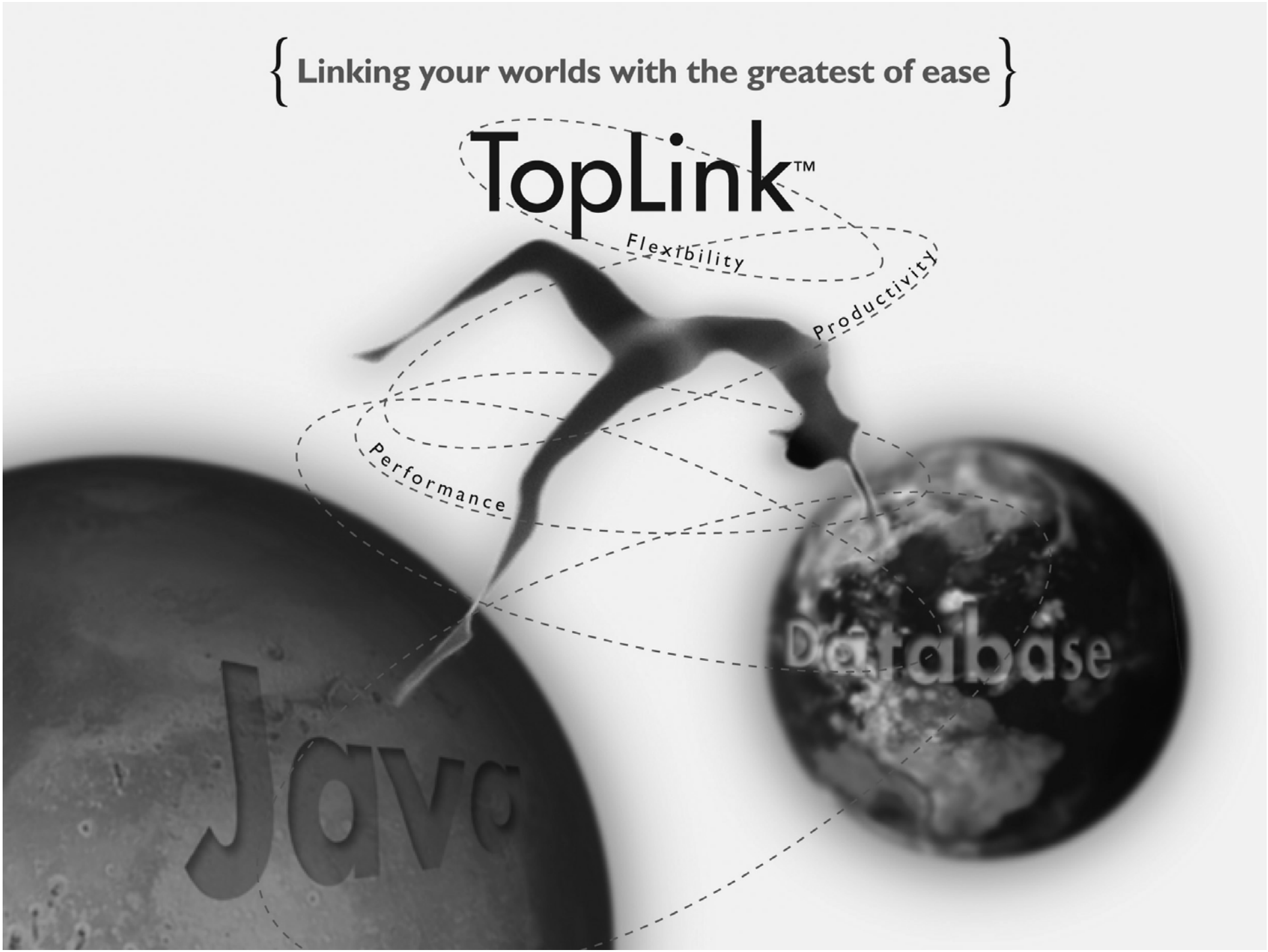
TopLink
das
performante und flexible
Persistenz
Framework

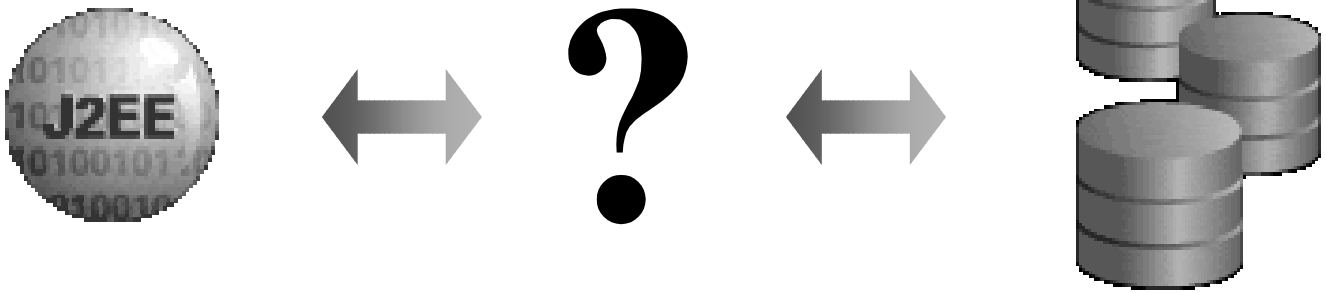

{ Linking your worlds with the greatest of ease }
TopLink™
Flexibility
Productivity
Performance
Java
Database

TopLink

- What is TopLink and where does TopLink fit in the Enterprise?
- Why is TopLink valuable?
- An Agent for Productivity, Performance and Flexibility – Key TopLink features

Oracle9*i*AS TopLink Problem Space

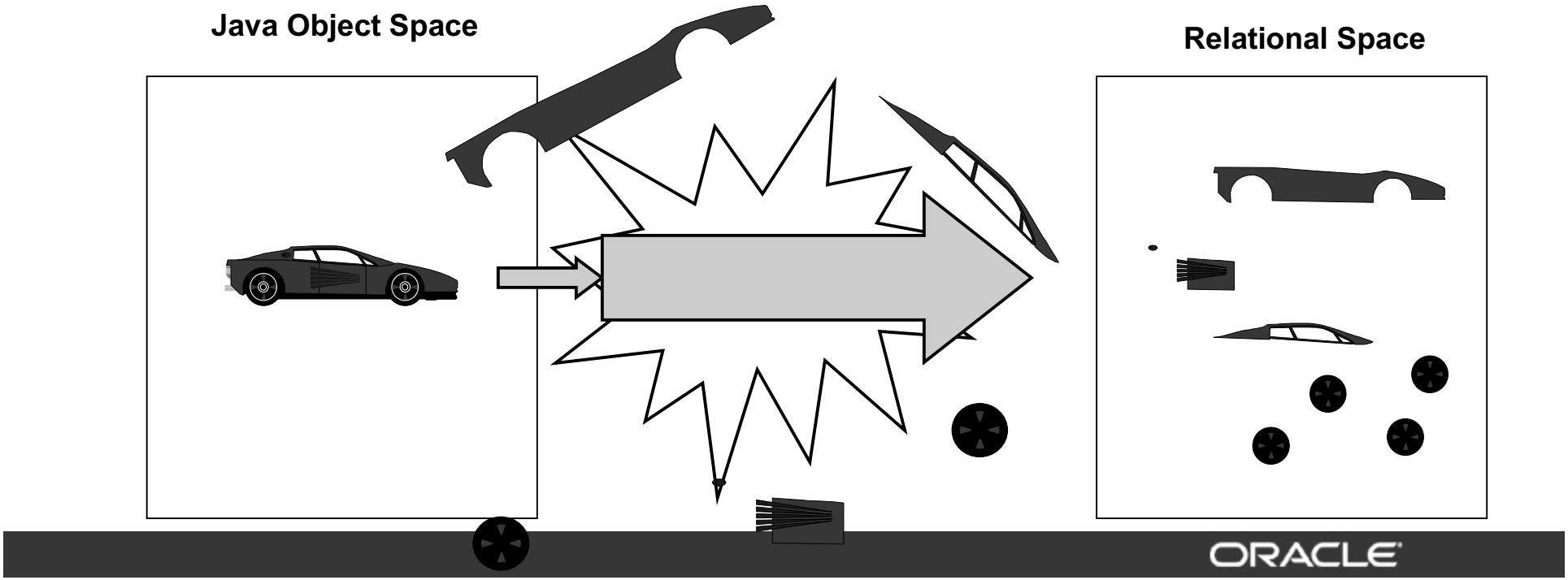
- Building Java applications with relational data sources is a VERY challenging and labor intensive problem to solve
  - Fundamentally different technology
  - Different skill sets
  - Different staff/ownership
  - Different modeling and design principles



Differences must be resolved to fulfill business requirements

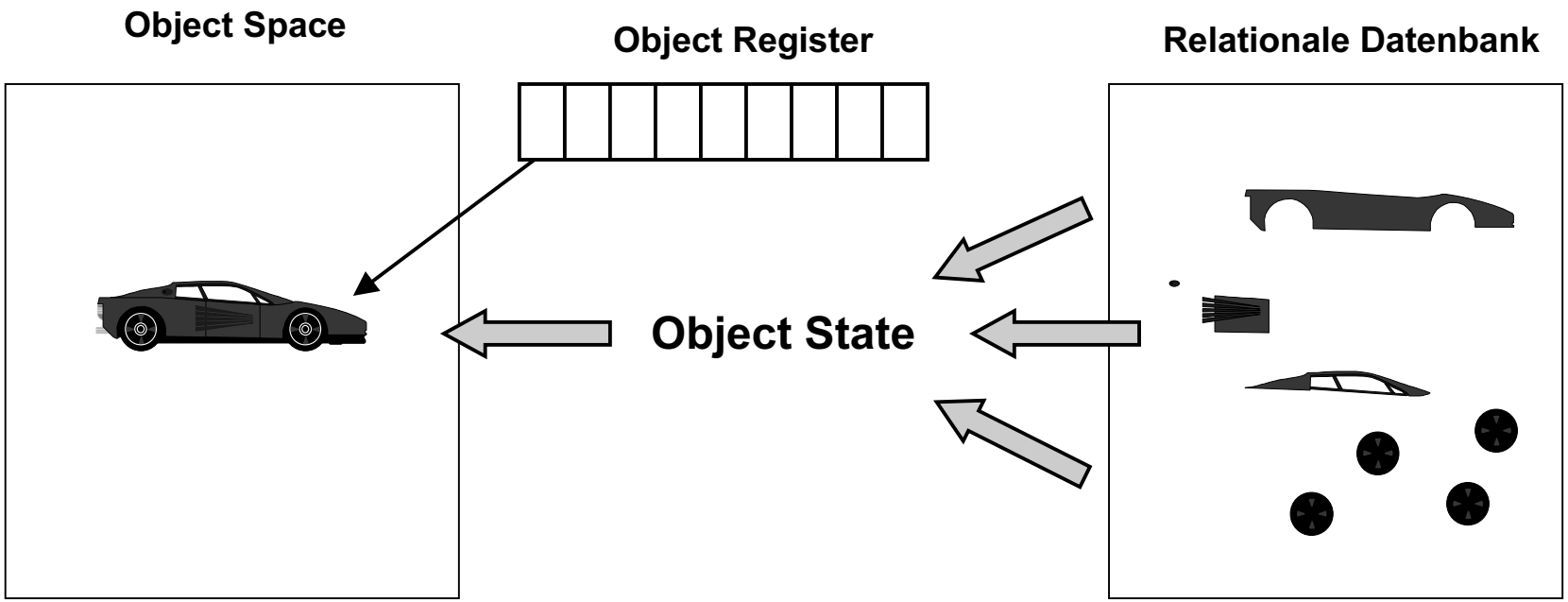
Relationale Object Mapping

- Writing Objects into a relational database
  - “flatten” the object into pieces
  - storing the pieces in the DB



Java and Database Integration

- Reading Objects out of a relational database
  - selecting the right pieces
  - assembling the pieces and creating the object

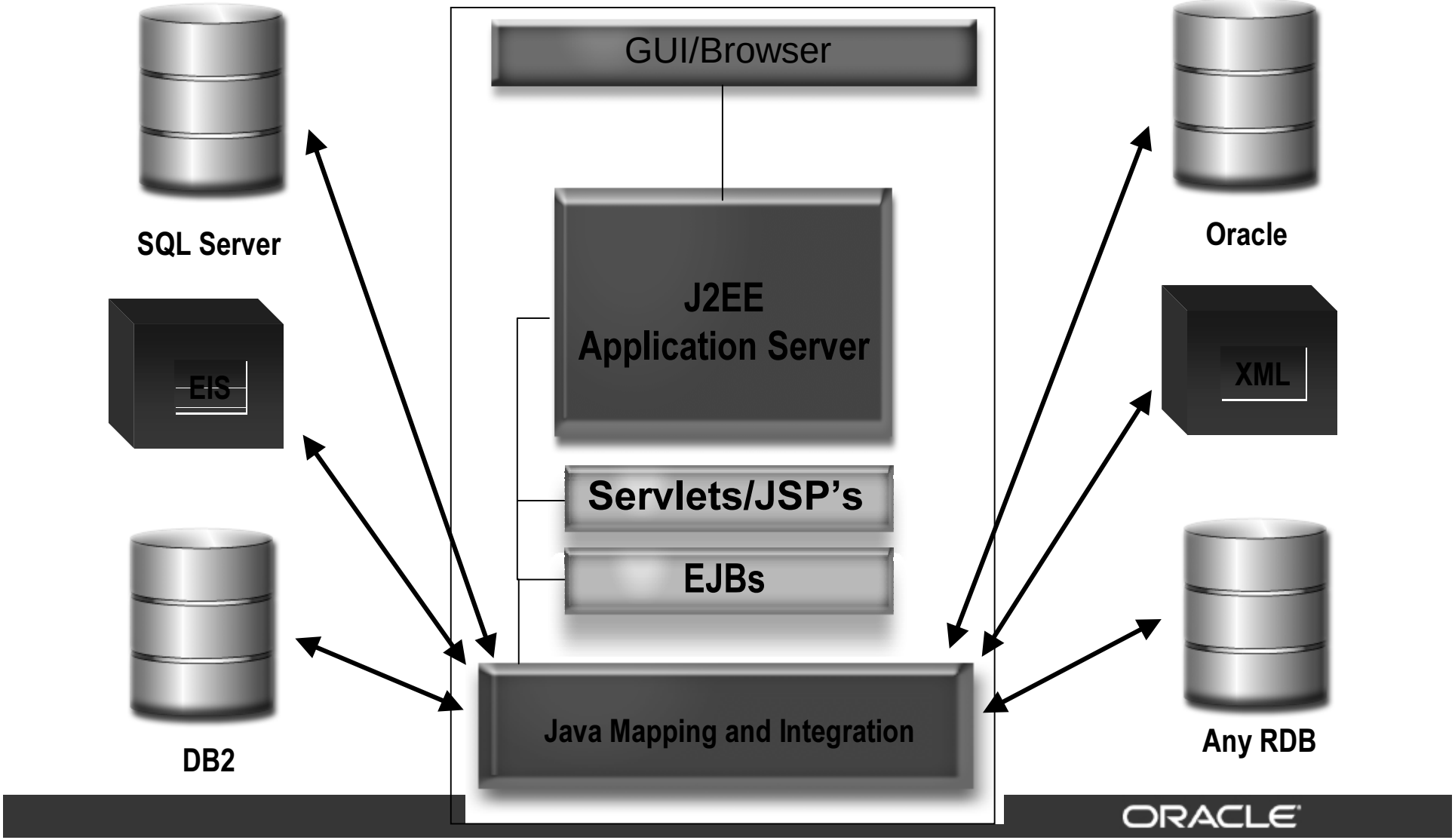


TopLink

- Runtime framework facilitating integration of databases and Java applications
- TopLink fosters *rapid* development, deployment and execution of all persistence related aspects of any Java Application



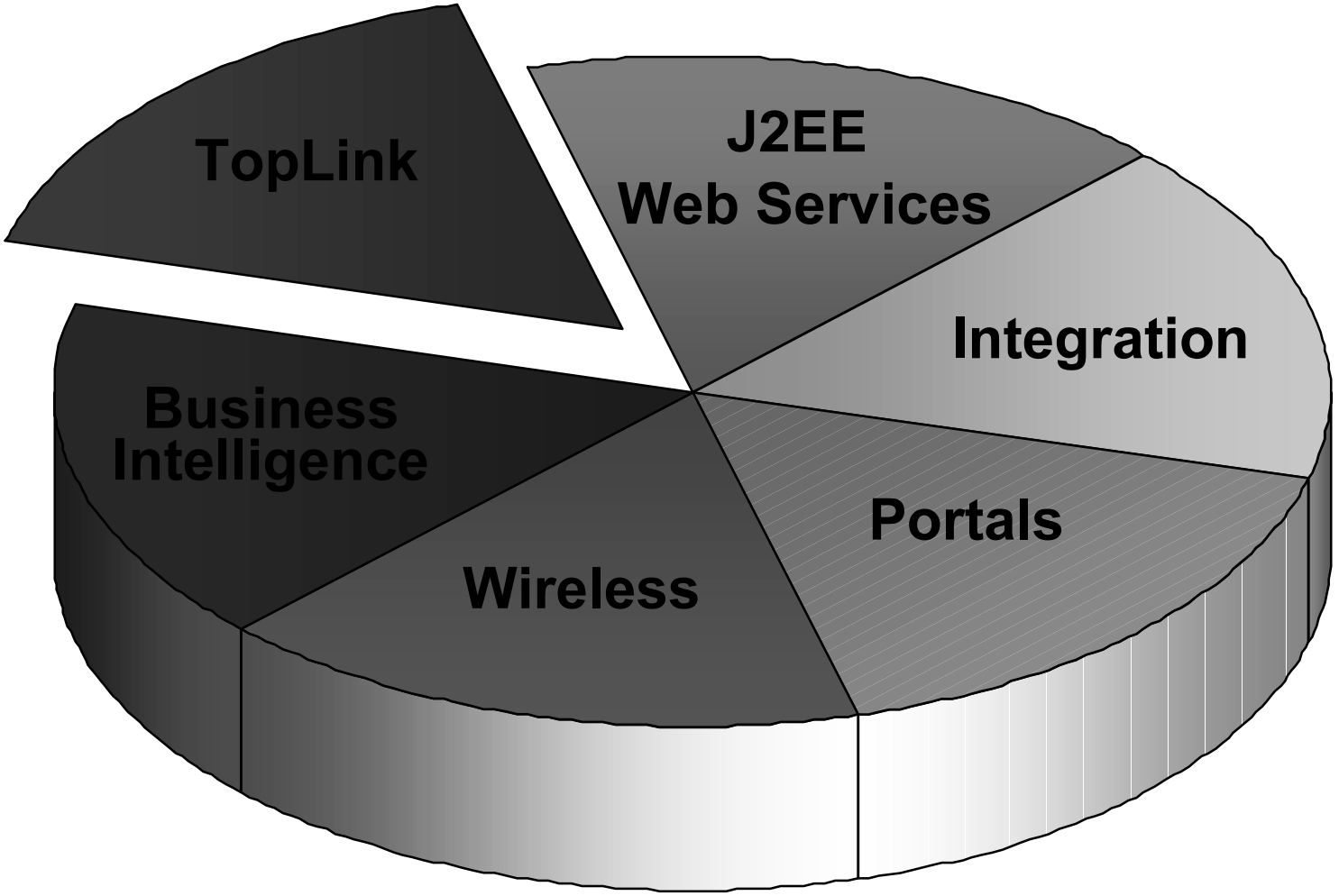
Where does TopLink fit?



Where does TopLink fit? Anywhere!

- TopLink integrates regardless of your architecture
  - Java Objects
  - Entity Beans
    - BMP in any J2EE compliant application server
    - CMP in WebLogic, WebSphere, HP-AS
  - Within various architectural approaches
    - JSP
    - Servlet
    - SessionBean
    - Message Driven Beans
    - 2-Tier, 3-Tier, Peer-to-peer
    - Fat client, thin client

Oracle9*i*AS

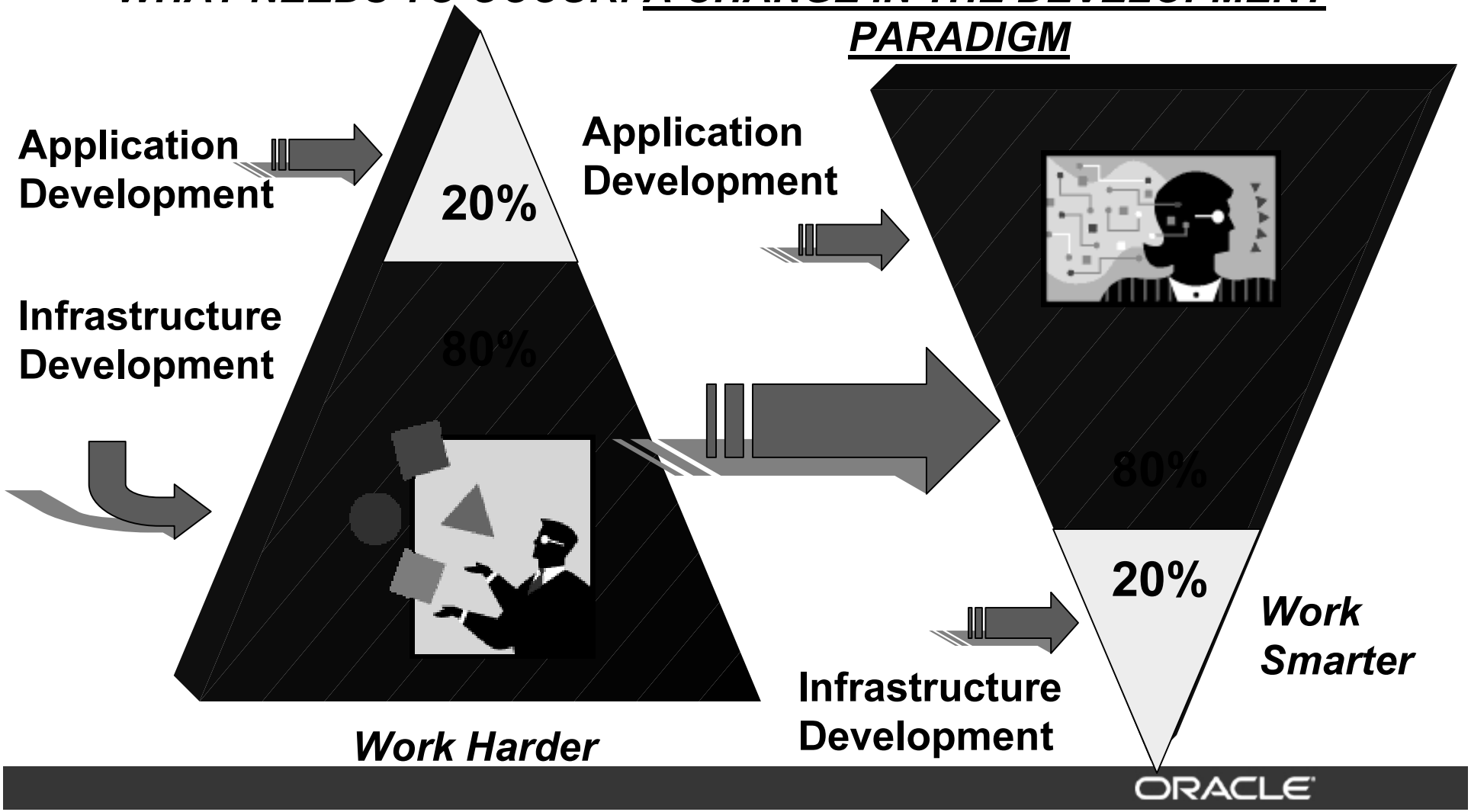

TopLink
J2EE
Web Services
Integration
Business
Intelligence
Portals
Wireless

TopLink

- What is TopLink and where does TopLink fit in the Enterprise?
- Why is TopLink valuable?
- An Agent for Productivity, Performance and Flexibility – Key TopLink features
- Services and support

Accelerating Application Development

WHAT NEEDS TO OCCUR: A CHANGE IN THE DEVELOPMENT PARADIGM



Oracle9*i*AS TopLink Minimizes Risks

- Oracle9*i*AS TopLink is an award winning **mature** product proven to cut application delivery time for **mission critical** applications



- Development teams using Oracle9*i*AS Top are not required to have database programming or Application Server infrastructure expertise

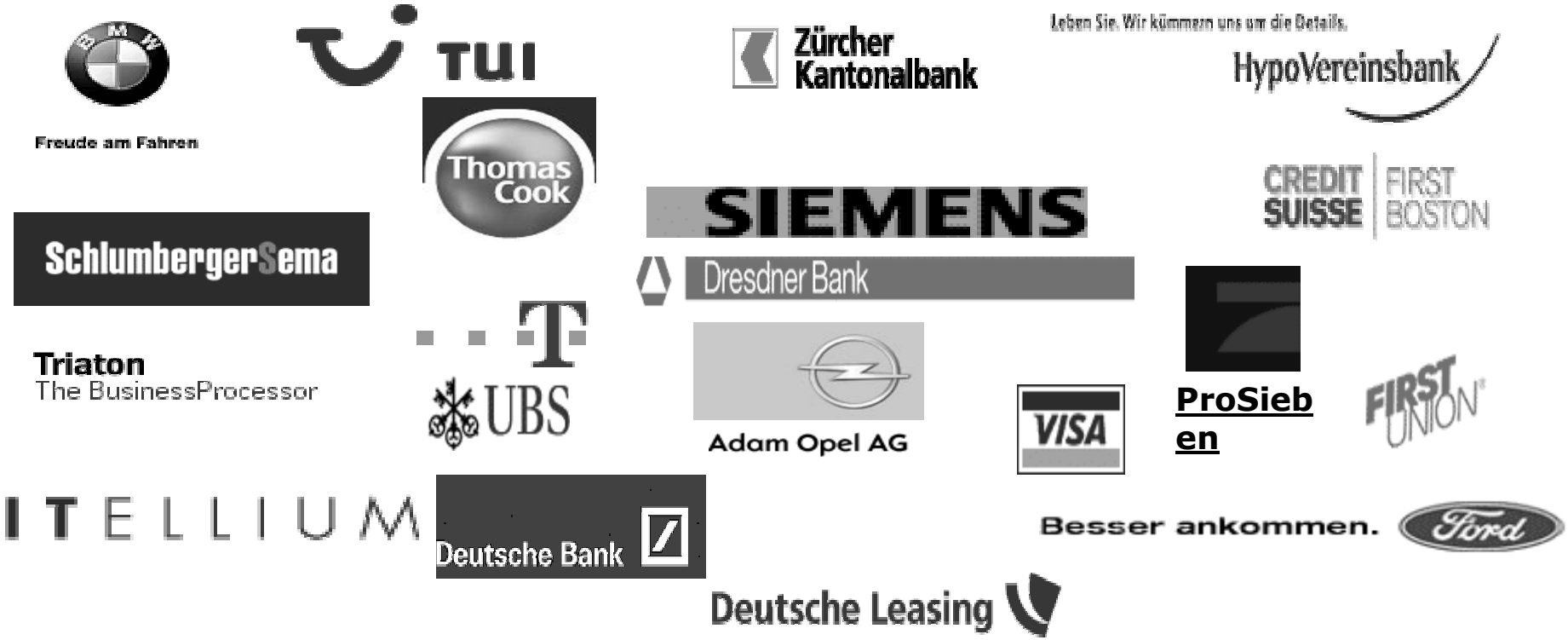


- Maintenance for applications using Oracle9*i*AS TopLink is dramatically reduced, change to mapping meta-data is rapid



Why TopLink?

TopLink has the maturity of thousands of developers and hundreds of successful projects from various vertical industries and countless architectural approaches



Top Reasons to Buy Oracle9*i*AS TopLink

- Reduce Costs
- Increase Performance
- Increase Productivity
- Simplify Complexity
- Flexibility



TopLink

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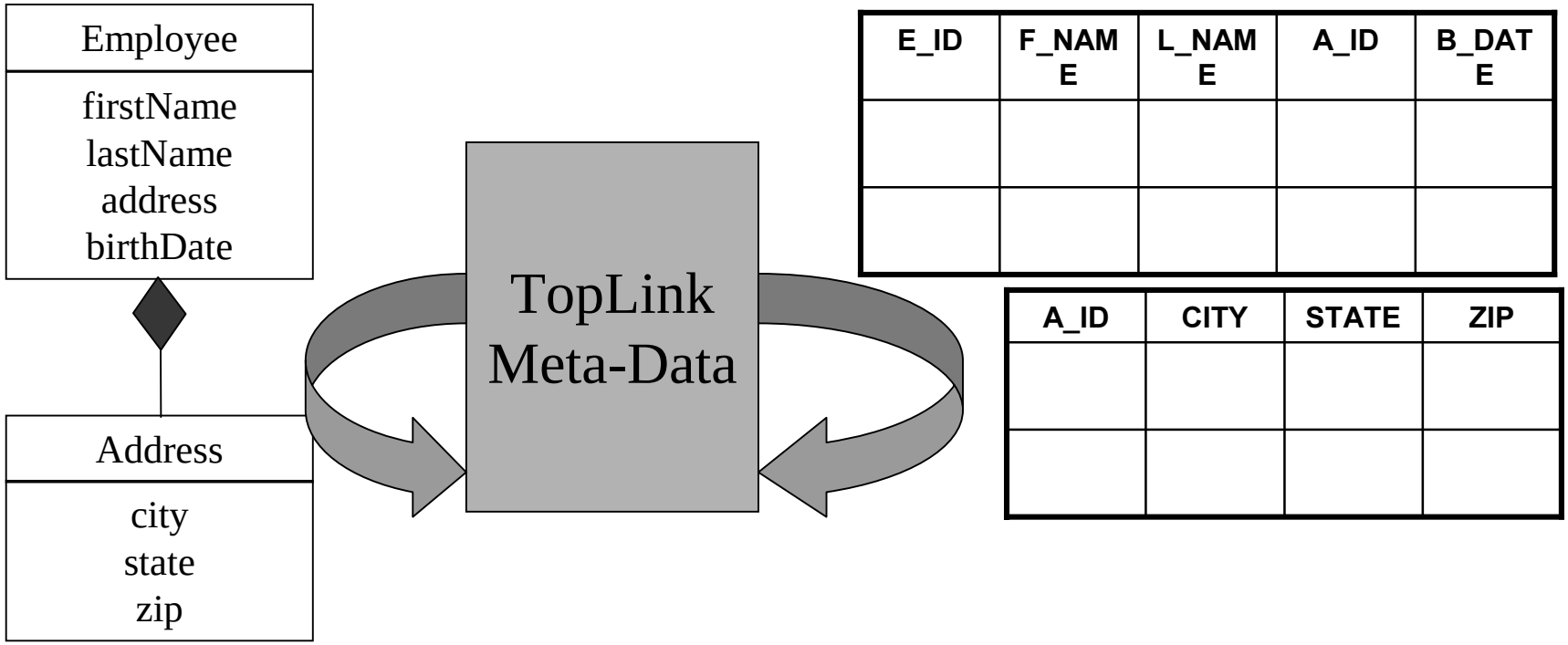
Key Product Features

- Meta-Data Architecture
- Comprehensive Visual Mapping Workbench
- Advanced Mapping Support and Flexibility
- Query Flexibility
- Caching
- Transaction support and integration
- Performance tuning options
- SDK
- Application Server Features



Meta-Data Architecture

- Mapping information is kept in descriptors and not in the objects
- Meta-data means TopLink is NOT at all intrusive on either the object model or the schema



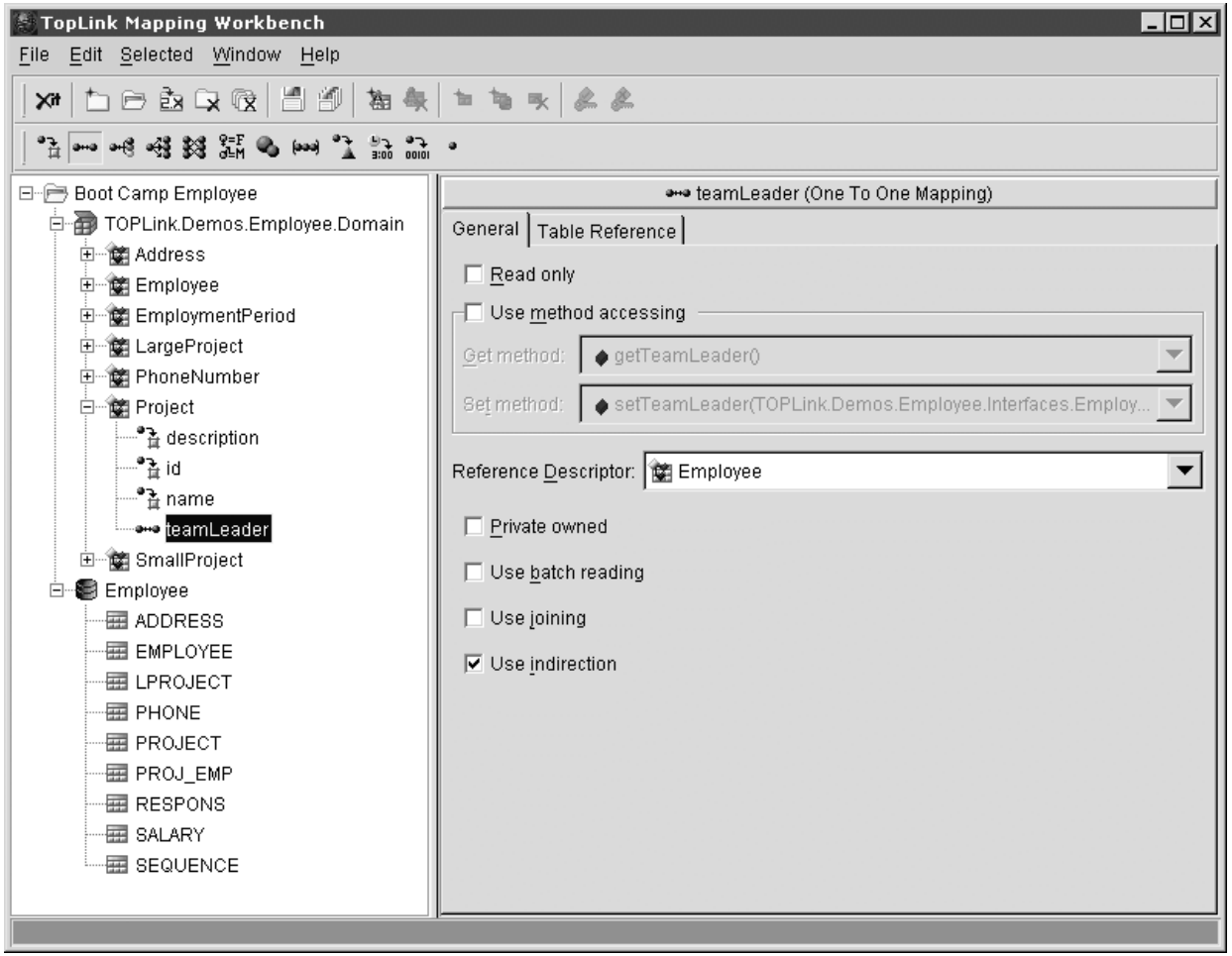
Meta-Data Architecture

- Meta-Data means TopLink is NOT at all intrusive on object model or schema
- “Data about Data” remains separate from the application, changes made initiate at runtime
- Isolates database from object model and vice versa
  - Minimizes impact of making changes to either during development
- Databases and schemas can be swapped out easily

100% of your business model is re-usable across projects since persistence related code is not necessary in the model

TopLink Mapping Workbench – Manages Meta-Data

- The TopLink Mapping Workbench allows you to build and manage the meta-data graphically



Mapping Workbench is comprehensive

- Import existing classes/beans, tables
- Generate tables from classes
- Generate classes/beans from tables
- Automap, automatically map classes/beans to tables
- Map descriptors visually, easy to learn
- Basic database management – table creation and DDL generation
- Java source code generation



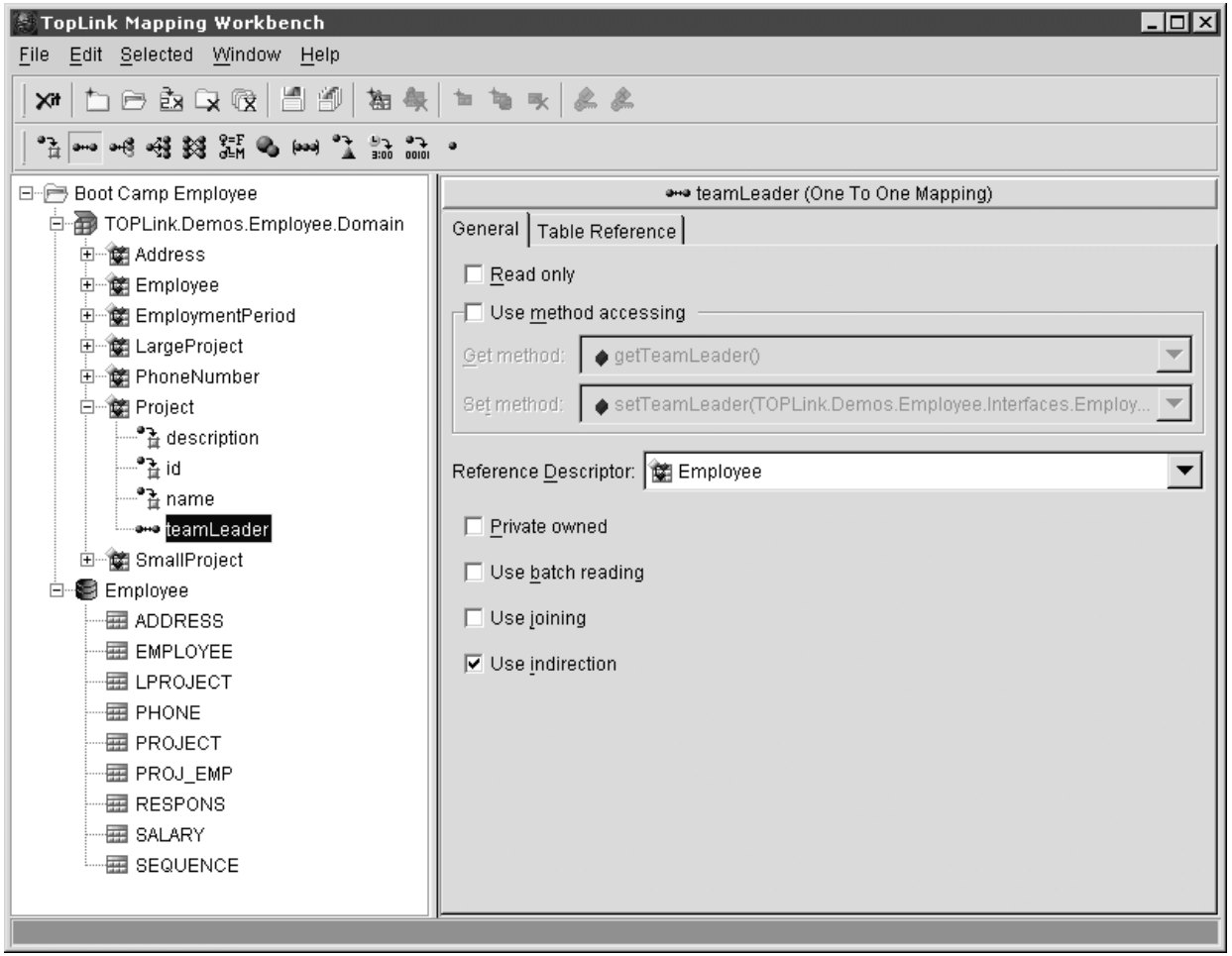
Advanced Mapping Support and Flexibility

- Direct to Field, One to One, One to Many, Many to Many
  - Any kind of foreign key relationships in Database supported, possibly including intermediate tables
- Object Type, Transformation
  - Enumation (‘Male’-> ‘M’) or conversions (String to Number)
  - User defined transformations
- Aggregates, Multiple tables
  - Multiple objects/beans per row
  - Man an object/bean to multiple tables
- And many more – Serialized mappings, Direct Collections, Object-Relational Mappings, etc



TopLink Mapping Workbench – Manages Meta-Data

- The TopLink Mapping Workbench allows you to build and manage the meta-data graphically



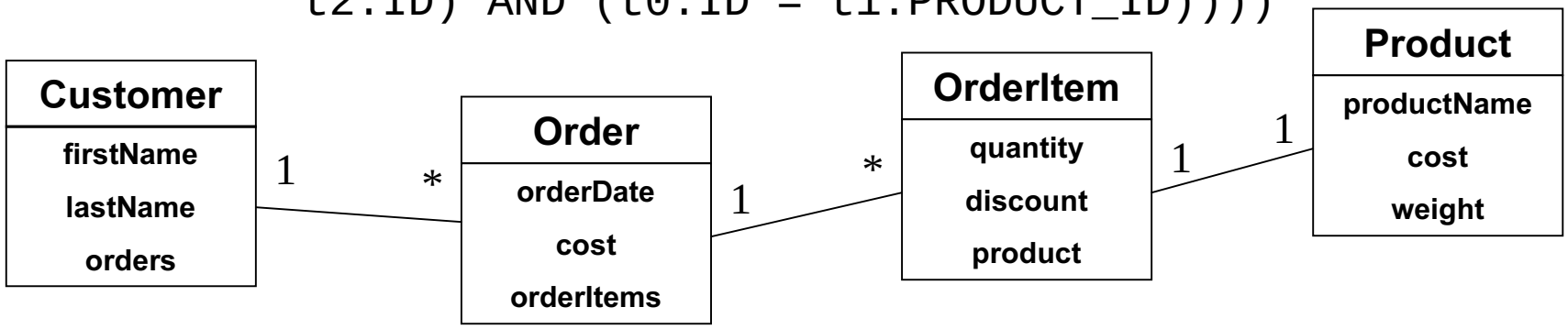
Object Queries with Java Expressions - Example

- Find all Customers who ordered a “Widget”
  - □□□□□□□□□□□□□□□□□□□□□□□□□, simple object attribute traversal:

```
custExpression.anyOf(“orders”).anyOf(“orderItems”).
  get(“product”).get("productName").equal(“Widget”)
```

  - □□□□□□□□□□□□□□□

```
SELECT t3.ID, t3.FIRST_NAME, t3.LAST_NAME,
  t3.STREET, t3.CITY, t3.STATE, t3.ZIP FROM
  CUSTOMER t3, ORDER t2, ORDER_ITEMS t1, PRODUCT
  t0 WHERE ((t0.PRODUCT_NAME = ’Widget’) AND
  ((t2.CUST_ID = t3.ID) AND ((t1.ORDER_ID =
  t2.ID) AND (t0.ID = t1.PRODUCT_ID))))
```



Object Queries with EJBQL

- Good features of EJBQL
  - Based primarily on SQL
  - Queries are in terms of bean attributes, not database
- Limitations of EJBQL
  - Application servers only support CMP
  - Only supports static querying - no dynamic behavior
  - Support is relatively basic without venturing beyond the spec
- **TopLink Value Add**
  - EJBQL for Java Objects, CMP and BMP
  - In memory EJBQL
  - Mapping Workbench EJBQL Management

Caching



- Numerous locking, refreshing and synchronization options available to minimize cache staleness
- Queries can be run in-memory only against the cache
- Cache manages “identity” to support bi-directional and cyclical relationships

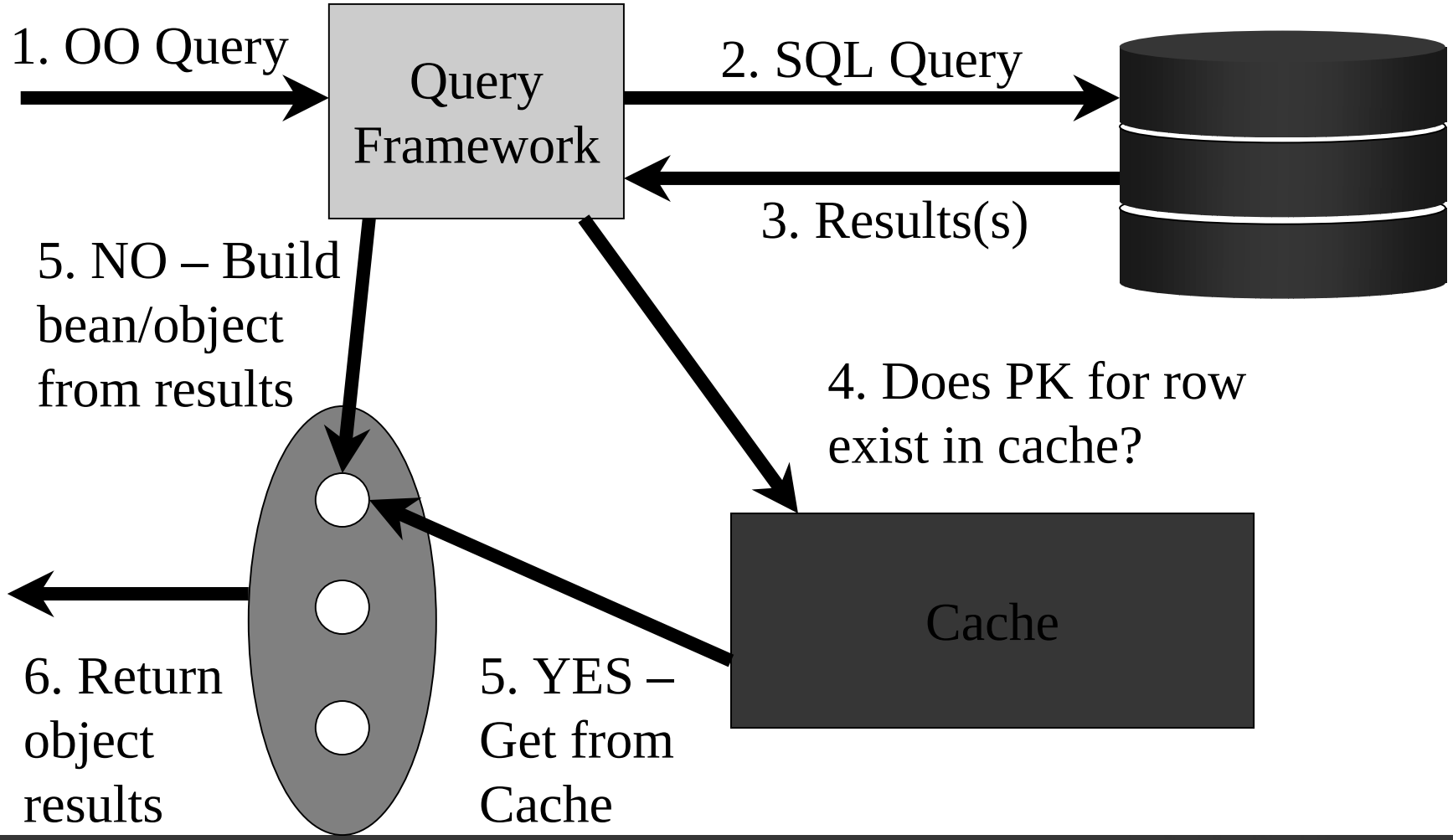


Caching

- Different caching policies are available and can be set class by class and bean by bean basis
- Different kinds of cache interact with the Java garbage collector differently to achieve desired caching behavior
  - *Soft Cache Weak Identity Map*
  - *Hard Cache Weak Identity Map*
  - *Weak Identity Map*
  - *Full Identity Map*
  - *Cache Identity Map*
  - *No Identity Map*



Default Cache Behavior



Transaction Features and Support

- TopLink has an extensive Java transaction support through it's "Unit Of Work" feature
- TopLink calculates the minimal change set at commit time so that only the minimal updates are sent to the database, reducing both traffic and database load
- TopLink properly orders INSERT, UPDATE and DELETE statements to respect database constraints
- Integration with any compliant JTS driver so TopLink transactions can participate in any greater transaction management

Performance and Tuning Options

- Minimal Writes, Updates
- Batch Reading, Writing
- SQL ordering
- Transformation support
- Existence checks
- Stored procedures
- Read Lock Support
- Statement Caching
- Scrolling cursors
- Partial Attribute Queries
- Indirection for “Just in Time” reading
- Automatic change detection
- Caching policies and sizes
- Parameterized SQL
- Pre-allocation of sequence numbers
- Cache synchronization support
- Optimistic, Pessimistic locking
- Joining object retrieval optimization
- In memory querying
- Dynamic queries
- Query optimization

AND MUCH MORE!

TopLink for non-Relational Data sources

- Enables access to non-relational data sources including EIS/Mainframe and XML
- Provides all of the flexibility and functionality that TopLink for a RDBMS provides
  - Caching,
  - Just in time reading,
  - Transaction integration, etc.
- Reference implementation supporting XML is provided

TopLink Scales!

- Multiple threads do modifications of business objects in their own exclusive transaction space
- Database connection pooling via TopLink feature or integration with commercial app server's JTS
- Shared cache to concurrent threads in your server for efficient reading
- Remote Session support for 3-tier Java clients
  - Client side TopLink functionality



TopLink and EJB Support

- TopLink supports persisting Java objects in any compliant Java VM
- TopLink supports persisting Bean Managed (BMP) Entity Beans in any J2EE Compliant Application Server
- TopLink supports persisting Container Managed (CMP) Entity Beans EJB 1.1 in WebSphere and WebLogic
- TopLink supports persisting Container Managed (CMP) Entity Beans EJB 2.0 in WebLogic, Oracle9iAS 9.0.4 and HP-AS

Architecture Options for Enterprise Java

- Entity Beans using Container Managed Persistence, often with related Java Objects
- Entity Beans using Bean Managed Persistence
- Session Beans accessing “regular” Java business objects
- Regular Java objects without EJBs (Servlet, JSP, MDB, etc)

“EJB Compliance” *ONLY* supports architectures where every persistent entity is a CMP Entity Bean

TopLink manages persistence in ALL of these Architectures!

TopLink and EJB Specification

- TopLink value add to “EJB Compliant” Application Servers
  - **Mapping Tools**
  - Stored Procedure support
  - Mapping Flexibility
  - Bean-Object relationship support
  - Bean/Object generation tools
  - **Enhanced Caching options**
  - Transformation support
  - Schema generation tools
  - Advanced expression support
  - **In memory querying**
  - Batch reading
  - Batch writing
  - Statement caching
  - **Reporting framework**
  - Just in time reading flexibility

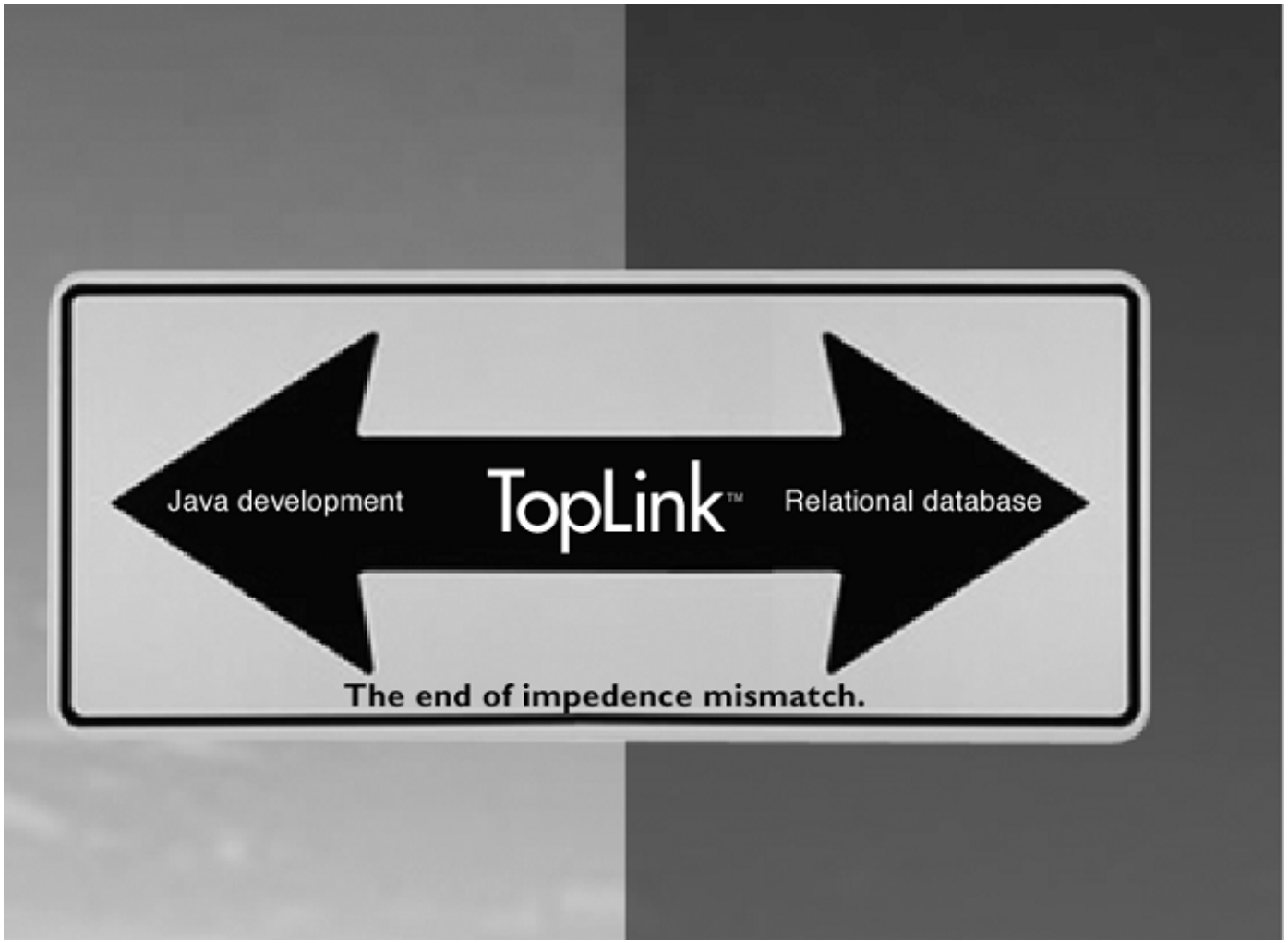
TopLink and EJB Specification

- TopLink value add to “EJB Compliant” Application Servers
  - Minimal writes
  - SQL ordering
  - Event framework
  - Sequencing flexibility
  - Optimistic locking
  - Pessimistic locking
  - No locking
  - Performance profiler GUI
  - Logging support
  - Interface support
  - BMP support
  - Java Object support
  - Cache synchronization support
  - Partial reads
  - Dynamic queries
  - 2-tier support
  - Inheritance support
  - Open API to support almost any data source

TopLink – Summary

- Reduce maintenance and development costs
  - Integration solution available at onset of development – removed from critical path
  - Leverage Java skills, leverage data skills
  - TopLink reusable across applications and fosters reusability of applications
- Portability
  - Database, Application, Schema
- Core Competence, a decade of domain experience
- Performance, Productivity, Flexibility
- Industry leading Java and Database Integration

THE END


Java development
TopLink™
Relational database
The end of impedence mismatch.