Ex No: 3 Date:10-9-25	**ETL Pipeline Implementation: Exporting Data from SQL Server to PostgreSQL**

Objective:

To design and implement an **ETL (Extract, Transform, Load) pipeline** that exports data from **Microsoft SQL Server** to **PostgreSQL**, ensuring secure connection, data transfer, and integrity between the two databases.

Outcomes:
1. Successfully connected SQL Server and PostgreSQL environments.
2. Extracted data from **SQL Server (AdventureWorks)** database.
3. Transferred and loaded data into **PostgreSQL AdventureWorks** database.
4. Established ETL role with appropriate privileges for smooth data migration and future integration.

Materials:

- etl.py

Lab Procedure:

Stage 1: Environment Setup
1. Install **SQL Server Express** and **SQL Server Management Studio (SSMS)**.
2. Install **PostgreSQL** and **pgAdmin** on Windows.
3. Download and configure the **AdventureWorks** sample database in SQL Server.
4. Verify both databases are running properly.

Stage 2: Create Database and Role in PostgreSQL

Create a new PostgreSQL database named `adventureworks`:

```
CREATE DATABASE adventureworks
WITH OWNER = postgres
ENCODING = 'UTF8'
LC_COLLATE = 'English_India.1252'
LC_CTYPE = 'English_India.1252'
LOCALE_PROVIDER = 'libc'
TABLESPACE = pg_default
```

```
CONNECTION LIMIT = -1
IS_TEMPLATE = False;
```

Create a role for ETL operations:

```
CREATE ROLE etl WITH LOGIN PASSWORD 'demopass';
GRANT ALL PRIVILEGES ON DATABASE adventureworks TO etl;
```

Grant necessary privileges:

```
GRANT USAGE, CREATE ON SCHEMA public TO etl;
GRANT ALL PRIVILEGES ON ALL TABLES IN SCHEMA public TO
etl;
GRANT ALL PRIVILEGES ON ALL SEQUENCES IN SCHEMA public TO
etl;
ALTER DEFAULT PRIVILEGES IN SCHEMA public GRANT ALL
PRIVILEGES ON TABLES TO etl;
ALTER DEFAULT PRIVILEGES IN SCHEMA public GRANT ALL
PRIVILEGES ON SEQUENCES TO etl;
```

Stage 3: Configure SQL Server for ETL Access

Create a login for ETL in SQL Server:
```
USE master;
```
```
GO
```
```
CREATE LOGIN etl WITH PASSWORD = 'demopass', DEFAULT_DATABASE =
AdventureWorksDW2022;
```
```
GO
```
Create a user in AdventureWorks database:
```
USE AdventureWorksDW2022;
```
```
GO
```
```
CREATE USER etl FOR LOGIN etl;
```
```
GRANT CONNECT TO etl;
```
```
GO
```

Install the **ODBC Driver for SQL Server** for connection compatibility.

USN NUMBER: 1RVU23CSE542
NAME:Vishruth D

Stage 4: Implement ETL Pipeline

1. **Extract:** Connect to SQL Server using ETL credentials and extract data from desired tables (e.g., `Sales`, `Customer`, etc.).
2. **Transform:** Clean or format data as needed (e.g., handle nulls, data type conversions).
3. **Load:** Connect to PostgreSQL using the `etl` role and insert data into the `adventureworks` tables.
4. Verify data consistency between SQL Server and PostgreSQL using simple queries.

GitHub Link:

https://github.com/VISHRUTH-DBS/FDE_Lab3