



open source enterprise software & services

Developing Wired and Wireless Applications for the HP

David H. Young
Chief Evangelist
Lutris Technologies

Agenda

- **Lutris Enhydra Introduction**
- **Enhydra Application Architecture**
 - Survey of key functions, services and tools
 - Organization of an Enhydra application
 - Using the AppWizard and Admin Console to get started
- **Application Architecture for A Device Independent Strategy**
 - Code snippets on DOM manipulation
- **A little bit about Perl Migration**
- **Q&A**



HP & Lutris

HP WebWise Internet suite - Netscape

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web & application servers

hp webwise

- mpe/ix secure web server
- Lutris® Enhydra™ application/wireless server

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Introduction to Lutris

*At the Intersection of the
wired and wireless Internet*



Derived from the world's leading
open source development community

Wireless Internet WAN/LAN



USA

CDPD, Mobitex,
DataTAC, WAP



EC

WAP



Japan

i-mode (PDC-P)



any

PROTOCOL

PRESENTATION

HDML & WML
*Handheld Dynamic
Markup Language*



WML
Wireless Markup Language



cHTML
*Compact Hypertext Markup
Language*



J2ME
*MIDlet GUI
Components*



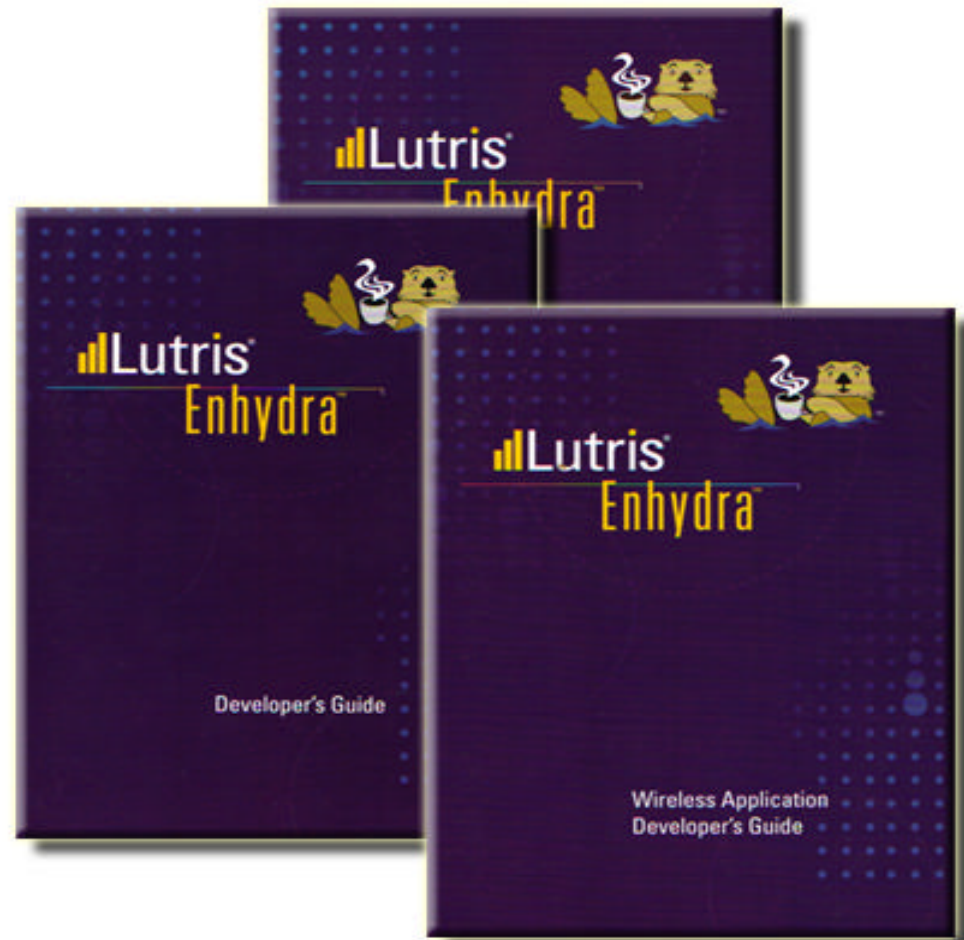
Lutris Enhydra 3.5

- One application
- Any device
- Any protocol
- Open platform
- Rapid development



The Lutris Enhydra Product

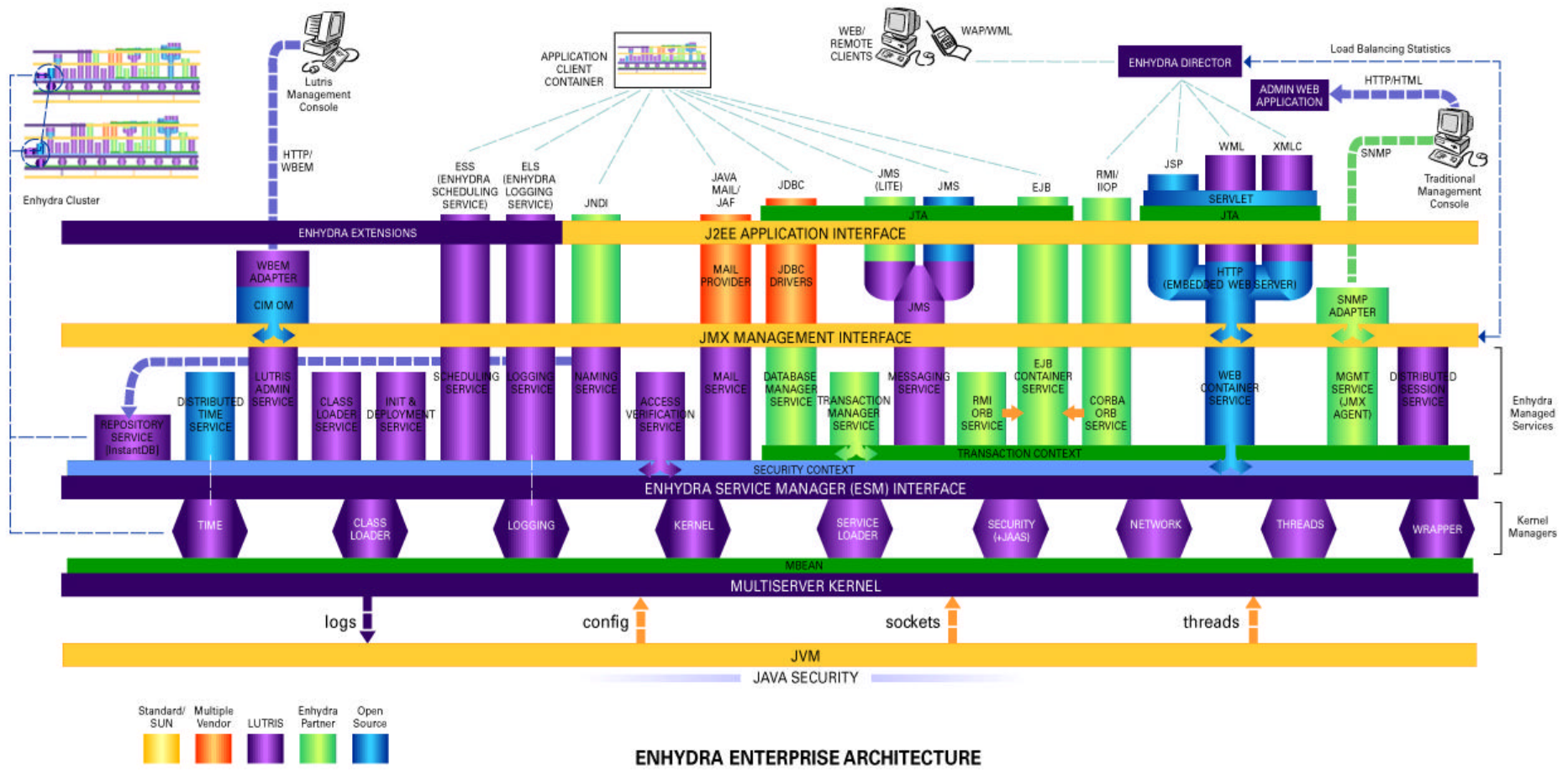
- Getting Started Guide
- Developer's Guide
- Wireless Application Developer's Guide
- Sample Applications with Source Code



www.airsent.com
www.dinerwire.com

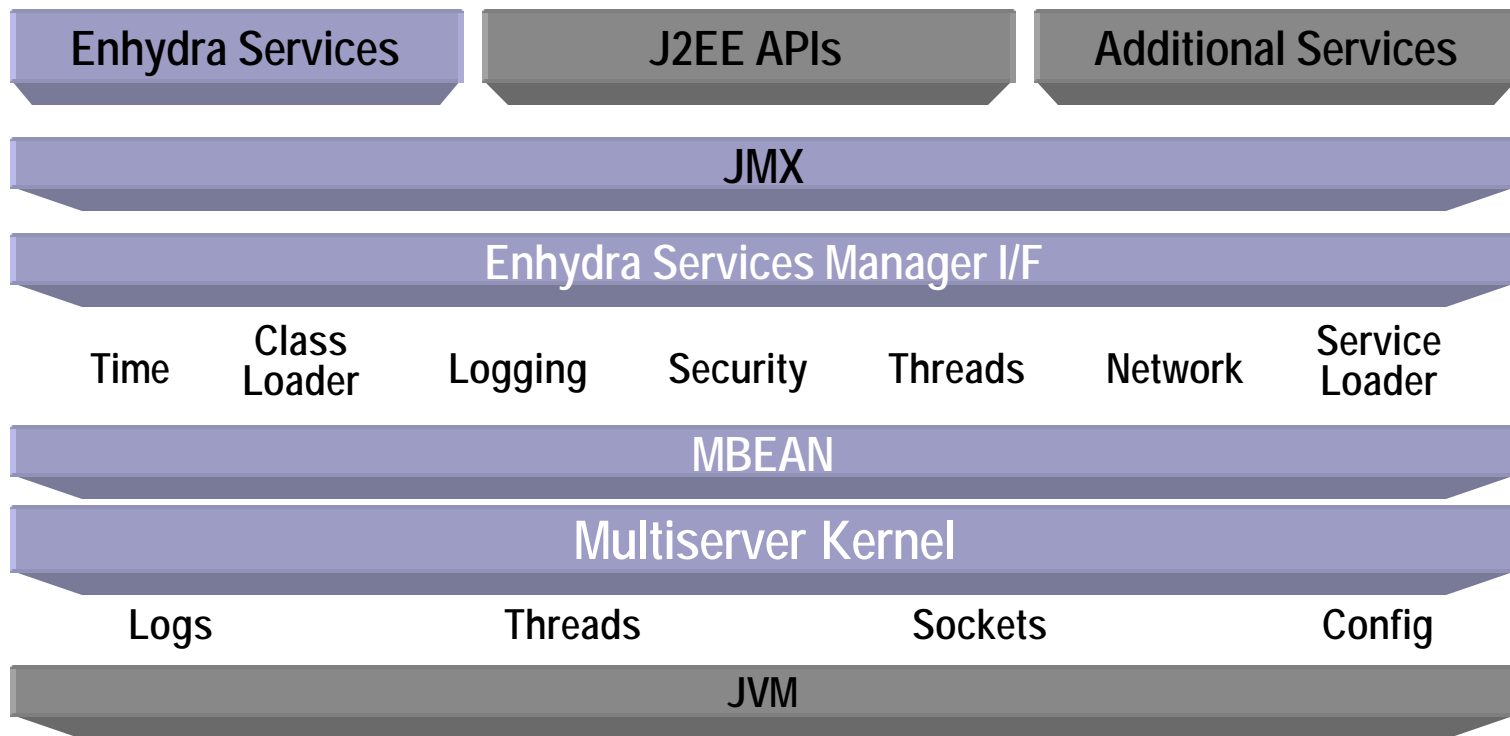


Enhydra Enterprise

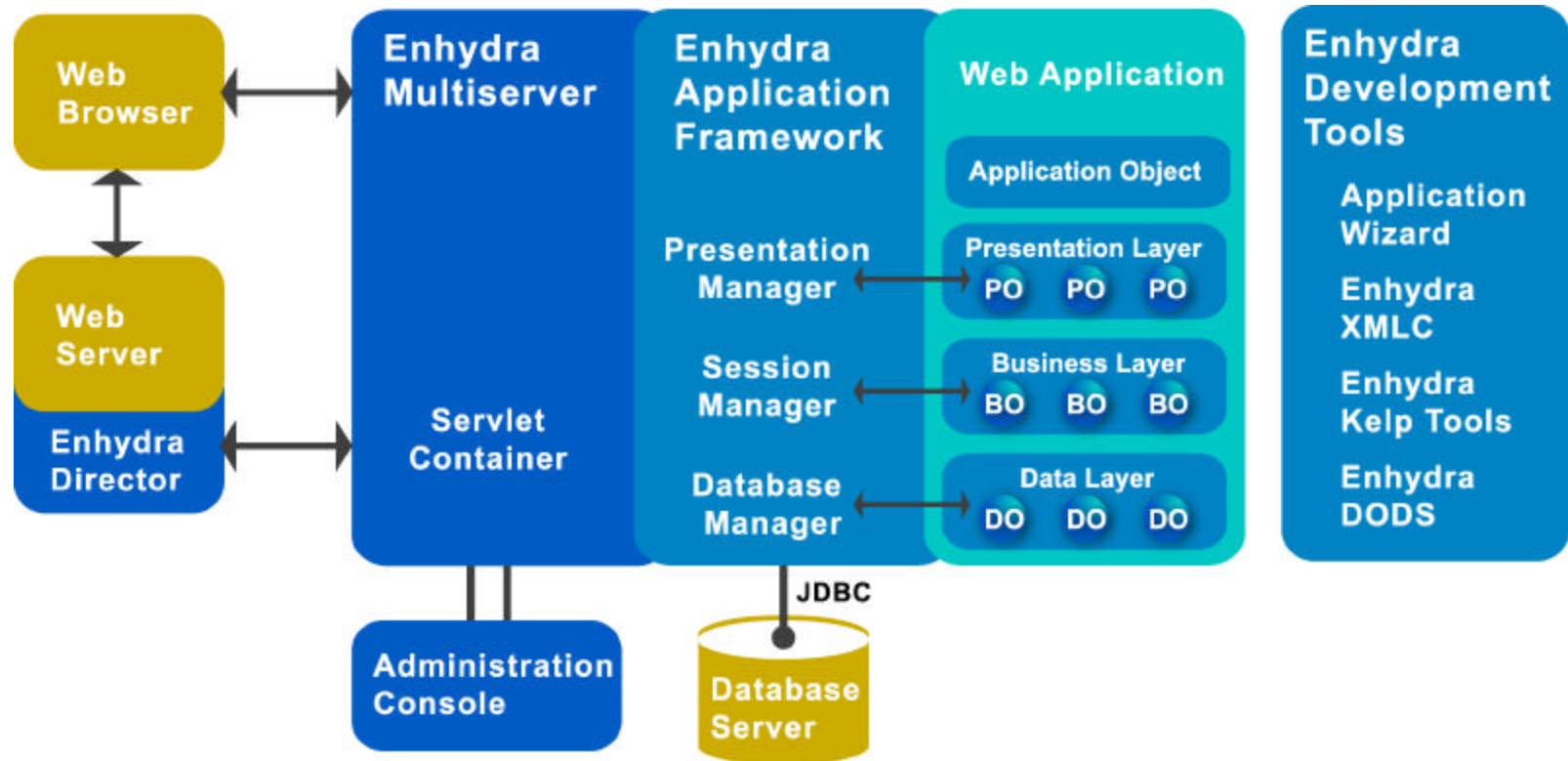


ENHYDRA ENTERPRISE ARCHITECTURE

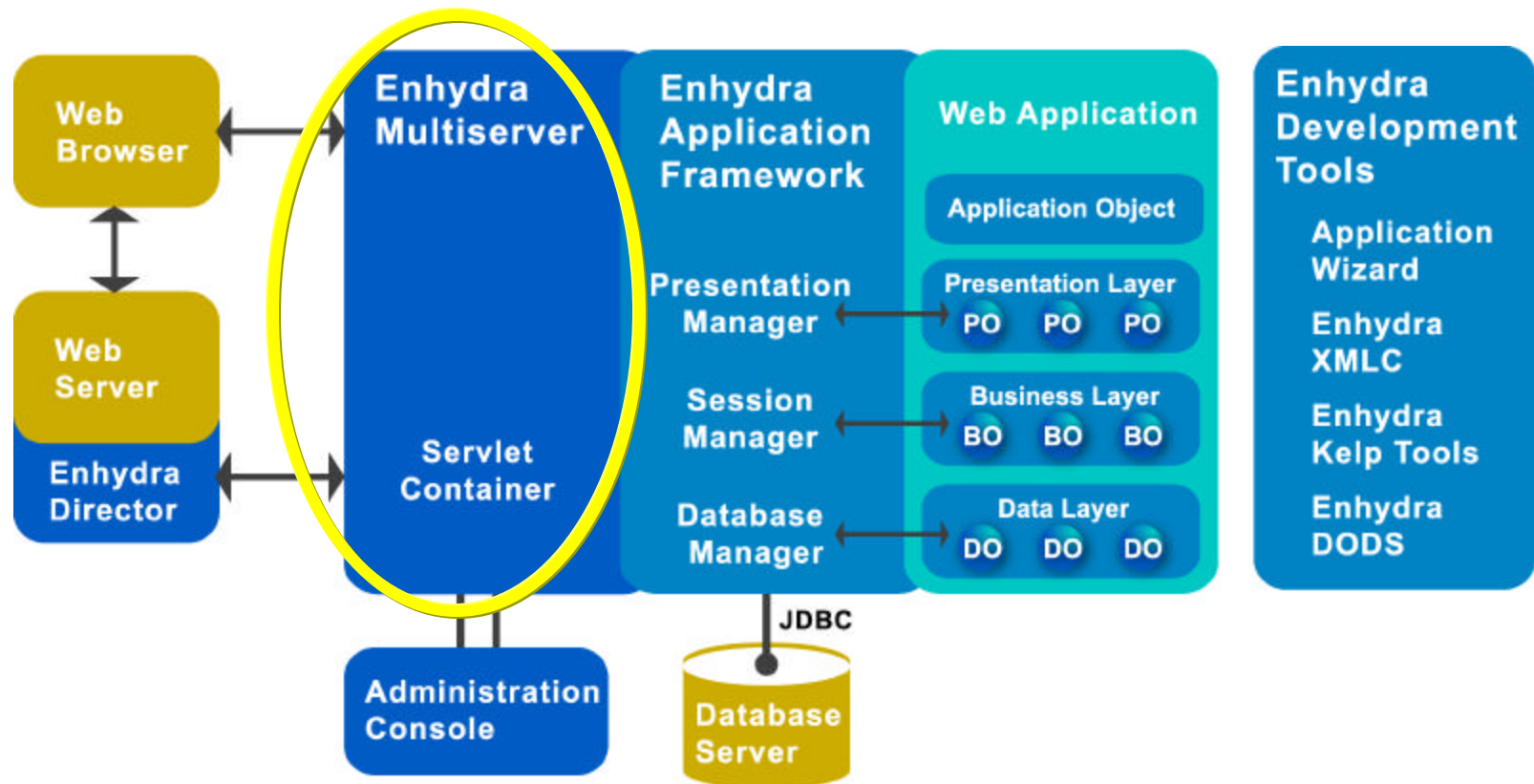
Lutris Enhydra Enterprise Service Architecture - ESA



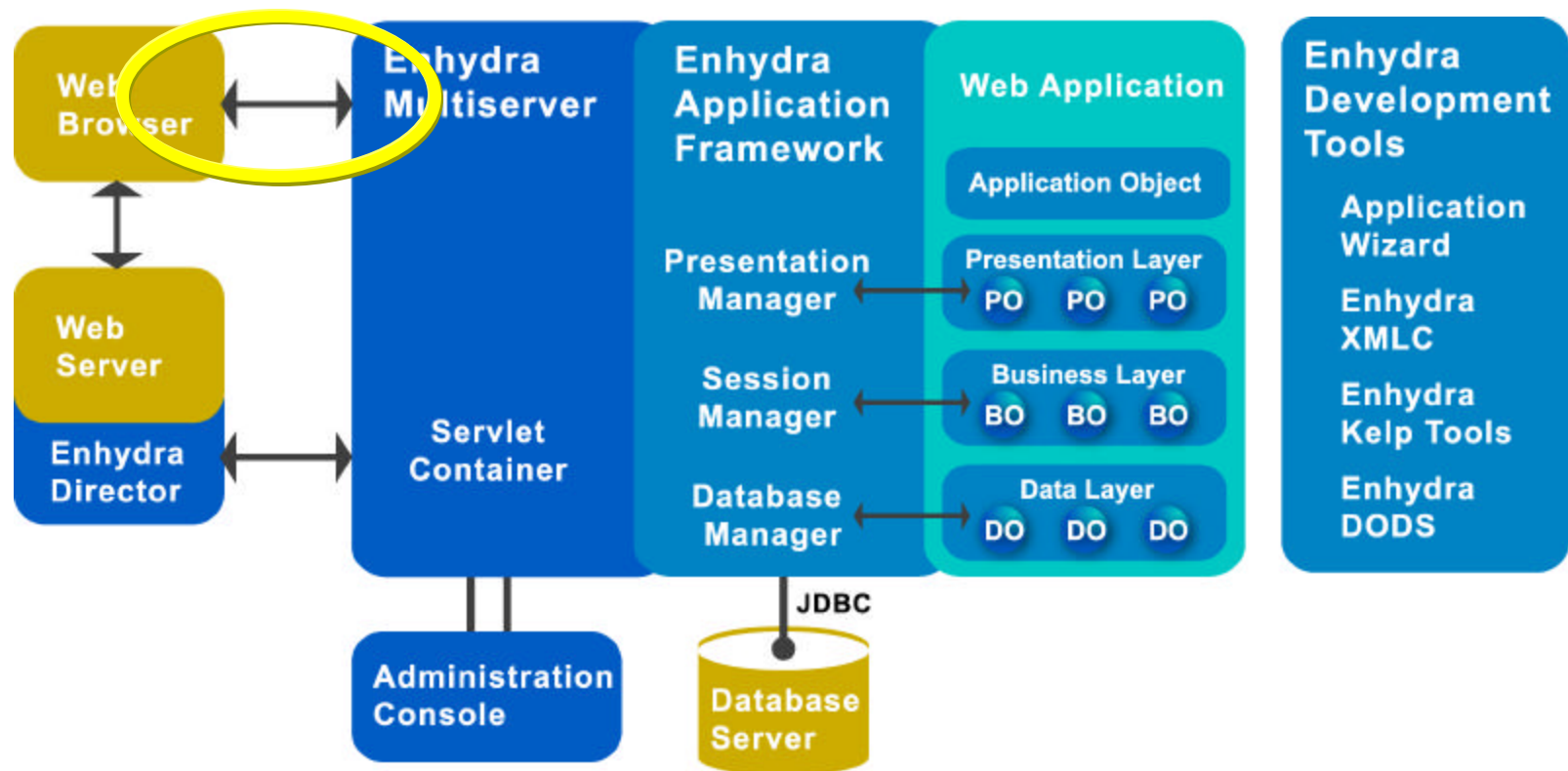
Lutris Enhydra Architecture



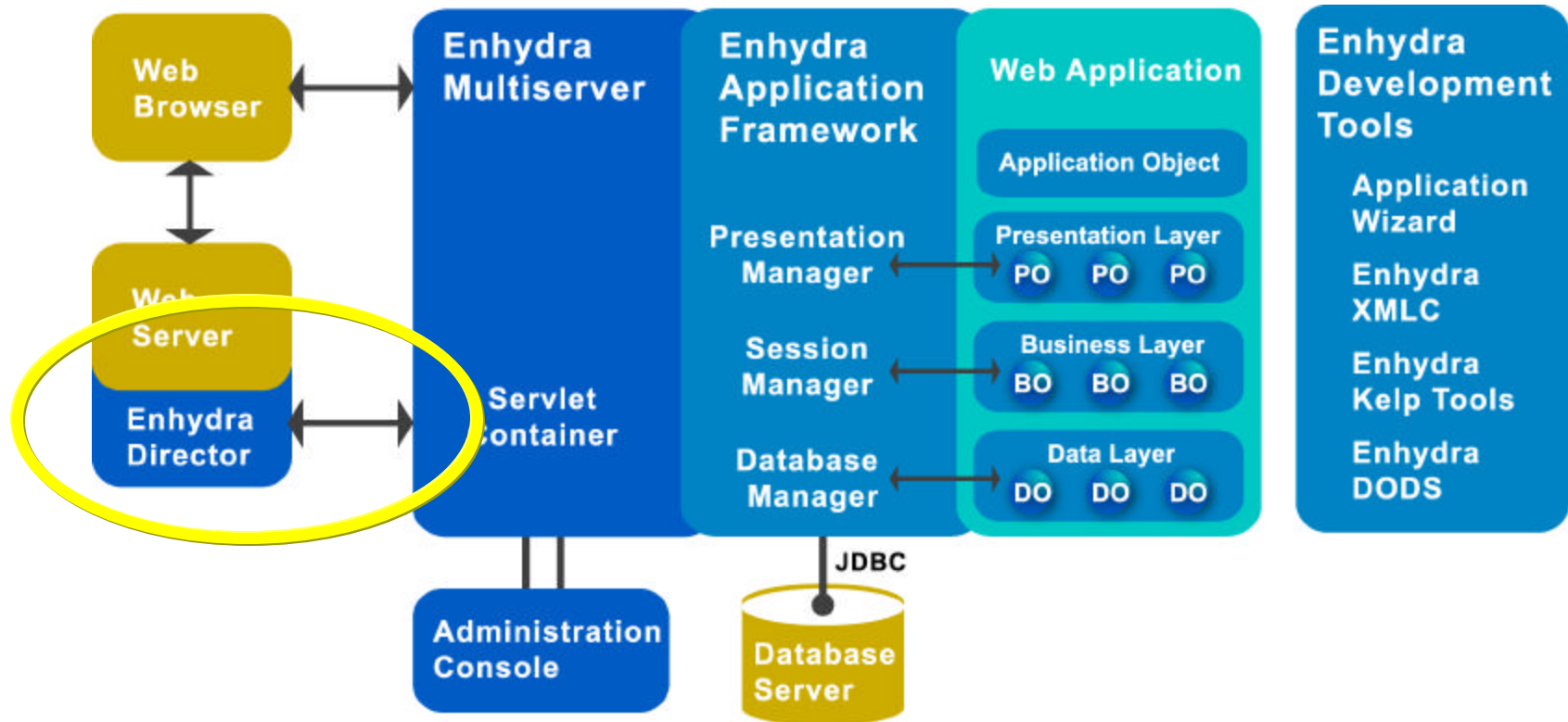
Lutris Enhydra Architecture



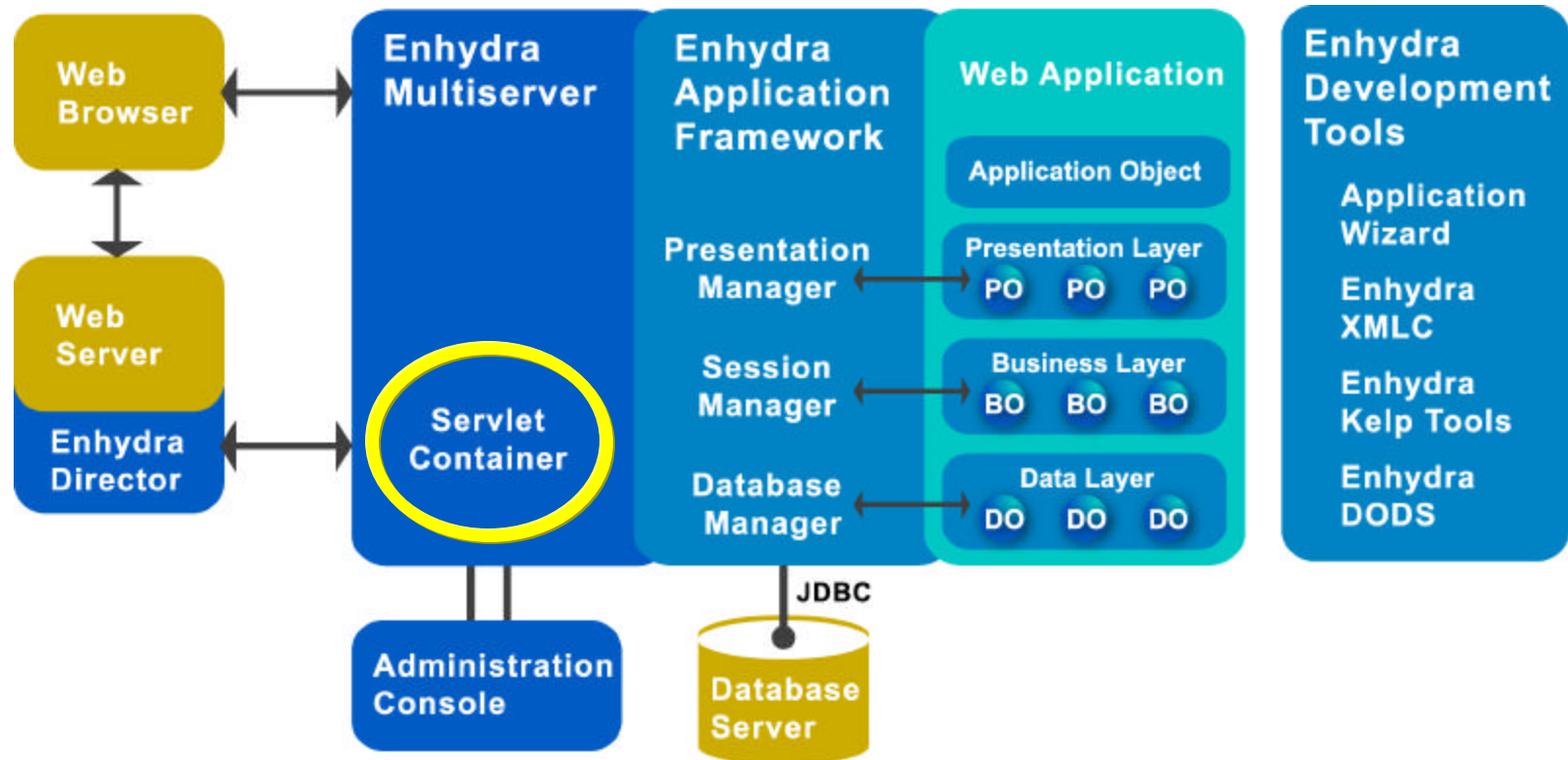
Lutris Enhydra Architecture



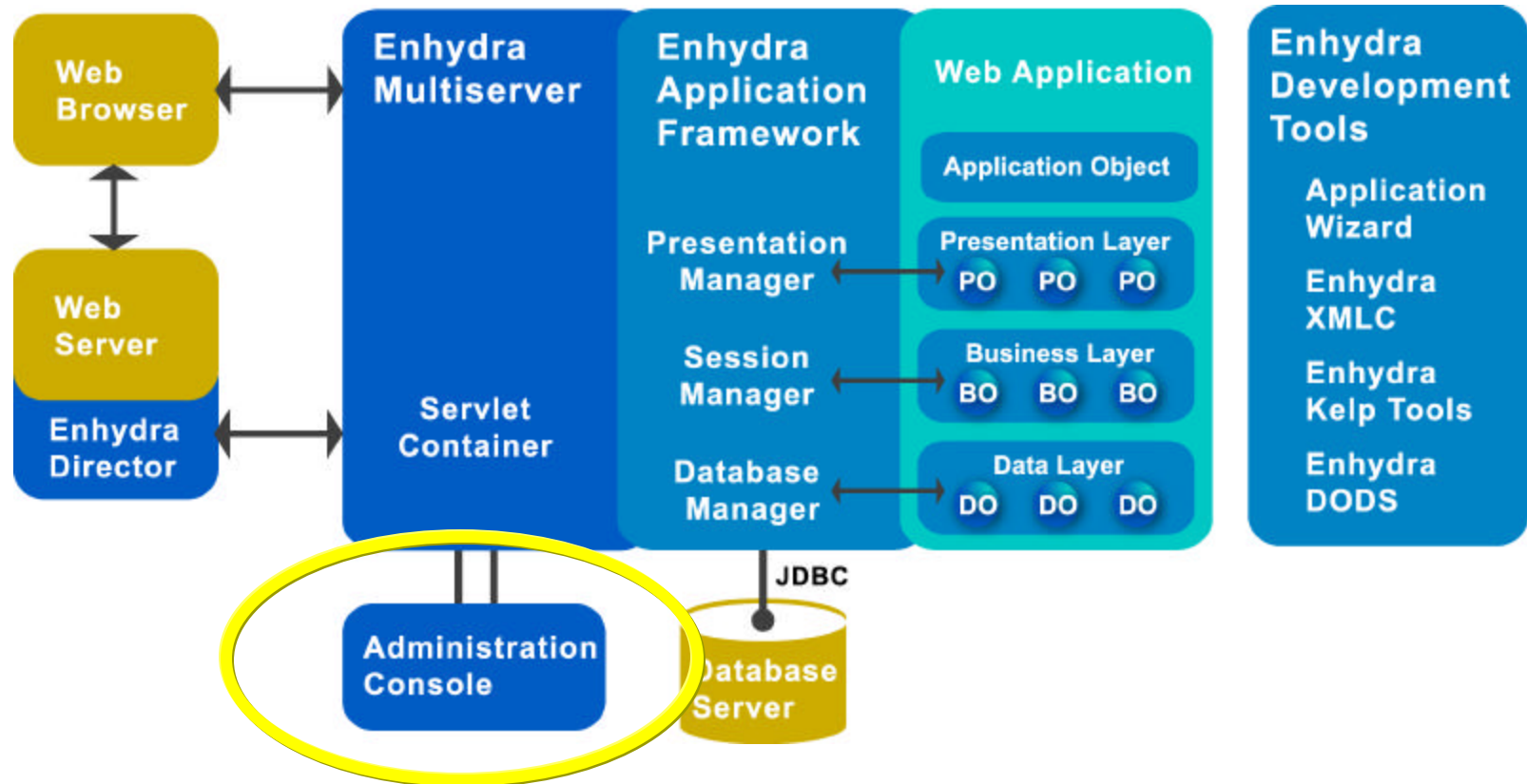
Lutris Enhydra Architecture



Lutris Enhydra Architecture



Lutris Enhydra Architecture



Web-based Enhydra Admin Console

ENHYDRA MULTISERVER

Applications:

- e3000demo (D)
- Welcome
- Javadoc
- WarExample

START STOP
ADD DELETE
MODIFY DEBUG
SAVE STATE

Multiserver:

STOP

STATUS

APPLICATION CONNECTIONS

e3000demo Status

Type:	Standard Enhydra Application	Conf File:	e3000demo.conf
Description:	Lutris/HP Webinar Demo		
Additional Classpaths:	C:/enhydra/e3000Demo/e3000demo/output/./classes		
Up Time:	00:04:20	Started:	Wed Mar 28 22:37:22 PST 2001

Presentation Manager

PO Cache:	Enabled	# Entries:	2
Resource Cache:	Disabled	# Entries:	N/A

Session Manager

Session Manager:	Standard Enhydra Session Manager (Basic Implementation)		
------------------	---	--	--

RESUME PAUSE
CLEAR FINISH

Monitoring e3000demo:

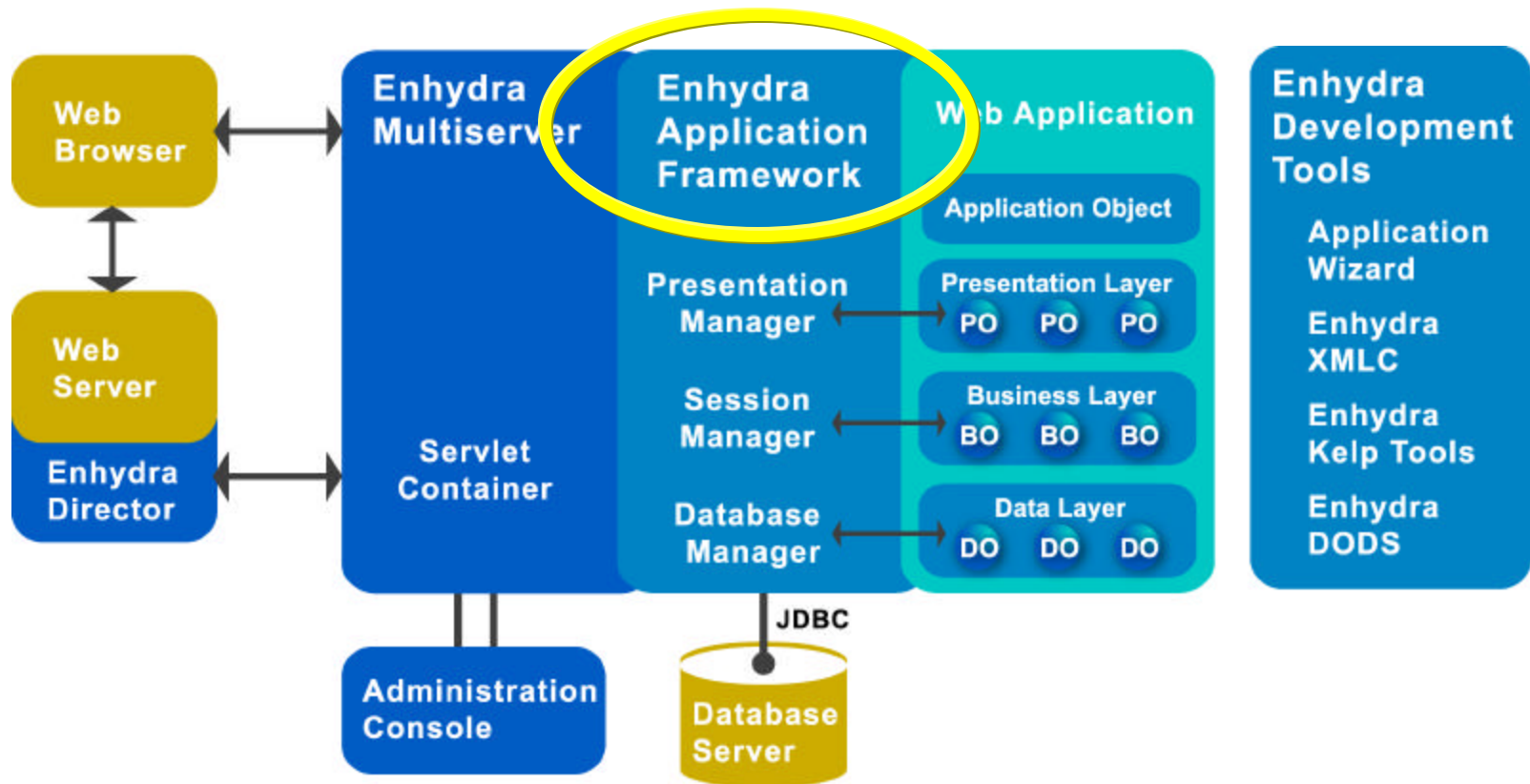
```

200 kspax GET /
200 kspax GET ...esentation.po
404 kspax GET ...a/Enhydra.gif
200 kspax GET ...esentation.po
200 kspax GET ...esentation.po
404 kspax GET ...a/Enhydra.gif
    
```

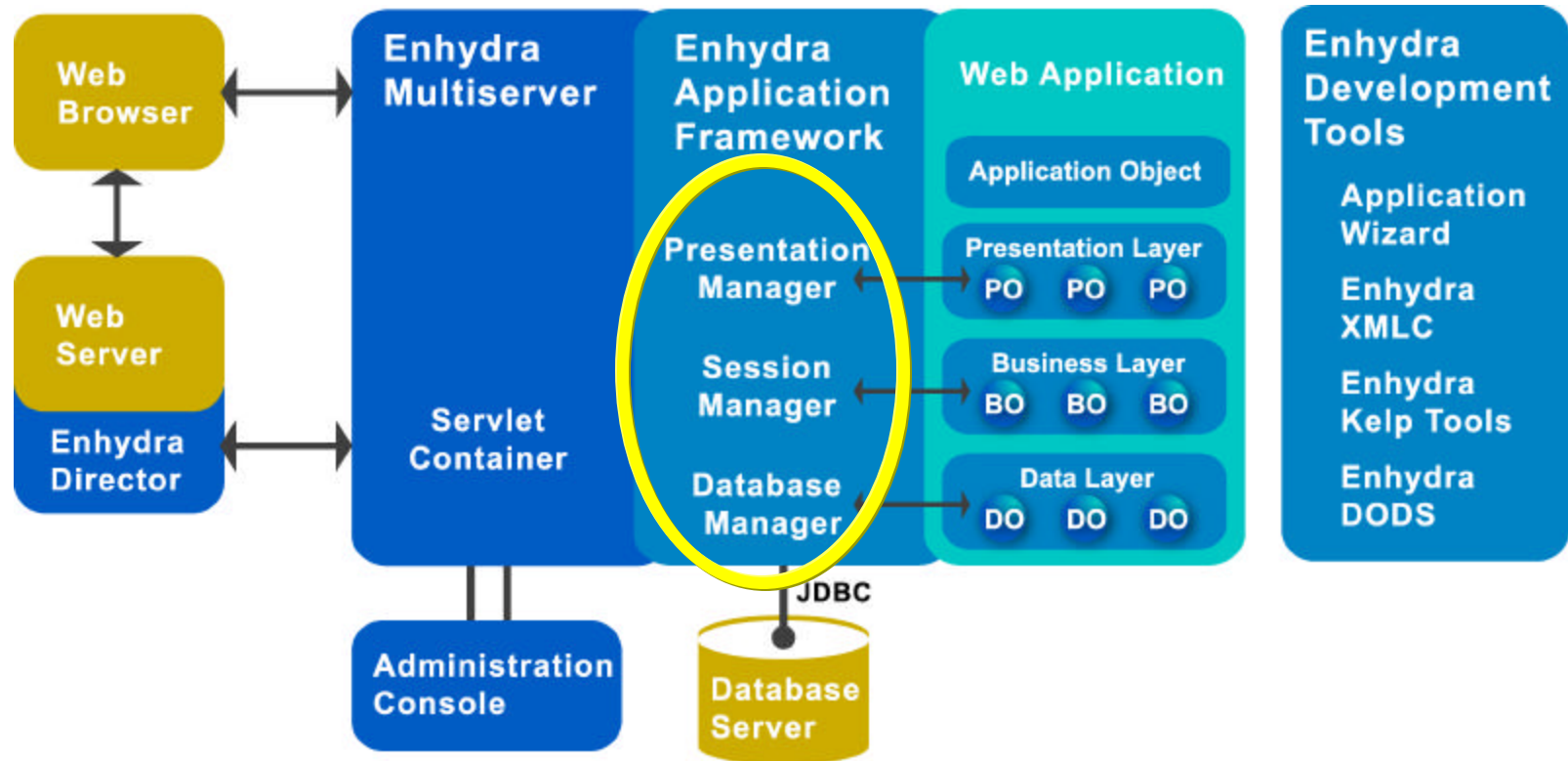
ENHYDRA



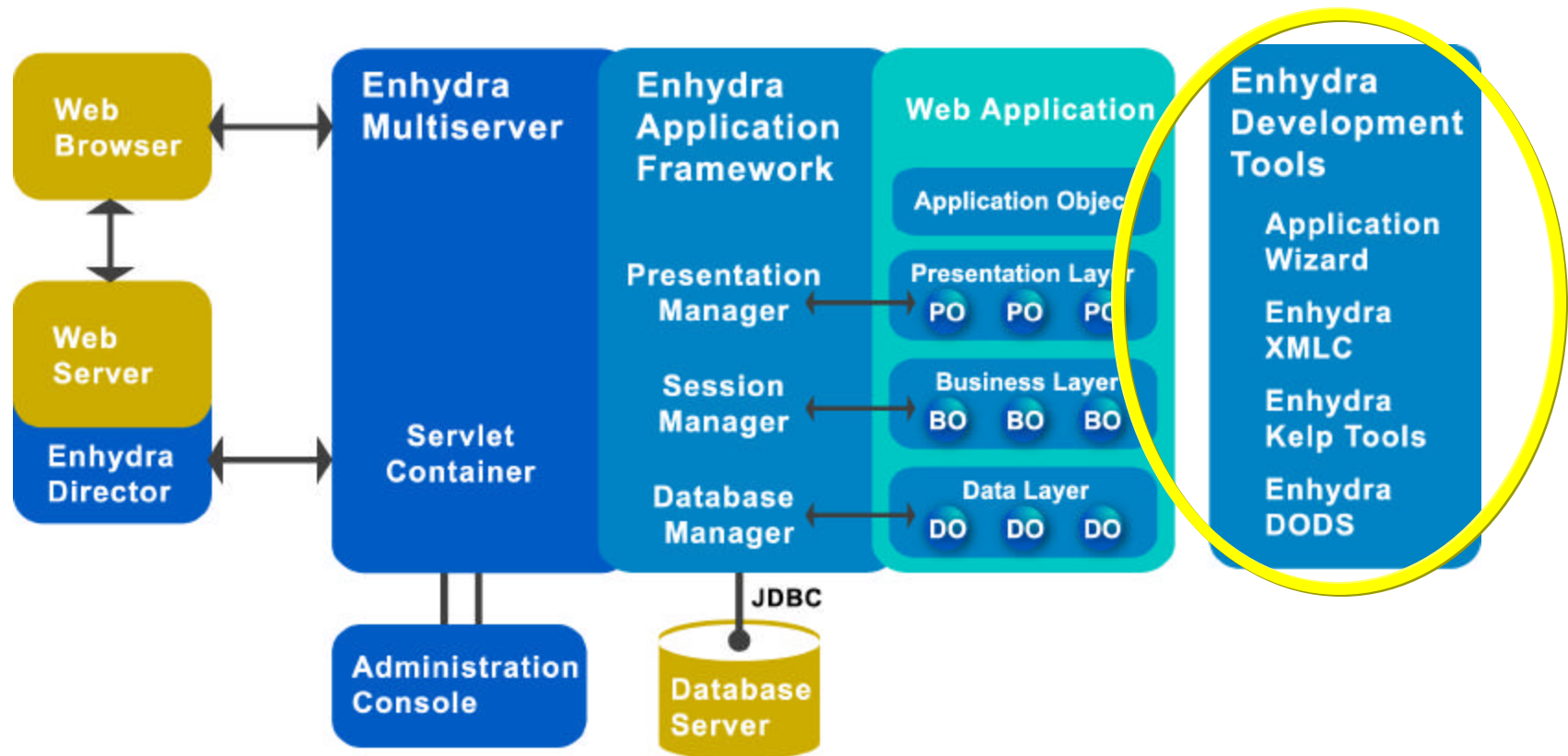
Lutris Enhydra Architecture



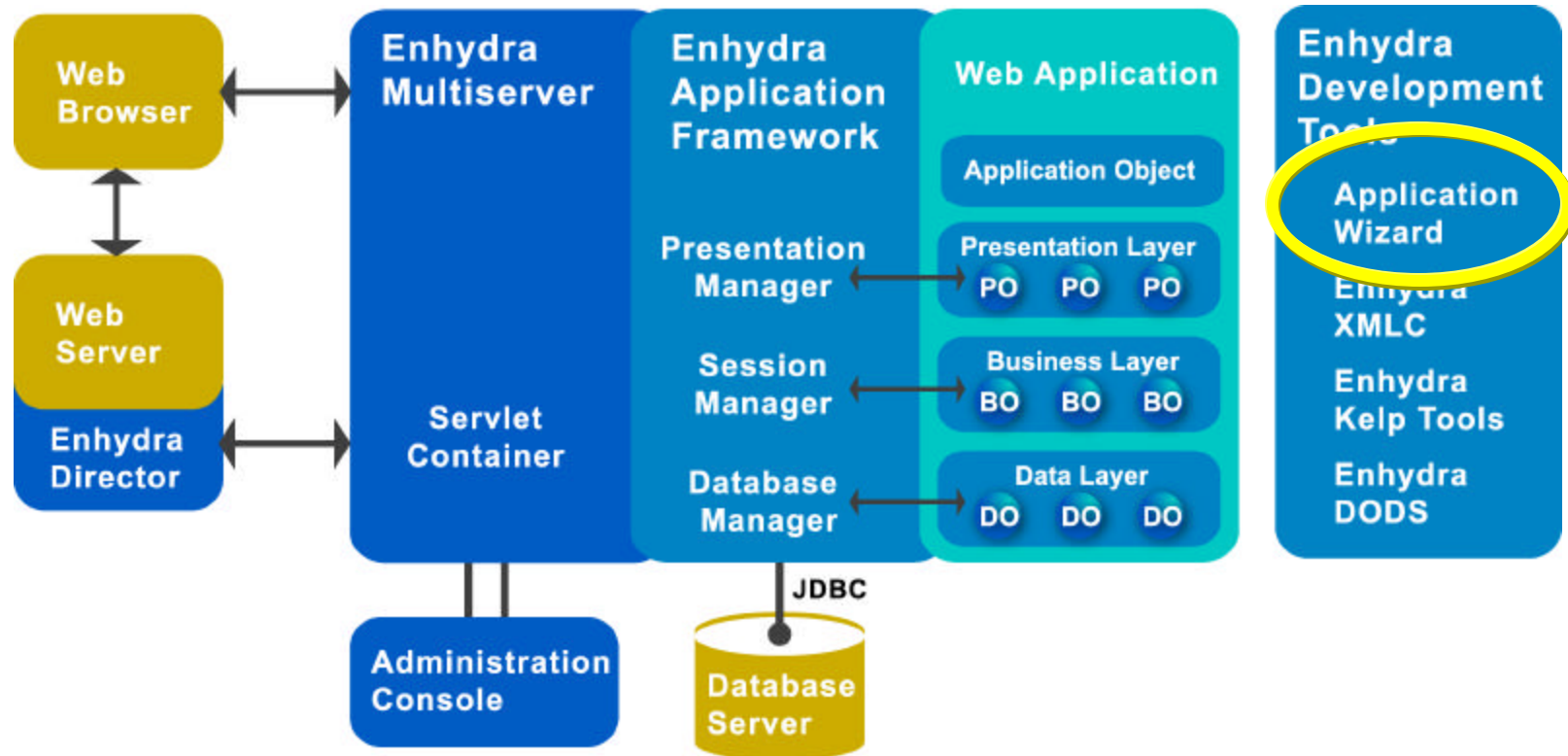
Lutris Enhydra Architecture



Lutris Enhydra Architecture



Lutris Enhydra Architecture



Enhydra AppWizard



Enhydra AppWizard

Enhydra Application Wizard

Client type and directory details

Enter the client type and directory details for the Web Application. These details will determine where the generator will create files and the names of some of the generated directories.

Client type:

Project directory name:

Package:

Root path:

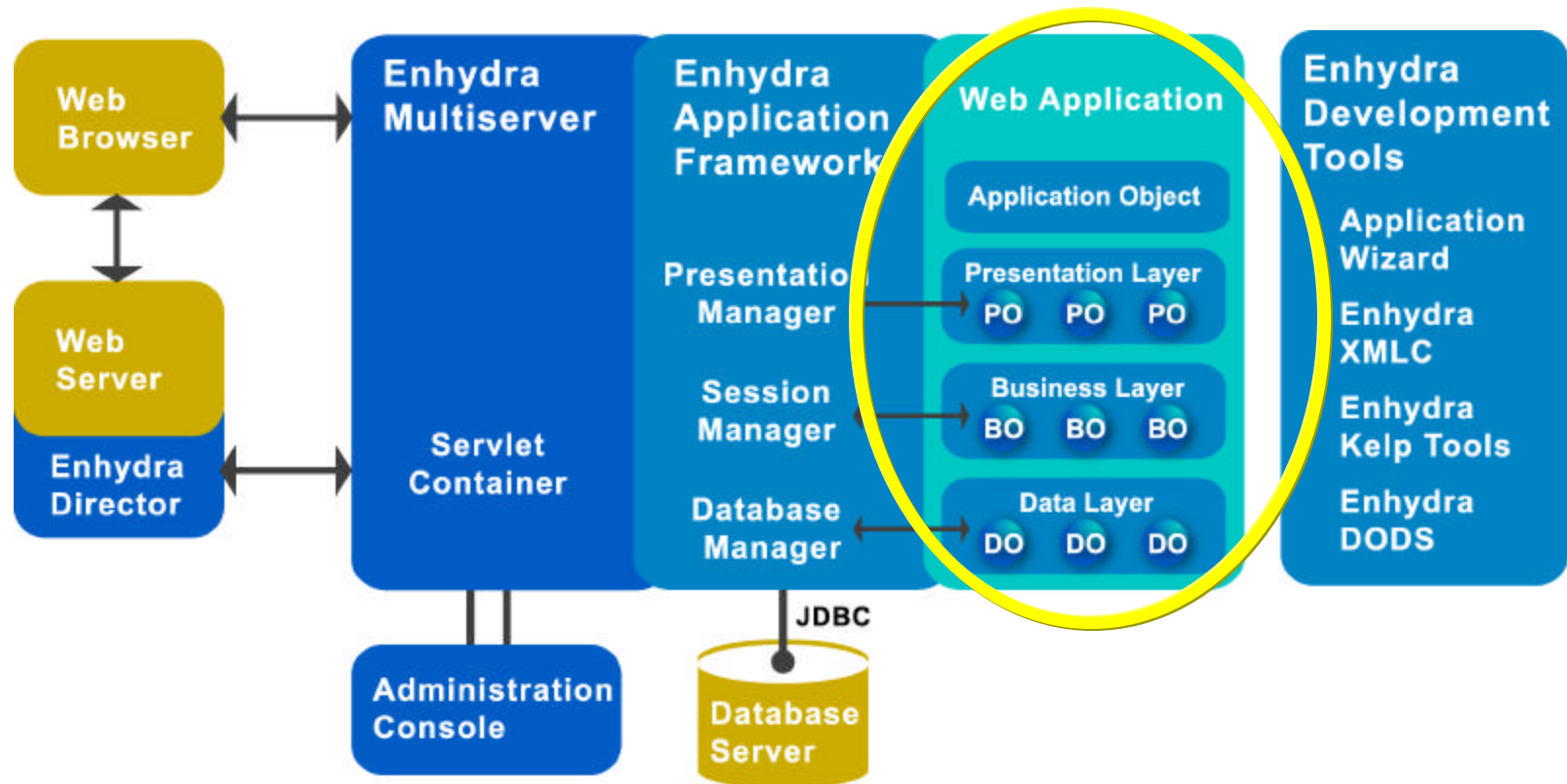
< Back Next > Finish Cancel Help



Enhydra AppWizard

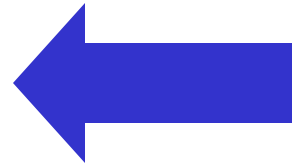
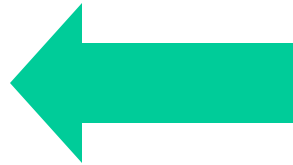


Lutris Enhydra Architecture



Three-Tier Application Development Hierarchy

Java Classes	e3000demo e3000demo/classes e3000demo/classes/e3000demo e3000demo/classes/e3000demo/presentation e3000demo/classes/e3000demo/presentation/media
	e3000demo/input e3000demo/input/conf e3000demo/input/conf/servlet
Deployment	e3000demo/output e3000demo/output/ start* e3000demo/output/archive e3000demo/output/conf e3000demo/output/conf/servlet
Application Arch	e3000demo/src e3000demo/src/e3000demo/ e3000demo.java e3000demo/src/e3000demo/ presentation e3000demo/src/e3000demo/ business e3000demo/src/e3000demo/ data e3000demo/src/e3000demo/presentation/xml e3000demo/src/e3000demo/presentation/wml e3000demo/src/e3000demo/presentation/chtml e3000demo/src/e3000demo/presentation/media

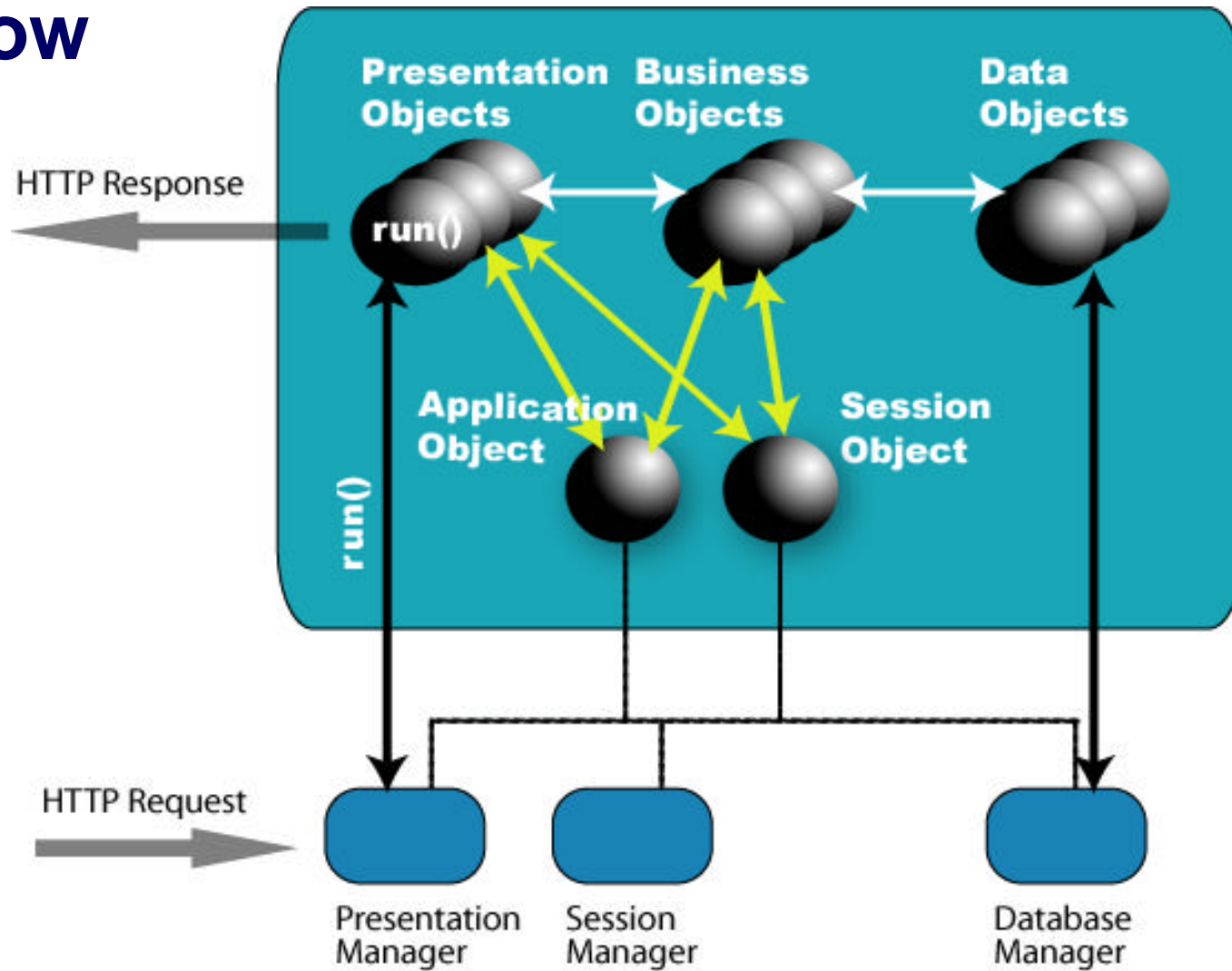


Key Lifecycle Methods

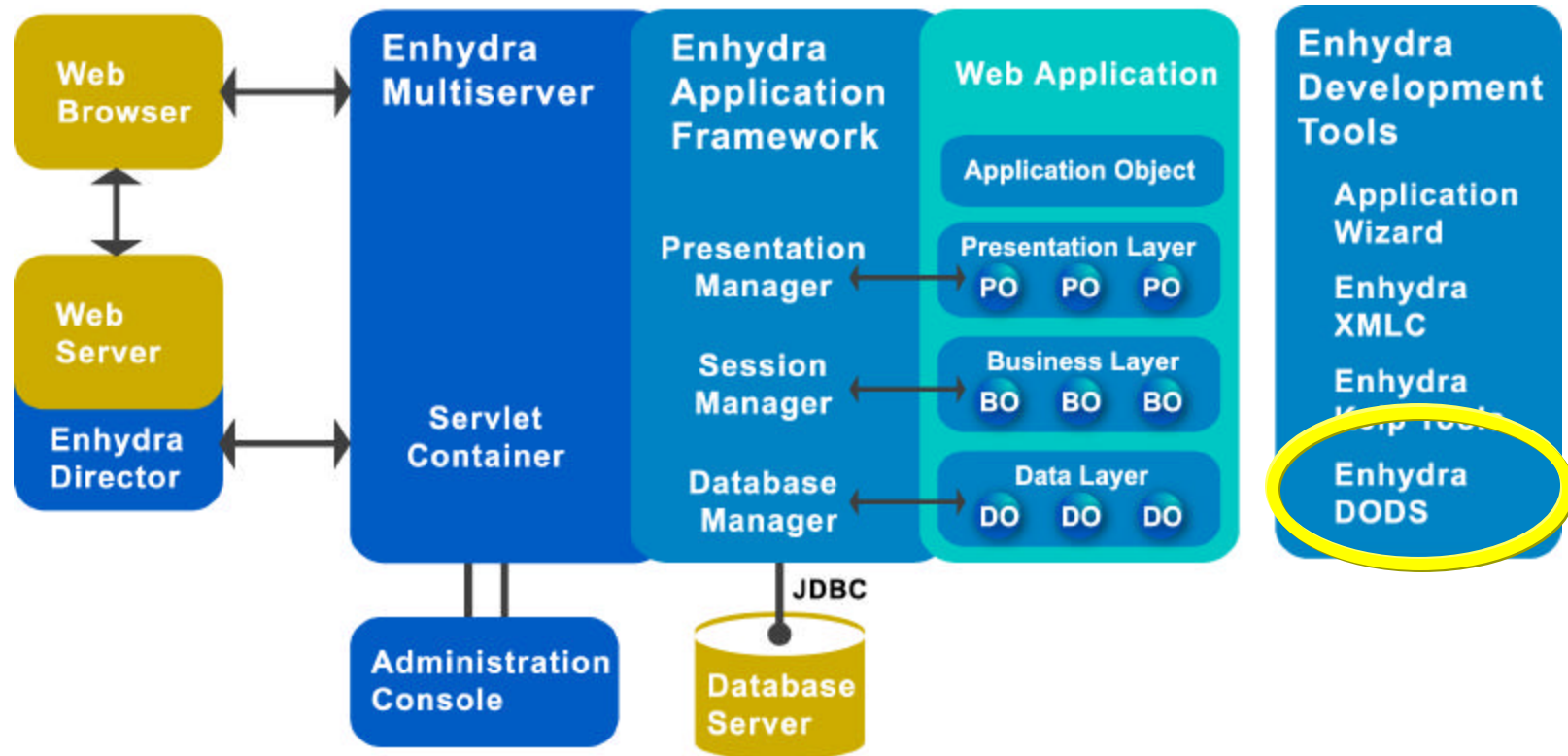
- **Startup()**
 - Hp3000demo.java
 - Method used by the Admin Console to start the application.
 - Where application object information can be stored.
- **requestProcessor()**
 - HP3000demo.java
 - Method invoked by application to request a session object
- **run()**
 - Hp3000demo/presentation/WelcomePresentation.java
 - Method used by Presentation Manager to invoke the Base Presentation Object



Execution Flow



Lutris Enhydra Architecture



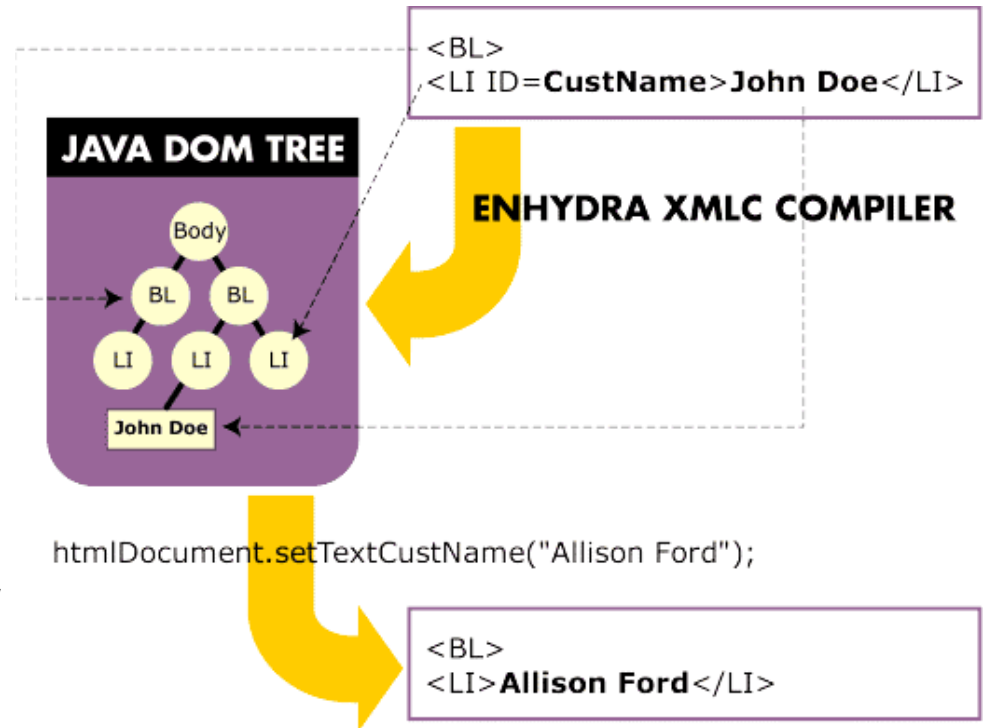
Challenge: Web applications for the New Devices On the Block



Enhydra XMLC

for device independence

- Enhydra XML Compiler
- Alternative to JSP for building truly maintainable Web presentations
- Completely separates designer from Java developer for real world consulting and development projects
- As an XML engine, able to read and modify pages of XML, HTML, WML, XHTML, cHTML (imode) & VoiceXML
- Power's HBO's "Soprano's" site (on top of BEA WebLogic).



- For those who choose JSP-based development, Enhydra also supports Servlet 2.2 with JSP 1.1

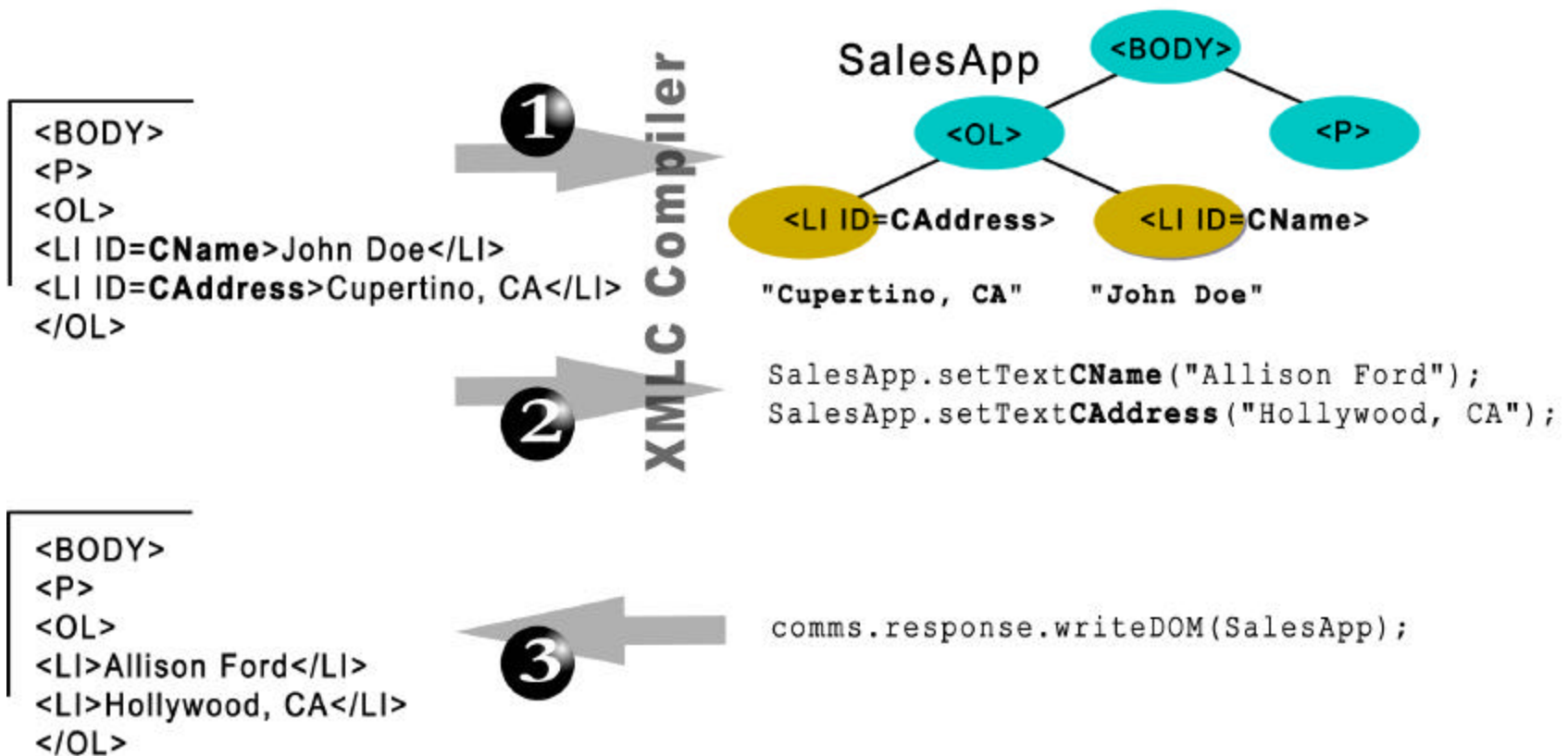


Enhydra XMLC Key Elements

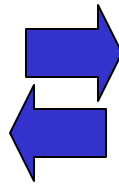
- **XML – more than just data transport**
 - Defined by W3C
 - Foundation for evolving standards, e.g. VoiceXML, XHTML, CML)
- **DOM – Document Object Model**
 - Defined by W3C
 - How a program represents an XML/HTML document in memory
 - A hierarchical representation of an XML/HTML document as represented in a software programming language, e.g. Java
 - Library for traversing, pruning, accessing portions of the DOM “tree”
- **XML Parser (from Apache Xerces Project)**
 - Parses an XML text file, turning the results into a Java DOM tree in memory.
- **Net Result**
 - presentation templates with id tags for dynamic elements are compiled to Java and become a resource to the application server



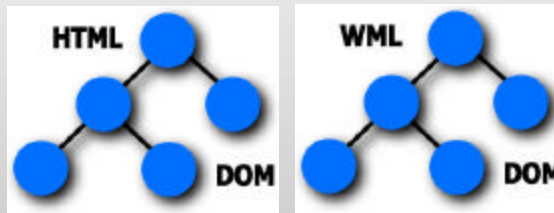
Development with Enhydra XMLC



How Enhydra XMLC delivers Enhydra's Global Device Support



Enhydra Multiserver



Base Presentation Object

Presentation Logic



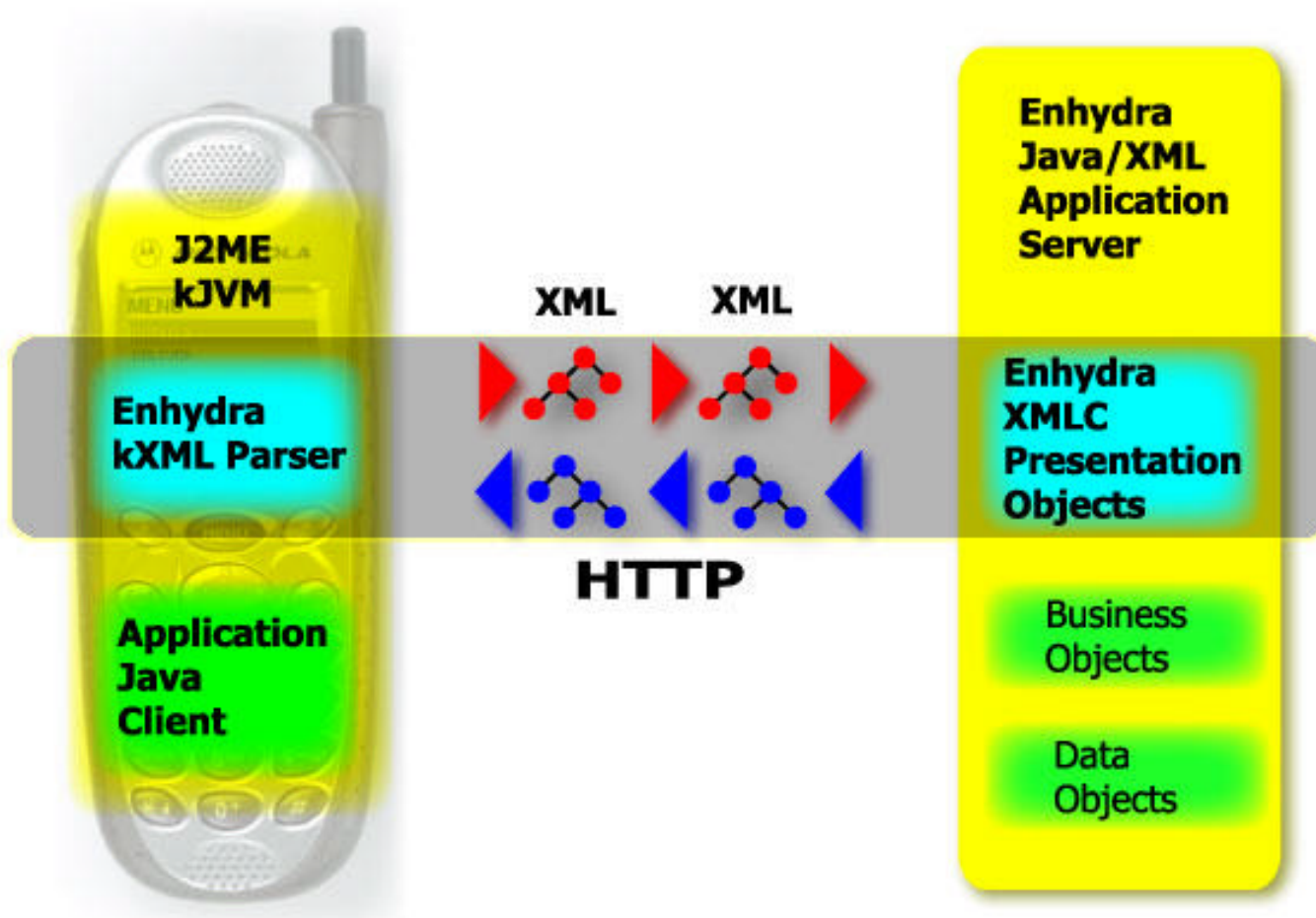
E. Java Beans

Business Logic

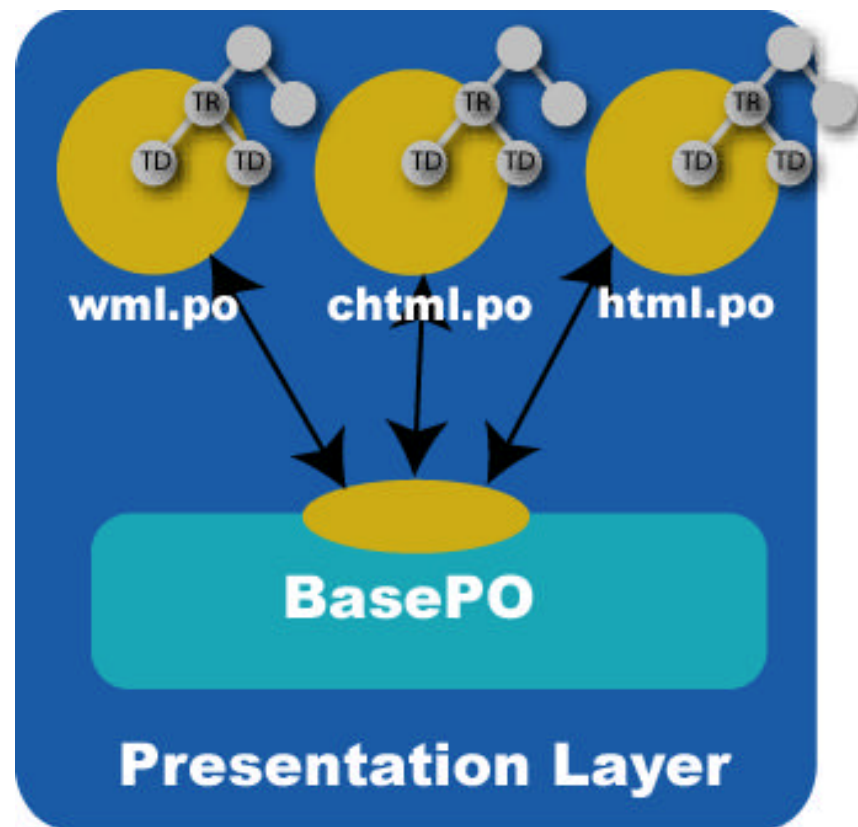


ENHYDRA

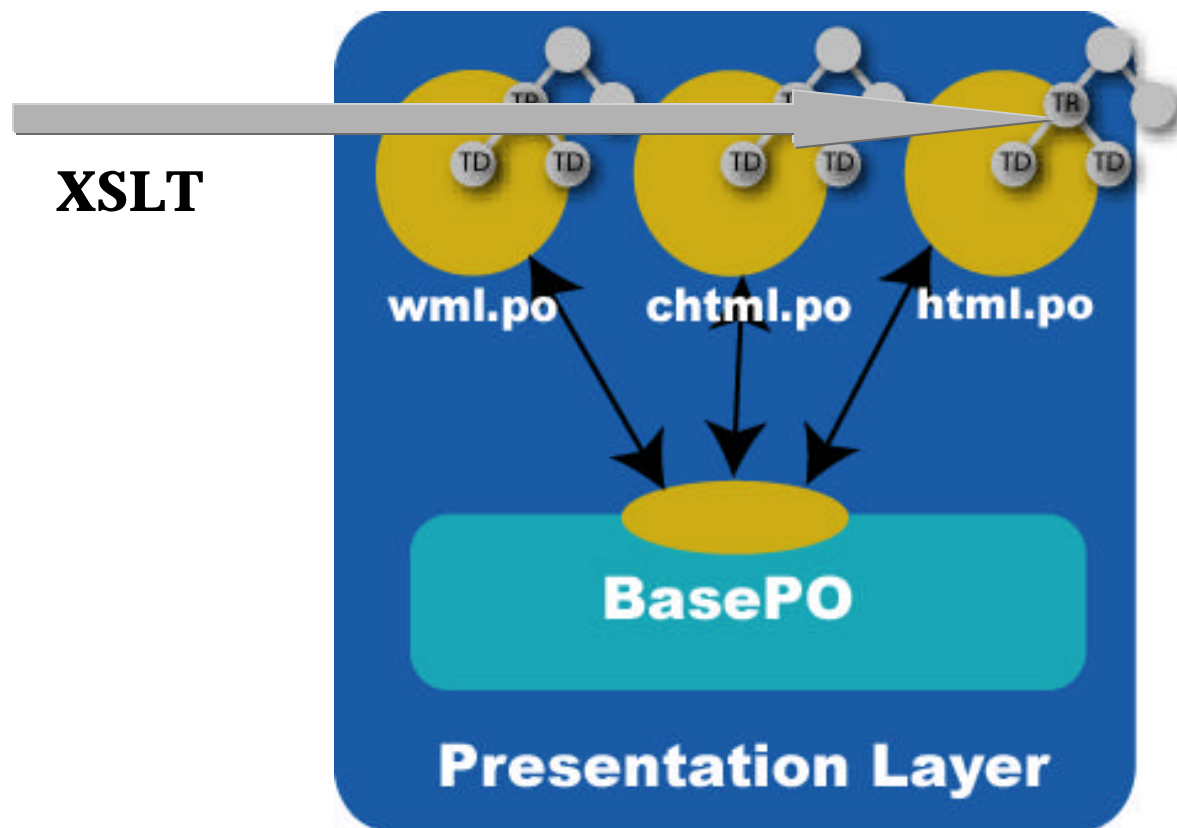
J2ME and Enhydra XMLC



Template Selection Mechanism



Template Selection Mechanism w/ XSLT

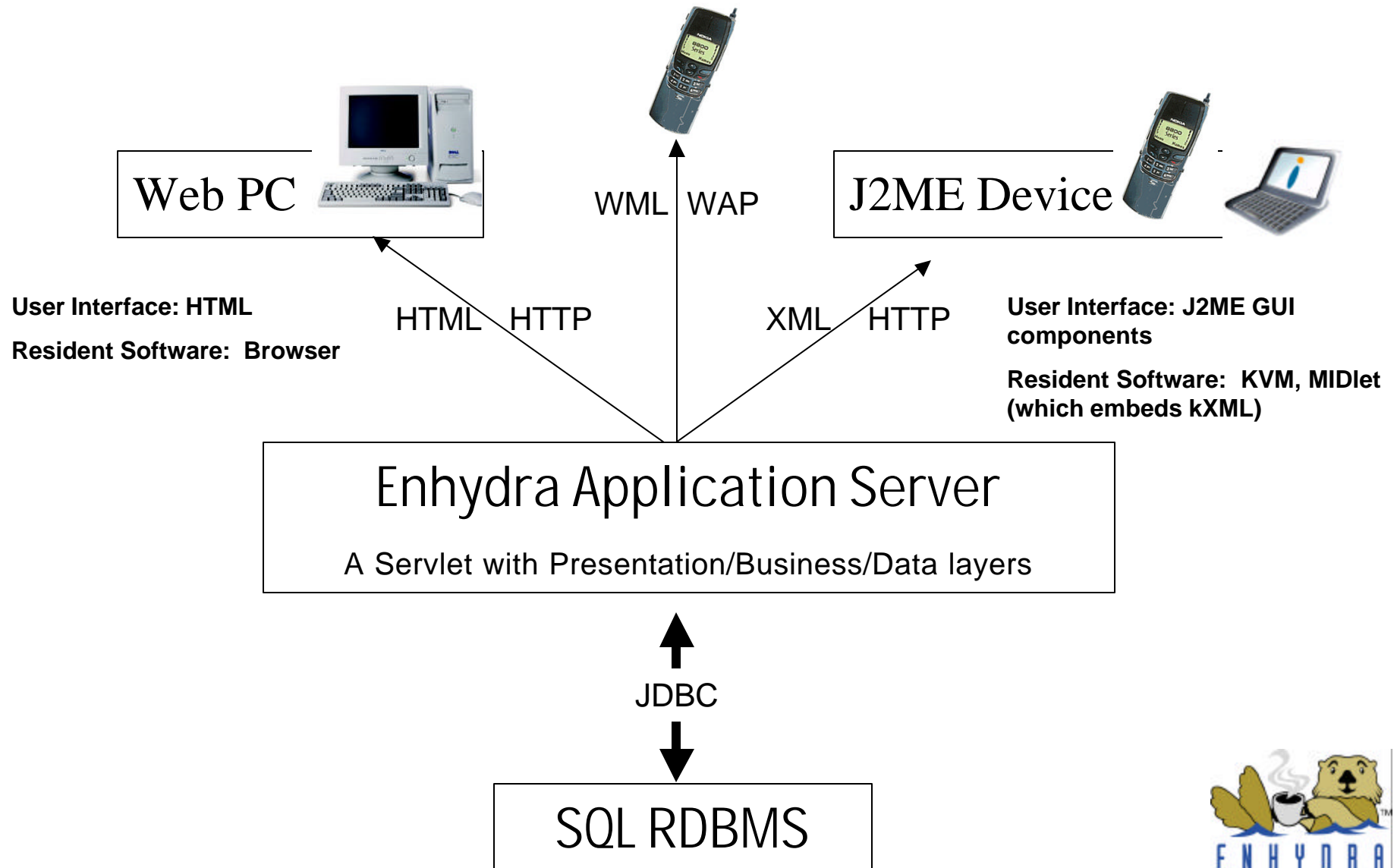


Simple Tutorial – An Address Book

- **Open Source, so share it!**
 - Orig Contributors Victor, Keith, Joe, & Robert
- **Easily extensible for other needs**
 - Local restaurants [query by city & type]
 - Local movies [query by city & time]
 - Your UPS package [query by name & ID]
- **Sample Application**
 - Phone Book – retrieve contact information
 - Supports 3 client types
 - HTML – web browser
 - WML – WAP phone
 - XML – J2ME client application
 - Demonstrates how device independence is implemented
 - Assumes you're adding a J2ME client to an existing application



High Level Address Book Architecture



Application Structure

File Edit View Tools Help

presentation

All Folders

- wireless
 - demo
 - com
 - ayg
 - demo
 - business
 - data
 - dods
 - presentation
 - html
 - wml
 - xml
- instantdb
- html
- images
- j2me-client
 - src
 - com
 - lutris
 - sample
 - data
 - forms
- de

Contents of 'D:\temp\wireless\demo\com\ayg\demo\presentation'

Name	Size	Type	Modified
html		File Folder	1/11/01 5:58 PM
wml		File Folder	1/11/01 5:58 PM
xml		File Folder	1/11/01 5:58 PM
BasePO.java	2KB	JAVA File	1/9/01 6:31 PM
Details.java	3KB	JAVA File	1/9/01 6:31 PM
DetailsPage.java	1KB	JAVA File	1/9/01 6:31 PM
Index.java	2KB	JAVA File	1/9/01 6:31 PM
Makefile	1KB	File	1/9/01 6:31 PM
Result.java	4KB	JAVA File	1/9/01 6:31 PM
ResultPage.java	1KB	JAVA File	1/9/01 6:31 PM
Search.java	4KB	JAVA File	1/9/01 6:31 PM
xml.mk	2KB	MK File	1/9/01 6:31 PM

12 object(s) 15.5KB (Disk free space: 1.01GB)

Application Structure

Exploring - D:\temp\wireless\demo\com\ayg\demo\presentation

File Edit View Tools Help

Exploring - D:\temp\wireless\demo\com\ayg\demo\presentation\html

File Edit View Tools Help

html

All Folders

Contents of 'D:\temp\wireless\demo\com\ayg\demo\presentation\html'

Name	Size	Type	Modified
Details.html	1KB	Microsoft HTML Doc...	1/9/01 6:31 PM
Index.html	1KB	Microsoft HTML Doc...	1/9/01 6:31 PM
Result.html	1KB	Microsoft HTML Doc...	1/9/01 6:31 PM

12 3 object(s) 1.01KB (Disk free space: 1.01GB)

Application Structure

The screenshot displays a Windows Explorer window with the following structure:

- Root: D:\temp\wireless\j2me-client\src\com\lutris\sample\forms
 - Details.java (3KB, JAVA File, Modified: 1/9/01 6:31 PM)
 - Makefile (1KB, File, Modified: 1/9/01 6:31 PM)
 - QueryForm.java (3KB, JAVA File, Modified: 1/9/01 6:31 PM)
 - QueryResultsList.java (6KB, JAVA File, Modified: 1/9/01 6:31 PM)

The left pane shows the following directory tree:

- wireless
 - demo
 - com
 - ayg
 - demo
 - business
 - data
 - dods
 - presentation
 - html
 - wml
 - xml
 - instantdb
 - html
 - images
 - j2me-client
 - src
 - com
 - lutris
 - sample
 - data
 - forms

Unlike HTML & WML clients, J2ME clients receive XML data streams from the application server. The XML is parsed by kXML, and displayed using the MIDP GUI components

5 Elements of Device Independent Application Presentations

- **XMLC, the XML Compiler.**
- **Device specific templates.**
- **Common XMLC API.**
- **Template selection mechanism.**
- **Generic DOM template manipulation.**



Creating a Presentation with XMLC

- **Designer and Developer agree on common IDs.**
 - IDs represent areas of dynamic content
 - E.g., `<TABLE id=Customers>`, `<TR id=CustomerInfo>`,
`John Doe`
 - Designer & Developer only re-group if ID changes are required.
- **Designer and Developer part ways.**
- **Developer passes preliminary document through Enhydra XMLC compiler**
 - Generates accessor methods, e.g. `SetTextCustomers()`,
`SetRowElement()` to begin development
- **Designer evolves document design/layout**
 - Review, rework according to customer requirements/feedback
- **Auto-recompile detects changes**



5 Elements of Device Independent Application Presentations

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HTML & WAP Device Specific Templates

HTML – Details.html

```
...  
<p id="person">  
  <b><em id="name">John Doe</em></b><br />  
  <b>Position: </b><em id="position">President</em><br />  
  <b>Phone: </b><em id="phone">111.2222</em><br />  
  <b>Fax: </b><em id="fax">222.3333</em><br />  
</p>  
...
```

WML – Details.wml

```
...  
<card id="indexTemplate" title="Details">  
  <p id="person">  
    <b><em id="name">Johh Doe</em></b><br />  
    <b>Position: </b><em id="position">President</em><br />  
    <b>Phone: </b><em id="phone">111.2222</em><br />  
    <b>Fax: </b><em id="fax">222.3333</em><br />  
  </p>  
</card>  
...
```



J2ME Device Specific Template

XML - Details.xml

```
...
<Person id="person">
  <Name id='name'>John Doe</Name>
  <Phone id='phone'>111.2222</Phone>
  <Position
    id='position'>President</Position>
  <Fax id='fax'>222.3333</Fax>
</Person>
```

sample.dtd

```
...
<!ELEMENT Person (Name, Phone,
  Position, Fax)>
<!ATTLIST Person id ID #IMPLIED>

<!ELEMENT Name (#PCDATA)>
<!ATTLIST Name id ID #IMPLIED>

<!ELEMENT Phone (#PCDATA)>
<!ATTLIST Phone id ID #IMPLIED>

<!ELEMENT Position (#PCDATA)>
<!ATTLIST Position id ID #IMPLIED>

<!ELEMENT Fax (#PCDATA)>
<!ATTLIST Fax id ID #IMPLIED>
```



J2ME HTTPConnection

```
/**
 * Retrieves the contact information for a particular person
 */
public Person getDetails(String oid)
    throws IOException
{
    HttpURLConnection con = null;
    InputStream in = null;
    Document document = null;

    try {
        StringBuffer detailsURL = new StringBuffer(DETAILS_SERVICE);
        detailsURL.append("?id=");
        detailsURL.append(oid);

        con = (HttpURLConnection) Connector.open(detailsURL.toString(),
            Connector.READ, true);
        con.setRequestMethod(HttpURLConnection.GET);
        con.setRequestProperty("Accept", "text/xml");
        con.setRequestProperty("Content-Language", "en-US");
        in = con.openInputStream();
    }
}
```



HTTP Connection, Cont'd

```
Parser parser = new DefaultParser(new InputStreamReader(in));
document = new Document();
document.parse(parser);
```

```
Person p =
XMLServices.getInstance().deserializePerson(document);
return p;
} finally {
    if (in != null) {
        in.close();
    }
    if (con != null) {
        con.close();
    }
}
```



J2ME GUI for Details.java

```
/**
 * Builds the screen with the information of a particular
 * Person.
 */
private void buildPersonInfo(Object person) {
    if (size() != 0) {
        clearScreen();
    }

    Person p = (Person) person;
    setTitle(p.getName());
    append("Phone: " + p.getPhone(), null);
    append("Position: " + p.getPosition(), null);
    append("Fax: " + p.getFax(), null);
}
```



5 Elements of Device Independent Application Presentations

- XMLC, the XML Compiler.
- Device specific templates.
- **Common XMLC API.**
- Template selection mechanism.
- Generic DOM template manipulation.



Define a Common XMLC API

DetailsPage.java

```
public interface DetailsPage extends XMLObject {  
    public Element getTagPerson();  
    public Element getTagName();  
    public Element getTagPosition();  
    public Element getTagPhone();  
    public Element getTagFax();  
  
    public void setTextName(String name);  
    public void setTextPosition(String position);  
    public void setTextPhone(String phone);  
    public void setTextFax(String fax);  
}
```



5 Elements of Device Independent Application Presentations

- XMLC, the XML Compiler.
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Template Selection Mechanism

BasePO.java – all other Pos extend BasePO

```
public String getPageName(HttpPresentationComms comms, String
poName) {
    ...
    try {
        if ((header = comms.request.getHeader("Accept")) == null) {
            return null;
        } else if (header.indexOf("text/xml") != -1) {
            return poName + "XML";
        } else if (header.indexOf("text/vnd.wap.wml") != -1) {
            return poName + "WML";
        } else {
            return poName + "HTML";
        }
    } catch (Exception e) {
        ...
    }
}
```



5 Elements of Device Independent Application Presentations

- XMLC, the XML Compiler.
- Device specific templates.
- Common XMLC API.
- Template selection mechanism.
- **Generic DOM template manipulation.**



Generic DOM Manipulation

Details.java

```
public class Details extends BasePO {
    public void run(HttpPresentationComms comms)
        throws HttpPresentationException
    {
        DetailsPage details = (DetailsPage)
            create(comms, "com.ayg.demo.presentation.Details");
        // RETRIEVE PERSON'S INFORMATION FROM DATABASE
        // IF PERSON NOT IN DATABASE
        Element personElement = details.getTagPerson();
        Node personContainer = personElement.getParentNode();
        Node errMsg = details.createElement("em");
        errMsg.appendChild(details
            .createTextNode("Error retrieving database info.));
        personContainer.replaceChild(errMsg, personElement);
        comms.response.writeDOM(details);
        return;
    }
}
```

Continued...



Generic DOM Manipulation (Cont.)

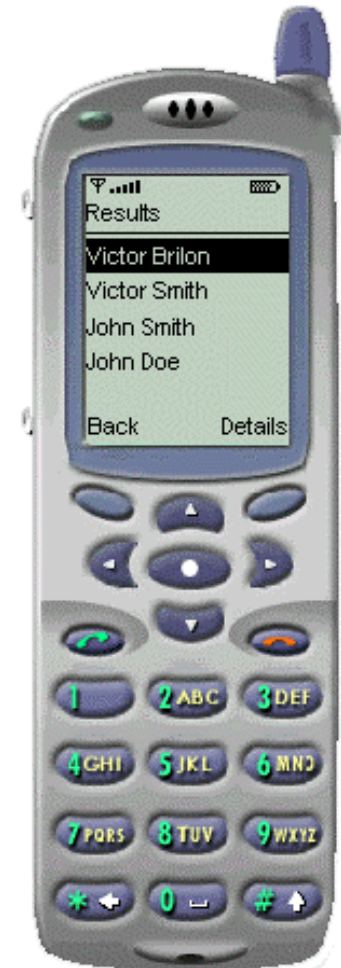
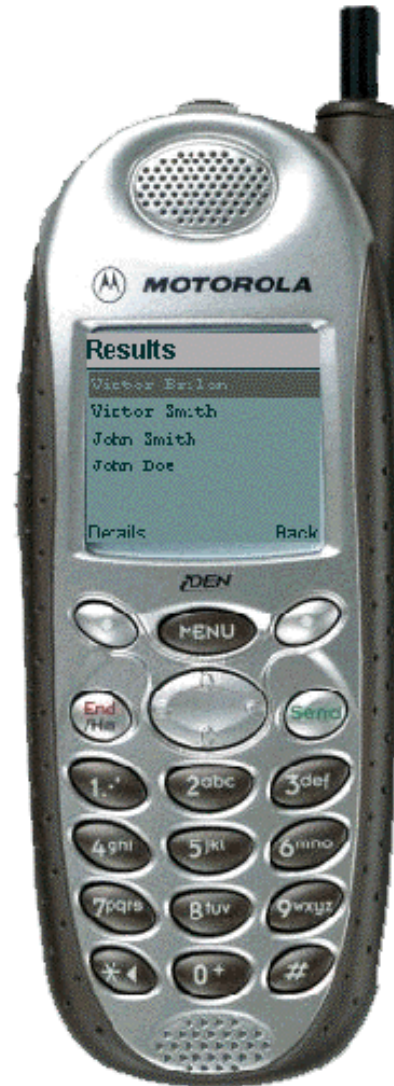
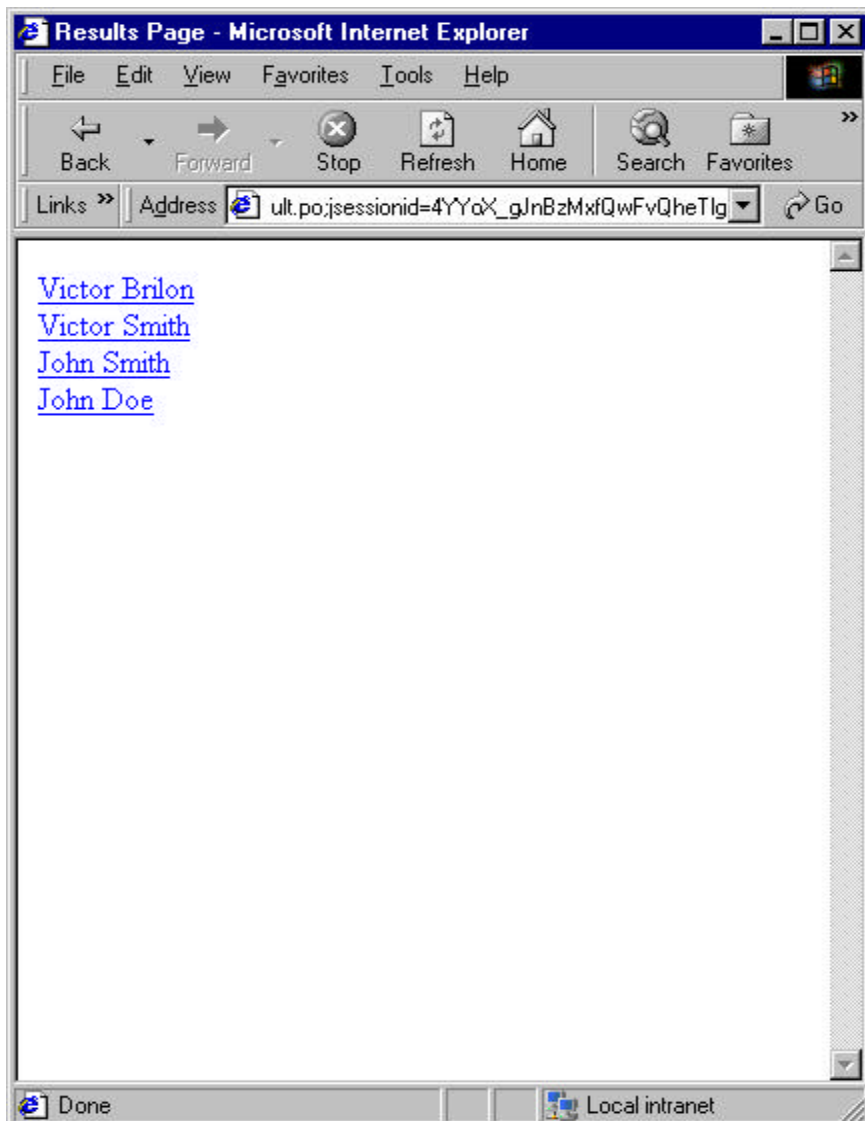
Details.java - continued...

```
try {
    String name = person.getFirstName() + " " +
person.getLastName();
    String phone = person.getPhone();
    String position = person.getPosition();
    String fax = person.getFax();

    details.setTextName(name);
    details.setTextPhone(phone);
    details.setTextPosition(position);
    details.setTextFax(fax);
} catch (Exception e) {
    ...
}
comms.response.writeDOM(details);
```



Consistent Behavior Across Devices



Making the Transition: From Perl to Enhydra...

- **Migrating to Java and Enhydra**
 - Enhydra as a safe learning environment
- **Comparative Points**
 - Clean separation of markup from logic
 - Template mechanism makes localization a snap
 - Standards are happening in the Java space
 - Scale to large project with Enhydra
- **Lutris White Paper:
Migrating from Perl to Enhydra**
<http://www.lutris.com/>



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Motorola leveraging open source and Enhydra to deliver J2ME platform
 - [David H. Young](#), Editor

As big as the Motorola/Lutris [announcement](#) in December was, I'm not really sure everyone understood the significance of what really happened. By shipping Enhydra 3.1 with their iDEN phone SDK and by licensing their J2ME phone emulator to ship with Lutris Enhydra 3.5, Motorola is doing what no other major OEM has done, namely, leverage an open source project to deliver new applications for their brand new line of mobile devices. Traditionally, OEMs have had to go door-to-door to traditional software houses to encourage product managers to support their new platforms. But now, with well-focused organizations like Enhydra.org as sponsored by Lutris, there's a brand new channel for fostering worldwide application development. (BTW, watch [lutris.com](#) for an announcement of the "Introduction to J2ME Development" Webinar from Lutris & Motorola, 22 Feb 2000).

Vote for Enhydra in the JDJ Poll

Download the Enhydra Competitive White Paper

I recently had the chance to pontificate more about OEMs, how they're embracing "open source solution stacks" and why. Check out my guest editorial at [ZDnet](#).

As we move well past 1,000 LEJ subscribers, we're getting some awesome article contributions, including our first from the University community. Edison Thomaz of MIT has written a very elegant account of his work with Enhydra. I'd love to represent the academic world's use of Enhydra on a regular basis in LEJ.

In this issue, we [report](#) on some fun we had porting the J2EE Pet Store application to Enhydra 3 for a performance comparison with WebLogic. Be sure to see how we confirm that Enhydra is lean and mean when stressed out with some good load testing.

In This Edition...

- » [Developing a Search Engine with Enhydra](#)
 MIT graduate student Edison Thomaz tells the journal his experience developing a search engine using Enhydra.
- » [Enhydra 3 vs WebLogic: The Pet Store Performance Bake-off](#)
 Thought we'd have some (serious) fun and see how the Enhydra superservlet framework compares with BEA WebLogic.
- » [Zope Versus Enhydra](#)
 Paul Gresham gives his hands-on insight into working with two top open source application servers.
- » [Introducing kXML for J2ME Enhydra](#)
 Stefan Hausteijn, chair of [kxml.enhydra.org](#), introduces the technology that glues Enhydra XMLC with new J2ME devices.





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Questions?

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