UNIT-V
CLOUD DATABASE

What is cloud Database?

Cloud database is a database that runs on a cloud computing platforms example like Amazon EC2 , Rackspace and GoGrid.

There are two ways to deploy a database.

1. Users can either run the database inside a secured virtual machine(VM)
2. Or either they can subscribe for particular database service managed by a cloud service provider.

OPERATION MODEL FOR CLOUD DATABASE

There are two primary methods of running a database on the cloud.

1. VM Image :- Cloud platforms allow users to purchase VM instances for a limited time. A cloud provider facilities more security for running database inside a VM.

If a users have their own VM image, then they upload it and run the database inside that or do so through preinstalled database Oracle.

2. Database as a Service:- Some cloud platforms and infrastructure service providers offer database services just as other services offerings. In which case we do not need to launch any instance or individual VM for database installation.

i. All the database licensing, updating and configuration are managed by the cloud providers.

ii. Applications owners have to, pay each month, pay-per-use of database services (RDS) and NoSQL services such as Amazon RDS, Amazon DynamoDB, Amazon SimpleDB, etc

Some of the Characteristics :-

1. Database services provide easy-access Web interface for end-users.
2. Database configuration is done by a Web console interface, But some cloud providers offer command line interface for managing database operations.
3. Database services providers offer more flexibility and transparency to users.
4. The service provider is entirely responsible for database installation, patch update and regular maintenances of the respective database.
5. Database services automatically handle high availability and scalability issues.

TYPES OF CLOUD DATABASE

Now a days cloud providers offer RDS (Cloud Relation Databases) now a days. Some of the popular and most adopted RDS across the globe are as follows.

1. Amazon relational database service:- Amazon RDS is very popular and widely adopted Web service. It looks like others AWS services and providers easy management consoles for operating RDS on cloud.

i. Amazon RDS is a highly cost-efficient and secured service.
ii. Currently it supports Oracle, SQL server, MySQL and PostgreSQL database.
iii. Amazon RDS specifically offers two types of RDS instances.

a. On-demand instances :- An on-demand instance offering is a pay-per-use instance with no long –term commitment.
b. Reserved DB instances:- Reserved DB instances give the flexibility of one-time payment for the DB instance if the database usage is predictable. There is also an offer of 30%-50% price cut over the on-demand price.

2. Google Cloud SQL:- Google cloud SQL is a MySQL database service that is managed by google and the entire management, data replication, encrpytion, security and backups are handled by google's cloud infrastructure.

i. Google claims maximum availability of its data because its data centers are located across every region of the world.
ii. Google cloud SQL is a very flexible, easy-to-use service.
iii. Which enables connecting and managing cloud SQL with an existing application, just as in done with MySQL.

3. Heroku Postgres:- Heroku Postgres is a relationship SQL database offered by Heroku. It is accessible through all programming lanaguages supported by Heroku.

i. Heroku postgres offers fully reliability of services, which means around 99.99% uptime and 99.99% durability of data.
ii. One of the advance features of Heroku Postgres is Dataclips, which enables users to send the results of the SQL query via the URL.

4. HP cloud relational database for MySQL:- HP cloud RDS automate application deployment, configuration management and patch-up task database.

i. It currently supports command line interface (CLI).
ii. But an easy-to-use Web-based console interface through API is excepted soon.
iii. It also provides database snapshot facility in multiple availability zones for providing more reliability.

5. Microsoft Azure SQL database:- Earlier it was known as SQL Azure. It is the most important component of the Microsoft Azure cloud service.

i. It can be operated as a standalone cloud database also.
ii. The database can be synched easily with other SQL server databases within the cloud infrastructure of the company or organization.
iii. The performance of database can be predicted irrespective of whether the service chosen is basic, standard or premium.

6. Oracle database cloud service:- Oracle database cloud offers two options for users:

i. One is a single schema-based service and
ii. Another is fully configured Oracle database installed virtual machine
iii. It also provides flexibility in the management option: self-managed service or fully managed by Oracle.

7. Rackspace cloud database:- Rackspace cloud databases are based on open standards. These currently support MySQL, Percona and MariaDB databases.

i. Rackspace cloud provides high database performance using container-based virtualization.
ii. It provides automated configuration which reduces operational costs and team effort.
iii. Rackspace cloud is also connected to SAN storage, which built-in data replication for high data replication.

Cloud NoSQL Databases

NoSQL database is “not only SQL” database. The evolution of NoSQL database started in early 2009 and has been growing rapidly since because of some limitations

A. Limitation with Existing Database

There are certain limitations with our traditional database system and they cannot fit into the current scenario of big-data related application because data is growing exponentially in every industry.

1. Store data in TB/PB; even a good processor cannot process millions of rows.
2. Process TB of data on a single machine
3. Be scalable after a certain limit.
4. Provide fault tolerance capability because they have a single point of failure.

B. Types of NoSQL Database

There are basically four types of NoSQL databse

1. Key-value store: Based on table keys and values (e,g AWS DynamoDB)
2. Document-based store: Document based datbase stores records that are made of tagged elements (e,g MongoDB, CouchDB)
3. Column-based store: Data divided into multiple columns and every storage block contains data of each column
4. Graph-based store: A network graph storage that uses edges and nodes for storing data