Tool Support for Developing Scalable J2EE Web Service Architectures

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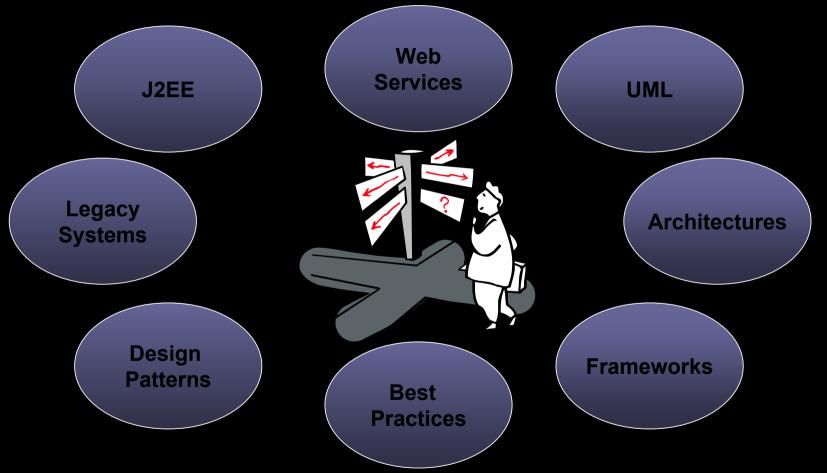
Application Development Tools
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Confused?

Compare with:
 Elevator Sign in Hyatt Burlingame:

In the event of a malfunction :

1. Do not become alarmed
2. Press the red button marked "alarm"

Why web services?

- Enabling Virtual Organizations
  - Eliminating the "stove pipe syndrone" within a company
    - E.g. telecoms company with .Net and J2EE focused divisions (based on pre-takeover culture)
  - Cross company collaborative business processes
    - E.g. doing what Dell does, without dictating implementation
- Ubiquitous Enterprise Application Integration
  - "Cheap and cheerful", not heavyweight
  - Utilize the internet for inter-connection
  - No more "screen scraping"

Start from Scratch?

- Web Service development does *not* require
  - A "whole new way of developing"
  - A "whole new architectural paradigm"
  - A "whole new component model"
- Web Services are simply a different way of exposing an *interface* to existing architectures
  - "WSDL is the IDL for the internet"
  - As with IDL, care must be taken to design the right interfaces
  - A reusable architecture is a prerequisite

End-to-end J2EE Application Architecture

- Component Standards
  - Container provides standardized run-time, e.g. EJB, Servlets
- Design Patterns
  - Solve common design issues & provide common vocabulary
  - E.g. Session Façade, Value Object, Paged Lists
- Development Frameworks
  - Optimize interaction between multiple patterns
  - Focused on client, web, server, or database tier
  - E.g. Struts, Oracle BC4J
- Application Architecture
  - Combine frameworks to form end-to-end application architecture
  - Typically *Model-View-Controller* architecture in J2EE context
  - E.g. JSP + Struts + BC4J + JDBC
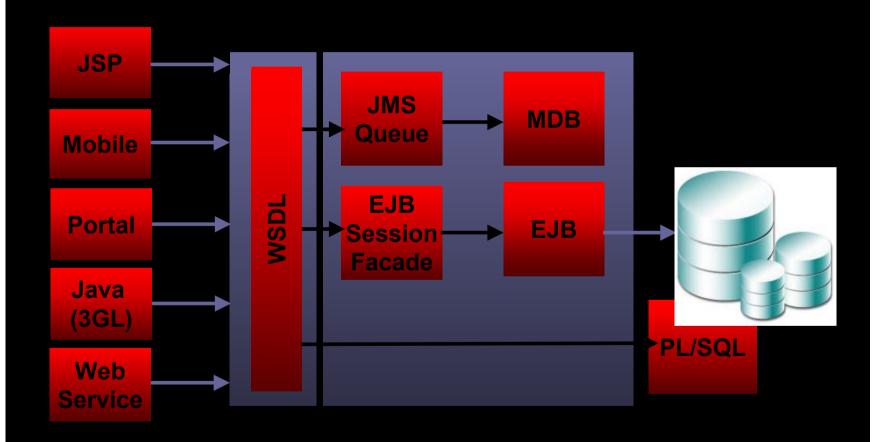 - Reuse the Model (e.g. Mobile + WS + BC4J + JDBC)
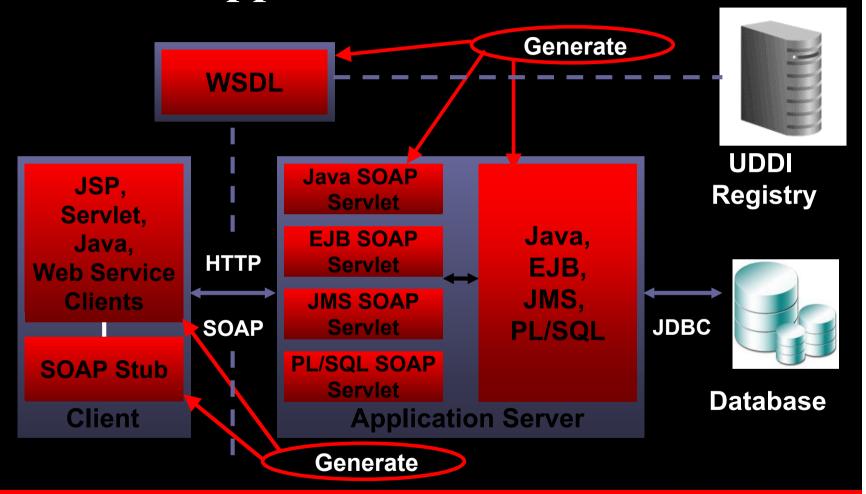
Scalability of WS Interfaces

- Performance of the protocol
  - SOAP versus RMI
- Binding between systems
  - Enterprise systems can't wait for each other
    - Asynchronous client
    - Asynchronous transport
    - Asynchronous server
- Granularity of requests
  - Batch up records
  - Batch up changes

Expose Coarse Grain Services
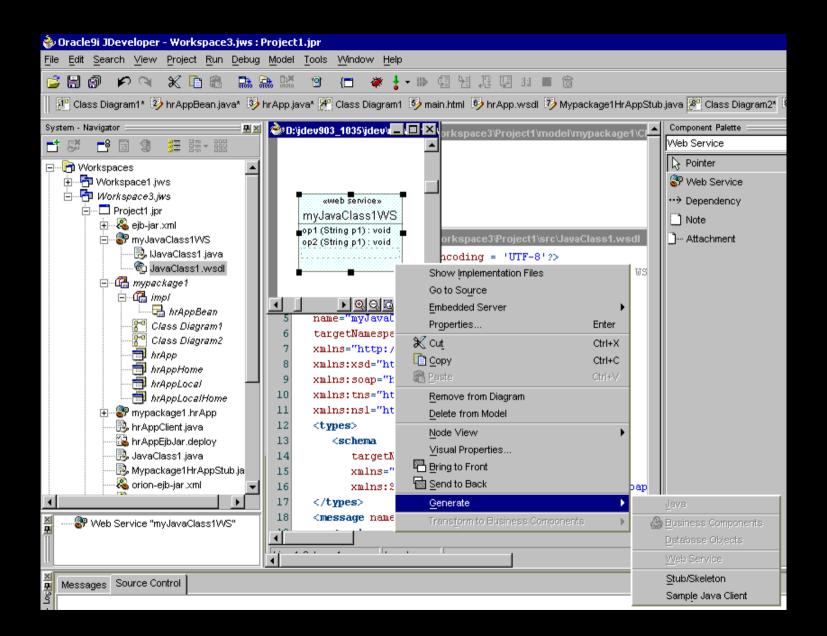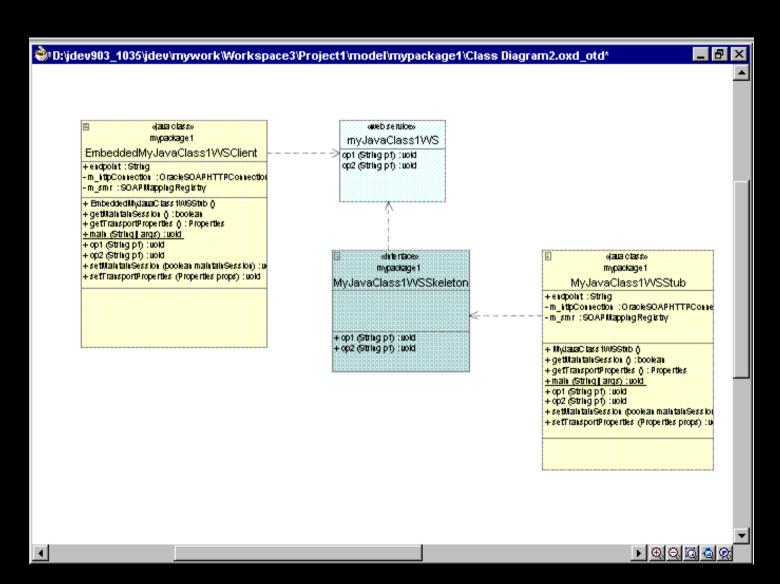
Tool Support for J2EE WS

Contract Driven Development

- Define UML web service PIM (service and operations)
- Select implementation target and generate PSM and Artifacts
    - WSDL
    - Client stub
    - (Sample) Client skeleton
    - Server stub
    - Server implementation skeleton
- Add client and server method implementations in framework context

«java class»
mypackage1
EmbeddedMyJavaClass1WSClient

+ endpoint : String
- m_httpConnection : OracleSOAPHTTPConnection
- m_smr : SOAPMappingRegistry

+ EmbeddedMyJavaClass1WSStub ()
+ getMaintainSession () : boolean
+ getTransportProperties () : Properties
+ main (String[] args) : void
+ op1 (String p1) : void
+ op2 (String p1) : void
+ setMaintainSession (boolean maintainSession) : v
+ setTransportProperties (Properties props) : void

«web service»
myJavaClass1WS

op1 (String p1) : void
op2 (String p1) : void

«interface»
mypackage1
MyJavaClass1WSSkeleton

+ op1 (String p1) : void
+ op2 (String p1) : void

«java class»
mypackage1
MyJavaClass1WSStub

+ endpoint : String
- m_httpConnection : OracleSOAPHTTPConne
- m_smr : SOAPMappingRegistry

+ MyJavaClass1WSStub ()
+ getMaintainSession () : boolean
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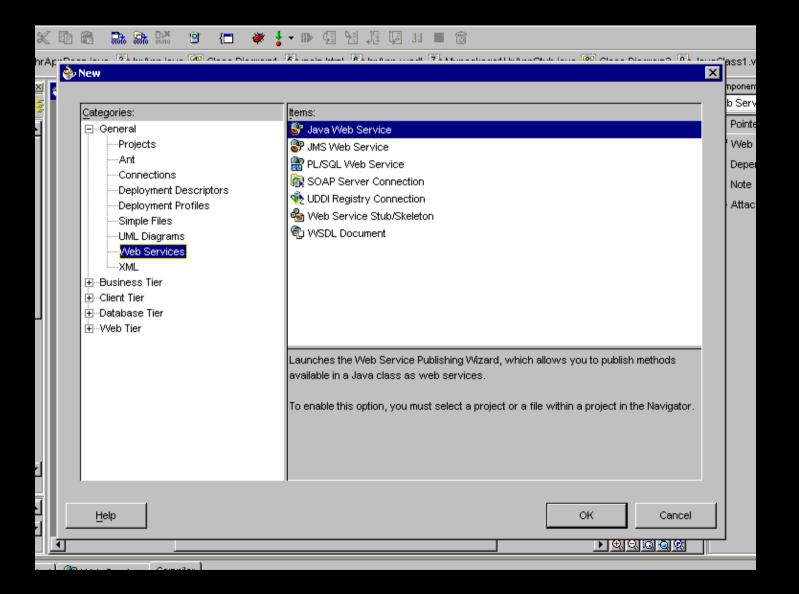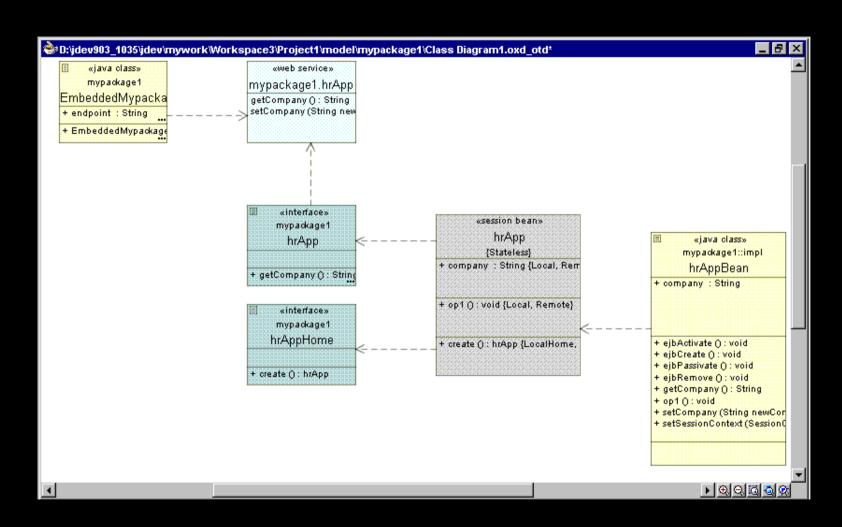+ setTransportProperties (Properties props) : v

Implementation Driven Development

- Reverse Engineer UML web service PIM, by selecting methods to be exposed from existing (framework or legacy) implementation

- Tool generation of PSM and Artifacts
  - WSDL
  - Client stub
  - (Sample) Client skeleton
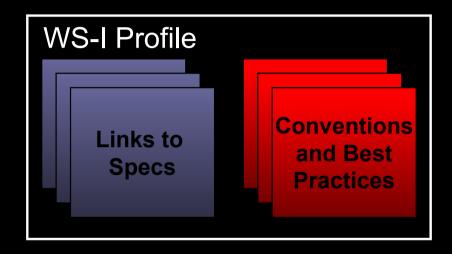 - Server stub

- Refine client implementation

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«java class»
mypackage1
EmbeddedMypacka
+ endpoint : String   ...
+ EmbeddedMypackage
                    ...

«web service»
mypackage1.hrApp
getCompany () : String
setCompany (String new

«interface»
mypackage1
hrApp
+ getCompany () : String
                    ...

«interface»
mypackage1
hrAppHome
+ create () : hrApp

«session bean»
hrApp
{Stateless}
+ company : String {Local, Rem
+ op1 () : void {Local, Remote}
+ create () : hrApp {LocalHome,

«java class»
mypackage1::impl
hrAppBean
+ company : String
+ ejbActivate () : void
+ ejbCreate () : void
+ ejbPassivate () : void
+ ejbRemove () : void
+ getCompany () : String
+ op1 () : void
+ setCompany (String newCor
+ setSessionContext (SessionC

Standards are essential

- JAX-RPC, JSR-109

- Interoperability : WS-I

  - Profiles
  - Best practices
  - Monitoring, Logging, Analyzing tools

- Customer quote:

  "there are standards, and there are standards"

  - Royalty-free versus licensing required?
  - Centralized control versus community process?
  - Overlapping content versus complementary?
  - Historical competence versus competitive body?

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http://otn.oracle.com/products/

- Full functionality software
- License fee payable on deployment of commercial application
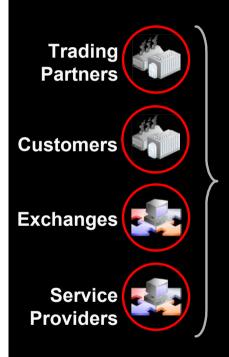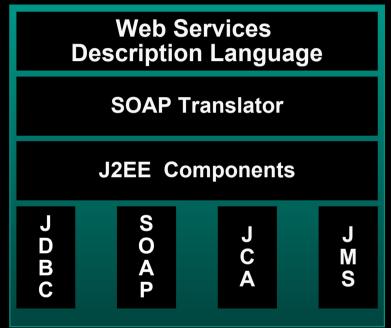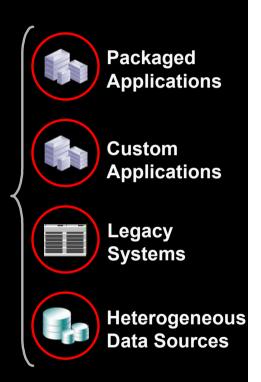- Many "How-To's" and Examples available

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QUESTIONS
ANSWERS

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Oracle9*i*AS: Application Server

	Web Services Description Language	
Trading Partners	**SOAP Translator**	**Packaged Applications**
Customers	**J2EE Components**	**Custom Applications**
Exchanges	**J D B C** **S O A P** **J C A** **J M S**	**Legacy Systems**
Service Providers		**Heterogeneous Data Sources**

Oracle9*i*AS Application Server

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Oracle9*i* JDeveloper: Building Web services

- Built on standards
  - SOAP, WSDL, UDDI
  - Java XML Pack
  - Apache SOAP
- Complete lifecycle
  - Model, build, deploy, debug, profile
- Integrated
  - Publish J2EE components
  - Publish DB stored procedures
  - Consume external services
- UDDI lookup and discovery

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- Web Service Publishing
- WSDL Generation
- UDDI Lookup
- SOAP Client & Server Generation
- J2EE Component Development
- J2EE Component Deployment

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