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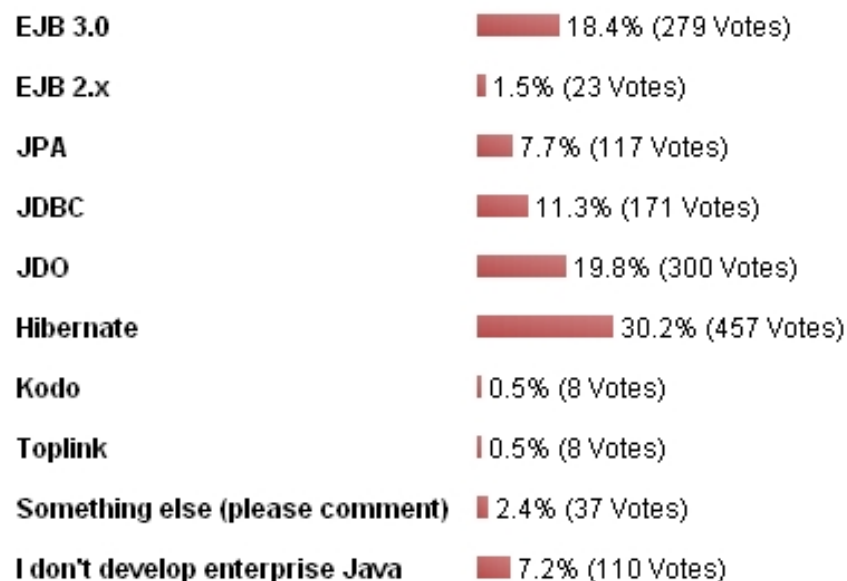
- JPA introduction
- Entities
- Relationships, Inheritance, JPQL
- Callbacks, Listeners, Transactions
- EntityManager, PersistenceContext
- Hibernate vs. Toplink, IDE support
- Demo application



- September 2006 results

POLL RESULTS

What do you prefer for enterprise Java persistence?



Total Votes: 1510

Primary features



- Simple to use and intuitive to learn
 - Configure by exception (smart defaults)
- POJO development model
- Object-oriented, inheritance, polymorphism, etc.
- Standardized metadata for O/R mapping (annotations, XML)
- Entity detachment to other tier or JVMs
- Java persistence query language
- Java SE and EE persistence model
- Support pluggable persistence providers



- Toplink Essential (Oracle; CDDL)
- Hibernate (JBoss; LGPL)
- OpenJPA (Solarmetric/BEA; Apache 2.0)
- Castor (Codehaus; Apache 2.0)
- JPOX (JPOX; Apache 2.0)
- Toplink (Oracle; commercial)
- Kodo (BEA; commercial)
- CocoBase (Thoughtinc; commercial)
- SAP JPA (SAP; commercial)



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- Serializable POJO annotated with `@Entity`
- Persistent state
 - Defined by persistent fields or properties (Hibernate extension)
 - `@AccessType.FIELD`, `@AccessType.PROPERTY`
 - Entities may also have transient state
 - `@Transient`, `transient`
 - Optimistic locking - `@Version`
 - Can be a concrete or abstract class

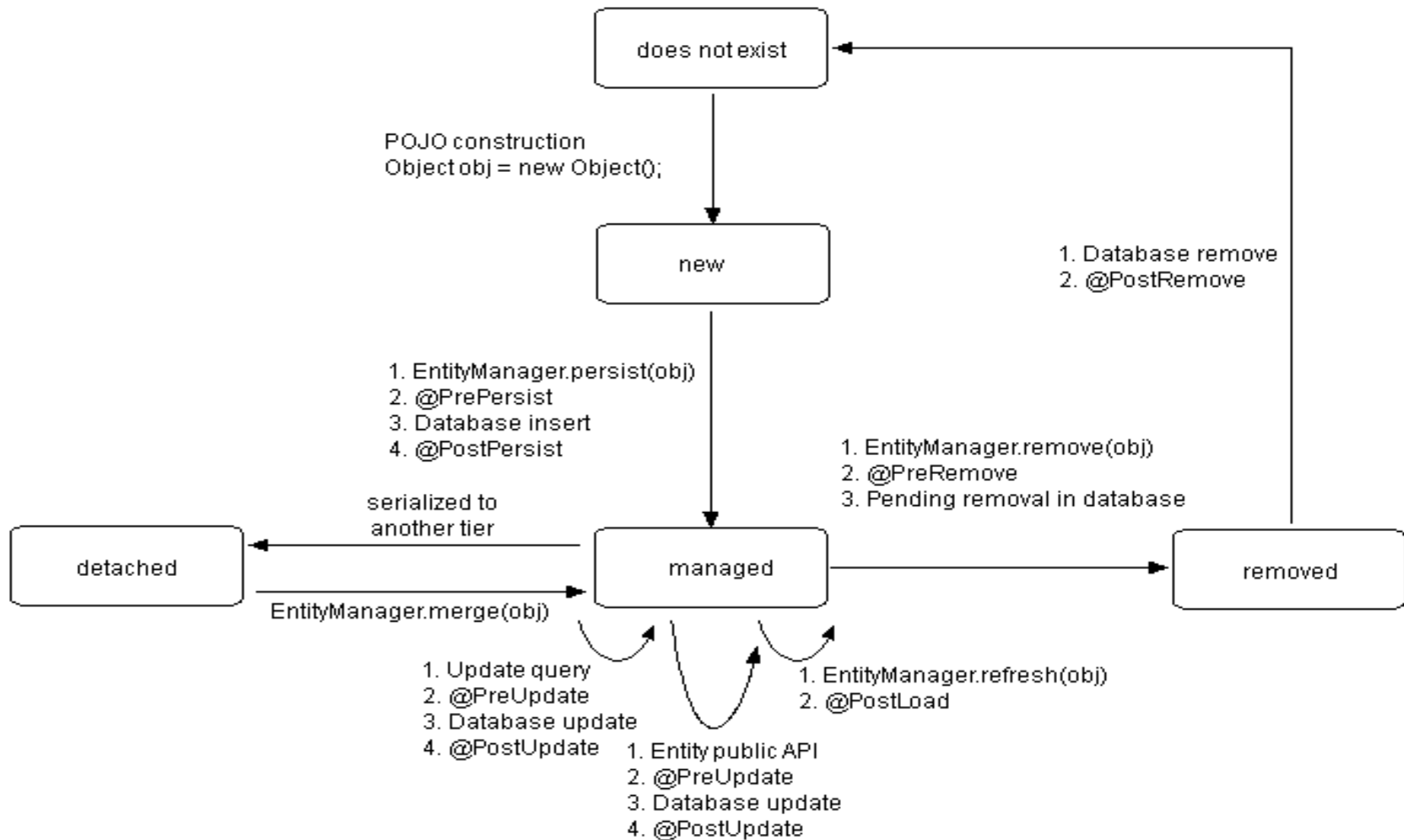


- Persistent identity must be defined
 - @Id, @EmbeddedId, @IdClass
- Primary key generation - @GenerationType
 - TABLE, SEQUENCE, IDENTITY, AUTO



- CascadeType
 - ALL, PERSIST, MERGE, REMOVE, REFRESH
- FetchType
 - LAZY, EAGER

Entity lifecycle





- Updates are flushed
 - Before query is executed
 - Transaction commit
 - Explicit flush using `EM.flush()`
- Detach
 - Persistent context ends
 - `EM.clear()` is called
 - deserialized



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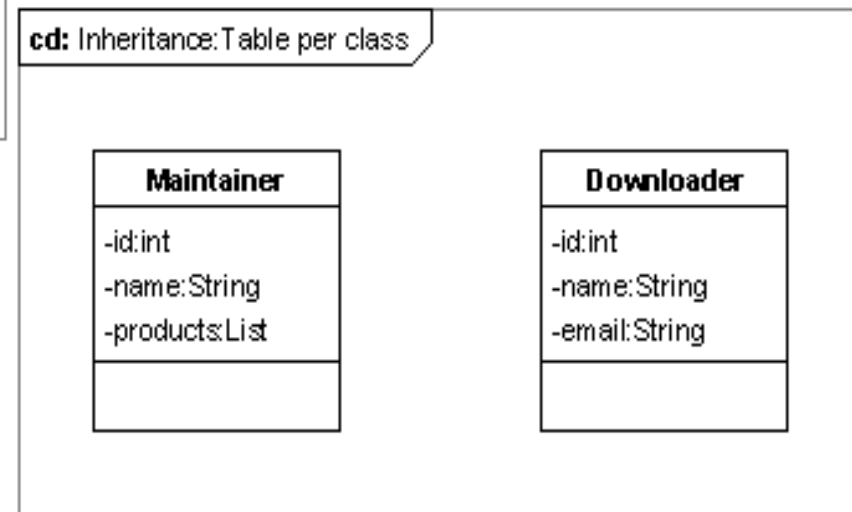
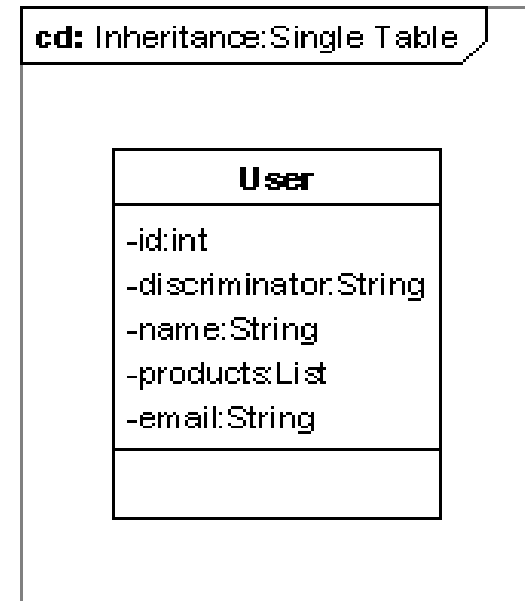
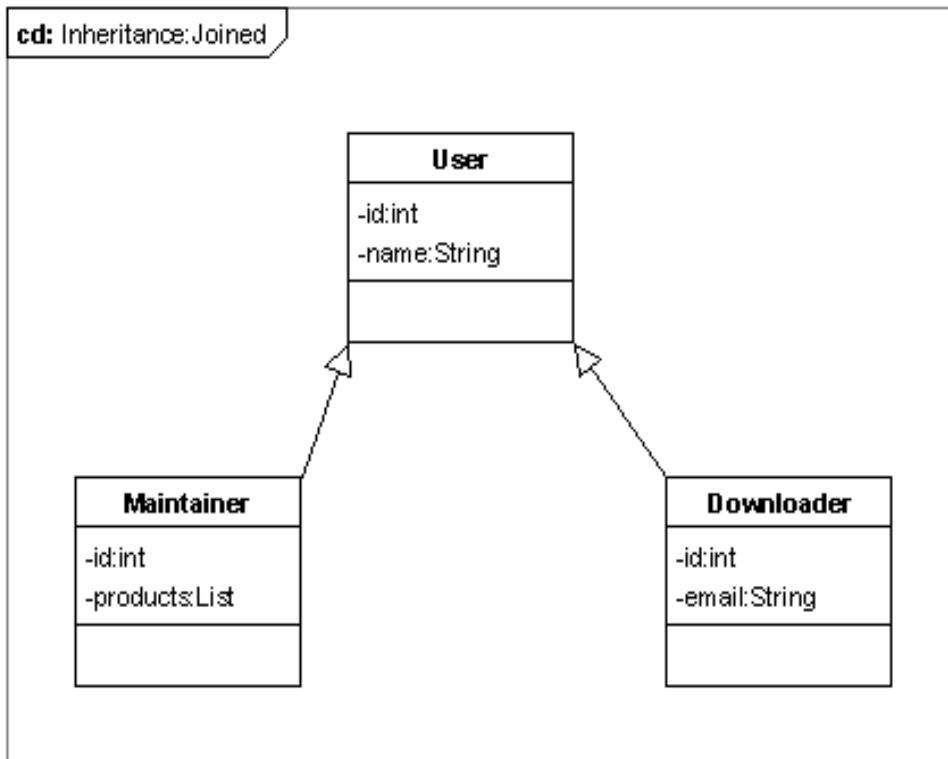


- Supports composition and aggregation relationship
 - @Embedable, @ManyToOne, ...
- Relationships (uni/bi directional)
 - One-to-one, one-to-many, many-to-one, many-to-many
- Bidirectional relationships have owning and inverse side
- @JoinColumn for FK definition



- Mixed inheritance hierarchies, entities and non-entities, either concrete or abstract
- `@MappedSuperclass`
 - Doesn't map to any table, can not query
- `@Inheritance`
 - `SINGLE_TABLE`, `JOINED`, `TABLE_PER_CLASS`

Inheritance





- JPA supports static (named), dynamic and native queries
 - @NamedQuery, precompiled, createNamedQuery()
 - createQuery()
 - @SQLResultSetMapping, createNativeQuery()
- Projection into non-existing classes
- Aggregate functions, Subquery, Inner and outer joins
- Paging, Max result returned, Bind parameter, Flush mode



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- Attached to entity by `@EntityListener`
 - `@PrePersist` - when application calls `persist()`
 - `@PostPersist` – after the SQL insert
 - `@PreRemove` – when application calls `remove()`
 - `@PostRemove` – after the SQL delete
 - `@PreUpdate` – when a container detects that the instance is dirty
 - `@PostUpdate` – after the SQL update
 - `@PostLoad` – after the instance was loaded
- Listener methods are defined on non-entity classes



- In SE transactions and bootstrapping must be handled by the application code
 - EntityTransaction
 - begin(), commit(), setRollbackOnly(), rollback(), isActive()
- EE transactions are always JTA
- @javax.ejb.TransactionAttribute
 - REQUIRED, REQUIRES_NEW, SUPPORTS, NOT_SUPPORTED, NEVER, MANDATORY



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- persistence.xml
- Defines
 - Name of persistence unit
 - Transaction strategy for EM
 - Entities
 - Persistence provider
 - O/R mapping file (overrides annotations)
- Persistent Unit
 - Set of entities that are mapped to the single DB and their mapping metadata



- Two types of EntityManagers
 - Container managed in EE
 - @PersistenceContext, @PersistenceUnit
 - Application managed in SE/EE
 - EntityManager, EntityManagerFactory
- Two types of Persistence context
 - Transaction-scoped
 - PersistenceContextType.TRANSACTION
 - Extended (new to java ORM)
 - PersistenceContextType.EXTENDED



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Hibernate vs. Toplink Essential



- 13 files, 4.2 MB
- Cleaner DDL generation
- 2 files, 2.5 MB
- Better documentation
- Checks integrity
- Finer logging support
- Showsql more verbose

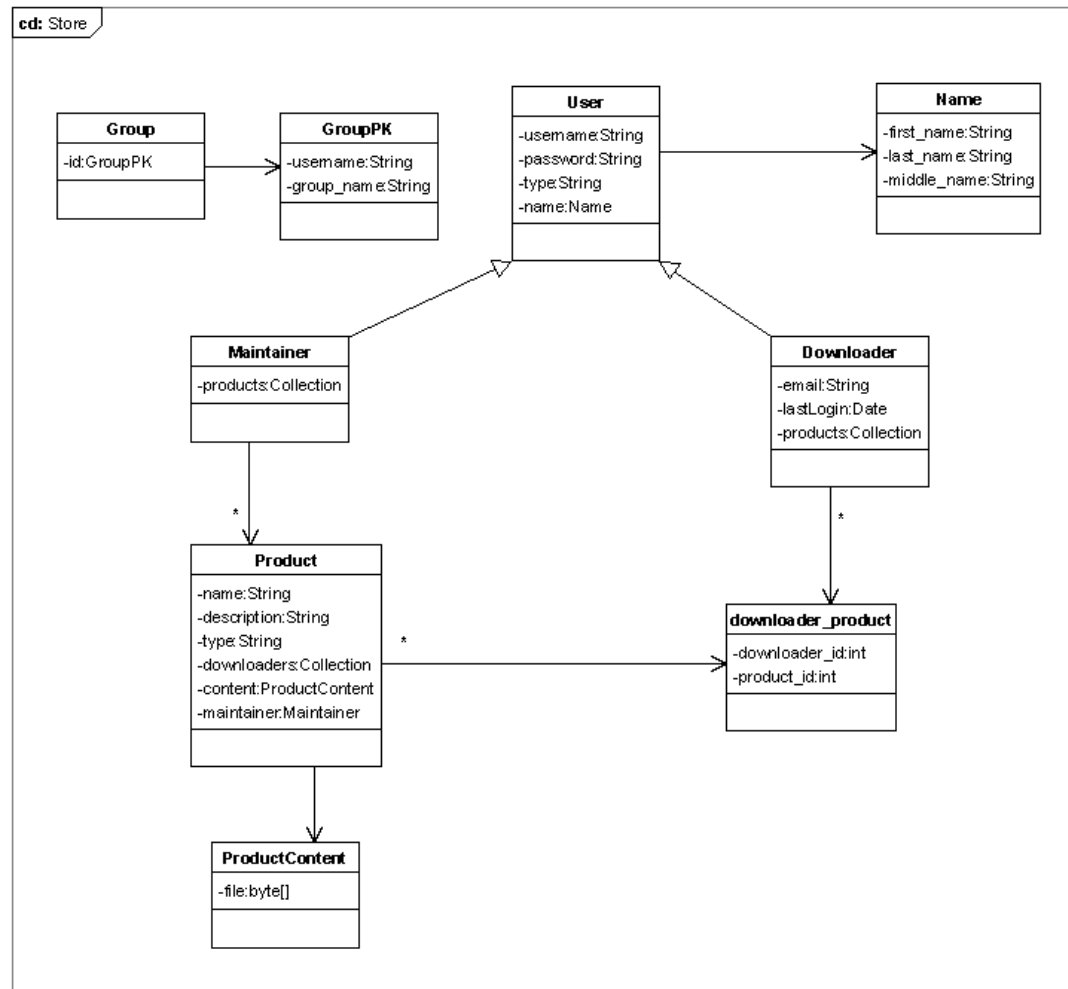


- Eclipse Dali plugin
- Netbeans 5.5



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Demo application - UML



Demo application - Layers



Client

Junit test cases
StoreTest_Spring StoreTest_SE StoreTest_EE

Service layer

Store Facade
(Spring managed or Session EJB)

DAO layer

DAO implementation
(Spring managed or Session EJB)

Domain layer

JPA domain model



- JPA + Spring using JpaDaoSupport
 - JPA + Spring in SE
 - JPA in SE
 - JPA in EE
-
- Run on Toplink Essential, Hibernate, JBoss



Nice Documentations

- <http://www.oracle.com/technology/products/ias/toplink/jpa/resources-index>.
- <http://incubator.apache.org/openjpa/docs/openjpa-0.9.0-incubating/manual/>

JPA Extensions

- <http://www.oracle.com/technology/products/ias/toplink/jpa/resources/toplink>
- http://www.hibernate.org/hib_docs/annotations/reference/en/html_single/#e

JPA IDE comparision

- http://blogs.sun.com/klingo/entry/jpa_netbeans_5_5_vs

Java persistence comparision

- <http://www.java.net/pub/pq/122>
- <http://www.jpox.org/>
- <http://jpa.hibernate.org/>



- Now
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Thank for attention