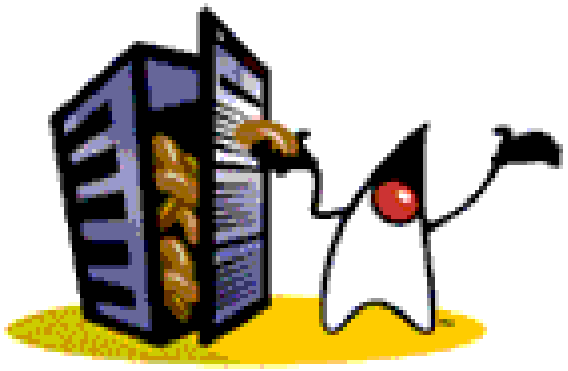
J2EE 1.4



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J2EE 1.4

- **Target audience**
  - J2EE developers and architects
- **Objectives**
  - Get a a first look at some of the major new features in J2EE 1.4
- **Non-Objectives**
  - Learn how to use the new J2EE 1.4 features...

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Agenda

- J2EE 1.4 overview
- J2EE 1.4 details
  - J2EE Connector Architecture 1.5
  - EJB 2.1
    - Message Driven Beans
      Connector Architecture Support
    - Web Services Support
  - J2EE Management 1.0
  - J2EE Deployment 1.1

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J2EE 1.4 overview

- Dates
  - July 16, 2002 - Public Draft
  - August 22, 2002 - Proposed Final Draft
  - November 12, 2002 - Proposed Final Draft 2 + J2EE 1.4 RI Beta
  - February 2003 - Expected Final Release
- New specifications (not complete list...)
  - Web Services for J2EE 1.0 (JSR 109)
  - J2EE Management 1.0 (JSR 77)
  - J2EE Deployment 1.1 (JSR 88)
  - JMX, Java Management Extensions 1.2
- Upgrades (not complete list...)
  - Servlet 2.4
  - JSP 2.0
  - JMS 1.1
  - EJB 2.1
  - J2EE Connector Architecture 1.5

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Agenda, where are we...

- J2EE 1.4 overview
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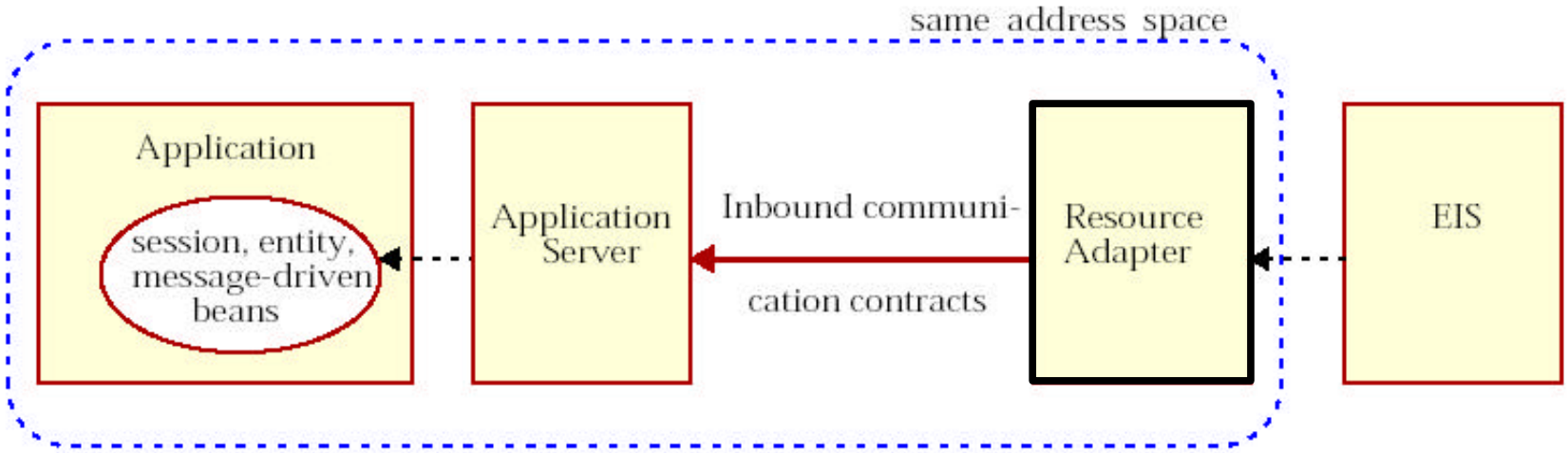
J2EE Connector Architecture 1.5

- Problem
  - Only support for outbound calls to EIS in v1.0

- Solution
  - Added support for inbound communication from EIS...



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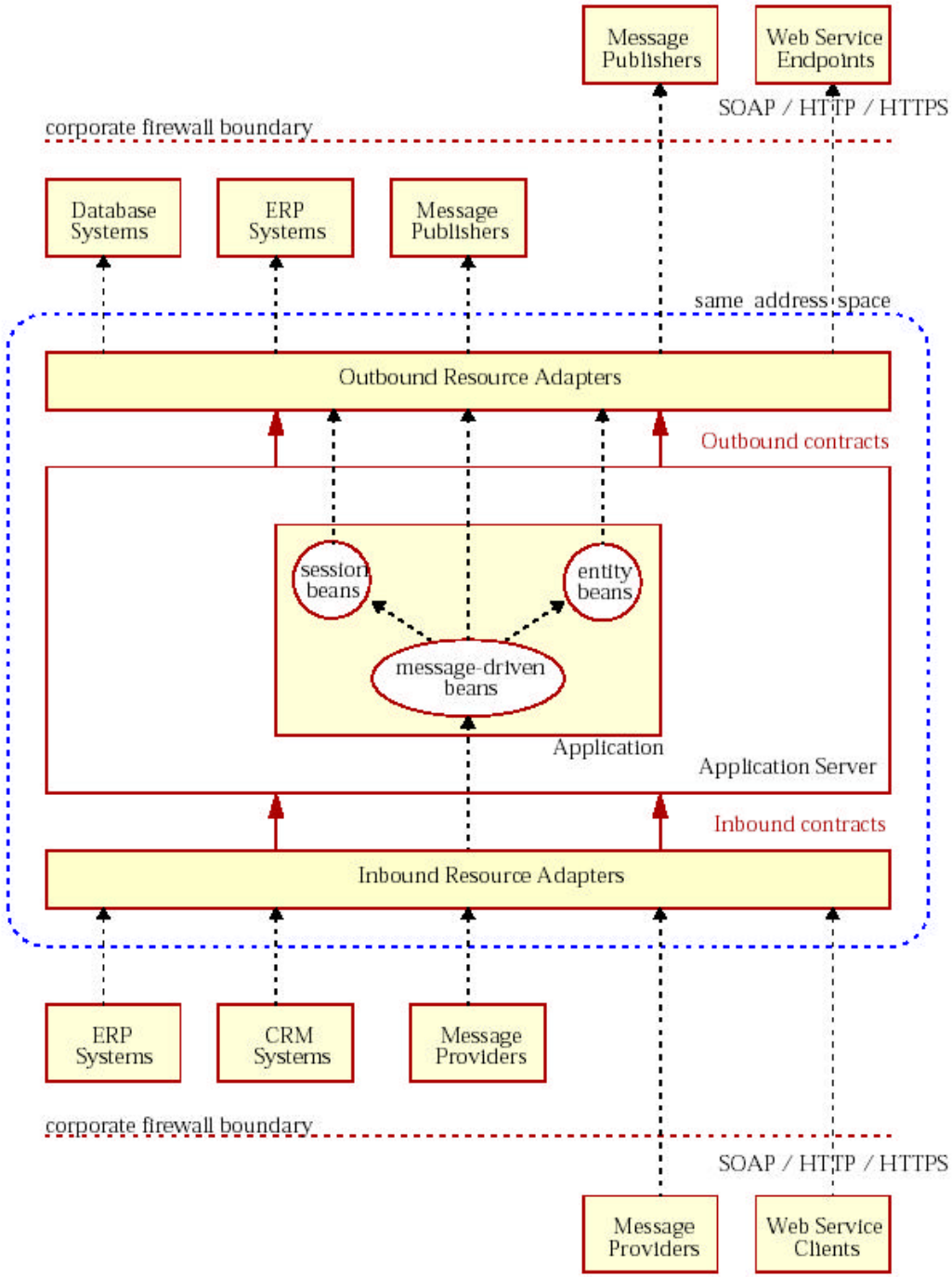
J2EE Co

- An illustrative Use Case



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J2EE Connector Architecture 1.5

- Technical details
  - Inbound calls delivered to Message Driven Beans
  - Offloaded Connection-, 2PC-Transaction- and Security-management from the Resource Adapter as before
  - Added Thread management by a **`WorkManager`**
  - Message Driven Beans are abstracted by proxies
  - The developer of a Resource Adapter can focus on communication with the specific EIS!!!

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Agenda, where are we...

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EJB 2.1 – Message Driven Beans
J2EE Connector Architecture Support

- Problems
  - No support for
    1. Multiple JMS providers

    2. Non-JMS messaging systems
       - E.g. E-mail, SOAP or proprietary EIS systems

- Solutions
  1. J2EE Connector Architecture v1.5
     - Provides a well defined SPI for JMS providers

  2. Message Driven Beans not bound to JMS anymore
     - Connector Architecture ensure portability

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EJB 2.1 – Message Driven Beans
J2EE Connector Architecture Support

- Technical details
  - **`javax.jms.MessageListener`** not required anymore
    - Can be replaced by any vendor specific listener-interface
  - Listener-interface can support request/reply
    - Results from non-void ”on-message” methods is handled as a reply
  - **`javax.ejb.MesageDrivenBean`** still required
    - Traditional EJB life-cycle stuff...
  - Dynamic deployment description of MDB’s
    - New element type **`<activation-config>`**

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EJB 2.1 – Message Driven Beans
J2EE Connector Architecture Support

- Examples: E-mail based MDB
  - Listener interface

```
package com.avendor.email;

public interface EmailListener {
  public void receiveMessage(javax.mail.Message message);
}
```

  - MDB

```
package com.acustomer.email;

public class EmailMDB implements
  javax.ejb.MessageDrivenBean,
  com.avendor.email.EmailListener {

  public void receiveMessage(javax.mail.Message message){
    String    subject   = message.getSubject();
    Address[] addresses = message.getFrom();
  }
}
```


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EJB 2.1 – Message Driven Beans
J2EE Connector Architecture Support

- Examples, cont...
  - SOAP request/reply-style messaging MDB

```
package com.anothervendor.soap;

import javax.xml.soap.SOAPMessage;

public interface SOAPRequestResponseListener {

  public SOAPMessage onMessage(SOAPMessage message);

}
```

Non void return value
i.e. request/reply

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EJB 2.1 – Message Driven Beans
J2EE Connector Architecture Support

- Examples
  - JMS based MDB deployment descriptor
    - MDB JMS ”acknowledge mode” in EJB2.0

```
<acknowledge-mode>Auto-acknowledge</acknowledge-mode>
```

    - MDB JMS ”acknowledge mode” in EJB2.1

```
<activation-property>
  <activation-config-property-name>
    acknowledgeMode
  </activation-config-property-name>
  <activation-config-property-value>
    Auto-acknowledge
  </activation-config-property-value>
</activation-property>
```


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EJB 2.1 – Message Driven Beans
J2EE Connector Architecture Support

- Examples

  - E-mail based MDB deployment descriptor

```
<activation-config>
  <activation-property>
    <activation-config-property-name>mailServer</activation-config-property-name>
    <activation-config-property-value>m1.706.telia.com</activation-config-property-value>
  </activation-property>
  <activation-property>
    <activation-config-property-name>serverType</activation-config-property-name>
    <activation-config-property-value>POP3 </activation-config-property-value>
  </activation-property>
  <activation-property>
    <activation-config-property-name>messageFilter</activation-config-property-name>
    <activation-config-property-value>to= 'aaa@bbb.ccc '</activation-config-property-value>
  </activation-property>
</activation-config>
```


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EJB2.1 – Web Services

- Problem
  - Extra ”plumbing-code” required to enable EJB beans to accept Web Services calls
    - Either through
      - Vendor specific products
      - Extra JAX-RPC-Servlets that delegates the Web Services calls to the appropriate EJB beans
        - » Sun WSDK
        - » Apache AXIS

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EJB2.1 – Web Services

- Solution
  - Enable Stateless Session Beans to act as Web Services Endpoints

- Technical Details
  - Based on JAX-RPC
  - A new Endpoint Interface for Session Beans

NOTE: Any EJB Bean can call a Web Service

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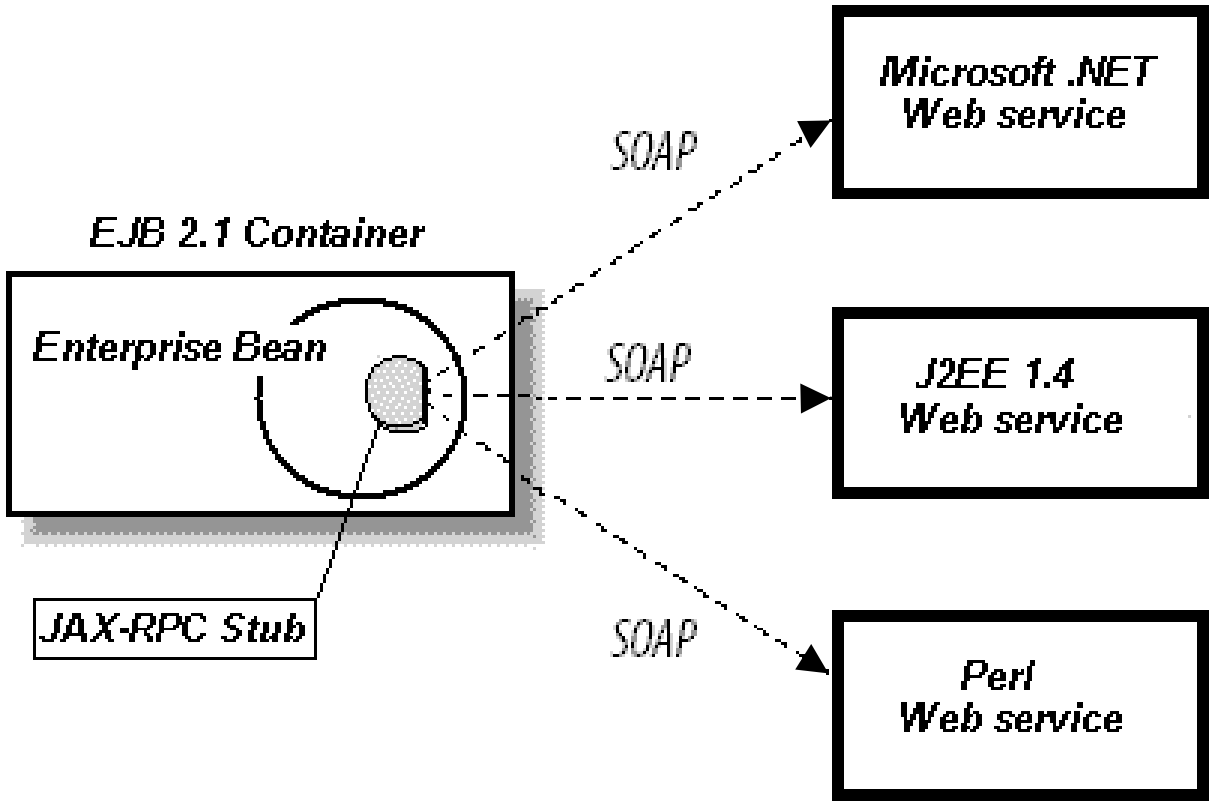
EJB2.1 – Web Services

- Technical Details
  - EJB Bean calling a Web Service



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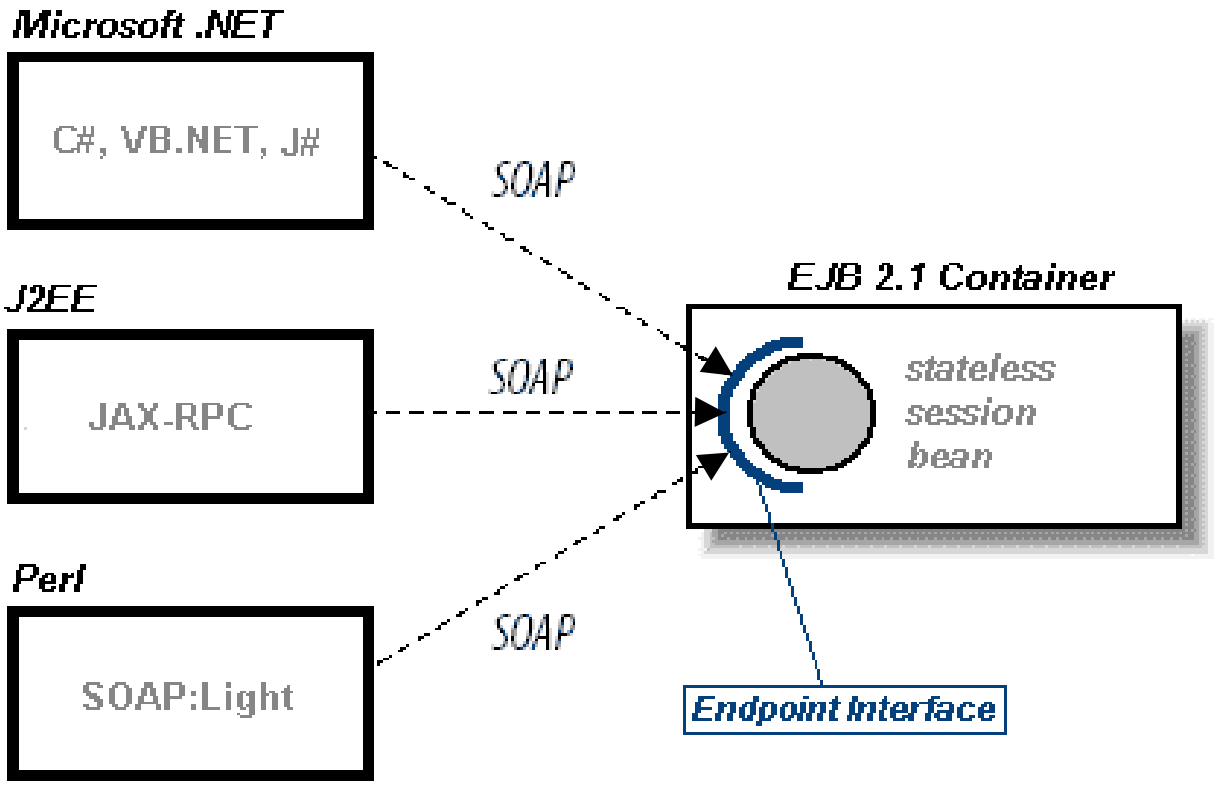
EJB2.1 – Web Services

- Technical Details
  - Stateless Session EJB Bean acting as a Web Service



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EJB2.1 – Web Services

- Example/Demo
  - "HelloWorld" with a .NET client and an EJB-endpoint
  - EJB-endpoint
    - Endpoint Interface
    - EJB-bean Class
    - Deployment Descriptor tag **<service-endpoint>**
    - "Same procedure" as for Remote and Local interfaces
  - .NET client
    - Web Service proxy for EJB-endpoints created as easy as if it was a C# based endpoints!

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EJB2.1 – Web Services

- Example/Demo - EJB-endpoint
  - Endpoint Interface

```
public interface HelloService extends Remote {
  public String sayHello(String name) throws RemoteException;
```

  - EJB-bean Class

```
public class HelloServiceBean implements SessionBean {
  public String sayHello(String name) {
    return "Hello " + name + " (from HelloServiceEJB)";
  }
```

  - Deployment Descriptor tag **<service-endpoint>**

```
<session>
  <ejb-name>HelloServiceEJB</ejb-name>
  <ejb-class>HelloServiceBean</ejb-class>
  <service-endpoint>HelloService</service-endpoint>
```


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EJB2.1 – Web Services

- Example/Demo - .NET client
  - WebService proxy for C#
    - Create ”Web Reference” in the Proxy-project based on the WSDL-file from the EJB-bean (**MyHelloService.wsdl**)
  - C# client code (Web Forms...)

```
using J2eeWebServiceProxy.WebReference1;
...
  private void Button1_Click(
    object sender, System.EventArgs e) {

    MyHelloService hs = new MyHelloService();
    Label1.Text = hs.sayHello(TextBox1.Text);
  }
```


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J2EE Management Specification

- Problem
  - J2EE vendor specific models and tools for management and monitoring
- Solution
  - A common object model for manageable objects, called **`J2EEManagedObject`**
  - An API for the object model
    - Based on JMX and MBeans
  - Enables any management tool to work with any J2EE server
    - Creates an market for J2EE Management Tools
    - Makes is easier to change J2EE server vendor

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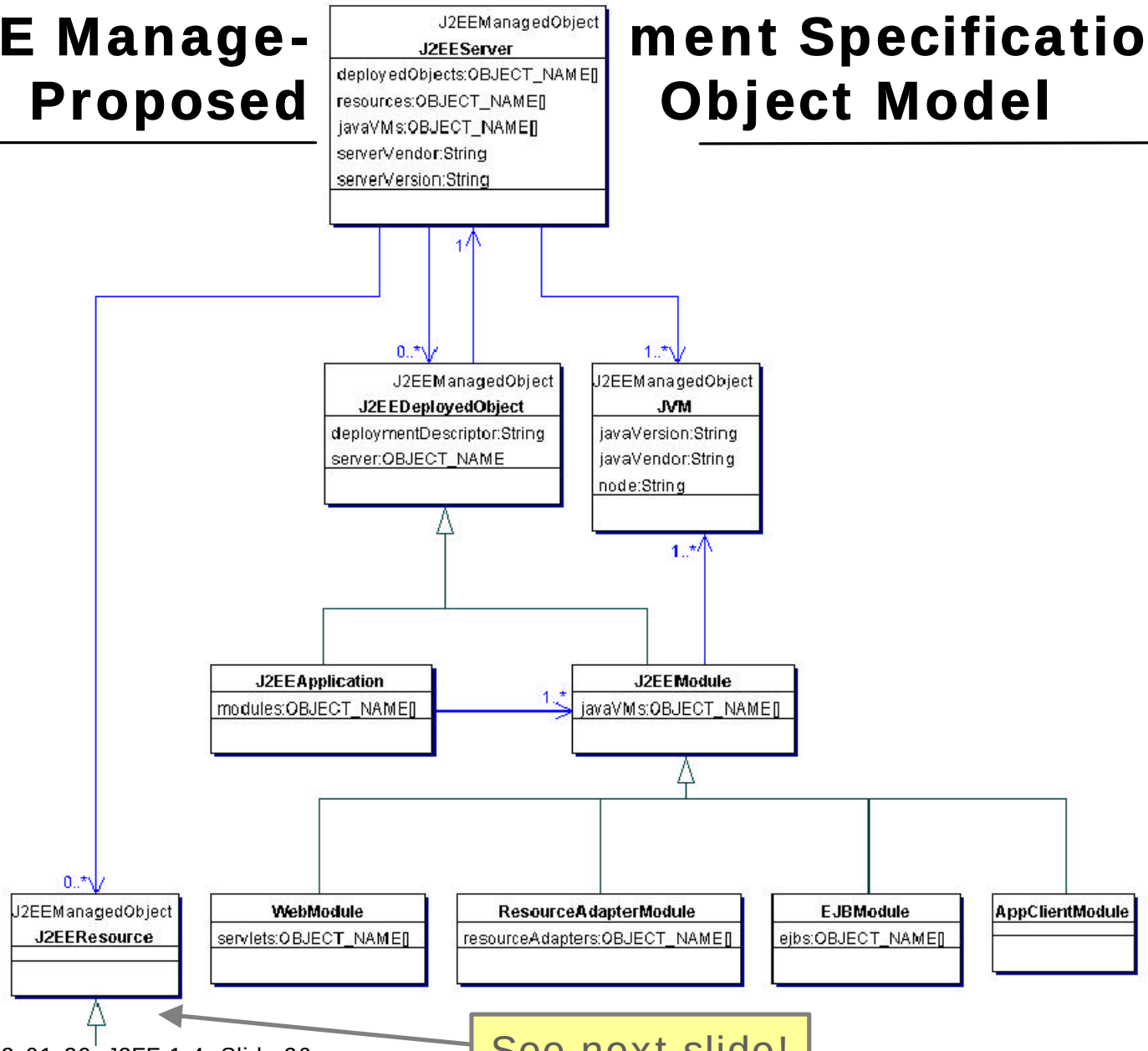
J2EE Management Specification - Proposed Object Model



See next slide!

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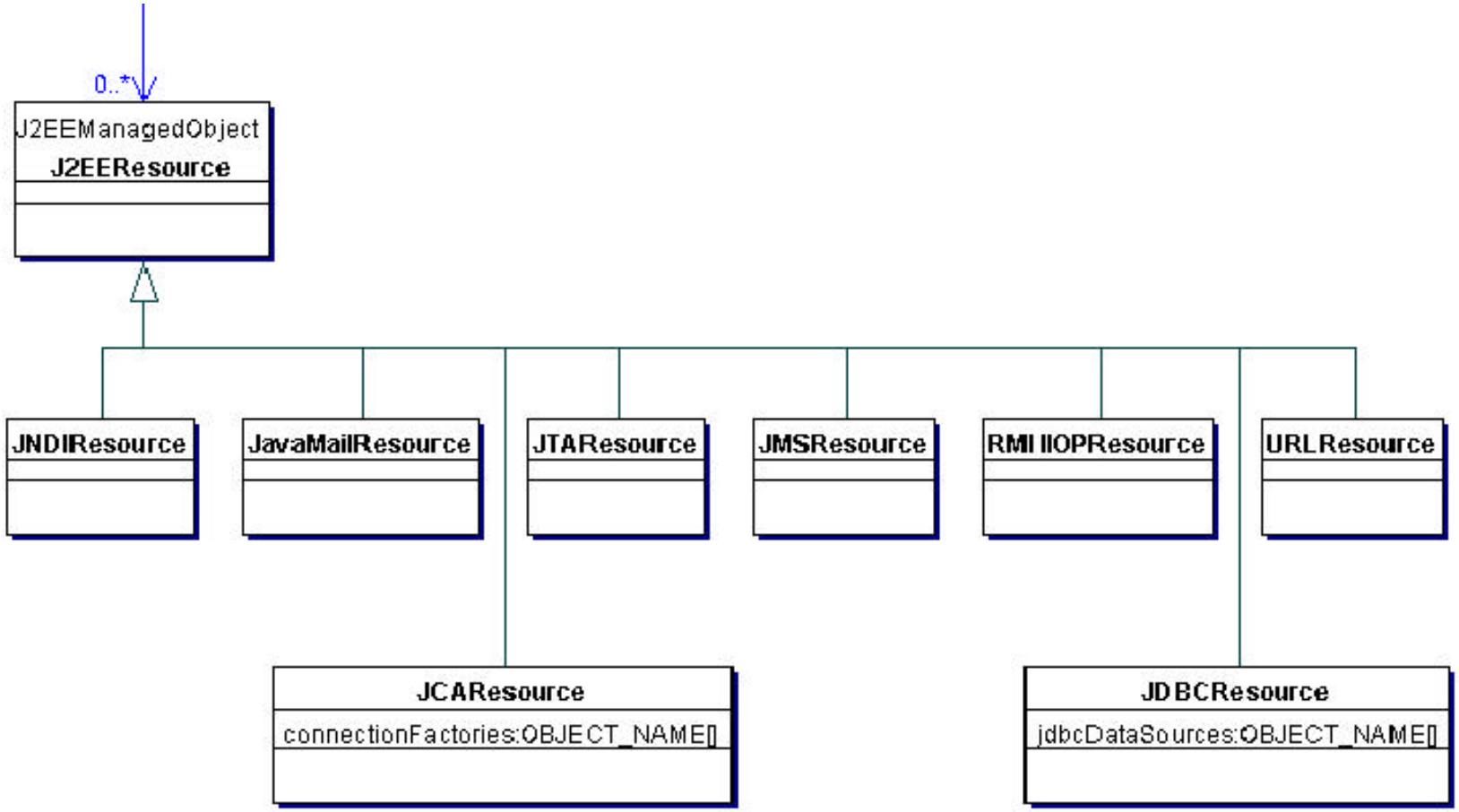
J2EE Management Specification
Proposed Object Model, cont...



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  - J2EE Management 1.0
  - **J2EE Deployment 1.1**

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J2EE Deployment Specification

- Problem
  - J2EE vendor specific deployment tools

- Solution
  - An API for deployment tools
    - Relies on the J2EE Management Specification
    - Streamlines the deployment process

  - Enables any deployment tool to work with any J2EE server
    - Creates an market for J2EE Deployment Tools
    - Makes is easier to change J2EE server vendor

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