Week3

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Day 1

AWS – Amazon Web Services

Web Service – Service offered through / via Web using http (hypertext transfer protocol)

Web Service – Communication between electronic devices using web (http)

Amazon is the pioneer in providing Cloud service in the Name of AWS

Amazon – AWS

MicroSoft – Azure

Google – GCP (Google Cloud Platform)

Redhat – OCP (Openshift Containerization Platform)

AWS – Free Tier Account is compulsory.

Availability Zones (AZ) & Regions

Data Centre (DC)

Different Services Provided by AWS

1. Compute Service (EC2 – Elastic Cloud Compute, ECS – Elastic Containerization Service, EKS – Elastic Kubernetes Service, EBS – Elastic Bean Stalk)
2. Storage Service – (S3 – Simple Storage Service (Buckets), )
3. Database Service – (RDS – Relational Database Service)
4. IoT, ML, AI, AR&VR, Satellite, Robotics, Security, IAM – (ID & Access Management), Business Applications Services

Types of Cloud – based on the Storage Security Level & Accessibility

1. Private Cloud (Highly secured – private access --- Dedicated / Spot instance)
2. Public Cloud ( Moderately Secured, low price, shared resources )
3. Hybrid Cloud (Combination of both private & public )

Type of Cloud Service – based on service Type

1. IaaS – Infrastructure as a Service (Only Hardware)
2. PaaS – Platform as a Service (Hardware + Software + Tools) [Virtual Machines ]
3. SaaS – Software as a Service (Hardware +Software + Tools + Application Software – GMAIL, Facebook, Office 365, Adobe Cloud)

Database – Organised way of storing the data. Helpful to read, filter, sort, retrieve the data quickly and easily.

To do all these operations, we use a Language called SQL (Structured Query Language)

DBMS – Application Software used to handle databases.

Schema / Database – Is a Container (Similar to a folder)

DBMS – Data Base Management System – A software used to manage the Data.

RDBMS – Relational Data Base Management System – A software used to manage the Data along with relationships.

Database Relationships

1. One to One [ One person One SSN (Social Security Number), One Name, One Head, One Nose, One Body] – No duplicates, Uniqueness (1..1)
2. One to Many [ One Class can have multiple Associates, One company can have multiple departments, One Shop can sell multiple products, One customer can have many accounts in bank ] (1..N)
3. Many to Many [ One Batch can have multiple QC, One QC will handle Multiple batches] (M..N)

Database

1. Primary Entity in DB is Table (This is the place where we store the data actually)
2. The data is organized in the form of Rows & Columns
3. Table is also called as Tuple
4. Row is also called record
5. Intersection of a ROW & Column is a cell.
6. Each row will have different details of a person/object
7. Each column will have same detail about different people/object
8. Everything in database is entity
9. To represent relationship between two tables we use ER diagram [Entity – Relationship Diagram]
10. Each table needs to have one column as a primary Key. {By default the PK is unique and not null)
11. Unique means no duplicate values, not null means no empty or null value
12. Creating primary key using two or more columns is called composite primary key.
13. Primary key is also called as key or unique key
14. A table can have one or more foreign keys.
15. Foreign keys enforces referential integrity. Which checks for the data present in the parent table.
16. To create a foreign key, always use the primary key column data type from the base/parent table.
17. Constraints – Unique (UQ), Not Null (NN), AI (Auto-Increment – Creating a Sequence along with the Trigger) Mainly used for inserting data for numerical primary key ), Zero Fill (ZF), UnSigned (UN), Primary Key (PK), Foreign Key (FK), Check , Default

SQL – Structured Query Lang

DDL – Data Definition Lang (Create/ Alter/Truncate/Drop)

DML – Data Manipulation Lang ( Update/ Delete/ Insert)

DQL – Data Query Lang (Select)

DCL – Data Control Lang (Grant & Revoke) Access related control [Who can access & How can access]

TCL – Transaction Control Lang (Commit, Rollback, SavePoint)

Truncate VS Drop [Truncate will leave the table structure as it is, where as drop deletes everything]

Truncate is equivalent to full delete. [Deleting all rows from a table]

ACID – Atomicity (Granular) , Consistency , Isolation , Durability

Normalization – It’s process to avoid redundancy (Duplicates)

1) First Normal Form (1NF) – No repeating groups, atomic column (If you have a primary key)

2) Second Normal Form (2NF) – should be in 1NF & No partial dependencies on pkey

3) Third Normal Form (3NF) – No transitive dependencies (A depend on B & B depend on C === A depends on C -- This is called transitive dependency)

4) Boyce-Cott Normal Form (3.5 NF)

Index – Creating a column to sort and retrieve it quickly. (Clustered – Non-clustered)

Index will be sorted automatically. And used to retrieve data quickly

Types of Index – primary, secondary, reverse, parse, dense, bitmap.

Views – Virtual Table

Materialized View – Introduced by oracle, which give static snapshots of data at a given point in time.

Joins – Used to combine data from two or more table.

Types of joins

1. Self Join
2. Inner Join
3. Outer Join
4. Left Join
5. Right Join

Maven – Project Management Tool for JAVA Applications

Build, Test, Package, Deploy and manage dependency of the application.

Back bone of Maven is POM.xml file

POM – Project Object Model

Each maven project will have unique groupid, artifactid & version number.

Maven will have local repository in the name of .m2 (folder) and remote repository (cloud repository) to manage all the project dependencies.

Some important Maven commands

Mvn clean

Mvn clean install

Mvn build

Mvn package

Mvn test

Echo %M2\_HOME%

path = %path%;%M2\_HOME%

JDBC – Java Data Base Connectivity

1. Driver
2. Connection
3. Statement
4. PreparedStatement
5. CallableStatement
6. ResultSet
7. DatabaseMetaData
8. ResultSetMetaData

Classes

1. Date
2. Time
3. DriverManager

JDBC is abstraction {Only specification Is provided not implementation}

That’s the reason database driver is needed to interact with the RDBMS. Each Database will have a different database driver (provided by the database Manufactures)

Steps to Connect with the Database

1. Load & Register the Data [Add the Driver Jar to Build path of the application]
2. Establish the connection between java & DB
3. Create & Execute the Query using Statement/PreparedStatement/CallableStatement
4. Store & Process the ResultSet
5. Close all the Resources