

# Apache O/R Mappers

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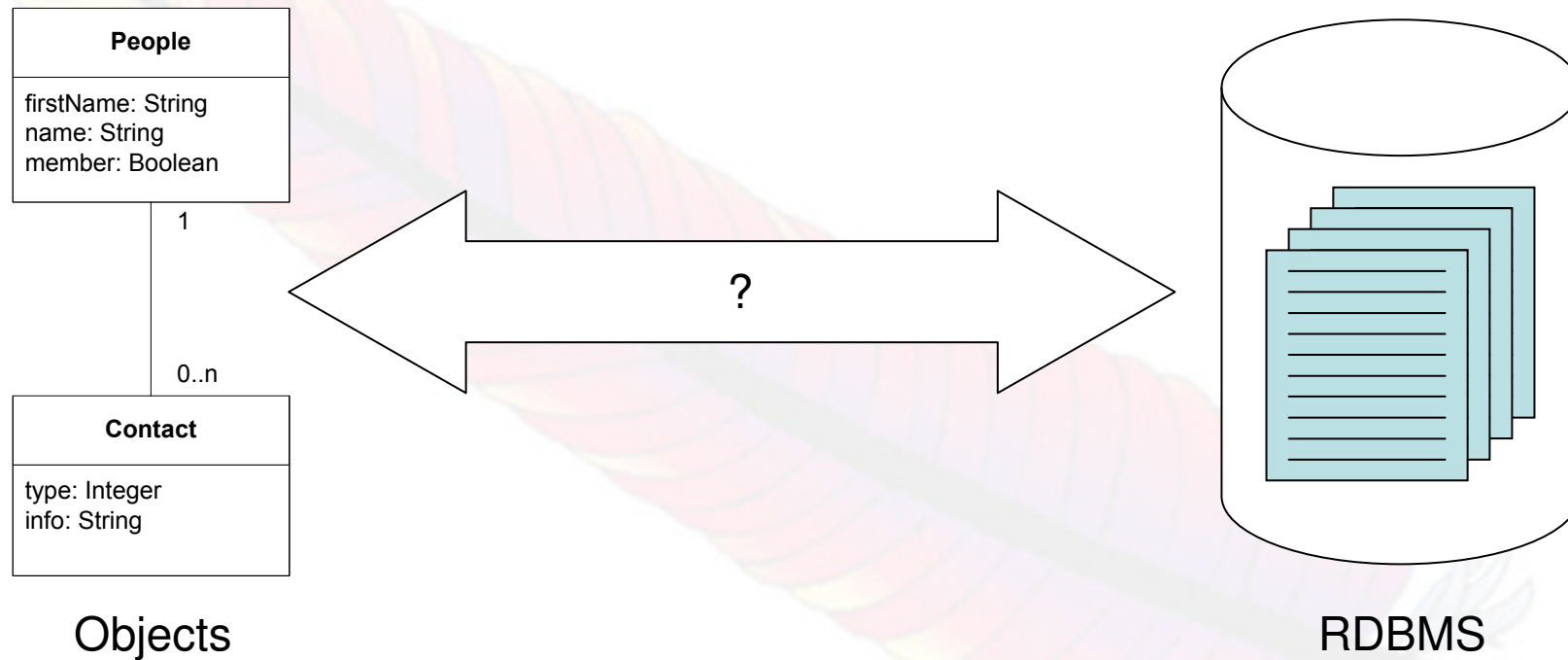
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# This is a Java talk!

- Apache O/R mappers in other languages:
  - iBATIS.NET - Microsoft .NET framework
- That's all folks! The rest is Java 😊

# What is O/R mapping?

The problem:



# O/R mapping in a nutshell

“Object-Relational mapping (or O/RM), is a programming technique that links databases to object-oriented language concepts, creating (in effect) a ‘virtual object database’.” - Wikipedia

# Do we need to talk about O/R?

- O/R mapping is „done“, isn't it?
- Hibernate is the 800lb gorilla.
- EJB3 and JDO2 will rule the market, right?
- JTA is on the horizon
- Oracle TopLink and Apple Enterprise Objects
  - (TopLink Essentials is Open Source RI for JSR-220)
- Do we need anything else?

# Yes, we do!

- EJB 3 and JDO 2 are a bit unwieldy
  - EJB3 spec: 818 pages! (simplified: 59)
  - JDO2 spec: 332 pages
- Hibernate is LGPL
  - legal implications for your code
- JDO is loaded with politics
- EJB3 was just finalized

I just want to query some data for  
my web application, dammit!

# O/R projects @ Apache

- JDO 1.0 and 2.0 API (and TCK)
- ‘real’ O/R mappers
  - DB Torque
  - DB ObjectRelationalBridge - OJB
  - Cayenne - In incubation
- SQL Maps/Data mapper
  - iBATIS



# A few words about JDO

- what Sun intended to be the “Java object persistence standard”
- Transparency of persistence
- Steamrolled by the success of Hibernate
- EJB 3 broke out the persistence layer (into Java Persistence API, JPA)
- JDO works with J2SE (also JPA)

# JDO @ Apache

- Code donated by Sun to the ASF
- JDO 1.0 API (JSR-12)
- JDO 1.1 Reference Implementation (RI)
- JDO 1.1 TCK
- JDO 2.0 API (JSR-243)
- JDO 2.0 TCK
- no JDO 2.0 RI, it is at [jpox.org](http://jpox.org)

# Common to all projects

- DB Support: MySQL, PostgreSQL, Oracle, HSQLDB, Apache Derby
- O/R mapping definition in XML
- 1:1, 1:n, m:n mappings
- native and generated primary keys
- “Half day rule”

# DB Torque

- current release is 3.2 (Dec. 2005)
- forked off the Jakarta Turbine project
- generates Java and SQL code from model (data objects and peers (DAOs))
- ant, maven-1 support

# DB Torque

- Pros:
  - DB Management (creation, dropping, loading)
  - XML schema support for SQL data
  - thin runtime layer
- Cons:
  - Lots of static classes, hard to extend
  - ‘heavy’ data objects (POJO support in 3.2)
  - no standards compliant API

# DB ObjectRelationalBridge

- current release is 1.0.4 (Dec 2005)
- Multiple APIs: PersistenceBroker, ODMG 3.0, JDO 1.0.1, OTM
- J2EE integration: JNDI, JTA, JCA coming
- Enterprise features: locking, distributed caching, clustering
- Polymorphism, Extents, Collections
- Object Query Language - OQL

# DB ObjectRelationalBridge

- Pros:
  - Standards compliance (ODMG, JDO)
  - Tool + IDE support
  - Enterprise features, scales well
  - Uses POJOs
- Cons:
  - Heavy
  - Uses private tables in the database

# Cayenne

- current release is 1.1.4 (off-Apache)
- comes with a Swing GUI tool for modelling
- ant, maven support
- concepts related to WebObjects EOF
- J2EE: JNDI, Managed Transactions



# Cayenne

- Pros:
  - GUI modeller included
  - Good documentation
- Cons:
  - Heavy data objects (inherit `DataObject`)
  - JTA support missing (though not needed)
  - no standards compliant API

# Example code

- This talk can only scratch the concepts
- Example code is available from my homepage:

- 

- ▶ Apache Cayenne
- ▶ Apache iBatis DAO
- ▶ Apache iBatis SQL Maps
- ▶ Apache JDO 2
- ▶ Apache OJB ODMG
- ▶ Apache OJB Persistence Broker
- ▶ Apache Torque

<http://henning.schmiedehausen.org/or-mappers>

# Retrieving an Object by PK

- Torque:

```
public People retrieve() {  
    People user = PeoplePeer.retrieveByPK(2L);  
    return user;  
}
```

- Cayenne:

```
People user = (People) DataObjectUtils  
    .objectForPK(dataContext, People.class, 2);
```

# Retrieving an Object by PK

- OJB (Persistence Broker):

```
Identity sel = broker.serviceIdentity()  
                .buildIdentity(People.class, 2);  
  
People user = (People) broker.getObjectByIdentity(sel);
```

- OJB (ODMG):

```
OQLQuery query = odmng.newOQLQuery();  
query.create("select people from " +  
            People.class.getName() + " where id=$1");  
query.bind(2L);  
People user = ((List<People>) query.execute()).get(0);
```

# Caveat

- Calling `retrieve()` twice returns:
  - Torque and OJB: Two different objects
  - Cayenne: The same object

# Changing an Object

- Torque:

```
People people = retrieve();  
people.setMember(true);  
people.save();
```

- Cayenne:

```
People people = retrieve();  
people.setMember(true);  
dataContext.commitChanges();
```

# Changing an Object

- OJB (Persistence Broker):

```
broker.beginTransaction();  
People people = retrieve();  
people.setMember(true);  
broker.store (people);  
Broker.commitTransaction();
```

- OJB (ODMG):

```
Transaction tx = odmng.newTransaction();  
tx.begin();  
People people = retrieve();  
people.setMember(true);  
tx.commit();
```



And Now...  
...for Something Completely  
Different



# iBATIS

- current release is 2.1.7 (Jan. 2006)
- Data mapper framework
- maps SQL queries to Java objects
- supports JNDI and JTA
- optional DAO (data access objects) layer (supports SQLMAP, Hibernate, JDBC)

# A mapped query

```
<select id="getPeople" parameterClass="people"
        resultMap="peopleResult">
  select * from people
  <dynamic prepend="where">
    <isNotNull prepend="and" property="id">
      people_id = #id#
    </isNotNull>
  </dynamic>
</select>
```

# Query examples

- Querying a single object

```
People select = new People();  
select.setId(2L);  
People user = (People)  
    sqlMap.queryForObject("getPeople", select);
```

- Querying a list

```
List select = sqlMap.queryForList("getPeople", null);
```

# Which one to use?

- This table is highly subjective! YMMV!

When	What
Torque, OJB, Cayenne	...if your Java is better than your SQL
iBATIS	...if your SQL is better than your Java / .NET
OJB, iBATIS, maybe Cayenne	...if you need J2EE integration
Torque	...if you need results fast



Any questions?



Thanks for your attention!