6 Critical Considerations for Optimizing Cloud Database Performance

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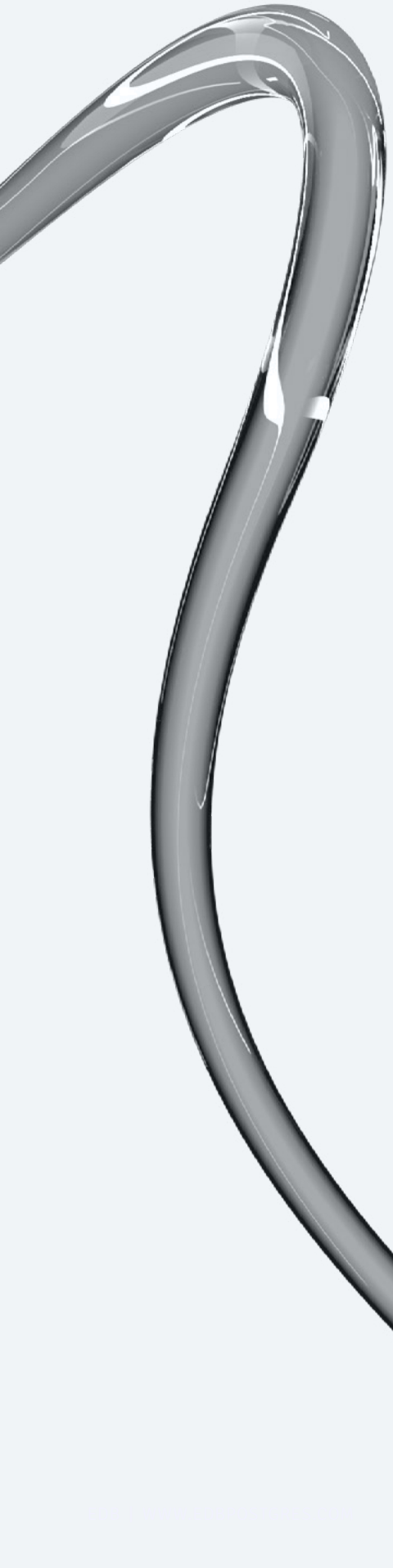

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Introduction

The wikipedia definition of a cloud database is a database that can run on the cloud computing platform and be accessed as a service. There are two options available to users for running their databases in the cloud.

- Using virtual machines
- Purchasing a database-as-a-service (DBaaS) option from the cloud provider

The virtual machine (VM) option allows users to create VMs in the cloud on the cloud provider's infrastructure, installing the database software on the VM, and optimizing it for the best performance. The DBaaS option is a fully managed service from the cloud provider to use the database software installed, maintained, and managed on the cloud provider's servers. The user pays the price for the service based on the usage and the cloud provider is responsible for maintaining and managing the database and infrastructure.

In this eBook, we'll discuss the DBaaS option of running databases in the cloud, highlighting six critical questions to ask to avoid downtime and maintain database performance in the cloud.

1 What are the SLAs guaranteed by the cloud provider and do they meet my SLAs?

All cloud vendors publish their Cloud Service Level Agreements (SLAs), and it's important to understand what that means in terms of uptime and downtime (for maintenance activities) per month. For example, 99.95% uptime means ~22 minutes of downtime per month. Is this acceptable to your users? Does this SLA meet the guarantees you have provided to your customers? One can achieve higher uptime, such as 99.99%, but that might require setting up replication to multiple availability zones and paying for additional replicas.

2 What are the options provided by the cloud vendor to maintain high availability of databases in the cloud?

Most cloud vendors provide options to create database replication in different availability zones. This helps maintain the database availability by failing over to one of the replications, in case the primary database goes down. Availability zones are distinct data centers in a region with their own network, power, and server infrastructure. These options come with costs associated with data transfer and setting up additional replications. Most cloud vendors charge for additional data replication across regions, while data replication within the same region is free.

Be sure to consider Recovery Time Objectives (RTO) and Recovery Point Objectives (RPO), to determine the type of replication and number of replicas needed to achieve your objectives. There are also limitations on how many replications you can create for your databases, so it is important to understand these limitations while choosing a DBaaS solution.

3 What scalability and performance guarantees does the cloud vendor provide for the databases in the cloud?

It is important to fine tune your databases in the cloud, as poorly performing databases will consume more resources as your workload grows, which in turn will result in increasing costs.

Most DBaaS vendors do not expose all database configuration parameters for performance tuning, so you should look at all the limitations that they will have while fine tuning their databases in the cloud. If you don't have access to all of the configuration parameters that you can tune, you will end up spending more money on resources such as CPU and memory to run your workload.

It is also a good idea to look at the features of the cloud to quickly scale out your database. This adds more read replicas to handle workload when the demand goes up and scale down by shutting down the replicas, saving cost as demand goes down. This feature is also known as scalability of the cloud, which can increase your resources when demand for workload goes up and decrease it when demand goes down. This leads to overall savings, as you are not wasting resources when you do not need them.

4 What security options does the cloud vendor provide to secure my data in the cloud?

Most cloud providers clearly mention in their SLAs the roles and responsibilities of each party in maintaining the SLA, providing security, and avoiding data breaches to avoid downtime. In a fully managed environment, the cloud vendor is mostly responsible for physical security of the data center, network security, and securing their servers. However, users are responsible for securing their database by limiting user access, encrypting the data, and preventing direct access to the database from the internet.

These roles and responsibilities should be clearly understood and proper measures must be taken to secure the cloud databases to avoid any downtime due to security breaches. It is helpful to read about the shared responsibility model published by each cloud provider to understand your responsibility as the customer, depending on the services you use.

5 What technical expertise does the cloud vendor have to manage and maintain the performance of my databases in the cloud?

Before considering any DBaaS service, you should also read the shared responsibility model of the cloud provider and know who does what. In most cases, a cloud provider is only responsible for patching, upgrades, and maintenance of the database software. All other DBA level responsibilities, such as schema design, database tuning/query tuning, and managing security fall under the user's area of responsibility.

If you do not have in-house expertise to perform these responsibilities, then you should consider vendors such as remote DBA service, 24x7 support for database technical issues, and professional services to help with migrations and other projects. Service relieves your team from day-to-day database management, freeing up time for more strategic tasks, such as modernizing applications and learning new technologies.

6 What types of support does the DBaaS provider have for maintaining the database software?

It is also important to know if the DBaaS provider has a back-to-back software support and maintenance agreement for commercial databases in order to address bugs, patches, and security issues in a timely manner. Ongoing support is important because otherwise you would need to pay the database vendor for a subscription to troubleshoot issues and resolve cases. For open source database support, find out if the DBaaS vendor is actively involved in the open source project, which can help with timely resolution of bugs and security issues.

Conclusion

Cloud databases and database-as-a-service (DBaaS) solutions offer significant advantages over the on-premise databases in terms of agility with which databases can be provisioned in the cloud, savings in terms of capital expenditures, and reduction in IT staff to manage the infrastructure and databases. However, there are new challenges that you must be aware of and ask the right questions before considering the cloud database. A cloud provider might be good at providing infrastructure services, but they might not provide all the services to support databases in the cloud or provide 24x7 support for any database issue.

Be sure to consider other options to get that level of support for your mission-critical databases running in the cloud. The cloud vendor might be good at guaranteeing the infrastructure SLAs, but that does not guarantee the required uptime for databases running in the cloud. Carefully designing high availability for databases is key. Finally, take into account the roles and responsibilities of cloud providers as well as hire and train staff to manage databases in the cloud effectively. This will help avoid downtime due to lack of monitoring of databases in the cloud.

To explore further, check out BigAnimal.

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