- Customers may need to plan for the archival and retention of historical data and resources associated with retired services, as access to these resources may no longer be available through the Azure portal.

It's crucial for Azure customers to stay informed about the lifecycle status of the services they rely on and to proactively plan for changes, especially when services are deprecated.

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# Azure Health Services

- **Azure Monitor**: Azure Monitor is a centralized monitoring service that provides a comprehensive solution for collecting, analyzing, and acting on telemetry data from Azure resources. It includes features such as metrics, logs, and alerts. Azure Monitor helps you understand the performance and health of your applications and infrastructure.
- **Azure Application Insights**: Azure Application Insights is a service that helps developers monitor and diagnose issues in web applications, including web services and APIs. It provides deep insights into application performance, user behavior, and error tracking.
- **Azure Security Center**: Azure Security Center is a unified security management system that helps you protect your Azure resources. It provides security recommendations, threat protection, and vulnerability assessments to help you strengthen your security posture.
- **Azure Service Health**: Azure Service Health is a service status and issue tracking service that provides real-time information about the health of Azure services in different regions. It helps you stay informed about any service disruptions or planned maintenance that might impact your resources

# Azure Health Services

- **Azure Advisor**: Azure Advisor is a personalized cloud consultant that helps you follow best practices to optimize your Azure resources. It offers recommendations for cost savings, performance improvements, and high availability.
- **Azure Network Watcher**: Azure Network Watcher is a network performance monitoring and diagnostic service that helps you monitor, diagnose, and gain insights into your Azure network resources. It includes tools for packet capture, flow logs, and connection troubleshooting.
- **Azure Application Gateway Analytics**: Azure Application Gateway provides detailed analytics and diagnostics for your web traffic. It helps you monitor traffic patterns, detect anomalies, and troubleshoot issues in your web applications.
- **Azure Diagnostics**: Azure Diagnostics allows you to collect diagnostic data from your Azure resources, such as virtual machines and web apps. You can route this data to various storage and analysis services, including Azure Monitor and Azure Storage.
- **Azure Log Analytics**: Azure Log Analytics is a service within Azure Monitor that allows you to collect, correlate, and analyze log and performance data from your applications and infrastructure. It supports custom queries and visualization of data for troubleshooting and insights.

# Azure Advisor

Azure Advisor covers various aspects of Azure services, including cost optimization, performance, security, and high availability. Here are some key features and functions of Azure Advisor:

1. **Recommendations**: Azure Advisor provides recommendations in several categories, including:

- **Cost**: Recommendations on how to reduce your Azure spending by identifying underutilized resources, rightsizing VMs, and optimizing reserved instances.
- **Performance**: Suggestions for improving the performance of your applications and resources by adjusting configurations or scaling resources.
- **Security**: Security-related recommendations to help you strengthen your Azure environment, such as enabling monitoring, configuring security features, and implementing identity and access management best practices.
- **High Availability**: Guidance on enhancing the availability of your applications and services by configuring redundancy and failover options.
- **Operational Excellence**: Recommendations for streamlining operations and improving the overall management of your Azure resources

# Azure Advisor

3. **Personalized Insights**: Azure Advisor tailors its recommendations to your specific Azure subscription and usage patterns. It takes into account the resources you have deployed and analyzes your historical usage to provide relevant advice.
4. **Integration with Azure Portal**: Azure Advisor is integrated into the Azure portal, making it easy to access and act on recommendations directly from the portal's interface.
5. **Advisor Score**: Azure Advisor provides an Advisor Score that helps you track your progress in implementing its recommendations. A higher Advisor Score indicates that you are following best practices and optimizing your Azure environment effectively.
6. **Actionable Advice**: Each recommendation includes detailed information on how to implement the suggested changes, helping you understand the potential impact and benefits of following the advice.

# Azure Advisor

7. **Recommendation History**: You can view your recommendation history to track changes over time and understand how your environment has evolved in response to Advisor's suggestions.
8. **Integration with Azure Policy**: You can use Azure Policy to enforce compliance with certain Advisor recommendations. For example, you can create policies that require specific configurations or security settings based on Advisor guidance.
9. **API Access**: Azure Advisor offers an API that allows you to programmatically access recommendation data and integrate it with your own tools and workflows.

Azure Advisor is a valuable tool for Azure customers, especially for organizations looking to optimize costs, enhance security, and improve the performance and reliability of their Azure resources

Thank You.