AZURE SQL

1)What Is Azure SQL?

Azure SQL defines Azure cloud-based managed, secure, and intelligent SQL Server database engine. We have the following Azure SQL solutions for SQL Server.

Azure SQL Database

Azure SQL Managed Instance (MI)

SQL Server on Azure VMs

2)What is Azure SQL Database?

Azure SQL Database is an intelligent, scalable, managed relational database service for SQL Server. It optimizes query performance, durability using AI-powered features. It supports serverless compute architecture along with hyper scale storage for automatically scaling resources on remand

3)What is the primary difference between Azure SQL Database and Azure SQL Managed Instance (MI)?

Azure SQL Managed Instance (MI) offers fully managed SQL instances as a service. It provides almost 100% SQL Server features and is suitable for most database migrations in the cloud. While Azure SQL Database is a database as a service and does not includes all SQL Server features such as SQL Server Agent, Database mail, PolyBase.

4)What is Azure SQL Database, and how does it differ from SQL Server on-premises?

Azure SQL Database is a cloud-based relational database service provided by Microsoft Azure. It is built on the SQL Server engine and offers a fully managed platform for hosting and managing databases in the Azure cloud. The main differences between Azure SQL Database and SQL Server on-premises are:

Azure SQL Database is a cloud-based service, while SQL Server on-premises is installed and managed locally within an organization's infrastructure.

Azure SQL Database provides scalability, high availability, automated backups, and other cloud-specific features, whereas SQL Server on-premises offers more control and customization options.

Azure SQL Database has a different pricing model based on performance tiers, while SQL Server on-premises typically requires upfront licensing costs.

5)How do you create an Azure SQL Database?

To create an Azure SQL Database, you can follow these steps:

Sign in to the Azure portal.

Click on "Create a resource" and search for "SQL Database."

Provide the necessary details, such as database name, server name, resource group, and select the appropriate pricing tier and configuration options.

Configure additional settings like collation, security, and connectivity.

Review the summary and click on "Create" to provision the database.

6)What are the different deployment options for Azure SQL Database?

Single Database: This option allows you to create individual databases with dedicated resources and control over their configuration settings.

Elastic Pool: An elastic pool allows you to manage and share resources (such as compute power and memory) across multiple databases. It enables better resource utilization and cost optimization.

7)How do you scale up and scale out an Azure SQL Database?

Scaling up an Azure SQL Database involves increasing its performance level by upgrading to a higher pricing tier with more resources. You can do this through the Azure portal, Azure PowerShell, or Azure CLI.

Scaling out an Azure SQL Database involves partitioning the data across multiple databases or adding read replicas to distribute the workload. This can be achieved using technologies such as Elastic Pools or database sharding.

8)How do you ensure high availability in Azure SQL Database?

Automatic backups: Azure SQL Database takes automated backups, allowing point-in-time restores within the retention period.

Automatic Patching: Microsoft handles the patching and maintenance of the underlying infrastructure, ensuring that the database remains up to date.

Active Geo-Replication: This feature enables asynchronous replication of the database to secondary regions for disaster recovery and read-only access.

Failover Groups: It allows automatic failover to a secondary region in case of a primary region outage.

Geo-Restore: Azure SQL Database enables restoring a database to a different Azure region in the event of a region-wide outage.

9)How do you monitor and optimize performance in Azure SQL Database

Azure Portal: Use the Azure portal's monitoring and performance insights to analyze database metrics, query performance, and resource utilization.

Dynamic Management Views (DMVs): DMVs provide valuable information about database health, query execution, and resource usage

Query Performance Insight: It offers query performance metrics and recommendations to optimize query execution.

Index optimization: Analyze and optimize database indexes to improve query performance.

Query tuning: Use execution plans, statistics, and query hints to optimize query performance.

Azure SQL Analytics: It provides advanced monitoring, troubleshooting, and diagnostics for Azure SQL Database.

10)How do you implement backups and disaster recovery for Azure SQL Database?

To implement backups and disaster recovery for Azure SQL Database, you can utilize the following approaches

Automated backups: Azure SQL Database automatically takes regular backups, including full backups, differential backups, and transaction log backups. The backups are stored in Azure Blob Storage, allowing point-in-time restore within the retention period.

Long-term retention backups: Azure SQL Database enables you to store backups for an extended period by configuring long-term retention policies.

Geo-Replication: Implement active geo-replication to replicate the database to secondary regions asynchronously. This provides a disaster recovery solution and allows failover in case of a primary region outage.

Failover Groups: Configure failover groups to automate the failover process in case of a disaster. It ensures continuity of operations by redirecting traffic to a secondary region.

Export/Import: Use the export feature to export a database to a BACPAC file and store it in Azure Blob Storage. You can later import the BACPAC file to restore the database.

11)How do you troubleshoot and resolve performance issues in Azure SQL Database?

Identify the problem: Analyze performance metrics, query execution plans, and resource utilization to identify the source of the performance issue.

Query tuning: Optimize poorly performing queries by reviewing the query execution plans, analyzing indexes, updating statistics, and rewriting the query if necessary.

Index optimization: Review and optimize database indexes to improve query performance.

Resource scaling: Consider scaling up or out the Azure SQL Database resources to handle increased workload demand.

Azure SQL Analytics: Leverage Azure SQL Analytics for advanced monitoring, troubleshooting, and diagnostics to identify and resolve performance issues.

Performance monitoring: Continuously monitor performance metrics and alerts to proactively detect and resolve performance bottlenecks.

12)How do you handle database schema changes in Azure SQL Database?

Use version control: Implement a version control system (such as Git) to track and manage database schema changes.

Database deployment tools: Utilize tools like SQL Server Data Tools (SSDT) or Azure DevOps to automate the deployment of schema changes and maintain consistency across environments.

Change management process: Establish a well-defined change management process that includes code reviews, testing in a non-production environment, and proper approvals before deploying schema changes to production.

Rollback strategy: Have a rollback strategy in place to revert schema changes if issues arise during deployment.

Continuous integration and continuous deployment (CI/CD)

13)What are the main benefits of using Azure SQL?

Interviewers ask this question to evaluate your knowledge of Azure SQL and how it can help solve business problems. Your answer provides insight into your technical skills and the value you can bring to an organisation. How you respond also highlights your ability to discuss technical concepts and the benefits of using a specific technology, which is valuable in an IT role. When answering, describe some of the main features and why they are important.

Example: There are many great benefits to using Azure SQL. First, Azure SQL offers a wide range of security features, such as encryption, to help protect sensitive data. Second, you can easily scale up or down depending on your storage needs and change them as needed. Third, it is a cost-effective solution for storing and processing data. Azure offers a flexible pricing model, which means you only pay for what you use. It is also incredibly easy to use.

14)What are some common challenges you have faced while working with Azure SQL and how did you overcome them?

Interviewers ask this question to assess your experience and problem-solving skills. They want to know what challenges you have faced while working with Azure SQL and how you identified and resolved them. Your answer demonstrates your technical ability to troubleshoot and your creativity in finding real-world solutions, so make sure you outline the challenge and your solution in your response.

Example: One of the main challenges I have faced with Azure SQL is slow query performance. I overcame this by using performance-tuning techniques, such as indexing, query optimisation and database design optimisation. As the database grows, it can also become challenging to scale it to meet the application's demands. I have used sharding and partitioning to overcome this issue.

15) Can you describe Azure SQL and its main components?

Interviewers ask this question to assess your understanding of Azure SQL and its various components. Your answer allows them to assess whether you can articulate its features and capabilities in a way that is easy to understand. Provide a concise overview of Azure by explaining what it is, highlighting its key features and describing its main components. Include some examples of how an organisation can use its features.

Example: Azure SQL is a cloud-based relational database service that is fully managed, freeing up time for customers to focus on other important tasks. Its key features include scalability, availability, security, cost-effectiveness and ease of management. Its three main components are the Azure SQL Database, Azure SQL Managed Instance and Azure Synapse Analytics, which all offer different services and use cases. Organisations use Azure SQL to store data from a web application, Azure Functions to process that data in real-time and Azure Stream Analytics to analyse the processed data for insights.

16) How would you ensure the security of sensitive data stored in Azure SQL?

Interviewers want to determine your understanding of data security and how you implement best practices for securing data in the cloud. Your answer shows them you are aware of the security risks associated with storing sensitive data and that you have a plan for mitigating those risks. Explain the importance of securing sensitive data, and then outline Azure SQL's security features and your experience with data encryption and other security measures.

Example: Ensuring the security of sensitive data in Azure SQL is important, and I take data security very seriously. I would first use Azure SQL's built-in encryption, firewall rules and authentication methods to secure data. I would also implement best practices such as strong passwords, multi-factor authentication and access controls to limit access to sensitive information. My approach is to continuously evaluate and improve my processes, stay updated with the latest security threats and trends and make sure every employee understands the importance of data security.

17)Can you share some best practices for optimising an Azure SQL database?

This question helps interviewers assess your understanding of Azure SQL and your ability to improve database performance. Your response allows them to determine how you make informed decisions about database design, configuration and administration. Discuss specific techniques regarding database performance, such as index design, database partitioning, query optimisation and resource management.

Example: Several effective best practices can help optimise an Azure SQL database. You can design an efficient database structure to minimise redundancy and improve query performance. Monitoring performance using tools such as SQL Server Management Studio, Dynamic Management Views (DMVs) and Azure SQL database performance insights is also critical. These tools help you identify and resolve bottlenecks and improve settings for optimal performance. You can also implement database partitioning, which helps distribute load and improve scalability. I would also use Azure SQL's elastic database pools so that databases can share a pool of resources, reducing cost and resources.

18)What will happen when SQL Azure database will reach the max size?

Answer: If the SQL Azure database will reach the max size, data read or fetch operations will still work on it but create, insert or update operations will stop with it. You can choose to drop, delete or truncate the data in this condition.

19)How many servers can you create in the single subscription?

Answer: In the single subscription, it is possible to create six servers while using SQL Azure.

20)What will be the differences between business edition and web edition?

Answer: The max size of the SQL Azure web edition will be 5 GB and the size of the business edition will be up to 50 GB. It is possible to increase or decrease web edition database size of 1GB and you will be able to increase or decrease the size of the business edition up to 10 GB.

21)What will be the process to migrate to SQL Azure from SQL server?

Answer: If you are going to face an interview for SQL Azure job, you may find it as one of the best SQL Azure interview questions. If you want to migrate from SQL server to SQL Azure, you can use SSIS or BCP. For the schema migration, generate script wizard will be used and you can also use the tool named as SQL Azure Migration Wizard for it.

22)How will you back up the SQL Azure data?

Answer: Backup is important to handle the issues of hardware and 3 database replicas are used in SQL Azure for backup. For the errors based on user level, the COPY command is used for the creation of SQL Azure database replica. It is also possible to back up the data of SQL Azure to any local SQL server with the use of SSIS, BCP etc.

23)What are the benefits of a Sharded Database?

Answer: Followings are some of the benefits of the sharded database –

Allows users to take benefit of maximum resources within the cloud

Reduces the chances of a single point of failure

Reduces SQL Azure throttling and I/O bottlenecks

Enables users to have their own database, to access other databases, and to share database

Benefits users by offering low-cost cloud resources on-demand basis and releasing when done

24)What is accelerated database recovery for Azure SQL Database?

The Accelerated Database Recovery (ADR) feature redesigns the SQL Server database engine recovery process for improving database availability, especially for long-running transactions. It provides Instantaneous transaction rollback, Fast and consistent database recovery. By default, it is enabled for the Azure database, and users cannot disable it.

25)Can we have point-in-time recovery (PITR) for Azure database backups?

Yes, by default, it supports up to 7 days of PITR recovery.

26)What will happen if the database space used reaches the maximum data size limit?

Select, delete, drop, and truncate statements work fine if the database space reaches the maximum limit. The client receives an error message for the insert or update statements.

27)Explain different connection policies for Azure SQL Database?

Azure supports the following server’s connection policy setting:

Redirect: The client establishes a connection directly to the node hosting the database in the redirect policy. It reduces latency and improves throughput.

Proxy: The proxy connection policy redirects connect through the Azure SQL Database gateways. Therefore, it increases the latency and reduces throughput.

Default: The default policy uses Redirect for all client connections originating inside the Azure network and Proxy for all internet or outside Azure network traffic