# **Difference Between JPA, Hibernate, and Spring Data JPA**

**1. Java Persistence API (JPA)**

* **Definition**: JPA is a **Java specification** (JSR 338) that provides a standard for ORM (Object Relational Mapping) in Java.
* **Role**: Acts as an **interface or contract** for persisting Java objects to a relational database.
* **Key Point**: JPA **does not provide an implementation**—it just defines **how** ORM should work.
* **Common Implementations**: Hibernate, EclipseLink, OpenJPA, etc.

**2. Hibernate**

* **Definition**: Hibernate is a **popular ORM framework** that provides a **concrete implementation of JPA**.
* **Role**: Maps Java classes to database tables, handles CRUD, caching, lazy loading, etc.
* **Key Point**: Hibernate can work **with or without JPA**, but is often used as the **JPA provider**.

**3. Spring Data JPA**

* **Definition**: Spring Data JPA is a **Spring framework module** that provides a **higher-level abstraction** over JPA.
* **Role**: It **eliminates boilerplate code** by auto-generating repository methods like save(), findById(), delete(), etc.
* **Key Point**: Spring Data JPA does **not implement JPA** itself; it works **on top of JPA providers** like Hibernate.

Code Comparison🡪

**🔸 Hibernate Example:**

public Integer addEmployee(Employee employee){

Session session = factory.openSession();

Transaction tx = null;

Integer employeeID = null;

try {

tx = session.beginTransaction();

employeeID = (Integer) session.save(employee);

tx.commit();

} catch (HibernateException e) {

if (tx != null) tx.rollback();

e.printStackTrace();

} finally {

session.close();

}

return employeeID;

}

**🔹 Spring Data JPA Example:**

**Repository Interface:**

public interface EmployeeRepository extends JpaRepository<Employee, Integer> {

}

**Service Class:**

@Autowired

private EmployeeRepository employeeRepository

@Transactional

public void addEmployee(Employee employee) {

employeeRepository.save(employee);}

🡺 We don't write transaction or save logic yourself.

🡺 JpaRepository provides built-in methods.

🡺 Spring handles dependency injection, transactions, and data persistence automatically.