Java Desktop System
Configuration Manager Release 1.1
Developer Guide
Contents

Preface 7

1 Configuration Manager Overview 11
   Overview 11
   Configuration Propagation 12
   Configuration Management 12

2 Templates 13
   The “Hello world!” Template 14
   ▼ Creating the “Hello world!” template 14
   Explaining the “Hello world!” Template 16
   Localization 17
   The Policy Package Format 19

3 Advanced Templates 23
   Sets 23
   Action Handlers 29
   Help 30

4 Design Recommendations 33
   Guidelines 33

5 Configuration Concepts 35
   Strata 35
Figures

| FIGURE 1–1 | Client- and server-side components | 11 |
| FIGURE 2–1 | Proxy page | 15 |
| FIGURE 2–2 | HelloWorld Package | 20 |
| FIGURE 3–1 | Dynamic proxy set | 23 |
| FIGURE 3–2 | Proxy set sub-page | 24 |
| FIGURE 3–3 | Proxy Set — “No Proxy For” | 27 |
| FIGURE 5–1 | “Tree of trees” | 37 |
| FIGURE 5–2 | Merge | 38 |
Preface

The *Java Desktop System Configuration Manager Release 1.1 Developer Guide* provides guidelines for developers who want to enable applications for the Java™ Desktop System Configuration Manager, Release 1.1. It provides the necessary knowledge about how to centrally manage the configuration of software applications that are not recognized by the Java Desktop System Configuration Manager by default.

After you have read this document, you will be able to create and deploy files, called “templates”, that contain information about where to store and how to display new configuration settings. This document also provides design recommendations, information about creating advanced templates, and reference information, which will help you to build the templates that you need.

Who Should Use This Book

The *Java Desktop System Configuration Manager Release 1.1 Developer Guide* is aimed at developers and advanced site administrators who want to extend the Configuration Manager to be able to centrally configure additional applications and settings.

Before You Read This Book

It is recommended that you read at least Chapter 1, “Concepts,” in *Java Desktop System Configuration Manager Release 1.1 Administration Guide*, and have some experience in administering and using the Configuration Manager. Some knowledge of XML is helpful, but not essential.
How This Book Is Organized

Chapter 1 provides an overview of the Java™ Desktop System Configuration Manager, Release 1.1.

Chapter 2 provides an introduction to templates and how to create them.

Chapter 3 describes how to create and use more complex templates.

Chapter 4 discusses guidelines for design recommendations.

Chapter 5 provides information about configuration concepts.

Appendix A provides helpful information about configuration path mapping.

Appendix B provides a reference for template elements and attributes.

Appendix C contains the template DTD.

Related Books

The following Sun documents are related to this manual and can provide you with additional information:

- Java Desktop System Configuration Manager Release 1.1 Administration Guide
- Java Desktop System Configuration Manager Release 1.1 Installation Guide

Accessing Sun Documentation Online

The docs.sun.comSM Web site enables you to access Sun technical documentation online. You can browse the docs.sun.com archive or search for a specific book title or subject. The URL is http://docs.sun.com
Typographic Conventions

The following table describes the typographic changes that are used in this book.

<table>
<thead>
<tr>
<th>Typeface or Symbol</th>
<th>Meaning</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>AaBbCc123</td>
<td>The names of commands, files, and directories, and onscreen computer output</td>
<td>Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>machine_name%</code> you have mail.</td>
</tr>
<tr>
<td>AaBbCc123</td>
<td>What you type, contrasted with onscreen computer output</td>
<td><code>machine_name% su</code> Password:</td>
</tr>
<tr>
<td>AaBbCc123</td>
<td>Command-line placeholder: replace with a real name or value</td>
<td>The command to remove a file is <code>rm filename</code>.</td>
</tr>
<tr>
<td>AaBbCc123</td>
<td>Book titles, new terms, and terms to be emphasized</td>
<td>Read Chapter 6 in the <code>User's Guide</code>. Perform a patch analysis. Do not save the file. [Note that some emphasized items appear bold online.]</td>
</tr>
</tbody>
</table>
This chapter provides an overview of the Java™ Desktop System Configuration Manager, Release 1.1 and an introduction to the concepts needed to create templates for the Configuration Manager.

To introduce a new application to the Configuration Manager, you need to develop templates. You also need to register those templates with the Configuration Manager. Templates are files that contain information about where to store and how to display new configuration settings. The Configuration Manager uses these templates to obtain all necessary information about configuration policies.

Overview

The Configuration Manager provides the necessary infrastructure for a centralized configuration of the Java™ Desktop System. Currently, the Configuration Manager consists of the following client- and server-side components:
Configuration Propagation

All policies are stored in a central configuration repository, such as an LDAP server (7). A policy is the term for a group of semantically coherent configuration settings. A Configuration Agent (3), running on each client machine, is responsible for retrieving the policy data from the LDAP server, and for caching the data locally (2). The Configuration Agent periodically checks for any changes on the LDAP server, and updates the cache accordingly. Furthermore, the Configuration Agent sends notifications to all interested applications. Desktop applications, such as StarOffice, Mozilla, Evolution or GNOME, read the policies by means of corresponding adapters (1). These adapters encapsulate the necessary communication with the cache and the Configuration Agent.

Configuration Management

The Configuration Manager (5) is a web-based administration tool that allows you to view, define, and enforce configuration settings on different levels of an organization’s hierarchy, such as an organization, group or user level with a web browser. The Configuration Manager is a part of the Java Web Console (4), which provides the necessary infrastructure for all of Sun’s administration tools, such as a common web-based graphical user interface (GUI) and single sign-on authentication. The Configuration Manager uses templates (6) to view, define, and enforce configuration settings in the configuration repository and to render the GUI for displaying these configuration settings.
Templates

Configuration Manager templates provide information about the location of every configuration setting in the configuration repository. Templates also provide information about their visual representation in the GUI of the Configuration Manager. Templates are XML files that conform to a document type definition (DTD) file.

Tip – If you are not familiar with XML, the following link provides a short introduction:
http://java.sun.com/webservices/docs/1.0/tutorial/doc/IntroXML.html

Using XML allows you to create definitions for managing configurations settings that are independent of the GUI rendering engine, the operating system, and the programming language. The GUI is rendered based on the semantic dependencies of the elements specified in the template. Due to its generality, the Configuration Manager template format does not provide solutions for every possible GUI design request. For instance, exact positioning on the screen is not supported.

This chapter contains information about the typical development cycle for templates. Beginning with a currently existing configuration dialog of a desktop application, you will learn how to create a simple template for that dialog. You will also learn how to make that file available to the Configuration Manager, so that the file is displayed in the Content Area.
The “Hello world!” Template

▼ Creating the “Hello world!” template

Assume that you want to make the proxy configuration settings of StarOffice available to the Configuration Manager.

The following template provides a first implementation of the GUI:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE apt:template SYSTEM "policytemplate.dtd">
<apt:template>
  <category apt:name="StarOffice" apt:label="StarOffice">
    <category apt:name="Internet" apt:label="Internet">
      <page apt:name="Proxy" apt:label="Proxy">
        <section apt:name="Settings" apt:label="Settings">
          <property apt:name="ProxyServer" apt:label="Proxy Server"
            apt:dataPath="org.openoffice.Inet/Settings/ooInetProxyType"
            oor:type="xs:int">
            <visual apt:type="radioButtons"/>
            <constraints>
              <enumeration oor:value="0" apt:label="None"/>
              <enumeration oor:value="2" apt:label="Manual"/>
            </constraints>
          </property>
          <property apt:name="HTTPProxy" apt:label="HTTP Proxy"
```

14  Java Desktop System Configuration Manager Release 1.1 Developer Guide • November, 2004
The following steps are necessary to announce the new template to the Configuration Manager:

**Steps**

1. **Login as root to the machine on which you installed the Configuration Manager.**

2. **Create a directory that is called**
   
   `HelloWorld/templates/StarOffice/Internet/Proxy`
   
   **under**
   
   `/usr/share/webconsole/apoc/packages`.

3. **Create a file called `proxy.xml` with the XML template content that was listed previously. Copy the file to the `Proxy` directory.**

4. **Grant the user “noaccess” read/execute permission to the `Proxy` directory.**

5. **Grant the user “noaccess” read access to the `proxy.xml` file.**

6. **Execute**
   
   `/usr/sbin/smreg add -a /usr/share/webconsole/apoc`
   
   **command.**

7. **Restart the webserver with the**
   
   `/usr/sbin/smcwebserver restart`
   
   **command.**

   After you log in to the Configuration Manager, you should see a new top-level category that is called ‘StarOffice’. Browsing down that category displays the “Proxy” page that you defined with the template that you created.
Explaining the “Hello world!” Template

The first two lines of the template are initial XML definitions. The third line contains the root element of the template called `apt:template`, which encloses the whole definition of the policy made in a template file.

The next four lines contain the main template structure elements. By nesting `apt:category` elements, you create the nodes of the configuration policy tree. The configuration policy tree represents the visual hierarchy of the policies in the GUI of the Configuration Manager (see “Trees” on page 36). If you specify an `apt:name` attribute, the attribute is used to uniquely designate that element. The `apt:label` attribute specifies the displayed text as a category in the GUI. If you do not specify the `apt:label` attribute, the displayed text is defined by the `apt:name` attribute. Therefore, always specify an `apt:label` element, because this element is used for localization. See “Localization” on page 17.
Every apt:category element must contain one or more apt:category elements or an apt:page element. The apt:page element represents a leaf in the configuration policy tree. The “Proxy” page that was shown previously is an example of a leaf. The Configuration Manager renders a page as a single HTML page that has to be divided into at least one apt:section. An apt:section element renders all its child elements in a table with a table heading. Using more than one section enables you to group settings on one page.

The apt:section element contains apt:property elements, which represent the configuration settings. The “Hello, world!” template contains six properties: ProxyServer, HTTPProxy, HTTPPort, FTPProxy, FTPPort, and NoProxyFor. Every property contains an apt:dataPath attribute. This attribute is required and specifies the data location in the configuration tree. The configuration tree in turn represents the hierarchy of the configuration settings as it is stored in the configuration repository. See “Trees” on page 36 for more information.

The cor:type attribute defines the data type of the configuration setting in the configuration repository. ProxyServer, HTTPPort, and FTPPort are of type xs:int, the other properties are of type xs:string. Integer and string types are displayed as edit fields by default.

The visual element is used to instruct the Configuration Manager how to display the property. Without specifying this element, the property ProxyServer would have been rendered using an edit field instead of a radio button group.

Tip – The GUI of the Configuration Manager deviates from the original StarOffice GUI by rendering the two possible integer values as a radio button group instead of using a drop-down list. For visualizing a dual value, improved usability is achieved using radio buttons instead of a drop-down list. An example, for instance, is one click compared with two clicks for changing a value.

The constraints element, in combination with the enumeration sub-element, is used to specify the number of radio buttons rendered and the integer values stored in the back end, depending on which radio button is selected. The apt:label attribute specifies the string rendered on the GUI for every radio button.

Localization

It is important to localize all strings that are defined in a template. Localized strings are retrieved from resource files. The resImport sub-element of the apt:template element is used to bind one or more resource files to a template. You need to specify the fully qualified path to the resource and its base name, for example: 
The resource key to be used is defined by providing the name of the key as value of the \texttt{apt:label} attribute, e.g.

\begin{verbatim}
<property apt:name="HTTPProxy" apt:label="SO.internet.proxy.name"
      apt:dataPath="org.openoffice.Inet/Settings/ooInetHTTPProxyName"
      oor:type="xs:string">
\end{verbatim}

The Configuration Manager searches every resource file bound to a template for the key specified in the \texttt{apt:label} attribute first. If no key is found, the value of the \texttt{apt:label} attribute is displayed. If a key is found, the corresponding value is retrieved from the resource file and is displayed.

The resource file from which the string is retrieved is determined in a similar way to the mechanism defined for Java: the package path specified in the \texttt{resImport} element and the languages selected in the web browser determine the selected resource file. For example, if en\_US is the language for web pages selected in the browser, and the package path specified in the \texttt{resImport} element is \texttt{com.sun.star.apoc.policies.resource.staroffice}, the Configuration Manager searches the following files in the given order for the resource key:

\begin{verbatim}
./res/com/sun/star/apoc/policies/resource/staroffice_en_US.properties
./res/com/sun/star/apoc/policies/resource/staroffice_en.properties
./res/com/sun/star/apoc/policies/resource/staroffice.properties
\end{verbatim}

The Configuration Manager searches the files in the local policy package first (see “The Policy Package Format” on page 19). If they are not found, all other packages are searched. This enables strings that are already localized in other packages to be reused, especially for category names.

See the API specification of the Java ResourceBundle for more details on resource recovery.

\textbf{Tip} – All applications of the Java Web Console determine the language during the login. To force any application to use a new language, you must log out. Then log in again after you have changed the language for web pages in your browser.

The online help should also be localized. The Configuration Manager chooses the HTML file according to the same rules that are applied to the resource files, except that only the local policy package is searched for the help file. For example, if you specify \\
\texttt{/StarOffice/Internet/Proxy} as the path to the HTML file, and en\_US in your browser, the Configuration Manager displays the online help file \texttt{./web/StarOffice/Internet/Proxy_en_US.html}.  

18 \hfill Java Desktop System Configuration Manager Release 1.1 Developer Guide • November, 2004
The Policy Package Format

Templates are embedded into a deployment container, which is similar to a "package" in the Java™ programming language. A package can also contain optional files, such as resource files for GUI localization, HTML files for online help, and arbitrary support files.

The Configuration Manager uses a special directory and a file name format to access the templates and all necessary optional files. This directory and file name structure is called the policy package format.

All policy packages are located in a unique subdirectory below the /usr/share/webconsole/apoc/packages directory. For the "Hello, world!" example, HelloWorld was chosen, resulting in a /usr/share/webconsole/apoc/packages/HelloWorld directory.

Tip – Use the product name and product version of the software for which you are installing the package. This ensures a unique package directory. For instance, HelloWorld3.1 is a better choice than HelloWorld.

Below the specific package directory, which should not be confused with the packages directory, the following subdirectories are allowed:

<table>
<thead>
<tr>
<th>Directory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>templates</td>
<td>The templates subdirectory must contain all templates of the policy package. Files that have the postfix .xml are considered to be templates. The name of the file must correlate with the value of the apt:name attribute of the page element. Templates can be organized in any way, although they should be located in the same directory hierarchy, as specified by their category hierarchy.</td>
</tr>
<tr>
<td>classes</td>
<td>The classes subdirectory must contain all class files of the policy package. Files that have the postfix .class are considered to be Java class files. The name of the file has to correlate with the name of the class defined in that file. The files have to be located in the same directory hierarchy as specified by their package hierarchy.</td>
</tr>
<tr>
<td>web</td>
<td>The web subdirectory must contain all HTML help files of the policy package and must contain images referenced by the policy package. Files that have the postfix .html are considered to be HTML files. Correlate the name of the HTML file with the name of the template using the HTML file. Locate HTML files in the same directory hierarchy as the template using the HTML file.</td>
</tr>
</tbody>
</table>
The res subdirectory must contain all resource files of the policy package. Files that have the postfix .properties are considered to be Java-compliant resource files. You can correlate the names and paths of the resource file with the names and paths of the template files that use them. You can also specify one directory hierarchy containing one resource file for all templates.

The lib subdirectory must contain all library files of the policy package. Files that have the postfix .jar are considered to be libraries. Libraries are automatically loaded by the Configuration Manager’s class loader. Their content is accessed by using the root directory in the jar file as the root directory for absolute paths. The typical use for library files is to act as a container for class or resource files, and for directories that are normally located in the classes and res directories.

Other file types have no special meaning to the Configuration Manager. Nevertheless, the files types can be placed in the classes or web directories, if they are needed by class or HTML files.

To further illustrate the package format, Figure 2-2 shows a mature HelloWorld package:
FIGURE 2-2 HelloWorld Package
The deployment of packages is completely up to the developer of the package, as long as you follow the rules defined previously in this chapter. You can provide a collection of files with instructions about how to copy the files to the correct locations, or you can provide a zip file, or you can use the deployment mechanisms provided by the operating systems, such as .pkg files for Solaris™ or .rpm files for Linux. The last method is recommended, as the enhanced means for maintaining and removing software offered by the corresponding operating system provide better support for the end user.
Advanced Templates

The chapter provides information about building and using more complex templates.

Sets

After creating the "Hello, World!" template presented in Chapter 2, you might need to make the list of configurable proxies dynamic. A dynamic list enables users to add proxies for additional protocols like GOPHER, SOCKS, and SSL. Sets enable you to accomplish this task.

Note – The use of sets for the proxy page is for demonstration purposes only. Neither StarOffice nor OpenOffice can handle this example, because their implementation expects the original layout of the configuration tree.

Figure Figure 3-1 depicts a dynamic list of proxies instead of using a fixed number of edit fields:
Proxies are added if you click on the New button. A dialog prompts for the name of the new protocol to use a proxy for. Specify **FTP** the first time, then click New again and type **HTTP** as the name for the second protocol. The result looks like Figure 3–1. The two entries are links. If you click on one of the links, the **Content Area** is loaded with the content that you see in Figure 3–2:
The functionality described in the two preceding figures is implemented by modifying the "Hello, world!" example as follows: Delete the four properties HTTPProxy, HTTPPort, FTPProxy, and FTPPort. Then add a set element, as seen in the annotated section in the following code example:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<DOCTYPE apt:template SYSTEM "policytemplate.dtd">
<apt:template>
  <category apt:name="StarOffice" apt:label="StarOffice">
    <category apt:name="Internet" apt:label="Internet">
      <page apt:name="Proxy" apt:label="Proxy">
        <section apt:name="Settings" apt:label="Proxy Server">
          <property apt:name="ProxyServer" apt:label="Proxy Server"
            apt:dataPath="org.openoffice.Inet/Settings/ooInetProxyType"
            oor:type="xs:int">
            <visual apt:type="radioButtons"/>
            <constraints>
              <enumeration oor:value="0" apt:label="None"/>
              <enumeration oor:value="2" apt:label="Manual"/>
            </constraints>
          </property>
          <property apt:name="NoProxyFor" apt:label="No Proxy For"
            apt:dataPath="org.openoffice.Inet/Settings/ooInetNoProxy"
            oor:type="xs:string"/>
        </section>
      </page>
    </category>
  </category>
</apt:template>
```

FIGURE 3-2 Proxy set sub-page
The `apt:dataPath` attribute of the set element points to the place where the set is stored in the back end. The set element contains a page element, which contains a section element, which in turn contains a property element. This hierarchy correlates to the element hierarchy below a category element. It is rendered as a page in the same way, except that it is triggered by clicking the link in the set table.

In comparison to a category page, the set page properties HostName and Port use a special notation for the `apt:dataPath`. The path begins with a dot, meaning that the path is relative to the first path definition found ascending the element hierarchy. The first parent element with an `apt:dataPath` is the set element, so the Configuration Manager translates the relative path of, for example, the Port property to `org.openoffice.Inet/Settings/ooInetProxyList/$queriedId/Port`. The other peculiarity in this path is the `$queriedId` variable. Since all data in the configuration repository needs to be uniquely identified, every element in a dynamic data structure needs to have a unique name. The `$queriedId` variable instructs the Configuration Manager to query the user for that name when the Add button is clicked. The resulting set element is stored with the specified name at the position determined by the position of the variable. Therefore, in the case of the FTP set element, the path to its port property is `org.openoffice.Inet/Settings/ooInetProxyList/FTP/Port`.

Another example: You can also use sets to display the NoProxyFor property. If the string of host names becomes long, the use of an edit field for this property can be problematic. Users then need to scroll to view the entire string in the edit field. A list of proxy names that are implemented with a set avoids that extra scrolling.

To use a set instead of a string for the NoProxyFor property, delete the NoProxyFor element with all its sub-elements. Then add the set element that is shown in annotated section in the following code example:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<DOCTYPE apt:template SYSTEM "policytemplate.dtd">
<apt:template>
  <category apt:name="StarOffice" apt:label="StarOffice">
    <category apt:name="Internet" apt:label="Internet">
      <page apt:name="Proxy" apt:label="Proxy">
        <section apt:name="Settings" apt:label="Proxy Server">
          <property apt:name="ProxyServer" apt:label="Proxy Server"
            apt:dataPath="org.openoffice.Inet/Settings/ooInetProxyList/FTP/Port"/>
        </section>
      </page>
    </category>
  </category>
</apt:template>
```
oor:type="xs:int">
<visual apt:type="radioButtons"/>
<constraints>
<enumeration oor:value="0" apt:label="None"/>
<enumeration oor:value="2" apt:label="Manual"/>
</constraints>
</property>
</section>
<!-- Beginning of set element to be added -->
<set apt:name="NoProxyFor" apt:label="No Proxy For"
apt:dataPath="org.openoffice.Inet/Settings/ooInetNoProxySet">
&page apt:name="HostNamePage">
<section apt:name="HostNameSection">
<property apt:name="HostNameProp"
apt:dataPath="./$queriedId/HostName" oor:type="xs:string"
apt:storeDefault="true">
<visual apt:type="hidden"/>
=value>$queriedId</value>
</property>
</section>
</page>
</set>
<!-- End of set element to be added -->
<set apt:name="ProxyList" apt:label="Proxy List"
apt:dataPath="org.openoffice.Inet/Settings/ooInetProxyList">
&page apt:name="ProxyPage" apt:label="Proxy">
<section apt:name="Proxy" apt:label="Host and Port">
<property apt:name="HostName" apt:label="Host Name"
apt:dataPath="./$queriedId/HostName" oor:type="xs:string"/>
<property apt:name="Port" apt:label="Port"
apt:dataPath="./$queriedId/Port" oor:type="xs:string"/>
</section>
</page>
</set>
</page>
</category>
</category>
</apt:template>
The entries in the table are no longer links, but rather the entries represent a flat list of single-valued elements. This is achieved by using the `apt:storeDefault` attribute and the `visual` element in combination with the `value` element. The `value` element can define a default value for a configuration setting. A default value is not stored in the configuration repository by default. The `apt:storeDefault` attribute instructs the Configuration Manager to override that default and to automatically store the default value in the back end. In this case, the default value is the value that the user enters in the dialog when a new set element is added. If the `apt:type` attribute of the `visual` element is specified as "hidden", the only section in that page is left empty. If a set page is empty, it makes no sense to display the page, so the Configuration Manager does not provide a link.

**FIGURE 3-3** Proxy Set — “No Proxy For”
Action Handlers

An action handler is used to execute user-defined actions whenever an event occurs. At the point, only one action handler is available: the XML handler, which generates JavaScript code in the client-side browser.

The XML handler can be used to implement a feature of the StarOffice/OpenOffice Proxy dialog not yet covered by the templates presented so far: selecting the value "None" for the "Proxy server" setting disables the edit fields.

The annotated areas in the following template show the necessary changes in the original "Hello, world!" template in order to enable or disable the edit fields if the "Proxy server" setting is set to "Manual" or "None":

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE apt:template SYSTEM "policytemplate.dtd">
<apt:template>
  <category apt:name="StarOffice" apt:label="StarOffice" >
    <category apt:name="Internet" apt:label="Internet">
      <page apt:name="Proxy" apt:label="Proxy">
        <section apt:name="Settings" apt:label="Settings">
          <property apt:name="ProxyServer" apt:label="Proxy Server" apt:dataPath="org.openoffice.Inet/Settings/ooInetProxyType" oor:type="xs:int"
            <!-- The following line should be added to original "Hello, world!" template -->
            <xmlHandler apt:name="switchState">
              <event apt:type="onChange" />
            </xmlHandler>

            <visual apt:type="radioButtons" />
            <constraints>
              <enumeration oor:value="0" apt:label="None"/>
              <enumeration oor:value="2" apt:label="Manual"/>
            </constraints>
          </property>
          <property apt:name="HTTPProxy" apt:label="HTTP Proxy" apt:dataPath="org.openoffice.Inet/Settings/ooInetHTTPProxyName" oor:type="xs:string" />
          <property apt:name="HTTPPort" apt:label="HTTP Port" apt:dataPath="org.openoffice.Inet/Settings/ooInetHTTPProxyPort" oor:type="xs:int" />
          <property apt:name="FTPPort" apt:label="FTP Port" apt:dataPath="org.openoffice.Inet/Settings/ooInetFTPProxyPort" oor:type="xs:int" />
          <property apt:name="FTPProxy" apt:label="FTP Proxy" apt:dataPath="org.openoffice.Inet/Settings/ooInetFTPProxyName" oor:type="xs:string" />
          <property apt:name="NoProxyFor" apt:label="No Proxy For" apt:dataPath="org.openoffice.Inet/Settings/ooInetNoProxy" oor:type="xs:string" />
        </section>
        <!-- Beginning of section to be added to original "Hello, world!" template -->
        <xmlHandler apt:name="switchState"> 
          <event apt:type="onChange" />
        </xmlHandler>
      </page>
    </category>
  </category>
</apt:template>
```
By adding the `apt:xmlHandler` attribute to the property `ProxyServer`, you associate the `xmlHandler` element with the same name (here: "switchState") to that property.

Action handlers are triggered by events. Which events are considered by an action handler is defined by the `apt:type` attribute of the event element. At this point, there is only one event available: the `onChange` event. This event is thrown when a user enters new data for a property. In the preceding example, the event is used to trigger the XML handler when the value of the `ProxyServer` property changes.

The action element contains the actions that are executed if any of the events specified by the event element occur. In the preceding example, the first action is to check the value of the `ProxyServer` property and to change the state of the other edit fields accordingly. This is achieved by using the `choose`, `when` and `otherwise` elements. All edit fields are disabled, if the `ProxyServer` property is set to "None". The edit fields are enabled, if the `ProxyServer` property is set to "Manual".

Help

There are two different types of help: the online help and the inline help.

The online help is a detailed, context-sensitive help that is displayed in a new window when the user clicks the `Help` link in the masthead. If the last action was taken in the `Content Area`, the online help document defined in the template currently displayed
in the **Content Area** is shown. If the last action was taken somewhere else, the general online help is shown. The `apt:onlineHelp` attribute of the `page` element is used to bind the HTML help file to a template. You need to specify the fully qualified path to the file and its base name, for example,

```xml
<page apt:name="Proxy">
    apt:label="Proxy"
    <apt:onlineHelp="/StarOffice/Internet/proxy">

references ./web/StarOffice/Internet/proxy.html.

You can use absolute and relative paths in HTML files. If you place an image in a directory that is called `images`, alongside of the HTML file, any of the following notations can be used in the HTML file:

- `<img src="/StarOffice/Internet/images/image.gif">
- `<img src="./images/image.gif">

The inline help is a brief text providing additional information for category, page and property pages. The inline help is displayed in the "Comment" column for a category element, below the page title for a page element and below the configuration setting for a property element. The help text is specified by the `apt:inlineHelp` attribute of any of the three elements category, page or property. For example,

```xml
<property apt:name="HTTPProxy"
    apt:label="HTTP Proxy"
    apt:inlineHelp="Specify no proxy (None) or a manually defined proxy (manual)."
    apt:dataPath="org.openoffice.Inet/Settings/ooInetHTTPProxyName"
    oor:type="xs:string"
</property>
```

You should provide resource keys for the label to facilitate localization.
Design Recommendations

Before you create templates for your application, you need to determine which configuration settings are to be centrally managed by the Configuration Manager. The most simple solution is to create templates containing every possible configuration setting, but this approach may create an unnecessary amount of work and often results in settings being displayed by the Configuration Manager that are never used.

Guidelines

Which settings to choose while creating templates depends heavily on the application in question, but the following list may provide some guidelines which settings to use:

- Settings that deal with security.
- Settings that deal with lockdown.
- Settings that reference resources, such as hosts, ports, URLs, paths, and so on.
- Settings that are used to define corporate identity, such as fonts or colors.

The concrete names of the categories and pages are completely up the template developer. There are only two rules to obey:

- The names must be unique for every level in the tree so that a unique path can be created, and
- The first category must uniquely identify the application and its version, for example, “StarOffice 6.0”.

Choosing an apt:section element or an apt:page element should depend on the following two requirements: You should try to avoid scrolling in the Content Area by restricting the amount of configuration items per page to no more than six. If you are mapping an already existing GUI to the Configuration Manager GUI, you should try to map the application GUI to the Configuration Manager GUI as precisely as possible.
to optimize usability by recognition. If these two requirements contradict, choose the latter one. If you are considering a deviation in the Configuration Manager GUI from an application GUI, it should be a small one.

Every text displayed on the GUI should present a consistent look. Apply the following capitalization guidelines for text that appears in GUI design elements:

- Use sentence capitalization for the inline help and the online help. Capitalize only the first word of each sentence, unless the text contains proper nouns, abbreviations, or acronyms that are always capitalized.
- Observe proper punctuation within and at the end of full sentences.
- Avoid the use of long phrases that are not full sentences. If you must use a phrase that is not a full sentence, no punctuation is required at the end.
- Use headline capitalization for labels, titles, checkbox text, menu and list items. To apply headline capitalization, capitalize every word except articles ("a", "an", and "the"), coordinating conjunctions (for example, "and", "or", "but", "so", "yet", and "nor"), and prepositions with fewer than four letters (such as "in"). The first and last words are always capitalized, regardless of what they are.
- A label should not be concluded with a semicolon.
- Be consistent within your application.

In general, the packages are self-contained. There are only two exceptions: You can reuse resources of other packages (see “Localization” on page 17) and you can reuse chooser definitions of other packages with the apt:extendsChooser attribute (see “Basic Data Elements: property, value, constraints” on page 47). Use this kind of references sparsely and deliberately. References to other packages introduce a dependency to that package and you cannot guarantee that every installation of the Configuration Manager contains the packages that you depend on.

As the Configuration Manager potentially scans every installed package for resource recovery, every resource key should be unique - not only inside your package, but also compared to the other packages. Either use the category hierarchy to prefix the local resource key or create your own hierarchical prefix, for example, by using a structure akin to the Java package structure or by using your product name.

The online help should be designed akin to the HTML files already provided in the standard packages. Include the following lines to allow for proper browser detection and CCS definitions:

```html
<script type="text/javascript" src="/com_sun_web_ui/js/browserVersion.js"></script>
<script type="text/javascript" src="/com_sun_web_ui/js/stylesheet.js"></script>
```

Use the styles "help-header-1", "help-header-2" and "help-header-3" for title layout.
CHAPTER 5

Configuration Concepts

The presentation of the different trees in this document differs from what is covered in the administration guide. The administration guide does not mention the configuration tree because knowledge of the two different configuration and configuration policy trees is not necessary to use the Configuration Manager.

Strata

From the client point of view, the applications get configuration data from three separate data sources or strata. These strata are the default stratum, the user stratum and the policy stratum.

The user stratum and default stratum are the existing data sources that client applications currently deal with. The default stratum is deployed with the application and is mostly unchanged throughout its lifetime. It is stored locally alongside the application. The user stratum stores the changes made by a given user to the application settings. It is stored either locally or in a shared location.

The policy stratum is stored centrally in the configuration repository, which contains configuration settings that are managed by the Configuration Manager. These settings are associated on the server with entities such as organizations, roles, users, and hosts. They are accessed on behalf of a given user or host and are read-only for the user or host.

The Configuration Manager is able to read or write the configuration settings of the policy stratum only. The content of the default or user stratum cannot be accessed by the Configuration Manager. The client application configuration system is in charge of the retrieval and the combination of the values gathered from all strata. See “Merging” on page 37.
Trees

The Configuration Manager deals with four different hierarchical structures, also known as trees. To understand how the Configuration Manager works, it is important to distinguish these trees.

The first tree is the organization tree, the gray area in Figure 5-1, which represents the relationships between organizational units. The first level of the tree represents the organization itself. Subsequent levels can represent, for instance, departments and sub-departments. The last level can represent the members of these departments.

The second tree is the domain tree, which represents relationships between elements of the network such as domains or hosts. The first level of the tree represents the overall network. Subsequent levels can represent, for instance, the various subnets, and the last level the actual hosts in these subnets.

In the Configuration Manager, these two trees are currently obtained by interpreting the contents of an LDAP server, which is the typical repository for corporate structures. Each location within the tree in LDAP is called an entity. Entries in a LDAP server are mapped to the entities recognized by the Configuration Manager, namely “Organization”, “Role”, “User”, “Domain” and “Host”.

The third tree is the configuration tree, which are represented by the blue areas in Figure 5-1. The configuration tree hierarchically groups configuration settings in the back end. At the highest level of the configuration tree are components. Components comprise configuration settings that configure one software component. All elements below a component are either nodes or properties. Nodes can contain nodes or properties. Properties contain configuration settings. Each configuration setting can be referred to by a path. For example, org.openoffice.Office.Common/ExternalMailer/Program is referring to the "Program" configuration setting, which is in the "External Mailer" node under the "Common" component.

Each entity in the organization or domain tree can have its own configuration tree, resulting in two "trees of trees", one being an organization tree containing configuration trees and the other a domain tree containing configuration trees.

The fourth tree is the configuration policies tree, which is represented by the yellow area of Figure 5-1. The configuration policies tree is used to visually organize the configuration settings in order to conveniently browse and edit them. This is done by defining a hierarchy that is completely independent from the hierarchy in the configuration tree. The concrete values that are displayed in the configuration policy tree are obtained by referencing the location of the configuration settings in the configuration tree. See the arrows in Figure 5-1. This allows for the separation of the different design requirements for GUI and back-end data. For example, the position of a configuration setting changes more rapidly on the GUI than in the back end.
At the highest level of the configuration policy tree, there are applications with subsequent levels corresponding to various modules and sub-modules of that application, the last level being the actual configuration settings. A similar presentation can be seen in configuration systems dealing with many settings, such as the settings from StarOffice™ or Mozilla, where, for instance, the HomeUrl setting would be found under Mozilla/Navigator/HomeUrl in the Preferences dialog.

**Note** – The presentation of the different trees in this document differs from the presentation in the *Java Desktop System Configuration Manager Release 1.1 Administration Guide*. The administration guide does not mention the configuration tree because a knowledge of the two different configuration and configuration policy trees is not necessary to use the Configuration Manager.

**FIGURE 5-1** “Tree of trees”

---

**Merging**

The configuration settings that are finally used for a given entity is determined by merging the configuration settings of that entity and those of its parent entities on the client side. For instance, the settings for a user take into account the policies assigned to that user and those assigned to the organizations that the user belongs to. The
merging works by inheritance, that is, the user inherits the settings specified in the upper levels of the organization structure. This process is illustrated in Figure 5-2, which shows how the settings of the "marketing" organization are inherited by one of its members, user "jclarke". The configuration settings of user "jclarke" override some of the inherited settings.

FIGURE 5–2 Merge

The three strata are merged to form the final set of configuration settings in the same way that the configuration settings are merged in the policy stratum. The user stratum takes precedence over the policy stratum, which in turn takes precedence over the default stratum. It is possible to mark configuration settings in the policy stratum so that configuration settings in the user stratum are no longer considered during the merge process, so that users not allowed to override settings made by an administrator with the Configuration Manager on their own client machines. This is called protection.
User-based and Host-based Configuration

The concepts for working with the organization tree and the domain tree are the same. The main difference between the two is that the organization tree consists of users and the domain tree consists of hosts. Having users and hosts in two separate trees enables the Configuration Manager to provide user-based and host-based configuration.

On the client side, the user-based configuration settings are fetched from the organization tree based on the user name. The host-based configuration settings are fetched from the domain tree based on the IP or the host name of the host the user is working on. The user settings are merged after the host settings, which means that the user settings take precedence over the host settings. For example, by offering these two types of configuration, roaming users can have one user-based configuration but nevertheless can make use of the optimal proxy configuration, depending on the host they are on.
Configuration Path Mapping

One of the central design alignments of the Configuration Manager configuration repository is to be as flexible as possible to be able to act as repository for configuration data of as many other already existing configuration formats as possible.

The configuration format that is used in the repository partitions configuration data into components. Components are collections of configuration settings. The settings that belong to a component are typically used together and may be interrelated. Often they are associated with a particular client application, software module or application domain. Components are identified by their name and grouped into a hierarchy of packages by using structured names, for example `org.openoffice.Inet`.

Each component has a hierarchical structure. This structure is composed of nodes and properties. A node is a structural element that serves as container for other nodes and properties. A property is a leaf element of the hierarchy. It contains one or more values. Nodes and properties are identified by their name, which must be unique within their parent node. That allows it to reference any node or property by its component and path, for example, `org.openoffice.Inet/Settings/ooInetProxyType`.

Other configuration systems have different configuration formats. The configuration data of other configuration systems is stored in the configuration registry using the APOC configuration format, but it has to be presented in the configuration format that the applications expect. A one-to-one mapping of the APOC format to the format expected by the applications is needed. The syntax mapping is silently done by the according APOC adapters. The only task remaining for template developers is to use the correct configuration path mappings when storing the configuration data in the configuration policy tree. These mappings are necessary to separate the config settings of the various client configuration systems in the central configuration repository. There are concrete mappings defined and considered by the adapters for the following configuration systems:

- StarOffice/OpenOffice Registry (OOR, used for StarOffice and OpenOffice.org)
- Gnome Configuration (GConf, used for Gnome applications)
- Java Preferences (used for Java programs)
- Mozilla Preferences (used for Mozilla)

---

**StarOffice/OpenOffice Registry (OOR)**

The OOR key naming scheme is the scheme used for the APOC configuration repository, therefore, no adaptation work is necessary for this configuration system.

---

**Gnome Configuration (GConf)**

To transform a GConf configuration element into an APOC component and path, the following mappings are performed:

- All GConf related components are prefixed with `org.gnome`.
- `/apps/<subdir>/*` is mapped to the component suffix `apps.<encoded subdir>`.
- `/desktop/<subdir>/*` is mapped to the component suffix `desktop.<encoded subdir>`.
- `/system/<subdir>/*` is mapped to the component suffix `system.<encoded subdir>`.
- `/extra/<subdir>/*` is mapped to the component suffix `extra.<encoded subdir>`.
- `/extra/<keyname>/*` is mapped to the component suffix `extra`.
- Keys not following the naming conventions are mapped to the component suffix `ooc.<encoded subdir>` if they feature a `subdir` and `ooc` otherwise.
- `/schemas/<keypath>` is mapped to the component part schemas, and then the above rules apply for the rest of the key.
- GConf key subdirs mapped to component parts are encoded to comply with component parts restrictions.

**EXAMPLE A-1 Gnome Configuration**

- `/desktop/sampleDir/sampleSub.Dir/sampleSetting` becomes `org.gnome.desktop.sampleDir/sampleSub.Dir/sampleSetting`,
- `extra/sampleSetting` becomes `org.gnome.extra/sampleSetting`,
- `/sample.Dir/sampleSetting` becomes `org.gnome.ooc.sample.Dir/sampleSetting`,

---

42 Java Desktop System Configuration Manager Release 1.1 Developer Guide • November, 2004

Java Preferences

To transform a Java Preferences node/key pair into an APOC component and path, the first three node path elements (or all node path elements if less than three are present) will be appended to java.prefs to form a component name and the remainder of the node path elements and the key will form the path. Only user preferences are considered.

EXAMPLE A–2 Java Preferences

- node /com/sun/star/configuration, key someKey becomes java.prefs.com.sun.star/configuration/someKey,
- node /com/acme/widget, key someKey becomes java.prefs.com.acme.widget/someKey,
- node /sample.Dir, key someKey becomes java.prefs.sample.Dir/someKey.

Mozilla Preferences

To transform a Mozilla configuration element into an APOC component and path, the first element (assuming the name contains more than one) is appended to org.mozilla to form a component name, and the rest of the name is used as a node path. Preferences with only one element are stored in org.mozilla.ooc under their respective names.

EXAMPLE A–3 Mozilla Preferences

- mail.server.default.isSecure becomes org.mozilla.mail/server/default/isSecure,
- sampleSetting becomes org.mozilla.ooc/sampleSetting.
Element Dictionary

This appendix provides a reference description for every element and attribute possible in a template.

Header Elements: apt:template, resImport, helpImport

The root element template has two sub-elements: resImport and category, which are described in “Structure Elements: category, page, section” on page 46.

The resImport element is used to import resource files. All resource keys of the imported resource bundle are announced to the template. You have to import the resource to use its resource keys in, for example, the apt:label attributes. See “Structure Elements: category, page, section” on page 46. The apt:packagePath attribute specifies the location of the resource file using a path. The delimiter is a dot ("."). The file postfix (.properties) must not be specified, as well as the ISO language code (ISO-639) and the ISO country code (ISO 3166). The root directory of the path is the res directory located below the package directory. See also “Localization” on page 17.
The category element is used to define the unique position of a page in the configuration policy tree. Its first attribute is the apt:name attribute. The name attribute is used to define a unique name for an element. It facilitates better orientation in large templates and referencing elements.

The second attribute of the category element is apt:scope. The scope attribute specifies to which tree the configuration setting can be applied. If the scope is "user", the configuration setting is applied to the organization tree only. If the scope is "host", the configuration setting is applied to the domain tree only. If the scope is "global", the configuration setting is applied to both trees. The default setting is "global". The elements inherit the scope from their parent elements, except if an element defines its own scope. If an element has a "user" scope and a configuration policy tree attached to a domain tree is displayed in the Content Area, that element is not displayed to the user. The same holds true if an element has "host" scope and a configuration policy tree attached to an organization tree is displayed.

The third attribute of the category element is apt:label. The label attribute specifies the name of the element displayed to the user and supports localization. The string specified by the label attribute is searched in the resource bundles first. If a key matching the string is found, its value is displayed on the GUI. If the string has no matching key in any of the resource bundles, the string itself is displayed on the GUI. If no label attribute is specified, the string specified by the name attribute is rendered in the GUI. If both attributes are not defined, no output is rendered.
The fourth attribute of the category element is `apt:inlineHelp`. The `inlineHelp` attribute specifies the help text displayed on the GUI. The help is displayed to the right of the category names in the "Comment" column. It supports localization in the same manner as the `label` attribute described in the preceding paragraph.

There is exactly one page element at the end of a category hierarchy. This element represents one option page. It contains four attributes recognized by the category element: `name`, `scope`, `label`, and `inlineHelp`. The value of the `inlineHelp` attribute is displayed below the page title. The value of the `label` attribute is displayed as the page title. The category and page names define the unique location and name of a page in the configuration policy tree.

The `apt:onlineHelp` attribute is used to make the HTML file containing the online help available to the Configuration Manager. The HTML page referred to by this element is displayed as context-sensitive help if the user clicks the Help link in the masthead of the Configuration Manager. The `apt:filePath` attribute specifies the location of the help file using a path. The delimiter is a forward slash ("/"). The file postfix (`.html`) must not be specified, as well as the ISO language code (ISO-639) and the ISO country code (ISO 3166). The root directory of the path is the web directory located below the package directory. See also “Localization” on page 17.

A page can contain an arbitrary number of sections or sets, followed by an optional list of xmlHandlers. Thus the page element contains the sub-elements `section`, `set` (see “Dynamic Data Elements: set” on page 53) and `xmlHandler` (see “Interaction Elements: xmlHandler, event, action, choose, command” on page 54).

The `section` element creates a visual group of all its property sub-elements in a table-like layout. It contains four attributes recognized from the category element: `name`, `scope`, and `label`. The value of the `label` attribute is displayed as the section title.

---

**Basic Data Elements: property, value, constraints**

```xml
element property (constraints?, value*, visual) |
attribute name ID #REQUIRED
apt:scope {user | host | global} #IMPLIED
apt:label NMTOKEN #IMPLIED
apt:inlineHelp NMTOKEN #IMPLIED
apt:filePath CDATA #REQUIRED
```

Appendix B • Element Dictionary 47
The `property` element provides the visualization of configuration settings by way of GUI elements, such as checkboxes, radio buttons, and edit fields. It contains four attributes recognized by the `category` element: `name`, `scope`, `label` and `inlineHelp`. The inline help is displayed below the input fields (or in non-editable appearance below the value string) in the “value” column. The value of the `label` attribute is displayed as the label of the GUI elements. The category, page, section and property names define the unique location and name of a page in the configuration policy tree.

The attribute `apt:dataPath` defines a path that points to the location in the data back end that stores the value of the property. The value of the `dataPath` attribute is an absolute component path, for example, `org.openoffice.Office.Common/ExternalMailer/Program`. See Appendix A. The `dataPath` attribute of a `property` element must point to a data back-end property. Pointing to a data back-end node yields a runtime error.

The `apt:type` is used to specify the type of the repository configuration data. The following types are defined:
These types resemble the types defined in the StarOffice/OpenOffice registry (OOR) format. Wherever possible, the APOC templates use the syntax of the OOR format for the sake of reusability. For more information on types, use the OpenOffice.org Registry Format (OOR) documentation at http://util.openoffice.org/common/configuration/oor-document-format.html

The attribute apt:storeDefault instructs the Configuration Manager to store the default data in the data back end. The default data is defined by the value element (see below) and used to display the default to the user. If the user doesn’t change the value or explicitly requests storing the default data by executing the "Apply Default" action in the Content Area, the default data is not stored in the repository. By setting the value of the storeDefault attribute to true, the default data is stored even if the user does not change the value or executes "Apply Default".

A property element has three sub-elements: constraints, value and visual.

The visual element defines the visual type of the property on the GUI. The following visual types are recognized: checkBox, radioButtons, comboBox, stringList, textField, password, textarea, chooser, colorSelector and hidden. Every GUI element has two appearances: editable and non-editable. The non-editable appearance is rendered if the administrator using the Configuration Manager has no write privileges for that property. See the following table for the visual appearances of the visual types:

<table>
<thead>
<tr>
<th>Visual type</th>
<th>Editable appearance</th>
<th>Non-editable appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>textField</td>
<td>Username</td>
<td>testuser</td>
</tr>
</tbody>
</table>
The hidden property does not render a visual GUI element, but passes the value associated with the property to the browser in a hidden field. This feature proves useful, for example, if one value entered on the front-end has to be saved at more than one location in the back end.

The visual type is defined by the `apt:type` attribute of the `visual` element. There are two exceptions: `checkBox` and `chooser`. These two GUI elements need additional information in order to be displayed correctly, so they have their own sub-elements containing this information.
The checkbox property displays strings before and after the checkbox. It is represented by the checkBox element. Two additional strings are needed for displaying the checkBox GUI element in the non-editable appearance (see previous table). As a result, a checkBox GUI element needs four strings, which are displayed as follows:

1. In front of the checkbox. This string is defined in the label attribute of the property element.

2. After the checkbox. This string is defined in the apt:labelPost attribute of the checkBox sub-element. If that attribute is not defined, ".post" is appended to the string defined in the label attribute. This string is searched as key in the resource files.

3. Instead of a checked checkbox, if the checkbox is rendered in the non-editable appearance. The string is defined in the label attribute of the first enumeration sub-element of the constraints element. If no constraints are given, the postfix ".checked" is appended to the string defined in the label attribute of the property element. This string is searched as key in the resource files.

4. Instead of an unchecked checkbox, if the checkbox is rendered in the non-editable appearance. The string is defined in the label attribute of the second enumeration sub-element of the constraints element. If no constraints are given, the postfix ".unchecked" is appended to the string defined in the label attribute of the property element. This string is searched as key in the resource files.

The chooser property enables a value from a list of entries to be set. It is represented by the chooser element. In contrast to a combobox, the list of entries is editable. This list is stored in the back end at the location specified by the apt:dataPath attribute of the chooser element.

When the Edit button is clicked, a pop-up window opens, which provides a GUI for editing the list. The title of the content of the pop-up window is defined by the apt:labelPopup attribute of the chooser element. You can specify default values for the list by using the enumeration sub-element of the constraints element (see the paragraph dealing with the constraints below).

The apt:extendsChooser property of the chooser element is used to refer to another chooser element. This eases the reuse of previously defined chooser elements. All elements and attributes defined in that referred chooser are interpreted as if they were defined in the referring chooser. Sub-elements and attributes that are defined in the referring chooser overwrite elements and attributes of the chooser referred to. A property path is used to locate the referred chooser. A property path is a concatenation of the apt:name values of every element on the path from the root category to a property, delimited by forwards slashes ("/"). For example: /StarOffice/Internet/Proxy/Settings/MyChooser.

If the visual type is not specified, the GUI element used is derived from the type attribute. If the type is xs:boolean, a checkbox is used. If the type is a list type (e.g., oor:short-list), xs:hexBinary or oor:any, a text area is rendered. For all other types, an edit field is used. If neither the visual type nor the data type are specified, an edit field is rendered and the back-end data type is assumed to be xs:string.
The constraints element provides restrictions for the input fields. For example, if you want to allow a user to save only integer values between 1 and 5, providing an oor:type attribute with the value "xs:int" is not sufficient. You can specify the required restriction by specifying a minOccurs constraint of 1 and a maxInclusive constraint of 5.

There is a second application for the enumeration constraint if used with a checkbox property. The first enumeration constraints sub-element defines the value stored in the back end if the checkbox is checked, the second enumeration constraints sub-element defined the value stored in the back end if the checkbox is unchecked. If no constraint is given, the default values stored are true and false. The default strings displayed on the GUI in the non-editable appearance are "Enabled" and "Disabled".

The enumeration constraint has the same semantics for radiobutton and combo box properties as for checkbox properties, except that it is mandatory. The content of these elements is completely up to the developer. The name displayed on the GUI is defined by the label attribute of the constraint element. It is possible to omit the label attribute in the enumeration constraint. In that case the additional resources are specified by postfixes appended to the string defined in the label attribute of the property element.

For example, assume a drop-down box, whose property label is "securityList" and whose enumeration constraints contain the values "1", "2" and "3" but the enumeration constraint labels are not defined. The strings displayed to the user are determined by searching the resources keys "securityList.1", "securityList.2" and "securityList.3" respectively.

The list entries of chooser properties are not localized. As a consequence the apt:label attribute of the enumeration constraint has no effect on these properties.

For a complete discussion of the other constraints, see the Property Constraints section of the OpenOffice.org Registry Format (OOR) documentation.

The value element contains the default value for the property. This default value may be the same value contained in the default stratum, or it may be introduced at this point. It defines the value that is displayed by the Configuration Manager if no data can be found in the data back end.

The definition of the value element is similar to the definitions given in the OOR format. The value element has no sub-elements, but rather three attributes: nil, separator and lang. If the xsi:nil attribute is set to true, the value of the property is defined as "has no value". The oor:separator attribute is used to specify the string that is used as separator for list tokens, if the value element contains list type values.

**Tip** – The list entries of stringList properties are stored as value of type oor:string-list. The default separator is a semicolon (";").
Dynamic Data Elements: set

<!ELEMENT set (page)>
<!ATTLIST set
  apt:name ID #REQUIRED
  apt:scope (user | host | global) #IMPLIED
  apt:label NMTOKEN #IMPLIED
  apt:labelPopup NMTOKEN #IMPLIED
  apt:dataPath CDATA #REQUIRED
  apt:elementNamePath CDATA #IMPLIED
>

Up to now, all elements handled static back-end content. The set element is used to handle dynamic content. It is, like the section element, a sub-element of a page and displays sets of properties in a table.

It contains three attributes recognized by the category element: name, scope and label. The value of the label attribute is displayed as the table title.

The `apt:dataPath` attribute defines a path that points to the data back-end node that contains the set of elements. The value of the `dataPath` attribute is an absolute path in the form of `org.openoffice.Office.Commands/Execute/Disabled` (see Appendix A). The `dataPath` attribute of a set element must point to a back-end node. Pointing to a back-end property yields an error.

The `dataPath` attributes of descendants of the set must contain a dynamic part. This dynamic part specifies the location of the back-end nodes that are set members. The name of any back-end set member must be different to allow access to that member. To achieve this, variables are used.

Variables are prefixed with a dollar symbol: `$variable_name`. Valid variable names are `queriedId` and `silentId`. If the `$queriedId` variable is specified, the Configuration Manager displays an additional edit field that queries the user for a unique id. If the `$silentId` variable is specified, no ID is queried form the user; the Configuration Manager generates the unique ID by itself.

For example: The `dataPath` attribute of a property element has the value `org.openoffice.Office.Commands/Execute/Disabled/$queriedId/Command`. If the user creates a new set element, the user is additionally asked for the name of the set member. The concrete question string displayed on the GUI is specified by the `apt:labelPopup` attribute. If this attribute is omitted, the prompt Please enter a name for the new entry. is displayed.
It is possible to specify a relative path as the value of the `dataPath` attribute of sets or properties to minimize the length of the path strings. An example of a relative path is `./$queriedId/Command`. The absolute path is constructed by ascending the template element tree and prefixing the relative path with the `dataPaths` of its ancestors, until an absolute path is constructed. Assuming the parent of a property is a set. This set specifies the `dataPath` value `org.openoffice.Office.Commands/Execute/Disabled`. The Configuration Manager combines this path with the relative path `./$queriedId/Command`, resulting in the absolute path `org.openoffice.Office.Commands/Execute/Disabled/$queriedId/Command`.

It is not necessary to specify a `dataPath` attribute for the set, if all descendants of the set that support the `dataPath` attribute (set and property elements), specify an absolute path as the value of their `dataPath` attribute.

Recursive set structures (sets of sets) can also be handled. This is accomplished by having a set element containing a `page` element, which contains a `set` element again. The `dataPath` attribute of the sub set can specify a path relative to the super set.

If a set member is a back-end property, the value of the `oor:name` attribute of the back-end property is displayed as the label in the GUI. The value of the back-end property is displayed as the value of the GUI element.

If a set member is a back-end node, the value of the `oor:name` attribute of the back-end node is displayed as the name of the link. You can use the `apt:elementNamePath` attribute to override this naming scheme. The `elementNamePath` specifies a path relative to the back-end node. The path must point to a back-end property and its value is displayed as the name of the link. If the user clicks on such a link, the Content Area is refreshed, displaying the page specified by the `page` sub-element of the set.

---

**Interaction Elements: xmlHandler, event, action, choose, command**

```xml
<!ELEMENT xmlHandler (event+, action+)>  
<!ATTLIST xmlHandler apt:name ID #REQUIRED>

<!ELEMENT event EMPTY>  
<!ATTLIST event apt:type (onChange) #IMPLIED>

<!ELEMENT action (choose|command)+>

<!ELEMENT choose (when+, otherwise?)>

<!ELEMENT when (command+)>
```
The `xmlHandler` element is used to execute JavaScript code on the client side. The code execution is triggered depending on changes in the environment. These changes are propagated by events. Events are thrown by properties if their state changes. The type of an event indicates the type of the change.

An XML handler is defined by specifying the `xmlHandler` sub-element of the `apt:template` element. It requires a name defined by the `apt:name` attribute. An XML handler is registered to listen for events thrown by a property by specifying the `apt:xmlHandler` attribute of the `property` element using the name of the XML handler as its value.

The `event` element is used to specify the events the `xmlHandler` listens to by using its `apt:type` attribute. For now, only the `onChange` element is defined. This event is thrown by a property if its value is changed by the user. The value of a property changes at the very moment the user changes its input, for example, by typing a key in an edit field, by deselecting a checkbox, or by choosing an entry in a list box. Moving the focus to, or removing the focus from, a GUI element does not trigger this event.

If a handler has registered for an event at one or more properties, and that event occurs for one of these properties, the code defined in the `action` element is executed. The `action` element contains at least one `choose` or `command` element.

A `command` element specifies the instructions to be executed on the client side. It can (up to now) contain assignments only. There are no calculations allowed, either on the left-hand side or the right-hand side of the assignment. Assignments obey the scheme: `<variable>=<value>.

Variables follow a dotted notation: `<property>.<qualifier>`. The `<property>` must be the name of a property. The `<qualifier>` can have two values: “value” and “enabled”. The value qualifier denotes the value of that property. The value of a variable can be read and set to any value, as long that value is compatible with the type specified for the property. The “enabled” qualifier contains "true" if the property is enabled (can receive the focus) and "false" otherwise. It can be read and set to "true" or "false". Example: `propname.enabled=false`.  

The `choose` element is similar to the `choose` element defined in XSLT, and allows the conditional execution of commands. It must contain at least one `when` element and may contain one `otherwise` element at the end.

The `when` element has one or more `command` sub-elements and one `apt:test` attribute. The `test` attribute must specify an expression evaluating to a Boolean value.

An expression may consist of variables, numbers, strings, and the following tokens: Appendix B • Element Dictionary  55
Example: \((\text{propname.enabled}\neq \text{false})\, \text{and} \, \neg(\text{propname.value}=\text{'foo'})\).

If the expression evaluates to "true", the commands of the \text{when} element are executed and the \text{choose} statement is performed if it evaluates to "false" the next \text{when} element is evaluated. If none of the \text{when} elements is true and there is an \text{otherwise} element specified, the \text{otherwise} element commands are executed.
The Template DTD

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!ELEMENT apt:template (resImport*, category)>  

<!ELEMENT resImport EMPTY>
<!ATTLIST resImport   apt:packagePath NMTOKEN #REQUIRED >

<!ELEMENT category (category | page)>  
<!ATTLIST category   apt:name ID #REQUIRED   apt:scope (user | host | global) #IMPLIED   apt:label NMTOKEN #IMPLIED   apt:inlineHelp NMTOKEN #IMPLIED >

<!ELEMENT page ((section | set)+, xmlHandler*)>  
<!ATTLIST page   apt:name ID #REQUIRED   apt:scope (user | host | global) #IMPLIED   apt:label NMTOKEN #IMPLIED   apt:inlineHelp NMTOKEN #IMPLIED   apt:onlineHelp CDATA #IMPLIED >

<!ELEMENT section (property+)>  
<!ATTLIST section   apt:name ID #REQUIRED   apt:scope (user | host | global) #IMPLIED   apt:label NMTOKEN #IMPLIED >
```
Appendix C • The Template DTD 59