J2EE™ Development with NetBeans

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Sun microsystems

Agenda

- Overview of J2EE technologies
- Sun J2EE software
- Prague Engineering Center
- Overview of NetBeans
- NetBeans 4.0: Web Tier support
- NetBeans 4.1: Enterprise JavaBeans™ and Web Services
- Future directions of J2EE

J2EE Overview

- Platform for developing and deploying complex enterprise applications
- One of two most successful platforms
- Developed in Java Community Process (JCP)
  - 1.4 is the current version, 5.0 (1.5) in progress
  - Specification, Reference Implementation, Technology Compatibility Kit (TCK)
- Implemented by multiple vendors
  - Sun, BEA, Oracle, IBM, Apache, JBoss, …

J2EE Technologies

- Major technologies
  - Servlets
  - JavaServer Pages™
  - Enterprise JavaBeans™
  - Web Services, JAX-*
  - JDBC
  - JNDI
  - JMS
  - JavaMail
  - …

Related technologies and products

- JavaServer Faces (JSF)
- JavaServer Pages Standard Tag Library (JSTL)
- Portlets
- Naming and directory management, LDAP
- Identity management, Liberty alliance
- ...

Additional aspects of J2EE

- Multiple types of clients
- Transactions
- Security, authentication, authorization
- Data persistence
- Distribution
- Integration with existing systems
- Internationalization and localization
- Clustering, scalability, high availability

Challenges of J2EE development

- Learning many different technologies
- Use of multiple languages (Java, JSP, XML, SQL, EJB-QL, ...)
- Teamwork
- Many aspects of development
- Performance, making it efficient
- "One size does not fit all"

Making J2EE development easier

- Sample code
- Tutorials
- Reference architectures
- Frameworks
- Books
- Simplify core specifications
- **<u>Tools</u>**

Sun Java Enterprise System

- Integrated set of products
  - Application Server
  - Web Server
  - Naming and Directory Server
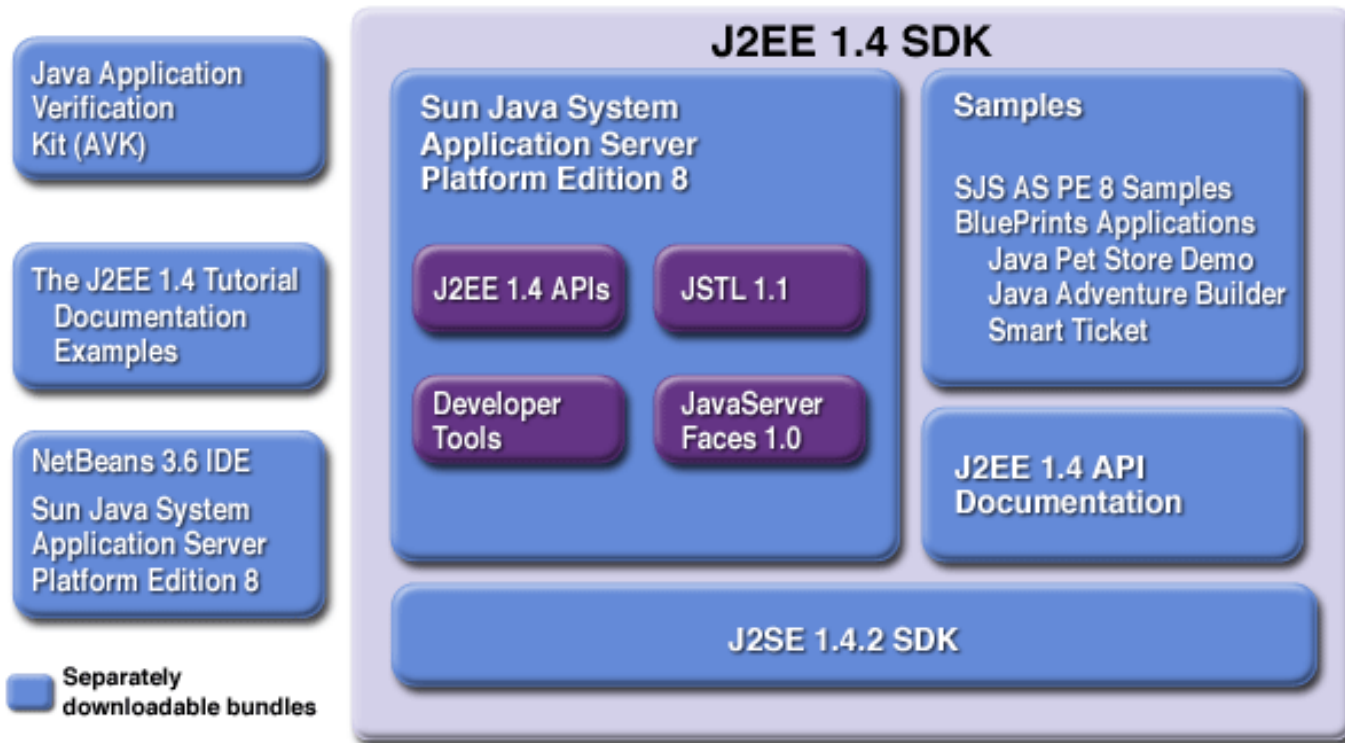 - Portal Server
  - Identity Server
  - ...

Sun Java System Application Server

- Several editions
  - Platform Edition

  - Standard Edition
  - Enterprise Edition
- Latest version is 8.0 (Platform Edition)
  - Supports J2EE 1.4
  - 8.1 under development, beta is released

J2EE Developer Resources

![Sun Microsystems logo]

J2EE 1.4 Software Bundles

J2EE 1.4 SDK

Java Application Verification Kit (AVK)

The J2EE 1.4 Tutorial
Documentation Examples

NetBeans 3.6 IDE
Sun Java System Application Server Platform Edition 8

Sun Java System Application Server Platform Edition 8
- J2EE 1.4 APIs
- JSTL 1.1
- Developer Tools
- JavaServer Faces 1.0

Samples
SJS AS PE 8 Samples
BluePrints Applications
- Java Pet Store Demo
- Java Adventure Builder
- Smart Ticket

J2EE 1.4 API Documentation

J2SE 1.4.2 SDK

Separately downloadable bundles

Sun Java Developer Tools

- ## NetBeans
  - FREE
  - Supports J2SE, J2EE web tier
  - Will support full J2EE soon
  - Integrated with SJS **Application Server Platform Edition**

- ## Sun Java Studio Creator
  - Visual development of web applications
  - Natively supports JavaServer Faces
  - Affordable: only 100$/year/developer, free evaluation
  - Built on NetBeans

Sun Java Developer Tools (cont'd)

- Sun Java Studio Enterprise
  - High end tool
  - Supports UML, team collaboration features
  - Integrated with Sun **Java Enterprise System**
  - Built on NetBeans
- NetBeans Mobility Pack
  - J2ME (MIDP) development
  - Will support J2ME web services (JSR 172)

Prague Engineering Center

- Several engineering teams
  - NetBeans
  - NetBeans Mobility
  - Java Enterprise System
  - Globalization
- University relations
- Prague will GROW
  - Expand existing teams
  - New teams in Prague

NetBeans

- FREE Java development tool
- Open source project
- Supports J2SE, J2ME and J2EE
- Community contributes bug reports, fixes, new modules, requests new features

NetBeans 4.0

- Landmark release
  - New Project system based on Apache Ant
  - Support for Java refactoring
  - Supports J2SE 5.0 release (Tiger)
- Other new features
  - Improved UI (window system)
  - Performance enhancements, UI responsiveness

Web Development with NetBeans 4.0

- Web Application project type
- Supports J2EE 1.3 and 1.4
- Integrates with the bundled Tomcat 5 server
- Integrates with SJS Application Server 8, Platform Edition (separate download)
- All stages of the development cycle
  - Create, Edit, Build, Deploy, Debug

Web Development – Create

- Create projects
  - Web Application project from scratch
  - Web Application project with existing sources
  - Web Application project with existing Ant script
- Create components
  - JSP pages, HTML pages, servlets, tag files, tag libraries, filters, listeners, ...
  - Manage deployment descriptor automatically
- Includes JSP Standard Tag Library (JSTL)

Web Development – Edit

- JSP Editor
  - Coloring of HTML, JSP, Java and Expression Language elements
  - Context-sensitive code completion
  - Help for JSP syntax
  - Formatting, tag matching, "smart case", …
  - Similar features also for Tag Files
- Java editor aware of J2EE APIs
- Code completion for deployment descriptors

Web Development – Build

- Build is completely driven by Ant
- Ant script automatically maintained by the Project system
- Respects common conventions
  - "build" and "dist" directories
  - Jakarta and Java BluePrints source structures
- Compile JSPs to discover coding errors

Web Development – Deploy

- Tomcat 5 included with NetBeans
- One-click deployment
- Fast iterative redeployment
- View server logs

Web Development – Debug

- Automatically start server in debug mode
- Step through Java **and JSP** code
- Evaluate expressions (as tooltips)
- HTTP monitor
  - Records all HTTP transactions between the browser and the server
  - Displays HTTP parameters, cookies, session data, HTTP headers, browser and server info, ...
  - Allows *replay* ▷ *ing* transactions recorded previously

Demo – NetBeans 4.0

NetBeans 4.1

- Complete J2EE development support
  - Enterprise JavaBeans™
  - Web Services
- Will support J2EE 1.4
- Will integrate with SJS Application Server 8.1, Platform Edition

From the
Computer History
Museum
in Santa Clara,
California

NetBeans 4.1 Goals

- Make it easier to develop J2EE applications
- Make experienced developers more productive
- Help beginners learn J2EE development
- Do not require in-depth knowledge of all details of J2EE
- Help by providing ent-to-end support, integrated experience
- Out Of Box Experience (OOBE)

J2EE in NetBeans 4.1 – basic features

- New Project types
    - EJB Module project
    - J2EE Application project
    - Web Services developed in Web project or EJB Module project
- Wizards for J2EE components

Enterprise JavaBeans™ Development

- Create EJBs
  - Entity Bean, CMP Entity Beans using an existing database, Session Bean, Message Driven Bean
- Automatically manage depl. descriptors
- High level operations (add business method)
- Visual deployment descriptor editor
- "Call EJB" action

Web Services Development

- Create Web service operations
  - From scratch
  - From an existing Java class
  - From an existing WSDL file
- Automatically manage all configuration files
- Supports common web service standards
  - SOAP, WSDL, JAX-RPC, JSR 109, ...

More J2EE features

- Verification of J2EE applications
- Manage and edit server-specific deployment descriptors
- Refactoring integrated with J2EE
- Java BluePrints solution catalog
- Sample J2EE projects

NetBeans 4.1 Schedule

- Early Access 1 was released in October 2004
- Early Access 2 in January 2005
- Beta in Q1 CY2005
- Final version in 1st half of 2005

Demo – NetBeans 4.1

The Future of J2EE

- J2EE 5.0 (1.5) will be the next major release
- Extensive use of annotations (JSR 175, introduced in J2SE 5.0)
- Enhancements in
  - CMP beans
  - New Web Services standards
  - Align JSP and JSF
  - …

Enterprise JavaBeans™ in J2EE 5.0

- EJB 3.0 (JSR 220) – early draft released
- Annotations

  ```
  @Stateful public class CartBean implements ShoppingCart {
  ```

  - Annotations replace deployment descriptors
  - EJBs are Plain Old Java Objects (POJO)
- EJB QL enhancements
- Enhanced Object-Relational mapping
- New APIs for entity beans
  - javax.ejb.EntityManager, javax.ejb.Query

Web Services in J2EE 5.0

- JAX-RPC 2.0
  - Improved binding of Java data types to XML
  - Built on top of JAXB 2.0
- JAXB 2.0 (Java API for XML Binding)
- Fast Web Services
  - Use of binary encoding of SOAP messages
- Annotations for Web Services (JSR 181)
- Web Services Security, digital signatures, ...

Web tier technologies in J2EE 5.0

- Align JSP and JSF
  - JSP 2.1 and JSF 1.2
  - Align expression languages

    ```
    ${JSP Expression}
    #{JSF Expression}
    ```

  - Use managed beans in JSP

Links

- http://java.sun.com/j2ee/index.jsp
  - J2EE main page, downloads of J2EE SDK (aka SJS Application Server 8.0 PE), samples, API docs, J2EE Blueprints, ...
- NetBeans community mailing lists

  www.netbeans.org - NetBeans

  nbusers@netbeans.org – general user questions

  nbj2ee@netbeans.org – questions about J2EE devt.
- Prague Engineering Center

  www.sun.cz

Q & A

J2EE™ Development with NetBeans

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Backup slides

J2SE™ 5.0 "Tiger"

There's lots of great stuff in Tiger

JMX BigDecimal updates z-ordering jstat jps

RMI dynamic proxies **Generics** Gnome Skins

JDBC Rowsets Autoboxing extended for loop

faster startup jconsole printf JVM sharing

synth L&F SAX 2.0 **Concurrency utilities**

Unicode Surrogates importing constants OpenGL

IP reachability Ocean L&F SASL performance XAWT

unsynchronized StringBuffer improved cookie support

XML Schema apt DOM 3 JVM Monitoring

fatal error handlers

Stack trace API Remote JMX improved footprint

varargs swing printing AMD64 Enumerated types

XDnD Packed JARs metadata OCSP

scanning New Memory Model

JVMPI Profiling

performance ergonomics **And lots more...**