Creating Simple Windchill Admin Tools Using Info*Engine

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ESC Design Development Process Support Team

The Engineering Services Contract (ESC) at Kennedy Space Center provides services to NASA for the design and development of flight and ground systems in support of manned space flight. The ESC process support team provides for efficient optimized design and development processes through development, configuration, and implementation of software tools, training, documentation and standards. The team supports over 200 engineers and design specialists using Windchill, Pro-E, NX, AutoCAD, and other design and analysis tools.

Engineering Services Contract

Partnering To Engineer the Future

Agenda

- Common Business Needs
- The Info*Engine and JSP Solution
- Process Overview
- Creating Info* Engine Tasks
- Creating JSP Pages
- Resources and Help

Common Business Needs

- Getting Information Out of Windchill
  - Generate reports
  - Export Windchill object information automatically to a third party application
  - Query Windchill for information and return it in a webpage
  - Create a simple webpage for non-technical users to perform specific actions
- Creating, Updating, or Performing Actions on Many Objects At Once
  - Duplicate or rename objects
  - Update object contents, attributes, lifecycle states, etc.
- Performing Administrative Tasks
  - Checkin or undo checkout all users' objects at once
  - Correct or update Windchill Object links
  - Change teams, domain polices, etc.…

The Info*Engine and JSP Solution

Function of Each Tool

- Info*Engine
  - Perform Windchill actions
- JSP Pages
  - Provide a web-based UI

The Info*Engine and JSP Solution

Use Cases

- How can they be used?
  - Frequently or occasionally
  - Automated or manual
- Who can use them?
  - Windchill administrators
  - Specific groups
  - All users

Demonstration

KSC Developed Info*Engine Example

- Renaming many objects

Process Overview

Steps to Implement Info*Engine and JSP

1. Write Info*Engine Task (XML)
2. Add XML files to Windchill codebase
3. Write JSP page (HTML and JavaScript)
4. Add JSP files to Windchill codebase

Creating Info*Engine Tasks

What is Info*Engine?

- Info*Engine - Provides a flexible, standard base foundation to automate specific tasks and transfers information to other third party applications. Info* Engine takes advantage of Service-Oriented Architecture (SOA) with the support for SOAP (Simple Object Access Protocol) and WSDL (Web Service Definition Language). Info*Engine tasks are in written in XML and do not require experience with Java.

- Info*Engine is the glue or underlying foundation of Windchill

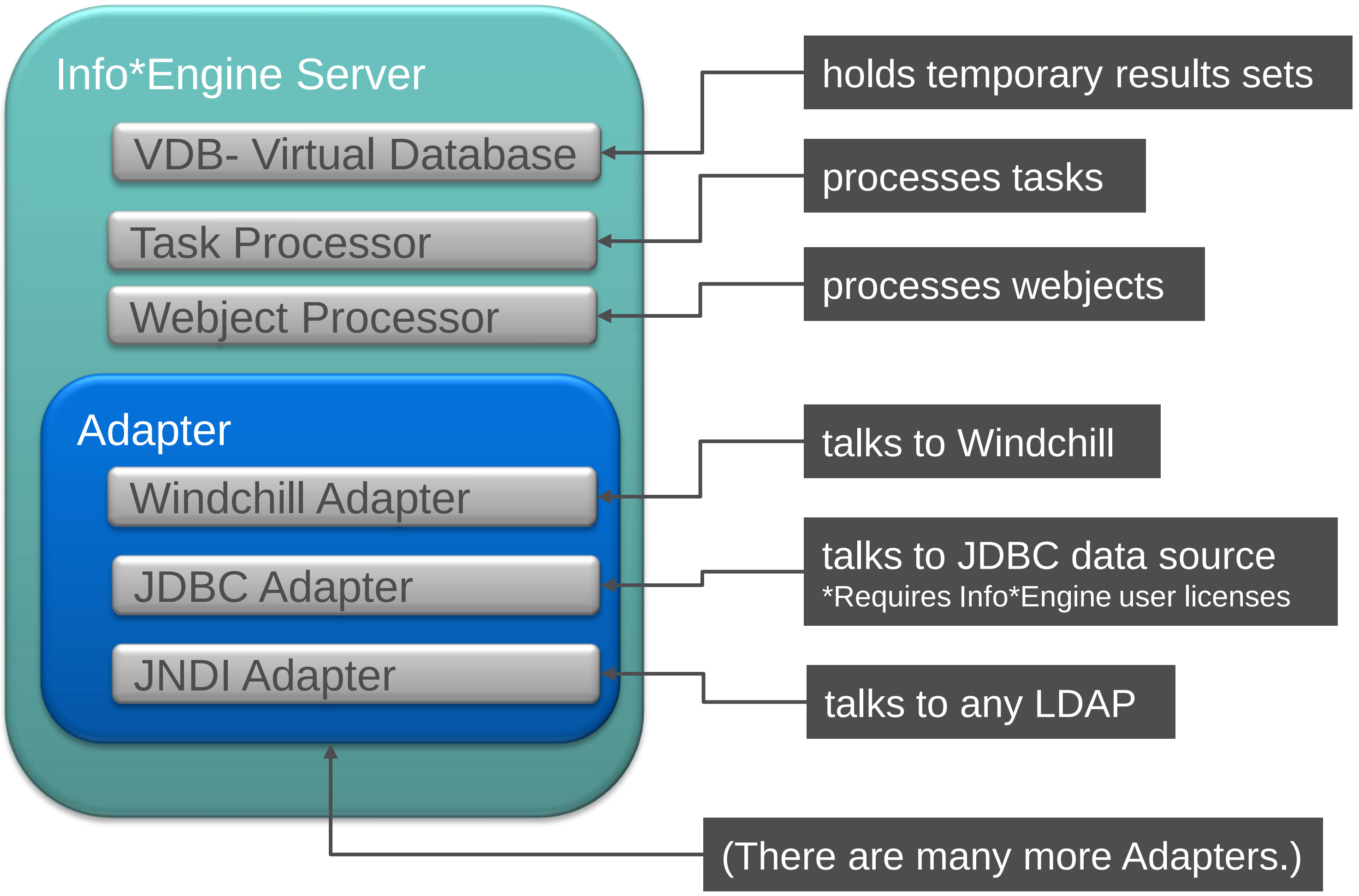
Creating Info*Engine Tasks

Additional Information

- Info*Engine is installed in every Windchill installation and is free to use within the PTC products.
- No additional licenses are required unless using Info*Engine to connect with third party applications.
- PTC supports Info*Engine
- Does not require a skilled programmer or Java experience
- Easy to implement

Creating Info*Engine Tasks

Info*Engine Architecture

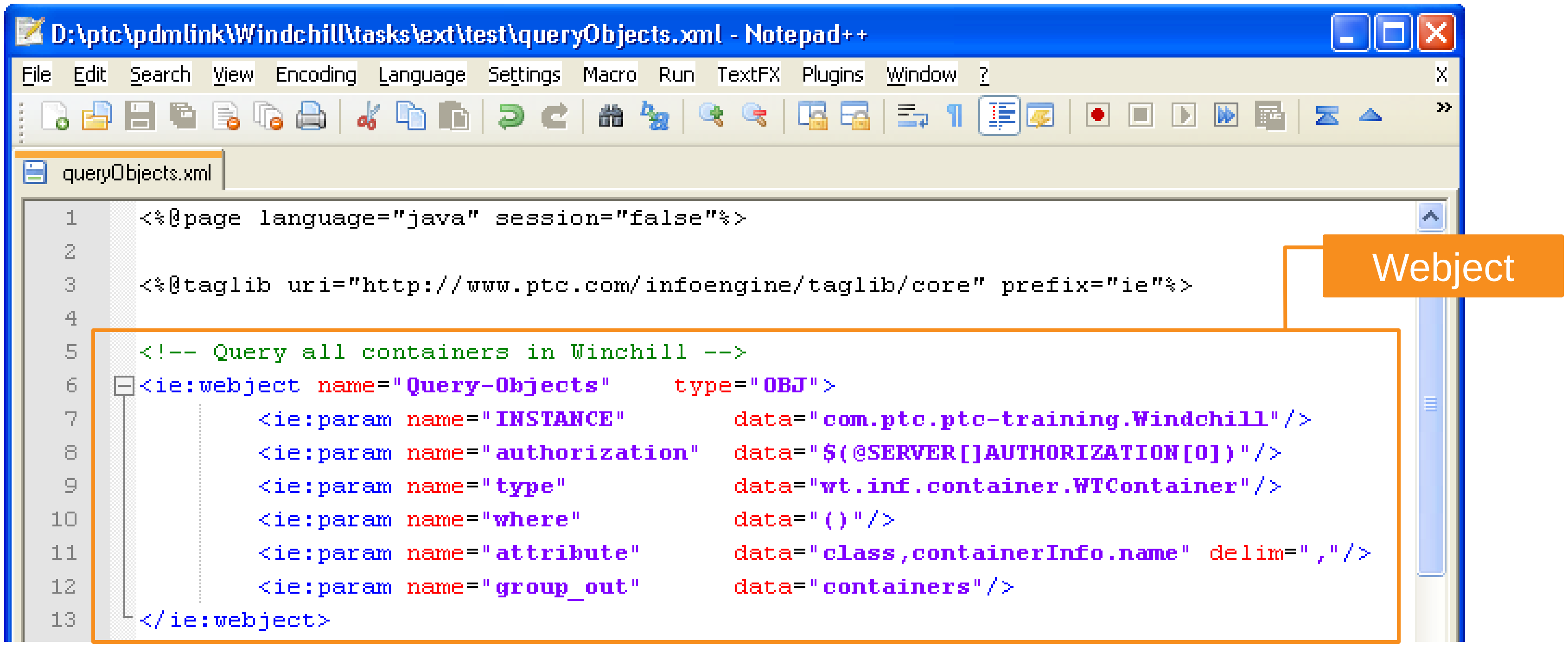


Creating Info*Engine Tasks

Understanding Tasks and Webjects

- Info*Engine tasks are text-based xml files. They can control the retrieval and manipulation of data within the Info*Engine environment. Instead of developing a Java application or a JSP, a task can perform many of the same operations as Java applications can.

- A task includes Webjects to perform Windchill operations


D:\ptc\pdmlink\Windchill\tasks\ext\test\queryObjects.xml - Notepad++
File Edit Search View Encoding Language Settings Macro Run TextFX Plugins Window ?
queryObjects.xml
Webject

```
<%@page language="java" session="false"%>

<%@taglib uri="http://www.ptc.com/infoengine/taglib/core" prefix="ie"%>

<!-- Query all containers in Winchill -->
<ie:webject name="Query-Objects"    type="OBJ">
        <ie:param name="INSTANCE"        data="com.ptc.ptc-training.Windchill"/>
        <ie:param name="authorization"   data="$(@SERVER[]AUTHORIZATION[0])"/>
        <ie:param name="type"            data="wt.inf.container.WTContainer"/>
        <ie:param name="where"           data="()"/>
        <ie:param name="attribute"       data="class,containerInfo.name" delim=","/>
        <ie:param name="group_out"       data="containers"/>
</ie:webject>
```

Creating Info*Engine Tasks

Understanding Tasks and Webjects

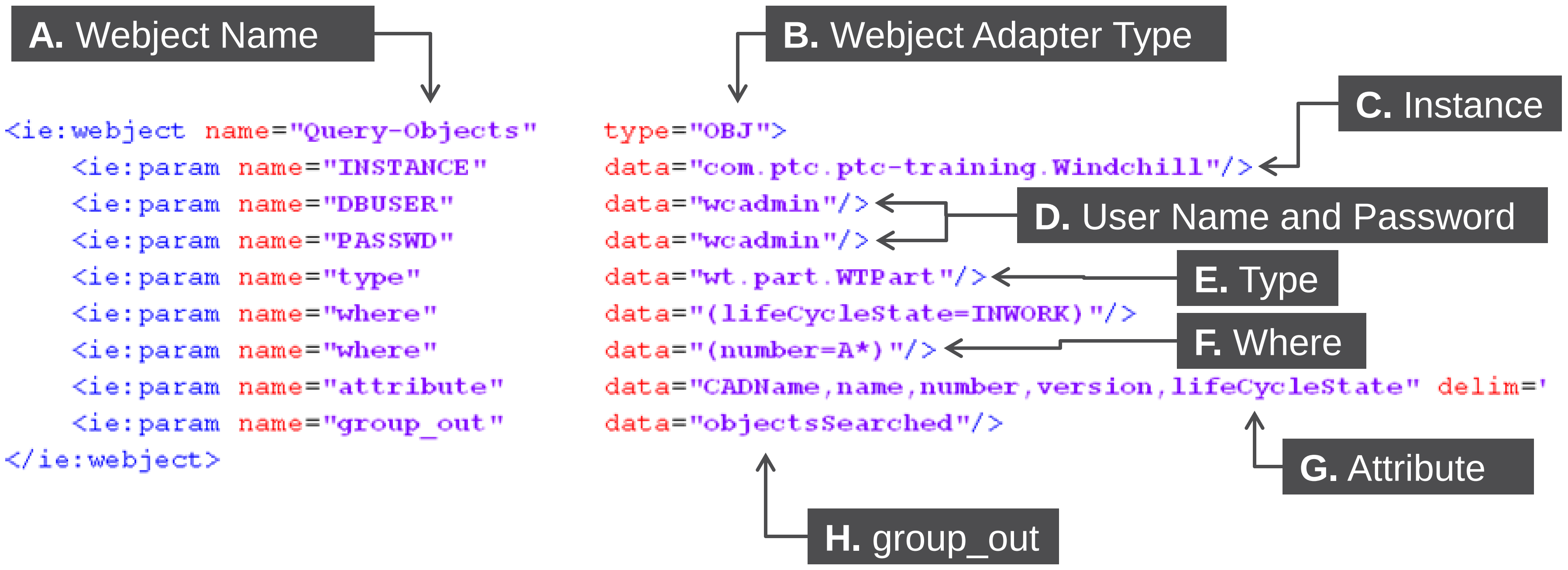
- The Info*Task compiler parses Info*Engine tasks and produces Java classes. This improves the performance of executing tasks by eliminating the need to parse and interpret a task each time it is called. It also facilitates embedding tasks in standalone Java applications and JSP pages.

- The task compiler produces the executable Java classes in three basic steps:
  1. Parses task sources and generates Java code that implements the task.
  2. Calls a Java compiler to produce an executable class from the generated Java source.
  3. Calls a class loader to load and instantiate the classes produced by the Java compiler.

Creating Info*Engine Tasks

Structure of a Webject

- Webjects are the basic form to do most significant actions in Info*Engine. They are custom tag libs. Webjects supported by the Windchill adapter accept parameters that specify database user credentials and query criteria.



```
<ie:webject name="Query-Objects"     type="OBJ">
    <ie:param name="INSTANCE"        data="com.ptc.ptc-training.Windchill"/>
    <ie:param name="DBUSER"          data="wcadmin"/>
    <ie:param name="PASSWD"          data="wcadmin"/>
    <ie:param name="type"            data="wt.part.WTPart"/>
    <ie:param name="where"           data="(lifeCycleState=INWORK)"/>
    <ie:param name="where"           data="(number=A*)"/>
    <ie:param name="attribute"       data="CADName,name,number,version,lifeCycleState" delim='
    <ie:param name="group_out"       data="objectsSearched"/>
</ie:webject>
```

Creating Info*Engine Tasks

Webject Adapters

- Webjects are the basic form to do most significant actions in Info*Engine. They are custom tag libs. Webjects supported by the Windchill adapter accept parameters that specify database user credentials and query criteria.

Most Common Types

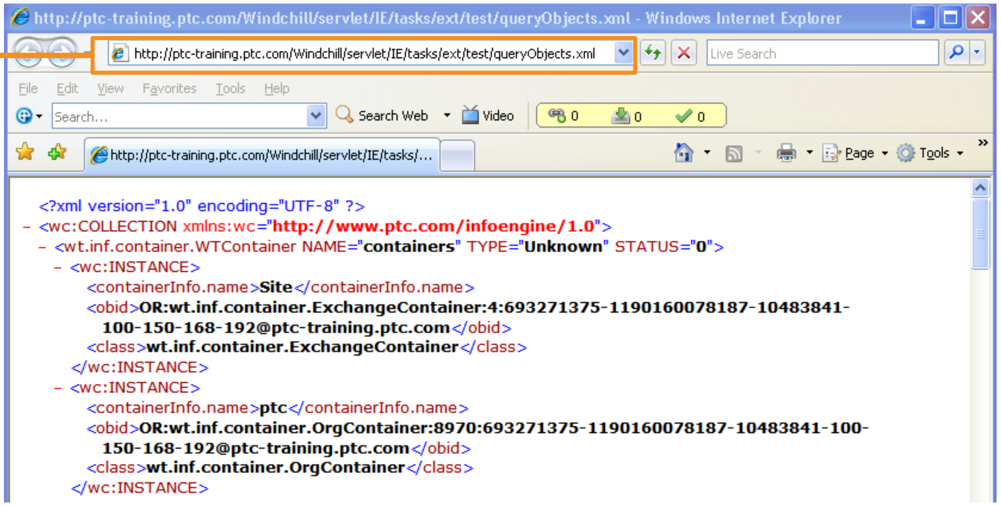
Type	Webjects	Description
ACT	Action	Performs actions on data
OBJ	Object or Query	Query the system
GRP	Group	Manipulate Virtual Data Base (VDB)
DSP	Display	Use data in VDB to display in HTML. This cannot be used in a standalone task but can be used in a JSP.
IMG	IMG	Use data in VDB to create a JPEG image
MGT	Management	Perform special activates such as throwing exceptions or getting properties
WES	Web Event Service	Subscribe to and manipulate messaging topics
MSG	Messaging	Subscribe to and manipulate message queues
ADM	Administrative	Perform I*E admin tasks, such as reloading cached properties

Creating Info*Engine Tasks

Running a Info*Engine Task

- The output of an Info*Engine task is in the form of XML. When running a task from the browser, the URL must include the **host name** and application URL prefix specified where I*E was installed. It also includes the **/servlet/IE/tasks** prefix, which directs the servlet to the task processor. And specifying the path where the xml task is located.

Host Name	Prefix	Servlet Prefix	XML Path
http://ptc-training.ptc.com	**/Windchill**	**/serverlet/IE/tasks**	**/Ext/test/queryObjects.xml**


http://ptc-training.ptc.com/Windchill/servlet/IE/tasks/ext/test/queryObjects.xml - Windows Internet Explorer
http://ptc-training.ptc.com/Windchill/servlet/IE/tasks/ext/test/queryObjects.xml
Live Search
File Edit View Favorites Tools Help
Search...
Search Web
Video
http://ptc-training.ptc.com/Windchill/servlet/IE/tasks/...
Page
Tools

```
  <?xml version="1.0" encoding="UTF-8" ?>
- <wc:COLLECTION xmlns:wc="http://www.ptc.com/infoengine/1.0">
  - <wt.inf.container.WTContainer NAME="containers" TYPE="Unknown" STATUS="0">
    - <wc:INSTANCE>
        <containerInfo.name>Site</containerInfo.name>
        <obid>OR:wt.inf.container.ExchangeContainer:4:693271375-1190160078187-10483841-
          100-150-168-192@ptc-training.ptc.com</obid>
        <class>wt.inf.container.ExchangeContainer</class>
      </wc:INSTANCE>
    - <wc:INSTANCE>
        <containerInfo.name>ptc</containerInfo.name>
        <obid>OR:wt.inf.container.OrgContainer:8970:693271375-1190160078187-10483841-100-
          150-168-192@ptc-training.ptc.com</obid>
        <class>wt.inf.container.OrgContainer</class>
      </wc:INSTANCE>
```

Demonstration

Demonstration of Info*Engine Task

- Update a objects attribute
- Modify Revisions of many CAD Document
- Updating Links between WTParts to CAD Documents.

Creating JSP Pages

What is a JSP?

- Java Server Pages (JSP) is a core technology of J2EE (the Java 2 Platform, Enterprise Edition) and solutions based upon EJB (Enterprise Java Beans).
- Info*Engine supports the development of enterprise custom Java applications and provides a JSP processor as an extension of the Info*Engine servlet engine. The JSP processor dynamically translates JSP pages into servlets.
- Usually, a JSP page is an HTML page with some additional JSP tags and some embedded Java code. However, inclusion of JSP tags or embedded Java is not mandatory, so a page containing only HTML is a legitimate JSP page.
- JSP pages that interact with Info*Engine usually contain a simple set of JSP tags and a set of custom Info*Engine tags that define the Webjects that are then executed when the page is accessed.

Creating JSP Pages

What is a JSP?

- JSP pages can include HTML, Java Classes, Java Scripts, Scriptlets, and Info*Engine code (Webjects).
- JSP pages are resided on a server
- A very simple example of a JSP page is shown below.

```
HTML>
<BODY>
<%
    //This is a scriptlet.
    System.out.println( "Evaluating date now" );
    java.util.Date date = new java.util.Date();
%>
Hello!  The time is now <%= date %>
</BODY>
</HTML>
```

Creating JSP Pages

Location of a Windchill JSP

- When Info*Engine is installed, the installer specifies an Info*Engine installation directory which determines where JSP pages must be stored. All Info*Engine JSP pages must reside under the codebase directory where Info*Engine is installed.
- All JSP pages are saved on the Windchill server at the below location.
- **<Windchill>\codebase\infoengine\jsp\**

Creating JSP Pages

Executing a Windchill JSP

- The URL to execute a JSP page includes the host name and Windchill application URL with “infoengine/jsp/” and the path to the JSP page.

Example of executing a JSP page URL is below.

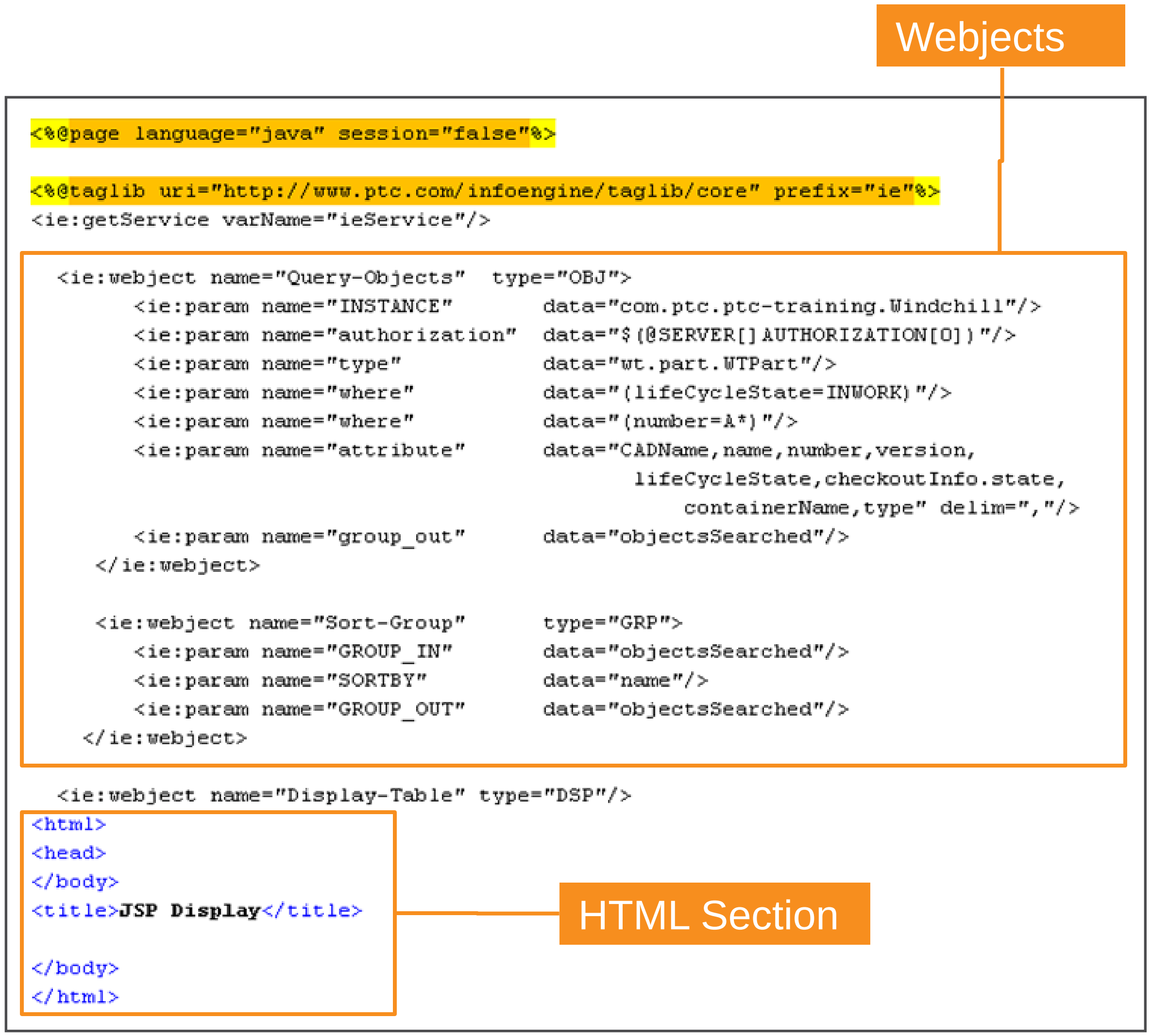
http://train.ptc.com/Windchill/infoengine/jsp/examples/My_Simple.jsp

When the file is executed, the Web Server passes the URL to the JSP processor.

Creating JSP Pages

Creating a Simple JSP

- There are many IDE that help develop JSP pages. Some examples are Coffer Cup, Eclipse, and Net Beans or a developer could use a good text editor like Notepad++.
- To the right is a simple JSP page with two Webjects.

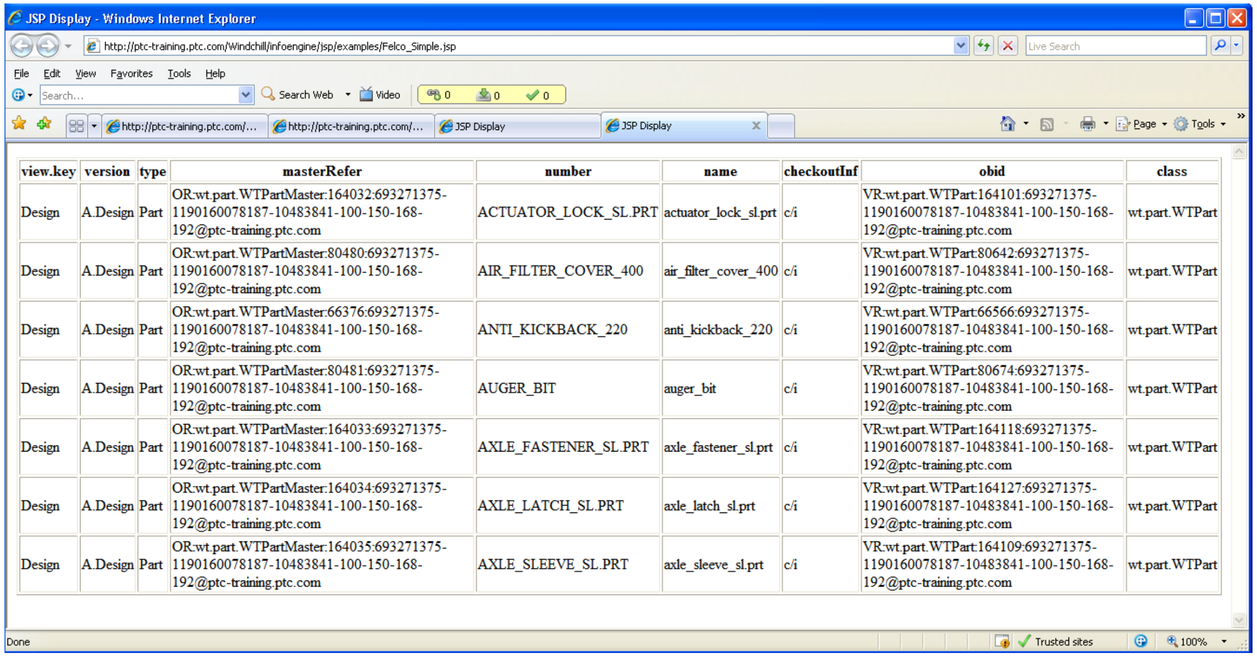


```
<%@page language="java" session="false"%>

<%@taglib uri="http://www.ptc.com/infoengine/taglib/core" prefix="ie"%>
<ie:getService varName="ieService"/>

  <ie:webject name="Query-Objects"  type="OBJ">
        <ie:param name="INSTANCE"         data="com.ptc.ptc-training.Windchill"/>
        <ie:param name="authorization"    data="${@SERVER[]AUTHORIZATION[0]}"/>
        <ie:param name="type"             data="wt.part.WTPart"/>
        <ie:param name="where"            data="(lifeCycleState=INWORK)"/>
        <ie:param name="where"            data="(number=A*)"/>
        <ie:param name="attribute"        data="CADName,name,number,version,
                                                 lifeCycleState,checkoutInfo.state,
                                                    containerName,type" delim=","/>

        <ie:param name="group_out"        data="objectsSearched"/>
     </ie:webject>

     <ie:webject name="Sort-Group"        type="GRP">
        <ie:param name="GROUP_IN"         data="objectsSearched"/>
        <ie:param name="SORTBY"           data="name"/>
        <ie:param name="GROUP_OUT"        data="objectsSearched"/>
    </ie:webject>

  <ie:webject name="Display-Table" type="DSP"/>
<html>
<head>
</body>
<title>JSP Display</title>

</body>
</html>
```

Demonstration

Demonstration of Running a JSP

- Running the My_Simple.jsp



JSP Display - Windows Internet Explorer

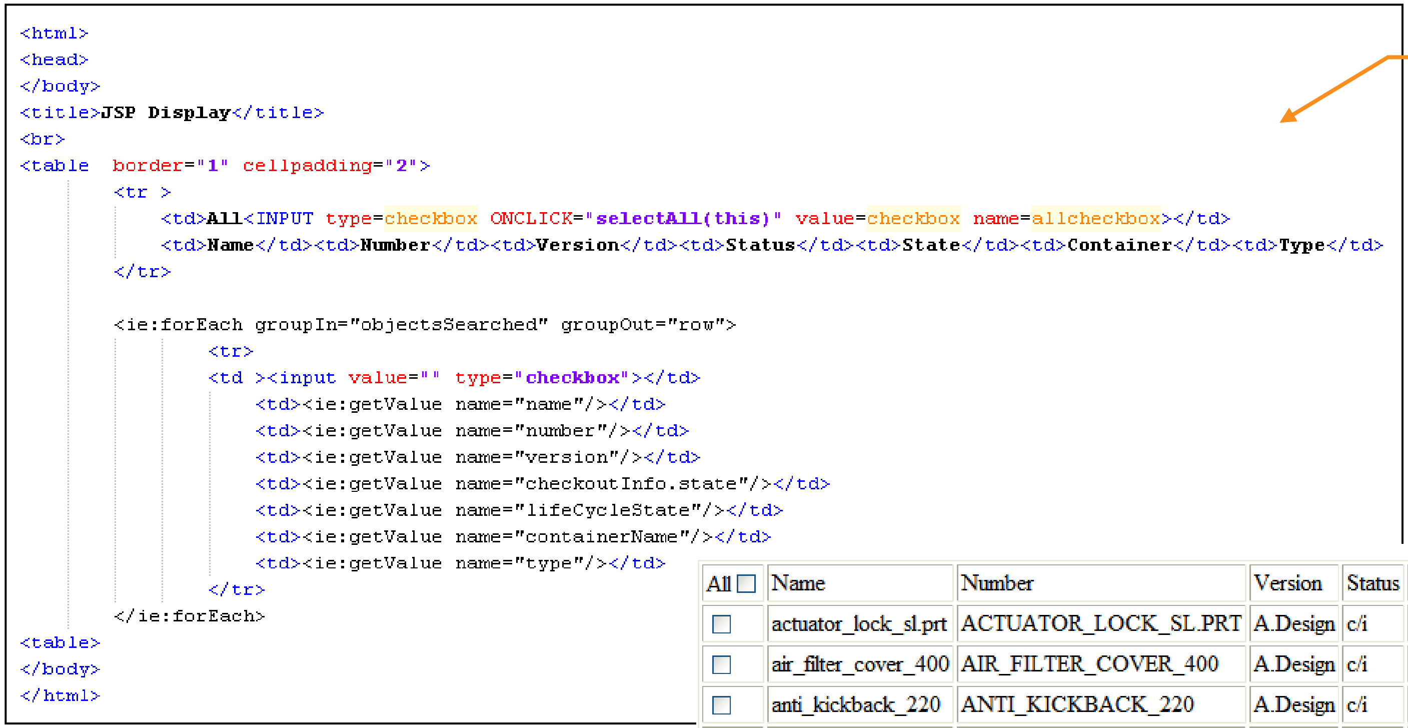
http://ptc-training.ptc.com/Windchill/infoengine/jsp/examples/Felco_Simple.jsp

view.key	version	type	masterRefer	number	name	checkoutInf	obid	class
Design	A.Design	Part	OR:wt.part.WTPartMaster:164032:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	ACTUATOR_LOCK_SL.PRT	actuator_lock_sl.prt	c/i	VR:wt.part.WTPart:164101:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	wt.part.WTPart
Design	A.Design	Part	OR:wt.part.WTPartMaster:80480:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	AIR_FILTER_COVER_400	air_filter_cover_400	c/i	VR:wt.part.WTPart:80642:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	wt.part.WTPart
Design	A.Design	Part	OR:wt.part.WTPartMaster:66376:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	ANTI_KICKBACK_220	anti_kickback_220	c/i	VR:wt.part.WTPart:66566:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	wt.part.WTPart
Design	A.Design	Part	OR:wt.part.WTPartMaster:80481:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	AUGER_BIT	auger_bit	c/i	VR:wt.part.WTPart:80674:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	wt.part.WTPart
Design	A.Design	Part	OR:wt.part.WTPartMaster:164033:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	AXLE_FASTENER_SL.PRT	axle_fastener_sl.prt	c/i	VR:wt.part.WTPart:164118:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	wt.part.WTPart
Design	A.Design	Part	OR:wt.part.WTPartMaster:164034:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	AXLE_LATCH_SL.PRT	axle_latch_sl.prt	c/i	VR:wt.part.WTPart:164127:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	wt.part.WTPart
Design	A.Design	Part	OR:wt.part.WTPartMaster:164035:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	AXLE_SLEEVE_SL.PRT	axle_sleeve_sl.prt	c/i	VR:wt.part.WTPart:164109:693271375-1190160078187-10483841-100-150-168-192@ptc-training.ptc.com	wt.part.WTPart

Creating JSP Pages

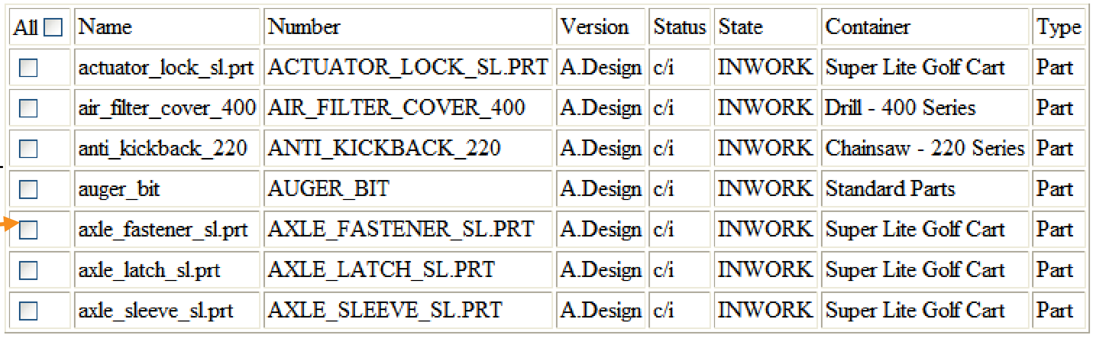
Using HTML and Webjects in a JSP

- The previous demonstration displays a table output of the Webjects results, but the table display is not what you want. The below images displays a HTML table to control the display.



```
<html>
<head>
</body>
<title>JSP Display</title>
<br>
<table  border="1" cellpadding="2">
        <tr >
            <td>All<INPUT type=checkbox ONCLICK="selectAll(this)" value=checkbox name=allcheckbox></td>
            <td>Name</td><td>Number</td><td>Version</td><td>Status</td><td>State</td><td>Container</td><td>Type</td>
        </tr>

        <ie:forEach groupIn="objectsSearched" groupOut="row">
                <tr>
                <td ><input value="" type="checkbox"></td>
                    <td><ie:getValue name="name"/></td>
                    <td><ie:getValue name="number"/></td>
                    <td><ie:getValue name="version"/></td>
                    <td><ie:getValue name="checkoutInfo.state"/></td>
                    <td><ie:getValue name="lifeCycleState"/></td>
                    <td><ie:getValue name="containerName"/></td>
                    <td><ie:getValue name="type"/></td>
                </tr>
        </ie:forEach>
<table>
</body>
</html>
```

JSP File Webjects are located at the top of the page



All ☐	Name	Number	Version	Status	State	Container	Type
☐	actuator_lock_sl.prt	ACTUATOR_LOCK_SL.PRT	A.Design	c/i	INWORK	Super Lite Golf Cart	Part
☐	air_filter_cover_400	AIR_FILTER_COVER_400	A.Design	c/i	INWORK	Drill - 400 Series	Part
☐	anti_kickback_220	ANTI_KICKBACK_220	A.Design	c/i	INWORK	Chainsaw - 220 Series	Part
☐	auger_bit	AUGER_BIT	A.Design	c/i	INWORK	Standard Parts	Part
☐	axle_fastener_sl.prt	AXLE_FASTENER_SL.PRT	A.Design	c/i	INWORK	Super Lite Golf Cart	Part
☐	axle_latch_sl.prt	AXLE_LATCH_SL.PRT	A.Design	c/i	INWORK	Super Lite Golf Cart	Part
☐	axle_sleeve_sl.prt	AXLE_SLEEVE_SL.PRT	A.Design	c/i	INWORK	Super Lite Golf Cart	Part

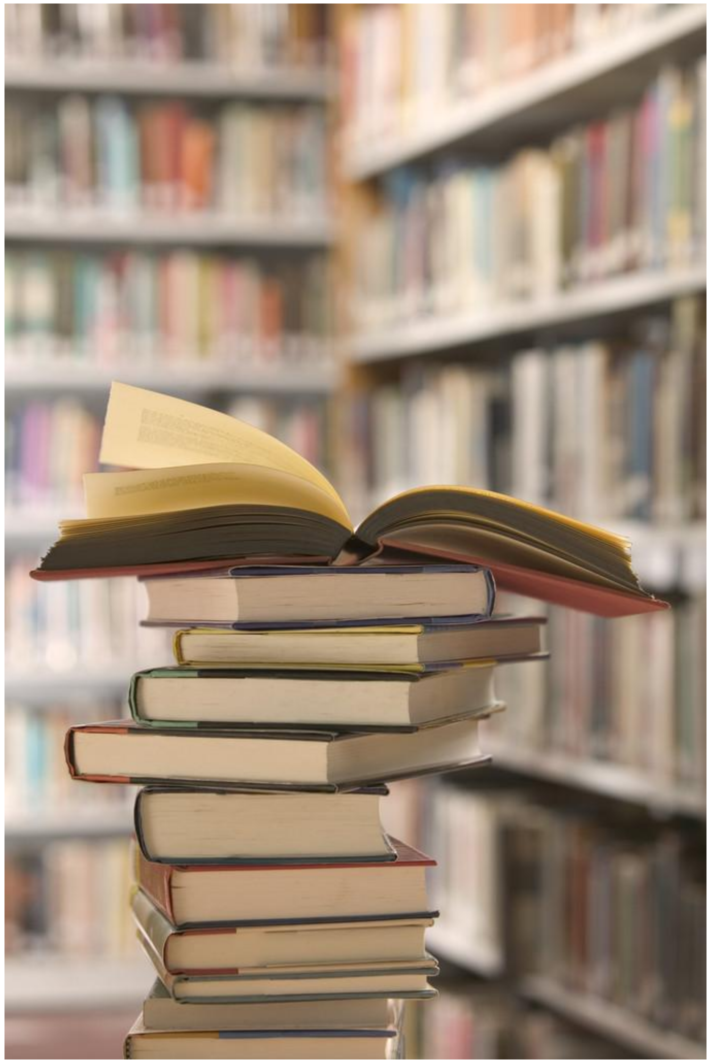
Page Results

Demonstration

Demonstration of HTML and Info*Engine in a JSP

- Displaying information using HTML elements
- Showing PTC JSP examples

Resources and Help



- Adapter Guide:
  WCAdapterGuide.pdf
- User Guide:
  IEUsersGuide.pdf
- Java Adapter Development Kit:
  IEJADKGuide.pdf
- Java Naming Directory Interface Adapter Guide:
  JNDIAdapterGuide.pdf
- Felco Solutions Website:
  http://www.felcosolutions.com

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Thank You