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COMMON CONTROLS · GUIDED TOUR

ListControl

Adding the control element to an existing application, step by step

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1 Guided Tour ListControl

1.1 Object

This tour demonstrates the use of the ListControl. The control element produces a table whose structure and appearance are freely configurable. Paging, sorting within the columns and updating the data model when the check column is clicked do not have to be implemented - the ListControl already covers those basics.

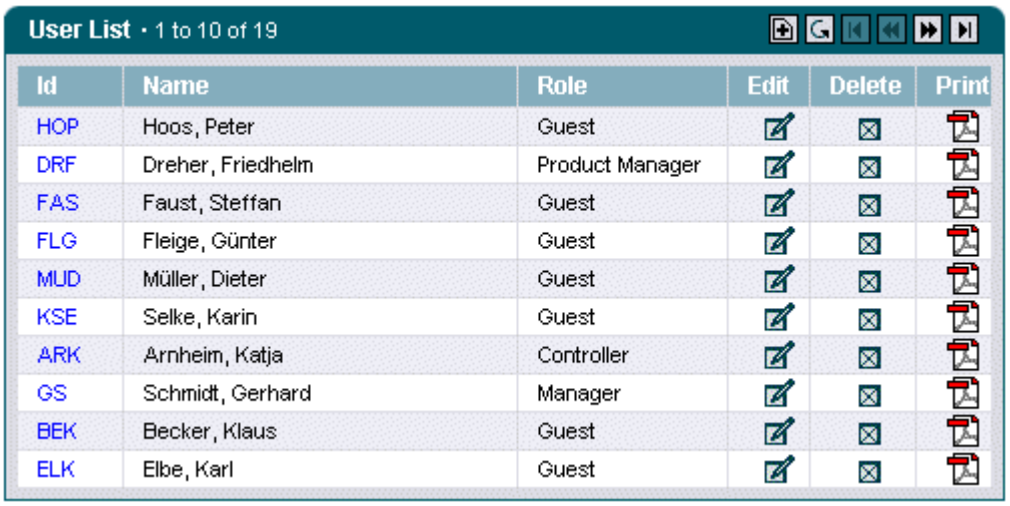


Figure 1: ListControl example

Using the ListControl takes the following steps:

1. Choosing the design of the user interface
2. Writing an action class
3. Instantiating a ListControl
4. Providing the display data
5. Configuring the table within the JSP page

1.2 Registering the painter factory

The first step is to register the painter factory. It determines the design of the user interface. This can be done for the whole application in the init() method of the front controller servlet.[1] Here we choose the standard design provided by the DefaultPainter.[2]

JAVA

```java
import javax.servlet.ServletException

import org.apache.struts.action.ActionServlet;
import com.cc.framework.ui.painter.PainterFactory
import com.cc.framework.ui.painter.def.DefPainterFactory;
import com.cc.framework.ui.painter.html.HtmlPainterFactory;

public class MyFrontController extends ActionServlet {

    public void init() throws ServletException {

        super.init();

        // Register all Painter Factories with the preferred GUI-Design
        // In this case we use the Default-Design.
        PainterFactory.registerApplicationPainter (
            getServletContext (), DefPainterFactory.instance());
        PainterFactory.registerApplicationPainter (
            getServletContext(), HtmlPainterFactory.instance());
    }
}
```

[1] If individual users are to choose between different interface designs, additional painter factories are registered in the user session. This is usually done in the LoginAction with PainterFactory.registerSessionPainter() in session scope.

[2] Further designs (painter factories) are part of the Professional Edition, or you develop your own.

1.3 Deriving the action class for the Struts adapter

Our table is to show information about the users of the system, so the action class that loads and fills the ListControl is called "UserBrowseAction". It is derived from the class FWAction, which wraps the Struts action class and adds the functions of the presentation framework. Instead of execute(), the doExecute() method is called. It receives the ActionContext, which wraps the access to further objects such as the request, session and response object.

JAVA

```java
import java.io.IOException;
import javax.servlet.ServletException;

import com.cc.framework.adapter.struts.FWAction
import com.cc.framework.adapter.struts.ActionContext

public class UserBrowseAction extends FWAction {

    /**
     * @see com.cc.framework.adapter.struts.FWAction#doExecute(ActionContext)
     */
    public void doExecute(ActionContext ctx)
        throws IOException, ServletException {
        // In the next chapter, we will instantiate
        // our ListControls with the DisplayData
    }
}
```

1.4 Instantiating the ListControl

The ListControl is now instantiated within the UserBrowseAction and filled with the data to be shown. Its data model is assigned to the control element through the setDataModel() method, which takes a **ListDataModel** as its argument. That is a simple interface, implemented here by the class UserDisplayList, which provides the display data.

JAVA

```java
import java.io.IOException;
import javax.servlet.ServletException;

import com.cc.framework.adapter.struts.ActionContext;
import com.cc.framework.adapter.struts.FWAction;
import com.cc.framework.ui.control.SimpleListControl;

import com.cc.sampleapp.common.Messages;
import com.cc.sampleapp.presentation.dsp.UserDisplayList;

public class UserBrowseAction extends FWAction {

    /**
     * @see com.cc.framework.adapter.struts.FWAction#doExecute(ActionContext)
     */
    public void doExecute(ActionContext ctx)
        throws IOException, ServletException {

        try {
            // Get the Displaydata for our List
            UserDisplayList dspData = DBUser.fetch();

            // Create the ListControl and populate it.
            // with the Data to be displayed
            SimpleListControl userList = new SimpleListControl();
            userList.setDataModel(dspData);

            // Put the ListControl into the Session-Object.
            // Our ListControl is a statefull Object.
            ctx.session().setAttribute("users", userList);
        }
        catch (Throwable t) {
            ctx. AddGlobalError(Messages.ERROR, t);
        }

        // Display the Page with the UserList
        ctx.forwardToInput();
    }
}
```

1.5 Providing the display data

The class that manages the display data for the ListControl only has to implement the interface ListDataModel. It adds methods for querying the row objects within the list to an existing class, and is kept simple accordingly.

JAVA

```java
import com.cc.framework.ui.model.ListDataModel;

/**
 * Collection with UserDsp-Objects
 */
public class UserDisplayList implements ListDataModel {

    private UserDsp[] data = new UserDsp[0];

    public UserDisplayList(UserDsp[] elements) {
        this.data = elements;
    }

    public Object getElementAt(int index) {
        return data[index];
    }

    public int size() {
        return data.length;
    }

    /**
     * Unique Key for each Row (Object).
     * In this Example our Key only contains the UserId.
     */
    public String getUniqueKey(int index) {
        return data[index].getUserId();
    }
}
```

JAVA

```java
import com.cc.framework.common.DisplayObject;
import com.cc.sampleapp.common.UserRole;

/**
 * User DisplayObject (ViewHelper)
 */
public class UserDsp implements DisplayObject {

    private String userId = "";
    private String firstName = "";
    private String lastName = "";
    private UserRole role = UserRole.NONE;

    public UserDsp(String userId, String firstName,
        String lastName, UserRole role) {

        super();
        this.userId = userId;
        this.firstName = firstName;
        this.lastName = lastName;
        this.role = role;
```

```
22      }
23
24      public UserRole getRole()   { return role; }
25      public String getUserId()   { return userId; }
26      public String getLastName() { return lastName; }
27      public String getName() { return firstName + ", " + lastName; }
28  }
```

1.6 Configuring the ListControl within the JSP page

To use the ListControl tag on a JSP page, the corresponding tag library has to be declared at the top of the page. The Common Controls are then available with the prefix <ctrl:tagname />. [The tag libraries also have to be listed in the deployment descriptor, the file WEB-INF/web.xml]

JSP

```jsp
<%@ taglib uri="/WEB-INF/tlds/cc-controls.tld" prefix="ctrl" %>

<ctrl:list
    id="userlist1"
    action="sample101/userBrowse"
    name="users"
    title="User List"
    width="500"
    rows="15"
    refreshButton="true"
    createButton="true">

    <ctrl:columndrilldown
        title="Id"
        property="userId"
        width="65"/>

    <ctrl:columntext
        title="Name"
        property="name"
        width="350"/>

    <ctrl:columntext
        title="Role"
        property="role.value"
        width="150"/>

    <ctrl:columnedit
        title="Edit"/>

    <ctrl:columndelete
        title="Delete"/>

</ctrl:list>
```

That covers every step needed to use the ListControl.

- Paging does not have to be implemented, the ListControl brings it along.
- In the JSP page we specified that the ListControl is to draw at most 15 rows. If there are more, the buttons for paging forwards and backwards appear automatically.
- Clicking the forward button triggers a server round trip and shows the next page. The presentation framework takes care of the update; no additional code is needed.

1.7 Tour end

The ListControl is quick and simple to integrate, yet flexible enough for special requirements: its standard behaviour can be overridden. That is how data is loaded dynamically, or how you build your own ListControl classes that already wrap the access to a particular table.

New columns are added in the configuration within the JSP page, and they can be shown or hidden depending on the user's permissions. The HTML code is produced by a painter, so other layouts are a matter of adapting the painter - and several layouts can be used side by side.

Features of the ListControl:

- Paging is built in, no extra programming needed. The buttons are disabled and enabled automatically at the first and last page.
- Column types: drilldown, text, check box, image, link, button, select, add, edit, delete, control.
- The check column supports the modes "single" and "multiple".
- Buttons are configurable and can be shown or hidden individually.
- The design of the ListControl can be defined in the JSP page or on the server side.
- Maps actions performed on the table to callback methods in the action class (for example onDrilldown, onSort, onEdit, onDelete, onRefresh, onCheck).
- JavaScript event handlers can be attached to columns.
- The columns shown depend on the user's permissions.
- The standard behaviour can be overridden.
- The layout can be adapted to your own style guide (corporate identity) through a painter factory.
- Compact HTML code.
- Same look and feel in Microsoft® Internet Explorer > 5.x and Netscape™ Navigator > 7.x

1.8 Excursus: implementing a callback method

For the user id the table uses a special column, the drilldown column. It renders a hyperlink which, in our application, branches to the detail view. The data is not to be edited in this view - that is what the edit button is for.

To react to that event, we add a matching callback method to our UserBrowseAction. Since we do not want to implement the business logic at this point, we pass the event on to another action, UserDisplayAction, which loads the details and calls the JSP page that shows them.

JAVA

```java
import java.io.IOException;
import javax.servlet.ServletException;

import com.cc.framework.adapter.struts.ActionContext;
import com.cc.framework.adapter.struts.FWAction;
import com.cc.framework.ui.control.ControlActionContext;
import com.cc.framework.ui.control.SimpleListControl;

import com.cc.sampleapp.common.Forwards;
import com.cc.sampleapp.common.Messages;
import com.cc.sampleapp.dbaccess.DBUser;
import com.cc.sampleapp.presentation.dsp.UserDisplayList;

public class UserBrowseAction extends FWAction {

    /**
     * @see com.cc.framework.adapter.struts.FWAction#doExecute(ActionContext)
     */
    public void doExecute(ActionContext ctx)
        throws IOException, ServletException {

    try {
            UserDisplayList dspData = DBUser.fetch();
            SimpleListControl userList = new SimpleListControl();
            userList.setDataModel(dspData);
            ctx.session().setAttribute("users", userList);
        }
        catch (Throwable t) {
            ctx.addGlobalError(Messages.ERROR, t);
        }

        // Display the Page with the UserList
        ctx.forwardToInput();
    }

    /**
     * This Method is called when the Drilldown-Column is clicked
     * In our Example we switch to the DetailView, which shows
     * more Information about the User. It's a readonly View.
     * @param   ctx ControlActionContext
     * @param   key     UniqueKey, as it was defined in the UserDisplayList
     *          to identify the Row. In this Example the UserId.
     */
    public void users_onDrilldown(ControlActionContext ctx, String key) {
        ctx.forwardByName(Forwards.DRILLDOWN, key);
    }
}
```

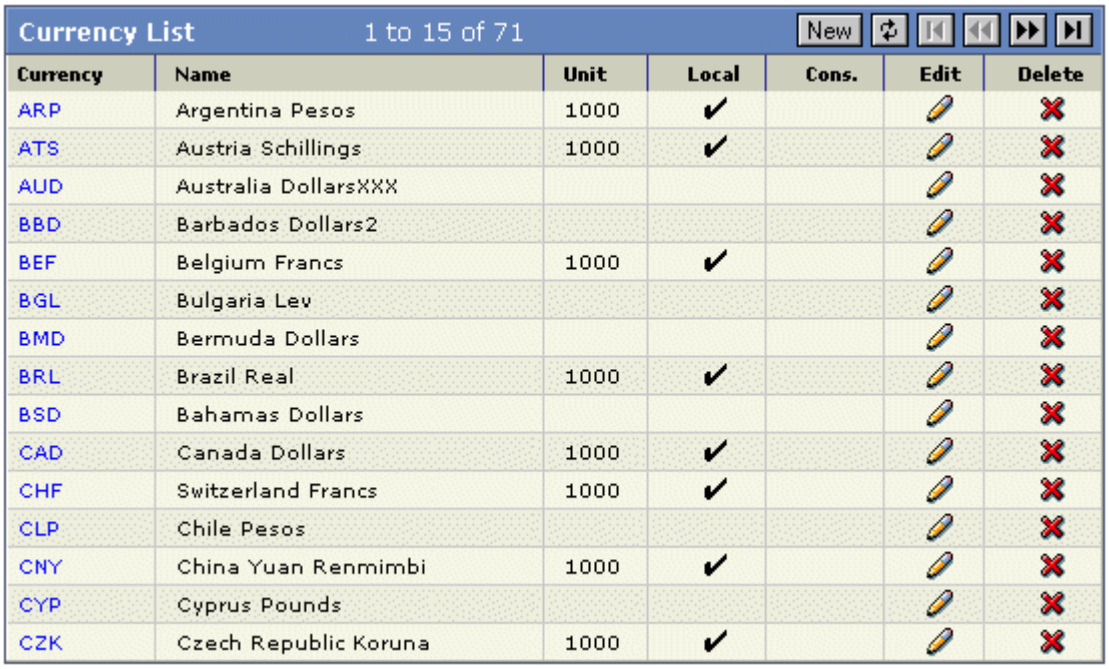
The name of the callback method is always made up of the **name of the bean**, the prefix **_on** and the **event** that occurred. The name of the bean is determined as follows:

- If the ListControl is handed over directly, for instance within the session as above --> the bean name is the name of the attribute the bean was stored under.
- If the ListControl sits inside an action form --> the bean name is the name of the property the instance of the control is held in within that form.

In our example the instance of the control element is kept in the session, so that it retains its internal state (current page, display data) across several server round trips. The callback method to be implemented therefore has to be called users_onDrilldown. It receives the ControlActionContext, which wraps the access to the session, request and response object among others. A further parameter carries the unique key of the row, as specified within the display list by the method getUniqueKey(int index). Our UserDisplayList returns the user id here.

1.9 Alternative layouts

Other layouts are produced by implementing and registering painter factories of your own. Here are a few examples from customer projects.



Currency List 1 to 15 of 71 New

Currency	Name	Unit	Local	Cons.	Edit	Delete
ARP	Argentina Pesos	1000	✔			
ATS	Austria Schillings	1000	✔			
AUD	Australia DollarsXXX					
BBD	Barbados Dollars2					
BEF	Belgium Francs	1000	✔			
BGL	Bulgaria Lev					
BMD	Bermuda Dollars					
BRL	Brazil Real	1000	✔			
BSD	Bahamas Dollars					
CAD	Canada Dollars	1000	✔			
CHF	Switzerland Francs	1000	✔			
CLP	Chile Pesos					
CNY	China Yuan Renmimbi	1000	✔			
CYP	Cyprus Pounds					
CZK	Czech Republic Koruna	1000	✔			

Figure 2: Layout example from a customer project

2 Glossary

CC	Common Controls
JSP	JavaServer Pages
Painter	Renders the HTML code of a control element; a custom painter factory adapts the layout to your corporate design.
DataModel	Interface through which a control element obtains its display data.