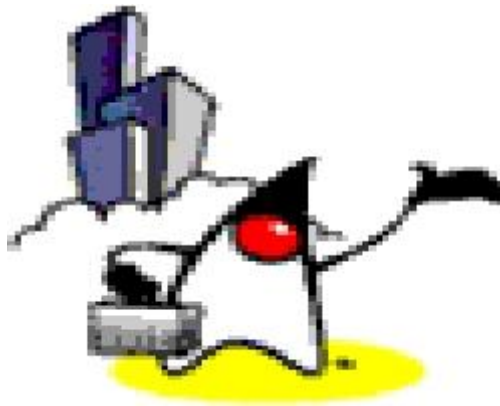# Hibernate Caching

Topics

- What is Caching?
- Hibernate caching
- Second-Level Caching implementations

What is Caching?

- Used for optimizing database applications.
- A cache is designed to reduce traffic between your application and the database by conserving data already loaded from the database.
  - Database access is necessary only when retrieving data that is not currently available in the cache.
  - The application may need to empty (invalidate) the cache from time to time if the database is updated or modified in some way, because it has no way of knowing whether the cache is up to date

Two Different Caches (for Caching Objects)

- First-level cache

  ☐ associated with the *Session* object

- Second-level cache

  ☐ associated with the *SessionFactory* object

First-level Cache

- Hibernate uses first-level cache on a per-transaction basis (within a single transaction boundary)

  - ☐ Used mainly to reduce the number of SQL queries it needs to generate within a given transaction.
  - ☐ For example, if an object is modified several times within the same transaction, Hibernate will generate only one SQL UPDATE statement at the end of the transaction, containing all the modifications

Second-level Cache

- Second-level cache keeps loaded objects at the Session Factory level across transaction boundaries
- The objects in the second-level cache are available to the whole application, not just to the user running the query
  - This way, each time a query returns an object that is already loaded in the cache, one or more database transactions potentially are avoided.

Cache Implementations

- Hibernate supports these open-source cache implementations out of the box
  - EHCache (org.hibernate.cache.EhCacheProvider)
  - OSCache (org.hibernate.cache.OSCacheProvider)
  - SwarmCache (org.hibernate.cache.SwarmCacheProvider)
  - JBoss TreeCache (org.hibernate.cache.TreeCacheProvider)
- Commercial cache implementation
  - Tangosol Coherence cache

Cache Configuration

Cache Configuration in Hibernate Configuration File

```
<hibernate-configuration>
    <session-factory>
...
        <property name="hibernate.cache.use_query_cache">
            true
        </property>
        <property name="hibernate.cache.use_second_level_cache">
            true
        </property>
        <property name="hibernate.cache.provider_class">
            org.hibernate.cache.EhCacheProvider
        </property>
...
    </session-factory>
</hibernate-configuration>
```

The End