



Oracle Rdb and Oracle 9iAS Web Services

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Agenda

- Introduction to Oracle9iAS Web Services
- Converging of Standards
- Where Rdb sits in the scheme of things

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Introduction to **Oracle9iAS Web Services**

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e-Businesses moving to **Collaborative e-Business**

Businesses have become e-Businesses
e-Businesses Collaborate using the Internet
Collaboration opens New Business Opportunities
Collaboration needs App-to-App Communication

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e-Business Applications must Communicate with other Applications

**Programming Language-Independent
Component Model-Independent
Location-Independent
Web Services enable App-to-App Communication**

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**Web Services
new paradigm of conducting ebusiness
service oriented architecture
open XML standards**

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Web Services are **Business Applications** or **Business Processes** that ...

Expose and Describe Themselves
Allow Client Applications to Locate Them on Internet
Can Be Invoked and Respond over Standard Protocol

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Web Services classified as
Simple Web Services
Complex Web Services

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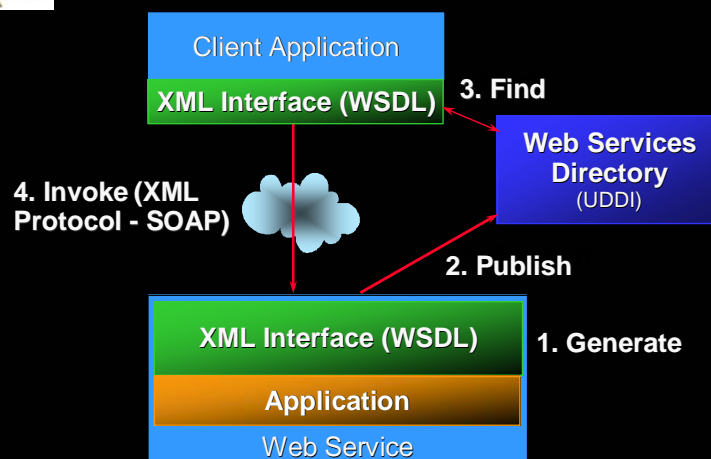
Simple Web Services are Applications that Communicate ...

Point-to-Point, Request-Response, Tightly Coupled
Applications Expose XML Interfaces (WSDL)
WSDL Interfaces Published to Registry (UDDI)
Clients look up UDDI and Invoke over XML Protocol (SOAP)

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The Web Services Model



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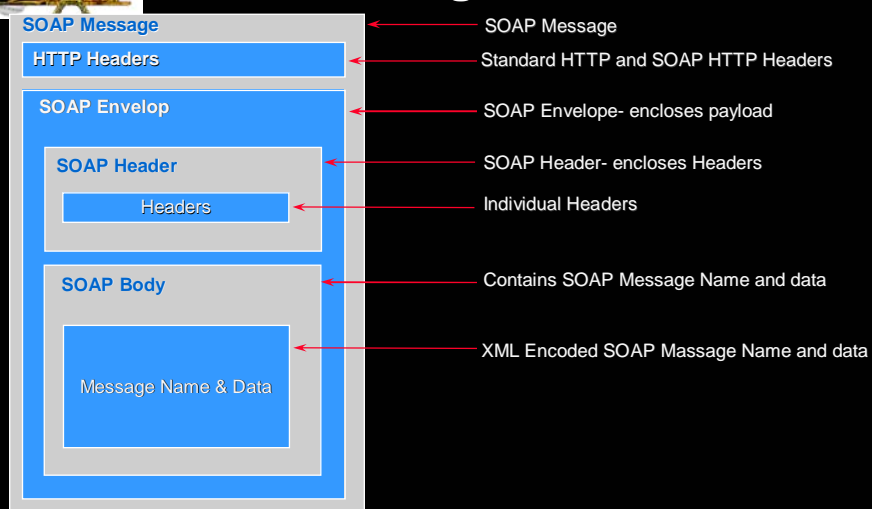
SOAP -Simple Object Access Protocol

- Uses HTTP(S) and other protocols as transport layer
- Introduces Self-describing data representation format in XML
- Represent request and response as XML messages
- Supports both RPC style and Messaging style invocation
- Works through firewalls – no need for special sockets

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SOAP Message - Overview



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SOAP Example

```
<SOAP-ENV:Envelope>
  <SOAP-ENV:Body>
    <GetStockQuote
      xmlns="urn:stock-quotes" >
      <StockSymbol>ORCL</StockSymbol>
    </GetStockQuote>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

Request

```
<SOAP-ENV:Envelope>
  <SOAP-ENV:Body>
    <GetStockQuoteResponse
      xmlns="urn:stock-quotes" >
      <USD_Price>45.25</USD_Price>
    </m:GetStockQuoteResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

Response

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WSDL -Web Services Definition Language

- A description language to define Web service interfaces and how to invoke them.
- Allows both the messages and the operations on the messages to be defined abstractly in XML.
- A WSDL schema includes:
 - Service
 - Types
 - Message
 - Operation
 - Port Type
 - Binding
 - Port

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UDDI Registry- Universal Description, Discovery and Integration

- standards based specification for service description and discovery
- Programmatic descriptions of businesses and services they support
- Publishing APIs
- Inquiry APIs

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UDDI registry

White Pages

- Directory of names
- Provider info
- Contact Info

Yellow Pages

- Directory of Domains
- Specific Search using Context such as location,service type
- point to White pages

Green Pages

- Directory of Business Info
- Information About Business Model
- Technical details of provided Service
- Information Business Process

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Complex Web Services are Applications that Communicate ...

Multi-Party **Not** Point-to-Point
Multi-Step Conversations **Not** Request-Response
Loosely Coupled **Not** Tightly Coupled
Based on ebXML, RosettaNet Standards

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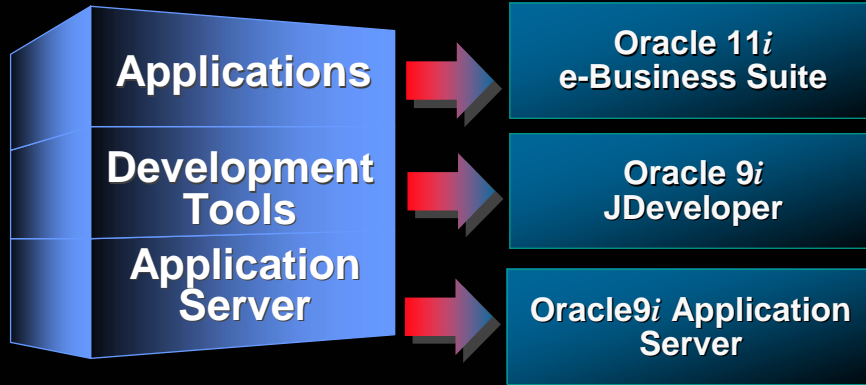


Oracle9iAS Web Services

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Oracle Web Services Strategy



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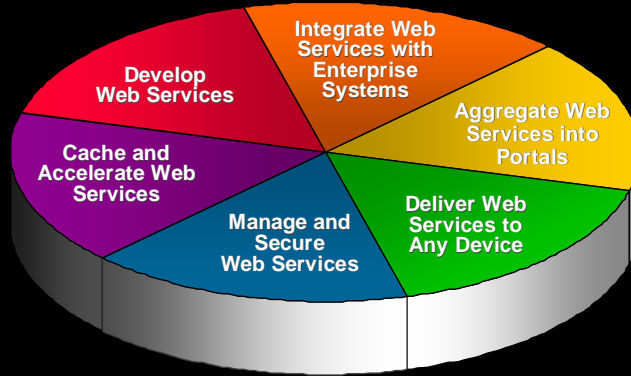


Oracle 9i
APPLICATION SERVER

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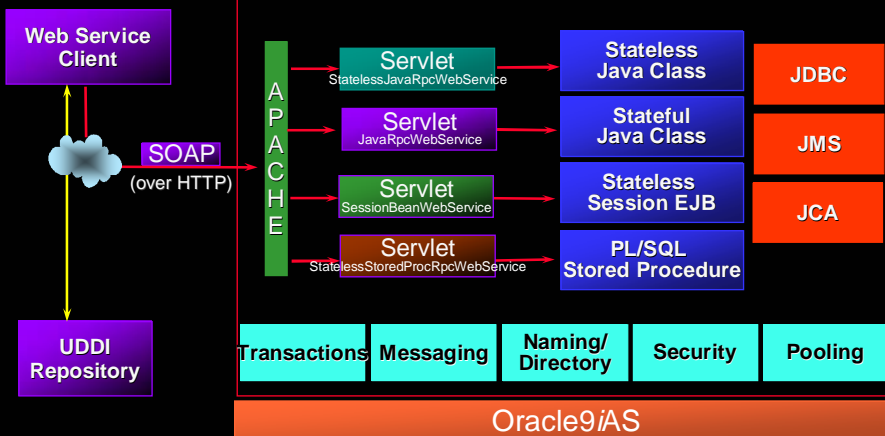
Oracle9i App Server Web Services



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Oracle9iAS Web Services Architecture



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Develop Web Services in Oracle9iAS

Make Stateless/Stateful Java, Stateless Session Beans
and PL/SQL stored proc into Web Service
Publish Servlet Entry for Each Web Service
Auto-Generate standards compliant WSDL
Package and Deploy as.EAR Files

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Building a Web Service in Oracle9iAS

- Implement your service
 - Stateful or stateless Java class, stateless PL/SQL stored proc, or stateless session bean
- Assemble web service archive as EAR file
 - Specify the web services servlet
 - For stateless Java classes, StatelessJavaRpcWebService
 - For stateful Java classes, JavaRpcWebService
 - For stateless session EJBs, SessionBeanWebService
 - For stateless PL/SQL, StatelessStoredProcRpcWebService
 - Identify datasource for PL/SQL service
 - Identify EJB ref for EJB-based service
 - Bind to URL
- Deploy to Oracle9iAS

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Example Stateless Service in EAR

```
<servlet>
  <servlet-name>Stateless Java Web Service</servlet-name>
  <servlet-class>oracle.j2ee.ws.StatelessJavaRpcWebService</servlet-class>
  <init-param>
    <param-name>class-name</param-name>
    <param-value>myJavaClass.class</param-value>
  </init-param>
  <init-param>
    <param-name>interface-name</param-name>
    <param-value>myJavaInterface.class</param-value>
  </init-param>
</servlet>
...
<servlet-mapping>
  <servlet-name>Stateless Java Web Service</servlet-name>
  <url-pattern>/StatelessTest</url-pattern>
</servlet-mapping>
```

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Web Services Assembly Tool

- Command line tool
- XML-based input file specifying...
 - Type of web service to be exposed
 - Location of the web service implementation
 - URI for the service
- Output is a web services archive -- EAR file

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Example Assembly Tool Input config.xml

```
<web-service>
  <display-name>Web Services Example</display-name>
  <description>Stateless Pure Java Web Service Example</description>
  <destination-path>/tmp/example1/JavaStatelessExample.ear</destination-path>
  <temporary-directory>/tmp/example1</temporary-directory>
  <context>/ws_example1</context>
  <stateless-java-service>
    <interface-name>ws.example.StatelessExample</interface-name>
    <class-name>ws.example.StatelessExampleImpl</class-name>
    <uri>/statelessTest</uri>
    <java-resource>/tmp/example1/classes</java-resource>
  </stateless-java-service>
</web-service>
```

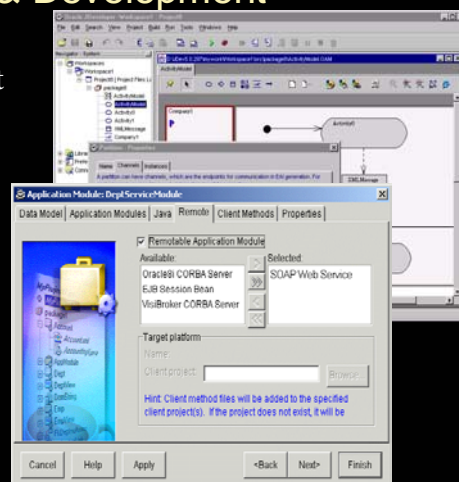
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Web Service Development

JDeveloper Web Services Tools Speed Design & Development

- Single IDE for J2EE and Web Service Development
 - Search UDDI registry
 - Bind to web services
 - Publish web services
- Service Creation Tools
 - Java->WSDL
 - PL/SQL->WSDL
- SOAP Proxy Generation
- HTML/XML Stream Processing Wizard



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Consume Web Services in J2EE

Consume Web services through static Proxy Stubs,
auto-generated EJBs,
Consume XML/HTML Streams as EJBs
Invoke Web Services through Dynamic Proxy

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Building Web Services Client in Oracle9iAS

- Static Binding
 - Get proxy jar, in previous example...
 - <http://host:port/StatelessTest?proxy.jar>
 - Jar contains proxy class that communicates via SOAP to the server
 - Knows exactly where the service is located without looking it up in the UDDI registry
 - Provides proxy methods for each method exposed as a part of the service
 - Does all the work to construct the SOAP request, marshal and unmarshal parameters, etc.
 - Write client code to use the proxy

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Proxy Jar -- Stateless

```
public class StatelessExampleProxy {
    public StatelessExampleProxy {
        m_httpConnection = new OracleSOAPHTTPConnection();
        setMaintainSession(maintainSession);
    }

    public java.lang.String helloWorld(java.lang.String param0)
    {
        ...
    }
    ...
    private String m_serviceID = "urn:StatelessExample";
    private String m_soapURL =
        "http://myhost.myport/ws_example1/StatelessTest";
    private OracleSOAPHTTPConnection m_httpConnection = null;
}
```

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Client Code Using the Proxy

```
public class WsExample1Static
{
    public static void main(String[] argv) throws Exception
    {
        StatelessExampleProxy proxy =
            new StatelessExampleProxy();
        System.out.println(proxy.helloWorld("Scott"));
    }
}
```

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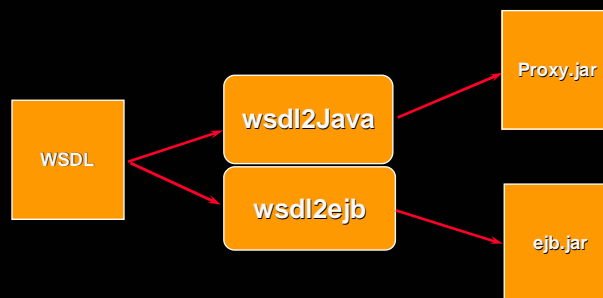
HTML/XML Stream Support

- Input
 - Wizard to use standard HTML/XML content
 - Static URL
 - Submit HTML form, its action URL, and its parameters
 - Supply URL of HTML page containing form to be submitted
- Response
 - Service response is the original stream
 - XML tree node defines XML Element as the response
 - Response is transformation of XML tree node
- EAR is generated
 - Contains EJB with methods that access web content and return proper response

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Consuming external Web Services



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Oracle9iAS UDDI registry

Register Businesses and Web Services
Deploy as private or public registry
interoperability with private or public registries
Security and access control

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UDDI Support

- White, yellow, green pages
- Inquiry API for Java programmers
 - Search, locate, drill-down
- Publish web services at deployment time
 - Via Enterprise Manager support
 - Categorize using standard taxonomies
- Browse UDDI repository
 - Or any UDDI browser can be used

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Oracle Enterprise Manager Administration

- Browse and register services with UDDI Service Registry
- Publish WSDL interfaces as WAR/EAR to J2EE container



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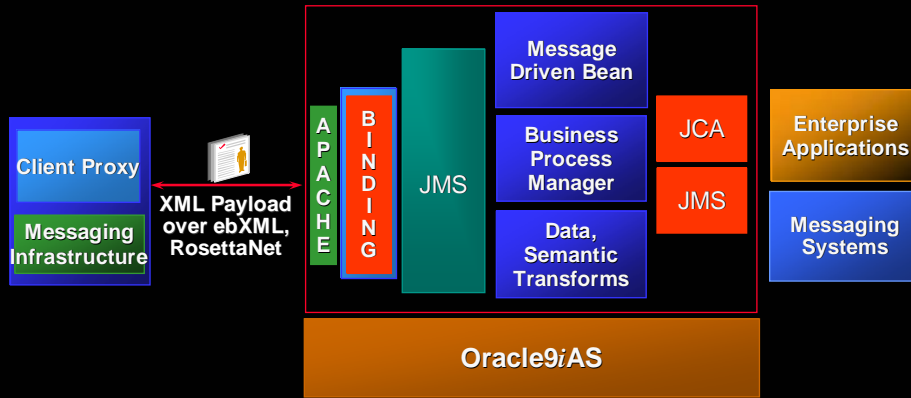
Integrate Web Services with Other Systems

Abstract Application Interfaces with Java Connectors
Transform Data/Semantics from One Format to Another
Provide Business Process Management for Collaboration
Support Standard Business-to-Business Messaging Protocols

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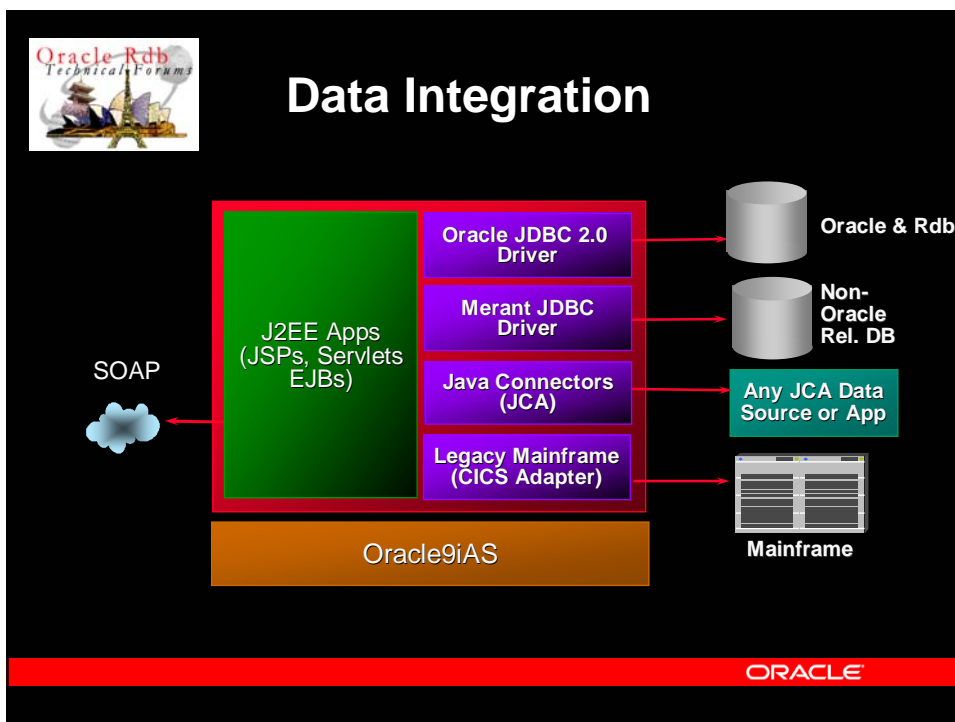
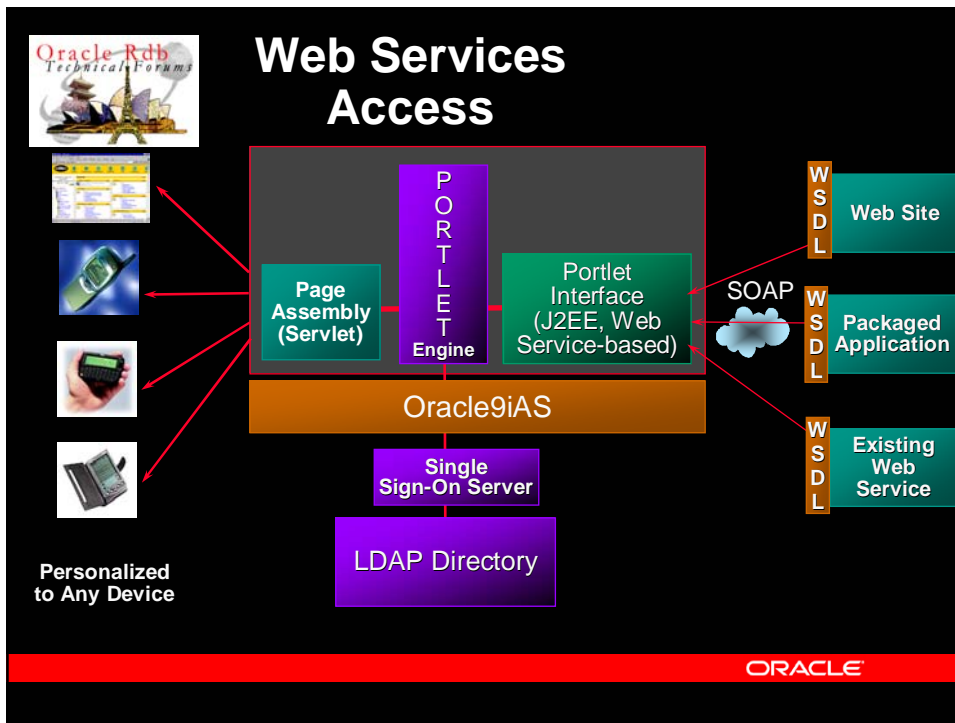
Web Services Integration



Aggregate Web Services into Portals & Provide Access from Any Device

- Provide a Single Point to Access Web Services
- Allow Users to Personalize Web Services they Access
- Access Web Services from Any Device, Anywhere
- Provide Single Sign-On across Web Services

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Oracle and Web Services Standards

W3C

- Web Services WG (SOAP,WSDL,UDDI)
- XMLP WG
- XML Schema WG
- XML Query WG
- XPath WG
- XSig WG
- Xencrypt WG
- Apache AXIS WG

OMG

- XMI Metadata WG
- CORBA/SOAP-WSDL
- UML 2.0 RFP
- CWM

Java/J2EE

- J2EE Web Services (JSR 109)
- JAXM
- JAXB
- JAX-RPC
- JAXP
- JAXR
- UML/EJB, JMI
- Security
- Connectors

OASIS

- ebXML
- TPAML

RosettaNet

- RNIF WG

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Oracle9iAS Customers



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What about existing Enterprise Applications ?...

Not a problem
Expose them as web services
Reuse the Business Logic

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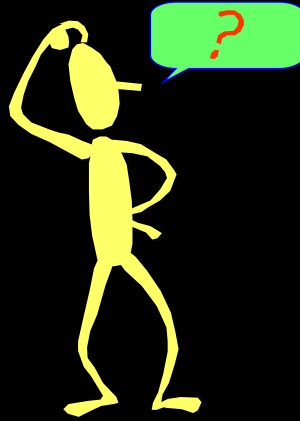
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- Oracle iDevelop Online
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Questions? Comments?



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