

Dynamic options and Cascading list in CSA



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Subscriber options allows designers to create option sets during modelling a Service design. These option sets are exposed to subscribers or consumers, which allows them to select option value on Market place portal (MPP). The option can be a String, Boolean, Integer or a List type. This white paper will discuss various choices available to populate the list properties.

Note: Dynamic options are supported for List type properties.

Introduction

Consider an Infrastructure cloud offering which provisions a simple server. Subscriber has to choose an operating system (OS) and OS Edition from a selection list. Designer can model the option list and load the list statically – at design time or load them from an external source like a file or a database.

Let us look at both of these cases with examples.

- Populate list at design time – statically populating list property
- Populate list from an external source – Dynamic loading

Dynamic loading

An option list property can be populated by fetching data from an external source like a file or a database. The list property is associated with a JSP file which embeds the logic to fetch data from an external source and wraps them as XML. CSA provides a framework to execute JSP (Java Server Pages) in the context of JBOSS and returns XML as a HTTP response.

When an offering is requested on MPP, the subscriber options on MPP are loaded, triggering an HTTP request call to the JSP. CSA executes the JSP and returns XML as response to populate the list.

Component properties

Consider as Service design having a Server component. Create two list property, OS (Operating System) and OS Edition on Server component.

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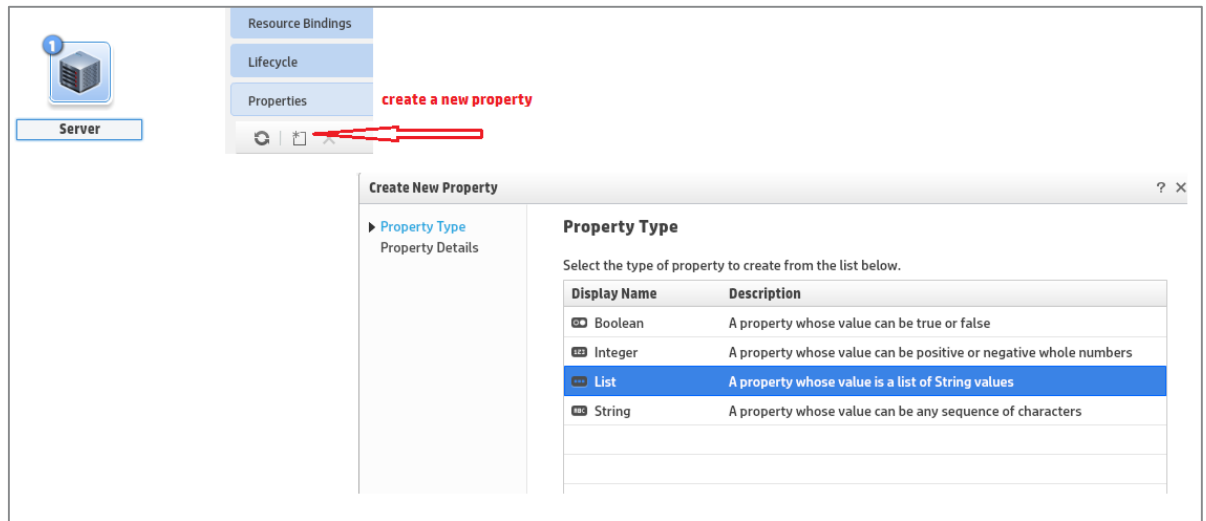
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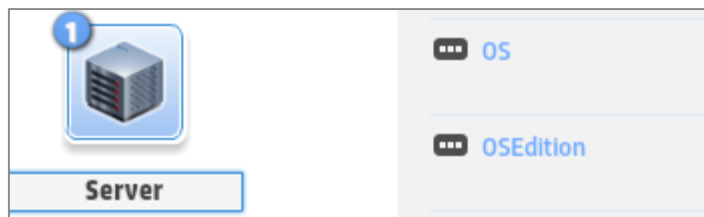
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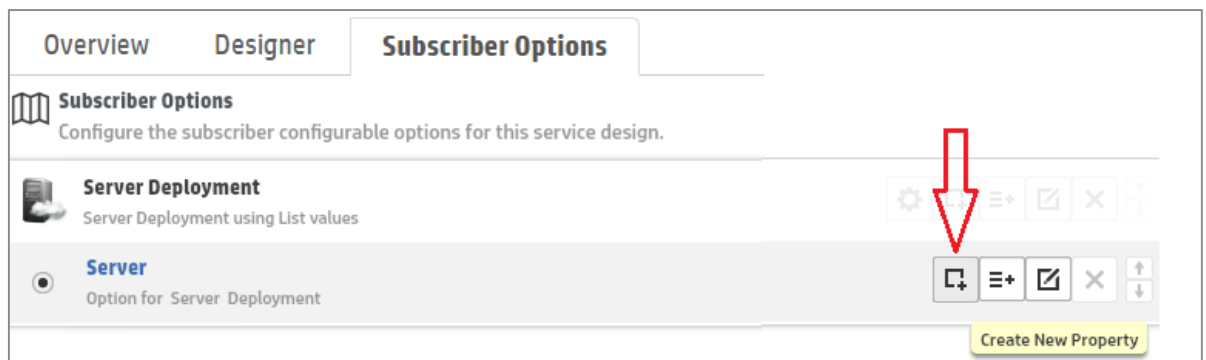


Following are the two List properties OS and OSEdition created on a Server component.



Subscriber Option

Create subscriber option set for Server deployment as shown. Use “Create New Property” to add new property into the option.



Static loading

Create a list property **Operation System** on the option. Populate the list by choosing “Manual Entry” option.

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Create New Property

Property Type
 Property Details
 Property Bindings

Property Details
 Set the details for this property.

Display Name *
 Operating System

Description

Marketplace Portal & Service Offering Options
 Editable Required

Value Entry Method
 Manual Entry Dynamic Query **Choose Manual**

Available Values
 + **Add Values**

Display Name	Description	Value
Windows 2008	Windows 2008	Windows 2008
Windows 2012	Windows 2012	Windows 2012

Enable Multi-Select

< Back Next > Create Cancel

Bind the Operating System property to OS property on the component as shown.

Create New Property

Property Type
 Property Details
 Property Bindings

Property Bindings
 Select one or more properties from the Service Design that will receive their value from this property.

+ - **Add**

Service Component - Property Name

Property Browser
 Select a service component and target property.

Service Components	Properties
Server	OS
	OSEdition

Select Cancel

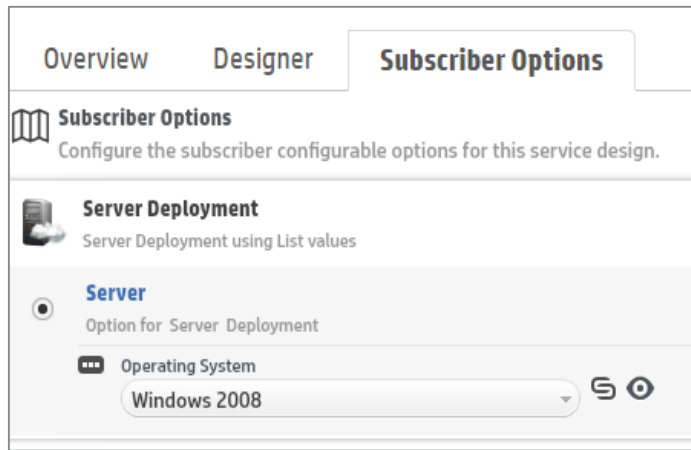
After binding and saving the property, following option property is created on Subscriber options tab.

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Limitations on static list property

The following table summarizes on the length of values these attributes can accommodate.

Name	Character length
Display Name	255
Description	255
Value	4000

Dynamic loading

A list property can also be populated by fetching data from an external source like a file or a database. The list property is associated with a JSP file which embeds the logic to fetch data from an external source and wrap them as XML. CSA provides a framework to execute JSP (Java Server Pages) in the context of JBOSS and returns the XML.

When an offering is requested on MPP, the list is populated by triggering an HTTP request call to JSP. CSA executes the JSP and returns XML as response to populate the list on MPP.

Create a list property “**Server Edition**” and configure the property by choosing “Dynamic Query” option and associate a JSP file as shown. Click Next button to bind the property.

All JSP files should be placed under:

`<CSA_HOME>/jboss-<version>/standalone/deployments/csa.war/propertysources`

JSP files placed under this folder are visible across all organization in MPP.

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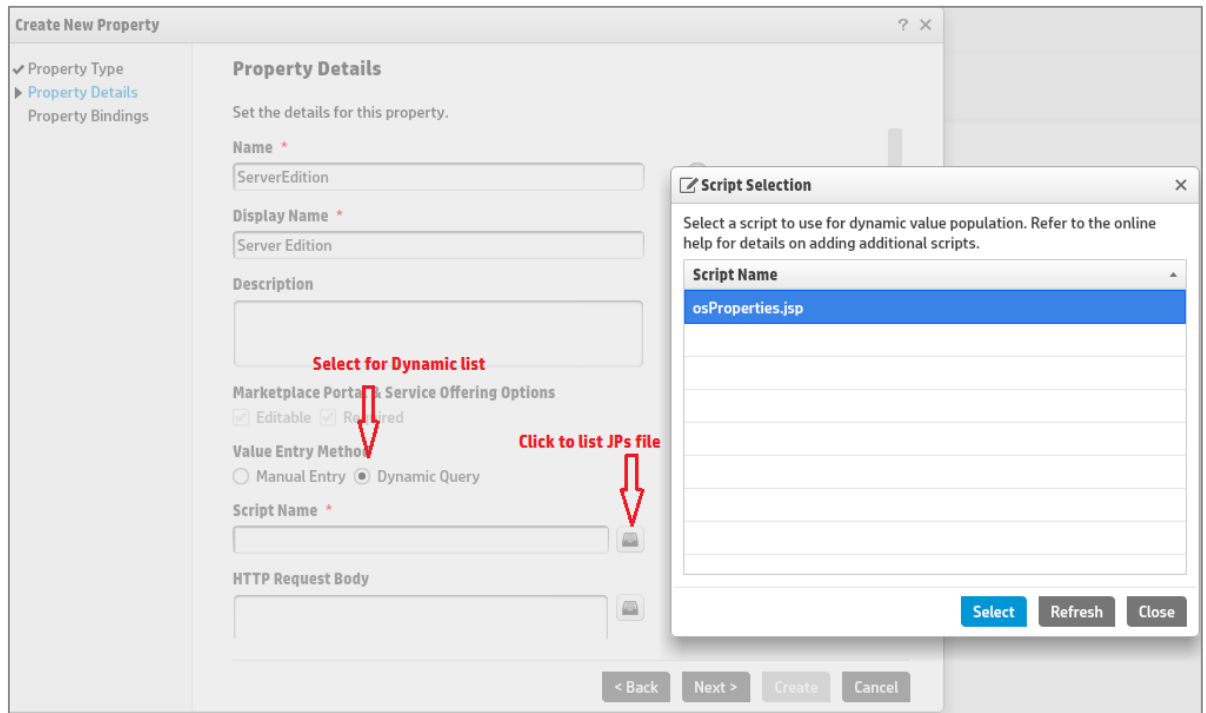
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Bind the Server Edition property to OSEdition property on the component as shown.

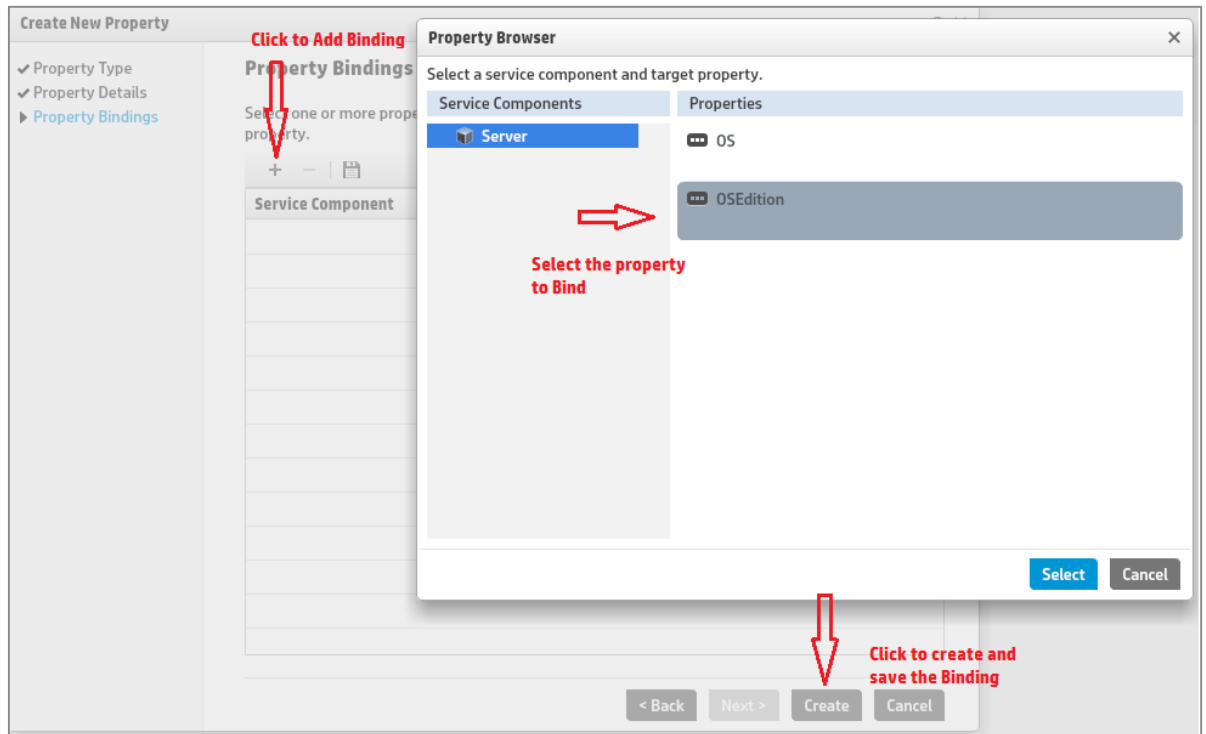
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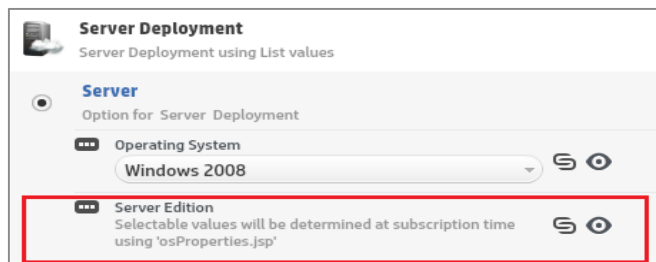
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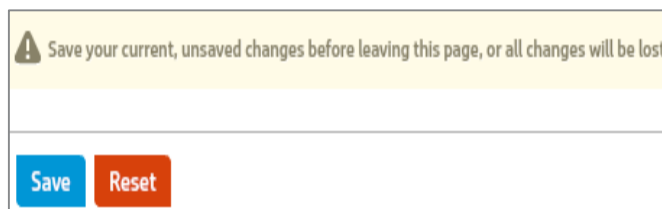




After binding the property, option property will be as shown below



* Save your changes.



Contents of JSP

To load a list of key-value pairs like (key1, name1), (key2, name2) ...into option property, JSP needs to wrap the key-value pairs in a XML shown. XML code in osProperties.jsp is also shown. Check **Appendix A** for few more sample JSP code snippets.

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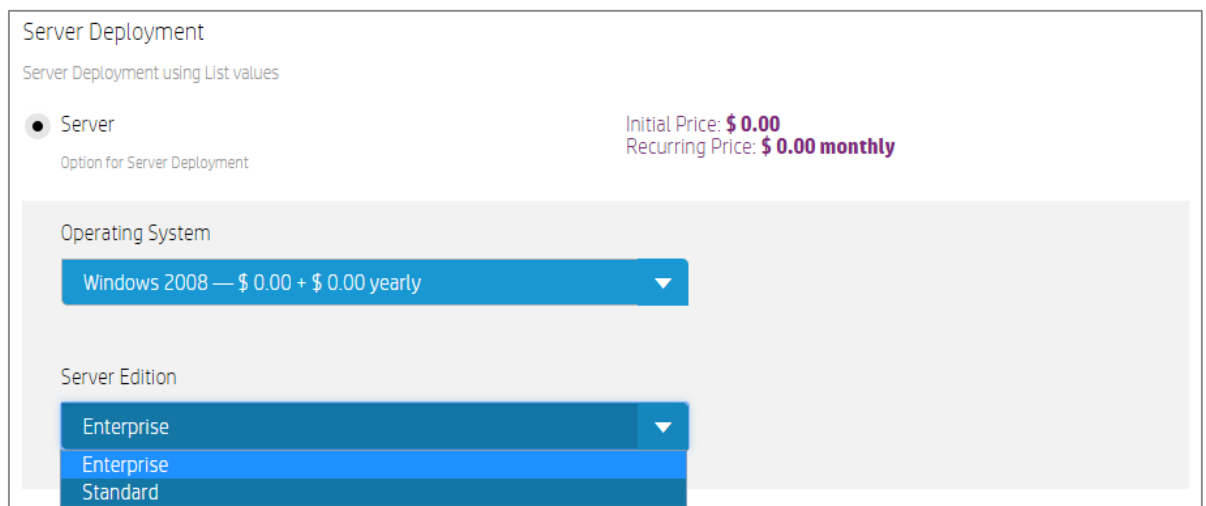
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Sample code of key-value pairs as XML in a JSP	Script code for osProperties.jsp
<pre> <Property> <availableValues> <value>key1</value> <displayName>name1</displayName> <description>Key description</description> </availableValues> <availableValues> <value>key2</value> <displayName>name2</displayName> <description> Key description </description> </availableValues> </Property> </pre>	<pre> <Property> <availableValues> <value>Standard</value> <displayName>Standard</displayName> <description>Standard</description> </availableValues> <availableValues> <value>Enterprise</value> <displayName>Enterprise</displayName> <description>Enterprise</description> </availableValues> </Property> </pre>

Dynamic list on MPP

On MPP the dynamic list will display as shown



Testing Dynamic Query

Testing from a Service Design

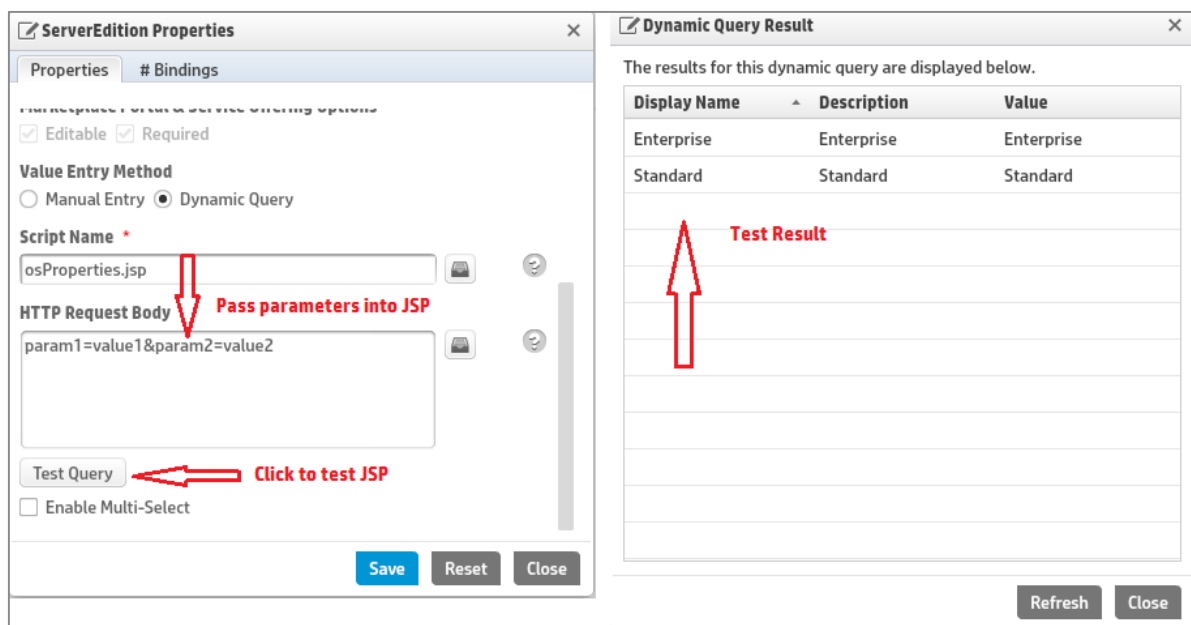
CSA provides capabilities to test the JSP file on the designer as shown. Click the “Test query” to validate JSP. Request parameters can be passed into JSP as HTTP POST data. Use standard URL encoding to pass parameters as param1=value1¶m2=value2

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Testing from browser

By default, accessing JSP on a browser is not allowed. CSA security policy does not allow JSP to be executed on a browser. For example: On a browser <https://<CSAHOST>:<PORT>/csa/propertysources/sample.jsp> will result in an error.

Let's turn off the security policy. Add the following line in `applicationContext-security.xml` file under `<CSA_HOME>\CSA\jboss-as\standalone\deployments\csa.war\WEB-INF`

Comment out:

```
<!-- <intercept-url pattern="/propertysources/**" access="hasRole('ROLE_DYNAMIC')"/> -->
```

Add the following line:

```
<intercept-url pattern="/propertysources/**" access="isAuthenticated()"/>
```

Restart CSA service.

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Limitations

Scope of dynamic list

Dynamic list feature of populating property values can be used only in Option model. This feature is not available for properties defined on components, providers or internal actions.

Also, there is no limitation to define number of option-sets or options in Option model. But there is limitation on nested options that be defined with an option set ie. option within an option. CSA allows only three level of nested options in the model.

Time to load data from a JSP

CSA has defined a property to set a default time limit to load a JSP. CSA will terminate the execution of JSP after default time and return a blank response to MPP. Default time limit can be updated by changing the property in the file as given below.

Property	DynamicPropertyFetch.READ_TIMEOUT=300000
File	csa.properties
Location	<CSA_HOME>/jboss- <version>/standalone/deployments\csa.war\WEB-INF\classes

Size of XML data

CSA defines a property to limit XML response size from a JSP. XML response greater than the defined limit will end up throwing an exception in MPP. The limit value can be updated by changing the property in the file as shown below

Property(character length)	DynamicPropertyFetch.RESPONSE_SIZE=50000
File	csa.properties
Location	<CSA_HOME>/jboss- <version>/standalone/deployments\csa.war\WEB-INF\classes

Note: name-value pairs are wrapped as XML <Property>...</Property> elements.XML tags add to overall payload of the response size. <Property>...</Property> XML alone contribute around 100 characters in length. For example: “name” is a four character length and “value” is a 5 character length when wrapped into <Property>...</Property> elements transforms into approximately 110 character in length. Hence set the **DynamicPropertyFetch.RESPONSE_SIZE** appropriately.

JSP code update

CSA compiles JSP into a java class before sending response to MPP. Any changes to JSP file will need a recompilation and this process will cause delay in sending response to MPP.

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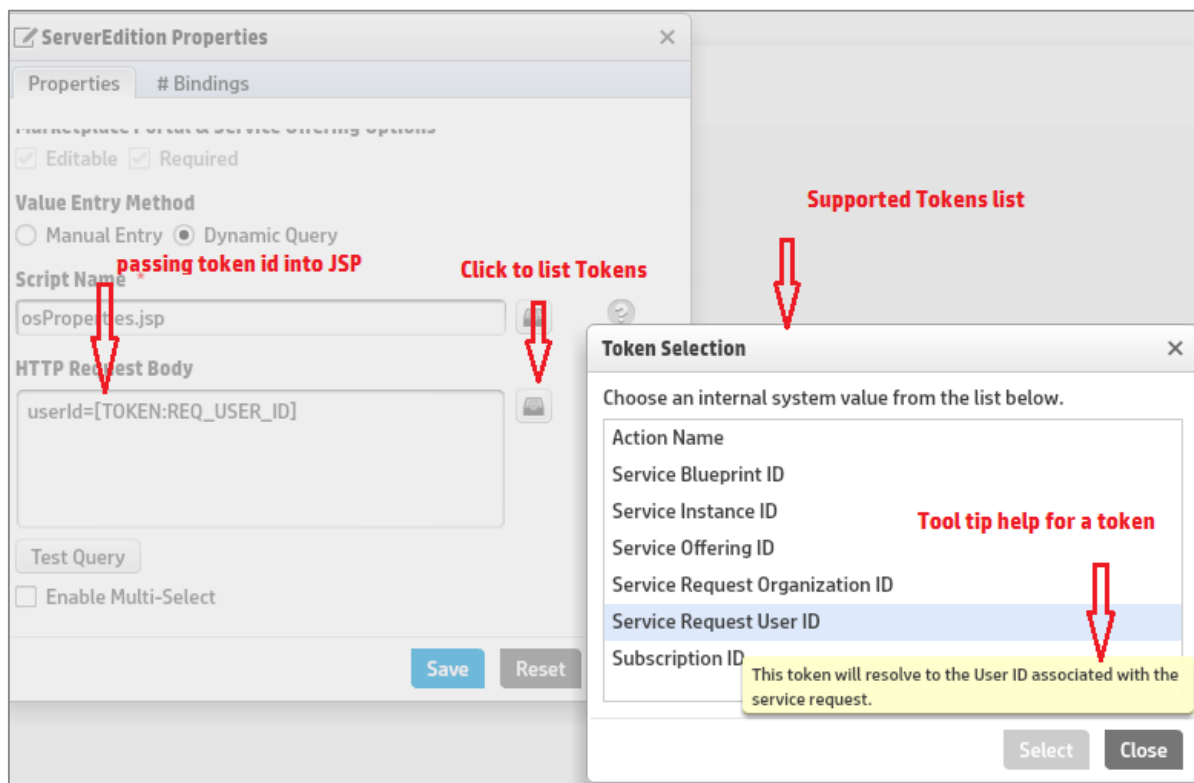
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CSA Helper API

CSA provides a framework to execute JSP script in the context of JBOSS, and supports to pass artifact ids/token ids as HTTP request parameters into the JSP. CSA java helper classes can be used to in JSP to fetch artifact information. Supported artifacts that can be passed into JSP are shown below. Check **Appendix A** for some sample code snippet to use CSA helper classes.



The following table summarizes helper API provided by CSA.

Class CSAIntegrationHelper

Method	getAccessPointForProcessEngine
API	public static AccessPointInfo getAccessPointForProcessEngine(java.lang.String processEngineName) throws java.lang.Exception
	Given a process engine name, this method returns the access point information of the process engine.
Parameters	processEngineName - a String object representing the name of the process engine
Returns	a AccessPointInfo object containing the hostName, port, username, encryptedPassword and uri
Throws	java.lang.Exception - thrown when an error occurs

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Method	getAccessPointForResourceProvider
API	public static AccessPointInfo getAccessPointForResourceProvider(java.lang.String resourceProviderId) throws java.lang.Exception Given a resource provider id, this method returns the access point information of the resource provider.
Parameters	resourceProviderId - a String object representing the id of the resource provider
Returns	a AccessPointInfo object containing the hostName, port, username, encryptedPassword and uri
Throws	java.lang.Exception - thrown when an error occurs
Method	getUsername
API	public static java.lang.String getUsername(java.lang.String userId) throws java.lang.Exception Given a user id, this method returns the username of the user.
Parameters	userId - A String object representing the id of the user.
Returns	A String object containing the username
Throws	java.lang.Exception - thrown when an error occurs

Method	getUserEmail
API	public static java.lang.String getUserEmail(java.lang.String userId) throws java.lang.Exception Given a user id, this method returns the email of the user.
Parameters	userId - A String object representing the id of the user.
Returns	A String object containing the user email.
Throws	java.lang.Exception - thrown when an error occurs

Method	getCsaReportingUserId
API	public static java.lang.String getCsaReportingUserId() throws java.lang.Exception CSA Reporting User a pre-seeded user who has READ_ONLY permissions for ALL artifacts
Parameters	None
Returns	a String object representing the id of the CSA Reporting User
Throws	java.lang.Exception - thrown when an error occurs

Method	getOrgName
API	public static java.lang.String getOrgName(java.lang.String orgnizationId) throws java.lang.Exception Given an organization id, this method returns the organization name.
Parameters	orgId - A String object representing organization id
Returns	A String object representing organization name.
Throws	java.lang.Exception - thrown when an error occurs

Method	executeCSAREST
API	public static java.lang.String executeCSAREST(java.lang.String URI) throws java.lang.Exception Given REST URI, the method returns XML payload of the REST response. NOTE only GET REST APIs are supported
Parameters	URI - The URI of the rest API. For e.g csa/rest/catalog/90d9651938770b300138770c2e97001e/subscription/90e72e2d39b14d540139b2379f370169?scope=subtree&userIdentifier=90d9651938770b300138770c2dae0009
Returns	XML payload

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Throws	java.lang.Exception - thrown when an error occurs
Method	getResourceProviderIds
API	public static java.lang.String[] getResourceProviderIds() throws java.lang.Exception Returns the ALL resource provider ids.
Parameters	None
Returns	a String array containing all the ids of the resource providers in the system.
Throws	java.lang.Exception - thrown when an error occurs

Method	getResourceProviderIds
API	public static java.lang.String[] getResourceProviderIds(java.lang.String providerTypeName) throws java.lang.Exception Returns the resource provider ids by provider type
Parameters	providerTypeName - a String object representing the name of the provider type, e.g., VMWARE_VCENTER, HP_SITESCOPE, HP_UCMDB, HP_SA, etc.
Returns	a String array containing the ids of resource providers of the given provider type
Throws	java.lang.Exception - thrown when an error occurs

Method	getProcessEngineNames
API	public static java.lang.String[] getProcessEngineNames(java.lang.String processEngineTypeName) throws java.lang.Exception Returns the process engine names by process engine type
Parameters	processEngineTypeName - a String object representing the name of the given process engine type, e.g. INTERNAL, HP_OO, HP_CDA
Returns	a String array containing the names of process engines of the given process engine type
Throws	java.lang.Exception - thrown when an error occurs

Class AccessPointInfo

AccessPointInfo	AccessPointInfo(java.lang.String hostName, java.lang.String port, java.lang.String username, java.lang.String encryptedPassword, java.lang.String uri)
Methods	
java.lang.String	public java.lang.String getHostName()
java.lang.String	public java.lang.String getEncryptedPassword()
java.lang.String	public java.lang.String getUri()
java.lang.String	public java.lang.String getUsername()
java.lang.String	public java.lang.String getPort()
	public void setEncryptedPassword(java.lang.String encryptedPassword)
	public void setHostName(java.lang.String hostName)
	public void setPort(java.lang.String port)
	public void setUri(java.lang.String uri)
	public void setUsername(java.lang.String username)

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Cascading Options

Consider a cloud offering for an infrastructure service where a subscriber needs to choose an OS (Operating system) from a list of choices. For example- Windows, RHEL etc. Based on OS selected, customer needs to choose a Server Edition from another list. For example a windows OS, list of choices are Standard and Enterprise and for RHEL, choices are Server and Desktop etc.

The Server Edition list should be filtered based on the OS selected.

Following table summarizes the subscriber options to be displayed to customer

Operating System	Server Edition
Windows	Standard
	Enterprise
RHEL	Server
	Desktop

Refer to [Component properties](#) section to create list properties on a component and also refer to [static list](#) section to populate a list of OS values on the option property. The list property name created is **“OperationSystem”**

Refer to [Dynamic loading](#) section to populate a list of Server Edition values on the option property. The list property created is **“ServerEdition”** as shown below

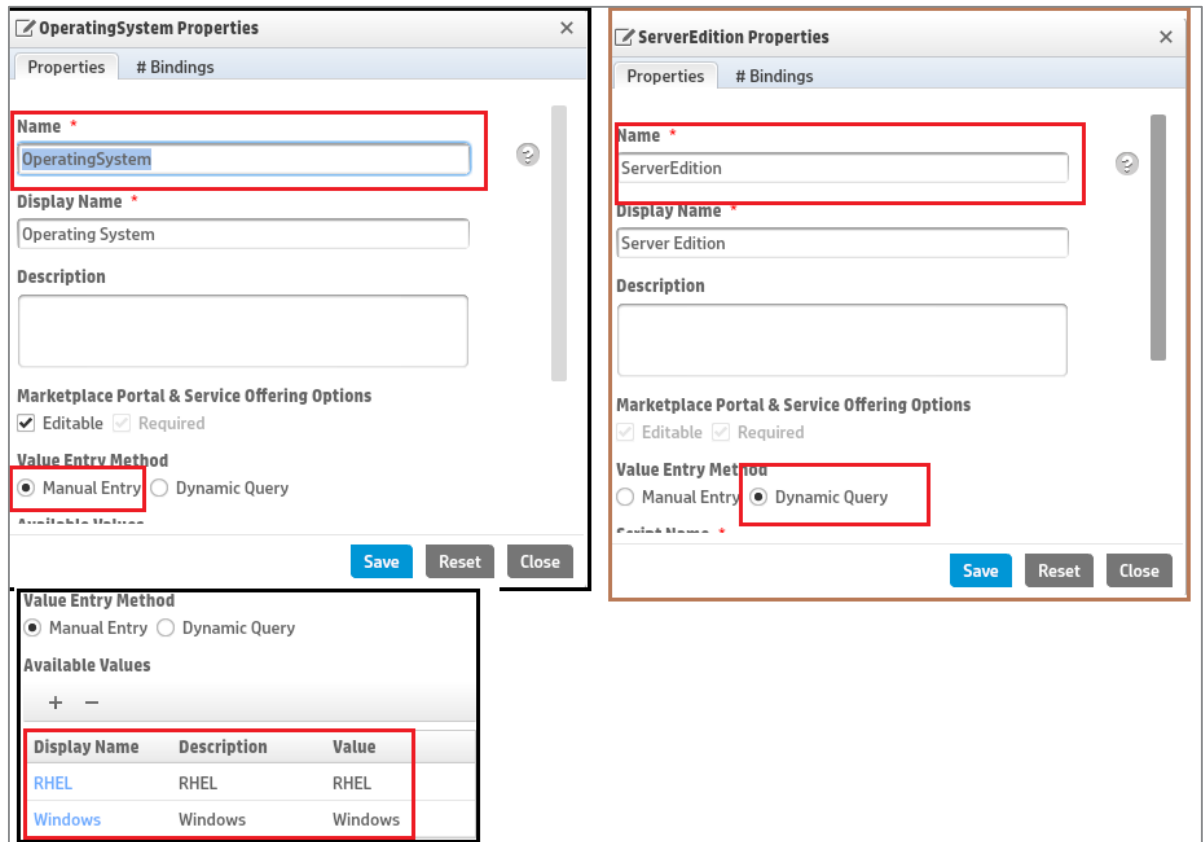
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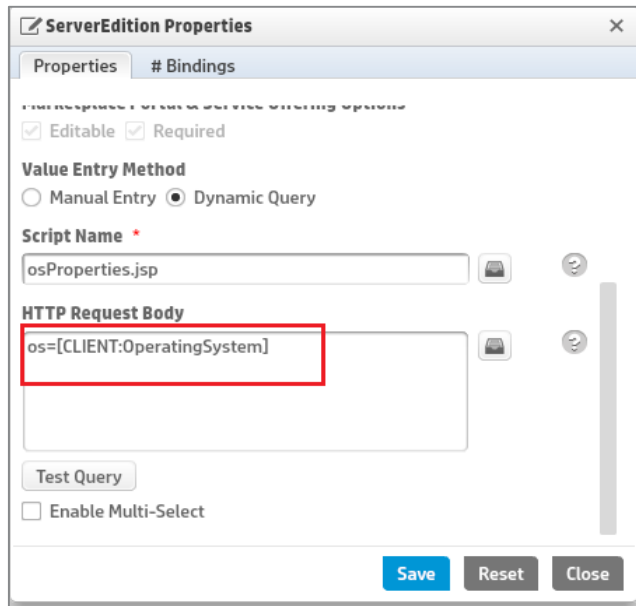
Server Edition is dependent on Operating System to list its values, hence pass Operating System name should be passed into Server Edition to list values as shown.

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osProperties.jsp code snippet to load Server Edition list values.

```
<Property>
<%
String osName = request.getParameter("os");
if( osName.equals("Windows")){
%>
  <availableValues>
    <value>Standard</value>
    <displayName>Standard</displayName>
    <description>Standard</description>
  </availableValues>
  <availableValues>
    <value>Enterprise</value>
    <displayName>Enterprise</displayName>
    <description>Enterprise</description>
  </availableValues>
<% } else if ( osName.equals("RHEL")){ %>
  <availableValues>
```

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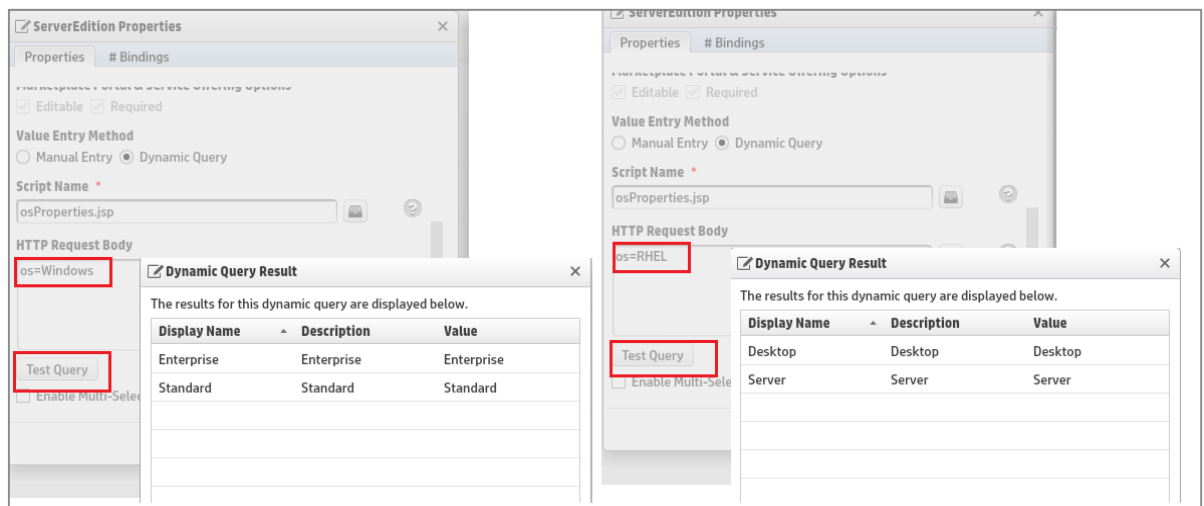



```

    <value>Server</value>
    <displayName>Server</displayName>
    <description>Server</description>
</availableValues>
<availableValues>
    <value>Desktop</value>
    <displayName>Desktop</displayName>
    <description>Desktop</description>
</availableValues>
<% } %>
</Property>

```

Test query can be used to validate the property as shown



Limitations

Cascading option within an option set

The option values can be passed from parent to child list within an option set. One cannot pass option values across option set.

Resolving multiple option values

Cascading option values in a child can resolve only one parent option. Passing multiple parent option values into a child option will result in an error.

For eg: Passing multiple OS values into a child option as shown will result in an error.

os1=[CLIENT:OperatingSystem1]& os2=[CLIENT:OperatingSystem2]

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Appendix A – JSP Sample code

Sample list

```
<Property>
  <availableValues>
    <value>Standard</value>
    <displayName>Standard</displayName>
    <description>Standard</description>
  </availableValues>
  <availableValues>
    <value>Enterprise</value>
    <displayName>Enterprise</displayName>
    <description>Enterprise</description>
  </availableValues>
</Property>
```

Load content from text file

```
<%@ page import="java.io.*" %>
<Property>
<%
// Read a text file line by line
FileReader file_reader = new FileReader("C:\\options.txt");
BufferedReader buffered_reader = new BufferedReader(file_reader);
String line = null;
while ((line = buffered_reader.readLine()) != null) {
  // Do something with line, e.g. push to output in the form of XML
  out.println("<availableValues><value>" + line + "</value><displayName>"
+ line + "</displayName><description>Foobar</description></availableValues>");
}
```

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```
}  
%>  
</Property>
```

Load content from DB using JDBC

Database driver jars should be placed under: <CSA_HOME>\jboss-as-7.1.1.Final\standalone\deployments\csa.war\WEB-INF\lib\

```
<%@ page import="java.sql.*" %>  
<Property>  
<%  
    // Load the database driver, this is vendor/DB specific  
    // MSSQL = net.sourceforge.jtds.jdbc.Driver  
    // Oracle = oracle.jdbc.OracleDriver  
    Class.forName("net.sourceforge.jtds.jdbc.Driver");  
  
    // Get a connection to the database  
    // NOTE The format of this URL varies greatly between drivers, check the docs  
    // - for the relevant driver you are using, e.g. Oracle, MS-SQL, etc  
    // MSSQL = jdbc:jtds:sqlserver://<ipaddress>:1433/dbname  
    // Oracle = jdbc:oracle:thin:@<ipaddress>:1521:SID  
    Connection conn = DriverManager.getConnection("jdbc:jtds:sqlserver://10.4.242.62:1433/Test", "dbuser",  
"secret");  
  
    // Get a statement from the connection  
    Statement stmt = conn.createStatement();  
    // Execute the query  
    ResultSet rs = stmt.executeQuery("SELECT name, value FROM mytable");  
    // Loop through the result set  
    while(rs.next()) {  
        // getString gets a named column from the result set row  
        String name = rs.getString("name");  
        String value = rs.getString("value");  
        out.println("<availableValues><value>" + name + "</value><displayName>"  
            + value + "</displayName><description>Foobar</description></availableValues>");  
    }  
  
    // Close the result set, statement and the connection  
    rs.close();  
    stmt.close();  
    conn.close();  
%>  
</Property>
```

Load data from a HTTP resource

```
<%@ page import="org.apache.http.client.*" %>  
<%@ page import="org.apache.http.client.methods.*" %>  
<%@ page import="org.apache.http.impl.client.*" %>
```

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```

<%
    try {
        String url_string = "http://<URL>/xxx.xml";

        DefaultHttpClient client = new DefaultHttpClient();

        // Make GET request, and read response into a String
        HttpGet get_request = new HttpGet(url_string);
        ResponseHandler<String> handler = new BasicResponseHandler();
        String response_body = client.execute(get_request, handler);
        client.getConnectionManager().shutdown();
        // Print result
        out.println(response_body);
    } catch (Exception e) {
        e.printStackTrace();
    }
%>

```

To authenticate an HTTP request esp. Basic Authentication

```

Credentials cred = new UsernamePasswordCredentials("user", "secret");
client.getCredentialsProvider().setCredentials(AuthScope.ANY, cred);

```

If HTTP response is returning a XML, following parsing logic can be applied

```

DocumentBuilderFactory factory = DocumentBuilderFactory.newInstance();
DocumentBuilder doc_builder = factory.newDocumentBuilder();
InputStream xml_src = new InputStream(new StringReader(response_body.toString()));
Document doc = doc_builder.parse(xml_src);
NodeList thing_nodes = doc.getElementsByTagName("thing");
for (int i = 0; i < thing_nodes.getLength(); i++) {
    Element thing = (Element)thing_nodes.item(i);
    String name = thing.getElementsByTagName("name").item(0).getTextContent();
    String val = thing.getElementsByTagName("value").item(0).getTextContent();
    String desc = thing.getElementsByTagName("desc").item(0).getTextContent();

    out.println("<availableValues><value>" + val + "</value><displayName>"
        + name + "</displayName><description>" + desc + "</description></availableValues>");
}

```

Using CSA API

CSA out-of-box JSP scripts namely **sample.jsp** and **sample-client-token.jsp** are available which demonstrates the usage of helper APIs.

The scripts are located under <CSA_HOME>\jboss\standalone\deployments\csa.war\propertysources

Refer to "CSA Helper API" section for more information on APIs supported

```

<%@ page import="com.hp.csa.web.util.CSAIntegrationHelper"%>

```

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```

<%
// CSA API call here
CSAIntegrationHelper.executeCSAREST("csa/rest/catalog?userIdentifier=90d96588360da0c701360da0f1d600a1");
%>
<Property>
  <availableValues>
    <value>username</value>
    <displayName><%= CSAIntegrationHelper.getUsername("90d96588360da0c701360da0f1d600a1")
%></displayName>
    <description>Admin user name.</description>
  </availableValues>
</Property>

```

Loading content from OO

Assumptions.

1. Pass the flow name as input parameter into JSP.
ooFlowURL=https://<oo_ip>:<oo_port>/PAS/services/rest/run/Library/Foo/Bar/My%20Flow
2. After execution of the OO flow, the OO flow should output two 'Flow Output Fields', one called "names" the other "values". These should both be a pipe delimited lists, and both lists are the same length i.e. together they represent a combined group of name=value pairs

```

<%@ page import="java.security.cert.X509Certificate" %>
<%@ page import="java.util.regex.*" %>
<%@ page import="javax.net.ssl.SSLContext" %>
<%@ page import="javax.net.ssl.TrustManager" %>
<%@ page import="javax.net.ssl.X509TrustManager" %>
<%@ page import="org.w3c.dom.*" %>
<%@ page import="org.xml.sax.*" %>
<%@ page import="javax.xml.parsers.*" %>
<%@ page import="javax.xml.xpath.*" %>
<%@ page import="org.apache.http.auth.*" %>
<%@ page import="org.apache.http.client.*" %>
<%@ page import="org.apache.http.client.methods.*" %>

```

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```

<%@ page import="org.apache.http.conn.ssl.*" %>
<%@ page import="org.apache.http.conn.scheme.*" %>
<%@ page import="org.apache.http.impl.client.*" %>
<%@ page import="org.apache.http.impl.conn.*" %>
<Property>
<%
    try {
        String flow_url = request.getParameter("ooFlowURL");
        String OO_ADMIN_USER = "admin";
        String OO_ADMIN_PASS = "admin";

        // Magic SSL voodoo allows us to ignore any cert errors
        // Required because of OO and its rubbish self signed cert
        SSLContext ssl_context = SSLContext.getInstance("SSL");
        ssl_context.init(null, new TrustManager[] { new X509TrustManager() {
            public X509Certificate[] getAcceptedIssuers() { return null; }
            public void checkClientTrusted(X509Certificate[] certs, String authType) {}
            public void checkServerTrusted(X509Certificate[] certs, String authType) {}
        } }, new java.security.SecureRandom());
        SSLSocketFactory sf = new SSLSocketFactory(ssl_context, SSLSocketFactory.ALLOW_ALL_HOSTNAME_VERIFIER);
        Scheme https_scheme = new Scheme("https", 443, sf);
        SchemeRegistry scheme_registry = new SchemeRegistry();
        scheme_registry.register(https_scheme);

        // PHEW! Now create our HttpClient, with our special SSL connection manager!
        DefaultHttpClient client = new DefaultHttpClient(new SingleClientConnManager(scheme_registry));

        // Set credentials, make GET request, and read response into a String
        Credentials cred = new UsernamePasswordCredentials(OO_ADMIN_USER, OO_ADMIN_PASS);
        client.getCredentialsProvider().setCredentials(AuthScope.ANY, cred);
        HttpGet get_request = new HttpGet(flow_url);
        ResponseHandler<String> handler = new BasicResponseHandler();
        String response_body = client.execute(get_request, handler);
    }
}

```

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```

client.getConnectionManager().shutdown());

// Build DOM document from XML string buffer
DocumentBuilderFactory factory = DocumentBuilderFactory.newInstance();
DocumentBuilder doc_builder = factory.newDocumentBuilder();
InputStream xml_src = new InputStream(new java.io.StringReader(response_body));
Document doc = doc_builder.parse(xml_src);

// Create an XPath to find the flowResult
XPathFactory xpath_factory = XPathFactory.newInstance();
XPath xpath = xpath_factory.newXPath();
XPathExpression expr = xpath.compile("//item[name='flowResult']/value");
expr.evaluate(doc);
String flow_result = (String)expr.evaluate(doc, XPathConstants.STRING);

// Now use a regex to extract the list of names and values
Pattern patt = Pattern.compile("names=(.*?);values=(.*?);FailureMessage");
Matcher matcher = patt.matcher(flow_result);
matcher.find();
// Pipe seperated
String names = matcher.group(1);
String[] name_parts = names.split("\\|");
String values = matcher.group(2);
String[] value_parts = values.split("\\|");

for(int i = 0; i < name_parts.length; i++) {
    out.println("<availableValues><value>" + value_parts[i] + "</value><displayName>"
        + name_parts[i] + "</displayName><description>" + name_parts[i] +
"</description></availableValues>");
}

} catch (Exception e) {
    e.printStackTrace();
}

```

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```
}  
%>  
</Property>
```

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