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Text Part Number: 78EE117C99-143029640

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/*

* Hibernate, Relational Persistence for Idiomatic Java

*

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* Boston, MA 02110-1301 USA

*/

```
package org.hibernate.ejb;
```

```
import java.util.Map;  
import javax.persistence.PersistenceContextType;  
import javax.persistence.PersistenceException;  
import javax.persistence.spi.PersistenceUnitTransactionType;
```

```
import org.jboss.logging.Logger;
```

```
import org.hibernate.HibernateException;  
import org.hibernate.Interceptor;  
import org.hibernate.Session;  
import org.hibernate.engine.spi.SessionOwner;  
import org.hibernate.annotations.common.util.ReflectHelper;  
import org.hibernate.ejb.internal.EntityManagerMessageLogger;  
import org.hibernate.engine.spi.SessionBuilderImplementor;  
import org.hibernate.engine.spi.SessionImplementor;
```

```
/**
```

```
* Hibernate implementation of { @link javax.persistence.EntityManager }.
```

```
*
```

```
* @author Gavin King
```

```
*/
```

```
public class EntityManagerImpl extends AbstractEntityManagerImpl implements SessionOwner {
```

```
    public static final EntityManagerMessageLogger LOG =  
    Logger.getMessageLogger(EntityManagerMessageLogger.class,  
                            EntityManagerImpl.class.getName());
```

```
    protected Session session;  
    protected boolean open;  
    protected boolean discardOnClose;  
    private Class sessionInterceptorClass;
```

```
    public EntityManagerImpl(  
        EntityManagerFactoryImpl entityManagerFactory,  
        PersistenceContextType pcType,
```

```

PersistenceUnitTransactionType transactionType,
boolean discardOnClose,
Class sessionInterceptorClass,
Map properties) {
super( entityManagerFactory, pcType, transactionType, properties );
this.open = true;
this.discardOnClose = discardOnClose;
Object localSessionInterceptor = null;
if (properties != null) {
localSessionInterceptor = properties.get( AvailableSettings.SESSION_INTERCEPTOR );
}
if ( localSessionInterceptor != null ) {
if (localSessionInterceptor instanceof Class) {
sessionInterceptorClass = (Class) localSessionInterceptor;
}
else if (localSessionInterceptor instanceof String) {
try {
sessionInterceptorClass =
ReflectHelper.classNameForName( (String) localSessionInterceptor, EntityManagerImpl.class );
}
catch (ClassNotFoundException e) {
throw new PersistenceException("Unable to instantiate interceptor: " + localSessionInterceptor, e);
}
}
else {
throw new PersistenceException("Unable to instantiate interceptor: " + localSessionInterceptor);
}
}
this.sessionInterceptorClass = sessionInterceptorClass;
postInit();
}

```

```

@Override
public Session getSession() {
if ( !open ) {
throw new IllegalStateException( "EntityManager is closed" );
}
return getRawSession();
}

```

```

@Override
protected Session getRawSession() {
if ( session == null ) {
SessionFactoryImplementor sessionFactory = getEntityManagerFactory().getSessionFactory().withOptions();
sessionBuilder.owner( this );
if (sessionInterceptorClass != null) {
try {
Interceptor interceptor = (Interceptor) sessionInterceptorClass.newInstance();
}
}
}
}

```

```

    sessionBuilder.interceptor( interceptor );
}
catch (InstantiationException e) {
    throw new PersistenceException("Unable to instantiate session interceptor: " + sessionInterceptorClass, e);
}
catch (IllegalAccessException e) {
    throw new PersistenceException("Unable to instantiate session interceptor: " + sessionInterceptorClass, e);
}
catch (ClassCastException e) {
    throw new PersistenceException("Session interceptor does not implement Interceptor: " + sessionInterceptorClass,
e);
}
}
}
sessionBuilder.autoJoinTransactions( getTransactionType() != PersistenceUnitTransactionType.JTA );
session = sessionBuilder.openSession();
if ( persistenceContextType == PersistenceContextType.TRANSACTION ) {
    ( (SessionImplementor) session ).setAutoClear( true );
}
}
return session;
}

```

```

public void close() {
    checkEntityManagerFactory();
    if ( !open ) {
        throw new IllegalStateException( "EntityManager is closed" );
    }
    if ( discardOnClose || !isTransactionInProgress() ) {
        //close right now
        if ( session != null ) {
            session.close();
        }
    }
    // Otherwise, session auto-close will be enabled by shouldAutoCloseSession().
    open = false;
}

```

```

public boolean isOpen() {
    //adjustFlushMode(); //don't adjust, can't be done on closed EM
    checkEntityManagerFactory();
    try {
        if ( open ) {
            getSession().isOpen(); //to force enlistment in tx
        }
        return open;
    }
    catch (HibernateException he) {
        throwPersistenceException( he );
    }
}

```

```

    return false;
}
}

@Override
public boolean shouldAutoCloseSession() {
    return !isOpen();
}

private void checkEntityManagerFactory() {
    if (! getEntityManagerFactory().isOpen()) {
        open = false;
    }
}
}
}
/*
 * Hibernate, Relational Persistence for Idiomatic Java
 *
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 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb;

import java.util.Collection;
import java.util.HashMap;
import java.util.Map;
import java.util.Set;
import javax.persistence.CacheRetrieveMode;
import javax.persistence.CacheStoreMode;
import javax.persistence.FlushModeType;
import javax.persistence.Parameter;

```

```

import javax.persistence.TransactionRequiredException;
import javax.persistence.TypedQuery;

import org.jboss.logging.Logger;

import org.hibernate.CacheMode;
import org.hibernate.FlushMode;
import org.hibernate.HibernateException;
import org.hibernate.LockMode;
import org.hibernate.TypeMismatchException;
import org.hibernate.ejb.internal.EntityManagerMessageLogger;
import org.hibernate.ejb.util.CacheModeHelper;
import org.hibernate.ejb.util.ConfigurationHelper;
import org.hibernate.ejb.util.LockModeTypeHelper;
import org.hibernate.hql.internal.QueryExecutionRequestException;

import static org.hibernate.ejb.QueryHints.HINT_CACHEABLE;
import static org.hibernate.ejb.QueryHints.HINT_CACHE_MODE;
import static org.hibernate.ejb.QueryHints.HINT_CACHE_REGION;
import static org.hibernate.ejb.QueryHints.HINT_COMMENT;
import static org.hibernate.ejb.QueryHints.HINT_FETCH_SIZE;
import static org.hibernate.ejb.QueryHints.HINT_FLUSH_MODE;
import static org.hibernate.ejb.QueryHints.HINT_READONLY;
import static org.hibernate.ejb.QueryHints.HINT_TIMEOUT;
import static org.hibernate.ejb.QueryHints.SPEC_HINT_TIMEOUT;

/**
 * Intended as a base class providing convenience in implementing both { @link javax.persistence.Query } and
 * { @link javax.persistence.TypedQuery }.
 * <p/>
 * IMPL NOTE : This issue, and the reason for this distinction, is that criteria and hl.sql queries share no
 * commonality currently in Hibernate internals.
 *
 * @author Steve Ebersole
 */
public abstract class AbstractQueryImpl<X> implements TypedQuery<X> {

    private static final EntityManagerMessageLogger LOG =
        Logger.getMessageLogger(EntityManagerMessageLogger.class,
            AbstractQueryImpl.class.getName());

    private final HibernateEntityManagerImplementor entityManager;

    public AbstractQueryImpl(HibernateEntityManagerImplementor entityManager) {
        this.entityManager = entityManager;
    }

    protected HibernateEntityManagerImplementor getEntityManager() {

```

```

return entityManager;
}

/**
 * Actually execute the update; all pre-requisites have been checked.
 *
 * @return The number of "affected rows".
 */
protected abstract int internalExecuteUpdate();

@Override
@SuppressWarnings({ "ThrowableInstanceNeverThrown" })
public int executeUpdate() {
    try {
        if ( ! entityManager.isTransactionInProgress() ) {
            entityManager.throwPersistenceException( new TransactionRequiredException( "Executing an update/delete query"
        ) );
            return 0;
        }
        return internalExecuteUpdate();
    }
    catch ( QueryExecutionRequestException he ) {
        throw new IllegalStateException(he);
    }
    catch( TypeMismatchException e ) {
        throw new IllegalArgumentException(e);
    }
    catch ( HibernateException he ) {
        entityManager.throwPersistenceException( he );
        return 0;
    }
}

private int maxResults = -1;

/**
 * Apply the given max results value.
 *
 * @param maxResults The specified max results
 */
protected abstract void applyMaxResults(int maxResults);

@Override
public TypedQuery<X> setMaxResults(int maxResult) {
    if ( maxResult < 0 ) {
        throw new IllegalArgumentException(
            "Negative value (" + maxResult + ") passed to setMaxResults"
        );
    }
}

```

```

    }
    this.maxResults = maxResult;
    applyMaxResults( maxResult );
    return this;
}

public int getSpecifiedMaxResults() {
    return maxResults;
}

@Override
public int getMaxResults() {
    return maxResults == -1
        ? Integer.MAX_VALUE // stupid spec... MAX_VALUE??
        : maxResults;
}

private int firstResult;

/**
 * Apply the given first-result value.
 *
 * @param firstResult The specified first-result value.
 */
protected abstract void applyFirstResult(int firstResult);

@Override
public TypedQuery<X> setFirstResult(int firstResult) {
    if ( firstResult < 0 ) {
        throw new IllegalArgumentException(
            "Negative value (" + firstResult + ") passed to setFirstResult"
        );
    }
    this.firstResult = firstResult;
    applyFirstResult( firstResult );
    return this;
}

@Override
public int getFirstResult() {
    return firstResult;
}

private Map<String, Object> hints;

@Override
public Map<String, Object> getHints() {
    return hints;
}

```

```

}

protected abstract void applyTimeout(int timeout);

protected abstract void applyLockTimeout(int timeout);

protected abstract void applyComment(String comment);

protected abstract void applyFetchSize(int fetchSize);

protected abstract void applyCacheable(boolean isCacheable);

protected abstract void applyCacheRegion(String regionName);

protected abstract void applyReadOnly(boolean isReadOnly);

protected abstract void applyCacheMode(CacheMode cacheMode);

protected abstract void applyFlushMode(FlushMode flushMode);

protected abstract boolean canApplyLockModes();

protected abstract void applyAliasSpecificLockMode(String alias, LockMode lockMode);

@Override
@SuppressWarnings( {"deprecation"})
public TypedQuery<X> setHint(String hintName, Object value) {
    boolean skipped = false;
    try {
        if ( HINT_TIMEOUT.equals( hintName ) ) {
            applyTimeout( ConfigurationHelper.getInteger( value ) );
        }
        else if ( SPEC_HINT_TIMEOUT.equals( hintName ) ) {
            // convert milliseconds to seconds
            int timeout = (int)Math.round(ConfigurationHelper.getInteger( value ).doubleValue() / 1000.0 );
            applyTimeout( timeout );
        }
        else if ( AvailableSettings.LOCK_TIMEOUT.equals( hintName ) ) {
            applyLockTimeout( ConfigurationHelper.getInteger( value ) );
        }
        else if ( HINT_COMMENT.equals( hintName ) ) {
            applyComment( (String) value );
        }
        else if ( HINT_FETCH_SIZE.equals( hintName ) ) {
            applyFetchSize( ConfigurationHelper.getInteger( value ) );
        }
        else if ( HINT_CACHEABLE.equals( hintName ) ) {
            applyCacheable( ConfigurationHelper.getBoolean( value ) );
        }
    }
}

```

```

}
else if ( HINT_CACHE_REGION.equals( hintName ) ) {
    applyCacheRegion( (String) value );
}
else if ( HINT_READONLY.equals( hintName ) ) {
    applyReadOnly( ConfigurationHelper.getBoolean( value ) );
}
else if ( HINT_CACHE_MODE.equals( hintName ) ) {
    applyCacheMode( ConfigurationHelper.getCacheMode( value ) );
}
else if ( HINT_FLUSH_MODE.equals( hintName ) ) {
    applyFlushMode( ConfigurationHelper.getFlushMode( value ) );
}
else if ( AvailableSettings.SHARED_CACHE_RETRIEVE_MODE.equals( hintName ) ) {
    final CacheRetrieveMode retrieveMode = (CacheRetrieveMode) value;

    CacheStoreMode storeMode = hints != null
        ? (CacheStoreMode) hints.get( AvailableSettings.SHARED_CACHE_STORE_MODE )
        : null;
    if ( storeMode == null ) {
        storeMode = (CacheStoreMode) entityManager.getProperties()
            .get( AvailableSettings.SHARED_CACHE_STORE_MODE );
    }
    applyCacheMode(
        CacheModeHelper.interpretCacheMode( storeMode, retrieveMode )
    );
}
else if ( AvailableSettings.SHARED_CACHE_STORE_MODE.equals( hintName ) ) {
    final CacheStoreMode storeMode = (CacheStoreMode) value;

    CacheRetrieveMode retrieveMode = hints != null
        ? (CacheRetrieveMode) hints.get( AvailableSettings.SHARED_CACHE_RETRIEVE_MODE )
        : null;
    if ( retrieveMode == null ) {
        retrieveMode = (CacheRetrieveMode) entityManager.getProperties()
            .get( AvailableSettings.SHARED_CACHE_RETRIEVE_MODE );
    }
    applyCacheMode(
        CacheModeHelper.interpretCacheMode( storeMode, retrieveMode )
    );
}
else if ( hintName.startsWith( AvailableSettings.ALIAS_SPECIFIC_LOCK_MODE ) ) {
    if ( ! canApplyLockModes() ) {
        skipped = true;
    }
    else {
        // extract the alias
        final String alias = hintName.substring( AvailableSettings.ALIAS_SPECIFIC_LOCK_MODE.length() + 1 );

```

```

// determine the LockMode
try {
    final LockMode lockMode = LockModeTypeHelper.interpretLockMode( value );
    applyAliasSpecificLockMode( alias, lockMode );
}
catch ( Exception e ) {
    LOG.unableToDetermineLockModeValue(hintName, value);
    skipped = true;
}
}
}
else {
    skipped = true;
    LOG.ignoringUnrecognizedQueryHint(hintName);
}
}
catch ( ClassCastException e ) {
    throw new IllegalArgumentException( "Value for hint" );
}

if ( !skipped ) {
    if ( hints == null ) {
        hints = new HashMap<String,Object>();
    }
    hints.put( hintName, value );
}

return this;
}

@SuppressWarnings( {"UnusedDeclaration"})
public Set<String> getSupportedHints() {
    return QueryHints.getDefinedHints();
}

@Override
public abstract TypedQuery<X> setLockMode(javax.persistence.LockModeType lockModeType);

@Override
public abstract javax.persistence.LockModeType getLockMode();

private FlushModeType jpaFlushMode;

@Override
public TypedQuery<X> setFlushMode(FlushModeType jpaFlushMode) {
    this.jpaFlushMode = jpaFlushMode;
    // TODO : treat as hint?
    if ( jpaFlushMode == FlushModeType.AUTO ) {

```

```

    applyFlushMode( FlushMode.AUTO );
}
else if ( jpaFlushMode == FlushModeType.COMMIT ) {
    applyFlushMode( FlushMode.COMMIT );
}
return this;
}

@SuppressWarnings( {"UnusedDeclaration"})
protected FlushModeType getSpecifiedFlushMode() {
    return jpaFlushMode;
}

@Override
public FlushModeType getFlushMode() {
    return jpaFlushMode != null
        ? jpaFlushMode
        : entityManager.getFlushMode();
}

private Map parameterBindings;

@SuppressWarnings( {"unchecked"})
protected void registerParameterBinding(Parameter parameter, Object value) {
    if ( parameter == null ) {
        throw new IllegalArgumentException( "parameter cannot be null" );
    }

    validateParameterBinding( parameter, value );

    if ( parameterBindings == null ) {
        parameterBindings = new HashMap();
    }
    parameterBindings.put( parameter, value );
}

private void validateParameterBinding(Parameter parameter, Object value) {
    if ( value == null || parameter.getParameterType() == null ) {
        // nothing we can check
        return;
    }

    if ( Collection.class.isInstance( value )
        && ! Collection.class.isAssignableFrom( parameter.getParameterType() ) ) {
        // we have a collection passed in where we are expecting a non-collection.
        // NOTE : this can happen in Hibernate's notion of "parameter list" binding
        // NOTE2 : the case of a collection value and an expected collection (if that can even happen)
        // will fall through to the main check.
    }
}

```

```

    validateCollectionValuedParameterMultiBinding( parameter, (Collection) value );
}
else if ( value.getClass().isArray() ) {
    validateArrayValuedParameterBinding( parameter, value );
}
else {
    if ( ! parameter.getParameterType().isInstance( value ) ) {
        throw new IllegalArgumentException(
            String.format(
                "Parameter value [%s] did not match expected type [%s]",
                value,
                parameter.getParameterType().getName()
            )
        );
    }
}
}

private void validateCollectionValuedParameterMultiBinding(Parameter parameter, Collection value) {
    // validate the elements...
    for ( Object element : value ) {
        if ( ! parameter.getParameterType().isInstance( element ) ) {
            throw new IllegalArgumentException(
                String.format(
                    "Parameter value element [%s] did not match expected type [%s]",
                    element,
                    parameter.getParameterType().getName()
                )
            );
        }
    }
}

private void validateArrayValuedParameterBinding(Parameter parameter, Object value) {
    if ( ! parameter.getParameterType().isArray() ) {
        throw new IllegalArgumentException(
            String.format(
                "Encountered array-valued parameter binding, but was expecting [%s]",
                parameter.getParameterType().getName()
            )
        );
    }

    if ( value.getClass().getComponentType().isPrimitive() ) {
        // we have a primitive array. we validate that the actual array has the component type (type of elements)
        // we expect based on the component type of the parameter specification
        if ( ! parameter.getParameterType().getComponentType().isAssignableFrom( value.getClass().getComponentType() ) ) {
    }
}
}

```

```

throw new IllegalArgumentException(
    String.format(
        "Primitive array-valued parameter bind value type [%s] did not match expected type [%s]",
        value.getClass().getComponentType().getName(),
        parameter.getParameterType().getName()
    )
);
}
}
else {
    // we have an object array. Here we loop over the array and physically check each element against
    // the type we expect based on the component type of the parameter specification
    final Object[] array = (Object[]) value;
    for ( Object element : array ) {
        if ( ! parameter.getParameterType().getComponentType().isInstance( element ) ) {
            throw new IllegalArgumentException(
                String.format(
                    "Array-valued parameter value element [%s] did not match expected type [%s]",
                    element,
                    parameter.getParameterType().getName()
                )
            );
        }
    }
}
}

@Override
public boolean isBound(Parameter<?> param) {
    return parameterBindings != null && parameterBindings.containsKey( param );
}

@Override
@SuppressWarnings({ "unchecked" })
public <T> T getParameterValue(Parameter<T> param) {
    if ( parameterBindings == null ) {
        throw new IllegalStateException( "No parameters have been bound" );
    }
    try {
        T value = (T) parameterBindings.get( param );
        if ( value == null ) {
            throw new IllegalStateException( "Parameter has not been bound" );
        }
        return value;
    }
    catch ( ClassCastException cce ) {
        throw new IllegalStateException( "Encountered a parameter value type exception" );
    }
}

```

```

}

@Override
public Object getParameterValue(String name) {
    return getParameterValue( getParameter( name ) );
}

@Override
public Object getParameterValue(int position) {
    return getParameterValue( getParameter( position ) );
}
}
/*
 * Hibernate, Relational Persistence for Idiomatic Java
 *
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 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb;

import java.io.IOException;
import java.io.ObjectInputStream;
import java.io.ObjectOutputStream;
import java.io.Serializable;
import java.util.ArrayList;
import java.util.Collections;
import java.util.HashMap;
import java.util.List;
import java.util.Map;
import javax.persistence.CacheRetrieveMode;
import javax.persistence.CacheStoreMode;

```

```

import javax.persistence.EntityExistsException;
import javax.persistence.EntityManager;
import javax.persistence.EntityNotFoundException;
import javax.persistence.EntityTransaction;
import javax.persistence.FlushModeType;
import javax.persistence.LockModeType;
import javax.persistence.LockTimeoutException;
import javax.persistence.NoResultException;
import javax.persistence.NonUniqueResultException;
import javax.persistence.OptimisticLockException;
import javax.persistence.PersistenceContextType;
import javax.persistence.PersistenceException;
import javax.persistence.PessimisticLockException;
import javax.persistence.PessimisticLockScope;
import javax.persistence.Query;
import javax.persistence.QueryTimeoutException;
import javax.persistence.TransactionRequiredException;
import javax.persistence.Tuple;
import javax.persistence.TupleElement;
import javax.persistence.TypedQuery;
import javax.persistence.criteria.CriteriaBuilder;
import javax.persistence.criteria.CriteriaQuery;
import javax.persistence.criteria.Selection;
import javax.persistence.metamodel.Metamodel;
import javax.persistence.spi.PersistenceUnitTransactionType;
import javax.transaction.Status;
import javax.transaction.SystemException;
import javax.transaction.TransactionManager;

import org.jboss.logging.Logger;

import org.hibernate.AssertionFailure;
import org.hibernate.CacheMode;
import org.hibernate.FlushMode;
import org.hibernate.HibernateException;
import org.hibernate.LockMode;
import org.hibernate.LockOptions;
import org.hibernate.MappingException;
import org.hibernate.ObjectDeletedException;
import org.hibernate.ObjectNotFoundException;
import org.hibernate.QueryException;
import org.hibernate.SQLQuery;
import org.hibernate.Session;
import org.hibernate.StaleObjectStateException;
import org.hibernate.StaleStateException;
import org.hibernate.TransientObjectException;
import org.hibernate.TypeMismatchException;
import org.hibernate.UnresolvableObjectException;

```

```

import org.hibernate.cfg.Environment;
import org.hibernate.dialect.lock.LockingStrategyException;
import org.hibernate.dialect.lock.OptimisticEntityLockException;
import org.hibernate.dialect.lock.PessimisticEntityLockException;
import org.hibernate.ejb.criteria.CriteriaQueryCompiler;
import org.hibernate.ejb.criteria.ValueHandlerFactory;
import org.hibernate.ejb.criteria.expression.CompoundSelectionImpl;
import org.hibernate.ejb.internal.EntityManagerMessageLogger;
import org.hibernate.ejb.util.CacheModeHelper;
import org.hibernate.ejb.util.ConfigurationHelper;
import org.hibernate.ejb.util.LockModeTypeHelper;
import org.hibernate.engine.ResultSetMappingDefinition;
import org.hibernate.engine.query.spi.HQLQueryPlan;
import org.hibernate.engine.query.spi.sql.NativeSQLQueryReturn;
import org.hibernate.engine.query.spi.sql.NativeSQLQueryRootReturn;
import org.hibernate.engine.spi.NamedSQLQueryDefinition;
import org.hibernate.engine.spi.SessionFactoryImplementor;
import org.hibernate.engine.spi.SessionImplementor;
import org.hibernate.engine.transaction.internal.jta.JtaStatusHelper;
import org.hibernate.engine.transaction.spi.JoinStatus;
import org.hibernate.engine.transaction.spi.TransactionCoordinator;
import org.hibernate.engine.transaction.spi.TransactionImplementor;
import org.hibernate.engine.transaction.synchronization.spi.AfterCompletionAction;
import org.hibernate.engine.transaction.synchronization.spi.ExceptionMapper;
import org.hibernate.engine.transaction.synchronization.spi.ManagedFlushChecker;
import org.hibernate.engine.transaction.synchronization.spi.SynchronizationCallbackCoordinator;
import org.hibernate.internal.util.ReflectHelper;
import org.hibernate.internal.util.collections.CollectionHelper;
import org.hibernate.proxy.HibernateProxy;
import org.hibernate.service.jta.platform.spi.JtaPlatform;
import org.hibernate.transform.BasicTransformerAdapter;
import org.hibernate.type.Type;

/**
 * @author <a href="mailto:gavin@hibernate.org">Gavin King</a>
 * @author Emmanuel Bernard
 * @author Steve Ebersole
 * @author Hardy Ferentschik
 */
@SuppressWarnings("unchecked")
public abstract class AbstractEntityManagerImpl implements HibernateEntityManagerImplementor, Serializable {
    private static final long serialVersionUID = 78818181L;

    private static final EntityManagerMessageLogger LOG =
        Logger.getMessageLogger(EntityManagerMessageLogger.class,
                               AbstractEntityManagerImpl.class.getName());

```

```

private static final List<String> entityManagerSpecificProperties = new ArrayList<String>();

static {
    entityManagerSpecificProperties.add( AvailableSettings.LOCK_SCOPE );
    entityManagerSpecificProperties.add( AvailableSettings.LOCK_TIMEOUT );
    entityManagerSpecificProperties.add( AvailableSettings.FLUSH_MODE );
    entityManagerSpecificProperties.add( AvailableSettings.SHARED_CACHE_RETRIEVE_MODE );
    entityManagerSpecificProperties.add( AvailableSettings.SHARED_CACHE_STORE_MODE );
    entityManagerSpecificProperties.add( QueryHints.SPEC_HINT_TIMEOUT );
}

private EntityManagerFactoryImpl entityManagerFactory;
protected transient TransactionImpl tx = new TransactionImpl( this );
protected PersistenceContextType persistenceContextType;
private PersistenceUnitTransactionType transactionType;
private Map<String, Object> properties;
private LockOptions lockOptions;

protected AbstractEntityManagerImpl(
    EntityManagerFactoryImpl entityManagerFactory,
    PersistenceContextType type,
    PersistenceUnitTransactionType transactionType,
    Map properties ) {
    this.entityManagerFactory = entityManagerFactory;
    this.persistenceContextType = type;
    this.transactionType = transactionType;

    this.lockOptions = new LockOptions();
    this.properties = new HashMap<String, Object>();
    for ( String key : entityManagerSpecificProperties ) {
        if ( entityManagerFactory.getProperties().containsKey( key ) ) {
            this.properties.put( key, entityManagerFactory.getProperties().get( key ) );
        }
        if ( properties != null && properties.containsKey( key ) ) {
            this.properties.put( key, properties.get( key ) );
        }
    }
}

public PersistenceUnitTransactionType getTransactionType() {
    return transactionType;
}

protected void postInit() {
    //register in Sync if needed
    if ( PersistenceUnitTransactionType.JTA.equals( transactionType ) ) {
        joinTransaction( false );
    }
}

```

```

setDefaultProperties();
applyProperties();
}

private void applyProperties() {
    getSession().setFlushMode( ConfigurationHelper.getFlushMode( properties.get( AvailableSettings.FLUSH_MODE
    )) );
    setLockOptions( this.properties, this.lockOptions );
    getSession().setCacheMode(
        CacheModeHelper.interpretCacheMode(
            currentCacheStoreMode(),
            currentCacheRetrieveMode()
        )
    );
}

private Query applyProperties(Query query) {
    if ( lockOptions.getLockMode() != LockMode.NONE ) {
        query.setLockMode( getLockMode(lockOptions.getLockMode()));
    }
    Object queryTimeout;
    if ( (queryTimeout = getProperties().get(QueryHints.SPEC_HINT_TIMEOUT)) != null ) {
        query.setHint ( QueryHints.SPEC_HINT_TIMEOUT, queryTimeout );
    }
    Object lockTimeout;
    if( (lockTimeout = getProperties().get( AvailableSettings.LOCK_TIMEOUT ))!=null){
        query.setHint( AvailableSettings.LOCK_TIMEOUT, lockTimeout );
    }
    return query;
}

private CacheRetrieveMode currentCacheRetrieveMode() {
    return determineCacheRetrieveMode( properties );
}

private CacheRetrieveMode determineCacheRetrieveMode(Map<String, Object> settings) {
    return ( CacheRetrieveMode ) settings.get( AvailableSettings.SHARED_CACHE_RETRIEVE_MODE );
}

private CacheStoreMode currentCacheStoreMode() {
    return determineCacheStoreMode( properties );
}

private CacheStoreMode determineCacheStoreMode(Map<String, Object> settings) {
    return ( CacheStoreMode ) properties.get( AvailableSettings.SHARED_CACHE_STORE_MODE );
}

```

```

private void setLockOptions(Map<String, Object> props, LockOptions options) {
    Object lockScope = props.get( AvailableSettings.LOCK_SCOPE );
    if ( lockScope instanceof String && PessimisticLockScope.valueOf( ( String ) lockScope ) ==
PessimisticLockScope.EXTENDED ) {
        options.setScope( true );
    }
    else if ( lockScope instanceof PessimisticLockScope ) {
        boolean extended = PessimisticLockScope.EXTENDED.equals( lockScope );
        options.setScope( extended );
    }
    else if ( lockScope != null ) {
        throw new PersistenceException( "Unable to parse " + AvailableSettings.LOCK_SCOPE + ": " + lockScope );
    }

    Object lockTimeout = props.get( AvailableSettings.LOCK_TIMEOUT );
    int timeout = 0;
    boolean timeoutSet = false;
    if ( lockTimeout instanceof String ) {
        timeout = Integer.parseInt( ( String ) lockTimeout );
        timeoutSet = true;
    }
    else if ( lockTimeout instanceof Number ) {
        timeout = ( (Number) lockTimeout ).intValue();
        timeoutSet = true;
    }
    else if ( lockTimeout != null ) {
        throw new PersistenceException( "Unable to parse " + AvailableSettings.LOCK_TIMEOUT + ": " + lockTimeout );
    }
    if ( timeoutSet ) {
        if ( timeout < 0 ) {
            options.setTimeout( LockOptions.WAIT_FOREVER );
        }
        else if ( timeout == 0 ) {
            options.setTimeout( LockOptions.NO_WAIT );
        }
        else {
            options.setTimeout( timeout );
        }
    }
}

/**
 * Sets the default property values for the properties the entity manager supports and which are not already explicitly
 * set.
 */
private void setDefaultProperties() {
    if ( properties.get( AvailableSettings.FLUSH_MODE ) == null ) {
        properties.put( AvailableSettings.FLUSH_MODE, getSession().getFlushMode().toString() );
    }
}

```

```

}
if ( properties.get( AvailableSettings.LOCK_SCOPE ) == null ) {
    this.properties.put( AvailableSettings.LOCK_SCOPE, PessimisticLockScope.EXTENDED.name() );
}
if ( properties.get( AvailableSettings.LOCK_TIMEOUT ) == null ) {
    properties.put( AvailableSettings.LOCK_TIMEOUT, LockOptions.WAIT_FOREVER );
}
if ( properties.get( AvailableSettings.SHARED_CACHE_RETRIEVE_MODE ) == null ) {
    properties.put( AvailableSettings.SHARED_CACHE_RETRIEVE_MODE,
CacheModeHelper.DEFAULT_RETRIEVE_MODE );
}
if ( properties.get( AvailableSettings.SHARED_CACHE_STORE_MODE ) == null ) {
    properties.put( AvailableSettings.SHARED_CACHE_STORE_MODE,
CacheModeHelper.DEFAULT_STORE_MODE );
}
}
}

```

```

public Query createQuery(String jpaqlString) {
    try {
        return applyProperties( new QueryImpl<Object>( getSession().createQuery( jpaqlString ), this ) );
    }
    catch ( HibernateException he ) {
        throw convert( he );
    }
}

```

```

public <T> TypedQuery<T> createQuery(String jpaqlString, Class<T> resultClass) {
    try {
        // do the translation
        org.hibernate.Query hqlQuery = getSession().createQuery( jpaqlString );

        resultClassChecking( resultClass, hqlQuery );

        // finally, build/return the query instance
        return new QueryImpl<T>( hqlQuery, this );
    }
    catch ( HibernateException he ) {
        throw convert( he );
    }
}

```

```

public static class TupleBuilderTransformer extends BasicTransformerAdapter {
    private List<TupleElement<?>> tupleElements;
    private Map<String,HqlTupleElementImpl> tupleElementsByAlias;

    public TupleBuilderTransformer(org.hibernate.Query hqlQuery) {
        final Type[] resultTypes = hqlQuery.getReturnTypes();
        final int tupleSize = resultTypes.length;
    }
}

```

```

this.tupleElements = CollectionHelper.arrayList( tupleSize );

final String[] aliases = hqlQuery.getReturnAliases();
final boolean hasAliases = aliases != null && aliases.length > 0;
this.tupleElementsByAlias = hasAliases
    ? CollectionHelper.<String, HqlTupleElementImpl>mapOfSize( tupleSize )
    : Collections.<String, HqlTupleElementImpl>emptyMap();

for ( int i = 0; i < tupleSize; i++ ) {
    final HqlTupleElementImpl tupleElement = new HqlTupleElementImpl(
        i,
        aliases == null ? null : aliases[i],
        resultTypes[i]
    );
    tupleElements.add( tupleElement );
    if ( hasAliases ) {
        final String alias = aliases[i];
        if ( alias != null ) {
            tupleElementsByAlias.put( alias, tupleElement );
        }
    }
}

@Override
public Object transformTuple(Object[] tuple, String[] aliases) {
    if ( tuple.length != tupleElements.size() ) {
        throw new IllegalArgumentException(
            "Size mismatch between tuple result [" + tuple.length + "] and expected tuple elements [" +
            tupleElements.size() + "]"
        );
    }
    return new HqlTupleImpl( tuple );
}

public static class HqlTupleElementImpl<X> implements TupleElement<X> {
    private final int position;
    private final String alias;
    private final Type hibernateType;

    public HqlTupleElementImpl(int position, String alias, Type hibernateType) {
        this.position = position;
        this.alias = alias;
        this.hibernateType = hibernateType;
    }

    @Override

```

```

public Class getJavaType() {
    return hibernateType.getReturnedClass();
}

@Override
public String getAlias() {
    return alias;
}

public int getPosition() {
    return position;
}

public Type getHibernateType() {
    return hibernateType;
}
}

public class HqlTupleImpl implements Tuple {
    private Object[] tuple;

    public HqlTupleImpl(Object[] tuple) {
        this.tuple = tuple;
    }

    @Override
    public <X> X get(String alias, Class<X> type) {
        return (X) get( alias );
    }

    @Override
    public Object get(String alias) {
        HqlTupleElementImpl tupleElement = tupleElementsByAlias.get( alias );
        if ( tupleElement == null ) {
            throw new IllegalArgumentException( "Unknown alias [" + alias + "]" );
        }
        return tuple[ tupleElement.getPosition() ];
    }

    @Override
    public <X> X get(int i, Class<X> type) {
        return (X) get( i );
    }

    @Override
    public Object get(int i) {
        if ( i < 0 ) {
            throw new IllegalArgumentException( "requested tuple index must be greater than zero" );
        }
    }
}

```

```

    }
    if ( i > tuple.length ) {
        throw new IllegalArgumentException( "requested tuple index exceeds actual tuple size" );
    }
    return tuple[i];
}

@Override
public Object[] toArray() {
    // todo : make a copy?
    return tuple;
}

@Override
public List<TupleElement<?>> getElements() {
    return tupleElements;
}

@Override
public <X> X get(TupleElement<X> tupleElement) {
    if ( HqlTupleElementImpl.class.isInstance( tupleElement ) ) {
        return get( ( (HqlTupleElementImpl) tupleElement ).getPosition(), tupleElement.getJavaType() );
    }
    else {
        return get( tupleElement.getAlias(), tupleElement.getJavaType() );
    }
}

}

}

}

}

public <T> TypedQuery<T> createQuery(
    String jpqlString,
    Class<T> resultClass,
    Selection selection,
    Options options) {
    try {
        org.hibernate.Query hqlQuery = getSession().createQuery( jpqlString );

        if ( options.getValueHandlers() == null ) {
            options.setResultMetadataValidator().validate( hqlQuery.getReturnTypes() );
        }

        // determine if we need a result transformer
        List tupleElements = Tuple.class.equals( resultClass )
            ? ( ( CompoundSelectionImpl<Tuple> ) selection ).getCompoundSelectionItems()
            : null;
        if ( options.getValueHandlers() != null || tupleElements != null ) {
            hqlQuery.setResultTransformer(

```

```

    new CriteriaQueryTransformer( options.getValueHandlers(), tupleElements )
);
}
return new QueryImpl<T>( hqlQuery, this, options.getNamedParameterExplicitTypes() );
}
catch ( HibernateException he ) {
    throw convert( he );
}
}

private static class CriteriaQueryTransformer extends BasicTransformerAdapter {
    private final List<ValueHandlerFactory.ValueHandler> valueHandlers;
    private final List tupleElements;

    private CriteriaQueryTransformer(List<ValueHandlerFactory.ValueHandler> valueHandlers, List tupleElements) {
        // todo : should these 2 sizes match *always*?
        this.valueHandlers = valueHandlers;
        this.tupleElements = tupleElements;
    }

    @Override
    public Object transformTuple(Object[] tuple, String[] aliases) {
        final Object[] valueHandlerResult;
        if ( valueHandlers == null ) {
            valueHandlerResult = tuple;
        }
        else {
            valueHandlerResult = new Object[tuple.length];
            for ( int i = 0; i < tuple.length; i++ ) {
                ValueHandlerFactory.ValueHandler valueHandler = valueHandlers.get( i );
                valueHandlerResult[i] = valueHandler == null
                    ? tuple[i]
                    : valueHandler.convert( tuple[i] );
            }
        }

        return tupleElements == null
            ? valueHandlerResult.length == 1 ? valueHandlerResult[0] : valueHandlerResult
            : new TupleImpl( tuple );
    }
}

private class TupleImpl implements Tuple {
    private final Object[] tuples;

    private TupleImpl(Object[] tuples) {
        if ( tuples.length != tupleElements.size() ) {
            throw new IllegalArgumentException(

```

```

        "Size mismatch between tuple result [" + tuples.length
        + "] and expected tuple elements [" + tupleElements.size() + "]"
    );
}
this.tuples = tuples;
}

public <X> X get(TupleElement<X> tupleElement) {
    int index = tupleElements.indexOf( tupleElement );
    if ( index < 0 ) {
        throw new IllegalArgumentException(
            "Requested tuple element did not correspond to element in the result tuple"
        );
    }
    // index should be "in range" by nature of size check in ctor
    return ( X ) tuples[index];
}

public Object get(String alias) {
    int index = -1;
    if ( alias != null ) {
        alias = alias.trim();
        if ( alias.length() > 0 ) {
            int i = 0;
            for ( TupleElement selection : ( List<TupleElement> ) tupleElements ) {
                if ( alias.equals( selection.getAlias() ) ) {
                    index = i;
                    break;
                }
                i++;
            }
        }
    }
    if ( index < 0 ) {
        throw new IllegalArgumentException(
            "Given alias [" + alias + "] did not correspond to an element in the result tuple"
        );
    }
    // index should be "in range" by nature of size check in ctor
    return tuples[index];
}

public <X> X get(String alias, Class<X> type) {
    return ( X ) get( alias );
}

public Object get(int i) {
    if ( i >= tuples.length ) {

```

```

        throw new IllegalArgumentException(
            "Given index [" + i + "] was outside the range of result tuple size [" + tuples.length + "]"
        );
    }
    return tuples[i];
}

public <X> X get(int i, Class<X> type) {
    return ( X ) get( i );
}

public Object[] toArray() {
    return tuples;
}

public List<TupleElement<?>> getElements() {
    return tupleElements;
}
}

private CriteriaQueryCompiler criteriaQueryCompiler;

public <T> TypedQuery<T> createQuery(CriteriaQuery<T> criteriaQuery) {
    if ( criteriaQueryCompiler == null ) {
        criteriaQueryCompiler = new CriteriaQueryCompiler( this );
    }
    return criteriaQueryCompiler.compile( criteriaQuery );
}

public Query createNamedQuery(String name) {
    try {
        org.hibernate.Query namedQuery = getSession().getNamedQuery( name );
        try {
            return new QueryImpl( namedQuery, this );
        }
        catch ( HibernateException he ) {
            throw convert( he );
        }
    }
    catch ( MappingException e ) {
        throw new IllegalArgumentException( "Named query not found: " + name );
    }
}

public <T> TypedQuery<T> createNamedQuery(String name, Class<T> resultClass) {
    try {
        /*

```

```

* Get the named query.
* If the named query is a SQL query, get the expected returned type from the query definition
* or its associated result set mapping
* If the named query is a HQL query, use getReturnType()
*/
org.hibernate.Query namedQuery = getSession().getNamedQuery( name );
//TODO clean this up to avoid downcasting
final SessionFactoryImplementor factoryImplementor = entityManagerFactory.getSessionFactory();
final NamedSQLQueryDefinition queryDefinition = factoryImplementor.getNamedSQLQuery( name );
try {
    if ( queryDefinition != null ) {
        Class<?> actualReturnedClass;

        final NativeSQLQueryReturn[] queryReturns;
        if ( queryDefinition.getQueryReturns() != null ) {
            queryReturns = queryDefinition.getQueryReturns();
        }
        else if ( queryDefinition.getResultSetRef() != null ) {
            final ResultSetMappingDefinition rsMapping = factoryImplementor.getResultSetMapping(
                queryDefinition.getResultSetRef()
            );
            queryReturns = rsMapping.getQueryReturns();
        }
        else {
            throw new AssertionFailure( "Unsupported named query model. Please report the bug in Hibernate
EntityManager");
        }
        if ( queryReturns.length > 1 ) {
            throw new IllegalArgumentException( "Cannot create TypedQuery for query with more than one return" );
        }
        final NativeSQLQueryReturn nativeSQLQueryReturn = queryReturns[0];
        if ( nativeSQLQueryReturn instanceof NativeSQLQueryRootReturn ) {
            final String entityClassName = ( ( NativeSQLQueryRootReturn ) nativeSQLQueryReturn ).getReturnEntityName();
            try {
                actualReturnedClass = ReflectHelper.classNameForName( entityClassName, AbstractEntityManagerImpl.class );
            }
            catch ( ClassNotFoundException e ) {
                throw new AssertionFailure( "Unable to instantiate class declared on named native query: " + name + " " +
entityClassName );
            }
            if ( !resultClass.isAssignableFrom( actualReturnedClass ) ) {
                throw buildIncompatibleException( resultClass, actualReturnedClass );
            }
        }
        else {
            //TODO support other NativeSQLQueryReturn type. For now let it go.
        }
    }
}

```

```

else {
    resultClassChecking( resultClass, namedQuery );

}
return new QueryImpl<T>( namedQuery, this );
}
catch ( HibernateException he ) {
    throw convert( he );
}
}
catch ( MappingException e ) {
    throw new IllegalArgumentException( "Named query not found: " + name );
}
}

private <T> void resultClassChecking(Class<T> resultClass, org.hibernate.Query query) {
    // make sure the query is a select -> HHH-7192
    final SessionImplementor session = unwrap( SessionImplementor.class );
    final HQLQueryPlan queryPlan = session.getFactory().getQueryPlanCache().getHQLQueryPlan(
        query.getQueryString(),
        false,
        session.getLoadQueryInfluencers().getEnabledFilters()
    );
    if ( queryPlan.getTranslators()[0].isManipulationStatement() ) {
        throw new IllegalArgumentException( "Update/delete queries cannot be typed" );
    }

    // do some return type validation checking
    if ( Object[].class.equals( resultClass ) ) {
        // no validation needed
    }
    else if ( Tuple.class.equals( resultClass ) ) {
        TupleBuilderTransformer tupleTransformer = new TupleBuilderTransformer( query );
        query.setResultTransformer( tupleTransformer );
    }
    else {
        final Class dynamicInstantiationClass = queryPlan.getDynamicInstantiationResultType();
        if ( dynamicInstantiationClass != null ) {
            if ( ! resultClass.isAssignableFrom( dynamicInstantiationClass ) ) {
                throw new IllegalArgumentException(
                    "Mismatch in requested result type [" + resultClass.getName() +
                    "] and actual result type [" + dynamicInstantiationClass.getName() + "]"
                );
            }
        }
    }
    else if ( query.getReturnTypes().length == 1 ) {
        // if we have only a single return expression, its java type should match with the requested type
        if ( !resultClass.isAssignableFrom( query.getReturnTypes()[0].getReturnedClass() ) ) {

```

```

        throw new IllegalArgumentException(
            "Type specified for TypedQuery [" +
            resultClass.getName() +
            "] is incompatible with query return type [" +
            query.getReturnTypes()[0].getReturnedClass() + "]"
        );
    }
}
else {
    throw new IllegalArgumentException(
        "Cannot create TypedQuery for query with more than one return using requested result type [" +
        resultClass.getName() + "]"
    );
}
}

private IllegalArgumentException buildIncompatibleException(Class<?> resultClass, Class<?> actualResultClass) {
    return new IllegalArgumentException(
        "Type specified for TypedQuery [" +
        resultClass.getName() +
        "] is incompatible with query return type [" +
        actualResultClass + "]"
    );
}

public Query createNativeQuery(String sqlString) {
    try {
        SQLQuery q = getSession().createSQLQuery( sqlString );
        return new QueryImpl( q, this );
    }
    catch ( HibernateException he ) {
        throw convert( he );
    }
}

public Query createNativeQuery(String sqlString, Class resultClass) {
    try {
        SQLQuery q = getSession().createSQLQuery( sqlString );
        q.addEntity( "alias1", resultClass.getName(), LockMode.READ );
        return new QueryImpl( q, this );
    }
    catch ( HibernateException he ) {
        throw convert( he );
    }
}

public Query createNativeQuery(String sqlString, String resultSetMapping) {

```

```

try {
    SQLQuery q = getSession().createSQLQuery( sqlString );
    q.setResultSetMapping( resultSetMapping );
    return new QueryImpl( q, this );
}
catch ( HibernateException he ) {
    throw convert( he );
}
}

@SuppressWarnings("unchecked")
public <T> T getReference(Class<T> entityClass, Object primaryKey) {
    try {
        return ( T ) getSession().load( entityClass, ( Serializable ) primaryKey );
    }
    catch ( MappingException e ) {
        throw new IllegalArgumentException( e.getMessage(), e );
    }
    catch ( TypeMismatchException e ) {
        throw new IllegalArgumentException( e.getMessage(), e );
    }
    catch ( ClassCastException e ) {
        throw new IllegalArgumentException( e.getMessage(), e );
    }
    catch ( HibernateException he ) {
        throw convert( he );
    }
}

@SuppressWarnings("unchecked")
public <A> A find(Class<A> entityClass, Object primaryKey) {
    return find( entityClass, primaryKey, null, null );
}

public <T> T find(Class<T> entityClass, Object primaryKey, Map<String, Object> properties) {
    return find( entityClass, primaryKey, null, properties );
}

@SuppressWarnings("unchecked")
public <A> A find(Class<A> entityClass, Object primaryKey, LockModeType lockModeType) {
    return find( entityClass, primaryKey, lockModeType, null );
}

public <A> A find(Class<A> entityClass, Object primaryKey, LockModeType lockModeType, Map<String,
Object> properties) {
    CacheMode previousCacheMode = getSession().getCacheMode();
    CacheMode cacheMode = determineAppropriateLocalCacheMode( properties );
    LockOptions lockOptions = null;

```

```

try {
    getSession().setCacheMode( cacheMode );
    if ( lockModeType != null ) {
        lockOptions = getLockRequest( lockModeType, properties );
        return ( A ) getSession().get(
            entityClass, ( Serializable ) primaryKey,
            lockOptions
        );
    }
    else {
        return ( A ) getSession().get( entityClass, ( Serializable ) primaryKey );
    }
}
catch ( EntityNotFoundException ignored ) {
    // DefaultLoadEventListener.returnNarrowedProxy may throw ENFE (see HHH-7861 for details),
    // which find() should not throw. Find() should return null if the entity was not found.
    if ( LOG.isDebugEnabled() ) {
        String entityName = entityClass != null ? entityClass.getName(): null;
        String identifierValue = primaryKey != null ? primaryKey.toString() : null ;
        LOG.ignoringEntityNotFound( entityName, identifierValue );
    }
    return null;
}
catch ( ObjectDeletedException e ) {
    //the spec is silent about people doing remove() find() on the same PC
    return null;
}
catch ( ObjectNotFoundException e ) {
    //should not happen on the entity itself with get
    throw new IllegalArgumentException( e.getMessage(), e );
}
catch ( MappingException e ) {
    throw new IllegalArgumentException( e.getMessage(), e );
}
catch ( TypeMismatchException e ) {
    throw new IllegalArgumentException( e.getMessage(), e );
}
catch ( ClassCastException e ) {
    throw new IllegalArgumentException( e.getMessage(), e );
}
catch ( HibernateException he ) {
    throw convert( he, lockOptions );
}
finally {
    getSession().setCacheMode( previousCacheMode );
}
}

```

```

public CacheMode determineAppropriateLocalCacheMode(Map<String, Object> localProperties) {
    CacheRetrieveMode retrieveMode = null;
    CacheStoreMode storeMode = null;
    if ( localProperties != null ) {
        retrieveMode = determineCacheRetrieveMode( localProperties );
        storeMode = determineCacheStoreMode( localProperties );
    }
    if ( retrieveMode == null ) {
        // use the EM setting
        retrieveMode = determineCacheRetrieveMode( this.properties );
    }
    if ( storeMode == null ) {
        // use the EM setting
        storeMode = determineCacheStoreMode( this.properties );
    }
    return CacheModeHelper.interpretCacheMode( storeMode, retrieveMode );
}

private void checkTransactionNeeded() {
    if ( persistenceContextType == PersistenceContextType.TRANSACTION && !isTransactionInProgress() ) {
        //no need to mark as rollback, no tx in progress
        throw new TransactionRequiredException(
            "no transaction is in progress for a TRANSACTION type persistence context"
        );
    }
}

public void persist(Object entity) {
    checkTransactionNeeded();
    try {
        getSession().persist( entity );
    }
    catch ( MappingException e ) {
        throw new IllegalArgumentException( e.getMessage() );
    }
    catch ( RuntimeException e ) {
        throw convert( e );
    }
}

@SuppressWarnings("unchecked")
public <A> A merge(A entity) {
    checkTransactionNeeded();
    try {
        return ( A ) getSession().merge( entity );
    }
    catch ( ObjectDeletedException sse ) {
        throw new IllegalArgumentException( sse );
    }
}

```

```

    }
    catch ( MappingException e ) {
        throw new IllegalArgumentException( e.getMessage(), e );
    }
    catch ( RuntimeException e ) { //including HibernateException
        throw convert( e );
    }
}

public void remove(Object entity) {
    checkTransactionNeeded();
    try {
        getSession().delete( entity );
    }
    catch ( MappingException e ) {
        throw new IllegalArgumentException( e.getMessage(), e );
    }
    catch ( RuntimeException e ) { //including HibernateException
        throw convert( e );
    }
}

public void refresh(Object entity) {
    refresh( entity, null, null );
}

public void refresh(Object entity, Map<String, Object> properties) {
    refresh( entity, null, properties );
}

public void refresh(Object entity, LockModeType lockModeType) {
    refresh( entity, lockModeType, null );
}

public void refresh(Object entity, LockModeType lockModeType, Map<String, Object> properties) {
    checkTransactionNeeded();
    CacheMode previousCacheMode = getSession().getCacheMode();
    CacheMode localCacheMode = determineAppropriateLocalCacheMode( properties );
    LockOptions lockOptions = null;
    try {
        getSession().setCacheMode( localCacheMode );
        if ( !getSession().contains( entity ) ) {
            throw new IllegalArgumentException( "Entity not managed" );
        }
    }
    if ( lockModeType != null ) {
        lockOptions = getLockRequest( lockModeType, properties );
        getSession().refresh( entity, lockOptions );
    }
}

```

```

else {
    getSession().refresh( entity );
}
}
catch ( MappingException e ) {
    throw new IllegalArgumentException( e.getMessage(), e );
}
catch ( HibernateException he ) {
    throw convert( he, lockOptions );
}
finally {
    getSession().setCacheMode( previousCacheMode );
}
}

public boolean contains(Object entity) {
    try {
        if ( entity != null
            && !( entity instanceof HibernateProxy )
            && getSession().getSessionFactory().getClassMetadata( entity.getClass() ) == null ) {
            throw new IllegalArgumentException( "Not an entity:" + entity.getClass() );
        }
        return getSession().contains( entity );
    }
    catch ( MappingException e ) {
        throw new IllegalArgumentException( e.getMessage(), e );
    }
    catch ( HibernateException he ) {
        throw convert( he );
    }
}

public LockModeType getLockMode(Object entity) {
    if ( !contains( entity ) ) {
        throw new IllegalArgumentException( "entity not in the persistence context" );
    }
    return getLockModeType( getSession().getCurrentLockMode( entity ) );
}

public void setProperty(String s, Object o) {
    if ( entityManagerSpecificProperties.contains( s ) ) {
        properties.put( s, o );
        applyProperties();
    } else LOG.debugf("Trying to set a property which is not supported on entity manager level!");
}

public Map<String, Object> getProperties() {
    return Collections.unmodifiableMap( properties );
}

```

```

}

public void flush() {
    if ( !isTransactionInProgress() ) {
        throw new TransactionRequiredException( "no transaction is in progress" );
    }
    try {
        getSession().flush();
    }
    catch ( RuntimeException e ) {
        throw convert( e );
    }
}

/**
 * return a Session
 *
 * @throws IllegalStateException if the entity manager is closed
 */
public abstract Session getSession();

/**
 * Return a Session (even if the entity manager is closed).
 *
 * @return A session.
 */
protected abstract Session getRawSession();

public EntityTransaction getTransaction() {
    if ( transactionType == PersistenceUnitTransactionType.JTA ) {
        throw new IllegalStateException( "A JTA EntityManager cannot use getTransaction()" );
    }
    return tx;
}

/**
 * {@inheritDoc}
 */
public EntityManagerFactoryImpl getEntityManagerFactory() {
    return entityManagerFactory;
}

/**
 * {@inheritDoc}
 */
public HibernateEntityManagerFactory getFactory() {
    return entityManagerFactory;
}

```

```

/**
 * {@inheritDoc}
 */
public CriteriaBuilder getCriteriaBuilder() {
    return getEntityManagerFactory().getCriteriaBuilder();
}

/**
 * {@inheritDoc}
 */
public Metamodel getMetamodel() {
    return getEntityManagerFactory().getMetamodel();
}

public void setFlushMode(FlushModeType flushModeType) {
    if ( flushModeType == FlushModeType.AUTO ) {
        getSession().setFlushMode( FlushMode.AUTO );
    }
    else if ( flushModeType == FlushModeType.COMMIT ) {
        getSession().setFlushMode( FlushMode.COMMIT );
    }
    else {
        throw new AssertionError( "Unknown FlushModeType: " + flushModeType );
    }
}

public void clear() {
    try {
        getSession().clear();
    }
    catch ( HibernateException he ) {
        throw convert( he );
    }
}

public void detach(Object entity) {
    try {
        getSession().evict( entity );
    }
    catch ( HibernateException he ) {
        throw convert( he );
    }
}

/**
 * Hibernate can be set in various flush modes that are unknown to
 * JPA 2.0. This method can then return null.

```

```

* If it returns null, do em.unwrap(Session.class).getFlushMode() to get the
* Hibernate flush mode
*/
public FlushModeType getFlushMode() {
    FlushMode mode = getSession().getFlushMode();
    if ( mode == FlushMode.AUTO ) {
        return FlushModeType.AUTO;
    }
    else if ( mode == FlushMode.COMMIT ) {
        return FlushModeType.COMMIT;
    }
    else {
        // otherwise this is an unknown mode for EJB3
        return null;
    }
}

public void lock(Object entity, LockModeType lockMode) {
    lock( entity, lockMode, null );
}

public void lock(Object entity, LockModeType lockModeType, Map<String, Object> properties) {
    LockOptions lockOptions = null;
    if ( !isTransactionInProgress() ) {
        throw new TransactionRequiredException( "no transaction is in progress" );
    }

    try {
        if ( !contains( entity ) ) {
            throw new IllegalArgumentException( "entity not in the persistence context" );
        }
        lockOptions = getLockRequest( lockModeType, properties );
        getSession().buildLockRequest( lockOptions ).lock( entity );
    }
    catch ( HibernateException he ) {
        throw convert( he, lockOptions );
    }
}

public LockOptions getLockRequest(LockModeType lockModeType, Map<String, Object> properties) {
    LockOptions lockOptions = new LockOptions();
    LockOptions.copy( this.lockOptions, lockOptions );
    lockOptions.setLockMode( getLockMode( lockModeType ) );
    if ( properties != null ) {
        setLockOptions( properties, lockOptions );
    }
    return lockOptions;
}

```

```

@SuppressWarnings("deprecation")
private static LockModeType getLockModeType(LockMode lockMode) {
    //TODO check that if we have UPGRADE_NOWAIT we have a timeout of zero?
    return LockModeTypeHelper.getLockModeType( lockMode );
}

private static LockMode getLockMode(LockModeType lockMode) {
    return LockModeTypeHelper.getLockMode( lockMode );
}

public boolean isTransactionInProgress() {
    return ( ( SessionImplementor ) getRawSession() ).isTransactionInProgress();
}

private SessionFactoryImplementor sfi() {
    return (SessionFactoryImplementor) getRawSession().getSessionFactory();
}

protected void markAsRollback() {
    LOG.debugf("Mark transaction for rollback");
    if ( tx.isActive() ) {
        tx.setRollbackOnly();
    }
    else {
        //no explicit use of the tx. boundaries methods
        if ( PersistenceUnitTransactionType.JTA == transactionType ) {
            TransactionManager transactionManager = sfi().getServiceRegistry().getService( JtaPlatform.class
).retrieveTransactionManager();
            if ( transactionManager == null ) {
                throw new PersistenceException(
                    "Using a JTA persistence context wo setting hibernate.transaction.manager_lookup_class"
                );
            }
            try {
                if ( transactionManager.getStatus() != Status.STATUS_NO_TRANSACTION ) {
                    transactionManager.setRollbackOnly();
                }
            }
            catch ( SystemException e ) {
                throw new PersistenceException( "Unable to set the JTA transaction as RollbackOnly", e );
            }
        }
    }

    public void joinTransaction() {

```

```

if( !isOpen() ){
    throw new IllegalStateException( "EntityManager is closed" );
}
joinTransaction( true );
}

public <T> T unwrap(Class<T> clazz) {
    if ( Session.class.isAssignableFrom( clazz ) ) {
        return ( T ) getSession();
    }
    if ( SessionImplementor.class.isAssignableFrom( clazz ) ) {
        return ( T ) getSession();
    }
    if ( EntityManager.class.isAssignableFrom( clazz ) ) {
        return ( T ) this;
    }
    throw new PersistenceException( "Hibernate cannot unwrap " + clazz );
}

private void joinTransaction(boolean explicitRequest) {
    if ( transactionType != PersistenceUnitTransactionType.JTA ) {
        if ( explicitRequest ) {
            LOG.callingJoinTransactionOnNonJtaEntityManager();
        }
        return;
    }

    final SessionImplementor session = (SessionImplementor) getSession();
    final TransactionCoordinator transactionCoordinator = session.getTransactionCoordinator();
    final TransactionImplementor transaction = transactionCoordinator.getTransaction();

    transaction.markForJoin();
    transactionCoordinator.pulse();

    LOG.debug( "Looking for a JTA transaction to join" );
    if ( ! transactionCoordinator.isTransactionJoinable() ) {
        if ( explicitRequest ) {
            // if this is an explicit join request, log a warning so user can track underlying cause
            // of subsequent exceptions/messages
            LOG.unableToJoinTransaction(Environment.TRANSACTION_STRATEGY);
        }
    }

    try {
        if ( transaction.getJoinStatus() == JoinStatus.JOINED ) {
            LOG.debug( "Transaction already joined" );
            return; // noop
        }
    }

```

```

// join the transaction and then recheck the status
transaction.join();
if ( transaction.getJoinStatus() == JoinStatus.NOT_JOINED ) {
    if ( explicitRequest ) {
        throw new TransactionRequiredException( "No active JTA transaction on joinTransaction call" );
    }
    else {
        LOG.debug( "Unable to join JTA transaction" );
        return;
    }
}
else if ( transaction.getJoinStatus() == JoinStatus.MARKED_FOR_JOINED ) {
    throw new AssertionFailure( "Transaction MARKED_FOR_JOINED after isOpen() call" );
}

// register behavior changes
SynchronizationCallbackCoordinator callbackCoordinator =
transactionCoordinator.getSynchronizationCallbackCoordinator();
callbackCoordinator.setManagedFlushChecker( new ManagedFlushCheckerImpl() );
callbackCoordinator.setExceptionHandler( new CallbackExceptionHandlerImpl() );
callbackCoordinator.setAfterCompletionAction( new AfterCompletionActionImpl( session, transactionType ) );
}
catch ( HibernateException he ) {
    throw convert( he );
}
}

/**
 * returns the underlying session
 */
public Object getDelegate() {
    return getSession();
}

private void writeObject(ObjectOutputStream oos) throws IOException {
    oos.defaultWriteObject();
}

private void readObject(ObjectInputStream ois) throws IOException, ClassNotFoundException {
    ois.defaultReadObject();
    tx = new TransactionImpl( this );
}

/**
 * {@inheritDoc}
 */
public void handlePersistenceException(PersistenceException e) {

```

```

if ( e instanceof NoResultException ) {
    return;
}
if ( e instanceof NonUniqueResultException ) {
    return;
}
if ( e instanceof LockTimeoutException ) {
    return;
}
if ( e instanceof QueryTimeoutException ) {
    return;
}

try {
    markAsRollback();
}
catch ( Exception ne ) {
    //we do not want the subsequent exception to swallow the original one
    LOG.unableToMarkForRollbackOnPersistenceException(ne);
}
}

/**
 * {@inheritDoc}
 */
public void throwPersistenceException(PersistenceException e) {
    handlePersistenceException( e );
    throw e;
}

/**
 * {@inheritDoc}
 */
//FIXME should we remove all calls to this method and use convert(RuntimeException) ?
public RuntimeException convert(HibernateException e) {
    return convert( e, null );
}

public RuntimeException convert(RuntimeException e) {
    RuntimeException result = e;
    if ( e instanceof HibernateException ) {
        result = convert( ( HibernateException ) e );
    }
    else {
        markAsRollback();
    }
    return result;
}

```

```

/**
 * {@inheritDoc}
 */
public RuntimeException convert(HibernateException e, LockOptions lockOptions) {
    if ( e instanceof StaleStateException ) {
        PersistenceException converted = wrapStaleStateException( ( StaleStateException ) e );
        handlePersistenceException( converted );
        return converted;
    }
    else if ( e instanceof LockingStrategyException ) {
        PersistenceException converted = wrapLockException( e, lockOptions );
        handlePersistenceException( converted );
        return converted;
    }
    else if ( e instanceof org.hibernate.exception.LockTimeoutException ) {
        PersistenceException converted = wrapLockException( e, lockOptions );
        handlePersistenceException( converted );
        return converted;
    }
    else if ( e instanceof org.hibernate.PessimisticLockException ) {
        PersistenceException converted = wrapLockException( e, lockOptions );
        handlePersistenceException( converted );
        return converted;
    }
    else if ( e instanceof org.hibernate.QueryTimeoutException ) {
        QueryTimeoutException converted = new QueryTimeoutException(e.getMessage(), e);
        handlePersistenceException( converted );
        return converted;
    }
    else if ( e instanceof ObjectNotFoundException ) {
        EntityNotFoundException converted = new EntityNotFoundException( e.getMessage() );
        handlePersistenceException( converted );
        return converted;
    }
    else if ( e instanceof org.hibernate.NonUniqueObjectException ) {
        EntityExistsException converted = new EntityExistsException( e.getMessage() );
        handlePersistenceException( converted );
        return converted;
    }
    else if ( e instanceof org.hibernate.NonUniqueResultException ) {
        NonUniqueResultException converted = new NonUniqueResultException( e.getMessage() );
        handlePersistenceException( converted );
        return converted;
    }
    else if ( e instanceof UnresolvableObjectException ) {
        EntityNotFoundException converted = new EntityNotFoundException( e.getMessage() );
        handlePersistenceException( converted );
    }
}

```

```

return converted;
}
else if ( e instanceof QueryException ) {
return new IllegalArgumentException( e );
}
else if ( e instanceof TransientObjectException ) {
try {
markAsRollback();
}
catch ( Exception ne ) {
//we do not want the subsequent exception to swallow the original one
LOG.unableToMarkForRollbackOnTransientObjectException(ne);
}
return new IllegalStateException( e ); //Spec 3.2.3 Synchronization rules
}
else {
PersistenceException converted = new PersistenceException( e );
handlePersistenceException( converted );
return converted;
}
}

/**
 * {@inheritDoc}
 */
public void throwPersistenceException(HibernateException e) {
throw convert( e );
}

/**
 * {@inheritDoc}
 */
public PersistenceException wrapStaleStateException(StaleStateException e) {
PersistenceException pe;
if ( e instanceof StaleObjectStateException ) {
StaleObjectStateException sose = ( StaleObjectStateException ) e;
Serializable identifier = sose.getIdentifier();
if ( identifier != null ) {
try {
Object entity = getRawSession().load( sose.getEntityName(), identifier );
if ( entity instanceof Serializable ) {
//avoid some user errors regarding boundary crossing
pe = new OptimisticLockException( null, e, entity );
}
}
else {
pe = new OptimisticLockException( e );
}
}
}
}

```

```

catch ( EntityNotFoundException enfe ) {
    pe = new OptimisticLockException( e );
}
}
else {
    pe = new OptimisticLockException( e );
}
}
else {
    pe = new OptimisticLockException( e );
}
}
return pe;
}

public PersistenceException wrapLockException(HibernateException e, LockOptions lockOptions) {
    final PersistenceException pe;
    if ( e instanceof OptimisticEntityLockException ) {
        final OptimisticEntityLockException lockException = (OptimisticEntityLockException) e;
        pe = new OptimisticLockException( lockException.getMessage(), lockException, lockException.getEntity() );
    }
    else if ( e instanceof org.hibernate.exception.LockTimeoutException ) {
        pe = new LockTimeoutException( e.getMessage(), e, null );
    }
    else if ( e instanceof PessimisticEntityLockException ) {
        PessimisticEntityLockException lockException = (PessimisticEntityLockException) e;
        if ( lockOptions != null && lockOptions.getTimeout() > -1 ) {
            // assume lock timeout occurred if a timeout or NO WAIT was specified
            pe = new LockTimeoutException( lockException.getMessage(), lockException, lockException.getEntity() );
        }
        else {
            pe = new PessimisticLockException( lockException.getMessage(), lockException, lockException.getEntity() );
        }
    }
    else if ( e instanceof org.hibernate.PessimisticLockException ) {
        org.hibernate.PessimisticLockException jdbcLockException = ( org.hibernate.PessimisticLockException ) e;
        if ( lockOptions != null && lockOptions.getTimeout() > -1 ) {
            // assume lock timeout occurred if a timeout or NO WAIT was specified
            pe = new LockTimeoutException( jdbcLockException.getMessage(), jdbcLockException, null );
        }
        else {
            pe = new PessimisticLockException( jdbcLockException.getMessage(), jdbcLockException, null );
        }
    }
    else {
        pe = new OptimisticLockException( e );
    }
    return pe;
}

```

```

private static class AfterCompletionActionImpl implements AfterCompletionAction {
    private final SessionImplementor session;
    private final PersistenceUnitTransactionType transactionType;

    private AfterCompletionActionImpl(SessionImplementor session, PersistenceUnitTransactionType transactionType)
    {
        this.session = session;
        this.transactionType = transactionType;
    }

    @Override
    public void doAction(TransactionCoordinator transactionCoordinator, int status) {
        if ( session.isClosed() ) {
            LOG.trace("Session was closed; nothing to do");
            return;
        }

        final boolean successful = JtaStatusHelper.isCommitted( status );
        if ( !successful && transactionType == PersistenceUnitTransactionType.JTA ) {
            ( (Session) session ).clear();
        }
        session.getTransactionCoordinator().resetJoinStatus();
    }
}

private static class ManagedFlushCheckerImpl implements ManagedFlushChecker {
    @Override
    public boolean shouldDoManagedFlush(TransactionCoordinator coordinator, int jtaStatus) {
        return ! coordinator.getTransactionContext().isClosed() &&
            ! coordinator.getTransactionContext().isFlushModeNever() &&
            ! JtaStatusHelper.isRollback( jtaStatus );
    }
}

private class CallbackExceptionMapperImpl implements ExceptionMapper {
    @Override
    public RuntimeException mapStatusCheckFailure(String message, SystemException systemException) {
        throw new PersistenceException( message, systemException );
    }

    @Override
    public RuntimeException mapManagedFlushFailure(String message, RuntimeException failure) {
        if ( HibernateException.class.isInstance( failure ) ) {
            throw convert( failure );
        }
        if ( PersistenceException.class.isInstance( failure ) ) {
            throw failure;
        }
    }
}

```

```

    }
    throw new PersistenceException( message, failure );
    }
}
}
/*
 * Hibernate, Relational Persistence for Idiomatic Java
 *
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 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb;

import java.util.List;
import java.util.Map;
import javax.persistence.LockModeType;
import javax.persistence.PersistenceException;
import javax.persistence.TypedQuery;
import javax.persistence.criteria.Selection;

import org.hibernate.HibernateException;
import org.hibernate.LockOptions;
import org.hibernate.StaleStateException;
import org.hibernate.ejb.criteria.ValueHandlerFactory;
import org.hibernate.type.Type;

/**
 * Additional internal contracts for the Hibernate { @link javax.persistence.EntityManager } implementation.
 *
 * @author Emmanuel Bernard
 * @author Steve Ebersole

```

```

*/
public interface HibernateEntityManagerImplementor extends HibernateEntityManager {
/**
 * Get access to the Hibernate extended EMF contract.
 *
 * @return The Hibernate EMF contract for this EM.
 */
public HibernateEntityManagerFactory getFactory();

/**
 * Provides access to whether a transaction is currently in progress.
 *
 * @return True if a transaction is considered currently in progress; false otherwise.
 */
boolean isTransactionInProgress();

/**
 * Handles marking for rollback and other such operations that need to occur depending on the type of
 * exception being handled.
 *
 * @param e The exception being handled.
 */
public void handlePersistenceException(PersistenceException e);

/**
 * Delegates to { @link #handlePersistenceException } and then throws the given exception.
 *
 * @param e The exception being handled and finally thrown.
 */
public void throwPersistenceException(PersistenceException e);

/**
 * Converts a Hibernate-specific exception into a JPA-specified exception; note that the JPA specification makes use
 * of exceptions outside its exception hierarchy, though they are all runtime exceptions.
 * <p/>
 * Any appropriate/needed calls to { @link #handlePersistenceException } are also made.
 *
 * @param e The Hibernate exception.
 * @param lockOptions The lock options in effect at the time of exception (can be null)
 *
 * @return The JPA-specified exception
 */
public RuntimeException convert(HibernateException e, LockOptions lockOptions);

/**
 * Converts a Hibernate-specific exception into a JPA-specified exception; note that the JPA specification makes use
 * of exceptions outside its exception hierarchy, though they are all runtime exceptions.
 * <p/>

```

```

* Any appropriate/needed calls to { @link #handlePersistenceException } are also made.
*
* @param e The Hibernate exception.
*
* @return The JPA-specified exception
*/
public RuntimeException convert(HibernateException e);

/**
* Delegates to { @link #convert } and then throws the given exception.
*
* @param e The exception being handled and finally thrown.
*/
public void throwPersistenceException(HibernateException e);

public PersistenceException wrapStaleStateException(StaleStateException e);

/**
* Convert from JPA 2 { @link LockModeType } & properties into { @link LockOptions }
*
* @param lockModeType is the requested lock type
* @param properties are the lock properties
*
* @return the LockOptions
*/
public LockOptions getLockRequest(LockModeType lockModeType, Map<String, Object> properties);

public static interface Options {
public static interface ResultMetadataValidator {
public void validate(Type[] returnTypes);
}
}

/**
* Get the conversions for the individual tuples in the query results.
*
* @return Value conversions to be applied to the JPA QL results
*/
public List<ValueHandlerFactory.ValueHandler> getValueHandlers();

/**
* Get the explicit parameter types. Generally speaking these would apply to implicit named
* parameters.
*
* @return The
*/
public Map<String, Class> getNamedParameterExplicitTypes();

public ResultMetadataValidator getResultMetadataValidator();

```

```

}

/**
 * Used during "compiling" a JPA criteria query.
 *
 * @param jpaqlString The criteria query rendered as a JPA QL string
 * @param resultClass The result type (the type expected in the result list)
 * @param selection The selection(s)
 * @param options The options to use to build the query.
 * @param <T> The query type
 *
 * @return The typed query
 */
public <T> TypedQuery<T> createQuery(String jpaqlString, Class<T> resultClass, Selection selection, Options
options);
}
/*
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 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */

//$Id$
package org.hibernate.ejb;

import javax.persistence.EntityTransaction;
import javax.persistence.PersistenceException;
import javax.persistence.RollbackException;

import org.hibernate.HibernateException;
import org.hibernate.Session;
import org.hibernate.Transaction;

```

```

/**
 * @author Gavin King
 * @author Emmanuel Bernard
 */
public class TransactionImpl implements EntityTransaction {

    private EntityManagerImplementor entityManager;
    private Transaction tx;
    private boolean rollbackOnly;

    public TransactionImpl(AbstractEntityManagerImpl entityManager) {
        this.entityManager = entityManager;
    }

    private Session getSession() {
        return entityManager.getSession();
    }

    public void begin() {
        try {
            rollbackOnly = false;
            if ( tx != null && tx.isActive() ) {
                throw new IllegalStateException( "Transaction already active" );
            }
            //entityManager.adjustFlushMode();
            tx = getSession().beginTransaction();
        }
        catch (HibernateException he) {
            entityManager.throwPersistenceException( he );
        }
    }

    public void commit() {
        if ( tx == null || !tx.isActive() ) {
            throw new IllegalStateException( "Transaction not active" );
        }
        if ( rollbackOnly ) {
            tx.rollback();
            throw new RollbackException( "Transaction marked as rollbackOnly" );
        }
        try {
            tx.commit();
        }
        catch (Exception e) {
            Exception wrappedException;
            if (e instanceof HibernateException) {
                wrappedException = entityManager.convert( (HibernateException)e );
            }
        }
    }
}

```

```

    }
    else {
        wrappedException = e;
    }
    try {
        //as per the spec we should rollback if commit fails
        tx.rollback();
    }
    catch (Exception re) {
        //swallow
    }
    throw new RollbackException( "Error while committing the transaction", wrappedException );
}
finally {
    rollbackOnly = false;
}
//if closed and we commit, the mode should have been adjusted already
//if ( entityManager.isOpen() ) entityManager.adjustFlushMode();
}

public void rollback() {
    if ( tx == null || !tx.isActive() ) {
        throw new IllegalStateException( "Transaction not active" );
    }
    try {
        tx.rollback();
    }
    catch (Exception e) {
        throw new PersistenceException( "unexpected error when rollbacking", e );
    }
    finally {
        try {
            if (entityManager != null) {
                Session session = getSession();
                if ( session != null && session.isOpen() ) session.clear();
            }
        }
        catch (Throwable t) {
            //we don't really care here since it's only for safety purpose
        }
        rollbackOnly = false;
    }
}

public void setRollbackOnly() {
    if ( !isActive() ) throw new IllegalStateException( "Transaction not active" );
    this.rollbackOnly = true;
}

```

```

public boolean getRollbackOnly() {
    if ( ! isActive() ) throw new IllegalStateException( "Transaction not active" );
    return rollbackOnly;
}

public boolean isActive() {
    try {
        return tx != null && tx.isActive();
    }
    catch (RuntimeException e) {
        throw new PersistenceException( "unexpected error when checking transaction status", e );
    }
}

}
/*
 * Hibernate, Relational Persistence for Idiomatic Java
 *
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 * You should have received a copy of the GNU Lesser General Public License
 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb;

import static javax.persistence.TemporalType.DATE;
import static javax.persistence.TemporalType.TIME;
import static javax.persistence.TemporalType.TIMESTAMP;

import java.util.Calendar;
import java.util.Collection;
import java.util.Collections;

```

```

import java.util.Date;
import java.util.HashSet;
import java.util.List;
import java.util.Map;
import java.util.Set;

import javax.persistence.NoResultException;
import javax.persistence.NonUniqueResultException;
import javax.persistence.Parameter;
import javax.persistence.PersistenceException;
import javax.persistence.Query;
import javax.persistence.TemporalType;
import javax.persistence.TransactionRequiredException;
import javax.persistence.TypedQuery;

import org.hibernate.CacheMode;
import org.hibernate.FlushMode;
import org.hibernate.HibernateException;
import org.hibernate.LockMode;
import org.hibernate.QueryParameterException;
import org.hibernate.TypeMismatchException;
import org.hibernate.ejb.internal.EntityManagerMessageLogger;
import org.hibernate.ejb.util.ConfigurationHelper;
import org.hibernate.ejb.util.LockModeTypeHelper;
import org.hibernate.engine.query.spi.NamedParameterDescriptor;
import org.hibernate.engine.query.spi.OrdinalParameterDescriptor;
import org.hibernate.engine.spi.SessionFactoryImplementor;
import org.hibernate.hql.internal.QueryExecutionRequestException;
import org.hibernate.internal.AbstractQueryImpl;
import org.hibernate.internal.SQLQueryImpl;
import org.hibernate.type.CompositeCustomType;
import org.hibernate.type.Type;
import org.jboss.logging.Logger;

/**
 * Hibernate implementation of both the { @link Query } and { @link TypedQuery } contracts.
 *
 * @author <a href="mailto:gavin@hibernate.org">Gavin King</a>
 * @author Emmanuel Bernard
 * @author Steve Ebersole
 */
public class QueryImpl<X> extends org.hibernate.ejb.AbstractQueryImpl<X> implements TypedQuery<X>,
HibernateQuery {

    public static final EntityManagerMessageLogger LOG =
Logger.getMessageLogger(EntityManagerMessageLogger.class, QueryImpl.class.getName());

    private AbstractQueryImpl query;

```

```

private Set<Integer> jpaPositionalIndices;
private Set<Parameter<?>> parameters;

public QueryImpl(org.hibernate.Query query, AbstractEntityManagerImpl em) {
    this( query, em, Collections.<String, Class>emptyMap() );
}

public QueryImpl(
    org.hibernate.Query query,
    AbstractEntityManagerImpl em,
    Map<String,Class> namedParameterTypeRedefinitions) {
    super( em );
    if ( ! AbstractQueryImpl.class.isInstance( query ) ) {
        throw new IllegalStateException(
            String.format( "Unknown query type [%s]", query.getClass().getName() )
        );
    }
    this.query = (AbstractQueryImpl) query;
    extractParameterInfo( namedParameterTypeRedefinitions );
}

@SuppressWarnings({ "unchecked", "RedundantCast" })
private void extractParameterInfo(Map<String,Class> namedParameterTypeRedefinition) {
    if ( ! AbstractQueryImpl.class.isInstance( query ) ) {
        throw new IllegalStateException( "Unknown query type for parameter extraction" );
    }

    HashSet<Parameter<?>> parameters = new HashSet<Parameter<?>>();
    AbstractQueryImpl queryImpl = AbstractQueryImpl.class.cast( query );

    // extract named params
    for ( String name : (Set<String>) queryImpl.getParameterMetadata().getNamedParameterNames() ) {
        final NamedParameterDescriptor descriptor =
            queryImpl.getParameterMetadata().getNamedParameterDescriptor( name );
        Class javaType = namedParameterTypeRedefinition.get( name );
        if ( javaType != null && mightNeedRedefinition( javaType, descriptor.getExpectedType() ) ) {
            descriptor.resetExpectedType(
                sfi().getTypeResolver().heuristicType( javaType.getName() )
            );
        }
        else if ( descriptor.getExpectedType() != null ) {
            javaType = descriptor.getExpectedType().getReturnedClass();
        }
        final ParameterImpl parameter = new ParameterImpl( name, javaType );
        parameters.add( parameter );
        if ( descriptor.isJpaStyle() ) {
            if ( jpaPositionalIndices == null ) {
                jpaPositionalIndices = new HashSet<Integer>();
            }
        }
    }
}

```

```

    }
    jpaPositionalIndices.add( Integer.valueOf( name ) );
    }
}

// extract positional parameters
for ( int i = 0, max = queryImpl.getParameterMetadata().getOrdinalParameterCount(); i < max; i++ ) {
    final OrdinalParameterDescriptor descriptor =
        queryImpl.getParameterMetadata().getOrdinalParameterDescriptor( i+1 );
    ParameterImpl parameter = new ParameterImpl(
        i + 1,
        descriptor.getExpectedType() == null
            ? null
            : descriptor.getExpectedType().getReturnedClass()
    );
    parameters.add( parameter );
    Integer position = descriptor.getOrdinalPosition();
    if (jpaPositionalIndices != null && jpaPositionalIndices.contains(position))
        LOG.parameterPositionOccurredAsBothJpaAndHibernatePositionalParameter(position);
}

this.parameters = java.util.Collections.unmodifiableSet( parameters );
}

private SessionFactoryImplementor sfi() {
    return (SessionFactoryImplementor) getEntityManager().getFactory().getSessionFactory();
}

private boolean mightNeedRedefinition(Class javaType, Type expectedType) {
    // only redefine dates/times/timestamps that are not wrapped in a CompositeCustomType
    if (expectedType == null)
        return java.util.Date.class.isAssignableFrom( javaType );
    else
        return java.util.Date.class.isAssignableFrom( javaType ) && !CompositeCustomType.class.isAssignableFrom(
            expectedType.getClass() );
}

private static class ParameterImpl implements Parameter {
    private final String name;
    private final Integer position;
    private final Class javaType;

    private ParameterImpl(String name, Class javaType) {
        this.name = name;
        this.javaType = javaType;
        this.position = null;
    }
}

```

```

private ParameterImpl(Integer position, Class javaType) {
    this.position = position;
    this.javaType = javaType;
    this.name = null;
}

public String getName() {
    return name;
}

public Integer getPosition() {
    return position;
}

public Class getParameterType() {
    return javaType;
}

public org.hibernate.Query getHibernateQuery() {
    return query;
}

@Override
protected int internalExecuteUpdate() {
    return query.executeUpdate();
}

@Override
protected void applyMaxResults(int maxResults) {
    query.setMaxResults( maxResults );
}

@Override
protected void applyFirstResult(int firstResult) {
    query.setFirstResult( firstResult );
}

@Override
protected void applyTimeout(int timeout) {
    query.setTimeout( timeout );
}

@Override
protected void applyComment(String comment) {
    query.setComment( comment );
}

```

```

@Override
protected void applyFetchSize(int fetchSize) {
    query.setFetchSize( fetchSize );
}

@Override
protected void applyCacheable(boolean isCacheable) {
    query.setCacheable( isCacheable );
}

@Override
protected void applyCacheRegion(String regionName) {
    query.setCacheRegion( regionName );
}

@Override
protected void applyReadOnly(boolean isReadOnly) {
    query.setReadOnly( isReadOnly );
}

@Override
protected void applyCacheMode(CacheMode cacheMode) {
    query.setCacheMode( cacheMode );
}

@Override
protected void applyFlushMode(FlushMode flushMode) {
    query.setFlushMode( flushMode );
}

@Override
protected boolean canApplyLockModes() {
    return org.hibernate.internal.QueryImpl.class.isInstance( query )
        || SQLQueryImpl.class.isInstance( query );
}

@Override
protected void applyAliasSpecificLockMode(String alias, LockMode lockMode) {
    query.getLockOptions().setAliasSpecificLockMode( alias, lockMode );
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked", "RedundantCast" })
public List<X> getResultList() {
    try {
        return query.list();
    }
}

```

```

    }
    catch (QueryExecutionRequestException he) {
        throw new IllegalStateException(he);
    }
    catch( TypeMismatchException e ) {
        throw new IllegalArgumentException(e);
    }
    catch (HibernateException he) {
        throw getEntityManager().convert( he );
    }
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked", "RedundantCast" })
public X getSingleResult() {
    try {
        final List<X> result = query.list();

        if ( result.size() == 0 ) {
            NoResultException nre = new NoResultException( "No entity found for query" );
            getEntityManager().handlePersistenceException( nre );
            throw nre;
        }
        else if ( result.size() > 1 ) {
            final Set<X> uniqueResult = new HashSet<X>(result);
            if ( uniqueResult.size() > 1 ) {
                NonUniqueResultException nure = new NonUniqueResultException( "result returns more than one elements" );
                getEntityManager().handlePersistenceException( nure );
                throw nure;
            }
        }
        else {
            return uniqueResult.iterator().next();
        }
    }
    else {
        return result.get( 0 );
    }
}
catch (QueryExecutionRequestException he) {
    throw new IllegalStateException(he);
}
catch( TypeMismatchException e ) {
    throw new IllegalArgumentException(e);
}
catch (HibernateException he) {
    throw getEntityManager().convert( he );
}

```

```

}
}

public <T> TypedQuery<X> setParameter(Parameter<T> param, T value) {
    if ( ! parameters.contains( param ) ) {
        throw new IllegalArgumentException( "Specified parameter was not found in query" );
    }
    if ( param.getName() != null ) {
        // a named param, for not delegate out. Eventually delegate *into* this method...
        setParameter( param.getName(), value );
    }
    else {
        setParameter( param.getPosition(), value );
    }
    return this;
}

public TypedQuery<X> setParameter(Parameter<Date> param, Date value, TemporalType temporalType) {
    if ( ! parameters.contains( param ) ) {
        throw new IllegalArgumentException( "Specified parameter was not found in query" );
    }
    if ( param.getName() != null ) {
        // a named param, for not delegate out. Eventually delegate *into* this method...
        setParameter( param.getName(), value, temporalType );
    }
    else {
        setParameter( param.getPosition(), value, temporalType );
    }
    return this;
}

public TypedQuery<X> setParameter(Parameter<Calendar> param, Calendar value, TemporalType temporalType)
{
    if ( ! parameters.contains( param ) ) {
        throw new IllegalArgumentException( "Specified parameter was not found in query" );
    }
    if ( param.getName() != null ) {
        // a named param, for not delegate out. Eventually delegate *into* this method...
        setParameter( param.getName(), value, temporalType );
    }
    else {
        setParameter( param.getPosition(), value, temporalType );
    }
    return this;
}

/**
 * {@inheritDoc}

```

```

*/
public TypedQuery<X> setParameter(String name, Object value) {
    try {
        if ( value instanceof Collection ) {
            query.setParameterList( name, (Collection) value );
        }
        else {
            query.setParameter( name, value );
        }
        registerParameterBinding( getParameter( name ), value );
        return this;
    }
    catch (QueryParameterException e) {
        throw new IllegalArgumentException( e );
    }
    catch (HibernateException he) {
        throw getEntityManager().convert( he );
    }
}

/**
 * {@inheritDoc}
 */
public TypedQuery<X> setParameter(String name, Date value, TemporalType temporalType) {
    try {
        if ( temporalType == DATE ) {
            query.setDate( name, value );
        }
        else if ( temporalType == TIME ) {
            query.setTime( name, value );
        }
        else if ( temporalType == TIMESTAMP ) {
            query.setTimestamp( name, value );
        }
        registerParameterBinding( getParameter( name ), value );
        return this;
    }
    catch (QueryParameterException e) {
        throw new IllegalArgumentException( e );
    }
    catch (HibernateException he) {
        throw getEntityManager().convert( he );
    }
}

/**
 * {@inheritDoc}
 */

```

```

public TypedQuery<X> setParameter(String name, Calendar value, TemporalType temporalType) {
    try {
        if ( temporalType == DATE ) {
            query.setCalendarDate( name, value );
        }
        else if ( temporalType == TIME ) {
            throw new IllegalArgumentException( "not yet implemented" );
        }
        else if ( temporalType == TIMESTAMP ) {
            query.setCalendar( name, value );
        }
        registerParameterBinding( getParameter(name), value );
        return this;
    }
    catch (QueryParameterException e) {
        throw new IllegalArgumentException( e );
    }
    catch (HibernateException he) {
        throw getEntityManager().convert( he );
    }
}

/**
 * {@inheritDoc}
 */
public TypedQuery<X> setParameter(int position, Object value) {
    try {
        if ( isJpaPositionalParameter( position ) ) {
            this.setParameter( Integer.toString( position ), value );
        }
        else {
            query.setParameter( position - 1, value );
            registerParameterBinding( getParameter( position ), value );
        }
        return this;
    }
    catch (QueryParameterException e) {
        throw new IllegalArgumentException( e );
    }
    catch (HibernateException he) {
        throw getEntityManager().convert( he );
    }
}

private boolean isJpaPositionalParameter(int position) {
    return jpaPositionalIndices != null && jpaPositionalIndices.contains( position );
}

```

```

/**
 * {@inheritDoc}
 */
public TypedQuery<X> setParameter(int position, Date value, TemporalType temporalType) {
    try {
        if ( isJpaPositionalParameter( position ) ) {
            String name = Integer.toString( position );
            this.setParameter( name, value, temporalType );
        }
        else {
            if ( temporalType == DATE ) {
                query.setDate( position - 1, value );
            }
            else if ( temporalType == TIME ) {
                query.setTime( position - 1, value );
            }
            else if ( temporalType == TIMESTAMP ) {
                query.setTimestamp( position - 1, value );
            }
            registerParameterBinding( getParameter( position ), value );
        }
        return this;
    }
    catch (QueryParameterException e) {
        throw new IllegalArgumentException( e );
    }
    catch (HibernateException he) {
        throw getEntityManager().convert( he );
    }
}

/**
 * {@inheritDoc}
 */
public TypedQuery<X> setParameter(int position, Calendar value, TemporalType temporalType) {
    try {
        if ( isJpaPositionalParameter( position ) ) {
            String name = Integer.toString( position );
            this.setParameter( name, value, temporalType );
        }
        else {
            if ( temporalType == DATE ) {
                query.setCalendarDate( position - 1, value );
            }
            else if ( temporalType == TIME ) {
                throw new IllegalArgumentException( "not yet implemented" );
            }
            else if ( temporalType == TIMESTAMP ) {

```

```

        query.setCalendar( position - 1, value );
    }
    registerParameterBinding( getParameter( position ), value );
}
return this;
}
catch (QueryParameterException e) {
    throw new IllegalArgumentException( e );
}
catch (HibernateException he) {
    throw getEntityManager().convert( he );
}
}
}

/**
 * {@inheritDoc}
 */
public Set<Parameter<?>> getParameters() {
    return parameters;
}

/**
 * {@inheritDoc}
 */
public Parameter<?> getParameter(String name) {
    if ( name == null ) {
        throw new IllegalArgumentException( "Name of parameter to locate cannot be null" );
    }
    for ( Parameter parameter : parameters ) {
        if ( name.equals( parameter.getName() ) ) {
            return parameter;
        }
    }
    throw new IllegalArgumentException( "Unable to locate parameter named [" + name + "]" );
}

/**
 * {@inheritDoc}
 */
public Parameter<?> getParameter(int position) {
    if ( isJpaPositionalParameter( position ) ) {
        return getParameter( Integer.toString( position ) );
    }
    else {
        for ( Parameter parameter : parameters ) {
            if ( parameter.getPosition() != null && position == parameter.getPosition() ) {
                return parameter;
            }
        }
    }
}

```

```

    }
    throw new IllegalArgumentException( "Unable to locate parameter with position [" + position + "]" );
    }
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public <T> Parameter<T> getParameter(String name, Class<T> type) {
    Parameter param = getParameter( name );
    if ( param.getParameterType() != null ) {
        // we were able to determine the expected type during analysis, so validate it here
        throw new IllegalArgumentException(
            "Parameter type [" + param.getParameterType().getName() +
            "] is not assignment compatible with requested type [" +
            type.getName() + "]"
        );
    }
    return param;
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public <T> Parameter<T> getParameter(int position, Class<T> type) {
    Parameter param = getParameter( position );
    if ( param.getParameterType() != null ) {
        // we were able to determine the expected type during analysis, so validate it here
        throw new IllegalArgumentException(
            "Parameter type [" + param.getParameterType().getName() +
            "] is not assignment compatible with requested type [" +
            type.getName() + "]"
        );
    }
    return param;
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public <T> T unwrap(Class<T> tClass) {
    if ( org.hibernate.Query.class.isAssignableFrom( tClass ) ) {
        return (T) query;
    }
    else {

```

```

try {
    return (T) this;
}
catch ( ClassCastException cce ) {
    PersistenceException pe = new PersistenceException(
        "Unsupported unwrap target type [" + tClass.getName() + "]"
    );
    //It's probably against the spec to not mark the tx for rollback but it will be easier for people
    //getManager().handlePersistenceException( pe );
    throw pe;
}
}
}

private javax.persistence.LockModeType jpaLockMode = javax.persistence.LockModeType.NONE;

@Override
@SuppressWarnings({ "unchecked" })
public TypedQuery<X> setLockMode(javax.persistence.LockModeType lockModeType) {
    if (! getEntityManager().isTransactionInProgress()) {
        throw new TransactionRequiredException( "no transaction is in progress" );
    }
    if ( ! canApplyLockModes() ) {
        throw new IllegalStateException( "Not a JPAQL/Criteria query" );
    }
    this.jpaLockMode = lockModeType;
    query.getLockOptions().setLockMode( LockModeTypeHelper.getLockMode( lockModeType ) );
    if ( getHints() != null && getHints().containsKey( AvailableSettings.LOCK_TIMEOUT ) ) {
        applyLockTimeout( ConfigurationHelper.getInteger( getHints().get( AvailableSettings.LOCK_TIMEOUT ) ) );
    }
    return this;
}

@Override
protected void applyLockTimeout(int timeout) {
    query.getLockOptions().setTimeOut( timeout );
}

@Override
public javax.persistence.LockModeType getLockMode() {
    return jpaLockMode;
}

}
/*
 * Hibernate, Relational Persistence for Idiomatic Java
 *
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- * along with this distribution; if not, write to:
- * Free Software Foundation, Inc.
- * 51 Franklin Street, Fifth Floor
- * Boston, MA 02110-1301 USA
- */

package org.hibernate.ejb;

```
import java.io.IOException;
import java.io.InvalidObjectException;
import java.io.ObjectOutputStream;
import java.io.Serializable;
import java.util.Collections;
import java.util.HashMap;
import java.util.Iterator;
import java.util.Map;
import java.util.Properties;
import javax.persistence.Cache;
import javax.persistence.EntityManager;
import javax.persistence.EntityManagerFactory;
import javax.persistence.PersistenceContextType;
import javax.persistence.PersistenceUnitUtil;
import javax.persistence.criteria.CriteriaBuilder;
import javax.persistence.metamodel.Metamodel;
import javax.persistence.spi.LoadState;
import javax.persistence.spi.PersistenceUnitTransactionType;
```

```
import org.jboss.logging.Logger;
```

```
import org.hibernate.Hibernate;
import org.hibernate.SessionFactory;
import org.hibernate.cfg.Configuration;
import org.hibernate.ejb.criteria.CriteriaBuilderImpl;
import org.hibernate.ejb.internal.EntityManagerFactoryRegistry;
import org.hibernate.ejb.metamodel.MetamodelImpl;
```

```

import org.hibernate.ejb.util.PersistenceUtilHelper;
import org.hibernate.engine.spi.SessionFactoryImplementor;
import org.hibernate.id.IdentifierGenerator;
import org.hibernate.id.UUIDGenerator;
import org.hibernate.internal.SessionFactoryImpl;
import org.hibernate.internal.util.config.ConfigurationHelper;
import org.hibernate.mapping.PersistentClass;
import org.hibernate.metadata.ClassMetadata;
import org.hibernate.service.ServiceRegistry;

/**
 * Actual Hibernate implementation of { @link javax.persistence.EntityManagerFactory }.
 *
 * @author Gavin King
 * @author Emmanuel Bernard
 * @author Steve Ebersole
 */
public class EntityManagerFactoryImpl implements HibernateEntityManagerFactory {
    private static final long serialVersionUID = 5423543L;
    private static final IdentifierGenerator UUID_GENERATOR =
        UUIDGenerator.buildSessionFactoryUniqueIdentifierGenerator();

    private static final Logger log = Logger.getLogger( EntityManagerFactoryImpl.class );

    private final transient SessionFactoryImpl sessionFactory;
    private final transient PersistenceUnitTransactionType transactionType;
    private final transient boolean discardOnClose;
    private final transient Class sessionInterceptorClass;
    private final transient CriteriaBuilderImpl criteriaBuilder;
    private final transient Metamodel metamodel;
    private final transient HibernatePersistenceUnitUtil util;
    private final transient Map<String, Object> properties;
    private final String entityManagerFactoryName;

    private final transient PersistenceUtilHelper.MetadataCache cache = new PersistenceUtilHelper.MetadataCache();

    @SuppressWarnings( "unchecked" )
    public EntityManagerFactoryImpl(
        PersistenceUnitTransactionType transactionType,
        boolean discardOnClose,
        Class sessionInterceptorClass,
        Configuration cfg,
        ServiceRegistry serviceRegistry,
        String persistenceUnitName) {
        this.sessionFactory = (SessionFactoryImpl) cfg.buildSessionFactory( serviceRegistry );
        this.transactionType = transactionType;
        this.discardOnClose = discardOnClose;
        this.sessionInterceptorClass = sessionInterceptorClass;
    }

```

```

    final Iterator<PersistentClass> classes = cfg.getClassMappings();
    final JpaMetaModelPopulationSetting jpaMetaModelPopulationSetting =
determineJpaMetaModelPopulationSetting( cfg );
    if ( JpaMetaModelPopulationSetting.DISABLED == jpaMetaModelPopulationSetting ) {
        this.metamodel = null;
    }
    else {
        this.metamodel = MetamodelImpl.buildMetamodel(
            classes,
            (SessionFactoryImplementor) sessionFactory,
            JpaMetaModelPopulationSetting.IGNORE_UNSUPPORTED == jpaMetaModelPopulationSetting
        );
    }
    this.criteriaBuilder = new CriteriaBuilderImpl( this );
    this.util = new HibernatePersistenceUnitUtil( this );

    HashMap<String, Object> props = new HashMap<String, Object>();
    addAll( props, (SessionFactoryImplementor) sessionFactory ).getProperties() );
    addAll( props, cfg.getProperties() );
    maskOutSensitiveInformation( props );
    this.properties = Collections.unmodifiableMap( props );
    String entityManagerFactoryName =
(String)this.properties.get( AvailableSettings.ENTITY_MANAGER_FACTORY_NAME );
    if ( entityManagerFactoryName == null ) {
        entityManagerFactoryName = persistenceUnitName;
    }
    if ( entityManagerFactoryName == null ) {
        entityManagerFactoryName = (String) UUID_GENERATOR.generate( null, null );
    }
    this.entityManagerFactoryName = entityManagerFactoryName;
    EntityManagerFactoryRegistry.INSTANCE.addEntityManagerFactory( entityManagerFactoryName, this );
}

private enum JpaMetaModelPopulationSetting {
    ENABLED,
    DISABLED,
    IGNORE_UNSUPPORTED;

    private static JpaMetaModelPopulationSetting parse( String setting ) {
        if ( "enabled".equalsIgnoreCase( setting ) ) {
            return ENABLED;
        }
        else if ( "disabled".equalsIgnoreCase( setting ) ) {
            return DISABLED;
        }
        else {
            return IGNORE_UNSUPPORTED;
        }
    }
}

```

```

    }
}

protected JpaMetaModelPopulationSetting determineJpaMetaModelPopulationSetting(Configuration cfg) {
    String setting = ConfigurationHelper.getString(
        AvailableSettings.JPA_METAMODEL_POPULATION,
        cfg.getProperties(),
        null
    );
    if ( setting == null ) {
        setting = ConfigurationHelper.getString( AvailableSettings.JPA_METAMODEL_GENERATION,
        cfg.getProperties(), null );
        if ( setting != null ) {
            log.infof(
                "Encountered deprecated setting [%s], use [%s] instead",
                AvailableSettings.JPA_METAMODEL_GENERATION,
                AvailableSettings.JPA_METAMODEL_POPULATION
            );
        }
    }
    return JpaMetaModelPopulationSetting.parse( setting );
}

private static void addAll(HashMap<String, Object> propertyMap, Properties properties) {
    for ( Map.Entry entry : properties.entrySet() ) {
        if ( String.class.isInstance( entry.getKey() ) ) {
            propertyMap.put( (String)entry.getKey(), entry.getValue() );
        }
    }
}

private void maskOutSensitiveInformation(HashMap<String, Object> props) {
    maskOutIfSet( props, AvailableSettings.JDBC_PASSWORD );
    maskOutIfSet( props, org.hibernate.cfg.AvailableSettings.PASS );
}

private void maskOutIfSet(HashMap<String, Object> props, String setting) {
    if ( props.containsKey( setting ) ) {
        props.put( setting, "*****" );
    }
}

public EntityManager createEntityManager() {
    return createEntityManager( null );
}

public EntityManager createEntityManager(Map map) {
    //TODO support discardOnClose, persistencecontexttype?, interceptor,

```

```

return new EntityManagerImpl(
    this, PersistenceContextType.EXTENDED, transactionType,
    discardOnClose, sessionInterceptorClass, map
);
}

public CriteriaBuilder getCriteriaBuilder() {
    return criteriaBuilder;
}

public Metamodel getMetamodel() {
    return metamodel;
}

public void close() {
    sessionFactory.close();
    EntityManagerFactoryRegistry.INSTANCE.removeEntityManagerFactory(entityManagerFactoryName, this);
}

public Map<String, Object> getProperties() {
    return properties;
}

public Cache getCache() {
    // TODO : cache the cache reference?
    if ( ! isOpen() ) {
        throw new IllegalStateException("EntityManagerFactory is closed");
    }
    return new JPACache( sessionFactory );
}

public PersistenceUnitUtil getPersistenceUnitUtil() {
    if ( ! isOpen() ) {
        throw new IllegalStateException("EntityManagerFactory is closed");
    }
    return util;
}

public boolean isOpen() {
    return ! sessionFactory.isClosed();
}

public SessionFactoryImpl getSessionFactory() {
    return sessionFactory;
}

public String getEntityManagerFactoryName() {
    return entityManagerFactoryName;
}

```

```

}

private static class JPACache implements Cache {
    private SessionFactory sessionFactory;

    private JPACache(SessionFactory sessionFactory) {
        this.sessionFactory = sessionFactory;
    }

    public boolean contains(Class entityClass, Object identifier) {
        return sessionFactory.getCache().containsEntity( entityClass, ( Serializable ) identifier );
    }

    public void evict(Class entityClass, Object identifier) {
        sessionFactory.getCache().evictEntity( entityClass, (Serializable) identifier );
    }

    public void evict(Class entityClass) {
        sessionFactory.getCache().evictEntityRegion( entityClass );
    }

    public void evictAll() {
        sessionFactory.getCache().evictEntityRegions();
        // TODO : if we want to allow an optional clearing of all cache data, the additional calls would be:
        // sessionFactory.getCache().evictCollectionRegions();
        // sessionFactory.getCache().evictQueryRegions();
    }
}

private static EntityManagerFactory getNamedEntityManagerFactory(String entityManagerFactoryName) throws
InvalidObjectException {
    Object result =
EntityManagerFactoryRegistry.INSTANCE.getNamedEntityManagerFactory(entityManagerFactoryName);

    if ( result == null ) {
        throw new InvalidObjectException( "could not resolve entity manager factory during entity manager deserialization
[name=" + entityManagerFactoryName + "]" );
    }

    return (EntityManagerFactory)result;
}

private void writeObject(ObjectOutputStream oos) throws IOException {
    if (entityManagerFactoryName == null) {
        throw new InvalidObjectException( "could not serialize entity manager factory with null
entityManagerFactoryName" );
    }
    oos.defaultWriteObject();
}

```

```

}

/**
 * After deserialization of an EntityManagerFactory, this is invoked to return the EntityManagerFactory instance
 * that is already in use rather than a cloned copy of the object.
 *
 * @return
 * @throws InvalidObjectException
 */
private Object readResolve() throws InvalidObjectException {
    return getNamedEntityManagerFactory(entityManagerFactoryName);
}

private static class HibernatePersistenceUnitUtil implements PersistenceUnitUtil, Serializable {
    private final HibernateEntityManagerFactory emf;
    private transient PersistenceUtilHelper.MetadataCache cache;

    private HibernatePersistenceUnitUtil(EntityManagerFactoryImpl emf) {
        this.emf = emf;
        this.cache = emf.cache;
    }

    public boolean isLoading(Object entity, String attributeName) {
        // added log message to help with HHH-7454, if state == LoadState.NOT_LOADED, returning true or false is not
        // accurate.
        log.debug("PersistenceUnitUtil#isLoading is not always accurate; consider using EntityManager#contains instead");
        LoadState state = PersistenceUtilHelper.isLoadingWithoutReference( entity, attributeName, cache );
        if (state == LoadState.LOADED) {
            return true;
        }
        else if (state == LoadState.NOT_LOADED ) {
            return false;
        }
        else {
            return PersistenceUtilHelper.isLoadingWithReference( entity, attributeName, cache ) != LoadState.NOT_LOADED;
        }
    }

    public boolean isLoading(Object entity) {
        // added log message to help with HHH-7454, if state == LoadState.NOT_LOADED, returning true or false is not
        // accurate.
        log.debug("PersistenceUnitUtil#isLoading is not always accurate; consider using EntityManager#contains instead");
        return PersistenceUtilHelper.isLoading( entity ) != LoadState.NOT_LOADED;
    }

    public Object getIdentifier(Object entity) {

```

```

final Class entityClass = Hibernate.getClass( entity );
final ClassMetadata classMetadata = emf.getSessionFactory().getClassMetadata( entityClass );
if (classMetadata == null) {
    throw new IllegalArgumentException( entityClass + " is not an entity" );
}
//TODO does that work for @IdClass?
return classMetadata.getIdentifier( entity );
}
}
}
/*
* Hibernate, Relational Persistence for Idiomatic Java
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* along with this distribution; if not, write to:
* Free Software Foundation, Inc.
* 51 Franklin Street, Fifth Floor
* Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria;
import javax.persistence.TupleElement;

/**
* TODO : javadoc
*
* @author Steve Ebersole
*/
public interface TupleElementImplementor<X> extends TupleElement<X> {
    public ValueHandlerFactory.ValueHandler<X> getValueHandler();
}
/*
* Hibernate, Relational Persistence for Idiomatic Java
*
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```

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* 51 Franklin Street, Fifth Floor
* Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria;
import javax.persistence.criteria.CollectionJoin;

/**
 * Specialization of {@link JoinImplementor} for {@link java.util.Collection} typed attribute joins
 *
 * @author Steve Ebersole
 */
public interface CollectionJoinImplementor<Z,X> extends JoinImplementor<Z,X>, CollectionJoin<Z,X> {
    /**
     * {@inheritDoc}
     * <p/>
     * Refined return type
     */
    public CollectionJoinImplementor<Z,X> correlateTo(CriteriaSubqueryImpl subquery);
}
/**
 * Hibernate, Relational Persistence for Idiomatic Java
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* along with this distribution; if not, write to:
* Free Software Foundation, Inc.
* 51 Franklin Street, Fifth Floor
* Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria;
import java.util.List;
import javax.persistence.criteria.Selection;

/**
 * TODO : javadoc
 *
 * @author Steve Ebersole
 */
public interface SelectionImplementor<X> extends TupleElementImplementor<X>, Selection<X> {
    public List<ValueHandlerFactory.ValueHandler> getValueHandlers();
}
/*
 * Hibernate, Relational Persistence for Idiomatic Java
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 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria;
import javax.persistence.criteria.ListJoin;

```

```

/**
 * Specialization of {@link JoinImplementor} for {@link java.util.List} typed attribute joins
 *
 * @author Steve Ebersole
 */
public interface ListJoinImplementor<Z,X> extends JoinImplementor<Z,X>, ListJoin<Z,X> {
/**
 * {@code @inheritDoc}
 * <p/>
 * Refined return type
 */
public ListJoinImplementor<Z,X> correlateTo(CriteriaSubqueryImpl subquery);
}
/**
 * Hibernate, Relational Persistence for Idiomatic Java
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 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb.criteria;

import java.io.Serializable;
import java.util.List;
import java.util.Set;
import javax.persistence.criteria.AbstractQuery;
import javax.persistence.criteria.CollectionJoin;
import javax.persistence.criteria.Expression;
import javax.persistence.criteria.Join;
import javax.persistence.criteria.ListJoin;
import javax.persistence.criteria.MapJoin;
import javax.persistence.criteria.ParameterExpression;

```

```

import javax.persistence.criteria.Predicate;
import javax.persistence.criteria.Root;
import javax.persistence.criteria.SetJoin;
import javax.persistence.criteria.Subquery;
import javax.persistence.metamodel.EntityType;

import org.hibernate.ejb.criteria.expression.ExpressionImpl;
import org.hibernate.ejb.criteria.path.RootImpl;

/**
 * The Hibernate implementation of the JPA {@link Subquery} contract. Mostly a set of delegation to its internal
 * {@link QueryStructure}.
 *
 * @author Steve Ebersole
 */
public class CriteriaSubqueryImpl<T> extends ExpressionImpl<T> implements Subquery<T>, Serializable {
    private final AbstractQuery<?> parent;
    private final QueryStructure<T> queryStructure;

    public CriteriaSubqueryImpl(
        CriteriaBuilderImpl criteriaBuilder,
        Class<T> javaType,
        AbstractQuery<?> parent) {
        super( criteriaBuilder, javaType);
        this.parent = parent;
        this.queryStructure = new QueryStructure<T>( this, criteriaBuilder );
    }

    /**
     * {@inheritDoc}
     */
    public AbstractQuery<?> getParent() {
        return parent;
    }

    /**
     * {@inheritDoc}
     */
    public void registerParameters(ParameterRegistry registry) {
        for ( ParameterExpression param : queryStructure.getParameters() ) {
            registry.registerParameter( param );
        }
    }

    /**
     * {@inheritDoc}
     */
    public Class<T> getResultType() {

```

```

return getJavaType();
}

// ROOTS ~~~~~

/**
 * {@inheritDoc}
 */
public Set<Root<?>> getRoots() {
    return queryStructure.getRoots();
}

/**
 * {@inheritDoc}
 */
public <X> Root<X> from(EntityType<X> entityType) {
    return queryStructure.from( entityType );
}

/**
 * {@inheritDoc}
 */
public <X> Root<X> from(Class<X> entityClass) {
    return queryStructure.from( entityClass );
}

// SELECTION ~~~~~

public Subquery<T> distinct(boolean applyDistinction) {
    queryStructure.setDistinct( applyDistinction );
    return this;
}

public boolean isDistinct() {
    return queryStructure.isDistinct();
}

public Expression<T> getSelection() {
    return (Expression<T>) queryStructure.getSelection();
}

public Subquery<T> select(Expression<T> expression) {
    queryStructure.setSelection( expression );
    return this;
}

```

```

// RESTRICTION ~~~~~

/**
 * {@inheritDoc}
 */
public Predicate getRestriction() {
    return queryStructure.getRestriction();
}

/**
 * {@inheritDoc}
 */
public Subquery<T> where(Expression<Boolean> expression) {
    queryStructure.setRestriction( criteriaBuilder().wrap( expression ) );
    return this;
}

/**
 * {@inheritDoc}
 */
public Subquery<T> where(Predicate... predicates) {
    // TODO : assuming this should be a conjunction, but the spec does not say specifically...
    queryStructure.setRestriction( criteriaBuilder().and( predicates ) );
    return this;
}

// GROUPING ~~~~~

/**
 * {@inheritDoc}
 */
public List<Expression<?>> getGroupList() {
    return queryStructure.getGroupings();
}

/**
 * {@inheritDoc}
 */
public Subquery<T> groupBy(Expression<?>... groupings) {
    queryStructure.setGroupings( groupings );
    return this;
}

/**
 * {@inheritDoc}

```

```

*/
public Subquery<T> groupBy(List<Expression<?>> groupings) {
    queryStructure.setGroupings( groupings );
    return this;
}

/**
 * {@inheritDoc}
 */
public Predicate getGroupRestriction() {
    return queryStructure.getHaving();
}

/**
 * {@inheritDoc}
 */
public Subquery<T> having(Expression<Boolean> expression) {
    queryStructure.setHaving( criteriaBuilder().wrap( expression ) );
    return this;
}

/**
 * {@inheritDoc}
 */
public Subquery<T> having(Predicate... predicates) {
    queryStructure.setHaving( criteriaBuilder().and( predicates ) );
    return this;
}

// CORRELATIONS
~~~~~

/**
 * {@inheritDoc}
 */
public Set<Join<?, ?>> getCorrelatedJoins() {
    return queryStructure.collectCorrelatedJoins();
}

/**
 * {@inheritDoc}
 */
public <Y> Root<Y> correlate(Root<Y> source) {
    final RootImpl<Y> correlation = ( ( RootImpl<Y> ) source ).correlateTo( this );
    queryStructure.addCorrelationRoot( correlation );
    return correlation;
}

```

```

}

/**
 * {@inheritDoc}
 */
public <X, Y> Join<X, Y> correlate(Join<X, Y> source) {
    final JoinImplementor<X,Y> correlation = ( (JoinImplementor<X,Y>) source ).correlateTo( this );
    queryStructure.addCorrelationRoot( correlation );
    return correlation;
}

/**
 * {@inheritDoc}
 */
public <X, Y> CollectionJoin<X, Y> correlate(CollectionJoin<X, Y> source) {
    final CollectionJoinImplementor<X,Y> correlation = ( (CollectionJoinImplementor<X,Y>) source ).correlateTo(
this );
    queryStructure.addCorrelationRoot( correlation );
    return correlation;
}

/**
 * {@inheritDoc}
 */
public <X, Y> SetJoin<X, Y> correlate(SetJoin<X, Y> source) {
    final SetJoinImplementor<X,Y> correlation = ( (SetJoinImplementor<X,Y>) source ).correlateTo( this );
    queryStructure.addCorrelationRoot( correlation );
    return correlation;
}

/**
 * {@inheritDoc}
 */
public <X, Y> ListJoin<X, Y> correlate(ListJoin<X, Y> source) {
    final ListJoinImplementor<X,Y> correlation = ( (ListJoinImplementor<X,Y>) source ).correlateTo( this );
    queryStructure.addCorrelationRoot( correlation );
    return correlation;
}

/**
 * {@inheritDoc}
 */
public <X, K, V> MapJoin<X, K, V> correlate(MapJoin<X, K, V> source) {
    final MapJoinImplementor<X, K, V> correlation = ( (MapJoinImplementor<X, K, V>) source ).correlateTo( this );
    queryStructure.addCorrelationRoot( correlation );
    return correlation;
}

```

```

/**
 * {@inheritDoc}
 */
public <U> Subquery<U> subquery(Class<U> subqueryType) {
    return queryStructure.subquery( subqueryType );
}

public String render(CriteriaQueryCompiler.RenderingContext renderingContext) {
    StringBuilder subqueryBuffer = new StringBuilder( "(" );
    queryStructure.render( subqueryBuffer, renderingContext );
    subqueryBuffer.append( ')' );
    return subqueryBuffer.toString();
}

public String renderProjection(CriteriaQueryCompiler.RenderingContext renderingContext) {
    throw new IllegalStateException( "Subquery cannot occur in select clause" );
}
}
/*
 * Hibernate, Relational Persistence for Idiomatic Java
 *
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 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb.criteria;
import javax.persistence.criteria.From;

/**
 * Implementation contract for the JPA {@link From} interface.
 *
 * @author Steve Ebersole

```

```

*/
public interface FromImplementor<Z,X> extends PathImplementor<X>, From<Z,X> {
    public void prepareAlias(CriteriaQueryCompiler.RenderingContext renderingContext);
    public String renderTableExpression(CriteriaQueryCompiler.RenderingContext renderingContext);

    public FromImplementor<Z,X> correlateTo(CriteriaSubqueryImpl subquery);
    public void prepareCorrelationDelegate(FromImplementor<Z,X> parent);
    public FromImplementor<Z, X> getCorrelationParent();
}
/*
* Hibernate, Relational Persistence for Idiomatic Java
*
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* along with this distribution; if not, write to:
* Free Software Foundation, Inc.
* 51 Franklin Street, Fifth Floor
* Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria;
import javax.persistence.criteria.Fetch;
import javax.persistence.criteria.Join;

/**
* Consolidates the { @link Join } and { @link Fetch } hierarchies since that is how we implement them.
* This allows us to treat them polymorphically.
*
* @author Steve Ebersole
*/
public interface JoinImplementor<Z,X> extends Join<Z,X>, Fetch<Z,X>, FromImplementor<Z,X> {
/**
* { @inheritDoc }
* <p/>
* Refined return type

```

```

*/
public JoinImplementor<Z,X> correlateTo(CriteriaSubqueryImpl subquery);
}
/*
* Hibernate, Relational Persistence for Idiomatic Java
*
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* along with this distribution; if not, write to:
* Free Software Foundation, Inc.
* 51 Franklin Street, Fifth Floor
* Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria;

/**
* Represents an illegal attempt to dereference from a { @link #getPathSource() path source } which
* cannot be dereferenced.
*
* @author Steve Ebersole
*/
public class IllegalDereferenceException extends RuntimeException {
    private final PathSource pathSource;

    public IllegalDereferenceException(PathSource pathSource) {
        super( "Illegal attempt to dereference path source [" + pathSource.getPathIdentifier() + "]" );
        this.pathSource = pathSource;
    }

    public PathSource getPathSource() {
        return pathSource;
    }
}

```

```

/*
 * Hibernate, Relational Persistence for Idiomatic Java
 *
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 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb.criteria;
import javax.persistence.criteria.Path;
import javax.persistence.metamodel.Attribute;

/**
 * Implementation contract for the JPA { @link Path } interface.
 *
 * @author Steve Ebersole
 */
public interface PathImplementor<X> extends ExpressionImplementor<X>, Path<X>, PathSource<X>, Renderable
{
    /**
     * Retrieve reference to the attribute this path represents.
     *
     * @return The metamodel attribute.
     */
    public Attribute<?, ?> getAttribute();
}
/*
 * Hibernate, Relational Persistence for Idiomatic Java
 *
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```

```

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* along with this distribution; if not, write to:
* Free Software Foundation, Inc.
* 51 Franklin Street, Fifth Floor
* Boston, MA 02110-1301 USA
*/

```

```
package org.hibernate.ejb.criteria;
```

```

import java.io.Serializable;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.Set;
import javax.persistence.Tuple;
import javax.persistence.criteria.CriteriaQuery;
import javax.persistence.criteria.Expression;
import javax.persistence.criteria.Order;
import javax.persistence.criteria.ParameterExpression;
import javax.persistence.criteria.Predicate;
import javax.persistence.criteria.Root;
import javax.persistence.criteria.Selection;
import javax.persistence.criteria.Subquery;
import javax.persistence.metamodel.EntityType;

```

```

import org.hibernate.ejb.HibernateEntityManagerImplementor;
import org.hibernate.type.Type;

```

```
/**
```

```

* The Hibernate implementation of the JPA {@link CriteriaQuery} contract. Mostly a set of delegation to its
* internal {@link QueryStructure}.

```

```
*
```

```
* @author Steve Ebersole
```

```
*/
```

```

public class CriteriaQueryImpl<T> extends AbstractNode implements CriteriaQuery<T>, Serializable {
    private final Class<T> returnType;

```

```

    private final QueryStructure<T> queryStructure;
    private List<Order> orderSpecs = Collections.emptyList();

```

```

public CriteriaQueryImpl(
    CriteriaBuilderImpl criteriaBuilder,
    Class<T> returnType) {
    super( criteriaBuilder );
    this.returnType = returnType;
    this.queryStructure = new QueryStructure<T>( this, criteriaBuilder );
}

/**
 * {@inheritDoc}
 */
public Class<T> getResultType() {
    return returnType;
}

// SELECTION ~~~~~

/**
 * {@inheritDoc}
 */
public CriteriaQuery<T> distinct(boolean applyDistinction) {
    queryStructure.setDistinct( applyDistinction );
    return this;
}

/**
 * {@inheritDoc}
 */
public boolean isDistinct() {
    return queryStructure.isDistinct();
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public Selection<T> getSelection() {
    return ( Selection<T> ) queryStructure.getSelection();
}

public void applySelection(Selection<? extends T> selection) {
    queryStructure.setSelection( selection );
}

/**

```

```

* { @inheritDoc }
*/
public CriteriaQuery<T> select(Selection<? extends T> selection) {
    applySelection( selection );
    return this;
}

/**
* { @inheritDoc }
*/
@SuppressWarnings({ "unchecked" })
public CriteriaQuery<T> multiselect(Selection<?>... selections) {
    return multiselect( Arrays.asList( selections ) );
}

/**
* { @inheritDoc }
*/
@SuppressWarnings({ "unchecked" })
public CriteriaQuery<T> multiselect(List<Selection<?>> selections) {
    final Selection<? extends T> selection;

    if ( Tuple.class.isAssignableFrom( getResultType() ) ) {
        selection = ( Selection<? extends T> ) criteriaBuilder().tuple( selections );
    }
    else if ( getResultType().isArray() ) {
        selection = ( Selection<? extends T> ) criteriaBuilder().array(
            ( Class<? extends Object[]> ) getResultType(),
            selections
        );
    }
    else if ( Object.class.equals( getResultType() ) ) {
        switch ( selections.size() ) {
            case 0: {
                throw new IllegalArgumentException(
                    "empty selections passed to criteria query typed as Object"
                );
            }
            case 1: {
                selection = ( Selection<? extends T> ) selections.get( 0 );
                break;
            }
            default: {
                selection = ( Selection<? extends T> ) criteriaBuilder().array( selections );
            }
        }
    }
    else {

```

```

    selection = criteriaBuilder().construct( getResultType(), selections );
}
applySelection( selection );
return this;
}

// ROOTS ~~~~~

/**
 * {@inheritDoc}
 */
public Set<Root<?>> getRoots() {
    return queryStructure.getRoots();
}

/**
 * {@inheritDoc}
 */
public <X> Root<X> from(EntityType<X> entityType) {
    return queryStructure.from( entityType );
}

/**
 * {@inheritDoc}
 */
public <X> Root<X> from(Class<X> entityClass) {
    return queryStructure.from( entityClass );
}

// RESTRICTION ~~~~~

/**
 * {@inheritDoc}
 */
public Predicate getRestriction() {
    return queryStructure.getRestriction();
}

/**
 * {@inheritDoc}
 */
public CriteriaQuery<T> where(Expression<Boolean> expression) {
    queryStructure.setRestriction( criteriaBuilder().wrap( expression ) );
    return this;
}

```

```

/**
 * {@inheritDoc}
 */
public CriteriaQuery<T> where(Predicate... predicates) {
    // TODO : assuming this should be a conjunction, but the spec does not say specifically...
    queryStructure.setRestriction( criteriaBuilder().and( predicates ) );
    return this;
}

// GROUPING ~~~~~

/**
 * {@inheritDoc}
 */
public List<Expression<?>> getGroupList() {
    return queryStructure.getGroupings();
}

/**
 * {@inheritDoc}
 */
public CriteriaQuery<T> groupBy(Expression<?>... groupings) {
    queryStructure.setGroupings( groupings );
    return this;
}

public CriteriaQuery<T> groupBy(List<Expression<?>> groupings) {
    queryStructure.setGroupings( groupings );
    return this;
}

/**
 * {@inheritDoc}
 */
public Predicate getGroupRestriction() {
    return queryStructure.getHaving();
}

/**
 * {@inheritDoc}
 */
public CriteriaQuery<T> having(Expression<Boolean> expression) {
    queryStructure.setHaving( criteriaBuilder().wrap( expression ) );
    return this;
}

/**

```

```

* { @inheritDoc }
*/
public CriteriaQuery<T> having(Predicate... predicates) {
    queryStructure.setHaving( criteriaBuilder().and( predicates ) );
    return this;
}

// ORDERING ~~~~~

/**
 * { @inheritDoc }
 */
public List<Order> getOrderList() {
    return orderSpecs;
}

/**
 * { @inheritDoc }
 */
public CriteriaQuery<T> orderBy(Order... orders) {
    if ( orders != null && orders.length > 0 ) {
        orderSpecs = Arrays.asList( orders );
    }
    else {
        orderSpecs = Collections.emptyList();
    }
    return this;
}

/**
 * { @inheritDoc }
 */
public CriteriaQuery<T> orderBy(List<Order> orders) {
    orderSpecs = orders;
    return this;
}

/**
 * { @inheritDoc }
 */
public Set<ParameterExpression<?>> getParameters() {
    return queryStructure.getParameters();
}

/**
 * { @inheritDoc }
 */

```

```

public <U> Subquery<U> subquery(Class<U> subqueryType) {
    return queryStructure.subquery( subqueryType );
}

public void validate() {
    // getRoots() is explicitly supposed to return empty if none defined, no need to check for null
    if ( getRoots().isEmpty() ) {
        throw new IllegalStateException( "No criteria query roots were specified" );
    }

    // if there is not an explicit selection, there is an *implicit* selection of the root entity provided only
    // a single query root was defined.
    if ( getSelection() == null && !hasImplicitSelection() ) {
        throw new IllegalStateException( "No explicit selection and an implicit one could not be determined" );
    }
}

/**
 * If no explicit selection was defined, we have a condition called an implicit selection if the query specified
 * a single { @link Root } and the java type of that { @link Root root's } model is the same as this criteria's
 * { @link #getResultType() result type }.
 *
 * @return True if there is an explicit selection; false otherwise.
 */
private boolean hasImplicitSelection() {
    if ( getRoots().size() != 1 ) {
        return false;
    }

    Root root = getRoots().iterator().next();
    Class<?> javaType = root.getModel().getJavaType();
    if ( javaType != null && javaType != returnType ) {
        return false;
    }

    // if we get here, the query defined no selection but defined a single root of the same type as the
    // criteria query return, so we use that as the implicit selection
    //
    // todo : should we put an implicit marker in the selection to this fact to make later processing easier?
    return true;
}

public CriteriaQueryCompiler.RenderedCriteriaQuery render(CriteriaQueryCompiler.RenderingContext
renderingContext) {
    final StringBuilder jpaqlQuery = new StringBuilder();

    queryStructure.render( jpaqlQuery, renderingContext );
}

```

```

if ( ! getOrderList().isEmpty() ) {
    jpaqlQuery.append( " order by " );
    String sep = "";
    for ( Order orderSpec : getOrderList() ) {
        jpaqlQuery.append( sep )
            .append( ( ( Renderable ) orderSpec.getExpression() ).render( renderingContext ) )
            .append( orderSpec.isAscending() ? " asc" : " desc" );
        sep = ", ";
    }
}

return new CriteriaQueryCompiler.RenderedCriteriaQuery() {
    public String getQueryString() {
        return jpaqlQuery.toString();
    }
}

@SuppressWarnings({ "unchecked" })
public List<ValueHandlerFactory.ValueHandler> getValueHandlers() {
    SelectionImplementor selection = (SelectionImplementor) queryStructure.getSelection();
    return selection == null
        ? null
        : selection.getValueHandlers();
}

public HibernateEntityManagerImplementor.Options.ResultMetadataValidator getResultMetadataValidator() {
    return new HibernateEntityManagerImplementor.Options.ResultMetadataValidator() {
        public void validate(Type[] returnTypes) {
            SelectionImplementor selection = (SelectionImplementor) queryStructure.getSelection();
            if ( selection != null ) {
                if ( selection.isCompoundSelection() ) {
                    if ( returnTypes.length != selection.getCompoundSelectionItems().size() ) {
                        throw new IllegalStateException(
                            "Number of return values [" + returnTypes.length +
                                "] did not match expected [" +
                                selection.getCompoundSelectionItems().size() + "]"
                        );
                    }
                }
            }
            else {
                if ( returnTypes.length > 1 ) {
                    throw new IllegalStateException(
                        "Number of return values [" + returnTypes.length +
                            "] did not match expected [1]"
                    );
                }
            }
        }
    }
}

```

```

    };
    }
};
}
}
/*
 * Hibernate, Relational Persistence for Idiomatic Java
 *
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 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb.criteria;

import java.io.Serializable;
import java.math.BigDecimal;
import java.math.BigInteger;
import java.util.Arrays;
import java.util.Collection;
import java.util.List;
import java.util.Map;
import java.util.Set;
import javax.persistence.Tuple;
import javax.persistence.criteria.CompoundSelection;
import javax.persistence.criteria.CriteriaBuilder;
import javax.persistence.criteria.CriteriaQuery;
import javax.persistence.criteria.Expression;
import javax.persistence.criteria.Order;
import javax.persistence.criteria.ParameterExpression;
import javax.persistence.criteria.Predicate;
import javax.persistence.criteria.Selection;
import javax.persistence.criteria.Subquery;

```

```

import org.hibernate.ejb.EntityManagerFactoryImpl;
import org.hibernate.ejb.criteria.expression.BinaryArithmeticOperation;
import org.hibernate.ejb.criteria.expression.CoalesceExpression;
import org.hibernate.ejb.criteria.expression.CompoundSelectionImpl;
import org.hibernate.ejb.criteria.expression.ConcatExpression;
import org.hibernate.ejb.criteria.expression.LiteralExpression;
import org.hibernate.ejb.criteria.expression.NullLiteralExpression;
import org.hibernate.ejb.criteria.expression.NullifExpression;
import org.hibernate.ejb.criteria.expression.ParameterExpressionImpl;
import org.hibernate.ejb.criteria.expression.SearchedCaseExpression;
import org.hibernate.ejb.criteria.expression.SimpleCaseExpression;
import org.hibernate.ejb.criteria.expression.SizeOfCollectionExpression;
import org.hibernate.ejb.criteria.expression.SubqueryComparisonModifierExpression;
import org.hibernate.ejb.criteria.expression.UnaryArithmeticOperation;
import org.hibernate.ejb.criteria.expression.function.AbsFunction;
import org.hibernate.ejb.criteria.expression.function.AggregationFunction;
import org.hibernate.ejb.criteria.expression.function.BasicFunctionExpression;
import org.hibernate.ejb.criteria.expression.function.CurrentDateFunction;
import org.hibernate.ejb.criteria.expression.function.CurrentTimeFunction;
import org.hibernate.ejb.criteria.expression.function.CurrentTimestampFunction;
import org.hibernate.ejb.criteria.expression.function.LengthFunction;
import org.hibernate.ejb.criteria.expression.function.LocateFunction;
import org.hibernate.ejb.criteria.expression.function.LowerFunction;
import org.hibernate.ejb.criteria.expression.function.ParameterizedFunctionExpression;
import org.hibernate.ejb.criteria.expression.function.SqrtFunction;
import org.hibernate.ejb.criteria.expression.function.SubstringFunction;
import org.hibernate.ejb.criteria.expression.function.TrimFunction;
import org.hibernate.ejb.criteria.expression.function.UpperFunction;
import org.hibernate.ejb.criteria.path.PluralAttributePath;
import org.hibernate.ejb.criteria.predicate.BetweenPredicate;
import org.hibernate.ejb.criteria.predicate.BooleanAssertionPredicate;
import org.hibernate.ejb.criteria.predicate.BooleanExpressionPredicate;
import org.hibernate.ejb.criteria.predicate.BooleanStaticAssertionPredicate;
import org.hibernate.ejb.criteria.predicate.ComparisonPredicate;
import org.hibernate.ejb.criteria.predicate.ComparisonPredicate.ComparisonOperator;
import org.hibernate.ejb.criteria.predicate.CompoundPredicate;
import org.hibernate.ejb.criteria.predicate.ExistsPredicate;
import org.hibernate.ejb.criteria.predicate.InPredicate;
import org.hibernate.ejb.criteria.predicate.IsEmptyPredicate;
import org.hibernate.ejb.criteria.predicate.LikePredicate;
import org.hibernate.ejb.criteria.predicate.MemberOfPredicate;
import org.hibernate.ejb.criteria.predicate.NullnessPredicate;

/**
 * Hibernate implementation of the JPA {@link CriteriaBuilder} contract.
 *
 * @author Steve Ebersole

```

```

*/
public class CriteriaBuilderImpl implements CriteriaBuilder, Serializable {
    private final EntityManagerFactoryImpl entityManagerFactory;

    public CriteriaBuilderImpl(EntityManagerFactoryImpl entityManagerFactory) {
        this.entityManagerFactory = entityManagerFactory;
    }

    /**
     * Provides protected access to the underlying { @link EntityManagerFactoryImpl}.
     *
     * @return The underlying { @link EntityManagerFactoryImpl}
     */
    public EntityManagerFactoryImpl getEntityManagerFactory() {
        return entityManagerFactory;
    }

    /**
     * { @inheritDoc}
     */
    public CriteriaQuery<Object> createQuery() {
        return new CriteriaQueryImpl<Object>( this, Object.class );
    }

    /**
     * { @inheritDoc}
     */
    public <T> CriteriaQuery<T> createQuery(Class<T> resultClass) {
        return new CriteriaQueryImpl<T>( this, resultClass );
    }

    /**
     * { @inheritDoc}
     */
    public CriteriaQuery<Tuple> createTupleQuery() {
        return new CriteriaQueryImpl<Tuple>( this, Tuple.class );
    }

    /**
     * Package-protected method to centralize checking of criteria query
     * multiselects as defined by the
     * { @link CriteriaQuery#multiselect(List)} method.
     *
     * @param selections The selection varargs to check
     *
     * @throws IllegalArgumentException If, as per
     * { @link CriteriaQuery#multiselect(List)} documentation,
     * <i>&quot;An argument to the multiselect method must not be a tuple-

```

```

    * or array-valued compound selection item.</i>
    */
void checkMultiselect(List<Selection<?>> selections) {
    for ( Selection<?> selection : selections ) {
        if ( selection.isCompoundSelection() ) {
            if ( selection.getJavaType().isArray() ) {
                throw new IllegalArgumentException(
                    "multiselect selections cannot contain " +
                    "compound array-valued elements"
                );
            }
            if ( Tuple.class.isAssignableFrom( selection.getJavaType() ) ) {
                throw new IllegalArgumentException(
                    "multiselect selections cannot contain " +
                    "compound tuple-valued elements"
                );
            }
        }
    }
}

/**
 * {@inheritDoc}
 */
public CompoundSelection<Tuple> tuple(Selection<?>... selections) {
    return tuple( Arrays.asList( selections ) );
}

/**
 * Version of { @link #tuple(Selection[])} taking a list.
 *
 * @param selections List of selections.
 *
 * @return The tuple compound selection
 */
public CompoundSelection<Tuple> tuple(List<Selection<?>> selections) {
    checkMultiselect( selections );
    return new CompoundSelectionImpl<Tuple>( this, Tuple.class, selections );
}

/**
 * {@inheritDoc}
 */
public CompoundSelection<Object[]> array(Selection<?>... selections) {
    return array( Arrays.asList( selections ) );
}

/**

```

```

* Version of { @link #array(Selection[])} taking a list of selections.
*
* @param selections List of selections.
*
* @return The array compound selection
*/
public CompoundSelection<Object[]> array(List<Selection<?>> selections) {
    return array( Object[].class, selections );
}

/**
* Version of { @link #array(Selection[])} taking a list of selections,
* as well as the type of array.
*
* @param type The type of array
* @param selections List of selections.
*
* @return The array compound selection
*/
public <Y> CompoundSelection<Y> array(Class<Y> type, List<Selection<?>> selections) {
    checkMultiselect( selections );
    return new CompoundSelectionImpl<Y>( this, type, selections );
}

/**
* { @inheritDoc }
*/
public <Y> CompoundSelection<Y> construct(Class<Y> result, Selection<?>... selections) {
    return construct( result, Arrays.asList( selections ) );
}

/**
* Version of { @link #construct(Class,Selection[])} taking the
* to-be-constructed type as well as a list of selections.
*
* @param result The result class to be constructed.
* @param selections The selections to use in the constructor call.
*
* @return The <b>view</b> compound selection.
*/
public <Y> CompoundSelection<Y> construct(Class<Y> result, List<Selection<?>> selections) {
    checkMultiselect( selections );
    return new CompoundSelectionImpl<Y>( this, result, selections );
}

// ordering ~~~~~

```

```

/**
 * {@inheritDoc}
 */
public Order asc(Expression<?> x) {
    return new OrderImpl( x, true );
}

/**
 * {@inheritDoc}
 */
public Order desc(Expression<?> x) {
    return new OrderImpl( x, false );
}

// predicates ~~~~~

public Predicate wrap(Expression<Boolean> expression) {
    if ( Predicate.class.isInstance( expression ) ) {
        return ( (Predicate) expression );
    }
    else if ( PathImplementor.class.isInstance( expression ) ) {
        return new BooleanAssertionPredicate( this, expression, Boolean.TRUE );
    }
    else {
        return new BooleanExpressionPredicate( this, expression );
    }
}

/**
 * {@inheritDoc}
 */
public Predicate not(Expression<Boolean> expression) {
    return wrap( expression ).not();
}

/**
 * {@inheritDoc}
 */
public Predicate and(Expression<Boolean> x, Expression<Boolean> y) {
    return new CompoundPredicate( this, Predicate.BooleanOperator.AND, x, y );
}

/**
 * {@inheritDoc}
 */
public Predicate or(Expression<Boolean> x, Expression<Boolean> y) {
    return new CompoundPredicate( this, Predicate.BooleanOperator.OR, x, y );
}

```

```

}

/**
 * {@inheritDoc}
 */
public Predicate and(Predicate... restrictions) {
    return new CompoundPredicate( this, Predicate.BooleanOperator.AND, restrictions );
}

/**
 * {@inheritDoc}
 */
public Predicate or(Predicate... restrictions) {
    return new CompoundPredicate( this, Predicate.BooleanOperator.OR, restrictions );
}

/**
 * {@inheritDoc}
 */
public Predicate conjunction() {
    return new CompoundPredicate( this, Predicate.BooleanOperator.AND );
}

/**
 * {@inheritDoc}
 */
public Predicate disjunction() {
    return new CompoundPredicate( this, Predicate.BooleanOperator.OR );
}

/**
 * {@inheritDoc}
 */
public Predicate isTrue(Expression<Boolean> expression) {
    if ( CompoundPredicate.class.isInstance( expression ) ) {
        final CompoundPredicate predicate = (CompoundPredicate) expression;
        if ( predicate.getExpressions().size() == 0 ) {
            return new BooleanStaticAssertionPredicate(
                this,
                predicate.getOperator() == Predicate.BooleanOperator.AND
            );
        }
        return predicate;
    }
    else if ( Predicate.class.isInstance( expression ) ) {
        return (Predicate) expression;
    }
    return new BooleanAssertionPredicate( this, expression, Boolean.TRUE );
}

```

```

}

/**
 * {@inheritDoc}
 */
public Predicate isFalse(Expression<Boolean> expression) {
    if ( CompoundPredicate.class.isInstance( expression ) ) {
        final CompoundPredicate predicate = (CompoundPredicate) expression;
        if ( predicate.getExpressions().size() == 0 ) {
            return new BooleanStaticAssertionPredicate(
                this,
                predicate.getOperator() == Predicate.BooleanOperator.OR
            );
        }
        predicate.not();
        return predicate;
    }
    else if ( Predicate.class.isInstance( expression ) ) {
        final Predicate predicate = (Predicate) expression;
        predicate.not();
        return predicate;
    }
    return new BooleanAssertionPredicate( this, expression, Boolean.FALSE );
}

/**s
 * {@inheritDoc}
 */
public Predicate isNull(Expression<?> x) {
    return new NullnessPredicate( this, x );
}

/**
 * {@inheritDoc}
 */
public Predicate isNotNull(Expression<?> x) {
    return isNull( x ).not();
}

/**
 * {@inheritDoc}
 */
public Predicate equal(Expression<?> x, Expression<?> y) {
    //noinspection SuspiciousNameCombination
    return new ComparisonPredicate( this, ComparisonOperator.EQUAL, x, y );
}

/**

```

```

* {@inheritDoc}
*/
public Predicate notEqual(Expression<?> x, Expression<?> y) {
    //noinspection SuspiciousNameCombination
    return new ComparisonPredicate( this, ComparisonOperator.NOT_EQUAL, x, y );
}

/**
* {@inheritDoc}
*/
public Predicate equal(Expression<?> x, Object y) {
    //noinspection SuspiciousNameCombination
    return new ComparisonPredicate( this, ComparisonOperator.EQUAL, x, y );
}

/**
* {@inheritDoc}
*/
public Predicate notEqual(Expression<?> x, Object y) {
    //noinspection SuspiciousNameCombination
    return new ComparisonPredicate( this, ComparisonOperator.NOT_EQUAL, x, y );
}

/**
* {@inheritDoc}
*/
public <Y extends Comparable<? super Y>> Predicate greaterThan(Expression<? extends Y> x, Expression<?
extends Y> y) {
    //noinspection SuspiciousNameCombination
    return new ComparisonPredicate( this, ComparisonOperator.GREATER_THAN, x, y );
}

/**
* {@inheritDoc}
*/
public <Y extends Comparable<? super Y>> Predicate lessThan(
    Expression<? extends Y> x,
    Expression<? extends Y> y) {
    //noinspection SuspiciousNameCombination
    return new ComparisonPredicate( this, ComparisonOperator.LESS_THAN, x, y );
}

/**
* {@inheritDoc}
*/
public <Y extends Comparable<? super Y>> Predicate greaterThanOrEqualTo(
    Expression<? extends Y> x,
    Expression<? extends Y> y) {

```

```

//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.GREATER_THAN_OR_EQUAL, x, y );
}

/**
 * {@inheritDoc}
 */
public <Y extends Comparable<? super Y>> Predicate lessThanOrEqualTo(
    Expression<? extends Y> x,
    Expression<? extends Y> y) {
//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.LESS_THAN_OR_EQUAL, x, y );
}

/**
 * {@inheritDoc}
 */
public <Y extends Comparable<? super Y>> Predicate greaterThan(
    Expression<? extends Y> x,
    Y y) {
//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.GREATER_THAN, x, y );
}

/**
 * {@inheritDoc}
 */
public <Y extends Comparable<? super Y>> Predicate lessThan(
    Expression<? extends Y> x,
    Y y) {
//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.LESS_THAN, x, y );
}

/**
 * {@inheritDoc}
 */
public <Y extends Comparable<? super Y>> Predicate greaterThanOrEqualTo(
    Expression<? extends Y> x,
    Y y) {
//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.GREATER_THAN_OR_EQUAL, x, y );
}

/**
 * {@inheritDoc}
 */
public <Y extends Comparable<? super Y>> Predicate lessThanOrEqualTo(

```

```

Expression<? extends Y> x,
Y y) {
//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.LESS_THAN_OR_EQUAL, x, y );
}

/**
 * {@inheritDoc}
 */
public Predicate gt(Expression<? extends Number> x, Expression<? extends Number> y) {
//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.GREATER_THAN, x, y );
}

/**
 * {@inheritDoc}
 */
public Predicate lt(Expression<? extends Number> x, Expression<? extends Number> y) {
//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.LESS_THAN, x, y );
}

/**
 * {@inheritDoc}
 */
public Predicate ge(Expression<? extends Number> x, Expression<? extends Number> y) {
//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.GREATER_THAN_OR_EQUAL, x, y );
}

/**
 * {@inheritDoc}
 */
public Predicate le(Expression<? extends Number> x, Expression<? extends Number> y) {
//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.LESS_THAN_OR_EQUAL, x, y );
}

/**
 * {@inheritDoc}
 */
public Predicate gt(Expression<? extends Number> x, Number y) {
//noinspection SuspiciousNameCombination
return new ComparisonPredicate( this, ComparisonOperator.GREATER_THAN, x, y );
}

/**
 * {@inheritDoc}

```

```

*/
public Predicate lt(Expression<? extends Number> x, Number y) {
    //noinspection SuspiciousNameCombination
    return new ComparisonPredicate( this, ComparisonOperator.LESS_THAN, x, y );
}

/**
 * {@inheritDoc}
 */
public Predicate ge(Expression<? extends Number> x, Number y) {
    //noinspection SuspiciousNameCombination
    return new ComparisonPredicate( this, ComparisonOperator.GREATER_THAN_OR_EQUAL, x, y );
}

/**
 * {@inheritDoc}
 */
public Predicate le(Expression<? extends Number> x, Number y) {
    //noinspection SuspiciousNameCombination
    return new ComparisonPredicate( this, ComparisonOperator.LESS_THAN_OR_EQUAL, x, y );
}

/**
 * {@inheritDoc}
 */
public <Y extends Comparable<? super Y>> Predicate between(
    Expression<? extends Y> expression,
    Y lowerBound,
    Y upperBound) {
    return new BetweenPredicate<Y>( this, expression, lowerBound, upperBound );
}

/**
 * {@inheritDoc}
 */
public <Y extends Comparable<? super Y>> Predicate between(
    Expression<? extends Y> expression,
    Expression<? extends Y> lowerBound,
    Expression<? extends Y> upperBound) {
    return new BetweenPredicate<Y>( this, expression, lowerBound, upperBound );
}

/**
 * {@inheritDoc}
 */
public <T> In<T> in(Expression<? extends T> expression) {
    return new InPredicate<T>( this, expression );
}

```

```
public <T> In<T> in(Expression<? extends T> expression, Expression<? extends T>... values) {
    return new InPredicate<T>( this, expression, values );
}
```

```
public <T> In<T> in(Expression<? extends T> expression, T... values) {
    return new InPredicate<T>( this, expression, values );
}
```

```
public <T> In<T> in(Expression<? extends T> expression, Collection<T> values) {
    return new InPredicate<T>( this, expression, values );
}
```

```
public Predicate like(Expression<String> matchExpression, Expression<String> pattern) {
    return new LikePredicate( this, matchExpression, pattern );
}
```

```
public Predicate like(Expression<String> matchExpression, Expression<String> pattern, Expression<Character>
escapeCharacter) {
    return new LikePredicate( this, matchExpression, pattern, escapeCharacter );
}
```

```
public Predicate like(Expression<String> matchExpression, Expression<String> pattern, char escapeCharacter) {
    return new LikePredicate( this, matchExpression, pattern, escapeCharacter );
}
```

```
public Predicate like(Expression<String> matchExpression, String pattern) {
    return new LikePredicate( this, matchExpression, pattern );
}
```

```
public Predicate like(Expression<String> matchExpression, String pattern, Expression<Character> escapeCharacter)
{
    return new LikePredicate( this, matchExpression, pattern, escapeCharacter );
}
```

```
public Predicate like(Expression<String> matchExpression, String pattern, char escapeCharacter) {
    return new LikePredicate( this, matchExpression, pattern, escapeCharacter );
}
```

```
public Predicate notLike(Expression<String> matchExpression, Expression<String> pattern) {
    return like( matchExpression, pattern ).not();
}
```

```
public Predicate notLike(Expression<String> matchExpression, Expression<String> pattern,
Expression<Character> escapeCharacter) {
    return like( matchExpression, pattern, escapeCharacter ).not();
}
```

```

public Predicate notLike(Expression<String> matchExpression, Expression<String> pattern, char escapeCharacter)
{
    return like( matchExpression, pattern, escapeCharacter ).not();
}

public Predicate notLike(Expression<String> matchExpression, String pattern) {
    return like( matchExpression, pattern ).not();
}

public Predicate notLike(Expression<String> matchExpression, String pattern, Expression<Character>
escapeCharacter) {
    return like( matchExpression, pattern, escapeCharacter ).not();
}

public Predicate notLike(Expression<String> matchExpression, String pattern, char escapeCharacter) {
    return like( matchExpression, pattern, escapeCharacter ).not();
}

// parameters ~~~~~

/**
 * {@inheritDoc}
 */
public <T> ParameterExpression<T> parameter(Class<T> paramClass) {
    return new ParameterExpressionImpl<T>( this, paramClass );
}

/**
 * {@inheritDoc}
 */
public <T> ParameterExpression<T> parameter(Class<T> paramClass, String name) {
    return new ParameterExpressionImpl<T>( this, paramClass, name );
}

/**
 * {@inheritDoc}
 */
public <T> Expression<T> literal(T value) {
    if ( value == null ) {
        throw new IllegalArgumentException( "literal value cannot be null" );
    }
    return new LiteralExpression<T>( this, value );
}

/**
 * {@inheritDoc}
 */

```

```

public <T> Expression<T> nullLiteral(Class<T> resultClass) {
    return new NullLiteralExpression<T>( this, resultClass );
}

// aggregate functions ~~~~~

/**
 * {@inheritDoc}
 */
public <N extends Number> Expression<Double> avg(Expression<N> x) {
    return new AggregationFunction.AVG( this, x );
}

/**
 * {@inheritDoc}
 */
public <N extends Number> Expression<N> sum(Expression<N> x) {
    return new AggregationFunction.SUM<N>( this, x );
}

/**
 * {@inheritDoc}
 */
public Expression<Long> sumAsLong(Expression<Integer> x) {
    return new AggregationFunction.SUM<Long>( this, x, Long.class );
}

/**
 * {@inheritDoc}
 */
public Expression<Double> sumAsDouble(Expression<Float> x) {
    return new AggregationFunction.SUM<Double>( this, x, Double.class );
}

/**
 * {@inheritDoc}
 */
public <N extends Number> Expression<N> max(Expression<N> x) {
    return new AggregationFunction.MAX<N>( this, x );
}

/**
 * {@inheritDoc}
 */
public <N extends Number> Expression<N> min(Expression<N> x) {
    return new AggregationFunction.MIN<N>( this, x );
}

```

```

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public <X extends Comparable<? super X>> Expression<X> greatest(Expression<X> x) {
    return new AggregationFunction.GREATEST( this, x );
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public <X extends Comparable<? super X>> Expression<X> least(Expression<X> x) {
    return new AggregationFunction.LEAST( this, x );
}

/**
 * {@inheritDoc}
 */
public Expression<Long> count(Expression<?> x) {
    return new AggregationFunction.COUNT( this, x, false );
}

/**
 * {@inheritDoc}
 */
public Expression<Long> countDistinct(Expression<?> x) {
    return new AggregationFunction.COUNT( this, x, true );
}

// other functions
~~~~~

/**
 * {@inheritDoc}
 */
public <T> Expression<T> function(String name, Class<T> returnType, Expression<?>... arguments) {
    return new ParameterizedFunctionExpression<T>( this, returnType, name, arguments );
}

/**
 * Create a reference to a function taking no params.
 *
 * @param name The function name.
 * @param returnType The return type.

```

```

*
* @return The function expression
*/
public <T> Expression<T> function(String name, Class<T> returnType) {
    return new BasicFunctionExpression<T>( this, returnType, name );
}

/**
* {@inheritDoc}
*/
public <N extends Number> Expression<N> abs(Expression<N> expression) {
    return new AbsFunction<N>( this, expression );
}

/**
* {@inheritDoc}
*/
public Expression<Double> sqrt(Expression<? extends Number> expression) {
    return new SqrtFunction( this, expression );
}

public Expression<java.sql.Date> currentDate() {
    return new CurrentDateFunction( this );
}

public Expression<java.sql.Timestamp> currentTimestamp() {
    return new CurrentTimestampFunction( this );
}

public Expression<java.sql.Time> currentTime() {
    return new CurrentTimeFunction( this );
}

public Expression<String> substring(Expression<String> value, Expression<Integer> start) {
    return new SubstringFunction( this, value, start );
}

public Expression<String> substring(Expression<String> value, int start) {
    return new SubstringFunction( this, value, start );
}

public Expression<String> substring(Expression<String> value, Expression<Integer> start, Expression<Integer>
length) {
    return new SubstringFunction( this, value, start, length );
}

public Expression<String> substring(Expression<String> value, int start, int length) {
    return new SubstringFunction( this, value, start, length );
}

```

```

}

public Expression<String> trim(Expression<String> trimSource ) {
    return new TrimFunction( this, trimSource );
}

public Expression<String> trim(Trimspec trimspec, Expression<String> trimSource) {
    return new TrimFunction( this, trimspec, trimSource );
}

public Expression<String> trim(Expression<Character> trimCharacter, Expression<String> trimSource) {
    return new TrimFunction( this, trimCharacter, trimSource );
}

public Expression<String> trim(Trimspec trimspec, Expression<Character> trimCharacter, Expression<String>
trimSource) {
    return new TrimFunction( this, trimspec, trimCharacter, trimSource );
}

public Expression<String> trim(char trimCharacter, Expression<String> trimSource) {
    return new TrimFunction( this, trimCharacter, trimSource );
}

public Expression<String> trim(Trimspec trimspec, char trimCharacter, Expression<String> trimSource) {
    return new TrimFunction( this, trimspec, trimCharacter, trimSource );
}

public Expression<String> lower(Expression<String> value) {
    return new LowerFunction( this, value );
}

public Expression<String> upper(Expression<String> value) {
    return new UpperFunction( this, value );
}

public Expression<Integer> length(Expression<String> value) {
    return new LengthFunction( this, value );
}

public Expression<Integer> locate(Expression<String> string, Expression<String> pattern) {
    return new LocateFunction( this, pattern, string );
}

public Expression<Integer> locate(Expression<String> string, Expression<String> pattern, Expression<Integer>
start) {
    return new LocateFunction( this, pattern, string, start );
}

```

```

public Expression<Integer> locate(Expression<String> string, String pattern) {
    return new LocateFunction( this, pattern, string );
}

public Expression<Integer> locate(Expression<String> string, String pattern, int start) {
    return new LocateFunction( this, pattern, string, start );
}

// arithmetic operations
~~~~~

@Override
public <N extends Number> Expression<N> neg(Expression<N> expression) {
    return new UnaryArithmeticOperation<N>(
        this,
        UnaryArithmeticOperation.Operation.UNARY_MINUS,
        expression
    );
}

@Override
@SuppressWarnings({ "unchecked" })
public <N extends Number> Expression<N> sum(Expression<? extends N> expression1, Expression<? extends N>
expression2) {
    if ( expression1 == null || expression2 == null ) {
        throw new IllegalArgumentException( "arguments to sum() cannot be null" );
    }

    final Class resultType = BinaryArithmeticOperation.determineResultType( expression1.getJavaType(),
expression2.getJavaType() );

    return new BinaryArithmeticOperation<N>(
        this,
        resultType,
        BinaryArithmeticOperation.Operation.ADD,
        expression1,
        expression2
    );
}

@Override
@SuppressWarnings({ "unchecked" })
public <N extends Number> Expression<N> prod(Expression<? extends N> expression1, Expression<? extends N>
expression2) {
    if ( expression1 == null || expression2 == null ) {
        throw new IllegalArgumentException( "arguments to prod() cannot be null" );
    }
}

```

```

    }

    final Class resultType = BinaryArithmeticOperation.determineResultType( expression1.getJavaType(),
expression2.getJavaType() );

    return new BinaryArithmeticOperation<N>(
        this,
        resultType,
        BinaryArithmeticOperation.Operation.MULTIPLY,
        expression1,
        expression2
    );
}

@Override
@SuppressWarnings({ "unchecked" })
public <N extends Number> Expression<N> diff(Expression<? extends N> expression1, Expression<? extends N>
expression2) {
    if ( expression1 == null || expression2 == null ) {
        throw new IllegalArgumentException( "arguments to diff() cannot be null" );
    }

    final Class resultType = BinaryArithmeticOperation.determineResultType( expression1.getJavaType(),
expression2.getJavaType() );

    return new BinaryArithmeticOperation<N>(
        this,
        resultType,
        BinaryArithmeticOperation.Operation.SUBTRACT,
        expression1,
        expression2
    );
}

@Override
@SuppressWarnings({ "unchecked" })
public <N extends Number> Expression<N> sum(Expression<? extends N> expression, N n) {
    if ( expression == null || n == null ) {
        throw new IllegalArgumentException( "arguments to sum() cannot be null" );
    }

    final Class resultType = BinaryArithmeticOperation.determineResultType( expression.getJavaType(), n.getClass() );

    return new BinaryArithmeticOperation<N>(
        this,
        resultType,
        BinaryArithmeticOperation.Operation.ADD,
        expression,

```

```

    n
  );
}

@Override
@SuppressWarnings({ "unchecked" })
public <N extends Number> Expression<N> prod(Expression<? extends N> expression, N n) {
  if ( expression == null || n == null ) {
    throw new IllegalArgumentException( "arguments to prod() cannot be null" );
  }

  final Class resultType = BinaryArithmeticOperation.determineResultType( expression.getJavaType(), n.getClass() );

  return new BinaryArithmeticOperation<N>(
    this,
    resultType,
    BinaryArithmeticOperation.Operation.MULTIPLY,
    expression,
    n
  );
}

@Override
@SuppressWarnings({ "unchecked" })
public <N extends Number> Expression<N> diff(Expression<? extends N> expression, N n) {
  if ( expression == null || n == null ) {
    throw new IllegalArgumentException( "arguments to diff() cannot be null" );
  }

  final Class resultType = BinaryArithmeticOperation.determineResultType( expression.getJavaType(), n.getClass() );

  return new BinaryArithmeticOperation<N>(
    this,
    resultType,
    BinaryArithmeticOperation.Operation.SUBTRACT,
    expression,
    n
  );
}

@Override
@SuppressWarnings({ "unchecked" })
public <N extends Number> Expression<N> sum(N n, Expression<? extends N> expression) {
  if ( expression == null || n == null ) {
    throw new IllegalArgumentException( "arguments to sum() cannot be null" );
  }

  final Class resultType = BinaryArithmeticOperation.determineResultType( n.getClass(), expression.getJavaType() );

```

```

return new BinaryArithmeticOperation<N>(
    this,
    resultType,
    BinaryArithmeticOperation.Operation.ADD,
    n,
    expression
);
}

@Override
@SuppressWarnings({ "unchecked" })
public <N extends Number> Expression<N> prod(N n, Expression<? extends N> expression) {
    if ( n == null || expression == null ) {
        throw new IllegalArgumentException( "arguments to prod() cannot be null" );
    }

    final Class resultType = BinaryArithmeticOperation.determineResultType( n.getClass(), expression.getJavaType() );

    return (BinaryArithmeticOperation<N>) new BinaryArithmeticOperation(
        this,
        resultType,
        BinaryArithmeticOperation.Operation.MULTIPLY,
        n,
        expression
    );
}

@Override
@SuppressWarnings({ "unchecked" })
public <N extends Number> Expression<N> diff(N n, Expression<? extends N> expression) {
    if ( n == null || expression == null ) {
        throw new IllegalArgumentException( "arguments to diff() cannot be null" );
    }

    final Class resultType = BinaryArithmeticOperation.determineResultType( n.getClass(), expression.getJavaType() );

    return new BinaryArithmeticOperation<N>(
        this,
        resultType,
        BinaryArithmeticOperation.Operation.SUBTRACT,
        n,
        expression
    );
}

@Override
@SuppressWarnings( {"unchecked"})

```

```

public Expression<Number> quot(Expression<? extends Number> expression1, Expression<? extends Number>
expression2) {
    if ( expression1 == null || expression2 == null ) {
        throw new IllegalArgumentException( "arguments to quot() cannot be null" );
    }

```

```

        final Class resultType = BinaryArithmeticOperation.determineResultType( expression1.getJavaType(),
expression2.getJavaType(), true );

```

```

return new BinaryArithmeticOperation<Number>(
    this,
    resultType,
    BinaryArithmeticOperation.Operation.DIVIDE,
    expression1,
    expression2
);
}

```

```

@Override

```

```

@SuppressWarnings( {"unchecked"})

```

```

public Expression<Number> quot(Expression<? extends Number> expression, Number number) {
    if ( expression == null || number == null ) {
        throw new IllegalArgumentException( "arguments to quot() cannot be null" );
    }

```

```

        final Class resultType = BinaryArithmeticOperation.determineResultType( expression.getJavaType(),
number.getClass(), true );

```

```

return new BinaryArithmeticOperation<Number>(
    this,
    resultType,
    BinaryArithmeticOperation.Operation.DIVIDE,
    expression,
    number
);
}

```

```

@Override

```

```

@SuppressWarnings( {"unchecked"})

```

```

public Expression<Number> quot(Number number, Expression<? extends Number> expression) {
    if ( expression == null || number == null ) {
        throw new IllegalArgumentException( "arguments to quot() cannot be null" );
    }

```

```

        final Class resultType = BinaryArithmeticOperation.determineResultType( number.getClass(),
expression.getJavaType(), true );

```

```

return new BinaryArithmeticOperation<Number>(

```

```

    this,
    resultType,
    BinaryArithmeticOperation.Operation.DIVIDE,
    number,
    expression
);
}

@Override
public Expression<Integer> mod(Expression<Integer> expression1, Expression<Integer> expression2) {
    if ( expression1 == null || expression2 == null ) {
        throw new IllegalArgumentException( "arguments to mod() cannot be null" );
    }

    return new BinaryArithmeticOperation<Integer>(
        this,
        Integer.class,
        BinaryArithmeticOperation.Operation.MOD,
        expression1,
        expression2
    );
}

@Override
public Expression<Integer> mod(Expression<Integer> expression, Integer integer) {
    if ( expression == null || integer == null ) {
        throw new IllegalArgumentException( "arguments to mod() cannot be null" );
    }

    return new BinaryArithmeticOperation<Integer>(
        this,
        Integer.class,
        BinaryArithmeticOperation.Operation.MOD,
        expression,
        integer
    );
}

@Override
public Expression<Integer> mod(Integer integer, Expression<Integer> expression) {
    if ( integer == null || expression == null ) {
        throw new IllegalArgumentException( "arguments to mod() cannot be null" );
    }

    return new BinaryArithmeticOperation<Integer>(
        this,
        Integer.class,
        BinaryArithmeticOperation.Operation.MOD,

```

```

    integer,
    expression
);
}

// casting
~~~~~
~~~~~

/**
 * {@inheritDoc}
 */
public ExpressionImplementor<Long> toLong(Expression<? extends Number> expression) {
    return ( (ExpressionImplementor<? extends Number>) expression ).asLong();
}

/**
 * {@inheritDoc}
 */
public ExpressionImplementor<Integer> toInteger(Expression<? extends Number> expression) {
    return ( (ExpressionImplementor<? extends Number>) expression ).asInteger();
}

/**
 * {@inheritDoc}
 */
public ExpressionImplementor<Float> toFloat(Expression<? extends Number> expression) {
    return ( (ExpressionImplementor<? extends Number>) expression ).asFloat();
}

/**
 * {@inheritDoc}
 */
public ExpressionImplementor<Double> toDouble(Expression<? extends Number> expression) {
    return ( (ExpressionImplementor<? extends Number>) expression ).asDouble();
}

/**
 * {@inheritDoc}
 */
public ExpressionImplementor<BigDecimal> toBigDecimal(Expression<? extends Number> expression) {
    return ( (ExpressionImplementor<? extends Number>) expression ).asBigDecimal();
}

/**
 * {@inheritDoc}
 */

```

```

public ExpressionImplementor<BigInteger> toBigInteger(Expression<? extends Number> expression) {
    return ( (ExpressionImplementor<? extends Number>) expression ).asBigInteger();
}

/**
 * {@inheritDoc}
 */
public ExpressionImplementor<String> toString(Expression<Character> characterExpression) {
    return ( (ExpressionImplementor<Character>) characterExpression ).asString();
}

// subqueries
~~~~~

~~~~~

/**
 * {@inheritDoc}
 */
public Predicate exists(Subquery<?> subquery) {
    return new ExistsPredicate( this, subquery );
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public <Y> Expression<Y> all(Subquery<Y> subquery) {
    return new SubqueryComparisonModifierExpression<Y>(
        this,
        (Class<Y>) subquery.getJavaType(),
        subquery,
        SubqueryComparisonModifierExpression.Modifier.ALL
    );
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public <Y> Expression<Y> some(Subquery<Y> subquery) {
    return new SubqueryComparisonModifierExpression<Y>(
        this,
        (Class<Y>) subquery.getJavaType(),
        subquery,
        SubqueryComparisonModifierExpression.Modifier.SOME
    );
}

```

```

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public <Y> Expression<Y> any(Subquery<Y> subquery) {
    return new SubqueryComparisonModifierExpression<Y>(
        this,
        (Class<Y>) subquery.getJavaType(),
        subquery,
        SubqueryComparisonModifierExpression.Modifier.ANY
    );
}

// miscellaneous expressions
~~~~~

~

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "RedundantCast" })
public <Y> Expression<Y> coalesce(Expression<? extends Y> exp1, Expression<? extends Y> exp2) {
    return coalesce( (Class<Y>) null, exp1, exp2 );
}

public <Y> Expression<Y> coalesce(Class<Y> type, Expression<? extends Y> exp1, Expression<? extends Y>
exp2) {
    return new CoalesceExpression<Y>( this, type ).value( exp1 ).value( exp2 );
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "RedundantCast" })
public <Y> Expression<Y> coalesce(Expression<? extends Y> exp1, Y exp2) {
    return coalesce( (Class<Y>) null, exp1, exp2 );
}

public <Y> Expression<Y> coalesce(Class<Y> type, Expression<? extends Y> exp1, Y exp2) {
    return new CoalesceExpression<Y>( this, type ).value( exp1 ).value( exp2 );
}

/**
 * {@inheritDoc}
 */
public <T> Coalesce<T> coalesce() {

```

```

return coalesce( (Class<T>)null );
}

public <T> Coalesce<T> coalesce(Class<T> type) {
return new CoalesceExpression<T>( this, type );
}

/**
 * {@inheritDoc}
 */
public Expression<String> concat(Expression<String> string1, Expression<String> string2) {
return new ConcatExpression( this, string1, string2 );
}

/**
 * {@inheritDoc}
 */
public Expression<String> concat(Expression<String> string1, String string2) {
return new ConcatExpression( this, string1, string2 );
}

/**
 * {@inheritDoc}
 */
public Expression<String> concat(String string1, Expression<String> string2) {
return new ConcatExpression( this, string1, string2 );
}

/**
 * {@inheritDoc}
 */
public <Y> Expression<Y> nullif(Expression<Y> exp1, Expression<?> exp2) {
return nullif( null, exp1, exp2 );
}

public <Y> Expression<Y> nullif(Class<Y> type, Expression<Y> exp1, Expression<?> exp2) {
return new NullifExpression<Y>( this, type, exp1, exp2 );
}

/**
 * {@inheritDoc}
 */
public <Y> Expression<Y> nullif(Expression<Y> exp1, Y exp2) {
return nullif( null, exp1, exp2 );
}

public <Y> Expression<Y> nullif(Class<Y> type, Expression<Y> exp1, Y exp2) {
return new NullifExpression<Y>( this, type, exp1, exp2 );
}

```

```

}

/**
 * {@inheritDoc}
 */
public <C, R> SimpleCase<C, R> selectCase(Expression<? extends C> expression) {
    return selectCase( (Class<R>)null, expression );
}

public <C, R> SimpleCase<C, R> selectCase(Class<R> type, Expression<? extends C> expression) {
    return new SimpleCaseExpression<C, R>( this, type, expression );
}

/**
 * {@inheritDoc}
 */
public <R> Case<R> selectCase() {
    return selectCase( (Class<R>)null );
}

public <R> Case<R> selectCase(Class<R> type) {
    return new SearchedCaseExpression<R>( this, type );
}

/**
 * {@inheritDoc}
 */
public <C extends Collection<?>> Expression<Integer> size(C c) {
    int size = c == null ? 0 : c.size();
    return new LiteralExpression<Integer>(this, Integer.class, size);
}

/**
 * {@inheritDoc}
 */
public <C extends Collection<?>> Expression<Integer> size(Expression<C> exp) {
    if ( LiteralExpression.class.isInstance(exp) ) {
        return size( ( LiteralExpression<C> ) exp ).getLiteral() );
    }
    else if ( PluralAttributePath.class.isInstance(exp) ) {
        return new SizeOfCollectionExpression<C>(this, (PluralAttributePath<C>) exp );
    }
    // TODO : what other specific types? any?
    throw new IllegalArgumentException("unknown collection expression type [" + exp.getClass().getName() + "]" );
}

/**
 * {@inheritDoc}

```

```

*/
public <V, M extends Map<?, V>> Expression<Collection<V>> values(M map) {
    return new LiteralExpression<Collection<V>>( this, map.values() );
}

/**
 * {@inheritDoc}
 */
public <K, M extends Map<K, ?>> Expression<Set<K>> keys(M map) {
    return new LiteralExpression<Set<K>>( this, map.keySet() );
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public <C extends Collection<?>> Predicate isEmpty(Expression<C> collectionExpression) {
    if ( PluralAttributePath.class.isInstance(collectionExpression) ) {
        return new IsEmptyPredicate( this, (PluralAttributePath<C>) collectionExpression );
    }
    // TODO : what other specific types? any?
    throw new IllegalArgumentException(
        "unknown collection expression type [" + collectionExpression.getClass().getName() + "]"
    );
}

/**
 * {@inheritDoc}
 */
public <C extends Collection<?>> Predicate isEmpty(Expression<C> collectionExpression) {
    return isEmpty( collectionExpression ).not();
}

/**
 * {@inheritDoc}
 */
public <E, C extends Collection<E>> Predicate isMember(E e, Expression<C> collectionExpression) {
    if ( ! PluralAttributePath.class.isInstance( collectionExpression ) ) {
        throw new IllegalArgumentException(
            "unknown collection expression type [" + collectionExpression.getClass().getName() + "]"
        );
    }
    return new MemberOfPredicate<E, C>(
        this,
        e,
        (PluralAttributePath<C>)collectionExpression
    );
}

```

```

}

/**
 * {@inheritDoc}
 */
public <E, C extends Collection<E>> Predicate isNotMember(E e, Expression<C> cExpression) {
    return isMember(e, cExpression).not();
}

/**
 * {@inheritDoc}
 */
public <E, C extends Collection<E>> Predicate isMember(Expression<E> elementExpression, Expression<C>
collectionExpression) {
    if ( ! PluralAttributePath.class.isInstance( collectionExpression ) ) {
        throw new IllegalArgumentException(
            "unknown collection expression type [" + collectionExpression.getClass().getName() + "]"
        );
    }
    return new MemberOfPredicate<E, C>(
        this,
        elementExpression,
        (PluralAttributePath<C>)collectionExpression
    );
}

/**
 * {@inheritDoc}
 */
public <E, C extends Collection<E>> Predicate isNotMember(Expression<E> eExpression, Expression<C>
cExpression) {
    return isMember(eExpression, cExpression).not();
}
}
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* Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria;
import javax.persistence.criteria.MapJoin;

/**
 * Specialization of {@link JoinImplementor} for {@link java.util.Map} typed attribute joins
 *
 * @author Steve Ebersole
 */
public interface MapJoinImplementor<Z,K,V> extends JoinImplementor<Z,V>, MapJoin<Z,K,V> {
    /**
     * {@inheritDoc}
     * <p/>
     * Refined return type
     */
    public MapJoinImplementor<Z,K,V> correlateTo(CriteriaSubqueryImpl subquery);
}
/**
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 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
*/

```

```

package org.hibernate.ejb.criteria;
import java.math.BigDecimal;
import java.math.BigInteger;
import javax.persistence.criteria.Expression;

/**
 * TODO : javadoc
 *
 * @author Steve Ebersole
 */
public interface ExpressionImplementor<T> extends SelectionImplementor<T>, Expression<T>, Renderable {
/**
 * See { @link javax.persistence.criteria.CriteriaBuilder#toLong }
 *
 * @return <tt>this</tt> but as a long
 */
public ExpressionImplementor<Long> asLong();

/**
 * See { @link javax.persistence.criteria.CriteriaBuilder#toInteger }
 *
 * @return <tt>this</tt> but as an integer
 */
public ExpressionImplementor<Integer> asInteger();

/**
 * See { @link javax.persistence.criteria.CriteriaBuilder#toFloat }
 *
 * @return <tt>this</tt> but as a float
 */
public ExpressionImplementor<Float> asFloat();

/**
 * See { @link javax.persistence.criteria.CriteriaBuilder#toDouble }
 *
 * @return <tt>this</tt> but as a double
 */
public ExpressionImplementor<Double> asDouble();

/**
 * See { @link javax.persistence.criteria.CriteriaBuilder#toBigDecimal }
 *
 * @return <tt>this</tt> but as a { @link BigDecimal }
 */
public ExpressionImplementor<BigDecimal> asBigDecimal();

/**
 * See { @link javax.persistence.criteria.CriteriaBuilder#toBigInteger }

```

```

*
* @return <tt>this</tt> but as a { @link BigInteger}
*/
public ExpressionImplementor<BigInteger> asBigInteger();

/**
* See { @link javax.persistence.criteria.CriteriaBuilder#toString}
*
* @return <tt>this</tt> but as a string
*/
public ExpressionImplementor<String> asString();
}
/*
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* 51 Franklin Street, Fifth Floor
* Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria;
import javax.persistence.criteria.SetJoin;

/**
* Specialization of { @link JoinImplementor} for { @link java.util.Set} typed attribute joins
*
* @author Steve Ebersole
*/
public interface SetJoinImplementor<Z,X> extends JoinImplementor<Z,X>, SetJoin<Z,X> {
/**
* { @inheritDoc}
* <p/>
* Refined return type

```

```

*/
public SetJoinImplementor<Z,X> correlateTo(CriteriaSubqueryImpl subquery);
}
/*
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* along with this distribution; if not, write to:
* Free Software Foundation, Inc.
* 51 Franklin Street, Fifth Floor
* Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria;
import java.io.Serializable;
import javax.persistence.criteria.Expression;
import javax.persistence.criteria.Order;

/**
* Represents an <tt>ORDER BY</tt> fragment.
*
* @author Steve Ebersole
*/
public class OrderImpl implements Order, Serializable {
    private final Expression<?> expression;
    private boolean ascending;

    public OrderImpl(Expression<?> expression) {
        this( expression, true );
    }

    public OrderImpl(Expression<?> expression, boolean ascending) {
        this.expression = expression;
        this.ascending = ascending;
    }
}

```

```

public Order reverse() {
    ascending = !ascending;
    return this;
}

public boolean isAscending() {
    return ascending;
}

public Expression<?> getExpression() {
    return expression;
}
}
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 * along with this distribution; if not, write to:
 * Free Software Foundation, Inc.
 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb.criteria.path;

import java.io.Serializable;
import javax.persistence.criteria.Root;
import javax.persistence.metamodel.EntityType;

import org.hibernate.ejb.criteria.CriteriaBuilderImpl;
import org.hibernate.ejb.criteria.CriteriaQueryCompiler;
import org.hibernate.ejb.criteria.CriteriaSubqueryImpl;
import org.hibernate.ejb.criteria.FromImplementor;

```

```

/**
 * TODO : javadoc
 *
 * @author Steve Ebersole
 */
public class RootImpl<X> extends AbstractFromImpl<X,X> implements Root<X>, Serializable {
    private final EntityType<X> entityType;

    public RootImpl(
        CriteriaBuilderImpl criteriaBuilder,
        EntityType<X> entityType) {
        super( criteriaBuilder, entityType.getJavaType() );
        this.entityType = entityType;
    }

    public EntityType<X> getEntityType() {
        return entityType;
    }

    public EntityType<X> getModel() {
        return getEntityType();
    }

    @Override
    protected FromImplementor<X, X> createCorrelationDelegate() {
        return new RootImpl<X>( criteriaBuilder(), getEntityType() );
    }

    @Override
    public RootImpl<X> correlateTo(CriteriaSubqueryImpl subquery) {
        return (RootImpl<X>) super.correlateTo( subquery );
    }

    @Override
    protected boolean canBeJoinSource() {
        return true;
    }

    public String renderTableExpression(CriteriaQueryCompiler.RenderingContext renderingContext) {
        prepareAlias( renderingContext );
        return getModel().getName() + " as " + getAlias();
    }

    @Override
    public String getPathIdentifier() {
        return getAlias();
    }
}

```

```

@Override
public String render(CriteriaQueryCompiler.RenderingContext renderingContext) {
    prepareAlias( renderingContext );
    return getAlias();
}

```

```

@Override
public String renderProjection(CriteriaQueryCompiler.RenderingContext renderingContext) {
    return render( renderingContext );
}
}

```

```

/*

```

```

* Hibernate, Relational Persistence for Idiomatic Java

```

```

*

```

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```

*/

```

```

package org.hibernate.ejb.criteria.path;

```

```

import java.io.Serializable;

```

```

import javax.persistence.criteria.From;

```

```

import javax.persistence.criteria.JoinType;

```

```

import javax.persistence.metamodel.Attribute;

```

```

import org.hibernate.ejb.criteria.CriteriaBuilderImpl;

```

```

import org.hibernate.ejb.criteria.CriteriaQueryCompiler;

```

```

import org.hibernate.ejb.criteria.CriteriaSubqueryImpl;

```

```

import org.hibernate.ejb.criteria.FromImplementor;

```

```

import org.hibernate.ejb.criteria.JoinImplementor;

```

```

import org.hibernate.ejb.criteria.PathSource;

```

```

/**
 * TODO : javadoc
 *
 * @author Steve Ebersole
 */
public abstract class AbstractJoinImpl<Z, X>
    extends AbstractFromImpl<Z, X>
    implements JoinImplementor<Z,X>, Serializable {

    private final Attribute<? super Z, ?> joinAttribute;
    private final JoinType joinType;

    public AbstractJoinImpl(
        CriteriaBuilderImpl criteriaBuilder,
        PathSource<Z> pathSource,
        Attribute<? super Z, X> joinAttribute,
        JoinType joinType) {
        this( criteriaBuilder, joinAttribute.getJavaType(), pathSource, joinAttribute, joinType );
    }

    public AbstractJoinImpl(
        CriteriaBuilderImpl criteriaBuilder,
        Class<X> javaType,
        PathSource<Z> pathSource,
        Attribute<? super Z, ?> joinAttribute,
        JoinType joinType) {
        super( criteriaBuilder, javaType, pathSource );
        this.joinAttribute = joinAttribute;
        this.joinType = joinType;
    }

    /**
     * {@inheritDoc}
     */
    public Attribute<? super Z, ?> getAttribute() {
        return joinAttribute;
    }

    /**
     * {@inheritDoc}
     */
    public JoinType getJoinType() {
        return joinType;
    }

    /**
     * {@inheritDoc}
     */

```

```

@SuppressWarnings({ "unchecked" })
public From<?, Z> getParent() {
    // this cast should be ok by virtue of our constructors...
    return (From<?, Z>) getPathSource();
}

public String renderTableExpression(CriteriaQueryCompiler.RenderingContext renderingContext) {
    prepareAlias( renderingContext );
    ( (FromImplementor) getParent() ).prepareAlias( renderingContext );
    return getParent().getAlias() + '.' + getAttribute().getName() + " as " + getAlias();
}

public JoinImplementor<Z, X> correlateTo(CriteriaSubqueryImpl subquery) {
    return (JoinImplementor<Z, X>) super.correlateTo( subquery );
}
}
}
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* Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria.path;

import java.io.Serializable;
import java.util.Collection;
import java.util.HashMap;
import java.util.Map;
import javax.persistence.criteria.Expression;
import javax.persistence.criteria.Path;

```

```

import javax.persistence.metamodel.Attribute;
import javax.persistence.metamodel.MapAttribute;
import javax.persistence.metamodel.PluralAttribute;
import javax.persistence.metamodel.SingularAttribute;

import org.hibernate.ejb.criteria.CriteriaBuilderImpl;
import org.hibernate.ejb.criteria.CriteriaQueryCompiler;
import org.hibernate.ejb.criteria.ParameterRegistry;
import org.hibernate.ejb.criteria.PathImplementor;
import org.hibernate.ejb.criteria.PathSource;
import org.hibernate.ejb.criteria.expression.ExpressionImpl;
import org.hibernate.ejb.criteria.expression.PathTypeExpression;

/**
 * Convenience base class for various { @link Path } implementors.
 *
 * @author Steve Ebersole
 */
public abstract class AbstractPathImpl<X>
    extends ExpressionImpl<X>
    implements Path<X>, PathImplementor<X>, Serializable {

    private final PathSource pathSource;
    private final Expression<Class<? extends X>> typeExpression;
    private Map<String,Path> attributePathRegistry;

    /**
     * Constructs a basic path instance.
     *
     * @param criteriaBuilder The criteria builder
     * @param javaType The java type of this path
     * @param pathSource The source (or origin) from which this path originates
     */
    @SuppressWarnings({ "unchecked" })
    public AbstractPathImpl(
        CriteriaBuilderImpl criteriaBuilder,
        Class<X> javaType,
        PathSource pathSource) {
        super( criteriaBuilder, javaType );
        this.pathSource = pathSource;
        this.typeExpression = new PathTypeExpression( criteriaBuilder(), getJavaType(), this );
    }

    public PathSource getPathSource() {
        return pathSource;
    }

    /**

```

```

* { @inheritDoc }
*/
@Override
public PathSource<?> getParentPath() {
    return getPathSource();
}

/**
* { @inheritDoc }
*/
@SuppressWarnings({ "unchecked" })
public Expression<Class<? extends X>> type() {
    return typeExpression;
}

/**
* { @inheritDoc }
*/
@Override
public String getPathIdentifier() {
    return getPathSource().getPathIdentifier() + "." + getAttribute().getName();
}

protected abstract boolean canBeDereferenced();

protected final RuntimeException illegalDereference() {
    String message = "Illegal attempt to dereference path source";
    PathSource<?> source = getPathSource();
    if ( source != null ) {
        message += " [" + getPathSource().getPathIdentifier() + "];"
    }
    return new IllegalArgumentException(message);
}

protected final RuntimeException unknownAttribute(String attributeName) {
    String message = "Unable to resolve attribute [" + attributeName + "] against path";
    PathSource<?> source = getPathSource();
    if ( source != null ) {
        message += " [" + source.getPathIdentifier() + "];"
    }
    return new IllegalArgumentException(message);
}

protected final Path resolveCachedAttributePath(String attributeName) {
    return attributePathRegistry == null
        ? null
        : attributePathRegistry.get( attributeName );
}

```

```

protected final void registerAttributePath(String attributeName, Path path) {
    if ( attributePathRegistry == null ) {
        attributePathRegistry = new HashMap<String,Path>();
    }
    attributePathRegistry.put( attributeName, path );
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
@Override
public <Y> Path<Y> get(SingularAttribute<? super X, Y> attribute) {
    if ( ! canBeDereferenced() ) {
        throw illegalDereference();
    }

    SingularAttributePath<Y> path = (SingularAttributePath<Y>) resolveCachedAttributePath( attribute.getName() );
    if ( path == null ) {
        path = new SingularAttributePath<Y>( criteriaBuilder(), attribute.getJavaType(), this, attribute );
        registerAttributePath( attribute.getName(), path );
    }
    return path;
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
@Override
public <E, C extends Collection<E>> Expression<C> get(PluralAttribute<X, C, E> attribute) {
    if ( ! canBeDereferenced() ) {
        throw illegalDereference();
    }

    PluralAttributePath<C> path = (PluralAttributePath<C>) resolveCachedAttributePath( attribute.getName() );
    if ( path == null ) {
        path = new PluralAttributePath<C>( criteriaBuilder(), this, attribute );
        registerAttributePath( attribute.getName(), path );
    }
    return path;
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })

```

```

@Override
public <K, V, M extends Map<K, V>> Expression<M> get(MapAttribute<X, K, V> attribute) {
    if ( ! canBeDereferenced() ) {
        throw illegalDereference();
    }

    PluralAttributePath path = (PluralAttributePath) resolveCachedAttributePath( attribute.getName() );
    if ( path == null ) {
        path = new PluralAttributePath( criteriaBuilder(), this, attribute );
        registerAttributePath( attribute.getName(), path );
    }
    return path;
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
@Override
public <Y> Path<Y> get(String attributeName) {
    if ( ! canBeDereferenced() ) {
        throw illegalDereference();
    }

    final Attribute attribute = locateAttribute( attributeName );

    if ( attribute.isCollection() ) {
        final PluralAttribute<X,Y,?> pluralAttribute = (PluralAttribute<X,Y,?>) attribute;
        if ( PluralAttribute.CollectionType.MAP.equals( pluralAttribute.getCollectionType() ) ) {
            return (PluralAttributePath<Y>) this.<Object,Object,Map<Object, Object>>get( (MapAttribute) pluralAttribute );
        }
        else {
            return (PluralAttributePath<Y>) this.get( (PluralAttribute) pluralAttribute );
        }
    }
    else {
        return get( (SingularAttribute<X,Y>) attribute );
    }
}

/**
 * Get the attribute by name from the underlying model. This allows subclasses to
 * define exactly how the attribute is derived.
 *
 * @param attributeName The name of the attribute to locate
 *
 * @return The attribute; should never return null.
 */

```

```

* @throws IllegalArgumentException If no such attribute exists
*/
protected final Attribute locateAttribute(String attributeName) {
    final Attribute attribute = locateAttributeInternal( attributeName );
    if ( attribute == null ) {
        throw unknownAttribute( attributeName );
    }
    return attribute;
}

/**
 * Get the attribute by name from the underlying model. This allows subclasses to
 * define exactly how the attribute is derived. Called from { @link #locateAttribute }
 * which also applies nullness checking for proper error reporting.
 *
 * @param attributeName The name of the attribute to locate
 *
 * @return The attribute; may be null.
 *
 * @throws IllegalArgumentException If no such attribute exists
 */
protected abstract Attribute locateAttributeInternal(String attributeName);

/**
 * { @inheritDoc }
 */
@Override
public void registerParameters(ParameterRegistry registry) {
    // none to register
}

@Override
public void prepareAlias(CriteriaQueryCompiler.RenderingContext renderingContext) {
    // Make sure we delegate up to our source (eventually up to the path root) to
    // prepare the path properly.
    PathSource<?> source = getPathSource();
    if ( source != null ) {
        source.prepareAlias( renderingContext );
    }
}

/**
 * { @inheritDoc }
 */
@Override
public String render(CriteriaQueryCompiler.RenderingContext renderingContext) {
    PathSource<?> source = getPathSource();
    if ( source != null ) {
        source.prepareAlias( renderingContext );
    }
}

```

```

    return source.getPathIdentifier() + "." + getAttribute().getName();
} else {
    return getAttribute().getName();
}
}

/**
 * {@inheritDoc}
 */
@Override
public String renderProjection(CriteriaQueryCompiler.RenderingContext renderingContext) {
    return render( renderingContext );
}
}
/*
 * Hibernate, Relational Persistence for Idiomatic Java
 *
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 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb.criteria.path;

import java.io.Serializable;
import java.util.Collections;
import java.util.LinkedHashSet;
import java.util.Set;
import javax.persistence.criteria.CollectionJoin;
import javax.persistence.criteria.Fetch;
import javax.persistence.criteria.From;
import javax.persistence.criteria.Join;
import javax.persistence.criteria.JoinType;

```

```

import javax.persistence.criteria.ListJoin;
import javax.persistence.criteria.MapJoin;
import javax.persistence.criteria.SetJoin;
import javax.persistence.metamodel.Attribute;
import javax.persistence.metamodel.CollectionAttribute;
import javax.persistence.metamodel.ListAttribute;
import javax.persistence.metamodel.ManagedType;
import javax.persistence.metamodel.MapAttribute;
import javax.persistence.metamodel.PluralAttribute;
import javax.persistence.metamodel.SetAttribute;
import javax.persistence.metamodel.SingularAttribute;
import javax.persistence.metamodel.Type;

import org.hibernate.ejb.criteria.BasicPathUsageException;
import org.hibernate.ejb.criteria.CollectionJoinImplementor;
import org.hibernate.ejb.criteria.CriteriaBuilderImpl;
import org.hibernate.ejb.criteria.CriteriaQueryCompiler;
import org.hibernate.ejb.criteria.CriteriaSubqueryImpl;
import org.hibernate.ejb.criteria.FromImplementor;
import org.hibernate.ejb.criteria.JoinImplementor;
import org.hibernate.ejb.criteria.ListJoinImplementor;
import org.hibernate.ejb.criteria.MapJoinImplementor;
import org.hibernate.ejb.criteria.PathSource;
import org.hibernate.ejb.criteria.SetJoinImplementor;

/**
 * Convenience base class for various { @link javax.persistence.criteria.From } implementors.
 *
 * @author Steve Ebersole
 */
public abstract class AbstractFromImpl<Z,X>
    extends AbstractPathImpl<X>
    implements From<Z,X>, FromImplementor<Z,X>, Serializable {

    public static final JoinType DEFAULT_JOIN_TYPE = JoinType.INNER;

    private Set<Join<X, ?>> joins;
    private Set<Fetch<X, ?>> fetches;

    public AbstractFromImpl(CriteriaBuilderImpl criteriaBuilder, Class<X> javaType) {
        this( criteriaBuilder, javaType, null );
    }

    public AbstractFromImpl(CriteriaBuilderImpl criteriaBuilder, Class<X> javaType, PathSource pathSource) {
        super( criteriaBuilder, javaType, pathSource );
    }

    @Override

```

```
@SuppressWarnings({ "unchecked" })
public PathSource<Z> getPathSource() {
    return super.getPathSource();
}
```

```
@Override
public String getPathIdentifier() {
    return getAlias();
}
```

```
@Override
protected boolean canBeDereferenced() {
    return true;
}
```

```
@Override
public void prepareAlias(CriteriaQueryCompiler.RenderingContext renderingContext) {
    if ( getAlias() == null ) {
        if ( isCorrelated() ) {
            setAlias( getCorrelationParent().getAlias() );
        }
        else {
            setAlias( renderingContext.generateAlias() );
        }
    }
}
```

```
@Override
public String renderProjection(CriteriaQueryCompiler.RenderingContext renderingContext) {
    prepareAlias( renderingContext );
    return getAlias();
}
```

```
@Override
public String render(CriteriaQueryCompiler.RenderingContext renderingContext) {
    return renderProjection( renderingContext );
}
```

```
@Override
public Attribute<?, ?> getAttribute() {
    return null;
}
```

```
public From<?, Z> getParent() {
    return null;
}
```

```
@Override
```

```

@SuppressWarnings({ "unchecked" })
protected Attribute<X, ?> locateAttributeInternal(String name) {
    return (Attribute<X, ?>) locateManagedType().getAttribute( name );
}

```

```

@SuppressWarnings({ "unchecked" })
protected ManagedType<? super X> locateManagedType() {
    // by default, this should be the model
    return (ManagedType<? super X>) getModel();
}

```

```

// CORRELATION

```

```

~~~~~

```

```

// IMPL NOTE : another means from handling correlations is to create a series of
// specialized From implementations that represent the correlation roots. While
// that may be cleaner code-wise, it is certainly means creating a lot of "extra"
// classes since we'd need one for each Subquery#correlate method

```

```

private FromImplementor<Z,X> correlationParent;

```

```

private JoinScope<X> joinScope = new BasicJoinScope();

```

```

/**

```

```

 * Helper contract used to define who/what keeps track of joins and fetches made from this <tt>FROM</tt>.
 */

```

```

public static interface JoinScope<X> extends Serializable {
    public void addJoin(Join<X, ?> join);
    public void addFetch(Fetch<X,?> fetch);
}

```

```

protected class BasicJoinScope implements JoinScope<X> {

```

```

    @Override
    public void addJoin(Join<X, ?> join) {
        if ( joins == null ) {
            joins = new LinkedHashSet<Join<X,?>>();
        }
        joins.add( join );
    }

```

```

    @Override
    public void addFetch(Fetch<X, ?> fetch) {
        if ( fetches == null ) {
            fetches = new LinkedHashSet<Fetch<X,?>>();
        }
        fetches.add( fetch );
    }

```

```

}
}

protected class CorrelationJoinScope implements JoinScope<X> {
    @Override
    public void addJoin(Join<X, ?> join) {
        if ( joins == null ) {
            joins = new LinkedHashSet<Join<X,?>>();
        }
        joins.add( join );
    }

    @Override
    public void addFetch(Fetch<X, ?> fetch) {
        throw new UnsupportedOperationException( "Cannot define fetch from a subquery correlation" );
    }
}

@Override
public boolean isCorrelated() {
    return getCorrelationParent() != null;
}

@Override
public FromImplementor<Z,X> getCorrelationParent() {
    return correlationParent;
}

@Override
@SuppressWarnings({ "unchecked" })
public FromImplementor<Z, X> correlateTo(CriteriaSubqueryImpl subquery) {
    final FromImplementor<Z, X> correlationDelegate = createCorrelationDelegate();
    correlationDelegate.prepareCorrelationDelegate( this );
    return correlationDelegate;
}

protected abstract FromImplementor<Z, X> createCorrelationDelegate();

@Override
public void prepareCorrelationDelegate(FromImplementor<Z, X> parent) {
    this.joinScope = new CorrelationJoinScope();
    this.correlationParent = parent;
}

@Override
public String getAlias() {
    return isCorrelated() ? getCorrelationParent().getAlias() : super.getAlias();
}
}

```

```
// JOINS
```

```
~~~~~  
~~~~~  
  
protected abstract boolean canBeJoinSource();
```

```
private RuntimeException illegalJoin() {  
    return new IllegalArgumentException(  
        "Collection of values [" + getPathIdentifier() + "] cannot be source of a join"  
    );  
}
```

```
@Override  
@SuppressWarnings({ "unchecked" })  
public Set<Join<X, ?>> getJoins() {  
    return joins == null  
        ? Collections.EMPTY_SET  
        : joins;  
}
```

```
@Override  
public <Y> Join<X, Y> join(SingularAttribute<? super X, Y> singularAttribute) {  
    return join( singularAttribute, DEFAULT_JOIN_TYPE );  
}
```

```
@Override  
public <Y> Join<X, Y> join(SingularAttribute<? super X, Y> attribute, JoinType jt) {  
    if ( ! canBeJoinSource() ) {  
        throw illegalJoin();  
    }  
}
```

```
Join<X, Y> join = constructJoin( attribute, jt );  
joinScope.addJoin( join );  
return join;  
}
```

```
private <Y> JoinImplementor<X, Y> constructJoin(SingularAttribute<? super X, Y> attribute, JoinType jt) {  
    if ( Type.PersistenceType.BASIC.equals( attribute.getType().getPersistenceType() ) ) {  
        throw new BasicPathUsageException( "Cannot join to attribute of basic type", attribute );  
    }  
}
```

```
// TODO : runtime check that the attribute in fact belongs to this From's model/bindable
```

```
if ( jt.equals( JoinType.RIGHT ) ) {  
    throw new UnsupportedOperationException( "RIGHT JOIN not supported" );  
}
```

```

final Class<Y> attributeType = attribute.getBindableJavaType();
return new SingularAttributeJoin<X,Y>(
    criteriaBuilder(),
    attributeType,
    this,
    attribute,
    jt
);
}

@Override
public <Y> CollectionJoin<X, Y> join(CollectionAttribute<? super X, Y> collection) {
    return join( collection, DEFAULT_JOIN_TYPE );
}

@Override
public <Y> CollectionJoin<X, Y> join(CollectionAttribute<? super X, Y> collection, JoinType jt) {
    if ( ! canBeJoinSource() ) {
        throw illegalJoin();
    }

    final CollectionJoin<X, Y> join = constructJoin( collection, jt );
    joinScope.addJoin( join );
    return join;
}

private <Y> CollectionJoinImplementor<X, Y> constructJoin(CollectionAttribute<? super X, Y> collection,
JoinType jt) {
    if ( jt.equals( JoinType.RIGHT ) ) {
        throw new UnsupportedOperationException( "RIGHT JOIN not supported" );
    }

    // TODO : runtime check that the attribute in fact belongs to this From's model/bindable

    final Class<Y> attributeType = collection.getBindableJavaType();
    return new CollectionAttributeJoin<X, Y>(
        criteriaBuilder(),
        attributeType,
        this,
        collection,
        jt
    );
}

@Override
public <Y> SetJoin<X, Y> join(SetAttribute<? super X, Y> set) {
    return join( set, DEFAULT_JOIN_TYPE );
}

```

```

@Override
public <Y> SetJoin<X, Y> join(SetAttribute<? super X, Y> set, JoinType jt) {
    if ( ! canBeJoinSource() ) {
        throw illegalJoin();
    }

    final SetJoin<X, Y> join = constructJoin( set, jt );
    joinScope.addJoin( join );
    return join;
}

private <Y> SetJoinImplementor<X, Y> constructJoin(SetAttribute<? super X, Y> set, JoinType jt) {
    if ( jt.equals( JoinType.RIGHT ) ) {
        throw new UnsupportedOperationException( "RIGHT JOIN not supported" );
    }

    // TODO : runtime check that the attribute in fact belongs to this From's model/bindable

    final Class<Y> attributeType = set.getBindableJavaType();
    return new SetAttributeJoin<X,Y>( criteriaBuilder(), attributeType, this, set, jt );
}

@Override
public <Y> ListJoin<X, Y> join(ListAttribute<? super X, Y> list) {
    return join( list, DEFAULT_JOIN_TYPE );
}

@Override
public <Y> ListJoin<X, Y> join(ListAttribute<? super X, Y> list, JoinType jt) {
    if ( ! canBeJoinSource() ) {
        throw illegalJoin();
    }

    final ListJoin<X, Y> join = constructJoin( list, jt );
    joinScope.addJoin( join );
    return join;
}

private <Y> ListJoinImplementor<X, Y> constructJoin(ListAttribute<? super X, Y> list, JoinType jt) {
    if ( jt.equals( JoinType.RIGHT ) ) {
        throw new UnsupportedOperationException( "RIGHT JOIN not supported" );
    }

    // TODO : runtime check that the attribute in fact belongs to this From's model/bindable

    final Class<Y> attributeType = list.getBindableJavaType();
    return new ListAttributeJoin<X,Y>( criteriaBuilder(), attributeType, this, list, jt );
}

```

```

}

@Override
public <K, V> MapJoin<X, K, V> join(MapAttribute<? super X, K, V> map) {
    return join( map, DEFAULT_JOIN_TYPE );
}

@Override
public <K, V> MapJoin<X, K, V> join(MapAttribute<? super X, K, V> map, JoinType jt) {
    if ( ! canBeJoinSource() ) {
        throw illegalJoin();
    }

    final MapJoin<X, K, V> join = constructJoin( map, jt );
    joinScope.addJoin( join );
    return join;
}

private <K, V> MapJoinImplementor<X, K, V> constructJoin(MapAttribute<? super X, K, V> map, JoinType jt) {
    if ( jt.equals( JoinType.RIGHT ) ) {
        throw new UnsupportedOperationException( "RIGHT JOIN not supported" );
    }

    // TODO : runtime check that the attribute in fact belongs to this From's model/bindable

    final Class<V> attributeType = map.getBindableJavaType();
    return new MapAttributeJoin<X, K, V>( criteriaBuilder(), attributeType, this, map, jt );
}

@Override
public <X,Y> Join<X, Y> join(String attributeName) {
    return join( attributeName, DEFAULT_JOIN_TYPE );
}

@Override
@SuppressWarnings({ "unchecked" })
public <X,Y> Join<X, Y> join(String attributeName, JoinType jt) {
    if ( ! canBeJoinSource() ) {
        throw illegalJoin();
    }

    if ( jt.equals( JoinType.RIGHT ) ) {
        throw new UnsupportedOperationException( "RIGHT JOIN not supported" );
    }

    final Attribute<X,?> attribute = (Attribute<X, ?>) locateAttribute( attributeName );
    if ( attribute.isCollection() ) {
        final PluralAttribute pluralAttribute = ( PluralAttribute ) attribute;

```

```

if ( PluralAttribute.CollectionType.COLLECTION.equals( pluralAttribute.getCollectionType() ) ) {
    return (Join<X,Y>) join( (CollectionAttribute) attribute, jt );
}
else if ( PluralAttribute.CollectionType.LIST.equals( pluralAttribute.getCollectionType() ) ) {
    return (Join<X,Y>) join( (ListAttribute) attribute, jt );
}
else if ( PluralAttribute.CollectionType.SET.equals( pluralAttribute.getCollectionType() ) ) {
    return (Join<X,Y>) join( (SetAttribute) attribute, jt );
}
else {
    return (Join<X,Y>) join( (MapAttribute) attribute, jt );
}
}
else {
    return (Join<X,Y>) join( (SingularAttribute)attribute, jt );
}
}

```

@Override

```

public <X,Y> CollectionJoin<X, Y> joinCollection(String attributeName) {
    return joinCollection( attributeName, DEFAULT_JOIN_TYPE );
}

```

@Override

@SuppressWarnings({ "unchecked" })

```

public <X,Y> CollectionJoin<X, Y> joinCollection(String attributeName, JoinType jt) {
    final Attribute<X,?> attribute = (Attribute<X, ?>) locateAttribute( attributeName );
    if ( ! attribute.isCollection() ) {
        throw new IllegalArgumentException( "Requested attribute was not a collection" );
    }
}

```

```

final PluralAttribute pluralAttribute = ( PluralAttribute ) attribute;

```

```

if ( ! PluralAttribute.CollectionType.COLLECTION.equals( pluralAttribute.getCollectionType() ) ) {
    throw new IllegalArgumentException( "Requested attribute was not a collection" );
}

```

```

return (CollectionJoin<X,Y>) join( (CollectionAttribute) attribute, jt );
}

```

@Override

```

public <X,Y> SetJoin<X, Y> joinSet(String attributeName) {
    return joinSet( attributeName, DEFAULT_JOIN_TYPE );
}

```

@Override

@SuppressWarnings({ "unchecked" })

```

public <X,Y> SetJoin<X, Y> joinSet(String attributeName, JoinType jt) {
    final Attribute<X,?> attribute = (Attribute<X, ?>) locateAttribute( attributeName );
}

```

```

if ( ! attribute.isCollection() ) {
    throw new IllegalArgumentException( "Requested attribute was not a set" );
}

final PluralAttribute pluralAttribute = ( PluralAttribute ) attribute;
if ( ! PluralAttribute.CollectionType.SET.equals( pluralAttribute.getCollectionType() ) ) {
    throw new IllegalArgumentException( "Requested attribute was not a set" );
}

return (SetJoin<X,Y>) join( (SetAttribute) attribute, jt );
}

@Override
public <X,Y> ListJoin<X, Y> joinList(String attributeName) {
    return joinList( attributeName, DEFAULT_JOIN_TYPE );
}

@Override
@SuppressWarnings({ "unchecked" })
public <X,Y> ListJoin<X, Y> joinList(String attributeName, JoinType jt) {
    final Attribute<X,?> attribute = (Attribute<X, ?>) locateAttribute( attributeName );
    if ( ! attribute.isCollection() ) {
        throw new IllegalArgumentException( "Requested attribute was not a list" );
    }

    final PluralAttribute pluralAttribute = ( PluralAttribute ) attribute;
    if ( ! PluralAttribute.CollectionType.LIST.equals( pluralAttribute.getCollectionType() ) ) {
        throw new IllegalArgumentException( "Requested attribute was not a list" );
    }

    return (ListJoin<X,Y>) join( (ListAttribute) attribute, jt );
}

@Override
public <X, K, V> MapJoin<X, K, V> joinMap(String attributeName) {
    return joinMap( attributeName, DEFAULT_JOIN_TYPE );
}

@Override
@SuppressWarnings({ "unchecked" })
public <X, K, V> MapJoin<X, K, V> joinMap(String attributeName, JoinType jt) {
    final Attribute<X,?> attribute = (Attribute<X, ?>) locateAttribute( attributeName );
    if ( ! attribute.isCollection() ) {
        throw new IllegalArgumentException( "Requested attribute was not a map" );
    }

    final PluralAttribute pluralAttribute = ( PluralAttribute ) attribute;
    if ( ! PluralAttribute.CollectionType.MAP.equals( pluralAttribute.getCollectionType() ) ) {

```

```

        throw new IllegalArgumentException( "Requested attribute was not a map" );
    }

    return (MapJoin<X,K,V>) join( (MapAttribute) attribute, jt );
}

```

```
// FETCHES
```

```

~~~~~
~~~~~

```

```

protected boolean canBeFetchSource() {
    // the conditions should be the same...
    return canBeJoinSource();
}

```

```

private RuntimeException illegalFetch() {
    return new IllegalArgumentException(
        "Collection of values [" + getPathIdentifier() + "] cannot be source of a fetch"
    );
}

```

```

@Override
@SuppressWarnings({ "unchecked" })
public Set<Fetch<X, ?>> getFetches() {
    return fetches == null
        ? Collections.EMPTY_SET
        : fetches;
}

```

```

@Override
public <Y> Fetch<X, Y> fetch(SingularAttribute<? super X, Y> singularAttribute) {
    return fetch( singularAttribute, DEFAULT_JOIN_TYPE );
}

```

```

@Override
public <Y> Fetch<X, Y> fetch(SingularAttribute<? super X, Y> attribute, JoinType jt) {
    if ( ! canBeFetchSource() ) {
        throw illegalFetch();
    }
}

```

```

Fetch<X, Y> fetch = constructJoin( attribute, jt );
joinScope.addFetch( fetch );
return fetch;
}

```

```

@Override
public <Y> Fetch<X, Y> fetch(PluralAttribute<? super X, ?, Y> pluralAttribute) {

```

```

return fetch( pluralAttribute, DEFAULT_JOIN_TYPE );
}

@Override
public <Y> Fetch<X, Y> fetch(PluralAttribute<? super X, ?, Y> pluralAttribute, JoinType jt) {
    if ( ! canBeFetchSource() ) {
        throw illegalFetch();
    }

    final Fetch<X, Y> fetch;
    // TODO : combine Fetch and Join hierarchies (JoinImplementor extends Join,Fetch???)
    if ( PluralAttribute.CollectionType.COLLECTION.equals( pluralAttribute.getCollectionType() ) ) {
        fetch = constructJoin( (CollectionAttribute<X,Y>) pluralAttribute, jt );
    }
    else if ( PluralAttribute.CollectionType.LIST.equals( pluralAttribute.getCollectionType() ) ) {
        fetch = constructJoin( (ListAttribute<X,Y>) pluralAttribute, jt );
    }
    else if ( PluralAttribute.CollectionType.SET.equals( pluralAttribute.getCollectionType() ) ) {
        fetch = constructJoin( (SetAttribute<X,Y>) pluralAttribute, jt );
    }
    else {
        fetch = constructJoin( (MapAttribute<X,?,Y>) pluralAttribute, jt );
    }
    joinScope.addFetch( fetch );
    return fetch;
}

@Override
public <X,Y> Fetch<X, Y> fetch(String attributeName) {
    return fetch( attributeName, DEFAULT_JOIN_TYPE );
}

@Override
@SuppressWarnings({ "unchecked" })
public <X,Y> Fetch<X, Y> fetch(String attributeName, JoinType jt) {
    if ( ! canBeFetchSource() ) {
        throw illegalFetch();
    }

    Attribute<X,?> attribute = (Attribute<X, ?>) locateAttribute( attributeName );
    if ( attribute.isCollection() ) {
        return (Fetch<X, Y>) fetch( (PluralAttribute) attribute, jt );
    }
    else {
        return (Fetch<X, Y>) fetch( (SingularAttribute) attribute, jt );
    }
}
}

```

```

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 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */

```

```
package org.hibernate.ejb.criteria.expression;
```

```

import java.io.Serializable;
import java.util.ArrayList;
import java.util.List;
import javax.persistence.Tuple;
import javax.persistence.criteria.CompoundSelection;
import javax.persistence.criteria.Selection;

```

```

import org.hibernate.ejb.criteria.CriteriaBuilderImpl;
import org.hibernate.ejb.criteria.CriteriaQueryCompiler;
import org.hibernate.ejb.criteria.ParameterRegistry;
import org.hibernate.ejb.criteria.Renderable;
import org.hibernate.ejb.criteria.TupleElementImplementor;
import org.hibernate.ejb.criteria.ValueHandlerFactory;

```

```

/**
 * The Hibernate implementation of the JPA { @link CompoundSelection }
 * contract.
 *
 * @author Steve Ebersole
 */

```

```

public class CompoundSelectionImpl<X>
    extends SelectionImpl<X>
    implements CompoundSelection<X>, Renderable, Serializable {

```

```

private final boolean isConstructor;
private List<Selection<?>> selectionItems;

public CompoundSelectionImpl(
    CriteriaBuilderImpl criteriaBuilder,
    Class<X> javaType,
    List<Selection<?>> selectionItems) {
    super( criteriaBuilder, javaType );
    this.isConstructor = !javaType.isArray() && !Tuple.class.isAssignableFrom( javaType );
    this.selectionItems = selectionItems;
}

@Override
public boolean isCompoundSelection() {
    return true;
}

@Override
public List<Selection<?>> getCompoundSelectionItems() {
    return selectionItems;
}

@Override
public List<ValueHandlerFactory.ValueHandler> getValueHandlers() {
    if ( isConstructor ) {
        return null;
    }
    boolean foundHandlers = false;
    ArrayList<ValueHandlerFactory.ValueHandler> valueHandlers = new
ArrayList<ValueHandlerFactory.ValueHandler>();
    for ( Selection selection : getCompoundSelectionItems() ) {
        ValueHandlerFactory.ValueHandler valueHandler = ( TupleElementImplementor ) selection ).getValueHandler();
        valueHandlers.add( valueHandler );
        foundHandlers = foundHandlers || valueHandler != null;
    }
    return foundHandlers ? null : valueHandlers;
}

public void registerParameters(ParameterRegistry registry) {
    for ( Selection selectionItem : getCompoundSelectionItems() ) {
        Helper.possibleParameter(selectionItem, registry);
    }
}

public String render(CriteriaQueryCompiler.RenderingContext renderingContext) {
    StringBuilder buff = new StringBuilder();
    if ( isConstructor ) {
        buff.append( "new " ).append( getJavaType().getName() ).append( '(' );
    }
}

```

```

    }
    String sep = "";
    for ( Selection selection : selectionItems ) {
        buff.append( sep )
            .append( ( (Renderable) selection ).renderProjection( renderingContext ) );
        sep = ", ";
    }
    if ( isConstructor ) {
        buff.append( ' ' );
    }
    return buff.toString();
}

public String renderProjection(CriteriaQueryCompiler.RenderingContext renderingContext) {
    return render( renderingContext );
}
}
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 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb.criteria.expression;

import java.io.Serializable;
import java.math.BigDecimal;
import java.math.BigInteger;
import java.util.Collection;
import javax.persistence.criteria.Expression;
import javax.persistence.criteria.Predicate;

```

```

import org.hibernate.ejb.criteria.CriteriaBuilderImpl;
import org.hibernate.ejb.criteria.ExpressionImplementor;
import org.hibernate.ejb.criteria.expression.function.CastFunction;

/**
 * Models an expression in the criteria query language.
 *
 * @author Steve Ebersole
 */
public abstract class ExpressionImpl<T>
    extends SelectionImpl<T>
    implements ExpressionImplementor<T>, Serializable {
    public ExpressionImpl(CriteriaBuilderImpl criteriaBuilder, Class<T> javaType) {
        super( criteriaBuilder, javaType );
    }

    /**
     * {@inheritDoc}
     */
    @SuppressWarnings({ "unchecked" })
    public <X> Expression<X> as(Class<X> type) {
        return type.equals( getJavaType() )
            ? (Expression<X>) this
            : new CastFunction<X, T>( criteriaBuilder(), type, this );
    }

    /**
     * {@inheritDoc}
     */
    public Predicate isNull() {
        return criteriaBuilder().isNull( this );
    }

    /**
     * {@inheritDoc}
     */
    public Predicate isNotNull() {
        return criteriaBuilder().isNotNull( this );
    }

    /**
     * {@inheritDoc}
     */
    public Predicate in(Object... values) {
        return criteriaBuilder().in( this, values );
    }
}

```

```

/**
 * {@inheritDoc}
 */
public Predicate in(Expression<?>... values) {
    return criteriaBuilder().in( this, values );
}

/**
 * {@inheritDoc}
 */
public Predicate in(Collection<?> values) {
    return criteriaBuilder().in( this, values.toArray() );
}

/**
 * {@inheritDoc}
 */
public Predicate in(Expression<Collection<?>> values) {
    return criteriaBuilder().in( this, values );
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public ExpressionImplementor<Long> asLong() {
    resetJavaType( Long.class );
    return (ExpressionImplementor<Long>) this;
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public ExpressionImplementor<Integer> asInteger() {
    resetJavaType( Integer.class );
    return (ExpressionImplementor<Integer>) this;
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public ExpressionImplementor<Float> asFloat() {
    resetJavaType( Float.class );
    return (ExpressionImplementor<Float>) this;
}

```

```

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public ExpressionImplementor<Double> asDouble() {
    resetJavaType( Double.class );
    return (ExpressionImplementor<Double>) this;
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public ExpressionImplementor<BigDecimal> asBigDecimal() {
    resetJavaType( BigDecimal.class );
    return (ExpressionImplementor<BigDecimal>) this;
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public ExpressionImplementor<BigInteger> asBigInteger() {
    resetJavaType( BigInteger.class );
    return (ExpressionImplementor<BigInteger>) this;
}

/**
 * {@inheritDoc}
 */
@SuppressWarnings({ "unchecked" })
public ExpressionImplementor<String> asString() {
    resetJavaType( String.class );
    return (ExpressionImplementor<String>) this;
}
}
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* Boston, MA 02110-1301 USA

*/

```
package org.hibernate.ejb.criteria.expression;
```

```
import java.io.Serializable;
```

```
import java.util.ArrayList;
```

```
import java.util.List;
```

```
import javax.persistence.criteria.CriteriaBuilder.SimpleCase;
```

```
import javax.persistence.criteria.Expression;
```

```
import org.hibernate.ejb.criteria.CriteriaBuilderImpl;
```

```
import org.hibernate.ejb.criteria.CriteriaQueryCompiler;
```

```
import org.hibernate.ejb.criteria.ParameterRegistry;
```

```
import org.hibernate.ejb.criteria.Renderable;
```

```
/**
```

```
* Models what ANSI SQL terms a simple case statement. This is a <tt>CASE</tt> expression in the form<pre>
```

```
* CASE [expression]
```

```
*   WHEN [firstCondition] THEN [firstResult]
```

```
*   WHEN [secondCondition] THEN [secondResult]
```

```
*   ELSE [defaultResult]
```

```
* END
```

```
* </pre>
```

```
*
```

```
* @author Steve Ebersole
```

```
*/
```

```
public class SimpleCaseExpression<C,R>
```

```
    extends ExpressionImpl<R>
```

```
    implements SimpleCase<C,R>, Serializable {
```

```
    private Class<R> javaType;
```

```
    private final Expression<? extends C> expression;
```

```
    private List<WhenClause> whenClauses = new ArrayList<WhenClause>();
```

```
    private Expression<? extends R> otherwiseResult;
```

```
    public class WhenClause {
```

```
        private final C condition;
```

```
        private final Expression<? extends R> result;
```

```
        public WhenClause(C condition, Expression<? extends R> result) {
```

```

    this.condition = condition;
    this.result = result;
}

public C getCondition() {
    return condition;
}

public Expression<? extends R> getResult() {
    return result;
}

}

public SimpleCaseExpression(
    CriteriaBuilderImpl criteriaBuilder,
    Class<R> javaType,
    Expression<? extends C> expression) {
    super( criteriaBuilder, javaType);
    this.javaType = javaType;
    this.expression = expression;
}

@SuppressWarnings({ "unchecked" })
public Expression<C> getExpression() {
    return (Expression<C>) expression;
}

public SimpleCase<C, R> when(C condition, R result) {
    return when( condition, buildLiteral(result) );
}

@SuppressWarnings({ "unchecked" })
private LiteralExpression<R> buildLiteral(R result) {
    final Class<R> type = result != null
        ? (Class<R>) result.getClass()
        : getJavaType();
    return new LiteralExpression<R>( criteriaBuilder(), type, result );
}

public SimpleCase<C, R> when(C condition, Expression<? extends R> result) {
    WhenClause whenClause = new WhenClause( condition, result );
    whenClauses.add( whenClause );
    adjustJavaType( result );
    return this;
}

@SuppressWarnings({ "unchecked" })

```

```

private void adjustJavaType(Expression<? extends R> exp) {
    if ( javaType == null ) {
        javaType = (Class<R>) exp.getJavaType();
    }
}

public Expression<R> otherwise(R result) {
    return otherwise( buildLiteral(result) );
}

public Expression<R> otherwise(Expression<? extends R> result) {
    this.otherwiseResult = result;
    adjustJavaType( result );
    return this;
}

public Expression<? extends R> getOtherwiseResult() {
    return otherwiseResult;
}

public List<WhenClause> getWhenClauses() {
    return whenClauses;
}

public void registerParameters(ParameterRegistry registry) {
    Helper.possibleParameter( getExpression(), registry );
    for ( WhenClause whenClause : getWhenClauses() ) {
        Helper.possibleParameter( whenClause.getResult(), registry );
    }
    Helper.possibleParameter( getOtherwiseResult(), registry );
}

public String render(CriteriaQueryCompiler.RenderingContext renderingContext) {
    StringBuilder caseExpr = new StringBuilder();
    caseExpr.append( "case " )
        .append( ( (Renderable) getExpression() ).render( renderingContext ) )
        .append( ' ');
    for ( WhenClause whenClause : getWhenClauses() ) {
        caseExpr.append( ( (Renderable) whenClause.getCondition() ).render( renderingContext ) )
            .append( " then " )
            .append( ( (Renderable) whenClause.getResult() ).render( renderingContext ) );
    }
    caseExpr.append( " else " )
        .append( ( (Renderable) getOtherwiseResult() ).render( renderingContext ) )
        .append( " end" );
    return caseExpr.toString();
}

```

```

public String renderProjection(CriteriaQueryCompiler.RenderingContext renderingContext) {
    return render( renderingContext );
}
}
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 */
package org.hibernate.ejb.criteria.expression;

import java.io.Serializable;
import java.util.Collections;
import java.util.List;
import javax.persistence.criteria.Selection;

import org.hibernate.ejb.criteria.CriteriaBuilderImpl;
import org.hibernate.ejb.criteria.ParameterContainer;
import org.hibernate.ejb.criteria.SelectionImplementor;
import org.hibernate.ejb.criteria.ValueHandlerFactory;

/**
 * The Hibernate implementation of the JPA { @link Selection }
 * contract.
 *
 * @author Steve Ebersole
 */
public abstract class SelectionImpl<X>
    extends AbstractTupleElement<X>
    implements SelectionImplementor<X>, ParameterContainer, Serializable {

```

```

public SelectionImpl(CriteriaBuilderImpl criteriaBuilder, Class<X> javaType) {
    super( criteriaBuilder, javaType );
}

public Selection<X> alias(String alias) {
    setAlias( alias );
    return this;
}

public boolean isCompoundSelection() {
    return false;
}

public List<ValueHandlerFactory.ValueHandler> getValueHandlers() {
    return getValueHandler() == null
        ? null
        : Collections.singletonList( (ValueHandlerFactory.ValueHandler) getValueHandler() );
}

public List<Selection<?>> getCompoundSelectionItems() {
    throw new IllegalStateException( "Not a compound selection" );
}
}
}
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 */
package org.hibernate.ejb.criteria.expression;

```

```

import java.io.Serializable;
import javax.persistence.criteria.ParameterExpression;

import org.hibernate.ejb.criteria.CriteriaBuilderImpl;
import org.hibernate.ejb.criteria.CriteriaQueryCompiler;
import org.hibernate.ejb.criteria.ParameterRegistry;

/**
 * Defines a parameter specification, or the information about a parameter (where it occurs, what is
 * its type, etc).
 *
 * @author Steve Ebersole
 */
public class ParameterExpressionImpl<T>
    extends ExpressionImpl<T>
    implements ParameterExpression<T>, Serializable {
    private final String name;
    private final Integer position;

    public ParameterExpressionImpl(
        CriteriaBuilderImpl criteriaBuilder,
        Class<T> javaType,
        String name) {
        super( criteriaBuilder, javaType );
        this.name = name;
        this.position = null;
    }

    public ParameterExpressionImpl(
        CriteriaBuilderImpl criteriaBuilder,
        Class<T> javaType,
        Integer position) {
        super( criteriaBuilder, javaType );
        this.name = null;
        this.position = position;
    }

    public ParameterExpressionImpl(
        CriteriaBuilderImpl criteriaBuilder,
        Class<T> javaType) {
        super( criteriaBuilder, javaType );
        this.name = null;
        this.position = null;
    }

    public String getName() {
        return name;
    }
}

```

```

public Integer getPosition() {
    return position;
}

public Class<T> getParameterType() {
    return getJavaType();
}

public void registerParameters(ParameterRegistry registry) {
    registry.registerParameter( this );
}

public String render(CriteriaQueryCompiler.RenderingContext renderingContext) {
    final String jpaqlParamName = renderingContext.registerExplicitParameter( this );
    return ':' + jpaqlParamName;
}

public String renderProjection(CriteriaQueryCompiler.RenderingContext renderingContext) {
    return render( renderingContext );
}
}
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* Free Software Foundation, Inc.
* 51 Franklin Street, Fifth Floor
* Boston, MA 02110-1301 USA
*/
package org.hibernate.ejb.criteria.predicate;

import java.io.Serializable;

```

```

import java.util.List;
import javax.persistence.criteria.Predicate;
import javax.persistence.criteria.Selection;

import org.hibernate.ejb.criteria.CriteriaBuilderImpl;
import org.hibernate.ejb.criteria.expression.ExpressionImpl;

/**
 * Basic template support for { @link Predicate } implementors providing
 * expression handling, negation and conjunction/disjunction handling.
 *
 * @author Steve Ebersole
 */
public abstract class AbstractPredicateImpl
    extends ExpressionImpl<Boolean>
    implements Predicate, Serializable {
    private boolean negated;

    protected AbstractPredicateImpl(CriteriaBuilderImpl criteriaBuilder) {
        super( criteriaBuilder, Boolean.class );
    }

    public boolean isNegated() {
        return negated;
    }

    public Predicate not() {
        negated = !negated;
        return this;
    }

    // Selection ~~~~~

    @Override
    public final boolean isCompoundSelection() {
        // Should always be false for predicates
        return super.isCompoundSelection();
    }

    @Override
    public final List<Selection<?>> getCompoundSelectionItems() {
        // Should never have sub selection items for predicates
        return super.getCompoundSelectionItems();
    }
}

```

```

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 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb.criteria.predicate;

import java.io.Serializable;
import java.util.Collections;
import java.util.List;
import javax.persistence.criteria.Expression;

import org.hibernate.ejb.criteria.CriteriaBuilderImpl;

/**
 * TODO : javadoc
 *
 * @author Steve Ebersole
 */
public abstract class AbstractSimplePredicate
    extends AbstractPredicateImpl
    implements Serializable {
    private static final List<Expression<Boolean>> NO_EXPRESSIONS = Collections.emptyList();

    public AbstractSimplePredicate(CriteriaBuilderImpl criteriaBuilder) {
        super( criteriaBuilder );
    }

    public BooleanOperator getOperator() {
        return BooleanOperator.AND;
    }

```

```

}

public final List<Expression<Boolean>> getExpressions() {
    return NO_EXPRESSIONS;
}

}
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 * 51 Franklin Street, Fifth Floor
 * Boston, MA 02110-1301 USA
 */
package org.hibernate.ejb.criteria.predicate;

import java.math.BigDecimal;
import java.math.BigInteger;

/**
 * @author Steve Ebersole
 */
public class ImplicitNumericExpressionTypeDeterminer {
    /**
     * Determine the appropriate runtime result type for a numeric expression according to
     * section "6.5.7.1 Result Types of Expressions" of the JPA spec.
     * <p/>
     * Note that it is expected that the caveats about quotient handling have already been handled.
     *
     * @param types The argument/expression types
     *
     * @return The appropriate numeric result type.
     */
}

```

```

*/
public static Class<? extends Number> determineResultType(Class<? extends Number>... types) {
    Class<? extends Number> result = Number.class;

    for ( Class<? extends Number> type : types ) {
        if ( Double.class.equals( type ) ) {
            result = Double.class;
        }
        else if ( Float.class.equals( type ) ) {
            result = Float.class;
        }
        else if ( BigDecimal.class.equals( type ) ) {
            result = BigDecimal.class;
        }
        else if ( BigInteger.class.equals( type ) ) {
            result = BigInteger.class;
        }
        else if ( Long.class.equals( type ) ) {
            result = Long.class;
        }
        else if ( isIntegralType( type ) ) {
            result = Integer.class;
        }
    }

    return result;
}

private static boolean isIntegralType(Class<? extends Number> type) {
    return Integer.class.equals( type ) ||
        Short.class.equals( type );
}
}
}
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package org.hibernate.ejb.metamodel;

import org.hibernate.engine.spi.SessionFactoryImplementor;
import org.hibernate.internal.util.collections.CollectionHelper;
import org.hibernate.mapping.MappedSuperclass;
import org.hibernate.mapping.PersistentClass;

import java.io.Serializable;
import java.util.HashSet;
import java.util.Iterator;
import java.util.Map;
import java.util.Set;
import javax.persistence.metamodel.*;

/**
 * Hibernate implementation of the JPA {@link Metamodel} contract.
 *
 * @author Steve Ebersole
 * @author Emmanuel Bernard
 */
public class MetamodelImpl implements Metamodel, Serializable {
    private final Map<Class<?>,EntityTypeImpl<?>> entities;
    private final Map<Class<?>,EmbeddableTypeImpl<?>> embeddables;
    private final Map<Class<?>,MappedSuperclassType<?>> mappedSuperclassTypeMap;
    private final Map<String,EntityTypeImpl<?>> entityTypesByEntityName;

    /**
     * Build the metamodel using the information from the collection of Hibernate
     * {@link PersistentClass} models as well as the Hibernate {@link org.hibernate.SessionFactory}.
     *
     * @param persistentClasses Iterator over the Hibernate (config-time) metamodel
     * @param sessionFactory The Hibernate session factory.
     * @return The built metamodel
     *
     * @deprecated use {@link
     #buildMetamodel(java.util.Iterator,org.hibernate.engine.spi.SessionFactoryImplementor,boolean)} instead
     */
    @Deprecated
    public static MetamodelImpl buildMetamodel(
        Iterator<PersistentClass> persistentClasses,
        SessionFactoryImplementor sessionFactory) {

```

```

        return buildMetamodel(persistentClasses, sessionFactory, false);
    }

/**
 * Build the metamodel using the information from the collection of Hibernate
 * { @link PersistentClass } models as well as the Hibernate { @link org.hibernate.SessionFactory }.
 *
 * @param persistentClasses Iterator over the Hibernate (config-time) metamodel
 * @param sessionFactory The Hibernate session factory.
 * @param ignoreUnsupported ignore unsupported/unknown annotations (like @Any)
 * @return The built metamodel
 */
public static MetamodelImpl buildMetamodel(
    Iterator<PersistentClass> persistentClasses,
    SessionFactoryImplementor sessionFactory,
    boolean ignoreUnsupported) {
    MetadataContext context = new MetadataContext( sessionFactory, ignoreUnsupported );
    while ( persistentClasses.hasNext() ) {
        PersistentClass pc = persistentClasses.next();
        locateOrBuildEntityType( pc, context );
    }
    context.wrapUp();
    return new MetamodelImpl( context.getEntityTypeMap(), context.getEmbeddableTypeMap(),
    context.getMappedSuperclassTypeMap(), context.getEntityTypesByEntityName() );
}

private static EntityTypeImpl<?> locateOrBuildEntityType(PersistentClass persistentClass, MetadataContext
context) {
    EntityTypeImpl<?> entityType = context.locateEntityType( persistentClass );
    if ( entityType == null ) {
        entityType = buildEntityType( persistentClass, context );
    }
    return entityType;
}

//TODO remove / reduce @SW scope
@SuppressWarnings( "unchecked" )
private static EntityTypeImpl<?> buildEntityType(PersistentClass persistentClass, MetadataContext context) {
    final Class javaType = persistentClass.getMappedClass();
    context.pushEntityWorkedOn(persistentClass);
    final MappedSuperclass superMappedSuperclass = persistentClass.getSuperMappedSuperclass();
    AbstractIdentifiableType<?> superType = superMappedSuperclass == null
        ? null
        : locateOrBuildMappedsuperclassType( superMappedSuperclass, context );
    //no mappedSuperclass, check for a super entity
    if (superType == null) {
        final PersistentClass superPersistentClass = persistentClass.getSuperclass();
        superType = superPersistentClass == null

```

```

    ? null
    : locateOrBuildEntityType( superPersistentClass, context );
}
EntityTypeImpl entityType = new EntityTypeImpl(
    javaType,
    superType,
    persistentClass.getJpaEntityName(),
    persistentClass.hasIdentifierProperty(),
    persistentClass.isVersioned()
);

    entityType.setTypeNames(persistentClass.getEntityName());

    context.registerEntityType( persistentClass, entityType );
context.popEntityWorkedOn(persistentClass);
return entityType;
}

private static MappedSuperclassTypeImpl<?> locateOrBuildMappedsuperclassType(
    MappedSuperclass mappedSuperclass, MetadataContext context) {
    MappedSuperclassTypeImpl<?> mappedSuperclassType = context.locateMappedSuperclassType(
mappedSuperclass );
    if ( mappedSuperclassType == null ) {
        mappedSuperclassType = buildMappedSuperclassType(mappedSuperclass, context);
    }
    return mappedSuperclassType;
}

//TODO remove / reduce @SW scope
@SuppressWarnings( "unchecked" )
private static MappedSuperclassTypeImpl<?> buildMappedSuperclassType(MappedSuperclass mappedSuperclass,
    MetadataContext context) {
    final MappedSuperclass superMappedSuperclass = mappedSuperclass.getSuperMappedSuperclass();
    AbstractIdentifiableType<?> superType = superMappedSuperclass == null
        ? null
        : locateOrBuildMappedsuperclassType( superMappedSuperclass, context );
    //no mappedSuperclass, check for a super entity
    if (superType == null) {
        final PersistentClass superPersistentClass = mappedSuperclass.getSuperPersistentClass();
        superType = superPersistentClass == null
            ? null
            : locateOrBuildEntityType( superPersistentClass, context );
    }
    final Class javaType = mappedSuperclass.getMappedClass();
    MappedSuperclassTypeImpl mappedSuperclassType = new MappedSuperclassTypeImpl(
        javaType,
        superType,
        mappedSuperclass.hasIdentifierProperty(),

```

```

        mappedSuperclass.isVersioned()
    );
    context.registerMappedSuperclassType( mappedSuperclass, mappedSuperclassType );
    return mappedSuperclassType;
}

/**
 * Instantiate the metamodel.
 *
 * @param entities The entity mappings.
 * @param embeddables The embeddable (component) mappings.
 * @param mappedSuperclassTypeMap The { @link javax.persistence.MappedSuperclass } mappings
 */
private MetamodelImpl(
    Map<Class<?>, EntityTypeImpl<?>> entities,
    Map<Class<?>, EmbeddableTypeImpl<?>> embeddables,
    Map<Class<?>, MappedSuperclassType<?>> mappedSuperclassTypeMap,
    Map<String, EntityTypeImpl<?>> entityTypesByEntityName) {
    this.entities = entities;
    this.embeddables = embeddables;
    this.mappedSuperclassTypeMap = mappedSuperclassTypeMap;
    this.entityTypesByEntityName = entityTypesByEntityName;
}

@Override
@SuppressWarnings({ "unchecked" })
public <X> EntityType<X> entity(Class<X> cls) {
    final EntityType<?> entityType = entities.get( cls );
    if ( entityType == null ) {
        throw new IllegalArgumentException( "Not an entity: " + cls );
    }
    return (EntityType<X>) entityType;
}

@Override
@SuppressWarnings({ "unchecked" })
public <X> ManagedType<X> managedType(Class<X> cls) {
    ManagedType<?> type = entities.get( cls );
    if ( type == null ) {
        type = mappedSuperclassTypeMap.get( cls );
    }
    if ( type == null ) {
        type = embeddables.get( cls );
    }
    if ( type == null ) {
        throw new IllegalArgumentException( "Not an managed type: " + cls );
    }
    return (ManagedType<X>) type;
}

```

```

}

@Override
@SuppressWarnings({ "unchecked" })
public <X> EmbeddableType<X> embeddable(Class<X> cls) {
    final EmbeddableType<?> embeddableType = embeddables.get( cls );
    if ( embeddableType == null ) {
        throw new IllegalArgumentException( "Not an embeddable: " + cls );
    }
    return (EmbeddableType<X>) embeddableType;
}

@Override
public Set<ManagedType<?>> getManagedTypes() {
    final int setSize = CollectionHelper.determineProperSizing(
        entities.size() + mappedSuperclassTypeMap.size() + embeddables.size()
    );
    final Set<ManagedType<?>> managedTypes = new HashSet<ManagedType<?>>( setSize );
    managedTypes.addAll( entities.values() );
    managedTypes.addAll( mappedSuperclassTypeMap.values() );
    managedTypes.addAll( embeddables.values() );
    return managedTypes;
}

@Override
public Set<EntityType<?>> getEntities() {
    return new HashSet<EntityType<?>>( entityTypeByName.values() );
}

@Override
public Set<EmbeddableType<?>> getEmbeddables() {
    return new HashSet<EmbeddableType<?>>( embeddables.values() );
}
}
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*/
package org.hibernate.ejb.metamodel;
import java.io.Serializable;
import javax.persistence.metamodel.BasicType;

/**
 * @author Emmanuel Bernard
 */
public class BasicTypeImpl<X> implements BasicType<X>, Serializable {
    private final Class<X> clazz;
    private PersistenceType persistenceType;

    public PersistenceType getPersistenceType() {
        return persistenceType;
    }

    public Class<X> getJavaType() {
        return clazz;
    }

    public BasicTypeImpl(Class<X> clazz, PersistenceType persistenceType) {
        this.clazz = clazz;
        this.persistenceType = persistenceType;
    }
}

```

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```

```
package org.apache.thrift;
```

```

/**
 * Utility methods for use when encoding/decoding raw data as byte arrays.
 */
public class EncodingUtils {

    /**
     * Encode <code>integer</code> as a series of 4 bytes into <code>buf</code>
     * starting at position 0 within that buffer.
     *
     * @param integer
     *     The integer to encode.
     * @param buf
     *     The buffer to write to.
     */
    public static final void encodeBigEndian(final int integer, final byte[] buf) {
        encodeBigEndian(integer, buf, 0);
    }
}

```

```

/**
 * Encode <code>integer</code> as a series of 4 bytes into <code>buf</code>
 * starting at position <code>offset</code>.
 *
 * @param integer
 *     The integer to encode.
 * @param buf
 *     The buffer to write to.
 * @param offset
 *     The offset within <code>buf</code> to start the encoding.
 */
public static final void encodeBigEndian(final int integer, final byte[] buf, int offset) {
    buf[offset] = (byte) (0xff & (integer >> 24));
    buf[offset + 1] = (byte) (0xff & (integer >> 16));
    buf[offset + 2] = (byte) (0xff & (integer >> 8));
    buf[offset + 3] = (byte) (0xff & (integer));
}

/**
 * Decode a series of 4 bytes from <code>buf</code>, starting at position 0,
 * and interpret them as an integer.
 *
 * @param buf
 *     The buffer to read from.
 * @return An integer, as read from the buffer.
 */
public static final int decodeBigEndian(final byte[] buf) {
    return decodeBigEndian(buf, 0);
}

/**
 * Decode a series of 4 bytes from <code>buf</code>, start at
 * <code>offset</code>, and interpret them as an integer.
 *
 * @param buf
 *     The buffer to read from.
 * @param offset
 *     The offset with <code>buf</code> to start the decoding.
 * @return An integer, as read from the buffer.
 */
public static final int decodeBigEndian(final byte[] buf, int offset) {
    return ((buf[offset] & 0xff) << 24) | ((buf[offset + 1] & 0xff) << 16)
        | ((buf[offset + 2] & 0xff) << 8) | ((buf[offset + 3] & 0xff));
}
}

```

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<http://svn.jackson.codehaus.org/browse/jackson/trunk/README.txt?hb=true>

== Jackson Json-processor ==

This is the Jackson Json-processor package. Project home page can be found

from:

<http://jackson.codehaus.org/>

which also has links to support forums such as mailing lists, as well

as links to obtain source code and binary artifacts.

=== Functionality ===

Jackson implements functionality for:

- * Reading (parsing) and writing (generation) of Json content
- * Data-binding (data-mapping, [de-]serialization) support to allow for converting between Json and Java objects
- * Support for converting to/from other data formats and access APIs, to improve interoperability.

=== Requirements ===

Jackson can be used on standard J2SE 1.5 platform. Some effort is made to support other non-standard platforms as well.

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1.38 data-model 5.78.2-117

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1.39 db-layer-ds 5.78.2-117

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1.40 db-layer-interface 5.78.2-117

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AppleJavaExtensions
 v 1.2

<http://developer.apple.com/samplecode/AppleJavaExtensions/AppleJavaExtensions.html>

This is a pluggable jar of stub classes representing the new Apple
 eAWT and eIO APIs for Java 1.4 on Mac OS X. The purpose of these
 stubs is to allow for compilation of eAWT- or eIO-referencing code on
 platforms other than Mac OS X. These stubs are not intended for the
 runtime classpath on non-Mac platforms. Please see the OSXAdapter
 sample for how to write cross-platform code that uses eAWT.

There is no license file provided for AppleJavaExtensions.jar. Below

is a response from Apple to a question about the license.

On 13 Aug 2004, at 12:33 AM, mdrance@apple.com wrote:

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AppleJavaExtensions
v 1.2

This is a pluggable jar of stub classes representing the new Apple eAWT and eIO APIs for Java 1.4 on Mac OS X. The purpose of these stubs is to allow for compilation of eAWT- or eIO-referencing code on platforms other than Mac OS X. The jar file is enclosed in a zip archive for easy expansion on other platforms.

These stubs are not intended for the runtime classpath on non-Mac platforms. Please see the OSXAdapter sample for how to write cross-platform code that uses eAWT.

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1.44 FindBugs-jsr305 2.0.1

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1.45 governor-annotations 1.10.4

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1.46 Gson 2.3.1

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 */
```

```
package com.google.gson.internal;
```

```
import java.lang.reflect.Type;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;
```

```
/**
 * Contains static utility methods pertaining to primitive types and their
 * corresponding wrapper types.
 *
 * @author Kevin Bourrillion
 */
```

```
public final class Primitives {
    private Primitives() {}
```

```
/** A map from primitive types to their corresponding wrapper types. */
    private static final Map<Class<?>, Class<?>> PRIMITIVE_TO_WRAPPER_TYPE;
```

```
/** A map from wrapper types to their corresponding primitive types. */
    private static final Map<Class<?>, Class<?>> WRAPPER_TO_PRIMITIVE_TYPE;
```

```
// Sad that we can't use a BiMap. :(
```

```

static {
    Map<Class<?>, Class<?>> primToWrap = new HashMap<Class<?>, Class<?>>(16);
    Map<Class<?>, Class<?>> wrapToPrim = new HashMap<Class<?>, Class<?>>(16);

    add(primToWrap, wrapToPrim, boolean.class, Boolean.class);
    add(primToWrap, wrapToPrim, byte.class, Byte.class);
    add(primToWrap, wrapToPrim, char.class, Character.class);
    add(primToWrap, wrapToPrim, double.class, Double.class);
    add(primToWrap, wrapToPrim, float.class, Float.class);
    add(primToWrap, wrapToPrim, int.class, Integer.class);
    add(primToWrap, wrapToPrim, long.class, Long.class);
    add(primToWrap, wrapToPrim, short.class, Short.class);
    add(primToWrap, wrapToPrim, void.class, Void.class);

    PRIMITIVE_TO_WRAPPER_TYPE = Collections.unmodifiableMap(primToWrap);
    WRAPPER_TO_PRIMITIVE_TYPE = Collections.unmodifiableMap(wrapToPrim);
}

private static void add(Map<Class<?>, Class<?>> forward,
    Map<Class<?>, Class<?>> backward, Class<?> key, Class<?> value) {
    forward.put(key, value);
    backward.put(value, key);
}

/**
 * Returns true if this type is a primitive.
 */
public static boolean isPrimitive(Type type) {
    return PRIMITIVE_TO_WRAPPER_TYPE.containsKey(type);
}

/**
 * Returns {@code true} if {@code type} is one of the nine
 * primitive-wrapper types, such as {@link Integer}.
 *
 * @see Class#isPrimitive
 */
public static boolean isWrapperType(Type type) {
    return WRAPPER_TO_PRIMITIVE_TYPE.containsKey(
        $Gson$Preconditions.checkNotNull(type));
}

/**
 * Returns the corresponding wrapper type of {@code type} if it is a primitive
 * type; otherwise returns {@code type} itself. Idempotent.
 * <pre>
 * wrap(int.class) == Integer.class

```

```

* wrap(Integer.class) == Integer.class
* wrap(String.class) == String.class
* </pre>
*/
public static <T> Class<T> wrap(Class<T> type) {
    // cast is safe: long.class and Long.class are both of type Class<Long>
    @SuppressWarnings("unchecked")
    Class<T> wrapped = (Class<T>) PRIMITIVE_TO_WRAPPER_TYPE.get(
        $Gson$Preconditions.checkNotNull(type));
    return (wrapped == null) ? type : wrapped;
}

/**
 * Returns the corresponding primitive type of { @code type } if it is a
 * wrapper type; otherwise returns { @code type } itself. Idempotent.
 * <pre>
 * unwrap(Integer.class) == int.class
 * unwrap(int.class) == int.class
 * unwrap(String.class) == String.class
 * </pre>
 */
public static <T> Class<T> unwrap(Class<T> type) {
    // cast is safe: long.class and Long.class are both of type Class<Long>
    @SuppressWarnings("unchecked")
    Class<T> unwrapped = (Class<T>) WRAPPER_TO_PRIMITIVE_TYPE.get(
        $Gson$Preconditions.checkNotNull(type));
    return (unwrapped == null) ? type : unwrapped;
}
}
}

```

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1.65 Jackson 1.9.2

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1.66 jackson-databind 2.5.2

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1.1

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1.69 JavaBeans Activation Framework (JAF)

1.1

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== Jackson Json-processor ==

This is the Jackson Json-processor package. Project home page can be found from:

<http://jackson.codehaus.org/>

which also has links to support forums such as mailing lists, as well as links to obtain source code and binary artifacts.

=== Functionality ===

Jackson implements functionality for:

- * Reading (parsing) and writing (generation) of Json content
- * Data-binding (data-mapping, [de-]serialization) support to allow for converting between Json and Java objects
- * Support for converting to/from other data formats and access APIs, to improve interoperability.

=== Requirements ===

Jackson can be used on standard J2SE 1.5 platform. Some effort is made to support other non-standard platforms as well.

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(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a

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If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

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1.129 null 1.8

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1.130 oasm-mercury-data-objects 1.9.0-2

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1.153 spring-tx 4.2.4.RELEASE

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1.158 tomcat-juli 8.0.28

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