Agenda

- Why Java?
- Java in Oracle’s iPlatform
- Oracle Tools and Technology for Java
- Intro to XML
- Oracle Technology for XML applications
- Q & A

Why Java?

An abbreviated list......

- Portable
- Object-oriented
- It’s fast, considering ......

- Supports the eBusiness philosophy (multi-tier)
- Supports multiple clients
  - client/server, html, xml, palmtops, internet appliances
- ... java had more registered developers in its first 900 days than C++ had in 10 years
Java in Oracle’s iPlatform

Java in the Database

- JServer
  - JVM with native compiler
  - CORBA 2.0 ORB
  - EJB Server
  - supports variety of dev models (JSP, CORBA, EJB)
  - SQLJ Translator

Java in the Application Server

- OAS 4.0.8.1
  - CORBA 2.0 ORB
  - EJB, JSP, JServlets, XML
  - supports variety of dev models (JSP, CORBA, EJB, HTML)
Oracle Tools and Technology for Java

- JDeveloper 3.0
- JDBC
- SQLJ
- Java Stored Procedures
- Oracle DAC
- BC4J

What tool could you use for 3 tier development??

- JDeveloper 3.0
  - Wizard-based development
  - Integrated debugger, codeviewer, component testers...
  - Build many types of components (Applets, Apps, BC4J, Web Objects...)
  - Integrated SQLJ precompiler
  - much more...
Oracle Tools and Technology for Java

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JDBC

*Java Database Connectivity*

- Standard interface for connecting to RDBMS’s from JAVA
- included in the java.sql package
- Using JDBC, you can write code that:
  - Connects to one or more data servers
  - Executes any SQL statement
  - Obtain a result set
  - Obtain metadata from data server
- Oracle drivers support pre-fetching
JDBC

Drivers included with Jdeveloper or on Technet

- Thin (Type 4)
  - Downloadable
  - 100% Java, Implements SQL*Net/Net8
  - Implements Oracle8i features
  - Typically used for applets, java socket connect
- Thick (Type 2)
  - Non-downloadable
  - OCI Native API, Partly Java
  - Faster transfer rate?
  - Typically used for Middle-tier to Data-tier connect
- Server Driver
  - Built into Oracle8i

Oracle Lite

SQLJ

- An industry standard
- SQL calls embedded in Java Code
- Reduces tedious coding of JDBC code for simple queries
- Only JDeveloper has an integrated SQLJ pre-compiler (1-step instead of 2 or 3)
SQLJ Example

```java
public int count_titles() throws SQLException {
    int numOfTitles = 0;
    #sql {select Count(titles) into :numOfTitles from ACME_TITLES };
    return numOfTitles;
}
```

### JDBC vs. SQLJ

**JDBC**
1. Register the Driver
2. Connect to the Database
3. Create a statement
4. Query the Database
5. Step through the results
6. Assign results to Java variables
7. Close the result set
8. Close the statement
9. Close the connection

**SQLJ**
1. Register the Driver
2. Connect to the Database
3. Set default context
4. Execute query and process results
5. Close the connection
Java Stored Procedures

- Procedures called from any client
- Centralized management of shared logic
- Thin-client compatibility
- Minimizes network traffic
- Super-fast query execution
- Standard Java
- Can interact with PL/SQL stored procs

Java Stored Procedures

Package and Deploy to Oracle 8i

Build Java class
Oracle DAC
Data Aware Controls

- Extended swing components
- Additional methods for DB
- Based on InfoBus standard

BC4J
Business Components for Java

- Oracle standard framework for reusable Java components
- Visual and non-Visual
- Entity, View, Application
- DAC can leverage BC4J
- Is being implemented in the entire Oracle stack
Database Triggers

Enforce your business rules

- In Oracle8i, these can be Java
- Consistency of code, everything Java
- Easily managed through SQL

Summary

- Java is just beginning...
- Oracle has Java on 3 tiers NOW
- Oracle has a robust/extensive Java development tool
- Multiple technologies supporting Java
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What is XML?

- eXtensible Markup Language
- A language and set of rules for formally defining markup languages.
  - A markup meta-language
  - A W3C Recommendation........
  - Subset or ‘Application Context’ of SGML
SGML: Standard Generalized Markup Language

- Markup meta-language used to formally describe markup languages
- HTML is an SGML application
- An ISO Standard: 1986, Revised in ‘88 and 98 (WebSGML - Allowed XML to become a subset)
- ...to reflect document structure and not document presentation. HTML departs from this intent.

How are HTML and XML related?

Markup Meta-Languages
- SGML (1986)
- WebSGML (1998)
- PersonML
- HTML
- XML (1998)
Why is XML Important to IT?

**Application Data Interchange**

- Is an Industry Standard: 10%
- Adds Structure to Business Communication: 20%
- Neutral Data Encoding: 30%
- Wide Tools Support: 40%
- Text-Based Encoding: 50%

Cap Ventures Study of 249 Companies

Application Data is Full of Rich Information Links
External “Clients” Expect Logical Views of the Data

XML is Great for Logical Views
Relational Databases Excel at Fast, Layered Logical Views

Object/Relational Databases Go a Major Step Farther
So is XML a New *Kind* of Data?

- Not Really…
- It’s a Internet Standard for…
  - Exchanging Business Critical Information with More Parties More Easily
  - Encoding Meaningful Structure into Semi-Structured Information like Documents
- Equally Powerful for Documents/Data

Documents & Data Converging in These Business Applications

- **Online Bookstore**
  - Author, Title, Price, In Stock?
  - Excerpts, Criticism, Reader Reviews
- **Online Universities**
  - Students, Courses, Exams, Grades
  - Course Materials (Text, Video, Audio)
- **Online Customer Service**
  - Claim Payment Information
  - Adjuster Damage Reports
Consider a Data Warehouse of Insurance Claims

Structured Data

```
<InsuranceClaim>
  <ClaimID>10023</ClaimID>
  <LossCategory>7</LossCategory>
  <Settlements>
    <Payment>
      <Payee>Jim Borden</Payee>
      <Date>12-OCT-1998</Date>
      <Amount>200000</Amount>
      <Approver>JCOX</Approver>
    </Payment>
  </Settlements>
</InsuranceClaim>
```

Document Fragments

```
<DamageReport>
  A massive <Cause>Fire</Cause> ravaged the building and <Casualties>12</Casualties> people were killed. Early FBI reports indicate that <Motive>arson</Motive> is suspected.
</DamageReport>
```

XML Document Fragment Searching

```
SELECT SUM(Amount)
FROM claim_header ch, claim_settlements cs, claim_settlement_payments csp
WHERE csp.Approver = 'JCOX'
AND CONTAINS(DamageReport,'Arson WITHIN Motive') > 0
AND CONTAINS(DamageReport,'Fire WITHIN Cause') > 0
AND ... /* Join Clauses */
```

```
<DamageReport>
  A massive <Cause>Fire</Cause> ravaged the building and <Casualties>12</Casualties> people were killed. Early FBI reports indicate that <Motive>arson</Motive> is suspected.
</DamageReport>
```
Serving XML Data Over the Web is Easy with XSQL Servlet

• Dynamic XML Documents Made Easy
  - Given a "Page Full 'o Queries", Make XML

• Declarative, Template-Based Approach
  - Just add <xsql:query> Tags to Your XML Template

• Transform Resulting XML Document
  - Using XSLT in the Server or in the Client

• Post XML for Insertion into the Database
  - Automates Use of Transformation & XML SQL Utility

XSQL Servlet Example Query for Arriving Flights

SELECT Carrier, FlightNumber, Origin,
  TO_CHAR(ExpectedTime,'HH24:MI') Due
FROM FlightSchedule
WHERE Arrived = 'N'
ORDER BY ExpectedTime
XSQL Servlet Example
Wrap with <xsql:query> Tag

<?xml version="1.0"?>
<xsql:query connection="demo" xmlns:xsql="urn:oracle-xsql">
  SELECT Carrier, FlightNumber, Origin,
  TO_CHAR(ExpectedTime,'HH24:MI') Due
  FROM FlightSchedule
  WHERE Arrived = 'N'
  ORDER BY ExpectedTime
</xsql:query>

XSQL Servlet Example
Add a Stylesheet

<?xml version="1.0"?>
<?xml-stylesheet href="LateFlights.xsl"?>
<xsql:query connection="demo" xmlns:xsql="urn:oracle-xsql">
  SELECT Carrier, FlightNumber, Origin,
  TO_CHAR(ExpectedTime,'HH24:MI') Due
  FROM FlightSchedule
  WHERE Arrived = 'N'
  ORDER BY ExpectedTime
</xsql:query>
XSQL Servlet Demos on OTN

Oracle8i Platform for XML

EJB
Java Orb

Oracle8i Java VM

JDBC Driver

SQL

XML / XSL

http/Servlets

http://technet.oracle.com/tech/xml

Your Custom Java Code

Java & PLSQL Stored Procs

Your Data

SQL

XML Search

NT Linux Unix Mainframes
Loading Java into Oracle 8i

• Your Favorite XML Code Just Works
  – Q: Why Bother?
  – A: Data Access for Java in 8i is Extremely Fast and Efficient.

• Examples (Alphabetical Order) ?
  – % loadjava -u scott/tiger xalan.jar
  – % loadjava -u scott/tiger xmlparserv2.jar
  – % loadjava -u scott/tiger xt.jar

Oracle XDK – XML Developer’s Kit

• Oracle XML Components
  – XML Parser for Java
  – XSLT Transformation Engine (Integrated w/ Parser)
  – XML Parser for C/C++
  – XML Parser for PL/SQL
  – XML Class Generator for Java and C/C++
  – XML Transviewer Beans

• Libraries and Command-line Versions
• Free Commercial Re-distribution License
• Official Support Program
• Available for Download on OTN
  – http://technet.oracle.com/tech/xml
Oracle XML Parser for Java

- Runs in the Database or any JVM
  - Validating/Non-validating with DTD caching
  - Full International Character Set Support and Internationalized Error Messages
  - Integrated DOM, XPath and XSLT Implementation
  - Fast UTF-8 IO & Performance-optimized Architecture
  - DOM and SAX API Support

- Available Everywhere Oracle Is
  - Integral Part of the Oracle 8i Platform
  - From NT & Linux to Parallel Mainframes

- Used by All of Oracle’s Own Dev Teams
  - C, C++, and PL/SQL Versions Available, too
JDev 3.0: Debug XML Servlets

Adding Java Libraries for XML Parser 2.0 and XML SQL Util
Business Components for Java
Java/XML App Framework

HTML, Java, and XML Interfaces

Task-Based App Service

Data Presentation & Manipulation

Business Logic

Application

View

Entity

Customer

Bill

Payment

XML

Payment Plan Mgmt

SlowPaying Customers

Late Payments

Summary

• Object/Relational Databases Like Oracle8i
  - Easily Mix Structured and Unstructured Data
  - Do XML with "Amazon"-like Reliability & Scalability
  - Do XML Without Changing Existing Tools & Apps
  - Form the Hub, with Oracle Integration Server, of Loosely-Coupled, Reliable, XML-Based Messaging

• Non-Programmers Can Leverage
  - XML Object Views
  - Oracle XSQL Pages
  - Intermedia Text XML Searching

• Programmers Can Leverage
  - Oracle XML Developers Kit
  - XML SQL Utility
  - JDeveloper 3.0 & Business Components for Java
Q & A

Is it time for Wine and Cheese yet??

TCOUG

January 20, 2000
What wrong with SGML?

- Difficult to learn
  - SGML spec =~ 300-400 pages
  - XML spec =~ 28 pages
- Processing of SGML documents is computationally demanding
- Unnecessarily complex for most applications
- SGML tools are expensive

What wrong with HTML?

- No usable, application-specific document structure
- New functionality has been added by new, proprietary markup tags
- Newer HTML features are limited by absence of structure
XML Document Syntax Rules

- Must start with XML declaration
- Non-empty tags must match and nest properly
- Empty tags must end with `/>`
- Only one root element
- Tag and attribute names are case-sensitive
- Attribute values must be quoted

```xml
<?xml version="1.0"?>
<person>
  <name>Jane Smith</name>
  <address>
    <street>100 Main St.</street>
    <city>Sometown</city>
    <state>California</state>
    <country>United States</country>
    <zipCode fiveDigit="95070" extension="5445"/>
  </address>
</person>
```