iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** VI **Month of publication:** June 2019

DOI: http://doi.org/10.22214/ijraset.2019.6333

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 7 Issue VI, June 2019- Available at www.ijraset.com

Comparison between Different ORM Tools

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***Abstract:** In today's world it is basic need of every application to store, retrieve and manipulate data in a persistence way. The traditional JDBC approach which was previously used to store and retrieve data from the database had some major drawbacks. With changing trends in the field of technology the IT industry demanded a more efficient way to store and retrieve data. In order to meet this demand ORM Tool was developed. I have worked on analyzing the different ORM Tools and provide a comparison between them. It will help an individual to understand the features of different ORM Tools.*

Problem Statement

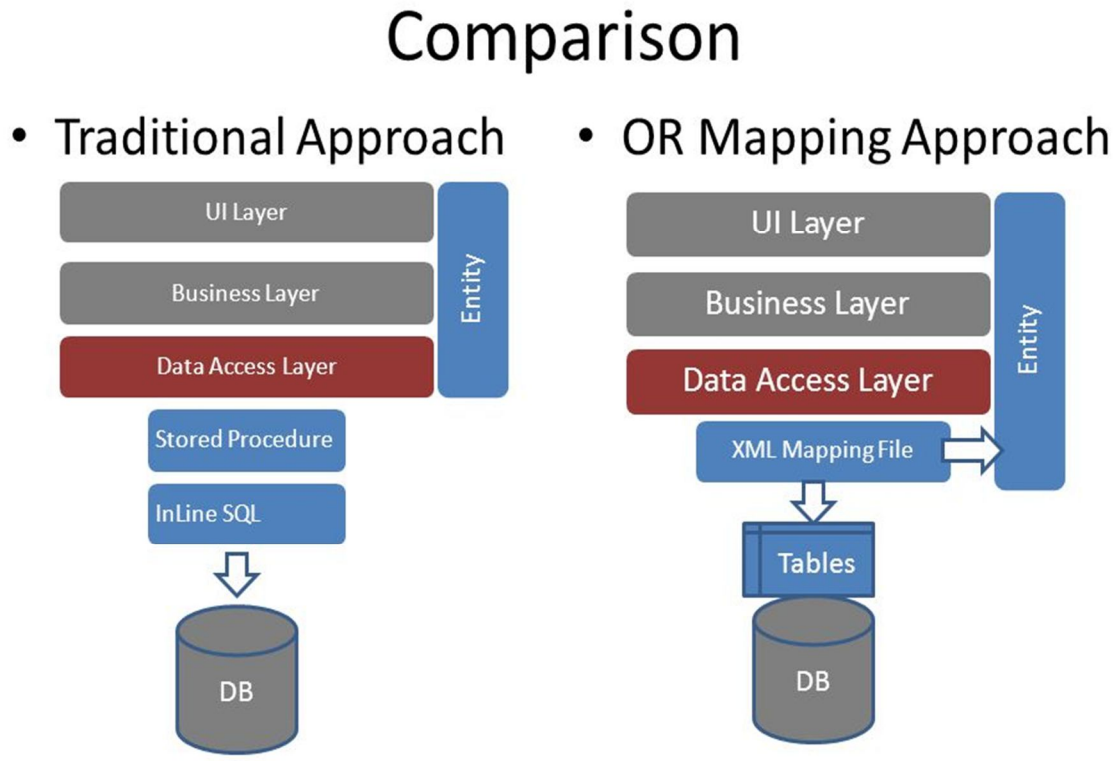
Analyzing different ORM Tools and providing a comparison between them.

I. INTRODUCTION

In today's world many applications require to store, retrieve and manipulate data from the database in an effective way. Application based on Object Oriented Environment generally uses objects to represent data. In such environment the process of representing data from database in form of objects was done using traditional JDBC approach. But programmers find this traditional approach very tedious and complex. This complexity can be reduced by providing a proper mapping by using different ORM Tools. ORM Tools helps a developer to focus more on writing business logic. Developers need not worry about writing queries and how connection is maintained with the database. Different ORM Tools have been analyzed in this report and a comparison between them has been specified.

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ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
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II. LITERATURE SURVEY

Object-relational mapping(ORM) plays an important role in field of Computer Programming. The main functionality ORM is to provide mapping between entities in the database to entities in your object. It is very easy to implement. It is a technique developed to enhance the efficiency of Object Oriented Programming(OOP). ORM Tools are required to initiate this mapping. Various ORM Tools are available in the market to make sure the mapping is done in an efficient way. The different ORM Tools available are in the market namely Hibernate, IBATIS, JPA etc.

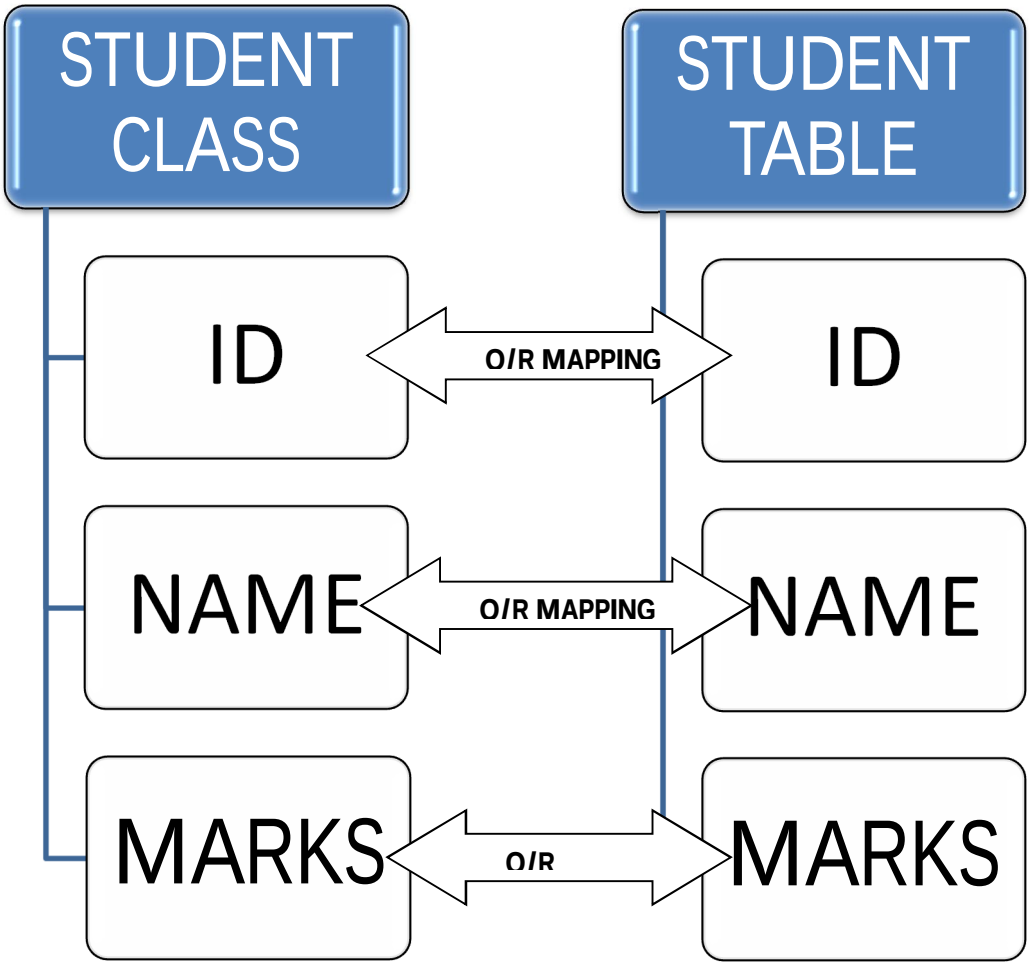
1) *Hibernate:* Hibernate ORM is an object-relational mapping tool for the Java programming language. It provides a framework for mapping an object-oriented domain model to a relational database. Hibernate handles object-relational impedance mismatch problems by replacing direct, persistent database accesses with high-level object handling functions. Hibernate is free software that is distributed under the GNU Lesser General Public License 2.1.
2) *IBATIS:* IBATIS is a persistence framework which automates the mapping between SQL databases and objects in Java, .NET, and Ruby on Rails. In Java, the objects are POJOs. The mappings are decoupled from the application logic by packaging the SQL statements in XML configuration files. The result is a significant reduction in the amount of code that a developer needs to access a relational database using lower level APIs like JDBC and ODBC.
3) *JPA:* JPA stands for Java Persistence API. JPA is a persistence framework that automates the mapping among SQL databases and objects in Java. JPA makes it easier to build better database oriented-applications more quickly and with less code.

a) *Example*

Following shows an Object Relational Mapping between Student class and Student Table

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III. HIBERNATE

A. *Introduction*

Hibernate is an open source, light-weight ORM tool which provides mapping between Java classes and Database tables and also from Java data types to SQL data types .
Using Hibernate you can directly store your java objects in database.
This is done with help of save() method.

B. *Features of Hibernate*

1) Mapping in Hibernate is done using a special Xml file called as Hibernate Mapping file also called as hbm file.
2) Hibernate provides Object/Relational mappings.
3) High object oriented concept of criteria.
4) It provides transparent persistence without byte code processing.
5) It introduces automatic Dirty Checking concept.
6) It supports tough concept of composite keys.
7) Automatic generation of primary key.
8) It supports JMX and JCA.
9) Provides its own query language knows as HQL.
10) Very simple to use.

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IV. IBATIS

A. *Introduction*

IBATIS is a persistence framework which automates the mapping between SQL databases and objects in Java, .NET, Ruby on Rails.

B. *Features of IBATIS*

1) Supports Stored Procedures
2) Supports inline SQL
3) Supports dynamic SQL
4) Integration is possible.
5) Efficient

V. JPA

A. *Introduction*

JPA is Java Persistence API. It is a specification which was defined as a part of EJB 3.0. It is collection of classes and methods to persistently store the data in database. It is basically a specification that allows you to do ORM. JPA makes it easier to build better database oriented-applications more quickly and with less code.

B. *Features of JPA*

1) Reduces the burden of interacting with database.
2) Highly Efficient
3) Supports use of Stored Procedure
4) Forms a bridge between object and relational model
5) JPA lets you map your entity classes into SQL tables
6) It handles conversion from SQL read queries to object instances.
7) Provides API for managing relational data in Java Based Application.
8) Mapping is done using Java annotations and Xml files.
9) Easy to use.

Comparison Table

POINTS	HIBERNATE	IBATIS	JPA
1. Simplicity	Best	Good	Good
2. Complete ORM Solution	Average	Good	Good
3. Adaptability to data models	Good	Average	Average
4. Complexity	Best	Good	Good
5. Dependence on SQL	Good	Average	Average
6. Support for Caching	High	Average	No support
7. Mapping	Maps your Java POJO and database tables	Maps your Result set to JAVA POJO	Uses annotations and xml to map POJO and tables
8. Use of SQL Query	Uses HQL Query which is database independent	Uses SQL which can be database dependent	Uses JPQL which is database independent

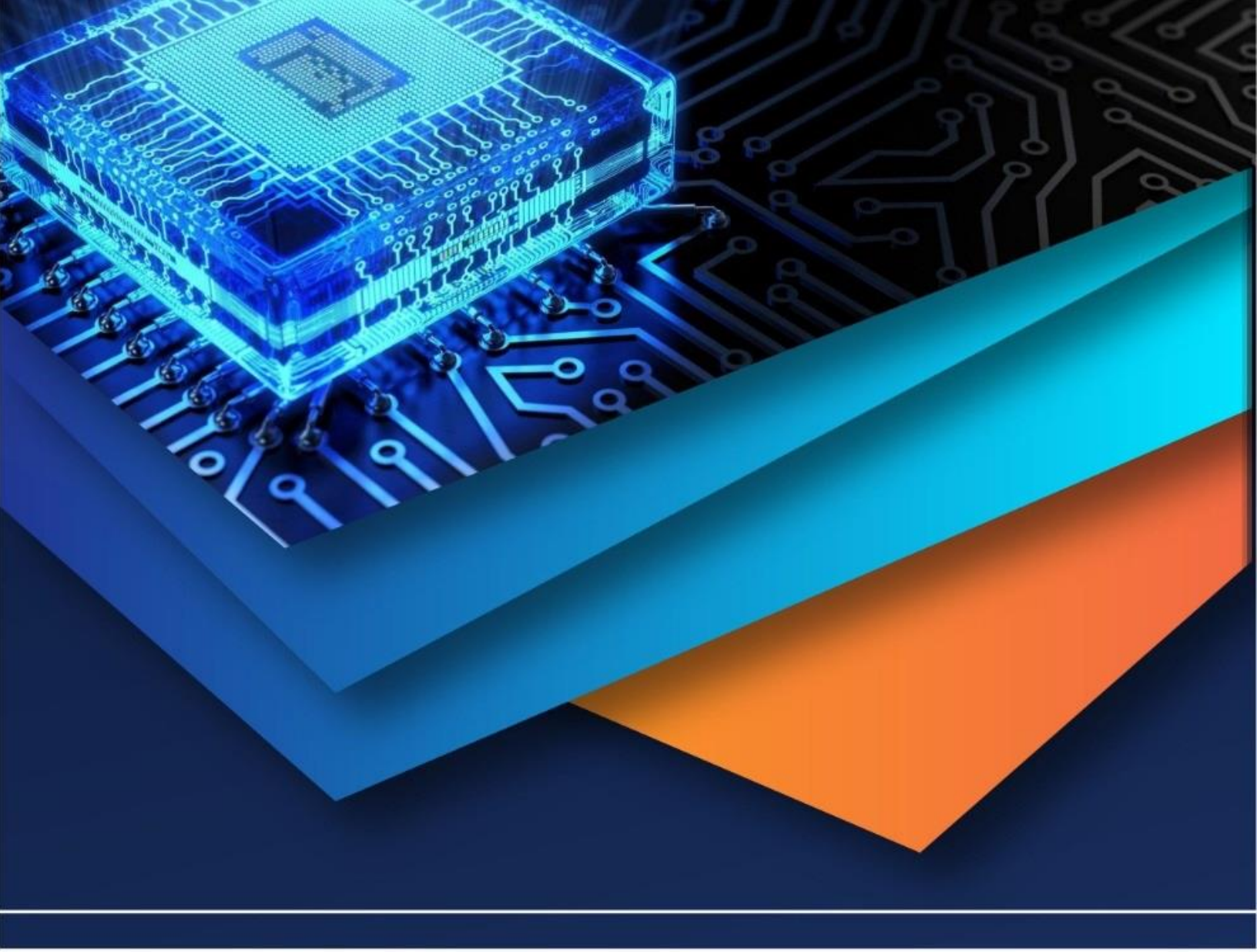
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