Examining the Open Source Equation

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The Equation

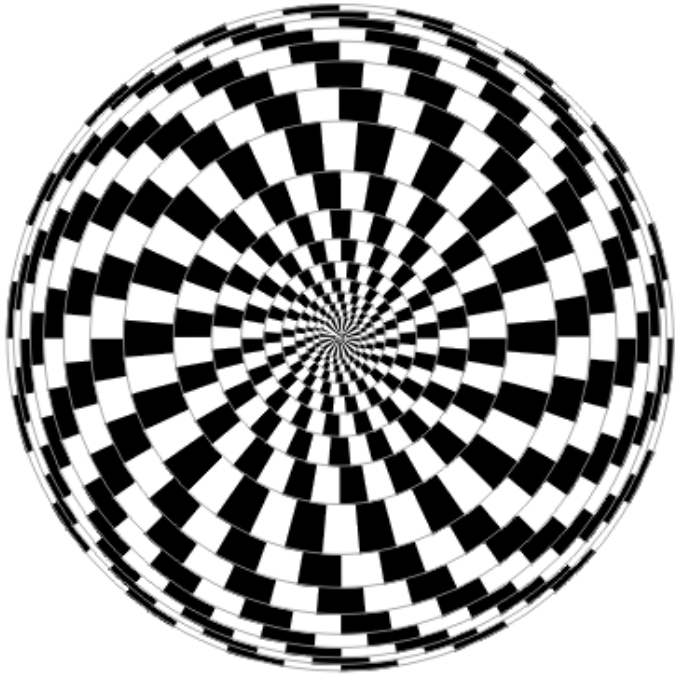
$$0 \approx \sum_{f=\$,\ldots} (\text{OracleDB}_f - \text{MySQL}_f) \times (\text{9iAS}_f - \text{JBoss}_f) \times (\text{JDeveloper9i}_f - \text{XDoclet}_f)$$

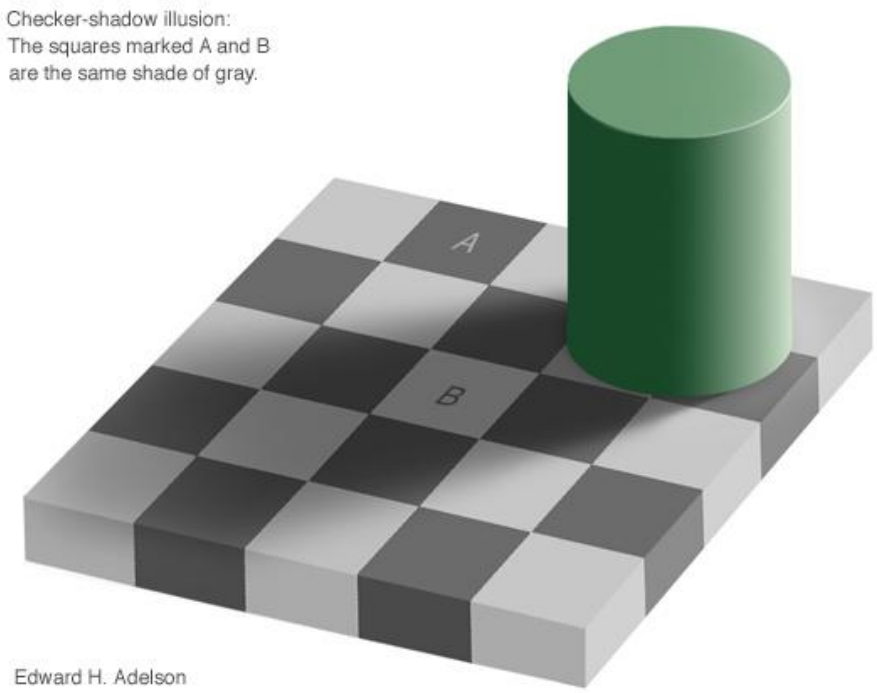
(For many practical purposes,)
Open Source software is “nearly equivalent to” Oracle’s offerings

Donations Welcome…

Suspend Your Disbelief…

- You are about to enter…






THE
OUTER
LIMITS

Comparison

- $$$$...$$$
  - Oracle 9iAS/Oracle Database/JDeveloper 9i
  - Warm fuzzy feeling of ‘security’
  - Boring!
  - Dealing with the hairy “real world”
- $000
  - JBoss/MySQL/XDoclet-Ant
  - The thrill of the chase
  - Net god status
  - Picking the low-hanging fruit

General Statements

- 80% ‘Rule’
  - These Open Source tools are probably good enough for 80% of all tasks
- Open Source value statement
  - These Open Source tools are only free if your time is worthless
- The “Coolness Factor”
  - We all want to be net gods…
- The “Fickleness Factor”
  - What happens when a new vein of ‘coolness’ opens up elsewhere?
- The “Job Security Factor”
  - No-one ever got fired for buying Oracle

MySQL Database

- The RDBMS underlying several major sites
  - Slashdot (and other users of ‘Slash’), US Census Bureau, Associated Press, Yahoo! Finance…
- Platform agnostic
  - Linux, FreeBSD, Windows,…
- A major component of the popular LAMP methodology
  - Linux, Apache, MySQL, P{HP,ython,erl}

“the world's most popular open source database, recognized for its speed and reliability…”

MySQL Database…

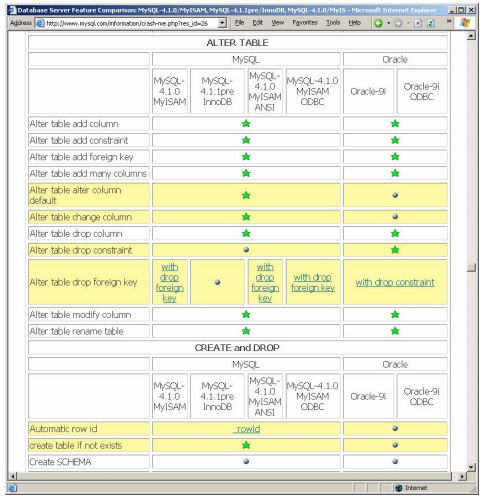
- Pros
  - Quick, less resource-hungry
    - Major factors underlying why people choose it…
  - Popular
  - Several technology/database format variants
    - Mix-and-match capabilities to need
- Cons
  - Primitive in some respects
    - But remember the 80% rule…
  - A bit confusing
    - Where is it now? Where is it going?

MySQL Database…

- Features
  - Entry-level SQL-92 database
  - Client-Server or embedded versions
  - Several storage engines
    - Non-transaction-safe
      - MyISAM (default; B-tree disk tables with index compression)
      - MERGE (collects MyISAM tables)
      - HEAP (in-memory)
    - Transaction-safe
      - Berkely DB (BDB) (simple transaction-safe engine) (γ)
      - InnoDB (transaction-safe with commit, rollback, crash recovery and row-level locking capabilities)
  - Four versions
    - MySQL Classic
      - Only includes the non-transactional storage engines
    - MySQL Standard
      - Classic plus InnoDB
    - MySQL Max
      - *"…for the user who wants early access to new features…"*
      - Standard plus extras like BDB, and support for splitting tables across multiple files
    - MySQL Pro
      - The commercially licensed version

MySQL Database…

- More features
  - Fixed-length and variable-length records
  - FULLTEXT search (β)
  - Query Cache
  - Regular expressions: `SELECT * FROM pet WHERE name REGEXP "^.{5}$";`
  - Internationalisation
  - ODBC and JDBC connectivity support
    - Also Delphi, PHP, Eiffel, C/C++, TCL…
  - Copes with more than 60,000 tables and 5,000,000,000 rows
  - Bulk insert features (α)
  - Database replication (γ)
  - Hot backup
  - SHOW and EXPLAIN functionality
  - A good retinue of support utilities
  - Fairly complete documentation
- Interesting ‘crash-me’ comparison tool
  - Get the RDBMS to tell its features ‘live’
    - Cross-database
  - http://www.mysql.com/information/features.html

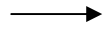


MySQL Database…

```
CREATE TABLE mytable (
  id    INTEGER      UNSIGNED
                     AUTO_INCREMENT
                     PRIMARY KEY,
  rank  INTEGER      NOT NULL,
  stuff VARCHAR(255) NOT NULL
) Type = InnoDB;
```

- Improving all the time
  - The addition of InnoDB tables raises the level a bit
    - Mitigates some of the bad rap dished out by DB purists
  - More to come (timeframes?)/Still missing
    - Version 4.1 will add
      - Support for OpenGIS
      - Subqueries/derived tables

```
SELECT * FROM table1 WHERE NOT EXISTS (SELECT id FROM
table2 WHERE table1.id=table2.id);
```

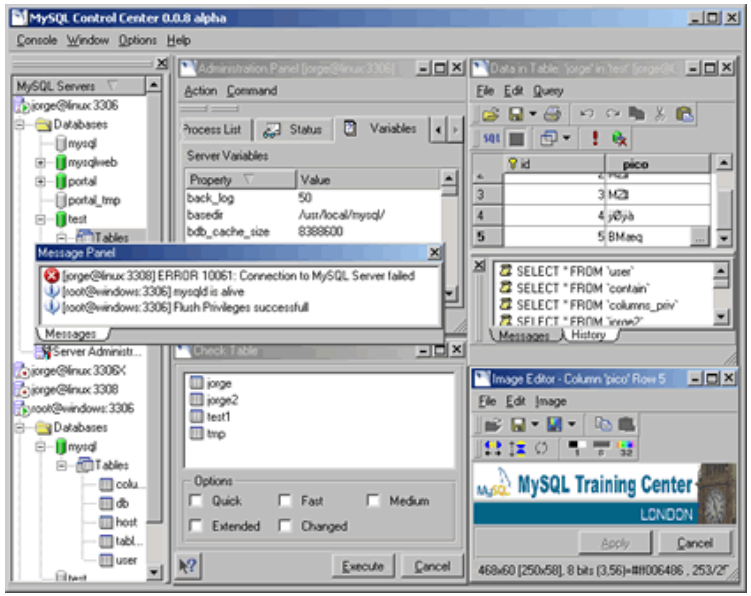


```
SELECT table1.* FROM table1 LEFT JOIN table2 ON
table1.id=table2.id WHERE table2.id IS NULL;
```

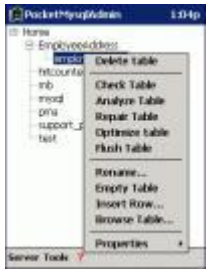
    - Version 5.0 will add
      - Stored procedures (with syntax similar to Oracle PL/SQL) and triggers
    - Version 5.1 will add
      - Views

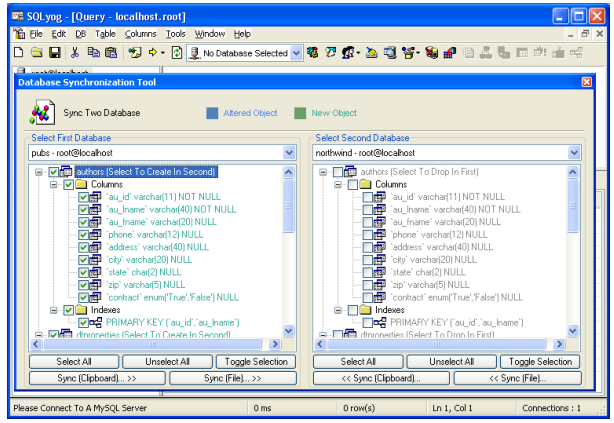
```
SELECT name, AsText(loc)
  FROM map_test
  WHERE
    Contains
      (GeomFromText('POLYGON((0 0, 0 1, 1 1, 1 0, 0 0))'),
                    loc) = 1;
```

MySQL Database…



- Various add-ins
  - Control Center, Connector/{J, C++,ODBC}, MySQLGUI, …
  - SQLyog
    - http://www.webyog.com/
  - PocketMyAdmin
    - http://www.pocketmysqladmin.com/
      - Cool!



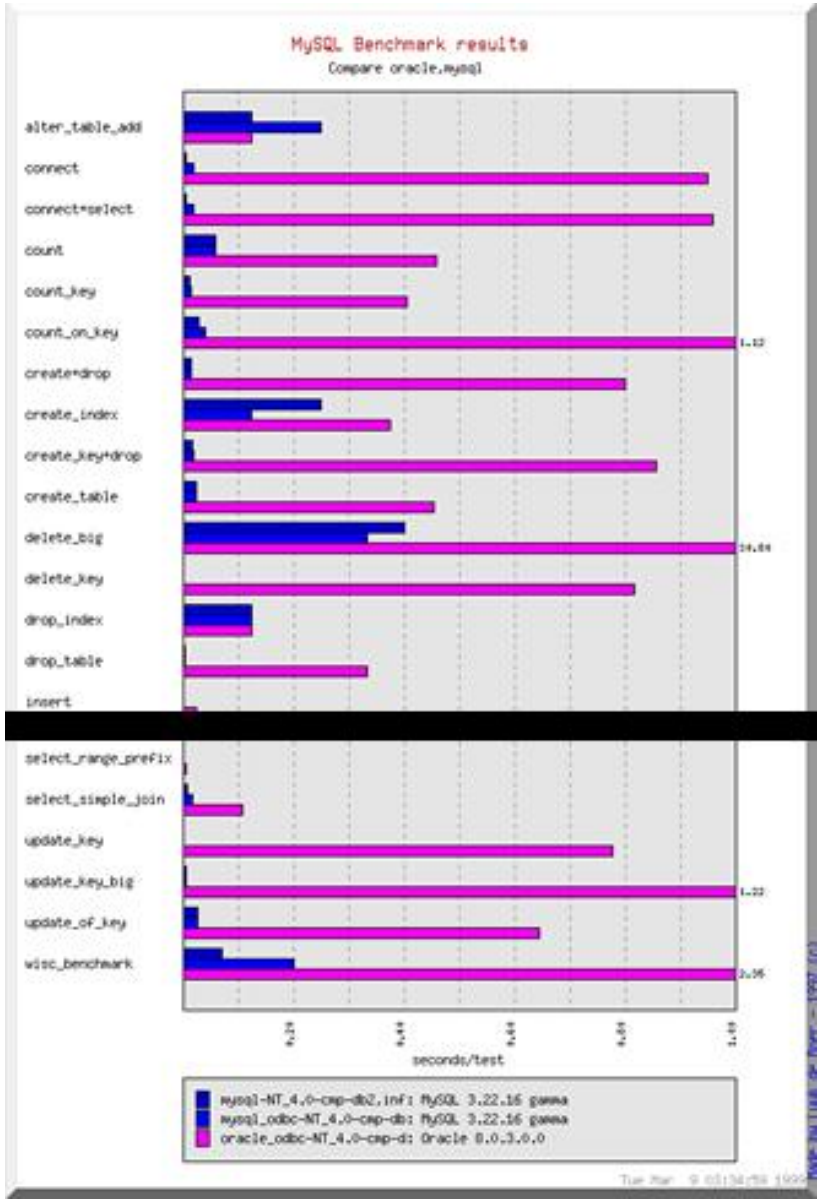


MySQL Database…

- Development being carried out by the Swedish company “MySQL AB”
- Open Source and ‘Pro’ Versions
  - Open Source version uses GNU Public License
    - http://www.mysql.com/products/licensing.html
  - Pro version
    - May be purchased by *“…those who do not wish to be bound by the terms of the GPL.”*
      - This is an issue of some controversy…many refuse to regard MySQL as “Open Source” software
    - http://www.mysql.com/products/pricing.html
      - US$440/copy for 1..9 copies
      - *“The MySQL Server license is per database server (single installed MySQL binary). There are no restrictions on the number of connections, number of CPUs, memory or disks to that one database server.”*
- Future slightly cloudy
  - SAP-DB is now under the MySQL banner
    - More advanced than ‘regular’ MySQL; some people foresee the current product’s demise

MySQL vs Oracle

- Comparison
  - http://mgc8.virtualave.net/texts/DBComparison.html
    - Evaluated Oracle, Informix, Mysql and Postgresql
      - Postgresql ‘won’…
- Benchmarks
  - http://www.mysql.com/information/benchmarks.html
    - MySQL ‘won’



Psst…PostgreSQL

- Another Open Source RDBMS
- If MySQL's limitations are a bit *too* limiting/confusing…
- Not quite as popular
  - Has a loyal following, nonetheless…
- Not quite as fast
- Not quite as well developed
  - Commercially, that is
    - Changing…
  - Technically superior, in some ways

JBoss Application Server

- JBoss: An Operating System for the Web
- Open Source Java Application Server
  - Supports Java 2, Enterprise Edition functionality
    - Not J2EE branded
      - *"We don't have the J2EE brand but basically because we never got around to passing these tests nor is SUN rushing to say that what is possibly the best appserver in its category is ABSOLUTELY FREE. No hidden cost, no per CPU, no licensing fee. ZIP."*
- Very well regarded
  - *"From the US government to MCI-WorldCom to Playboy.com to the Sims Online to some of the largest banks and hedge-funds in the world …, JBoss is a key component in these mission critical systems."*
  - *Throwaway figures*
    - *43% of enterprise developments are done on JBoss with BEA a distant second at 29%*
    - *200,000 developers a month download JBoss*

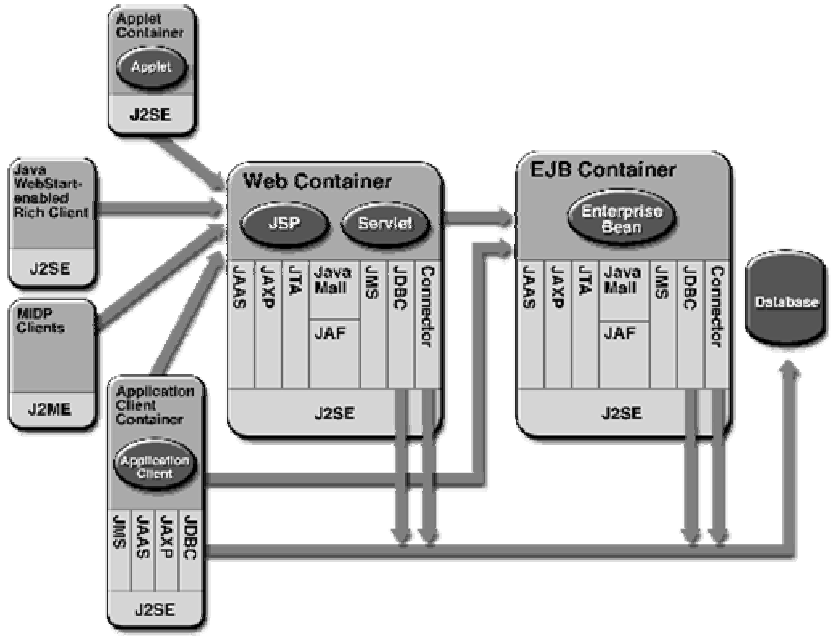
JBoss Application Server…

- Pros
  - The “poster child” for Open Source Application Servers
    - Well supported by OS development tools
  - Tracks all relevant standards very well
    - Often “first to market” with implementations
      - For the person who likes to be on the bleeding/leading edge…
    - Puts necessary pressure on the big players
  - Plays well with others
- Cons
  - Limited documentation
  - **Lousy** documentation
    - Even the stuff you pay for…
  - May be slower than Oracle’s OC4J
  - Some developers report stability issues
  - Pycho-sociological issues
    - Half of the team have just picked up their ball to go play in another field…

JBoss Application Server…

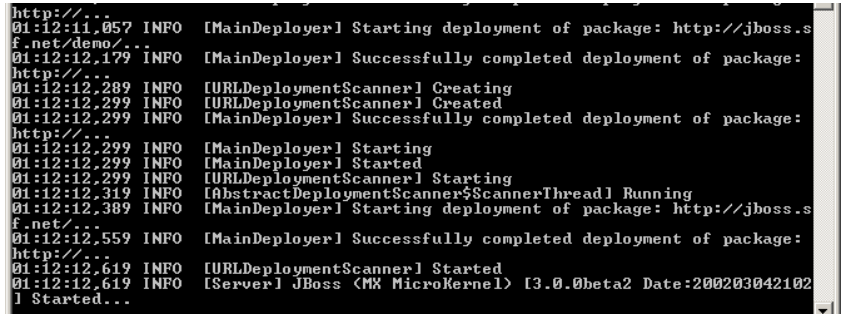
- J2EE…
  - JDBC
    - Database connectivity
  - JDNI
    - Naming/Directory services
  - JTA/JTS
    - Transaction handling
  - Servlets
    - Handles web-based client interactions
  - JSP/Taglibs
    - Template API to Servlet mechanism
    - Component/tool API for JSPs
  - EJBs
    - Enterprise-grade components
  - JCA
    - High-level EIS integration
  - JAXP
    - XML manipulation
  - JMS
    - Messaging Oriented Middleware
  - JAAS
    - Authorisation/Authentication infrastructure

"The J2EE platform represents a single standard for implementing and deploying enterprise applications. … the J2EE platform is designed to provide server-side and client-side support for developing enterprise, multitier applications."

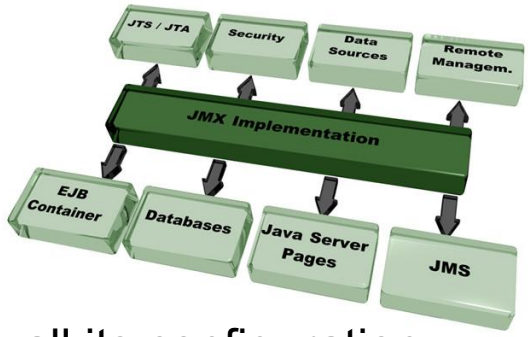


http://java.sun.com/blueprints/guidelines/designing_enterprise_applications_2e/technologies/technologies2.html

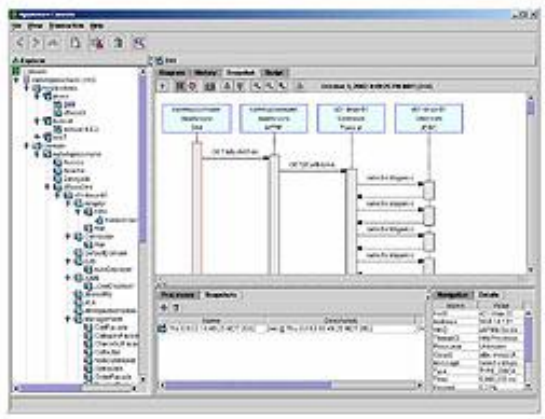
JBoss Application Server…



- And beyond…
  - Clustering/reliability
  - Custom(isable) security
  - JMX
    - Application management and monitoring
  - WebServices
    - XML-based messaging between components
  - NetBoot
    - A 50 kbyte microkernel capable of downloading all its configuration data and classes from a central HTTP server
      - Can boot into specific web apps, J2EE container, etc.

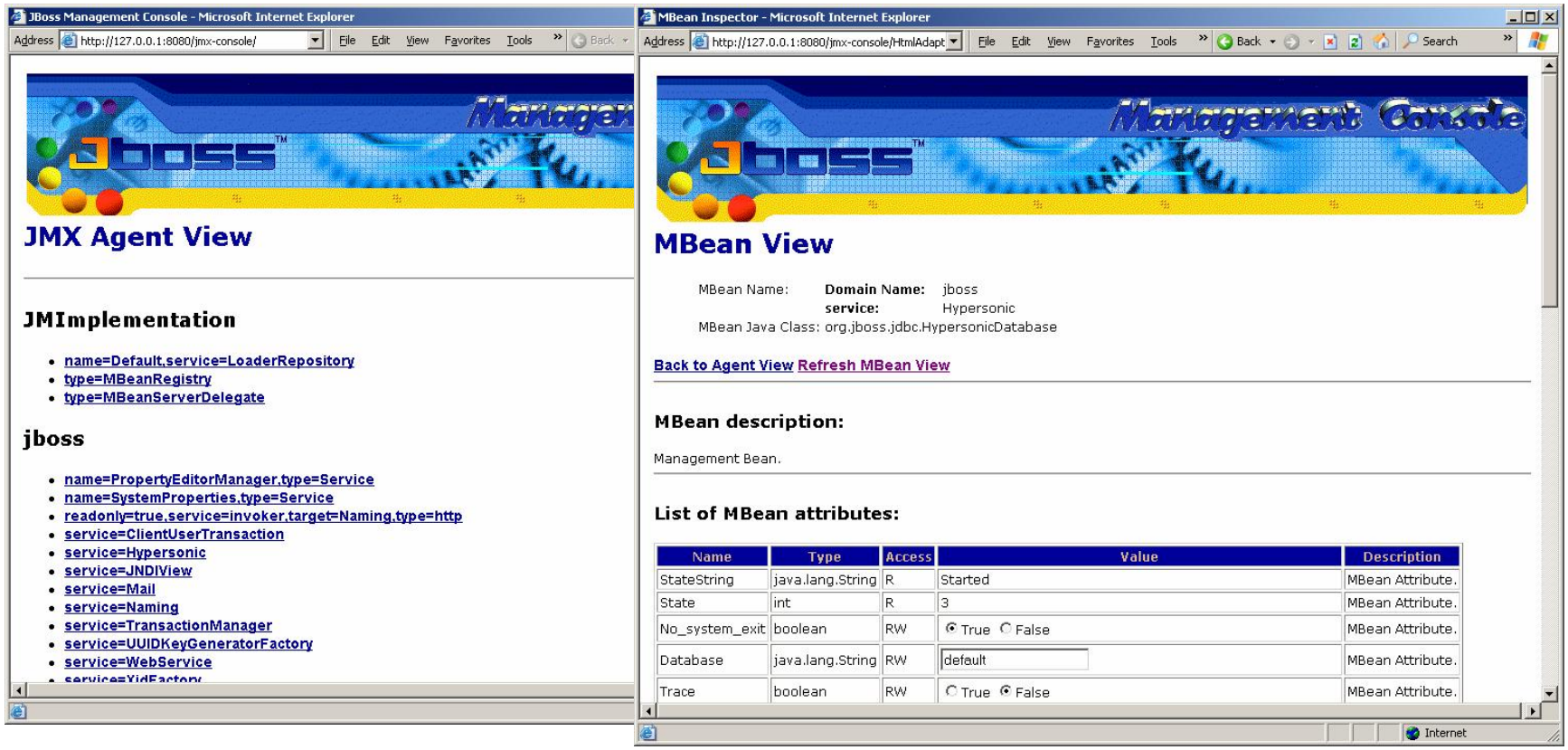


- Appsure
  - 3rd party monitoring/metrics tool



JBoss Application Server…

- JMX



JBoss Application Server…

- Aspect Oriented Programming
  - The Next Big Thing?
    - *"…an exciting new paradigm that should have the same effect on software development that object-oriented programming (OOP) had 15-20 years ago."* (ONJava.com)
    - Being prepared for JBoss 4.0
      - *"…unique among Java-based application servers today, this architecture combines the simplicity of standard Java with the power of J2EE."*
  - Allows you to define cross-cutting concerns that can be applied across separate, and very different, object models
    - Logging, security, de/anti-bugging, gathering performance metrics, persistence, etc.
    - Allows developers to write plain Java objects and apply these enterprise-type services later on in the development cycle—without changing a line of Java code
      - Layered onto code, rather than embedded
        - Code is more readable and easier to maintain
      - Declarative

```
<?xml version="1.0" encoding="UTF-8">
<aop>
   <class-metadata group="tracing" class="POJO">
      <method name="(get.*)|(set.*)">
        <filter>true</filter>
      </method>
      <method name="main">
        <filter>true</filter>
      </method>
   </class-metadata>
</aop>
```

XDoclet

"This free open source solution can simplify your EJB development, allowing you to work just with a bean class and have the interfaces and descriptors generated for you. This framework is growing, and isn't just for EJBs."

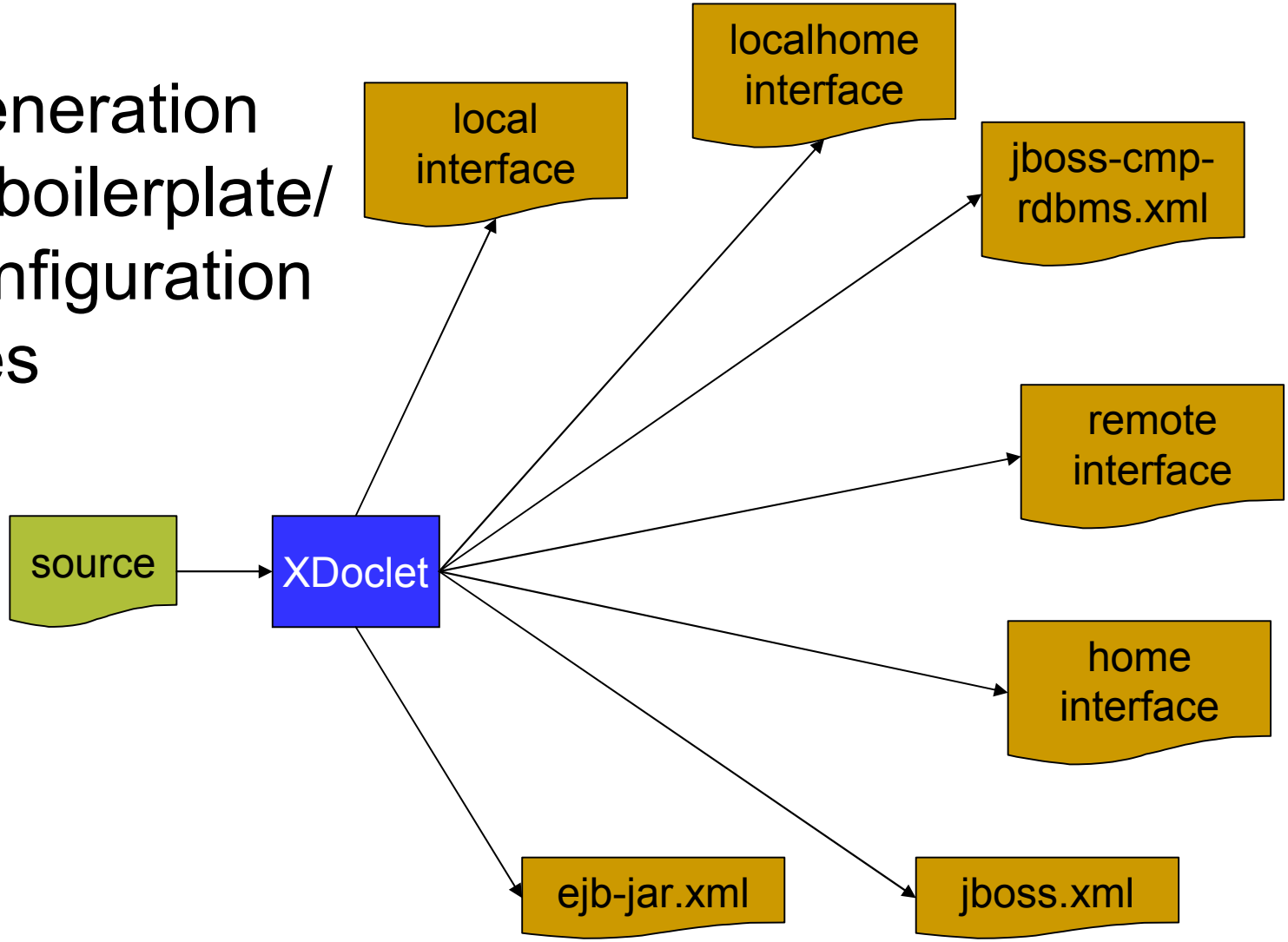
- Attribute-Oriented Programming
- A generic Java tool that lets you create custom Javadoc @tags and based on those tags generate source code or other files (such as J2EE xml deployment descriptors)
  - Vendor/technology agnostic
  - Very appealing
  - A cure for .Net envy!
- Makes "Continuous Reconfiguration" possible
  - Don't have to worry about outdating deployment meta-data whenever you touch the code
  - Integrated into the build process through Ant

XDoclet…

- *"J2EE Made Easy"*
  - Code business logic and let XDoclet generate the boilerplate/support code
  - Write the enterprise bean implementation and XDoclet generates interfaces, value objects, struts forms, unique id generators, *"and much, much more"*
- Support for Leading Servers and Tools
  - JBoss, BEA WebLogic, IBM WebSphere, Oracle IAS, Orion, Borland, JRun, Jonas, Pramati, Sybase EAServer,…
  - Castor, Hibernate, JDO, Struts, WebWork, MockObjects,…
- Extensible
  - Identify boiler plate code and write appropriate XDoclet templates
- Open, Distributed Development
  - Distributed under a flexible BSD license
  - Avoid vendor lock-ins by using XDoclet
  - Satisfy the needs of users instead of vendors

XDoclet…

- Generation of boilerplate/ configuration files



XDoclet…

```
/**
 *   @ejb:bean type="Stateless"
 *             name="MyEJB"
 *             jndi-name="the-ejb-name"
 *             display-name="The EJB"
 *
 *   @ejb:env-entry
 *     name="parameter"
 *     type="java.lang.String"
 *     value="some.data"
 */
public class MyEJB implements SessionBean
  {

  /**
   *  @ejb:interface-method
   *    view-type="remote"
   *  @ejb:transaction  type="Required"
   *  @ejb:permission unchecked="true
   */
  public void aMethod(String someParam)
    throws RemoteException
    {
    ...
```

```
<target name="ejbdoclet" depends="prepare">

  <taskdef name="ejbdoclet"
           classname="xdoclet.ejb.EjbDocletTask"
           classpath="${java.class.path};${xdoclet.jar.path};
           ${log4j.jar.path};${ant.jar.path}"/>

  <ejbdoclet sourcepath="${java.dir}"
             destdir="${generated.java.dir}"
             ejbspec="2.0">

    <fileset dir="${java.dir}">
      <include name="**/EJB.java" />
    </fileset>

    <remoteinterface/>
    <homeinterface/>
    <utilobject includeGUID="true" />
    <deploymentdescriptor destdir="${build.dir}/ejb/META-INF"/>
    <orion destdir="${build.dir}/ejb/META-INF" />

  </ejbdoclet>
</target>
```

XDoclet…

- Cross-application server coding made easy…

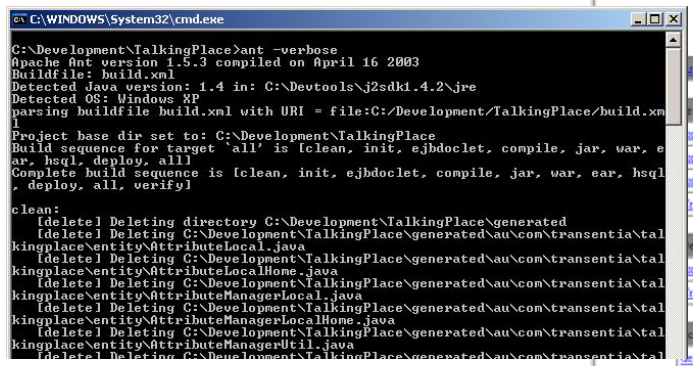
```
/**
 * @ejb.bean
 *    cmp-version="2.x"
 *    local-jndi-name="airline.LanguageLocalHome"
 *    name="Language"
 *    primkey-field="languageId"
 *    type="CMP"
 *    view-type="local"
 * @ejb.finder
 *    method-intf="LocalHome"
 *    query="SELECT OBJECT(o) FROM Language o"
 *    result-type-mapping="Local"
 *    signature="java.util.Collection findAll()"
 * @ejb.persistence
 *    table-name="language"
 * @weblogic.data-source-name airline.database
 * @orion.bean data-source="airline.database"
 */
public abstract class LanguageBean
  implements javax.ejb.EntityBean
  {
```

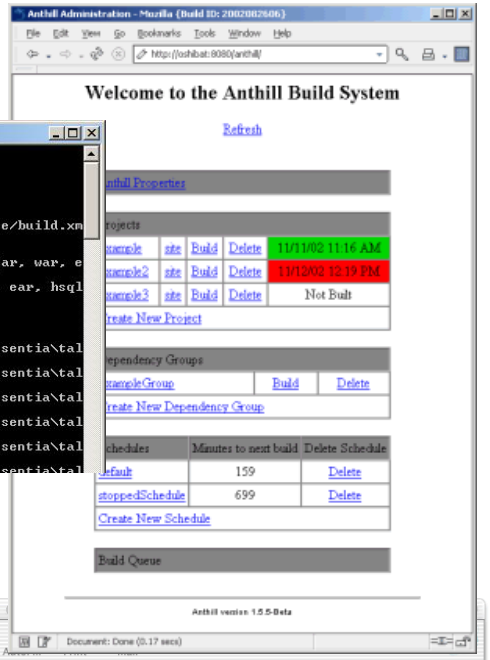
```
/**
 * @ejb.interface-method
 *    view-type="local"
 * @ejb.relation
 *    name="city-language"
 *    role-name="language-has-city"
 * @weblogic.relation
 *    join-table-name="language_city"
 * @weblogic.column-map
 *    foreign-key-column="language_id_fk"
 *    key-column="language_id"
 * @jboss.relation
 *    fk-column="city_id_fk"
 *    related-pk-field="cityId"
 */
public abstract java.util.Collection getCities();
```

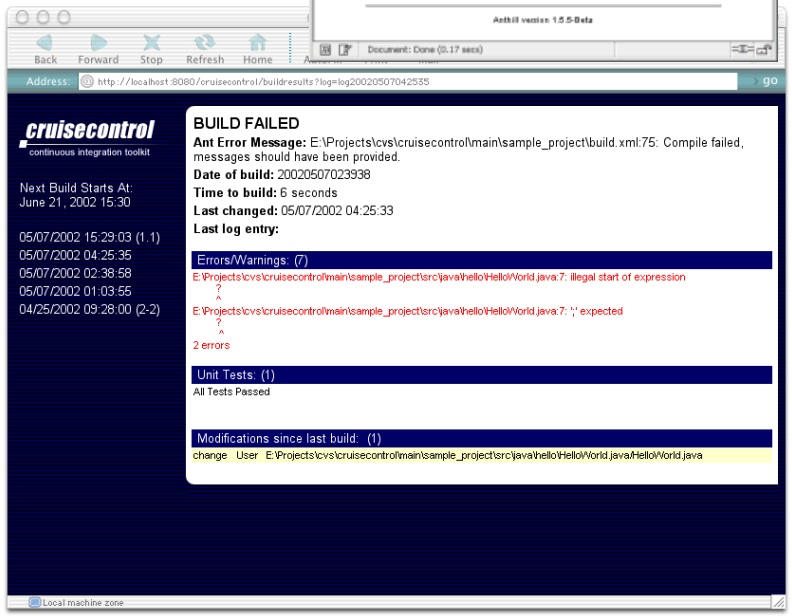
```
<orion destdir="${build.dir}/ejb/META-INF" />
<jboss version="3.0"
        typemapping="mySQL"
        destdir="${build.dir}/ejb/META-INF"
        preferredRelationMapping="relation-table"
        datasource="java:/MySqlDS"
        xmlencoding="UTF-8"/>
```

XDoclet and Other Tools

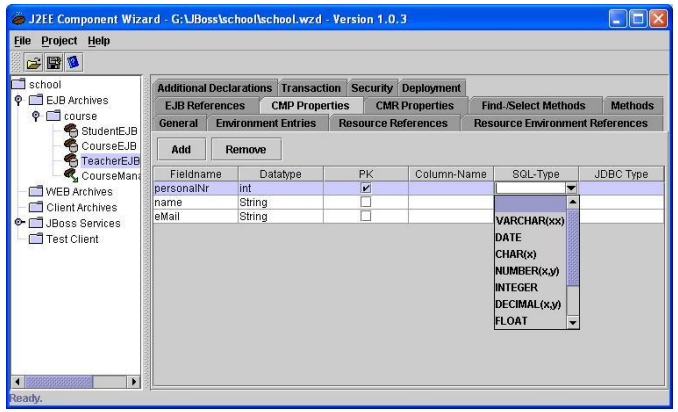
- Vi!
- Ant
  - Java-based build tool
- AntHill
  - Facilitates a controlled build process
    - OS and ‘Pro’ versions available
- CruiseControl
  - *“Developing a disciplined and automated build process is essential to a controlled project. Many software gurus say that, but we've found that it's still a rarity in the field.”*
    —Martin Fowler, Chief Scientist, ThoughtWorks







XDoclet vs. JDeveloper9i



- Not an IDE
  - No debugging, UML, etc.
  - Although there are some OK helper tools
    - J2EEWizard, http://www.j2eeguru.net/
  - Can be integrated into IDEs via Ant support
    - Sometimes not too successfully…
- Left brain appeal
  - For those who don't like to click their way through life and don't care about pretty pictures…
- Repeatability
- Greater versatility
  - Support for more toys (hibernate, JDO, etc.); not tied to Oracle's strategies
- Harder to sell
  - No pretty pictures

Summation

- Oracle should be feeling a bit of pressure!
  - As should many other vendors…
- These tools *are* doing good work
  - With large organisations
  - In difficult, “real-world” situations
  - Earning kudos along the way…
    - *Often* performing better than commercial offerings
- Potential drawbacks are *largely* psycho-socio-political, not technical

Resources

- These Slides
  - http://www.transentia.com.au/material/AUSOUG2003.pdf
- Oracle Stuff
  - JDeveloper, http://otn.oracle.com/products/jdev/
  - Oracle 9iAS, http://www.oracle.com/ip/deploy/ias/
  - Oracle DB, http://www.oracle.com/ip/deploy/database/oracle9i/
- MySQL, http://www.mysql.org/
- JBoss, http://www.jboss.org
- XDoclet, http://xdoclet.sourceforge.net/
- PostgreSQL, http://www.postgresql.org/
- Ant, http://ant.apache.org/
- CruiseControl, http://cruisecontrol.sourceforge.net/

Resources…

- Vim, http://www.vim.org/
- Eclipse, http://www.eclipse.org
- OnLamp, http://www.onlamp.com
- AOP, http://www.onjava.com/pub/a/onjava/2003/05/28/aop_jboss.html
- Christopher B. Browne's Home Page, http://cbbrowne.com/info/
  - A very useful database-oriented site; some good thoughts on Oracle, MySQL and PostgreSQL
  - http://www.ntlug.org/~cbbrowne/rdbmssql.html