db4objects
Creator of db4o –
the Open Source Object Database

Presentation for EclipseME Team
Carl Rosenberger, CSA db4objects
Christof Wittig, CEO db4objects
May 16, 2007
db4o is the world’s most popular object database
Focus on embedded, zero-admin use
Open source / dual license business model
20,000 registered developers (Java and .NET)
100 commercial customers (Boeing, Ricoh, Seagate)

“I stumbled into db4o’s highly addictive ease of use and power [...] The savings are substantial even when you factor-in the cost associated with acquiring a commercial license

User Aziz
db4o is an embeddable, zero-admin database
- Native to Java and .NET applications
- Enables developers to store their application objects with only one line of code
- Replaces traditional dual schema or O/R mapping approaches
- Requires no DBA

Saves significant time and corresponding cost; enables new types of distributed applications and makes software easier to maintain, refactor, and reuse

db4o has a unique architecture which takes full advantage of Java and .NET’s object-oriented programming paradigms
“Tools are available […], but is it perfect? Far from it. One thing that I really appreciate when using Db4o is that I have no such problems. Simply because there is no database schema or in other words: the database schema reflects what I have in my model.”

Michal Talaga
db4objects, Inc. | Company Key Facts

- Founded in 2004
- Headquarters in San Mateo, California (USA)
- Global workforce in 5 continents
- 20,000 community members, 100 contributors, 25 staff
- Spun out of Stanford University
  - CEO Christof Wittig
  - CTO Carl Rosenberger
- High profile backers
  - Mark Leslie (Veritas)
  - Vinod Khosla (Sun)
  - Jerry Fiddler (Wind River)
  - and others

"I have been using db4o a LOT lately, and I don't expect I shall return. I can say without question that it has increased my productivity by at least... 1 million times."

Travis Reeder
1,000,000 downloads (3/07)

20,000 registered users

1,000 commercial leads

100 dDN subscriptions

30 runtime shipments

“Object databases... I had no idea they were so useful and simple to use. [...] That's how the whole of IT should be...”

Blogger Orbifold
I’m using DB4O. I’m so behind I’m not going to waste more time messing with Hibernate. DB4O is so quick and simple.

Blogger Sam
"If you are sick of programming oo using a relational database or moreover an object-relational mapper then you have to try […] db4o […] Check this out and enjoy! Once you have tried it out you do not want to use a relational database anymore."

— Blogger Crazy Teuton
db4objects at Heart of “Triple Convergence”

Fast growth of embedded and smart device software

Open Source business models are validated

Java and .NET make OO mainstream

“db4o a great, open source, OODB that can beat SQL Server anytime when it comes to persisting native objects.

No mapping, no nothing, store your object model, not a flat, relational model. It supports native queries (query in native C#).

Anyways, MS is still too hung up on the old RDBMS product and it shows. So 80’s. :-)

ThomasJ
“After experimenting with db4o I realized that object oriented databases have really the potential to boost up productivity by relieving the programmer of the burden of having to convert all the data between the relational and the object oriented world.”

Martin Unterholzner

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Object Persistence Options

**Serialization**
- Requires loading full object graph into memory
- Cannot be partially retrieved/queried
- Breaks if the class model changes

**db4o**
- Objects stored and retrieved as needed
- Full index and query capabilities
- Small footprint
- Zero admin.
- Native implementation (Java/.NET)

**RDBMS**
- Mapping layer required to store/retrieve objects
- Resource intensive (memory/cpu)
- Slower performance
- Object class modifications require costly schema changes
db4o’s Success Relies on 3 Key Benefits

- **Slashes 90% of cost** to develop persistence
- **10% faster to market** with your application
- Runs **up to 55x faster** than conventional systems

- Better memory management
- More robust and economical than RYO solutions
- Brings DBMS grade robustness to small devices

- Deployable in large volumes without local administration
- Build lean and truly object-oriented software
- Build distributed, fully synchronized data architectures
- Fewer errors, better refactorability and software longevity

“I’m tossing and turning at night out of sheer excitement of the fact that I can store _real_ objects in a database, without OR mapping!”

Carlos Muentes
One line of code stores any object
Class model = object schema
Smooth production process

```java
public void store(Car car){
    ObjectContainer db =
        Db4o.openFile("car.yap");
    db.set(car);
    db.commit();
    db.close();
}
```

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Travis Reeder
db4o Key Features: Embeddable

- **Easy deployment**
  - Simple deployment as a library/jar
  - No separate database installation

- **Zero administration**
  - Hot backup
  - Defragment
  - Application-managed authorization

- **Automatic object schema versioning**
  - Database upgrades objects automatically to match current class definitions

- **Small memory footprint**
  - 350k JAR file size (expected to drop to 250k)

"Object databases... I had no idea they were so useful and simple to use. [...] That's how the whole of IT should be..."
db4o Key Features: Multiple platform support

- Runs natively in .NET and Java (dll/jar)
  - .NET 1.1, 2.0
    - Compact Framework 1.1, 2.0
    - Mono
  - Java 1.1.x through 5.0
    - J2ME, CDC (Future support for CLDC/MIDP)
  - Requires no IDE plug-ins or specialized compilers
    - Visual Studio 2003, 2005
    - Eclipse
    - IDEA
  - Easily leverage IDE code refactoring to maintain database queries and object code simultaneously

- Mobile, PCs and servers
- Runs cross-platform

"I demonstrated that the application would reduce the logic code, which is 60% for persistence, to one hundredth of that, and improve performance ten fold, not to mention the overall simplification."

Michael Couck
db4o Key Features: Brings more OO to the database

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<tr>
<th>Company</th>
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<th>Vision</th>
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- Object-oriented replication (dRS)
- Object-oriented queries (Native Queries)
- ObjectManager browser

```
List <Student> students = database.query <Student> (new Predicate <Student> () { public boolean match(Student student) { return student.getAge() < 20 && student.getName().contains("f"); } });
```

```
IList <Student> students = database.Query <Student> (delegate(Student student){ return student.Age < 20 && student.Name.Contains("f"); });
```
Object-oriented Replication

"Object databases... I had no idea they were so useful and simple to use. [...] That's how the whole of IT should be..."
db4o Key Benefits: Performance! Performance!

- 100% native implementation ensures fastest performance
- Running the db4o engine in-process eliminates needless data transportation
- Elimination of O/R Mapping logic allows db4o to run up to 44 times faster
- Smart object caching gives huge boosts in performance when re-querying the same data
- Integration with native garbage collection saves memory and reduces footprint when needed

“I really love db4o, it really does save more than 50% on my development time, and it’s really nice to only have to think in objects, and not relational.”

LaStone
db4o Key Benefits: Reliability

- Full ACID transaction model (Atomic, Consistent, Isolated, Durable)
- Data transaction journaling ensures zero data loss in case of system failure
  - Automatic data recovery after system failure
- db4o core is thread-safe for simultaneous operations

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Michal Talaga
## Target Market: Embeddable Java/.NET Databases

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<tr>
<th>Application</th>
<th>Data in <strong>DBA</strong> domain “exposed DBMS”</th>
<th>… in <strong>developer</strong> domain</th>
<th>zero-admin “embedded DBMS”</th>
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<tr>
<td><strong>Programming languages</strong></td>
<td><strong>Java and .NET</strong></td>
<td><strong>Oracle, MSFT, IBM</strong></td>
<td>Oracle, MSFT, IBM, BerkeleyDB, HSQL, Derby, Firebird</td>
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<td><em><em>C, C++, P</em>, others</em>*</td>
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<td><strong>MySQL</strong></td>
<td><strong>BerkeleyDB, Encirq</strong></td>
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<td><strong>Direct Access or ORMs</strong></td>
<td><strong>HSQL, Firebird, MySQL</strong></td>
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“db4o... wow this is something else! the best bit of software I have seen since google earth […] I now have my application working great, it’s faster, easier and handles even bigger tables... and currently all in under 3 meg. […] There is no going back!”

Ove Nordström
**Customers : Ricoh**

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**Tatsuo Ito, new multi-functional platform team lead**

"db4o provides a persistence solution for our broad range of technical challenges and for our stringent quality standards. After a long period of evaluation, we found that db4o has the flexibility to fit our cutting-edge architectures, which aim to achieve better productivity in our object-oriented software development."

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"db4o rocks, db4o is just plain good technology […] It is purposeful, cool, fun, impressive, well coded - all sorts of good."

Chris Donnan
Customers: Intel

Sean DeMartino, software engineer and XP coach

"db4o will make application development much easier for our group. The OR mapper/SQL database alternative really did not allow us to do everything we needed and forced us to contort our application designs. By comparison, implementing with db4o was seamless and worked within our existing architecture.”
"If you think of a database system that can process thousands of updates in a few seconds. What hardware requirements do you think you need? No, that’s not it...think smaller, think much more smaller. Maybe even more. Hello DB4O! This object database can run on your smart phone and still have the processing power that makes even a big Oracle database jealous."

Robert Osaki, director of Mirra customer support

"With db4o running seamlessly on the back end, supporting vast scalability and top-notch performance, the company’s customer support caseload has been reduced by more than 10%"

War Bekker
Boeing uses db4o for the P-8A Multi-Mission Maritime Aircraft, because the native object database required significantly lower database administration and improved developer productivity over conventional, non-native database solutions.
“db4o... wow this is something else! the best bit of software I have seen since google earth [...] I now have my application working great, it's faster, easier and handles even bigger tables... and currently all in under 3 meg. [...] There is no going back!”

Ove Nordström

Sebastian Hubrich, XR31 project lead

"Our biggest concern is shortening our commissioning time. The use of db4o on the data-backend has helped us to achieve a time-saving effect of at least 10% on each project.”
“Possibly the most important benefit is the ability to query with objects, enabling us to have a very complex Java OOD without requiring data transformation. Another key benefit is the zero maintenance environment, a must when designing real-time systems.”

José Miguel Rubio Sánchez, director railway systems

After merger, now Europe’s #3 IT shop with 18,000 employees and $2B in sales
Pilot user since 2002
db4o used to run high speed train network in Spain (and soon more countries)
Our Mission

Make the life of software developers easier by providing a database, which simply matches the object world, and thus saves time and costs.

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Michal Talaga
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Ward Bekker
“I really love db4o, it really does save more than 50% on my development time, and it’s really nice to only have to think in objects, and not relational.”

Lastone