CA Spectrum®

OneClick Customization Guide

Release 9.4

CA Technologies Product References

This document references the following CA Technologies products:

- CA Spectrum® Infrastructure Manager (CA Spectrum)

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Chapter 1: OneClick Directory Structure

This section explains the directory structure of the XML files used to create the OneClick interface. You must be familiar with the structure to find the files necessary for customization and to implement customization in directories that are not overwritten when you upgrade or reinstall CA Spectrum.

This section contains the following topics:

Existing OneClick Files (see page 9)

Existing OneClick Files

The OneClick user interface is installed with a default layout, panel, menu, toolbar, and submenu content. The files that reside on the OneClick server controls all of these features. These files and their locations are identified in this section.

The console/config Directory

The files in the <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/console/config directory support menus, topology views, privileges for user interface elements, branding elements, and other aspects of the OneClick user interface. The files that are located in this directory are placeholder files that resemble templates for customizations to OneClick functionality. The files and their functions are described as follows:

custom-app-config.xml

General OneClick registrations, and topology support for CA Spectrum model types, including icons and views.

custom-branding-config.xml

Customizes the following UI branding elements of OneClick:

- Application brand name
- Application suite name
- Image to display in the splash screen
- Image to display as the logo button in the lower-left corner
- Name of the root node in the tree in the Navigation panel
- About dialog

Note: For information about the XML elements to specify these branding elements, see the comments in the file that is named custom-branding-config.xml in *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/config/.

custom-menu-config.xml

OneClick menus and toolbars.

custom-privileges.xml

Registers custom privileges that are applied to the menu items, columns, and subviews.

To customize the OneClick user interface, copy these files to the *<$SPECROOT>*/custom/console/config directory and then edit them.

Important! Do not add customizations to the files in their default location (*<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/config/). The customizations in that directory are ignored. In addition, these files are overwritten when you perform CA Spectrum and OneClick upgrades.

Check the *<$SPECROOT>*/custom/console/config directory before copying files there. Some actions, such as creating custom searches in the Explorer, automatically create a copy of the custom-app-config.xml if one does not exist. If the config files already exist in the *<$SPECROOT>*/custom/console/config directory, add your customizations to those existing files.

More information:

Customizing the OneClick Console Menu (see page 17)
Adding Support for Model Types or Model Classes (see page 65)
Customizing a Model's Information View (see page 101)
Creating Custom Privileges (see page 131)

The topo/config Directory

The files in this directory create the components of the OneClick topology views. These components include icons, subviews, and tables that display data.

All of the table files are named after the functionality that they display. For example, the file that builds the interface table for each model type is table-common-ifconfig-config.xml.

The common/config Directory

The files in this directory create various topology elements that can be used by all of the other files that create the OneClick interface. This includes colors, columns for tables, and tables.

The alarm/config Directory

The files in this directory create the OneClick alarm views and contents, including the Alarms table and the Alarm Details information tab.

Customizing OneClick

OneClick provides a flexible platform for administrators to modify aspects of the application to meet specific requirements. For example, you can modify OneClick behavior to support the unique structure of a site, an enterprise and network environment, work processes, and software deployments. Make your modifications using the OneClick UI or by coding the changes in the XML files that are provided for that purpose.

Important! Do not add customizations to the files in their default location (*<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/config/). The customizations in that directory are ignored. In addition, these files are overwritten when you perform CA Spectrum and OneClick upgrades.

Prerequisites for Customizing OneClick XML Files

Before you attempt to customize OneClick files, be aware of the following requirements:

- You must be able to create and modify files on the OneClick server.
- You must be familiar with the fundamentals of XML coding as well as the CA Spectrum and OneClick directory structure.
- You must know the following:
  - The file whose functionality you want to extend with your modifications.
  - The directory in the *<$SPECROOT>*/custom directory structure in which to create your custom file. For more information, see OneClick Directory Structure (see page 9).

Extend Factory XML Files

You can extend default XML files to accomplish OneClick customizations without overriding the entire factory default file. Customized XML files are not removed during a CA Spectrum/OneClick software upgrade or reinstallation.

To extend the default OneClick XML configuration files, create a file with the same name as the default file in the appropriate custom directory. Use the XML idref attribute in the new file to refer to the default OneClick file of the same name. Code the new functionality in this file. When OneClick parses the XML files, the changes in the new file are added to the existing factory file referenced using idref.

By extending factory files, you are able to take advantage of new features and functionality available in software updates to the factory XML code while preserving your customizations.

Although you can still override a factory XML file by creating a copy of it in the <*$SPECROOT*>/custom directory and making your changes in the copy, using the IDREF XML attribute provides the ability to inherit and extend the factory file, while maintaining customizations in streamlined files.

More information:

Preserve XML Customizations (see page 14)
Save Customized XML Files (see page 13)

Override Factory Files

Override a factory configuration file by copying the original file to the appropriate custom directory, and then adding new XML code or modifying the existing XML code. OneClick reads the files in the custom directory first. If the file exists in the custom directory and does not contain an idref statement referencing the original factory file, OneClick does not read the original factory file, and the new file overrides the original factory file.

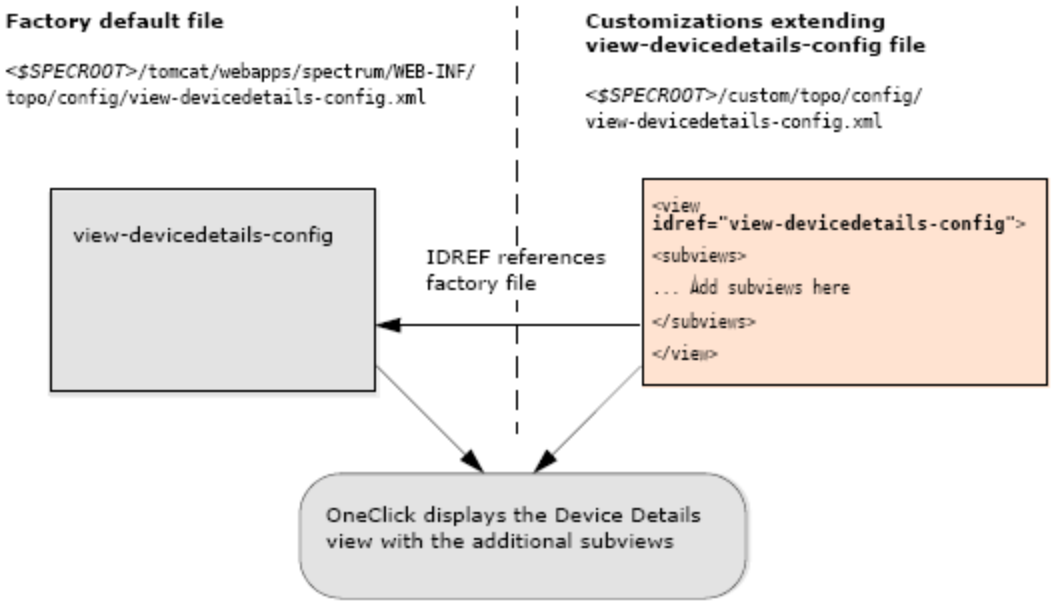
Important! Do not add customizations to the files in their default location (<*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/console/config/). The customizations in that directory are ignored. In addition, these files are overwritten when you perform CA Spectrum and OneClick upgrades.

Inherit Features in Factory XML Files

Using idref to extend XML files has applications beyond extending the factory file with the same name. You can use this technique to inherit or reuse features in any file of the same type. For example, you can create your own model types that have a customized details view defined in view-mymtypedetails-config.xml. This model type can also inherit the default device views configured in view-devicedetails-config using idref. The new custom file extends the functionality of the default file while also inheriting the views in the default file.

Example: Extending Factory XML File

The example in the following figure extends the functionality of the factory default <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/topo/config/view-devicedetails-config.xml file by adding the code for the new subviews in <*$SPECROOT*>/custom/topo/config/view-devicedetails-config.xml. The default factory file view-devicedetails-config is specified in an "idref" statement.



Save Customized XML Files

OneClick customization files must be placed in specific “custom” directories so that OneClick finds and reads the customized code and associates it with the correct default factory file. The following lists the custom directories for the OneClick component categories.

Alarms

<*$SPECROOT*>/custom/alarm/config/

Common

<*$SPECROOT*>/custom/common/config/

Important! Do *not* copy the <*$SPECROOT*>/custom/common/config/custom-jnlp-config.xml file to another computer when you migrate and upgrade CA Spectrum. This file can contain memory settings that are not compatible with the computer where you are copying the custom directories.

Console components

<*$SPECROOT*>/custom/console/config/

Event format and probable cause files

<*$SPECROOT*>/custom/Events/

Images

<*$SPECROOT*>/custom/images/

Background images

<*$SPECROOT*>/custom/images/Background/

Stored SSL certificates

<*$SPECROOT*>/custom/keystore/

Report Manager

<*$SPECROOT*>/custom/repmgr/config/

Topologies

<*$SPECROOT*>/custom/topo/config/

Preserve XML Customizations

OneClick does not delete or overwrite files in the custom directory during an upgrade of CA Spectrum or OneClick.

Customized OneClick XML files may be overwritten in the following situation:

- Uninstalling SpectroSERVER
- Reinstalling the same version of SpectroSERVER if you have installed OneClick under the CA Spectrum installation directory.

  In this case, you should save off the customized files to an area unaffected by the uninstall process, and re-insert them once you have reinstalled SpectroSERVER.

Note: For more information on upgrades and installation of CA Spectrum and OneClick, see the *Installation Guide*.

Preserve Custom Images

You must place all image files that you create or customize in the <*$SPECROOT*>/custom/images directory. Otherwise, all new or customized images are deleted or overwritten during an upgrade or reinstallation of CA Spectrum or OneClick.

Chapter 2: Customizing the OneClick Login Dialog

This section contains the following topics:

Custom Login Message

Custom messages can be added to the Login dialog for the OneClick Console. You can use this message to inform OneClick users about your usage policies, legal rights, consequences of unauthorized usage, or other important information they must know before they log in. The custom message appears in the Login dialog for the OneClick Console only.

Add a Custom Message to the OneClick Login Dialog

To inform OneClick users about usage policies, legal rights, or other important information needed before logging in, you can add a custom message to the OneClick Login dialog.

To add a custom message to the OneClick Login dialog

1. Open the <*$SPECROOT*>/tomcat/webapps/spectrum/oneclick.jnlp file with WordPad.
2. Add the following argument into the <application-desc> section:

   `<argument>-loginTitle *Message_Text*</argument>`

   For example, you can replace the *Message_Text* variable with your own message, as follows:

   ```
   <argument>-loginTitle For authorized company use only. Unauthorized users will be punished to the fullest extent of the law.</argument>
   ```

3. Click File, Save.

   Your custom message is added to the OneClick Login dialog.

Chapter 3: Customizing the OneClick Console Menu

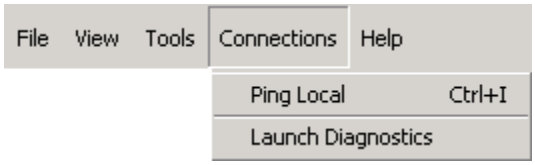
This section describes how to add new menus and new menu items to the OneClick console. You can use new menu items to launch URLs, third-party applications, and scripts, and to pass parameters to them.

This section contains the following topics:

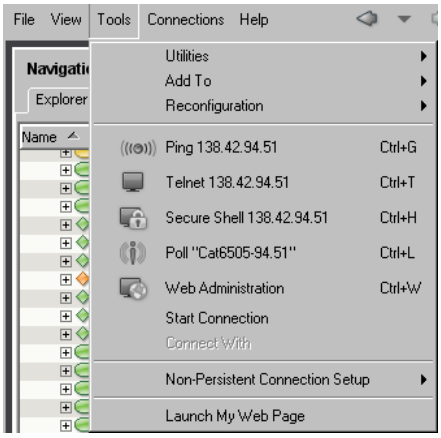
The custom-menu-config.xml File

The <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/console/config/custom-menu-config.xml file contains examples on how to add custom menus and custom menu items to your OneClick console as shown in the images. You will need to copy this file in to the <*$SPECROOT*>/custom/console/config/ directory if the file is not already in this directory.

The following image shows the Connections menu and its two new menu items: Ping Local and Launch Diagnostics:



The following image shows a new menu item called Launch My Web Page, which has been added to the existing Tools menu. This menu item has been created to launch a specified web page.



You create OneClick menus and menu items using the <menu> and <item> XML elements. The <menu> element can enclose one or more <item> elements that define the commands that will be available on the menu. The <item> element can enclose several other elements that define how the menu item appears and behaves. See the following table for information about these elements.

Element	Parent Element	Description
<menu>	<root>	Defines the menu. The name attribute is used to define the name of the menu.
<separator>	<menu>	Used just before an <item> element to define a separator line as shown in the first figure in this section.
<item>	<menu>	Defines an item on a specific menu. The name attribute is used to define the name of the item.
<privilege>	<item>	Associates a privilege to the menu item. If the user is not given this privilege, the menu item will not be displayed for that user.
<toolbar-image>	<item>	Specifies the image to display for the menu item and its associated toolbar button when the functionality is available to the user.
<toolbar-image-rollover>	<item>	Specifies the toolbar image displayed when a user places the cursor over the toolbar button.
<toolbar-image-disabled>	<item>	Specifies the toolbar image displayed when the functionality is disabled (not available to the user). A typical representation for this state is an image that is 80% “grayed out.”

Element	Parent Element	Description
<accelerator>	<item>	Defines a keyboard sequence that executes the menu item.
<action>	<item>	Defines the action that takes place when the user clicks on the menu item.
<hot-key>	<item>	Underlines the first instance of the indicated letter and enables the user to activate the menu item using this letter as a keyboard shortcut.

The subsequent sections of this chapter describe how to use the <menu> element to create a new menu and how to use the <item> element and its child elements to add menu items to a new or existing menu.

More information:

Existing OneClick Files (see page 9)
Creating Custom Privileges (see page 131)
Add a New Menu Item (see page 21)
Add Toolbar Images (see page 23)
Define a Keyboard Accelerator (see page 23)
Perform an Action (see page 24)

Add a New Menu

The <menu> element is used to create a OneClick console menu.

To add a new menu

1. Open the existing *<$SPECROOT>*/custom/console/config/custom-menu-config.xml file.
2. If the file does not exist, copy the file *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/config/custom-menu-config.xml into the *<$SPECROOT>*/custom/console/config directory, and then open it.

   The <root> element is the root element for this file. You must define all new menus inside the <root> element.
3. Use the <menu> element to create new menus. This element has a single attribute, name, which defines the name of the menu.

Note: Some of the examples in the custom-menu-config.xml file show a fully qualified menu name that references a Java class created by OneClick engineers. For example, com.aprisma.spectrum.app.swing.window.menu.Tool is used as the value for the name attribute in the <menu> element that defines the Tools menu. You do not have to use a fully qualified name to create a new menu or to refer to an existing menu. Simply use the exact text that you would like to appear as the menu name on the toolbar.

4. Add items to the new menu by specifying them using the <item> element and its available child elements. If you do not specify menu items for a menu, the menu will not be visible in the OneClick console.
5. Save the changes you have made to custom-menu-config.xml.
6. To view and test the new menus, restart the OneClick console.

Example: Creating a New Menu

The following lines of XML create the Connections menu shown in The custom-menu-config.xml File.

```
<menu name="Connections">
    <item name="Ping Local">
        .
        .
        .
    </item>
    <item name="Launch Diagnostics">
        .
        .
        .
    </item>
</menu>
```

More information:

OneClick Directory Structure (see page 9)
The custom-menu-config.xml File (see page 17)
Add a New Menu Item (see page 21)

Add a New Menu Item

To add an item to an existing OneClick console menu or to a new menu that you created, you must create a new <item> element inside the <menu> element that you are customizing. The <item> element uses the <name> attribute to specify the name of the menu item.

Note: The new menu item is also added automatically to the right-click menu.

To add a new menu item

1. Open <*$SPECROOT*>/custom/console/config/custom-menu-config.xml.
2. Find the <menu> element you created in Add a New Menu that defines the menu to which you want to add items. If the <menu> item does not yet exist, add it using the name attribute to define either an existing or a new menu.

   Note: Some of the examples in custom-menu-config.xml show a fully qualified menu name that references a Java class created by OneClick engineers. For example, com.aprisma.spectrum.app.swing.window.menu.Tool is used as the value for the name attribute in the <menu> element that defines the Tools menu. You do not have to use a fully qualified name to create a new menu or to refer to an existing menu. For example, you can use <menu name="Tools"> to refer to the Tools menu.
3. Use the <item> element to create each new menu item. This element has one attribute, name, which defines the name of the menu item.
4. The <item> element has a series of child elements that enable you to define how the item behaves. These elements are listed in the table in the custom-menu-config.xml File, and they are further defined in the rest of this chapter. Use these elements to define the behavior of the menu item you have added.
5. Save the changes you have made to custom-menu-config.xml.
6. To view the new menu items, restart the OneClick Console.

Example: Creating New Menu Items

The following example adds a menu item called Ping Local to a menu called Connections.

```
<menu name="Connections">
    <item name="Ping Local">
        <accelerator modifiers="2">VK_I</accelerator>
        <action>
                <filter>

                <has-attribute>AttributeID.NETWORK_ADDRESS</has-attribute>
                </filter>
                <context>com.aprisma.spectrum.app.topo.client.render.ModelContext
        </context>
                <context>com.aprisma.spectrum.app.alarm.client.group.AlarmContext
        </context>
                <launch-application>
                        <platform>
                                <os-name>Windows 9x</os-name>
                                <command>command.com /c start "Local ping {0}"
        cmd.exe /c
                                "ping.exe {0} &amp;amp;&amp;amp; pause"</command>
                        </platform>
                        <platform>
                                <os-name>Windows</os-name>
                                <command>cmd.exe /c start "Local ping {0}" cmd.exe
        /c "ping.exe
                                {0} &amp;amp;&amp;amp; pause"</command>
                        </platform>
                        <platform>
                                <command>/usr/dt/bin/dtterm -e ping -s
        {0}</command>
                         </platform>
                                <param>

        <attribute>AttributeID.NETWORK_ADDRESS</attribute>
                                </param>
                </launch-application>
        </action>
    </item>
</menu>
```

More information:

The custom-menu-config.xml File (see page 17)
Add a New Menu (see page 19)

Add Toolbar Images

In order to have a toolbar image available for each of the three toolbar image states, you must specify them in your menu item definition. The elements for toolbar states are:

- <toolbar-image>
- <toolbar-image-rollover>
- <toolbar-image-disabled>

You can use the following image formats for OneClick toolbar images: .png, .gif, .jpg, and .jpeg.

The recommended toolbar image size is 24 x 24 pixels. Store custom images in the <*$SPECROOT*>/custom/images directory. When you reference an image placed in this directory, specify the path from the images directory, for example, images/myimage.png.

The following line of code specifies a toolbar image using the relative path to the image file.

```
<toolbar-image>images/hints.gif</toolbar-image>
```

For a listing of all of the elements used in defining OneClick menu items, see the table in Contextually Apply the Action.

More information:

Contextually Apply the Action (see page 24)

Define a Keyboard Accelerator

The <accelerator> element specifies a combination of keyboard input that executes a corresponding menu item.

Specify the code for the accelerator key using the capitalized letter on the keyboard, preceded by “VK_”.

The modifiers attribute indicates the modifier key combinations as an integer where:

- 1 = Shift
- 2 = Ctrl
- 3 = Ctrl+Shift
- 8 = Alt

- 9 = Alt+Shift
- 10 = Ctrl+Alt

You are not required to specify a keyboard accelerator for a customized menu item.

```
<accelerator modifiers="2">VK_L</accelerator>
```

In the preceding example, the menu item's specified action is performed if the 'L' key is pressed while holding down the Control key (Ctrl+L).

More information:

Perform an Action (see page 24)

Perform an Action

The <action> element specifies the action that is performed when the menu item is selected. You can use the child elements shown in the table in Contextually Apply the Action to specify a particular action.

The <context> element specifies the context in which the menu item will be active so that the action can be executed. This applies to both the standard and the right-click menu.

More information:

Contextually Apply the Action (see page 24)

Contextually Apply the Action

Actions do not always apply in all situations, such as an action that is applicable only when the user selects a model. Therefore, you can specify one of the following contexts for your actions:

- **ModelContext**

  Indicates that the action should be available when the user selects a model. The format for this context is as follows:

  ```
  <context>com.aprisma.spectrum.app.topo.client.render.ModelContext</context>
  ```

- **AlarmContext**

  Indicates that the action should be available when the user selects an alarm. The format for this context is as follows:

  ```
  <context>com.aprisma.spectrum.app.alarm.client.group.AlarmContext</context>
  ```

- **TableContext**

  Indicates that the action should be available when the user selects any table. The format for this context is as follows:

  ```
  <context>com.aprisma.spectrum.app.util.table.TableContext</context>
  ```

  If no table name is specified, context is limited to any table. However, you can also limit context to a single table using the following format:

  ```
  <context>com.aprisma.spectrum.app.util.table.TableContext</context>
      <table-name>TableName</table-name>
  ```

You can specify one or a combination of contexts. If no specified context matches the current window context, the menu item is disabled. If no contexts are specified, the menu item is displayed in all contexts.

The following table describes the elements used to implement an action.

Element	Parent Element	Description
<context>	<action>	Limits the context in which the menu item is enabled and can perform the action.
<table-name>	<action>	Used with <context>, specifies the table name when limiting the action to a single table. Works with TableContext only.
<column-name>	<param>	Used with <context> and <command>, specifies which values in a table column to pass into a script from a selected row in the table. Works with TableContext only.
<filter>	<action>	Limits the availability of menu items.
<has-attribute>	<filter>	Specifies the attribute on which to filter.
<and>, <or>, <value>, <equals>	<filter>	Creates an expression that can be used with a filter.
<launch-browser>	<action>	Launches a browser.

Element	Parent Element	Description
<launch-sso-browser>	<action>	Launches a browser and, if single sign-on is enabled in OneClick, includes a single sign-on token associated with the current session in the URL. This token can be used to reauthenticate the session across integrated web applications instead of prompting the user repeatedly for a username and password. **Note:** For information on how to set up single sign-on in OneClick using CA SiteMinder® or CA Embedded Entitlements Manager, see the integration guide for that application.
<url>	<launch-browser>	Specifies the URL to launch in the browser.
<launch-application>	<action>	Launches an application.
<launch-web-server-script>	<action>	Launches a script available on the web server.
<display-output>	<launch-application>, <launch-web-server-script>	Displays the output from the launched script.
<display-exit-status>	<launch-application>, <launch-web-server-script>	Displays the exit status of a launched script.
<command>	<launch-application>, <launch-web-server-script>, <platform>	Specifies the application or script that the menu item launches.
<platform>	<launch-application>	Used with <os-name>, specifies the application to launch based on the operating system of the OneClick client.
<validate>	<launch-application>	Used with the <command> element, specifies that the menu item should only be added to the menu if the command exists on the OneClick client and has execute permissions. If either condition is found to be false during OneClick startup, the menu item is not added to the menu. If the <validate> element is not used, the menu item is always added to the menu, but its state is determined by the value of other elements.

Element	Parent Element	Description
<os-name>	<platform>	Used with <platform>, specifies the application to be launched specific to the operating system of the OneClick client.
<param>	<url>, <command>	Specifies a parameter that is passed to a browser, executable, or script.
<attribute>	<param>	Specifies an attribute used as a parameter.

More information:

Limit the Availability of Menu Items (see page 27)
Launch a Browser (see page 29)
Launch an Application From OneClick (see page 33)
Launch a Web Server Script (see page 36)
Manipulate Attribute Output Using Renderers (see page 139)
Important Information About Specifying URLs (see page 30)
Specify a Username (see page 33)
Display the Status of a Launched Application or Script (see page 37)
Pass Table Values to a Script (see page 36)

Limit the Availability of Menu Items

The <filter> element specifies a filter that further restricts the enabled state of the menu item. You can filter on any attribute of the selected context.

```
<filter>
    <has-attribute>AttributeID.NETWORK_ADDRESS</has-attribute>
</filter>
```

In the preceding example, the action needs the IP address of the alarmed model. Therefore, it should only be enabled if the alarmed model has the Network_Address (ID 0x12d7f) attribute.

You can specify complex attribute filters with any combination of nested “and” and “or” filters.

Example: Nesting Filters

The following example enables the item if the selected model has the Network_Address attribute and the Condition (ID 0x1000a) attribute is RED.

```
<filter>
    <and>
        <has-attribute>AttributeID.NETWORK_ADDRESS</has-attribute>
        <equals>
                <attribute id="AttributeID.CONDITION">
                        <value>3</value> <!--red-->
                </attribute>
        </equals>
    </and>
</filter>
```

The file <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/common/schema/attribute-filter.xsd contains the complete syntax for attribute filters.

The following table defines commonly used attributes where an attribute ID is expected.

Constant	Attribute
AttributeID.NETWORK_ADDRESS	Network Address (ID 0x12d7f)
AttributeID.MTYPE_ID	Model Type Handle (ID 0x129ab)
AttributeID.MTYPE_NAME	Model Type Name (ID 0x10000)
AttributeID.MODEL_OBJECT	Model Handle (ID 0x11f53)
AttributeID.MODEL_NAME	Model Name (ID 0x1006e)
AttributeID.MODEL_CLASS	Model Class (ID 0x11ee8)
AttributeID.CONDITION	Condition (ID 0x1000a)
AttributeID.DOMAIN_ID	Landscape Handle (ID 0x129ac)
AttributeID.DOMAIN_NAME	Landscape Name (ID 0x11d42)
AttributeID.MAC_ADDRESS	MAC Address (ID 0x110df)
AttributeID.DEVICE_TYPE	Device Type (ID 0x23000e)

You can use the constants defined in the following table for alarm attributes:

Constant	Alarm Attribute
AlarmAttrID.ACKNOWLEDGED	Acknowledged (ID 0x11f4d)
AlarmAttrID.ALARM_FILTER_MH	Alarm Filter (ID 0x12a56)
AlarmAttrID.ALARM_ID	Full Alarm ID (ID 0x11f9c)
AlarmAttrID.INT_ALARM_ID	Integer Alarm ID (ID 0x4820067)
AlarmAttrID.ALARM_SOURCE	Alarm Source (ID 0x11fc4)
AlarmAttrID.ALARM_STATUS	Alarm Status (ID 0x11f4f)
AlarmAttrID.CAUSE_CODE	Cause Code (ID 0x11f50)
AlarmAttrID.CAUSE_LIST	Cause List (ID 0x12a05)
AlarmAttrID.CAUSE_TITLE	Cause Title (ID 0x4820020)
AlarmAttrID.CREATION_DATE	Creation Date (ID 0x11f4e)
AlarmAttrID.CLEARED_BY_USER_NAME	Cleared By User Name (ID 0x11f51)
AlarmAttrID.IMPACT_SEVERITY	Impact Severity (ID 0x1290d)
AlarmAttrID.OCCURRENCES	Occurrences (ID 0x11fc5)
AlarmAttrID.ORIGINATING_EVENT	Originating Event (ID 0x1296e)
AlarmAttrID.PERSISTENT	Persistent (ID 0x12942)
AlarmAttrID.PRIMARY_ALARM	Primary Alarm (ID 0x11f54
AlarmAttrID.SEVERITY	Severity (ID 0x11f56)
AlarmAttrID.TROUBLESHOOTER	Troubleshooter (ID 0x11f57)
AlarmAttrID.TROUBLE_TICKET_ID	Trouble Ticket ID (ID 0x12022)
AlarmAttrID.USER_CLEARABLE	User Clearable (ID 0x11f9b)

If you need to use an attribute other than one of the attributes listed in the 2 preceding tables, specify the attribute using its hexadecimal attribute ID.

Launch a Browser

The <launch-browser> element lets you launch a specified URL in a browser and pass parameters to the URL. These parameters can be hard-coded values or values from model attributes.

Example: <launch-browser> Code

The following example launches the default browser on the client machine. The <url> element specifies the URL pattern. You can specify parameters to substitute in the URL pattern by enclosing the parameter number (starting at 0) in curly braces {}. You then specify <param> elements for each parameter.

```
<launch-browser>
    <url>http://{0}</url>
    <param>
        <attribute>AttributeID.NETWORK_ADDRESS</attribute>
    </param>
</launch-browser>
```

CA Spectrum processes the <param> elements in order so the first one corresponds to the 0th parameter in the URL pattern. A <param> element has a specific syntax. The most commonly used is the <attribute> element. This element substitutes the value of the specified attribute for the selected context. In the preceding example, the value of the Network Address attribute is substituted in the URL pattern. For more complex parameters, see the definition of <param-type> in the file.

<$SPECROOT>/tomcat/webapps/spectrum/WEB-INF/common/schema/basic-config.xsd

More information:

About Parameters (see page 137)

Important Information About Specifying URLs

You must provide the following information when specifying URLs.

Use Standard Characters

Whenever a URL is specified in XML customization code for OneClick, the URL formatting must adhere to the standards published in the Internet Engineering Task Force (IETF) RFC 1738. Use of non-standard characters in URLs results in unreliable browser performance including the browser not locating the specified web page.

URL Encoding of Spaces and Commas

If you are using spaces or commas, or other "reserved" or "unsafe" characters in URLs (see the tables later in this section), convert them to their ASCII equivalent value with the proper URL encoding. URL encoding of a character consists of a "%" symbol, followed by the two-digit hexadecimal representation (case-insensitive) of the ISO-Latin code point for the character. Examples for "space" and "comma" are:

- For spaces, use %20
- For commas, use %2C

Note: Some browsers may encounter problems processing URLs even when using this encoding.

Use of Ampersands

If you are using an ampersand in a URL or in XML customization code, you must convert it to &amp.

Use CDATA in XML

You can place URLs inside a CDATA section so that they are not parsed. This avoids possible problems with URLs and the XML parser.

Be sure to follow the requirements for CDATA, including:

- A CDATA section cannot contain the string "]]>", therefore, nested CDATA sections are not allowed.
- Also make sure there are no spaces or line breaks inside the "]]>" string.

URL Unsafe Characters

Some characters can be misunderstood within URLs for various reasons. These characters should also always be encoded. Unsafe characters and their hexadecimal encoding are provided in the following table.

Character	Code Points (Hex)
Space	20
Quotation marks (")	22
'Less Than' symbol ("<")	3C
'Greater Than' symbol (">")	3E
Pound' character ("#")	23
Percent symbol ("%")	25

Character	Code Points (Hex)
Left Curly Brace ("{")	7B
Right Curly Brace ("}")	7D
Vertical Bar/Pipe ("|")	7C
Backslash ("\")	5C
Caret ("^")	5E
Tilde ("~")	7E
Left Square Bracket ("[")	5B
Right Square Bracket ("]")	5D
Grave Accent ("`")	60

URL Reserved Characters

URLs use some characters for special use in defining their syntax. When these characters are not used in their special role inside a URL, they need to be encoded. These characters and their hexadecimal encoding are provided in the following table.

Character	Code Points (Hex)
Dollar ("$")	24
Ampersand ("&")	26
Plus ("+")	2B
Comma (",")	2C
Forward slash/Virgule ("/")	2F
Colon (":")	3A
Semi-colon (";")	3B
Equals ("=")	3D
Question mark ("?")	3F
'At' symbol ("@")	40

More information:

About Expressions (see page 147)

Specify a Username

You can pass the current user's OneClick username to an application, web browser, or executable requiring a username. Use the following expression to specify the logged-in user's username:

```
<param>
    <expression>
        com.aprisma.spectrum.app.util.context.DefaultApplicationContext.getGlobal
        Parameter(com.aprisma.spectrum.app.util.context.ApplicationContext.
        USER_PARAMETER_NAME)
    </expression>
</param>
```

Example: Pass Username to Browser

The following example launches a browser to a specified URL and passes the username to the browser.

```
<launch-browser>
    <url> http://acme.com?user={0}</url>
    <param>
        <expression>
        com.aprisma.spectrum.app.util.context.DefaultApplicationContext.getGlobal
        Parameter(com.aprisma.spectrum.app.util.context.ApplicationContext.USER_P
        ARAMETER_NAME)
        </expression>
    </param>
</launch-browser>
```

Launch an Application From OneClick

The <launch-application> element enables you to launch a specified command or executable.

Example 1: <launch-application>

The following example launches an application called myapp on the client machine and passes in the IP address of the selected model. As with the <launch-browser> action, you can substitute any number of parameters.

```
<launch-application>
    <command>myapp {0}</command>
    <param>
        <attribute>AttributeID.NETWORK_ADDRESS</attribute>
    </param>
</launch-application>
```

The <command> element specifies the command or executable to execute. You can provide the path to the command or executable in one of two ways:

- You can specify the path on each client via an environment variable. To do this in the Solaris environment, use the PATH environment variable. To create an environment variable in the Windows environment, select My Computer,Properties,Advanced, and then select the Environment Variables button.
- You can specify an absolute path to the command or executable. If you do this, keep in mind that the path must be the same on each OneClick client. Path statements in the Windows environment should use a double backslash instead of a single backslash, for example:

  ```
  C:\\Windows\\system32\\cmd.exe
  ```

Note: You can use the <validate> element to verify that the command or executable exists on the OneClick client and has execute permissions. If either of these conditions is found to be false during OneClick startup, the associated menu item is not added to the OneClick menu. (If the <validate> element is not used, the menu item is always added to the menu, but its state is determined by the value of other elements.)

If you use the <validate> element, you must specify an absolute path in the <command> element, as shown in the following example:

```
<launch-application>
    <command>c:\\windows\\system32\\notepad.exe</command>
    <validate/>
</launch-application>
```

The <command> element must conform to the following syntax rules:

- The command arguments are delimited by only spaces. If you would like to have a space within an argument, you must either place quotes around the argument or use the escape character '\' prior to the internal space(s).
- If you would like to embed quotes within an argument, you must place the escape character '\' prior to the quote.
- If any of your command arguments contain commas, CA Spectrum will automatically place the argument within quotes. This is important to know in case you are going to parse an argument that is a numeric value that contains commas.
- CA Spectrum replaces arguments that return null or have a string length of zero with empty quotes (“ ”).

Example 2: <launch-application>

The following example uses the <platform> element to specify different commands for different platforms. The <os-name> element specifies the operating system name and the <command> element specifies the command to execute on that operating system. The <os-name> element is optional. If you do not specify the <os-name>, the associated command is the default such that if no other platforms match, the default command is executed.

```
<launch-application>
    <platform>
        <os-name>Windows</os-name>
        <command>cmd.exe /c start "ping {0}" cmd /c "ping.exe {0}
        &amp;amp;&amp;amp;pause"</command>
    </platform>
    <platform>
        <os-name>SunOS</os-name>
        <command>>/usr/dt/bin/dtterm -e ping {0}</command>
    </platform>
    <param>
        <attribute>AttributeID.NETWORK_ADDRESS</attribute>
    </param>
</launch-application>
```

At runtime, CA Spectrum compares the specified OS names to the OS name returned by the “os.name” Java property. CA Spectrum uses a best-match algorithm so only a prefix of the OS name need be specified. You may specify any of the following OS names:

- SunOS for the Solaris platform
- Windows for all Windows platforms
- Windows 9x for Windows 95/98
- Windows 2000 for Windows 2000
- Windows 2003 for Windows 2003
- Windows XP for Windows XP
- Windows Vista for Windows Vista and Windows Server 2008
- Windows 7 for Windows 7
- Linux for the Linux platform
- Mac for the Macintosh platform

If no specified platforms match, the associated menu item will be disabled.

Launch a Web Server Script

The <launch-web-server-script> element launches a script on the web server machine. The <command> element specifies the script to execute. As with the <launch-browser> action, any number of parameters can be substituted. Since the script resides on the web server, which is restricted to either a Windows or Solaris machine, you do not use a <platform> element to denote the platform on which the script is running.

Note: This action can only be used to launch a script; it cannot be used to launch a user interface.

Example: <launch-web-server-script> Code

The following example launches "myscript" on the web server, passing it the model name and model type name of the selected model. Note that the path shown in the <command> element is a path for a Windows web server.

```
<launch-web-server-script>
        <command>c:/scripts/myscript {0} {1}</command>
        <param>
                <attribute>AttributeID.MODEL_NAME</attribute>
        </param>
        <param>
                <attribute>AttributeID.MTYPE_NAME</attribute>
        </param>
</launch-web-server-script>
```

Use the <platform> tag with the <launch-web-server-script> as described in Launch an Application From OneClick.

More information:

Launch an Application From OneClick (see page 33)

Pass Table Values to a Script

Used with the <context> and <command> elements, the <column-name> element lets you add menu items in OneClick that execute a command using data from a selected row in a table. With this feature, CA Spectrum eliminates the need to look up attributes separately to build the logic. Instead, you can build the logic from selected column headings within a table and pass the values from any row in the table to the script. This ability to pass values directly from a table is helpful when you need to use the data in an external script. For example, you can build an interface between CA Spectrum and an issue-tracking system. Then, you can creates a menu item that creates trouble tickets from table data in OneClick.

Note: The <column-name> element works with TableContext only in the <context> element.

Example: <command> and <column-name> Commands

The following example passes values from three columns (Condition, Status, and Type) to the "NewTicket" command. The <command> element specifies the command pattern. You specify parameters to substitute in the command by enclosing the parameter number (starting at 0) in curly braces {}. You then specify <param> elements for each column that passes values to the command.

```
<context>com.aprisma.spectrum.app.util.table.TableContext</context>
<command>$SCRIPT_PATH/NewTicket.exe {0} {1} {2} {3}</command>
    <param>
        <column-name>Condition</column-name>
    </param>
    <param>
        <column-name>Status</column-name>
    </param>
    <param>
        <column-name>Type</column-name>
    </param>
```

CA Spectrum processes the <param> elements in order so the first one corresponds to the 0th parameter in the command pattern. By default, CA Spectrum passes the raw value to the command. To preserve the formatting information from the table, use the <formatted/> option, as follows:

```
<param>
    <column-name>Condition
        <formatted/>
    </column-name>
</param>
```

Note: The formatted option attempts to render the specified column as seen in the table. However, CA Spectrum cannot pass images as arguments to commands and, therefore, passes the raw value only.

Display the Status of a Launched Application or Script

Use the <display-exit-status> and <display-output> elements with <launch-web-server-script> and <launch-application> to display the exit status and the output from the script or application.

By default <display-exit-status> displays “Success” if the exit code is 0 and “Failed with error code #” otherwise. You can change the default behavior by specifying <status> child tags that map an exit code to a custom message to display.

Example: <display-exit-status> Code

Examine the following example using <display-exit-status>:

```
<display-exit-status>
    <status code="1">Could not open file</status>
    <status code="2">Bad parameter</status>
    <status code="3">Could not connect to the server</status>
    <status default="true">Unknown error code {0}</status>
</display-exit-status>
```

This example maps status codes 1, 2, and 3 to specific message strings. The last status code specifies default="true", mapping all other error codes except 0, which by default maps to "Success". If exit code 0 does not indicate success, you can override it with a <status> tag. The {0} in the message string will substitute the exit code.

By default, <display-output> displays both the standard output and standard error output from the process. You can display only the standard output by specifying:

```
<display-output stdout="t"/>
```

or only the standard error output by specifying:

```
<display-output stderr="t"/>
```

Note: The <display-exit-status> and <display-output> elements can only be used for command line applications or scripts and not GUI applications. OneClick waits for the script to complete before being available to the user again.

Chapter 4: Customizing OneClick Alarms

You can create custom alarm attributes and add them to the Alarm table and Information views.

Adding customized alarm attributes that display in OneClick is a multi-step process that requires using the Model Type Editor and the Alarm Preferences dialog, in addition to modifying the Alarm table and the Alarm Information view to display the custom alarm attributes.

To create and view custom alarm attributes

1. Create the custom alarm attributes by adding them to the GlobalAlarm model type using the Model Type Editor. The attribute group ID value must be set to equal 11f4c.

   Note: For information on how to add custom alarm attributes to the GlobalAlarm model type see, *Model Type Editor User Guide (0659).* The guide provides complete instructions on accessing and using the Model Type Editor.

2. Add a column to the Alarm table that displays the new customized alarm attribute by customizing the alarm-table-config.xml file. Modify Table Columns provides an example showing how to add a column to a table configuration file.

3. Add a field to the Alarm Details view configuration that displays the alarm attribute in the alarm's Information tab by customizing the view-alarmdetails-config.xml file. Extend or Modify an Information View provides information and examples on how to add a subview to an existing information view.

   You can also apply a custom privilege to the new alarm attribute by customizing the custom-privileges.xml file. Doing this limits which users or user groups or specific privileges are required to view the customized alarms. The name of the privilege must use the following syntax:

   `alarm-write-<attribute ID in hex>`

   The following example adds the new privilege to the Alarm Management group.

   ```
   <alarm-write-ffff0000 type="write">
       <group scope="alarm-manager">alarm-mgmt</group>
       <label>New Alarm Attr</label>
   </alarm-write-ffff0000>
   ```

4. Save and close the XML files you edited.

5. You must restart the OneClick server in order to apply the new privilege.

6. You must restart the OneClick Console to view the changes made to the Alarms table and Alarm Information view.

More information:

Creating Custom Privileges (see page 131)
Modify Table Columns (see page 41)
Extend or Modify an Information View (see page 102)

Chapter 5: Customizing OneClick Tables

This section discusses some of the ways that you can modify existing tables found in the OneClick Console. A list of the table elements available in OneClick and their descriptions are presented in Example: Defining a Table Column. Specific examples for modifying table columns are presented in the sections listed below.

This section contains the following topics:

Modify Table Columns

If you want to display additional attributes in a OneClick console table, you can do so by making modifications to the XML using a customization file. The modifications need to be made in a separate XML file in the appropriate directory under <*$SPECROOT*>/custom/.

Extend a Factory Default File Using IDREF

OneClick requires that you write your customization code in a new file located in the <*$SPECROOT*>/custom/topo/config directory that uses the same name as the factory default file that builds the table you are modifying. Use the IDREF attribute to "reference" the factory file and extend it with the new customization file. See Create Customizations for details on creating customization files in OneClick.

Example: Referencing a Column File from a Table Configuration File

The following example shows a portion of an XML file used to define a table. Rather than defining each column in the same file that defines the entire table, the example uses separate files to define the first two columns in the table. The example uses the idref attribute with each <column> element to link to the file that defines the column.

```
<table id="table-licenses-config"
    xmlns="http://www.aprisma.com"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.aprisma.com
    ../../common/schema/table-config.xsd">
    <swing-row-template>
        <enumerated-color idref="alternatingrow-color-config"/>
    </swing-row-template>
    <swing-table-template>
        <show-vertical-lines>true</show-vertical-lines>
        <show-horizontal-lines>false</show-horizontal-lines>
    </swing-table-template>
    <swing-header-row-template>
        <static-color idref="row-header-color-config"/>
    </swing-header-row-template>
    <column-list>
        <column idref="column-servicestate-config"/>
        <column idref="column-modelname-config">
        <default-width>300</default-width>
        </column>
    </column-list>
    .
    .
</table>
```

The first column is defined in the column-servicestate-config.xml file. The beginning portion of this file is shown below. Note the id attribute used with the <column> element to define this file as “column-servicestate-config”.

```
<column id="column-servicestate-config"
    xmlns="http://www.aprisma.com"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.aprisma.com
   ../../common/schema/table-config.xsd">
```

More information:

Customizing OneClick (see page 11)

Modify a Table Column

The following steps describe the general process for modifying table columns in OneClick. Specific examples are provided in the following sections.

To modify a table column

1. Identify the default factory XML file that builds the table that you want to modify.

   Many of the table files used to display data in the OneClick console are located in *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/topo/config. All of the table files are named for the functionality that they display. For example, the table used to display interface information for each model is called table-common-ifconfig-config.xml.

2. Create the file in which to add your modifications.

   In this example the default file is *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/topo/configtable-common-ifconfig-config.xml. Create a file with the same name in the *<$SPECROOT>*/custom/topo/config directory. If a file with that name already exists in this directory, that is an indication that previous customizations have been made to this table. In this case, add your customized code to the existing file.

3. Open the file in a text editor in order to make the appropriate modifications.

4. Use idref to reference the table configuration you are extending with this new column configuration (see Step 1).

5. Construct a new column using the XML elements defined in Example: Defining a Table Column. The example that follows this procedure shows how some of these elements are used to define a column.

6. Find the <column-list> element in the XML file. The <column-list> element contains all of the <column> elements used to define each column in the table.

7. Define a <column> element within the <column-list> element. The columns display in the order they appear within the <column-list> element.

8. Insert the <name> element to define the title of the column.

9. Insert a <content> and an <attribute> element to define the contents you want to display in the column.

10. (Optional) Use the <default-width> element to define the default width of the column.

11. Save and close the modified file, and restart the OneClick console to view the changes.

Example: Defining a Table Column

```
<column-list>
        <column>
                <name>Interface</name>
                <content>
                        <attribute>0x100c4</attribute>
                </content>
                <default-width>30</default-width>
        </column>
        .
        .
        .
</column-list>
```

The following table describes the elements used for modifying a table.

Element	Parent Element	Description
<table>	Not applicable	This is the root element, and encloses all child elements used to create a table.
<swing-table-template>	<table>	Used to define the appearance of the table.
<show-vertical-lines>	<swing-table-template>	Defines whether to show vertical lines in the table, values are true or false.
<show-horizontal-lines>	<swing-table-template>	Defines whether to show horizontal lines in the table, values are true or false.
<line-color>	<swing-table-template>	Defines the color of the lines used to create the table. The default value is light-background_color. Other values can be found in the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/common/config/common-color-config.xml file.
<show-tree-lines>	<swing-table-template>	Defines whether the table will be shown with dashed lines connecting tree nodes, values are true or false.
<preferred-width>	<swing-table-template>	Defines (in pixels) the default width of the table.
<preferred-height>	<swing-table-template>	Defines (in pixels) the default height of the table.
<swing-header-row-template>	<table>	Used to define the appearance of the header row of the table.

Element	Parent Element	Description
<static-color>	<swing-header-row-template>	Specifies the color for the header row. Use value idref=row-header-color-config for consistency.
<swing-row-template>	<table>	Used to define the appearance for the body rows in the table.
<enumerated-color>	<swing-row-template>	Used to specify different colors for each row of the table, the default value used is alternating row-color-config.
<static-color>	<swing-row-template>	Used to specify a single color used for all of the rows in the table.
<column-list>	<table>	Used to define the list of columns to be used in the table
<column>	<column-list>	Used to define a column in the column list.
<name>	<column>	The name of the column. The text used here will appear in the table header for this column.
<editable>	<column>	Defines whether the value in the table can be edited. If this value is set to true, a set link appears next to the value.
<content>	<column>	Defines the value placed in the column. This is the value used for sorting and filtering. See "Rendering a value" for information on what child elements can be specified. The final displayed text can be further manipulated by defining a <swing-cell-template> tag. See Define How Cells Display in Table Columns for information on <swing-cell-template>.
<renderer>	<content>	Specifies the renderer to be used for the content of the column. See Customize the Port Name Column of the Interface Table for more information.
<dynamic-renderer>	<content>	Enables you to specify a renderer depending on model class or model type. See About <dynamic-renderer> for detailed instructions on usage.

Element	Parent Element	Description
<expression>	<content>	Used to define an expression to produce a value for the column. See XML Usage Common to All Customization Files for more information
<message>	<content>	Used for specifying a plain text value for the column.
<select>	<content>	Used to select a value for the column based on certain criteria. See XML Usage Common to All Customization Files for more information.
<attribute>	<content>	Used to specify an attribute ID. The value of the attribute will be placed in the column.
<swing-cell-template>	<column>	Used to define how the cell in the column is displayed. See Define How Cells Display in Table Columns for detailed information on using this element.
<image>	<swing-cell-template>	Used to display an image in a cell.
<attribute>	<image>	The attribute used to determine the image selection.
<select>	<image>	Used to define the image that is selected. See XML Usage Common to All Customization Files for more information.
<text>	<swing-cell-template>	Used to display a string of text in a cell.
<renderer>	<text>	The renderer used to manipulate the text. See Customize the Port Name Column of the Interface Table for an example. See Manipulate Attribute Output Using Renderers for detailed information on OneClick renderers.
<param>	<renderer>	Specifies any parameters to be used by the renderer. See About Parameters for detailed information.
<renderer-class>	<swing-cell-template>	The class to use for rendering something other than an image or text.
<editable>	<column>	Allows the user to edit the value in a column. See Make a Table Column Editable for more information.

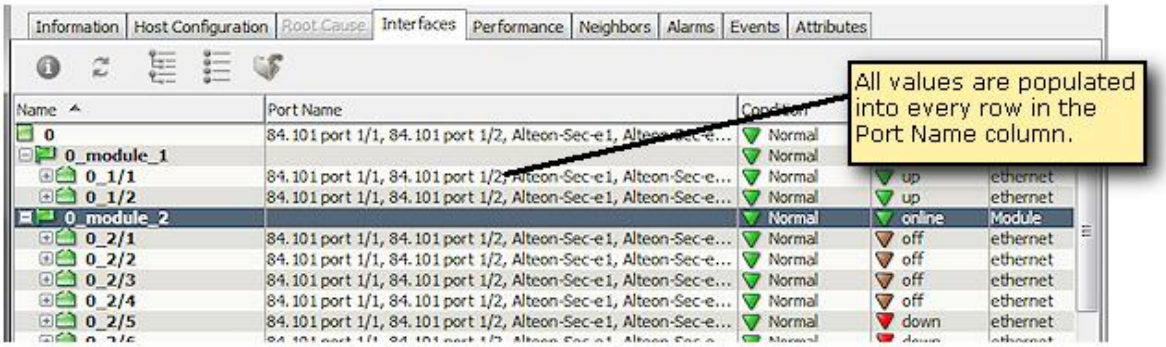
Element	Parent Element	Description
<hidden-by-default>	<column>	Use this element to hide the column by default. The user must add the column to the table using the preferences dialog.
<default-width>	<column>	The default width of the column in pixels.
<default-sort>	<column-list>	Used in conjunction with the <sort-column-list> element to determine how the table is sorted by default.
<sort-column-list>	<default-sort>	A list of columns that will be sorted on (maximum of three).
<sort-column>	<sort-column-list>	The column to be sorted on. Columns will be sorted in the order that they are listed.
<name>	<sort-column>	The name of the column to sort on. This must match the name defined for the column.
<direction>	<sort-column>	The direction of the sort, values can be ascending or descending.

More information:

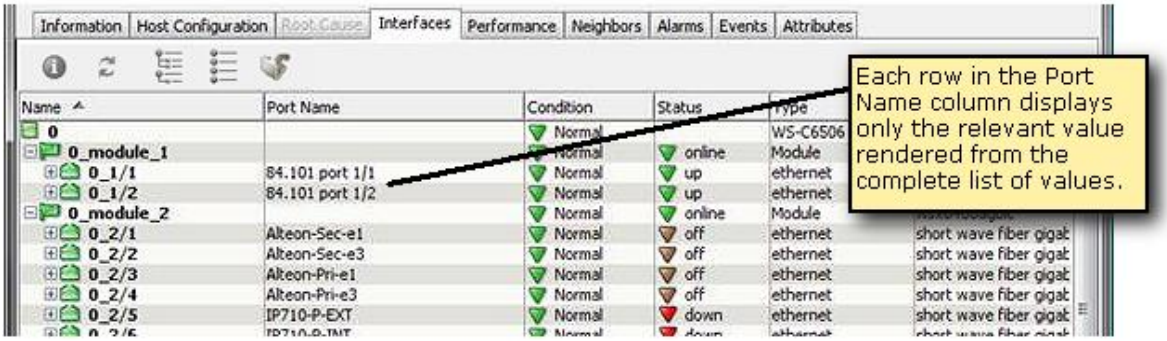
Customize the Port Name Column of the Interface Table (see page 60)
Use a Select Case (see page 139)
Define How Cells Display in Table Columns (see page 49)
XML Usage Common to All Customization Files (see page 137)
Make a Table Column Editable (see page 55)
Set Up a Default Sort (see page 58)

Display Instanced Attribute Values in Separate Table Rows

If you add a new table column for attributes with instanced values (such as, PortName and BoardToPortMap), adding ObjectIDValueListRenderer *and* the <refID> to your XML file helps ensure the data displays correctly. Using this renderer without the <refID> value, CA Spectrum displays all values returned for the selected OID value list attribute in every row.



When the <refID> value is added to the XML file, CA Spectrum displays the attribute values correctly, rendering only the particular value from the list that applies to a given row.



The supported parameters include the following:

- <attrID> - Required parameter. ID of the CA Spectrum attribute displayed in the cell.
- <refID> - Required parameter. Reference ID for the CA Spectrum attribute that is used for indexing the attribute values.

Example: Displaying a Single OID Value in Each Row of a Column

The following example shows the contents of the column-portname-config.xml file used to create a custom table column for the Port Name attribute.

```
<?xml version="1.0" encoding="UTF-8"?>
<column id="column-portname-config"
        xmlns ="http://www.aprisma.com"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://www.aprisma.com
             ../../common/schema/column-config.xsd">

    <name>Port Name</name>

    <content>
        <attribute>0x11c0056</attribute>
        <renderer>
             <param name="attrID">0x11c0056</param>
             <param name="refID">0x1297f</param>
             com.aprisma.spectrum.app.util.render.ObjectIDValueListRenderer
        </renderer>
    </content>

</column>
```

Define How Cells Display in Table Columns

The <swing-cell-template> defines the final presentation of content within the cell of a table column. Use this element in conjunction with the <content> element to specify how the content is presented to users. This element gives the developer flexibility in processing raw OneClick data using buttons, scrollable lists, wrapping text, and other techniques.

If you do not specify <swing-cell-template> in a column cell definition, the raw output from the <content> element is displayed without refinement. The elements you can use in defining <swing-cell-template> are described in the following table.

Element	Parent Element	Description
<image>	<swing-cell-template>	Defines an image displayed in the cell.
<text>	<swing-cell-template>	Defines the text to display in a cell. If no child elements are specified, then the text from the <content> element is displayed.
<renderer-class>	<swing-cell-template>	Specifies a Java class to use for the final presentation of data in a cell. See Use Renderers to Present Data in Column Cells for the renderers available to use with this element.

More information:

Use Renderers to Present Data in Column Cells (see page 50)

Use Renderers to Present Data in Column Cells

The following Java classes are available to use with <renderer-class> to render or manipulate and format raw data for display in table column cells.

TextAreaCellRenderer

Use this renderer to display text that wraps at the cell width.

Classname: com.aprisma.spectrum.app.swing.table.render.TextAreaCellRenderer

Supported Parameters: None

Example: Displaying Wrapping Text in a Cell

The following example creates a cell that displays text and allows it to wrap at a defined width, displaying in multiple lines of fixed width. This technique is used in the Notes field on the device's Information tab. Text entered by operators in this field wraps at a predetermined column width.

```
<swing-cell-template>
    <text/>
    <renderer-class>
        com.aprisma.spectrum.app.swing.table.render.TextAreaCellRenderer
    </renderer-class>
</swing-cell-template>
```

ListAttributeRenderer

Displays the values from a list-type attribute in a scrollable list.

Classname: com.aprisma.spectrum.app.swing.table.render.ListAttributeRenderer

Supported Parameters:

- <attrID> - Required parameter. ID of the CA Spectrum attribute displayed in the cell.
- <maxRowsToDisplay> - Integer; specifies the maximum number of viewable list entries, scrolling is turned on after this maximum is exceeded.
- <order> - True or false; if true, the users can modify the list order if the column is editable.
- <add> - True or false; if true, users can add new entries to the list if the column is editable.
- <remove> - True or false; if true, users can remove entries from the list if the column is editable.
- <valuePrompt> - The text displayed when prompting the user to add a new value to the list. If not specified, a default prompt is used.

Example: Displaying a Scrollable List in a Cell

The following example defines the maximum number of rows displayed in the cell as four; if there are more than four rows, the list becomes scrollable.

```
<swing-cell-template>
    <renderer-class>
        com.aprisma.spectrum.app.swing.table.render.ListAttributeRenderer
        <param name="maxRowsToDisplay">4</param>
        <param name="attrID">0x25e0039</param>
        <param name="add">true</param>
        <param name="remove">true</param>
        <param name="valuePrompt">SNMP Port</param>
    </renderer-class>
</swing-cell-template>
```

ListAttributeOIDRenderer

Displays the OIDs from a list-type attribute in a scrollable list.

Classname: com.aprisma.spectrum.app.swing.table.render.ListAttributeOIDRenderer

Supported Parameters: See ListAttributeRenderer.

- <oidPrompt> - The text displayed when prompting the user to add a new OID to the list. If not specified, a default prompt is used.

More information:

ListAttributeRenderer (see page 51)

ActionButtonCellRenderer

Displays a button in the cell that sends an action to the model when clicked.

Classname:
com.aprisma.spectrum.app.topo.client.render.ActionButtonPanelCellRenderer

Supported Parameters:

- <actionID> - Required parameter; the CA Spectrum attribute ID for the action the button sends.
- <text> - Required parameter; the text displayed on the button.
- <toolTipText> - The text displayed in a tooltip for the button.

- <prompt> - The text displayed when prompting the user to confirm a button click. If not specified, no prompt is displayed.
- <confirmSuccess> - True or false; if true, a message is displayed if the action was successful.

Example: Displaying an Action Button in a Cell

```
<swing-cell-template>
    <renderer-class>
        com.aprisma.spectrum.app.topo.client.render.ActionButtonCellRenderer
        <param name="actionID">0x0001011f</param>
        <param name="text">Reevaluate Model Names</param>
        <param name="toolTipText">
                Reevaluates all model names based on the model naming order of VNM
        </param>
        <param name="confirmSuccess">true</param>
    </renderer-class>
</swing-cell-template>
```

ActionButtonPanelCellRenderer

Displays one or more buttons that each send an action to the model. All parameters are specified as a semi-colon separated list, one per button.

Classname:
com.aprisma.spectrum.app.topo.client.render.ActionButtonPanelCellRenderer

Supported Parameters: See ActionButtonCellRenderer.

Example: Displaying Multiple Action Buttons in a Cell

The following example defines two buttons, “Reconfigure Model” and “Discover Connections.” The parameters with a value for each button separate each value with a semi-colon (;).

```
<swing-cell-template>
    <renderer-class>
        com.aprisma.spectrum.app.topo.client.render.ActionButtonPanelCellRenderer
        <param name="actionID">0x1000e;0x25e0022</param>
        <param name="text">Reconfigure Model;Discover Connections</param>
        <param name="confirmSuccess">true;true</param>
    </renderer-class>
</swing-cell-template>
```

More information:

ActionButtonCellRenderer (see page 52)

AttrToggleButtonCellRenderer

Displays a button with text that can be one of two values based on two specified values of an attribute. When the button is clicked, the opposite value is written to the attribute.

Classname:
com.aprisma.spectrum.app.topo.client.render.AttrToggleButtonCellRenderer

Supported Parameters:

- <attrID> - Required parameter. ID of the CA Spectrum attribute that the button toggles the value of.
- <firstValueMapping> - Required parameter. Specifies the first attribute value and the text to display when the attribute equals this value, separated by a semi-colon.
- <secondValueMapping> - Required parameter. Specifies the second attribute value and the text to display when the attribute equals this value, separated by a semi-colon.
- <promptOnFirstValue> - Specifies the text used to prompt the user for confirmation when the button is clicked and the attribute equals the first value. If not specified, no prompt is displayed.
- <promptOnSecondValue> - Specifies the text used to prompt the user for confirmation when the button is clicked and the attribute equals the second value. If not specified, no prompt is displayed.
- <disableOnFirstValue> - True or false; if true, the button is disabled when the attribute equals the first value.
- <disableOnSecondValue> - True or false; if true, the button is disabled when the attribute equals the second value.

Example: Displaying a Toggle Action Button in a Cell

```
<swing-cell-template>
    <renderer-class>
        com.aprisma.spectrum.app.topo.client.render.AttrToggleButtonCellRenderer
        <param name="attrID">0x11b6e</param>
        <param name="firstValueMapping">true;Start</param>
        <param name="secondValueMapping">false;Stop</param>
        <param name="promptOnSecondValue">Are you sure you want to stop?</param>
    </renderer-class>
</swing-cell-template>
```

BoldAttributeTableCellRenderer

Displays the cell text in bold.

Classname:
com.aprisma.spectrum.app.swing.table.render.BoldAttributeTableCellRenderer

Example: Displaying Bold Text in a Cell

```
<swing-cell-template>
    <text/>
    <renderer-class>
        com.aprisma.spectrum.app.swing.table.render.BoldAttributeTableCellRendere
        r
    </renderer-class>
</swing-cell-template>
```

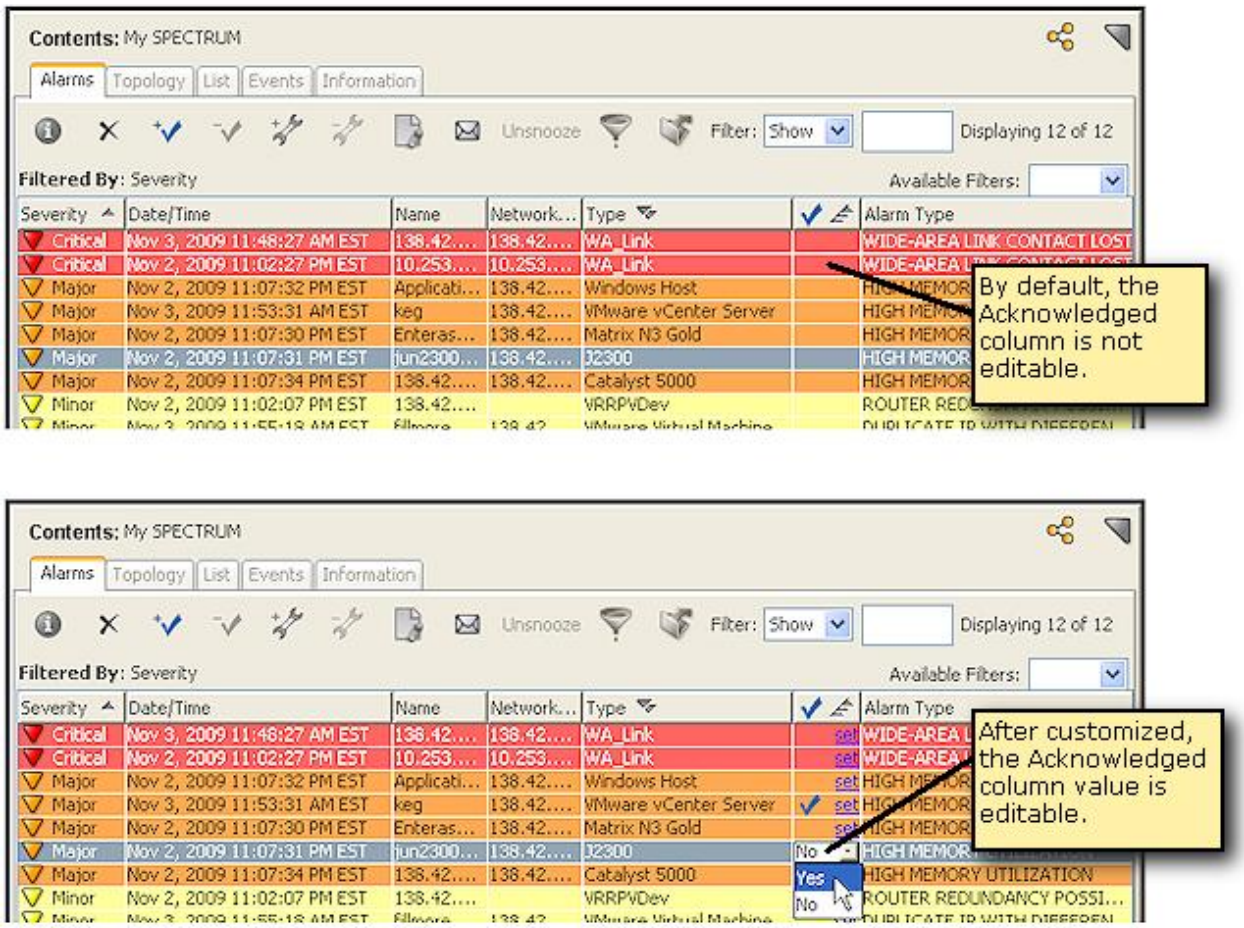
Make a Table Column Editable

In some cases, you can allow the user to edit the value found in a particular table cell in the column. The Acknowledged column in the Alarms table and the Admin Status column in the Interface Configuration table are examples of columns that allow users to edit.

Customize the Alarm Table Acknowledge Field

Some organizations may prefer to see text displayed in the Acknowledged column (“yes” or “no”) instead of the default check mark or blank space. This section describes how to make the Acknowledged column in the Alarms table editable by extending the factory XML file.

The following figure shows the default Acknowledged field in the Alarms table and the Acknowledged field after customizing it to make it editable.



Check to see if the file *<$SPECROOT>*/custom/alarm/config/alarm-table-config.xml already exists. It exists in this directory if previous customization have been made to this file. If the file does not exist, create it.

To create an editable Acknowledged column

1. Open the file and add the following XML

```
<table idref="alarm-table-config">
    <column-list>
            <column idref="column-alarmacknowledge-config">
                    <editable/>
                    <default-width>37</default-width>
            </column>
    </column-list>
</table>
```

2. Save and close the alarm-table-config.xml file.
3. Restart the OneClick client for the changes to take effect.

   This code overrides the "column-alarmacknowledge-config" entry in the factory alarm-table-config.xml file.

Customize Alarm Table Row Colors

You can customize the background color displayed in each row of the Alarms table. By default, each row in the Alarms table takes on the background color associated with the alarm listed in the row.

Customize the Alarms table to display in alternating gray and white rows by changing the swing-row-template definition from enumerated-severity-color-config to alternatingrow-color-config.

To customize the Alarm table colors

1. Create an alarm-table-config.xml file (if one does not already exist) in the *<$SPECROOT>*/custom/alarm/config directory.
2. Use the idref attribute to reference the factory file being extended: alarm-table-config.xml.
3. Define <enumerated-color> to reference alternatingrow-color-config.
4. Save and close the file.
5. Close and restart the OneClick Console to view the changes.

Example: Modifying the Alarm Table Row Color

```
<table idref="alarm-table-config">
    <swing-row-template>
        <enumerated-color idref="alternatingrow-color-config"/>
    </swing-row-template>
</table>
```

Set Up a Default Sort

You can create a default sort criteria for a table using the <default-sort> element and its child elements. You can sort on a maximum of three columns. CA Spectrum sorts the columns in the order in which they are listed in <sort-column-list>.

To set up a default sort

1. Identify the appropriate XML file that is used to build the table. All of the table files that are used to display data in the OneClick console are located in the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/topo/config directory. All of the table files are named after the functionality that they display. For example, the table used to display interface information for each model is called table-common-ifconfig-config.xml.
2. Determine if this file exists in the *<$SPECROOT>*/custom/topo/config directory. It exists in this directory if previous customizations were made to this file. If it is not there, copy the factory table file into the *<$SPECROOT>*/custom/topo/config directory.
3. Open the file in a text editor in order to make the appropriate modifications.
4. Find the closing tag for the column-list element, </column-list>.
5. Insert the XML to create the default sort after the </column-list> using the <default-sort> element.
6. Save and close the XML file.
7. Restart the OneClick client for your changes to take effect.

Example: Using <default-sort>

```
<table>
<column-list>
.
.
.
</column-list>
<default-sort>
    <sort-column-list>
        <sort-column>
                <name>Name_of_first_column_to_sort</name>
                <direction>ascending</direction>
        </sort-column>
        <sort-column>
                <name>Name_of_second_column_to_sort</name>
                <direction>ascending</direction>
        </sort-column>
        <sort-column>
                <name>Name_of_third_column_to_sort</name>
                <direction>ascending</direction>
        </sort-column>
    </sort-column-list>
</default-sort>
```

Note: Include the specific text for the contents of each <name> element based on the column list entries.

More information:

Modify a Table Column (see page 43)

Customize the Port Name Column of the Interface Table

You can change the tree column in the interface table to display something other than model name which is the default attribute displayed. This type of customization requires you to override the factory content-iftree-config.xml file.

To customize the port name column

1. Determine if the file *<$SPECROOT>*/custom/topo/config/content-iftree-config.xml exists. It already exists in this directory if previous customizations have been made to this file. If the file does not exist, create this file in the specified directory by copying it from *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/topo/config and pasting it into *<$SPECROOT>*/custom/topo/config.

2. Find the following code in the content-iftree-config.xml file that creates the column containing the model name attribute:

```
<content id="content-iftree-config"
    xmlns ="http://www.aprisma.com"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.aprisma.com
    ../../common/schema/column-config.xsd">
    <attribute>AttributeID.MODEL_NAME</attribute>
<!-- If the model name is not filled in or it's a GnPort, use Component_OID-->
    <expression>
            (((String)value()).length() == 0 ||
            ((String)value()).equals("GnPort")) ?
            attr(0x1006a).toString(): value()
    </expression>
</content>
```

   Note: The contents of the <expression> element are specific to the use of the Model_Name attribute and should be removed when specifying other attributes.

3. Customize the attribute displayed in the Port Name column by changing the <attribute><value></attribute> element to contain the attribute you want to display. To display a different attribute, change <value> to the desired attribute ID. You can specify the integer ID (for example, 0x129e0) or a predefined constant. The table beneath this procedure lists the predefined Port Attributes and their integer IDs.

   To display the port description, edit the file as follows:

```
<content id="content-iftree-config"
    xmlns ="http://www.aprisma.com"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.aprisma.com
    ../../common/schema/column-config.xsd">
    <attribute>AttributeID.PORT_DESCRIPTION</attribute>
</content>
```

4. Save and close <*$SPECROOT*>/custom/topo/config/content-iftree-config.xml.
5. Close and restart the OneClick client to see the changes take effect.

Predefined Port Attribute Value Constant	Integer ID
AttributeID.PORT_DESCRIPTION	0x129e0 (ifDescr)
AttributeID.PORT_TYPE	0x129ed (ifType)
AttributeID.COMPONENT_OID	0x1006a

Sort Interfaces Table by ifIndex

CA Spectrum sorts the interfaces in the Interfaces table by the first column, which is the interface model name. CA Spectrum sorts this field alphabetically based on the textual values.

To sort the interfaces table numerically by ifIndex value

1. Edit the definition of the interfaces table content definition file acquire the ifIndex data. Check the <*$SPECROOT*>/custom/topo/config directory to see if the content-iftree-config.xml file exists. The file exists in this directory if previous customizations have been made to it.
2. If the file is not in this custom directory, create it by copying it from <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/topo/config and pasting it into the <*$SPECROOT*>/custom/topo/config directory.
3. Open the file and find the line that reads:

   ```
   <attribute>AttributeID.MODEL_NAME</attribute>
   ```

4. Change this line to read:

   ```
   <attribute>0x1006a</attribute>
   ```

   Note: The 0x1006a attribute is Component_OID (which is rolled from ifIndex).

   The contents of the <expression> element are specific to the use of the Model_Name attribute and should be removed when specifying other attributes.

5. Save your changes to the content-iftree-config.xml file.

   In the following steps, you edit the interface table column definition file to relabel the Model Name column to be the Index column, as it will display the interface index value instead of the model name.

6. Open the <*$SPECROOT*>/custom/topo/config directory and check to see if the column-iftree-config.xml file already exists there. If it does not, go to the <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/topo/config directory and find the column-iftree-config.xml file. Copy it and paste it into the <*$SPECROOT*>/custom/topo/config directory.
7. Find the line that reads:

   ```
   <name>com.aprisma.spectrum.app.util.render.ModelNameColumn</name>
   ```

8. Change this line to read:

   ```
   <name>Index</name>
   ```

9. Save your changes to the column-iftree-config.xml file.

   In the following steps, you edit the interface table configuration file to change the name element value from the model naming java class to the text “Index”.

10. Open the <*$SPECROOT*>/custom/topo/config directory and check to see if the interfaces-table-config.xml file already exists there. If it does not, go to the <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/topo/config/ directory and find the interfaces-table-config.xml file. Copy it and paste it into the <*$SPECROOT*>/custom/topo/config directory.
11. Find the line that reads:

    ```
    <name>com.aprisma.spectrum.app.util.render.ModelNameColumn</name>
    ```

12. Change this line to read:

    ```
    <name>Index</name>
    ```

13. Save your changes to the interfaces-table-config.xml file.
14. Close all of the text files and restart the OneClick console in order for the changes to take effect.

If you would like to retain the interface model name in the table, implement the following additional instructions:

1. Open the <*$SPECROOT*>/custom/topo/config/interfaces-table-config.xml file.
2. Find the following entry within the <column-list> element:

   ```
   <column idref="column-iftree-config">
       <default-width>150</default-width>
   </column>
   ```

3. Add the following three lines to the end of this entry.

   ```
   <column idref="column-ifmodelname-config">
       <default-width>150</default-width>
   </column>
   ```

4. Save your changes and close the XML file.
5. Close and restart the OneClick console in order for the changes to take effect.

Chapter 6: Adding Support for Model Types or Model Classes

This section describes how to add or extend OneClick support for a CA Spectrum model type or model class. For example, you may want to add specific OneClick support for a management module that you have created with the Generic SNMP Toolkit in CA Spectrum.

This section contains the following topics:

Create a Registration

If you have created a new model type or model class, you can use the XML elements described in this chapter to configure the associated model appearance, available information, and views within the OneClick interface.

Register the Model Type or Model Class in custom-app-config.xml

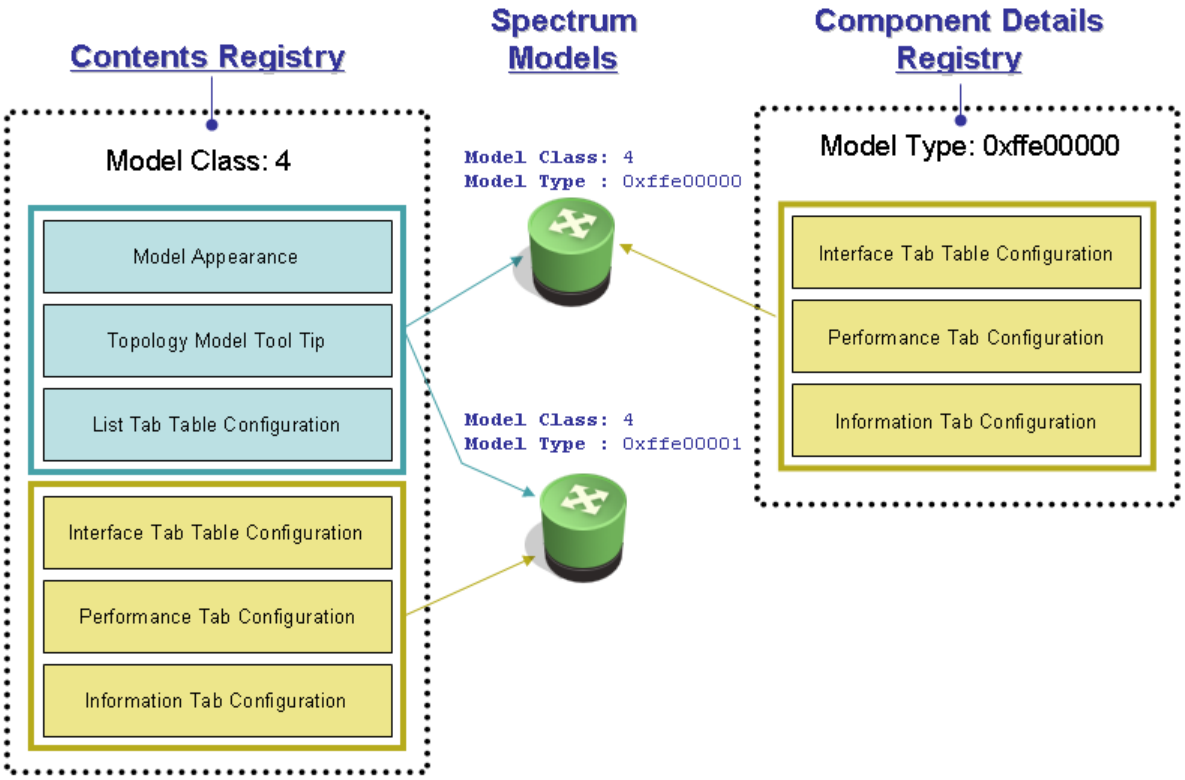
OneClick registration for new model types and model classes is performed within the custom-app-config.xml file. Doing so enables one to configure OneClick support on a per model type and/or model class basis. There are two methods for registration:

- Contents registry
- Component details registry

Both of these registrations work in conjunction with each other to provide effective OneClick support for CA Spectrum models. The component details registry acts as an extension of the contents registry in order to define general and specific OneClick device support.

Because most models of a given model class will share the same OneClick device support, typically you define a contents registry for the model class to define this general support. However, for a given model class, you might want to expose different information in the Component Details panel based on model type. To accomplish this, you define a component details registry for the applicable model type. As a result, the model receives its general, shared content from the contents registry, and it receives its more specific component details content from the component details registry.

Consider the example illustrated in the following figure. There are two routers of model class 4 (switch-router). They both receive their general information from the contents registry that has been registered with model class 4. However, the model of type 0xffe00000 receives its component details content from the component details registry. Because the model of type 0xffe00001 does not have a component details registry, it receives all of its configuration content from the contents registry.



Define General OneClick Device Support Based on Model Class

The contents registry (denoted by the <oi> element) is primarily used to define the general, shared configuration for a model class or a group of model types. By default, CA Spectrum defines this general behavior for most model classes. Therefore, if you set the appropriate model class for your custom model type, it automatically inherits this generic content.

If the default configuration meets most of your requirements, but you want to modify the information in the Component Detail panel, you should only create a component details registry for the applicable model type.

However, if you create a new model class, or you want to define a specific model appearance for a model type, you need to create a contents registry entry using the XML elements described in the following table.

Element	Parent Element	Description
<app-config>	ot applicable	The root element for the custom-app-config.xml file.
<contents-registry>	<app-config>	Used to associate a single or group of model classes and/or model types to configuration files that define model appearance and tooltip content. (Optional) You can use the scope attribute to specify the location of the configuration xml files you are using (when you are not using the default locations of console, topo, or common). The scope attribute has to match the directory name where the existing configuration xml files reside, as follows: <$SPECROOT>/tomcat/webapps/spectrum/ WEB-INF/<scope>/config For example, <contents-registry scope="devman"> specifies the devman/config directory, which contains the configuration xml files for device management views and subviews.
<model-class>	<contents-registry>	Registers a model class for this contents registry.
<model-type>	<contents-registry>	Registers a model type for this contents registry. Model types should only be registered for a contents registry if you need a unique topology icon or tooltip. If you only want to configure component detail content for a model type, use the <component-details-registry> instead of the <contents-registry>.
<is-derived-from>	<contents-registry>	Registers a parent model type and all of its derived model types for this contents registry. Model types should only be registered for a contents registry if you need a unique topology icon or tooltip. If you want to configure only component detail content for a model type, use the <component-details-registry> instead of the <contents-registry>.

Element	Parent Element	Description
<icon-reg-id>	<contents-registry>	The icon registration ID that identifies the icon configuration to use. The icon configuration defines the appearance of the icon in OneClick.
<tooltip-config>	<contents-registry>	The XML that defines the tooltip content for topology icons.
<table-config>	<contents-registry>	Specifies the XML that configures the columns available on the List tab in the Contents panel.
<information-config>	<contents-registry>	Specifies the XML that defines the content of the model's Information tab.
<performance-config>	<contents-registry>	Specifies the XML that defines the contents of the model's Performance tab, where one or more graphs can be defined to show the values of model attributes over time. The contents of these graphs are real time; the data is only available for the current OneClick client session.
<interface-table-config>	<contents-registry>	Specifies the XML that configures the table on the Interfaces tab.

Define Specific OneClick Device Support Based on Model Type

As mentioned earlier in this chapter, the contents registry defines the general OneClick device support. If you want to define specific device support on a per model type basis in the OneClick client, you should define a component details registry (denoted by the <component-details-registry> element). The component details registry defines the contents for the views within the Component Detail panel.

Element	Parent Element	Description
<app-config>	Not applicable	The root element for the custom-app-config.xml file.

Element	Parent Element	Description
<component-details registry>	<app-config>	Used to associate a single or group of model classes and/or model types to configuration files that define the content in the Component Detail panel. The same child elements of <component-details-registry> are supported within <contents-registry>. However, since <component-details-registry> is an extension of <contents-registry>, all elements that are not defined are inherited from <contents-registry>. If both are registered for the same model type or model class, <component-details-registry> takes precedence over <contents-registry>.
<model-class>	<contents-registry>	Registers a model class for this component details registry.
<model-type>	<contents-registry>	Registers a model type for this component details registry.
<is-derived-from>	<contents-registry>	Registers a parent model type and all of its derived model types for this contents registry.
<information-config>	<contents-registry>	Specifies the XML that defines the content of the model's Information tab.
<performance-config>	<contents-registry>	Specifies the XML that defines the contents of the model's Performance tab, where one or more graphs can be defined to show the values of model attributes over time. The contents of these graphs are real time; the data is only available for the current OneClick client session.
<interface-table-config>	<contents-registry>	Specifies the XML that configures the table on the Interfaces tab.

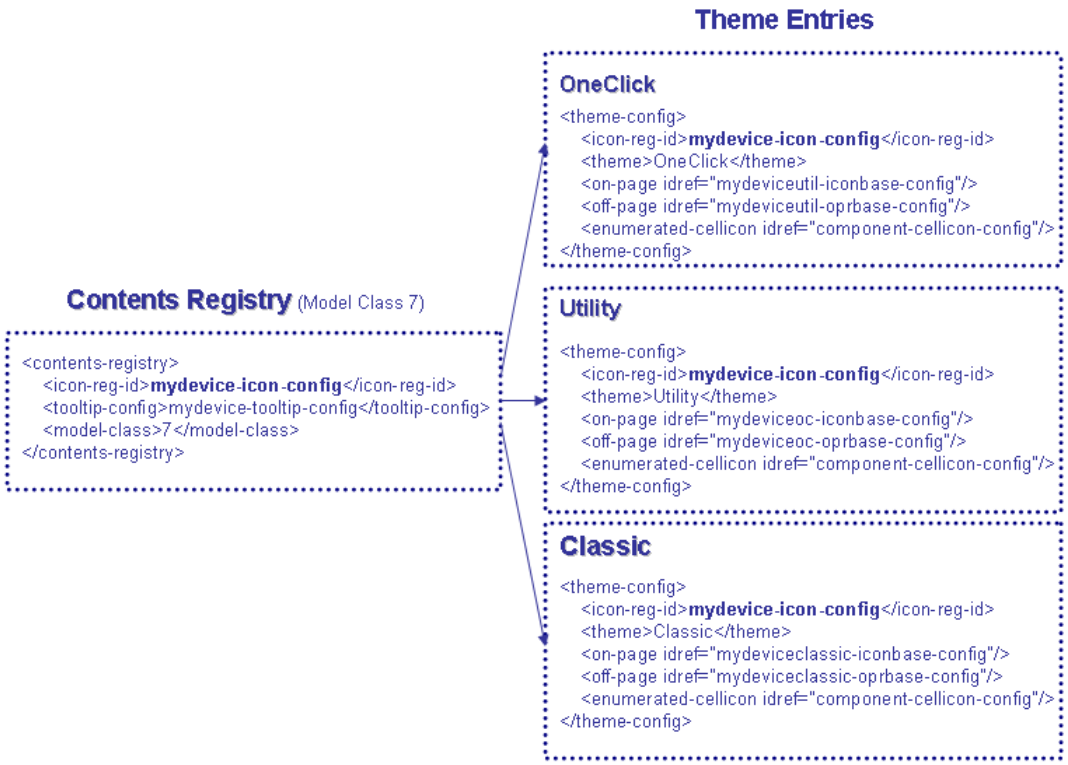
More information:

Customizing a Model's Information View (see page 101)
Customizing OneClick Tables (see page 41)
Creating a Model's Performance View (see page 121)

Define Model Appearance

You can define the model appearance as it will look within the OneClick client through XML configuration (for example, topology, Component Detail header, navigation hierarchy, and so on). This is accomplished using the contents registry on a per model class and/or model type basis.

Within the contents registry entry, you need to specify an icon registration ID (<icon-reg-id>). As shown in the following figure, this ID maps to theme configuration entries (<theme-config>) that define the XML files used to construct the model appearance for a specific theme. By default, OneClick includes three icon themes: OneClick, Utility, and Classic.



In the preceding XML example, the contents registry for model class 7 specifies the <icon-reg-id> as mydevice-icon-config. For this ID, a theme configuration is created for each of the three themes included with OneClick: OneClick, Utility, and Classic. Within the theme configurations, the XML files that construct the icons are specified.

The following procedure outlines the process to define a model's appearance in the OneClick user interface using each of these elements.

To define a model's appearance in the OneClick user interface

1. If it does not already exist, create a file named <*$SPECROOT*>/custom/console/config/custom-app-config.xml by copying <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/console/config/custom-app-config.xml.

   If the file already exists, it already contains customized changes to the factory default file, and you should make your additional changes in it.

2. Open the file with a text editor.

3. Create a contents registry entry for the applicable model types and/or model classes.

```
<contents-registry>
    ...
        <model-type>0xffff0000</model-type>
        <model-class>2</model-class>
    ...
</contents-registry>
```

4. Within the contents registry, specify an icon registration ID. This ID will map to theme configuration entries.

5. For each desired theme, create a <theme-config> entry. These entries will be identified using the registration ID from the previous step.

6. Design the appearance of the icon for each theme as described in Design On-Page and Off-Page Reference Icons.

7. Define the tooltips for the icons as described in Define Model Icon Tooltips.

8. Once you have created support for a model's appearance, you may want to customize the views and information available in the model's Component Detail panel.

9. Save and close the <*$SPECROOT*>/custom/console/config/custom-app-config.xml file.

10. Restart the OneClick client for your changes to take effect.

More information:

Customizing a Model's Information View (see page 101)
Define Model Icon Tooltips (see page 98)
Register the Model Type or Model Class in custom-app-config.xml (see page 65)
Configure Icons for OneClick Themes (see page 72)
Design On-Page and Off-Page Reference Icons (see page 74)

Configure Icons for OneClick Themes

By default, OneClick includes three icon themes:

- OneClick (default theme)
- Utility
- Classic

The default OneClick theme is the most robust and, therefore, is the recommended theme for use.

The elements that you can use to create a theme configuration are described in the following table:

Element	Parent Element	Description
<theme-config>	<app-config>	Defines the theme configuration for a specific icon registration ID.
<icon-reg-id>	<theme-config>	The icon registration ID that maps the theme configuration to the contents registry for one or more model types and/or model classes.
<enumerated-cellicon>	<theme-config>	Specifies that an enumerated cell icon image should be used for the model hierarchy tree. The idref attribute of this element defines the id of the chosen cellicon. Predefined icons exist in the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/topo/config directory and follow the naming pattern *-color-config.xml.
<dynamic-cellicon>	<theme-config>	Specifies that a dynamic cell icon image should be used for the model hierarchy tree. The idref attribute of this element defines the id of the chosen cellicon. Predefined icons exist in the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/topo/config directory and follow the naming pattern *-color-config.xml.
<static-cellicon>	<theme-config>	Specifies that a static cell icon image should be used for the model hierarchy tree. The idref attribute of this element defines the id of the chosen cellicon. Predefined icons exist in the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/topo/config directory and follow the naming pattern *-color-config.xml.

Element	Parent Element	Description
<theme>	<theme-config>	The name of the theme to which this configuration is applied. OneClick, Classic, or Utility should be specified to configure the existing themes. Specifying a new name generates a new theme.
<on-page>	<theme-config>	The icon configuration for the standard icon for the designated theme.
<off-page>	<theme-config>	The icon configuration for the referenced icon for the designated theme.

The <on-page> and <off-page> elements specify the XML files used to construct the standard version and off-page reference version of the icon as they would appear within the Topology.

The image used within the Navigation panel hierarchy is defined by one of the following three <*-cellicon> elements:

- <enumerate-cellicon>
- <dynamic-cellicon>
- <static-cellicon>

More information:

Design On-Page and Off-Page Reference Icons (see page 74)

Using the <theme-config> Element to Create Icon Appearance

The following example shows how the theme configuration for the icon registration ID mydevice-icon-config is defined using the <theme-config> element. Notice that the icon's appearance is defined for each of the OneClick themes: Utility, Classic, and OneClick.

Example: <theme-config> Code

```
<theme-config>
    <icon-reg-id>mydevice-icon-config</icon-reg-id>
    <theme>Utility</theme>
    <on-page idref="mydeviceutil-iconbase-config"/>
    <off-page idref="mydeviceutil-oprbase-config"/>
    <enumerated-cellicon idref="component-cellicon-config"/>
</theme-config>
<theme-config>
    <icon-reg-id>mydevice-icon-config</icon-reg-id>
    <theme>Classic</theme>
    <on-page idref="mydeviceclassic-iconbase-config"/>
    <off-page idref="mydeviceclassic-oprbase-config"/>
    <enumerated-cellicon idref="component-cellicon-config"/>
</theme-config>
<theme-config>
     <icon-reg-id>mydevice-icon-config</icon-reg-id>
     <theme>OneClick</theme>
     <on-page idref="mydeviceoc-iconbase-config"/>
     <off-page idref="mydeviceoc-oprbase-config"/>
     <enumerated-cellicon idref="component-cellicon-config"/>
</theme-config>
```

Design On-Page and Off-Page Reference Icons

A model can have two different appearances within the OneClick topology:

- On-page
- Off-page

The on-page representation is the standard appearance of the model and, therefore, the more important appearance. The off-page representation is used when the model is drawn in a topology as a reference to a model that exists in a different topological view. That is, when the model is connected to another model that resides in a different topology.

If the model supports connections (links) within the OneClick topology, you should specify an off-page reference icon (image) in addition to an on-page version.

You specify the on-page and off-page icons within the theme configuration using the <on-page> and <off-page> elements. These elements specify the XML that constructs the corresponding model icon.

The following table defines the elements that can be used within the XML files referenced by the <on-page> and <off-page> elements.

Element	Parent Element	Description
<icon-config>	Not applicable	This is the root element for the icon configuration file.
<static-cellicon>	<icon-config>	A single color foreground/background or image. You can use the idref attribute to refer to another file that defines the image or color. Predefined icons exist in the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/topo/config directory and follow the naming pattern *-color-config.xml.
<dynamic-cellicon>	<icon-config>	More than one color or image. You can use the idref attribute to refer to another file that defines the image or color. Predefined icons exist in the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/topo/config directory and follow the naming pattern *-color-config.xml.
<enumerated-cellicon>	<icon-config>	Displays an image or color based on the value of an attribute. You can use the idref attribute to refer to another file that defines the image or color. Predefined icons exist in the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/topo/config directory and follow the naming pattern *-color-config.xml.
<shape>	<icon-config>	See Define the Icon Shape.

Element	Parent Element	Description
<stroke>	<icon-config>	The type of line used to create the shape. The following values can be used: - Bump1: Bump stroke of width 1. - Bump2: Bump stroke of width 2. - Dash1x1x1: Dashed Stroke of width of 1, and repeats dash of length 1 followed by a blank of length 1. - Dash1x1x3: Dashed Stroke of width of 1, and repeats dash of length 1 followed by a blank of length 3. - Dash1x2x2: Dashed Stroke of width of 1, and repeats dash of length 2 followed by a blank of length 2. - Dash1x3x1: Dashed Stroke of width of 1, and repeats dash of length 3 followed by a blank of length 1. - Dash2x1x1: Dashed Stroke of width of 2, and repeats dash of length 1 followed by a blank of length 1. - Dash2x1x3: Dashed Stroke of width of 2, and repeats dash of length 1 followed by a blank of length 3. - Dash2x2x2: Dashed Stroke of width of 2, and repeats dash of length 2 followed by a blank of length 2. - Dash2x3x1: Dashed Stroke of width of 2, and repeats dash of length 3 followed by a blank of length 1. - DashDot: Dashed Stroke of width of 1, and repeats dash of length 3 followed by a blank of length 1 followed by a dot of length 1 followed by a blank of length 1. - DashDotDot: Dashed Stroke of width of 1, and repeats dash of length 3 followed by a blank of length 1 followed by a dot of length 1 followed by a blank of length 1 followed by a dot of length 1 followed by a blank of length 1. - DashedSeparator: Dashed Stroke used for display a separator lines for the CA Spectrum look and feel. - PenStroke Ditch1: Ditch stroke with a width of 1. - Ditch2: Ditch stroke with a width of 2. - Ditch4: Ditch stroke with a width of 4. - Hole1: Hole stroke of width 1. - Hole2: Hole stroke of width 2. - Invisible: Invisible Pen Stroke. - Ridge2: Ridge stroke with a width of 2.

Element	Parent Element	Description
<pipe-connection>	<icon-config>	See Define Pipe Connection Location.
<components>	<icon-config>	This element encloses the image, label, and text components that define the icon. The different components are layered on top of each other, and the index value for each of these components determines the drawing order. The lowest number (1) will be drawn first. See Define Image Components, Define Text Components, and Define Selection Components.

More information:

Define Pipe Connection Location (see page 83)
Define Image Components (see page 84)
Define Text Components (see page 94)
Define Selection Components (see page 95)
Define the Icon Shape (see page 79)

Use <on-page> and <off-page> Elements

If you create an icon configuration file called mydevice-utility-iconbase-config.xml that defines the on-page reference for your icon in the Utility theme, you must define the <on-page> reference element in the appropriate theme configuration as in the following example.

Example: <on-page> and <off-page> Code

```
<theme-config >
    <icon-reg-id>mydevice-icon-config</icon-reg-id>
    <theme>Utility</theme>
    <on-page idref="mydevice-utility-iconbase-config"/>
    <off-page idref="mydevice-utility-oprbase-config"/>
    <enumerated-cellicon idref="component-cellicon-config"/>
</theme-config>
```

Example: Icon Configuration File

This example shows an icon configuration file using the XML elements described in the table in Design On-Page and Off-Page Reference Icons.

```
<?xml version="1.0" encoding="UTF-8"?>
<icon-config id="mydevice-utility-iconbase-config">
    <static-color idref="default-iconbase-color-config"/>
    <shape-rectangle >
        <x>0</x>
        <y>0</y>
        <width>139</width>
        <height>84</height>
    </shape-rectangle>
    <stroke>Invisible</stroke>
<!-- ========================================================
- Specify the location of where pipes will connect to the icon.-
========================================================= -->
    <pipe-connection>
        <x>73</x>
        <y>36</y>
    </pipe-connection>
    <components>
<!-- ========================================================
- Definition of the model's base image. The color of this
- image is determined by the condition of the model.-
========================================================= -->
        <image-component index="2">
                <x>0</x>
                <y>0</y>
                <width>139</width>
                <height>84</height>
                <image idref="oneclick-orgservice-iconbase-image-config"/>
        </image-component>
    </components>
</icon-config>
```

More information:

Define Pipe Connection Location (see page 83)
Define Image Components (see page 84)
Define Text Components (see page 94)
Define Selection Components (see page 95)
Define the Icon Shape (see page 79)
Create an Icon Label (see page 90)

Define the Icon Shape

The base shape of the icon defines the area for the icon that the user clicks on to activate the model. The base shapes for a OneClick icon are the following:

- Rectangle
- Rounded Rectangle
- Ellipse
- Polygon
- Line

Define each of these shapes using the <icon-config> element.

Rectangle

Elements used to specify a rectangle in OneClick are defined in the following table.

Element	Parent Element	Description
<shape-rectangle>	<icon-config>	Defines a rectangle.
<x>	<shape-rectangle>	The upper left X coordinate of the rectangle.
<y>	<shape-rectangle>	The upper left Y coordinate of the rectangle.
<width>	<shape-rectangle>	The width of the rectangle.
<height>	<shape-rectangle>	The height of the rectangle.

Example: Rectangle Code

```
<shape-rectangle>
    <x>26</x>
    <y>24</y>
    <width>45</width>
    <height>14</height>
</shape-rectangle>
```

More information:

X and Y Coordinates (see page 83)

Rounded Rectangle

Elements used to specify a rounded rectangle in OneClick are defined in the following table.

Element	Parent Element	Description
<shape-roundrectangle>	<icon-config>	Defines a rounded rectangle.
<x>	<shape-roundrectangle>	The upper left X coordinate.
<y>	<shape-roundrectangle>	The upper left Y coordinate.
<width>	<shape-roundrectangle>	The width.
<height>	<shape-roundrectangle>	The height.
<arcwidth>	<shape-roundrectangle>	The width of the arc that defines the corners.
<archeight>	<shape-roundrectangle>	The height of the arc that defines the corners.

Example: Rounded Rectangle Code

```
<shape-roundrectangle>
    <x>0</x>
    <y>0</y>
    <width>89</width>
    <height>68</height>
    <arcwidth>12</arcwidth>
    <archeight>12</archeight>
</shape-roundrectangle>
```

More information:

X and Y Coordinates (see page 83)

Ellipse

Elements used to specify an ellipse in OneClick are defined in the following table.

Element	Parent Element	Description
<shape-ellipse>	<icon-config>	Creates an ellipse.

Element	Parent Element	Description
<x>	<shape-ellipse>	The upper left X coordinate of the ellipse.
<y>	<shape-ellipse>	The upper left Y coordinate of the ellipse.
<width>	<shape-ellipse>	The width of the ellipse.
<height>	<shape-ellipse>	The height of the ellipse.

Example: Ellipse Code

```
<shape-ellipse>
    <x>26</x>
    <y>24</y>
    <width>45</width>
    <height>14</height>
</shape-ellipse>
```

More information:

X and Y Coordinates (see page 83)

Polygon

Elements used to specify a polygon in OneClick are defined in the following table.

Element	Parent Element	Description
<shape-polygon>	<icon-config>	Defines a polygon.
<point>	<shape-polygon>	A point defining an edge of the polygon. The x attribute of this element defines the x coordinate position of the point. The y attribute of this element defines the y coordinate position of the point.

Example: Polygon Code

```
<shape-polygon>
    <point x="0" y="28" />
    <point x="10" y="10" />
    <point x="28" y="0" />
    <point x="116" y="0" />
    <point x="134" y="10" />
    <point x="144" y="28" />
    <point x="144" y="65" />
    <point x="134" y="80" />
    <point x="116" y="92" />
    <point x="28" y="92" />
    <point x="10" y="80" />
    <point x="0" y="65" />
</shape-polygon>
```

Line

Elements used to specify a line in OneClick are defined in the following table.

Element	Parent Element	Description
<shape-line>	<icon-config>	Defines a line.
<x1>	<shape-line>	X coordinate for the start of the line.
<y1>	<shape-line>	Y coordinate for the start of the line.
<x2>	<shape-line>	X coordinate for the end of the line.
<y2>	<shape-line>	Y coordinate for the end of the line.

Example: Line Code

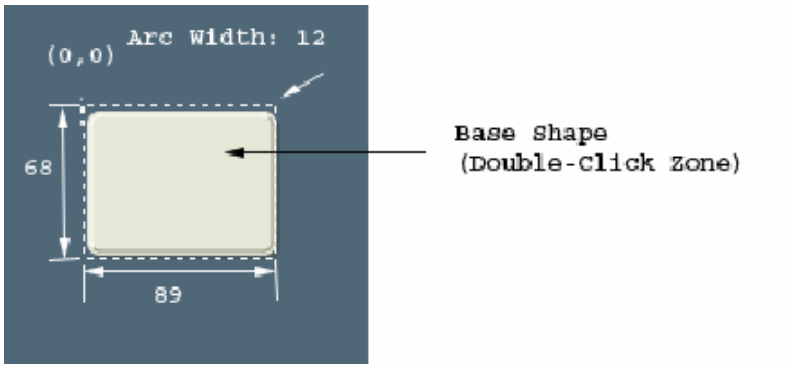
```
<shape-line>
    <x1>5</x1>
    <y1>5</y1>
    <x2>40</x2>
    <y2>40</y2>
</shape-line>
```

Create an Icon Shape

The icon shape defines the area of the icon the user can click in and select the device. The following example defines the rounded-rectangle icon shape shown in the image that follows the example.

Example: Icon Shape Code

```
<icon-config id="device-iconbase-config">
    <static-color idref="device-iconbase-color-config"/>
    <shape-roundrectangle >
        <x>0</x>
        <y>0</y>
        <width>89</width>
        <height>68</height>
        <arcwidth>12</arcwidth>
        <archeight>12</archeight>
    </shape-roundrectangle>
```



X and Y Coordinates

The x and y coordinates define the upper left-hand corner of the image. As the value of x increases, the upper left-hand corner of the image moves from the left to the right. As the value of y increases, the upper left-hand corner of the image moves from the top to the bottom. The image in the preceding section shows the upper left corner of the icon shape at 0,0, defined in Example: Icon Shape Code.

Define Pipe Connection Location

The pipe location defines where pipes get connected to the icon. Elements used to define pipe connection locations are listed in the following table.

Element	Parent Element	Description
<pipe-connection>	<icon-config>	Defines the pipe location on an icon.

Element	Parent Element	Description
<x>	<pipe-connection>	The x coordinate for the pipe location.
<y>	<pipe-connection>	The y coordinate for the pipe location.

Example: <pipe-connect> Code

```
<pipe-connection>
    <x>73</x>
    <y>36</y>
</pipe-connection>
```

Define Image Components

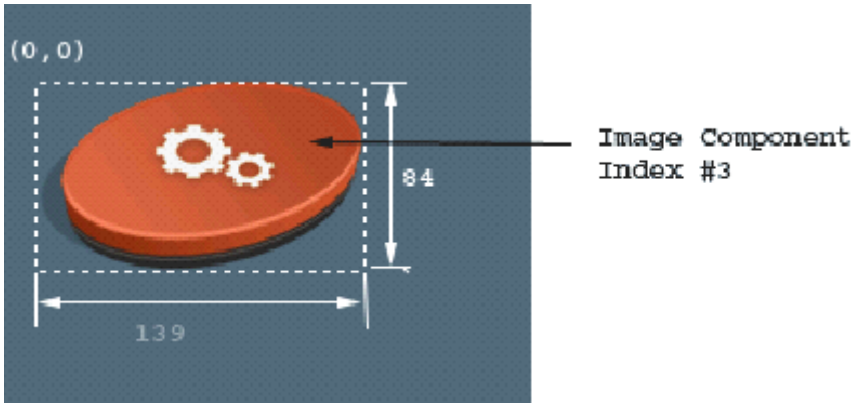
Image components enable you to add static or dynamic images to a model based on the model attributes. Image components are defined in the table after the following example.

Example: <image-component> Code

The following example defines an image component in an icon configuration file:

```
<image-component index="1">
    <x>0</x>
    <y>0</y>
    <width>139</width>
    <height>84</height>
    <image idref="oneclick-orgservice-iconbase-image-config"/>
</image-component>
```

The <image> element references the image definition file shown in Example: Image Definition File. This generates the image component shown in the following figure, showing the model in the CRITICAL (3) state.



The following table describes the elements used for defining image components.

Element	Parent Element	Description
<components>	<icon-config>	Defines all components for the icon.
<image-component>	<components>	Defines the image component. The index attribute of this element defines the order that the image is drawn relative to the other image, text, and selection components defined for this icon. Each index value must be unique, for example you cannot have two <*-component> elements with an index value of 1 in the same file. If you do, only the first <*-component> element is used. Index values must begin at 1.
<x>	<image-component>	The x coordinate of the upper left corner of image.
<y>	<image-component>	The y coordinate of the upper left corner of image.
<width>	<image-component>	The width of the image in pixels. There are no size restrictions on the image, however, it is recommended that you use a size relative to the other images used in OneClick.
<height>	<image-component>	The height of the image in pixels. There are no size restrictions on the image, however, it is recommended that you use a size relative to the other images used in OneClick.

Element	Parent Element	Description
<image>	<image-component>	The image to be rendered. The idref attribute references the XML file that builds the image. It is put in a separate file for organizational purposes only. Images should be in png file format and should be placed in the <*$SPECROOT*>/tomcat/webapps/spectrum/images directory.
<shape-*>	<image-component>	Shape component to be drawn with image.
<enumerated-color>	<image-component>	Colors used for the shape.
<static-color>	<image-component>	Color used for the shape.
<selection-component>	<image-component>	Indicates whether this is to be shown only when the user selects the image component.

Example: Image Definition File

The following XML code defines the image used for <image-component index =“2”> in Example: Icon Configuration File. The example uses the <select>, <case>, and <expression> elements to conditionally select an image based on the value of the condition attribute. The example uses the <yield> to define which image should be used when a condition is met. Note that the image is in PNG file format. Images used for customization purposes should be stored in the <*$SPECROOT*>/tomcat/webapps/spectrum/images directory. Express the path to an image placed in this directory from the images directory, as images/myimage.png.

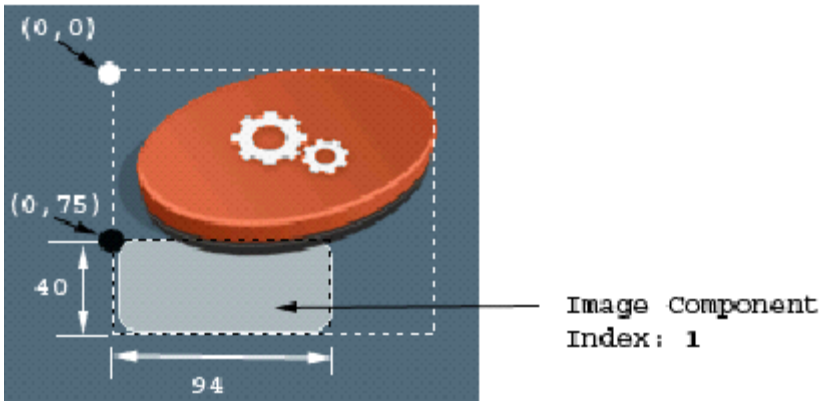
```
<?xml version="1.0" encoding="UTF-8"?>
<image id="oneclick-orgservice-iconbase-image-config">
    <select>
        <case>
                <expression>
                        attrInt(AttributeID.CONDITION) == 0
                        <!-- GREEN_CONDITION -->
                </expression>
                <yield>
                        images/oneclick_org_service_green.png
                </yield>
        </case>
        <case>
                <expression>
                        attrInt(AttributeID.CONDITION) == 1
                </expression>
                <yield>
                        images/oneclick_org_service_yellow.png
                </yield>
        </case>
        <case>
                <expression>
                        attrInt(AttributeID.CONDITION) == 2
                </expression>
                <yield>
                        images/oneclick_org_service_orange.png
                </yield>
        </case>
        <case>
                <expression>
                        attrInt(AttributeID.CONDITION) == 3
                </expression>
                <yield>
                        images/oneclick_org_service_red.png
                </yield>
        </case>
        <case>
                <expression>
                        attrInt(AttributeID.CONDITION) == 4
```

```
                </expression>
                <yield>
                        images/oneclick_org_service_brown.png
                </yield>
        </case>
        <case>
                <expression>
                        attrInt(AttributeID.CONDITION) == 5
                </expression>
                <yield>
                        images/oneclick_org_service_grey.png
                </yield>
        </case>
        <case>
                <expression>
                        attrInt(AttributeID.CONDITION) == 6
                </expression>
                <yield>
                        images/oneclick_org_service_blue.png
                </yield>
        </case>
                <default>
                        images/oneclick_org_service_blue.png
                </default>
        </select>
</image>
```

Example: Icon Configuration File

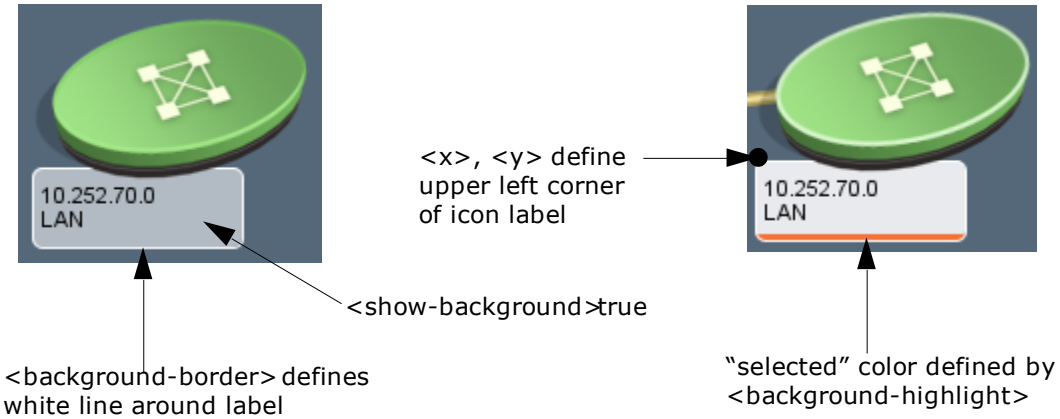
This icon configuration example generates the image that follows it. The example assumes that the condition of the model is CRITICAL (3).

```
<?xml version="1.0" encoding="UTF-8"?>
<icon-config id="oneclick-orgservice-iconbase-config">
    <static-color idref="oneclick-default-iconbase-color-config"/>
    <shape-rectangle >
        <x>0</x>
        <y>0</y>
        <width>139</width>
        <height>84</height>
    </shape-rectangle>
    <stroke>Invisible</stroke>
<!-- ============================================================
Specify the location of where pipes will connect to the icon.
=============================================================-->
    <pipe-connection>
        <x>73</x>
        <y>36</y>
    </pipe-connection>
    <components>
<!-- ============================================================
Definition of the model label.
============================================================ -->
        <label-component idref="default-iconlabel-config" index="1">
                <x>0</x>
                <y>77</y>
                <column-list>
                        <field-column>
                                <column idref="column-modelname-config"/>
                                <column idref="column-devicetype-config"/>
                        </field-column>
                </column-list>
        </label-component>
<!-- ========================================================
Definition of the model's base image. Image color is determined by model condition.
-========================================================== -->
        <image-component index="2">
                <x>0</x>
                <y>0</y>
                <width>139</width>
                <height>84</height>
                <image idref="oneclick-orgservice-iconbase-image-config"/>
        </image-component>
    </components>
</icon-config>
```



Create an Icon Label

OneClick model or device type icons have labels to identify them to OneClick operators. Use the <label-component> elements listed in the table in the default-iconlabel-config.xml file to add labels to the icons you create. The following figure shows how some of the elements can be used in defining an icon label.



More information:

The default-iconlabel-config.xml File (see page 91)
Adjust Icon Label Background Width (see page 93)
Default Label Width Settings (see page 93)
Create Fixed Width Icon Labels (see page 94)

The default-iconlabel-config.xml File

The file <*$SPECROOT*>/SPECTRUM/tomcat/webapp/spectrum/WEB-INF/topo/config/default-iconlabel-config.xml contains examples and more information on using the <label-component> element and its attributes to create icon labels.

Example: <label-component> Code

```
<!-- ================================================================
Definition of the model label.
=================================================================-->
<label-component idref="default-iconlabel-config" index="1">
    <x>0</x>
    <y>67</y>
    <column-list>
        <field-column>
                <column idref="column-modelname-config"/>
                <column idref="column-devicetype-config"/>
        </field-column>
    </column-list>
</label-component>
```

This example defines the model label by extending the functionality of the default-iconlabel-config.xml file. This example creates a label that displays two fields of text defined in the two column statements. The column statements create two rows in the label for the content defined by the column configuration files they reference. This label displays the model name and device type in the icon label. The code does not specify a minimum or maximum column width for the label (see the following table), so it has a fixed width of 95 pixels, the default condition.

Element	Parent Element	Description
<components>	<icon-config>	Defines all components for the icon.
<label-component>	<component>	Defines a label component. The index attribute defines the order that the label is drawn in with respect to other image, text, and label components defined for the same icon. Each index value must be unique. If you have two <*-components> with the same index value - only the second one is drawn. Index values begin at 1.
<x>	<label-component>	Defines the x coordinate of the upper left corner of the label relative to the icon image component.

Element	Parent Element	Description
<y>	<label-component>	Defines the y coordinate of the upper left corner of the label relative to the icon image component.
<column-list>	<label-component>	Constructs a list of columns used to create the labels. Only one column is supported.
<field-column>	<column-list>	Constructs a column of information
<column>	<field-column>	Defines the data for the <field-column>. The idref attribute allows you to associate another XML file with the <column> that defines the data for the column. The data for the <column> does not have to reside in another file.
<max-background-width>	<label-component>	Defines the maximum width of the label background. The label background expands and contracts in width based on the longest column value.
<min-background-width>	<label-component>	Defines the minimum width of the label background.
<default-transparency>	<label-component>	Defines transparency value for label background when the icon is not selected. 0 - 255; 0=completely transparent, 255=completely opaque.
<selected-transparency>	<label-component>	Defines transparency value for label background when the icon is selected. 0 - 255; 0=completely transparent, 255=completely opaque.
<show-background>	<label-component>	Indicate whether or not to show the label's background.
<enumerated-color>	<label-component>	Defines the label background color. <enumerated-color> uses expressions and enumerations to determine the color.
<static-color>	<label-component>	Defines the label background color. <static-color> uses a specific color.
<vertical-spacing>	<label-component>	Specifies the spacing between rows of text in pixels.
<border-spacing>	<label-component>	Defines the border height above the first column and below the last column in pixels.

Element	Parent Element	Description
<background-border>	<label-component>	True or False. If true, a one-pixel wide line is used to outline the label border.
<enumerated-color>	<background-border>	Defines the color of <background-border>. For details, see <enumerated-color> in this table.
<static-color>	<background-border>	Defines the color of <background-border>.
<background-highlight>	<label-component>	Defines the line that displays at the bottom of the label when the icon is selected.
<enumerated-color>	<background-highlight>	Defines label background color when the icon is selected. For details, see <enumerated-color> in this table.
<static-color>	<background-highlight>	Defines the color of <background-highlight>, the label background that displays when the icon is selected.
<field-value>	<label-component>	Defines the values displayed in the icon label.
<enumerated-color>	<field-value>	Defines the color of text of the icon label.
<static-color>	<field-value>	Defines the color of text of the icon label.
<font>	<field-value>	Defines the font used for the icon label text.

Adjust Icon Label Background Width

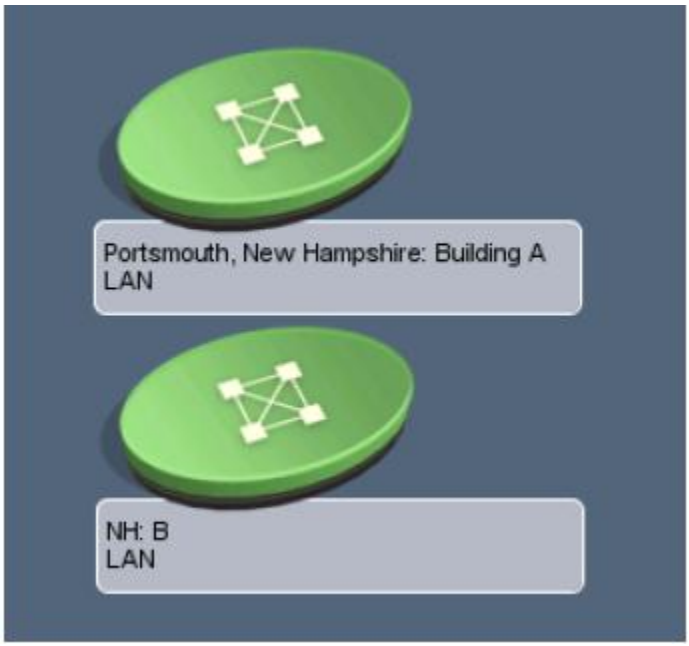
The icon label background widens and narrows according to the length of the longest text entry in the label, up to the maximum width specified in <max-background-width>, and down to the minimum width specified in <min-background-width>. If the label background is not wide enough to accommodate the length of the label text, increase the <max-background-width> value.

Default Label Width Settings

When you create an icon label using label-component, the default label size is fixed at 95 pixels. Both <max-background-width> and <min-background-width> have a default value of 95. This creates a label background with a fixed width of 95. If you do not specify either of these elements, they assume the default value.

Create Fixed Width Icon Labels

To create an icon label that has a fixed width, set <max-background-width> and <min-background-width> to the same value that provides enough line space for the icon label text. The following image shows an icon label with a fixed width of 200.

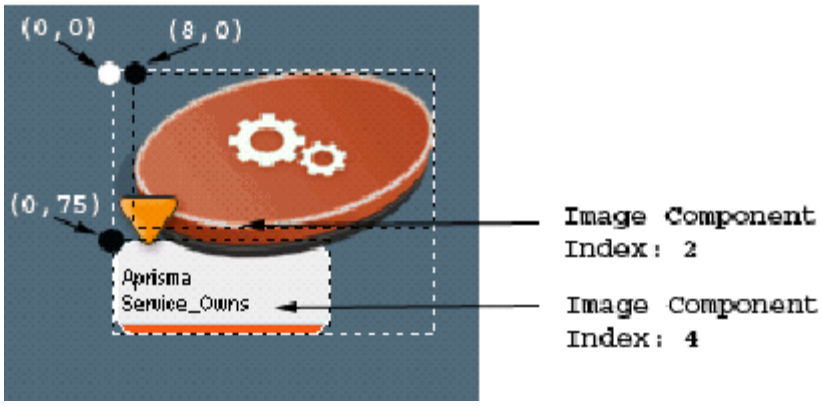


Define Text Components

Refer to versions of this manual for release 8.0 or earlier on the CA Spectrum support and documentation web site: http://ca.com/support http://www.aprisma.com/manuals

Define Selection Components

In order to make the icon standout when selected, you may want to specify images that will appear only during selection. You do this via the <selection-component> element. In the example below there are two components added that are defined as Selection Components (image component #2 and #4). If the user selected the component, these image components would become visible. Otherwise, they remain invisible. The following figure shows the two selection components:



```
<?xml version="1.0" encoding="UTF-8"?>
<icon-config id="oneclick-orgservice-iconbase-config">
<static-color idref="oneclick-default-iconbase-color-config"/>
<shape-rectangle >
    <x>0</x>
    <y>0</y>
    <width>139</width>
    <height>84</height>
</shape-rectangle>
<stroke>Invisible</stroke>
<!-- ============================================================
Specify the location of where pipes will connect to the icon. -
============================================================ -->
<pipe-connection>
    <x>73</x>
    <y>36</y>
</pipe-connection>
<components>
<!-- ============================================================
Definition of the model text background.
============================================================ -->
    <image-component index="1">
        <x>0</x>
        <y>75</y>
        <width>94</width>
        <height>40</height>
        <image>
                <select>
                        <default>
                                com/aprisma/spectrum/app/topo/images/
                                icon_text_background.png
                        </default>
                </select>
        </image>
    </image-component>
    <image-component index="2">
        <x>0</x>
        <y>75</y>
        <width>94</width>
        <height>40</height>
        <selection-component>true</selection-component>
        <image>
                <select>
                        <default>
                                com/aprisma/spectrum/app/topo/images
                                icon_selected_text_background.png
                        </default>
                </select>
        </image>
```

```
    </image-component>
<!-- ========================================================
Definition of the model's base image. The color of this image is
determined by the condition of the model.
========================================================= -->
    <image-component index="3">
        <x>0</x>
        <y>0</y>
        <width>139</width>
        <height>84</height>
        <image idref="oneclick-orgservice-iconbase-image-config"/>
    </image-component>
<!-- ========================================================
Definition of the image to show when the model is selected.
========================================================= -->
    <image-component index="4">
        <x>8</x>
        <y>0</y>
        <width>131</width>
        <height>72</height>
        <selection-component>true</selection-component>
        <image>
                <select>
                        <default>
                                com/aprisma/spectrum/app/topo/images/
                                oneclick_selected_container.png
                        </default>
                </select>
        </image>
    </image-component>
<!--========================================================
Definition of the model name text field.
========================================================= -->
    <text-component idref="oneclick-default-textfield-config"index="5">
        <x>5</x>
        <y>97</y>
        <width>85</width>
        <height>13</height>
        <horizontal_alignment>left</horizontal_alignment>
        <text>
                <attribute>0x1006e</attribute>
        </text>
    </text-component>
<!-- ========================================================
Definition of the model type name text.
========================================================= -->
    <text-component idref="oneclick-default-textfield-config" index="6">
        <x>5</x>
        <width>85</width>
```

```
        <height>12</height>
        <horizontal_alignment>left</horizontal_alignment>
        <text>
                <attribute>AttributeID.DEVICE_TYPE</attribute>
                <expression>
                        ( value() == null || ((String)value()).length() ==
                        0 ) ? attr(AttributeID.MTYPE_NAME ) : value()
                </expression>
        </text>
    </text-component>
<!-- ========================================================
Definition of the rollup condition symbol.
========================================================= -->
        <image-component index="7">
                <x>0</x>
                <y>54</y>
                <width>19</width>
                <height>19</height>
                <image idref="oneclick-rollup-triangle-image-config"/>
        </image-component>
</components>
</icon-config>
```

Define Model Icon Tooltips

You can configure the content of a tooltip that displays when a OneClick user moves the cursor over the model icon. In the contents registry of the custom-app-config.xml file, the <tooltip-config> element specifies the file that defines the tooltip. The custom tooltip file, mydevice-tooltip-config.xml must be placed into the *$SPECROOT*/custom/topo/config folder.

A tooltip configuration for models of model class 2, 5, 11, and 12 is registered to use the tooltip that is defined within the mydevice-tooltip-config.xml file. Verify the following example:

```
<contents-registry>
    <reg-id>device-icon-config</reg-id>
    <tooltip-config>mydevice-tooltip-config</tooltip-config>
    <model-class>2</model-class>
    <model-class>5</model-class>
    <model-class>11</model-class>
    <model-class>12</model-class>
</contents-registry>
```

The following example shows the contents of a tooltip file. Each element is explained in the table with examples.

```
<?xml version="1.0" encoding="UTF-8"?>
<tooltip-config id="mydevice-tooltip-config"
xmlns ="http://www.aprisma.com"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.aprisma.com../../common/schema/column-config.xsd">
DO NOT USE<![CDATA[
<html><table>
    <tr>
        <td><b>{0}</b></td>
        <td>{1}</td>
    </tr>
    <tr>
        <td><b>{2}</b></td>
        <td>{3}</td>
    </tr>
    <tr>
        <td><b>{4}</b></td>
        <td>{5}</td>
    </tr>
</table></html>
</format>
<param>
    <localize>com.aprisma.spectrum.app.util.render.ModelNameColumn</localize>
</param>
<param>
    <attribute>AttributeID.MODEL_NAME</attribute>
    <renderer>com.aprisma.spectrum.app.util.render.NullRenderer
    </renderer>
</param>
<param>
    <localize>
    com.aprisma.spectrum.app.util.render.NetworkAddressColumn
    </localize>
</param>
<param>
    <attribute>AttributeID.NETWORK_ADDRESS</attribute>
    <renderer>com.aprisma.spectrum.app.util.render.NullRenderer
    </renderer>
</param>
<param>
    <localize>
    com.aprisma.spectrum.app.util.render.MACAddressColumn
    </localize>
</param>
<param>
    <attribute>AttributeID.MAC_ADDRESS</attribute>
    <renderer>com.aprisma.spectrum.app.util.render.NullRenderer
```

```
    </renderer>
</param>
</device-tooltip-config>
```

Note: The numbers that are used in the curly brackets reference the parameters that are defined by the following <param> elements. {0} references the first parameter, {1} references the second parameter and so on.

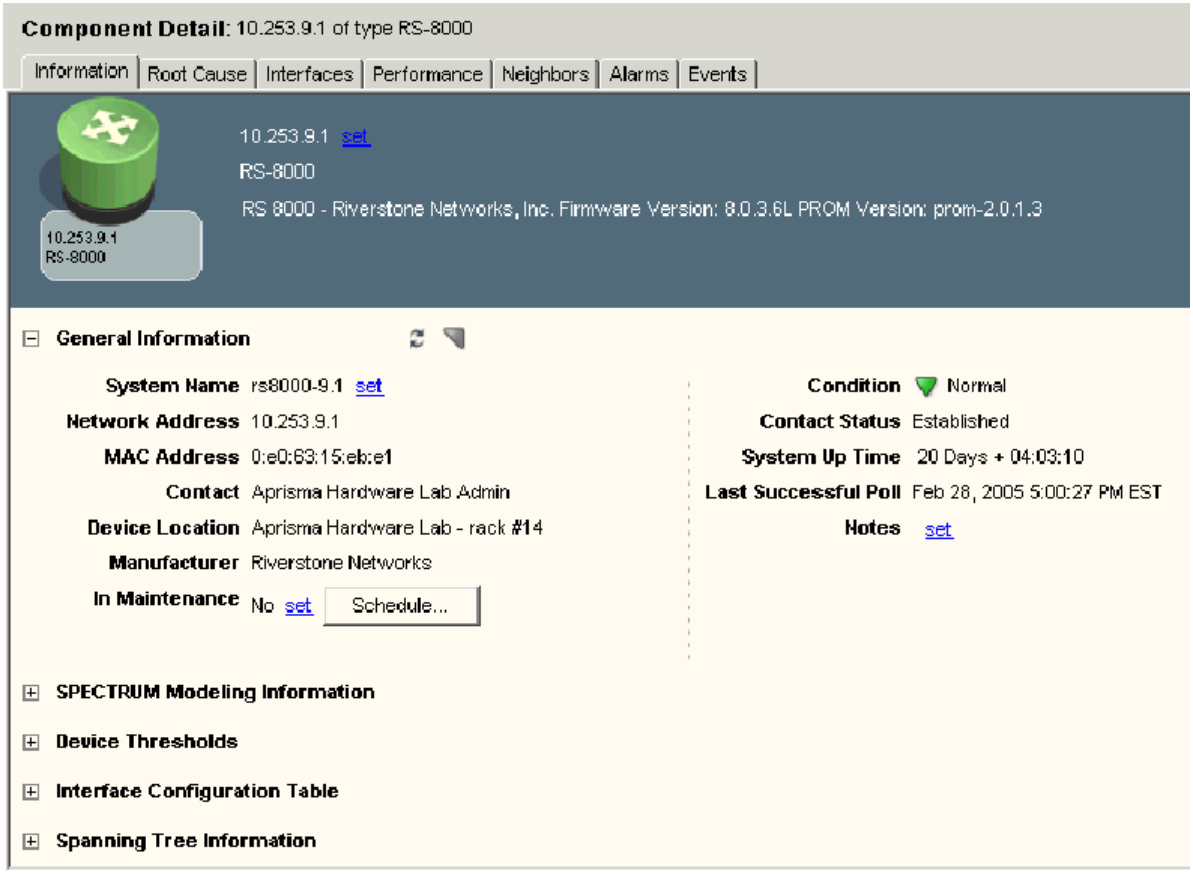
Element	Parent Element	Description
<tooltip-config>	Not applicable	The root element for the file that defines the tooltip. The id attribute for this element must be set equal to the value used for the <tooltip-config> element in the <content-registry> found in the custom-app-config.xml file.
DO NOT USE	<tooltip-config>	Use this to define how the data will be displayed in the tooltip. In the above example, an HTML table is used. The number in the curly brackets, e.g. {3}, references the corresponding parameter, for example, the third parameter defined in the file.
<param>	<tooltip-config>	Use this to define the value to be displayed.
<localize>	<param>	Converts the string specified in the parameter to a localized value. Use this if you are using a parameter value obtained from a OneClick XML file that shipped with CA Spectrum and begins with "com.aprisma.spectrum".
<renderer>	<param>	See Customize the Port Name Column of the Interface Table.
<attribute>	<param>	Use this to identify the attribute you want to be displayed.
<message>	<param>	Use this for specifying a plain text value for a parameter.

More information:

Define Model Appearance (see page 70)
Customize the Port Name Column of the Interface Table (see page 60)

Chapter 7: Customizing a Model's Information View

Each model displayed in OneClick has an Information view as shown in the following figure. You access this view using the Information tab in the Component Detail panel.



Information views are constructed from separate XML files called Information Configuration files. The primary file is the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/topo/config/topo-app-config.xml file. In this file, for each model type, the <contents-registry> element specifies the <information-config> elements that link an Information Configuration file to the model type.

The <contents-registry> in the following example is found in topo-app-config.xml. It links the 0x2100c (Rtr_Cisco) model type with view-devicedetails-config.xml, which specifies the format for the Information view.

```
<contents-registry>
    <reg-id>router-icon-config</reg-id>
    <tooltip-config>device-tooltip-config</tooltip-config>
    <information-config>view-devicedetails-config</information-config>
    <performance-config>performance-data-rtrcisco-config</performance-config>
    <!-- All Model Types derived from Rtr_Cisco (0x21000c) -->
    <model-type>0x21000c</model-type>
    <!-- Rtr_Cisco -->
</contents-registry
```

Several model classes and model types may be specified within the contents or component details registries. Information views can be reused in one or more <contents-registry> elements.

This section describes how to add and edit information displayed in the Information view for a particular model type or model class.

This section contains the following topics:

Extend or Modify an Information View

You can modify or create an Information view to display information available in a device MIB that CA Spectrum and OneClick do not support by default. You can decide whether to add this parameter to one of the existing subviews in the Information view for that device type, or to create a new subview.

When you create or modify an Information view, you must create a new Information Configuration file in the *<$SPECROOT>*/custom/console/config/ directory. This file must have the same name as the factory default Information Configuration file that you need to modify. You then associate the Information Configuration file with the appropriate model type using the *<$SPECROOT>*/custom/console/config/custom-app.config.xml file.

Note: You must create the file *<$SPECROOT>*/custom/console/config/custom-app-config.xml and add your customization code to it. See Create Customizations (see page 11) for information about creating and saving customization files, and relating them to their factory default counterpart files using IDREF. That topic also discusses extending, overriding, or creating new configuration files.

Follow these steps:

1. If you are modifying or extending an existing Information view for an existing model type or model class, identify the current Information view configuration file that is used to create the Information view.

   a. Open the <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/topo/config/topo-app-config.xml file and find the <contents-registry> element for the appropriate model type or model class. (For an example, see the XML code example at the start of this chapter.)

      Note: OneClick uses the hierarchy that model_type definitions override the same definition found in a model_class.

   b. Find the <information-config> element within the <contents-registry> element, and note the name of the Information Configuration file that is described by this element. All of the existing Information Configuration files are located in the <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/topo/config directory.

2. To extend an existing information configuration, take the following steps:

   a. Create a new file in the <*$SPECROOT*>/custom/topo/config directory with the same name as the Information Configuration file determined in the next step. Use idref to extend the existing factory file with the contents of this new file.

   b. Open the file using a text editor and use the XML syntax outlined in Create an Information Configuration File (see page 104) to build the file.

   c. Continue to step 4.

3. To modify an existing information configuration:

   a. Copy the Information configuration file identified in step 1 from <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/topo/config directory into the <*$SPECROOT*>/custom/topo/config directory.

   b. Open the file using a text editor and use the XML syntax outlined in Create an Information Configuration File (see page 104) to modify the file.

   c. Continue to step 4.

4. Save and close the file.

5. Associate the new Information Configuration file with the appropriate model types or model classes. Follow the instructions in Associate an Information Configuration File with a Model Class or Model Type (see page 119).

Create an Information Configuration File

The XML that defines the Information Configuration is split up into two major sections: the header definition and the subview definition. Each define that portion of the model's information tab as shown in the following figure.

The XML elements used to build the header and subview in the Information view are listed in the following table.

Element	Parent Element	Description
<view>	Not applicable	This is the root element for the Information Configuration file. The ID attribute for this element defines the value that should be used for the <information-config> element in the custom-app-config.xml file.
<view-header>	<view>	Defines the header portion of the view.
<subviews>	<view>	Defines the available subviews.

More information:

Associate an Information Configuration File with a Model Class or Model Type (see page 119)
Define the Header (see page 105)
Define the Subview (see page 106)

Define the Header

The Information tab header is identified by the <view-header> element. The header specifies the model's graphical depiction and textual information as shown in the image in Create an Information Configuration File.

Example: Code for Information Tab Header

```
<view-header>
    <show-icon>true</show-icon>
    <show-labels>false</show-labels>
    <field-column>
        <column idref="column-modelname-config"/>
        <column idref="column-modeltype-config"/>
    </field-column>
</view-header>
```

Element	Parent Element	Description
<view-header>	<view>	Defines the header portion of the view.
<show-icon>	<view-header>	Indicates whether or not to show the icon. Values: true or false.
<show-labels>	<view-header>	Indicates whether or not to show field labels Values: true or false
<field-column>	<view-header>	Constructs a column of information.
<column>	<field-column>	Defines the data for the field column. The idref attribute enables you to associate another XML file, which will define the data for the column. The data for the column does not have to be in another file, it is done for organizational purposes only.

More information:

Create an Information Configuration File (see page 104)

Define the Subview

The subview section defines one or more subviews that display in the Information tab as shown in the image in Create an Information Configuration File. You can define one or more subviews using the <subviews> element and the child elements shown in the following table. As shown in the Example: Subview Definition, all subview definitions are enclosed within one <subviews> element.

Element	Parent Element	Description
<subviews>	<view>	Encloses all of the elements which define each type of subview.
<field-subview>	<subviews>	Defines a field subview.
<table-subview>	<subviews>	Defines a table subview.
<application-subview>	<subviews>	Defines an application subview.
<related-model-subview>	<subviews>	Defines a related model subview.
<related-model-table-subview>	<subviews>	Defines a related model table subview.
<subview-group>	<subviews>	Groups subviews together under one subview.

Example: Subview Definition

```
<subviews>
    <field-subview>
    .
    .
    .
    </field-subview>
    <application-subview>
    .
    .
    .
    </application-subview>
    <table-subview>
    .
    .
    .
    </table-subview>
</subviews>
```

More information:

Create an Information Configuration File (see page 104)
Add a Field Subview (see page 108)
Add Field Subviews Using IDREF (see page 110)
Add a Table Subview (see page 110)
Add an Application Subview (see page 113)
Add a Related Model Subview (see page 114)
Add a Related Models Table Subview (see page 115)

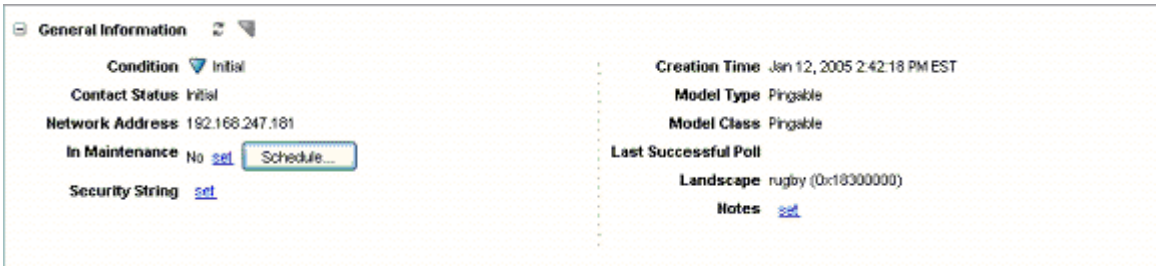
Add a Field Subview

Field subviews are used to display a list of non-list attributes available on the selected device model. The following is an example of XML syntax used to create a field subview.

Example: Field Subview

```
<field-subview>
    <title>General Information</title>
    <privilege>
        <name>GeneralInfo</name>
    </privilege>
    <field-column>
        <column idref="column-condition-config"/>
        <column idref="column-contactstatus-config"/>
        <column idref="column-networkaddress-config"/>
        <column idref="column-ismanaged-config">
                <editable/>
        </column>
        <column idref="column-securitystring-config">
                <editable verifier=
                "com.aprisma.spectrum.app.swing.widget.SecStringInputVerifier"/>
        </column>
    </field-column>
    <field-column>
        <column idref="column-modelcreationdate-config"/>
        <column idref="column-modeltypename-config"/>
        <column idref="column-modelclass-config"/>
        <column idref="column-lastsuccessfulpoll-config"/>
        <column idref="column-landscape-config"/>
        <column idref="column-modelnotes-config">
                <editable/>
        </column>
    </field-column>
</field-subview>
```

This code generates a subview similar to the one shown in the following figure.



You can use the elements shown in the following table to create a field subview.

Element	Parent Element	Description
<field-subview>	<subviews>	Defines a field subview. If you set the expanded attribute of this element to true, the subview will be expanded by default. The idref attribute enables you to associate an XML file that defines the data for this subview. The data for the subview does not have to be in another file, it is done for organizational purposes only.
<title>	<field-subview>	The title of the subview. In our example above, the title is "General Information".
<display-if>	<field-subview>	Enables the author to specify whether the subview should be displayed via an expression.
<display-if-app-installed>	<field-subview>	Enables the author to specify that the defined view only be added if the specified application is installed.
<privilege>	<field-subview>	Associates a privilege to the subview. If the user is not given this privilege, the subview will not be displayed for that user.
<show-labels>	<field-subview>	Indicates whether or not to show field labels. Values: true or false.
<field-column>	<field-subview>	Constructs a column of information.
<column>	<field-column>	Defines the data for the field column. The idref attribute enables you to associate another XML file, which will define the data for the column. The data for the column does not have to be in another file, it is done for organizational purposes only.
<editable>	<column>	Specifies if the column is editable.

More information:

Creating Custom Privileges (see page 131)

Add Field Subviews Using IDREF

The example in this section shows how to extend the factory default view-devicedetails-config.xml file with a customized field subview using the IDREF attribute. The code shown is in the file <*$SPECROOT*>/custom/topo/config/view-devicedetails-config.xml, the same name as the file it extends, but in the /custom directory.

Example: Field Subview using IDREF

```
<view idref="view-devicedetails-config">
<subviews>
    <field-subview >
        <title>My Subview</title>
        <field-column>
                <column idref="column-networkaddress-config">
                <editable/>
                </column>
        </field-column>
    </field-subview>
</subviews>
</view>
```

This example creates a field subview titled My Subview that displays information defined by the file column-networkaddress-config.xml.

The line <view idref="view-devicedetails-config"> adds the field subview “My Subview” to the factory default view-devicedetails-config.xml file.

Add a Table Subview

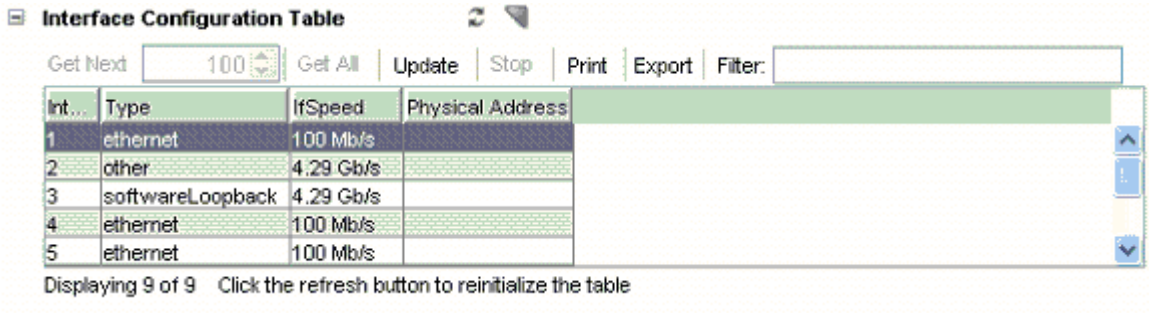
A table subview enables you to display a group of list attributes available from the selected model. These list attributes are displayed in table format. The following is an example of XML syntax used to create a table subview.

Example: Table Subview

```
<table-subview>
    <title>Interface Configuration Table</title>
    <privilege>
        <name>InterfaceConfigurationTable</name>
    </privilege>
    <swing-header-row-template>
        <static-color idref="row-header-color-config"/>
    </swing-header-row-template>
    <swing-row-template>
    </swing-row-template>
    <column-list>
        <column>
                <name>Interface</name>
                <content><attribute>0x100c4</attribute>
                </content>
                        <default-width>30</default-width>
        </column>
        <column>
                <name>Type</name>
                <content>
                        <attribute>0x100c6</attribute>
                        <renderer>
                        <param name="attrID">0x100c6</param>

                com.aprisma.spectrum.app.util.render.EnumeratedAttrRenderer
                        </renderer>
                </content>
                <default-width>100</default-width>
        </column>
        <column>
                <name>IF Speed</name>
                <content>
                        <attribute>0x100c8</attribute> <!-- IfSpeed -->
                        <renderer>com.aprisma.spectrum.app.topo.client.
                                interfaces.render.IfSpeedRenderer
                        </renderer>
                </content>
                <default-width>60</default-width>
        </column>
        <column>
                <name>Physical Address</name>
                <content>
                        <attribute>0x100c9</attribute>
                </content>
                <default-width>90</default-width>
        </column>
    </column-list>
</table-subview>
```

The code in this example generates a subview similar to the one shown in the following image.



You can use the elements shown in the following table to create a table subview.

Element	Parent Element	Description
<table-subview>	<subviews>	Adds a table subview. If you set the expanded attribute of this element to true, the subview will be expanded by default. The idref attribute enables you to associate an XML file that defines the data for this subview. The data for the subview does not have to be in another file, it is done for organizational purposes only.
<title>	<table-subview>	The title for the table.
<privilege>	<table-subview>	Associates a privilege to the subview. If the user is not given this privilege, the subview will not be displayed for that user.

Note: All of the elements that can be used to modify a table can be used to create the table for the table subview.

More information:

Creating Custom Privileges (see page 131)
Modify a Table Column (see page 43)

Add an Application Subview

An application subview enables you to display attributes affiliated with an application model type related to the selected model type by a specified criteria. The example below uses CA Spectrum's PossPrimApp (0x230000) relation.

Example: Application Subview

```
<application-subview>
    <title>SNMP2 IP Routing Table</title>
    <model-type>0x230010</model-type>
    <subviews>
        <table-subview idref="table-ip2-ip-routingtable-config"/>
    </subviews>
</application-subview>
```

The attribute used within the <model-type> element defines the model type to which the subview pertains. In the example above, the value 0x230010 is used. This attribute value corresponds to the SNMP2_Agent Application model type. This means that this particular table definition applies only to the SNMP2_Agent application. If the current device does not implement this application, this table will not be visible.

Element	Parent Element	Description
<application-subview>	<subviews>	Creates an application subview. If you set the expanded attribute of this element to true, the subview will be expanded by default. The idref attribute enables you to associate an XML file that defines the data for this subview. The data for the subview does not have to be in another file, it is done for organizational purposes only.
<title>	<application-subview>	The title of the subview.
<model-type>	<application-subview>	The model type to which the subviews will pertain.
<subviews>	<application-subview>	Enables you to add a prebuilt table-subview or field-subview to the detail components that reside within the application subview. Values: table-subview and/or field-subview.
<criteria>	<application-subview>	The search criteria used to find the related models.
<privilege>	<application-subview>	Associates a privilege to the subview. If the user is not given this privilege, the subview will not be displayed for that user.

More information:

Creating Custom Privileges (see page 131)

Add a Related Model Subview

A related model subview enables the user to display the attributes of models related to the current, selected model via a search criteria, for example, models that are related by a specific association. The user can then display attributes of the found models in field or table format. Add a Related Models Table Subview shows how you can display the attributes in table format.

You can use the elements in the following table to create related model subview.

Element	Parent Element	Description
<related-model-subview>	<subviews>	If you set the expanded attribute of this element to true, the subview will be expanded by default. The idref attribute enables you to associate an XML file that defines the data for this subview. The data for the subview does not have to be in another file, it is done for organizational purposes only.
<title>	<related-model-subview>	The title of the subview.
<model-type>	<related-model-subview>	The model type to which the subviews will pertain.
<subviews>	<related-model-subview>	Enables you to add a prebuilt table-subview or field- subview to the detail components that reside within the subview. Values: table-subview and/or field-subview.
<criteria>	<related-model-subview>	The search criteria used to find the related models.
<privilege>	<related-model-subview>	Associates a privilege to the subview. If the user is not given this privilege, the subview will not be displayed for that user.

More information:

Creating Custom Privileges (see page 131)
Add a Related Models Table Subview (see page 115)

Add a Related Models Table Subview

You can use the <related-models-table-subview> to display a table of models that are associated with the current selected model based on a specified search criteria.

You can use the elements in the following table to create a related model table subview.

Element	Parent Element	Description
<related-model-table-subview>	<subviews>	If you set the expanded attribute of this element to true, the subview will be expanded by default. The idref attribute enables you to associate an XML file that defines the data for this subview. The data for the subview does not have to be in another file, it is done for organizational purposes only.
<title>	<related-model-table-subview>	The title of the subview.
<privilege>	<related-model-table-subview>	Associates a privilege to the subview. If the user is not given this privilege, the subview will not be displayed for that user.
<table>	<related-model-table-subview>	This elements and its sub-elements define the table. See the table in Modify a Table Column for a list of sub-elements.
<criteria>	<related-model-table-subview>	The search criteria used to find the related models.

In the example that follows, the <subviews> element is used to place a view within a view allowing multiple views to be nested within each other. Each column in the table represents the value of an attribute for each of the models that have passed the search criteria.

Example: Related-Model-Table Subview (demo-details-config.xml)

```
<subviews>
    <related-models-table-subview>
        <title>Demo Table Title</title>
        <criteria>demo-search-criteria</criteria>
        <table>demo-table-config</table>
    </related-models-table-subview>
</subviews>
```

Example: Referenced Criteria XML (demo-search-criteria.xml)

```
<search-criteria id="demo-search-criteria"
    xmlns="http://www.aprisma.com"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.aprisma.com
    ../../common/schema/search-criteria-config.xsd">
    <child-models>
        <relation>Collects</relation>
    </child-models>
</search-criteria>
```

Example: Referenced Table XML (demo-table-config.xml)

```
<?xml version="1.0" encoding="utf-8"?>
<table id="demo-table-config"
    xmlns="http://www.aprisma.com"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.aprisma.com
       ../../common/schema/table-config.xsd">
    <swing-header-row-template>
        <static-color idref="row-header-color-config"/>
    </swing-header-row-template>
    <swing-row-template>
        <enumerated-color idref="alternatingrow-color-config"/>
    </swing-row-template>
    <column-list>
        <column>
                <name>Model Name</name>
                <content>
                        <attribute>AttributeID.MODEL_NAME</attribute>
                </content>
        </column>
        <column>
                <name>Condition</name>
                <content>
                        <attribute>AttributeID.CONDITION</attribute>
                </content>
        </column>
    </column-list>
</table>
```

More information:

Creating Custom Privileges (see page 131)
Modify a Table Column (see page 43)

Define a Subview Group

You can group together one or more subviews under a single collapsible group using the <subview-group> element.

```
<subview-group>
    <title>Subview Group Title</title>
    <display-if>
        <expression>
                attrInt(AttributeID.MTYPE_HANDLE) == 0x3cc0002
        </expression>
    </display-if>
    <subviews>
        <table-subview idref="example-table1-config">
                <title>Example Sub View #1</title>
        </table-subview>
        <table-subview idref="example-table2-config">
                <title>Example Sub View #2</title>
        </table-subview>
    </subviews>
</subview-group>
```

This example generates a subview group similar to the one shown in the following figure.

Use the elements shown in the following table to create a subview group.

Element	Parent Element	Description
<subview-group>	<subviews>	If you set the expanded attribute of this element to true, the subview will be expanded by default. The idref attribute enables you to associate an XML file that defines the data for this subview. The data for the subview does not have to be in another file, it is done for organizational purposes only.
<title>	<subview-group>	The title of the subview group. In the example above, this is Subview Group Title.
<privilege>	<subview-group>	Associates a privilege to the subview group. If the user is not given this privilege, the subview group will not be displayed for that user.
<display-if>	<subview-group>	Adds an expression that will determine whether or not the group will be visible.
<subviews>	<subview-group>	Adds any type of subview (besides group) to this subview group.

More information:

Creating Custom Privileges (see page 131)

Associate an Information Configuration File with a Model Class or Model Type

Once you have created the Information view with an Information Configuration file, you must follow the instructions below to associate the Information Configuration file with the model type or model class.

To associate an Information Configuration File with a Model

1. If it does not already exist there, copy the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/config/custom-app-config.xml to the *<$SPECROOT>*/custom/console/config directory.
2. Open this file with a text editor.

3. Add the following block of XML code to link the appropriate model type(s) or model class(es) to the Information Configuration file. Use the XML elements shown to define the information appropriate to your model type or model class.

```
<contents-registry>
<icon-reg-id>your-icon-registration</icon-reg-id>
<tooltip-config>your-tooltip-config</tooltip-config>
<information-config>your-information-config-file</information-
                config>
<model-class>your-model-class</model-class>
</contents-registry>
```

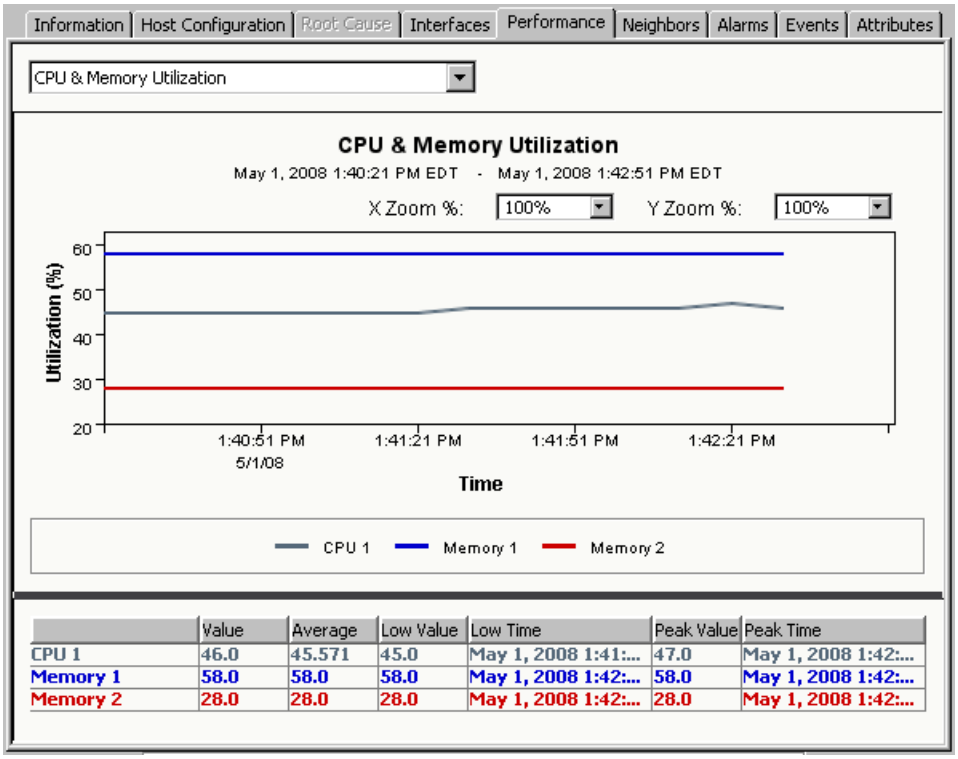
4. Save and close the custom-app-config.xml file.
5. Restart the OneClick client for your changes to take effect.

More information:

Define Model Appearance (see page 70)

Chapter 8: Creating a Model's Performance View

By default, some model types are configured to have a Performance view that shows changes in attributes, such as CPU utilization or memory, over time. In OneClick, you access this device view by clicking the Performance tab in the Component Detail panel.



A Performance view is composed of two XML files:

A performance data configuration file

This XML file specifies the data that can be displayed in any of the graphs within the Performance tab. Typically, this data includes attributes of the associated model type.

A performance view configuration file

This XML file defines the appearance of each graph available within the Performance tab. Each graph can display any of the lines defined within the performance data configuration file.

If the data or the format of one of the default Performance views does not meet your requirements, you can customize it for a particular model type or model class. For example, if you have added support in CA Spectrum for additional MIBs that are supported by a device, you might want to customize the view to graph some of the data that is available in the MIB. You can also create your own custom Performance views.

If a Performance view is not configured for the model currently selected in OneClick, the Performance tab is disabled.

This section contains the following topics:

Create a New Performance View

When you create a Performance view for a model type or model class from scratch, you should place the configuration files that define the view in the *<$SPECROOT>*/custom/topo/config directory. This helps to ensure they are not overwritten during an upgrade of CA Spectrum.

You associate the view's performance data configuration file with each applicable model type or model class in a file named custom-app-config.xml. While you can use either the <contents-registry> element or the <component-details-registry> element to do this, a best practice is to use the <component-details-registry> element because it configures only the Component Detail panel for the given model type or model class. For a description of the different registries available, see Chapter 5: Add Support for Model Types or Model Classes.

To create a new Performance view

1. In the *<$SPECROOT>*/custom/topo/config directory, create the performance data configuration file that specifies the data to be graphed in the view.
2. In the *<$SPECROOT>*/custom/topo/config directory, create a performance view configuration file that defines the appearance of each graph in the view.

3. In custom-app-config.xml, associate the performance data configuration file with the appropriate model types or model classes:

   a. If it does not already exist there, copy *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF/console/config/custom-app-config.xml to the *<$SPECROOT>*/custom/console/config directory.

      Note: Ensure to copy the file to the specified location. Do not modify the default custom-app-config.xml file that is provided with CA Spectrum because it is overwritten when you upgrade to a newer version.

   b. In custom-app-config.xml, add a block of XML code similar to the following example using a text editor. This code links the appropriate model types and model classes to the performance configuration data file.

      The following XML code example associates a model type whose ID is 0x3250004 to a performance data configuration file named *<$SPECROOT>*/custom/topo/config/performance-data-ciscovoiceapp-config.xml.

```
<component-details-registry>
  <performance-config>performance-data-ciscovoiceapp-config</performan
ce-config>
  <model-type>0x3250004</model-type>
  <!-- CiscoVoiceApp -->
</component-details-registry>
```

      Note: You can specify several model classes and model types within the contents or component details registries. You can also reuse Performance views in one or more <contents-registry> elements.

   c. Save and close the custom-app-config.xml file.

4. Restart the OneClick client for your changes to take effect.

More information:

Adding Support for Model Types or Model Classes (see page 65)
Create a Performance Data Configuration File (see page 124)
Create a Performance View Configuration File (see page 126)

Create a Performance Data Configuration File

The *performance data configuration file* specifies the data that can be displayed in any of the graphs within the Performance tab. A recommended naming convention for this XML file is performance-<descriptor>-data-config.xml.

Use the XML elements described in the following table to create a performance data configuration file.

Element	Parent Element	Description
performance-config	Not applicable	Represents the top-level parent element. You specify multiple graphs for a Performance view using multiple instances of the <graph> element in the performance view configuration file.
display	performance-config	Specifies the XML file that defines the view for presenting the graph data. This name must exactly match the simple file name of the actual performance view configuration file.
line	performance-config	Defines a line in the graph.
name	line	Specifies the label (name) for the line defined by the <line> parent element as it will be seen in the graph. The value for name needs to match its corresponding line definition in the performance graph view configuration file. If you are graphing a list attribute, you can also specify an attr-id attribute for the name element. This specifies an attribute ID whose value is appended to the name of each instance in the list. If not specified, the instance number is appended to the name of each list instance. In the following example, attribute 0x12ac6 represents the list of labels for the multiple lines defined by <list-content>. <line> <name attr-id="0x12ac6"> Memory Utilization </name> <list-content> <attribute>0x12ac6</attribute> </list-content> </line>

Element	Parent Element	Description
content	line	Specifies scalar data to graph as a single line defined by the <line> parent element, for example: <content> <attribute>0x2100cc</attribute> </content>
list-content	line	Specifies list data to graph as multiple lines defined by the <line> parent element. In the following example, the attribute 0x12ac6 is an integer list attribute that represents memory utilization. There will be a separate line graphed for each instance in the list. <line> <name attr-id="0x12ac6"> Memory Utilization </name> <list-content> <attribute>0x12ac6</attribute> </list-content> </line>
attribute	content, list-content	Specifies the ID of the attribute to graph as the line defined by the <line> parent element.
expression	content, list-content	Used to define an expression to produce a value for the column, for example: (attrInt(0xd054c) + attrInt(0xd054d))/8
applications	line	You can also graph data from related application models. Within the <applications> element, use the <model-type> element to specify the model type handle of the related application model. If the model in context has an application model related to it of this type, the data is retrieved from that application model. <applications> <model-type>0xc40043</model-type> </applications>
model-type	applications	The model type handle of the application model from which the data is retrieved. If no application models of this type are related to the model in context, the line is not shown.

The following example specifies the data to display in a 2-line performance graph that shows the change in both active and total VoIP calls over time for a Cisco device.

```
<performance-config id="performance-data-ciscovoiceapp-config">
    <display>performance-ciscovoiceapp-config</display>
    <line>
        <name>Active VoIP Calls</name>
        <content>
                <attribute>0x325012b</attribute><!-- VoIP_Current_Calls -->
        </content>
    </line>
    <line>
        <name>Total VoIP Calls</name>
        <content>
                <attribute>0x3250129</attribute> <!-- VoIP_Total_Calls -->
        </content>
    </line>
</performance-config>
```

Note: For additional, more complex examples of performance data configuration files, see the supporting files for the Performance views included with CA Spectrum. You can find these files by navigating to the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF directory and searching for files named perf*.

More information:

XML Usage Common to All Customization Files (see page 137)
Create a Performance View Configuration File (see page 126)

Create a Performance View Configuration File

The *performance view configuration file* defines the appearance of each graph available within the Performance tab. A recommended naming convention for this XML file is performance-<descriptor>-view-config.xml.

Use the XML elements described in the following table to create a performance view configuration file.

Element	Parent Element	Description
performance-view	Not applicable	Represents the top-level parent element.

Element	Parent Element	Description
graph	performance-view	Within the performance view configuration file, you can configure multiple graphs. Each graph is denoted by this <graph> element. The id attribute of this element is used as the graph title and displayed in the pulldown menu on the view (which is used for switching between multiple graphs for a single model). <graph id="CPU Utilization"> <y-axis-label>Utilization</y-axis-label> <y-axis-units>%</y-axis-units> <line> <name>CPU Utilization</name> </line> </graph>
y-axis-label	graph	Specifies the label for the Y axis.
y-axis-units	graph	Specifies the units for the Y axis, for example, % or Bits per Second.
line	graph	Defines a line in the graph, for example: <line color="#ffff00"> Use the color attribute to specify the hexadecimal RGB value of the color to use.
name	line	Specifies the label (name) for the line defined by the <line> parent element. This value must match the value for the same line in the performance data configuration file that defines the view's data. If you are graphing a list attribute, you may also specify an attr-id attribute for the name element. This represents the attribute id of which the value is appended to the name of each instance in the list. If not specified, the instance number is appended to name of each list instance.
display-if	line	Specifies the line should be displayed in the graph only if the expression defined in the <expression> child element evaluates to TRUE.
expression	display-if	Used to define an expression to define a complex condition for whether or not to graph the line. For more information, see Chapter 9: XML Usage Common to All Customization Files.
fill	line	If this element is included, the area below the line is filled in with color.

The following example specifies the format for a 2-line performance graph that shows the change in both active and total VoIP calls over time for a Cisco device.

Note: This is the format for the example graph whose data is defined in Create a Performance Data Configuration File.

```
<performance-view id="performance-ciscovoiceapp-config">
    <graph id="VoIP Calls Title">
        <y-axis-label>Calls</y-axis-label>
        <y-axis-units>unit</y-axis-units>
        <line>
           <name>Active VoIP Calls</name>
        </line>
        <line>
            <name>Total VoIP Calls</name>
        </line>
    </graph>
</performance-view>
```

Note: For additional, more complex examples of performance view configuration files, see the supporting files for the Performance views included with CA Spectrum. You can find these files by navigating to the *<$SPECROOT>*/tomcat/webapps/spectrum/WEB-INF directory and searching for files named perf*.

More information:

Create a Performance Data Configuration File (see page 124)

Customize an Existing Performance View

In general, you customize an existing Performance view by overriding the default configuration files for the view with versions that contain your customizations.

To customize an existing Performance view

1. Identify the default configuration files that define the Performance view you want to customize:
   a. Open <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/topo/config/topo-app-config.xml and find the <contents-registry> or <component-details-registry> element for the appropriate model type or model class.

      Note: If your model qualifies for both a model type and a model class registration, the model type registration takes precedence and is applied. Also, even though you can define the Performance view configuration in both the contents registry and the component details registry, the component details registry takes precedence. The contents registry is primarily for model appearance and typically is applied to only the model class.

   b. Find the <performance-config> element within the <contents-registry> or <component-details-registry> element, and note the name of the specified performance data configuration file.

      Note: All of the default performance configuration files—both the data configuration files and the view configuration files—are located in the <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/*/config directories.

   c. Open the <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/topo/config directory, and then open the performance data configuration file you identified in the previous step.

   d. Find the <display> element within the <performance-config> element, and note the name of the specified performance view configuration file.
2. Copy over one or both of the performance configuration files that you identified in step 1 to the <*$SPECROOT*>/custom/topo/config directory. You only need to copy over a file if it requires customizations.

   Note: To override the factory default performance configuration files, the copied files (that will contain your customizations) must have the same names as the original, default files.
3. If necessary, modify the copied performance data configuration file per your requirements, and then save and close the file.
4. If necessary, modify the copied performance view configuration file per your requirements, and then save and close the file.

5. If necessary, in custom-app-config.xml, change the model types or model classes that are associated with the performance data configuration file:

   a. If it does not already exist there, copy <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/console/config/custom-app-config.xml to the <*$SPECROOT*>/custom/console/config directory.

      Note: Make sure to copy the file to the specified location. Do not modify the default custom-app-config.xml file that is provided with CA Spectrum because it is overwritten when you upgrade to a newer version.

   b. In custom-app-config.xml, add a block of XML code similar to the following example using a text editor. This code links the appropriate model types and model classes to the performance configuration data file.

      The following XML code example associates a model type whose ID is 0x3250004 to a performance data configuration file named <*$SPECROOT*>/custom/topo/config/performance-data-ciscovoiceapp-config.xml.

      ```
      <component-details-registry>
        <performance-config>performance-data-ciscovoiceapp-config</performan
      ce-config>
        <model-type>0x3250004</model-type>
        <!-- CiscoVoiceApp -->
      </component-details-registry>
      ```

      Note: You can specify several model classes and model types within the contents or component details registries. You can also reuse Performance views in one or more <contents-registry> elements.

      The <component-details-registry> element within custom-app-config.xml *overrides* the equivalent registration for the model type or model class within an *-app-config.xml file. These registrations are used in the factory XML files in <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/*/config/*-app-config.xml.

   c. Save and close the custom-app-config.xml file.

6. Restart the OneClick client for your changes to take effect.

More information:

Create a Performance Data Configuration File (see page 124)
Create a Performance View Configuration File (see page 126)

Chapter 9: Creating Custom Privileges

This section describes how to restrict access to menu items, attributes, and subviews using privileges.

This section contains the following topics:

Define a Custom Privilege

Define each new privilege in the custom-privileges.xml file. This file registers custom privileges that can be applied to the following components:

- Menu items
- Columns
- Subviews

If an administrator has not assigned the corresponding privilege to a user, that user cannot access the menu item, column, or subview.

Follow these steps:

1. Copy <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/console/config/custom-privileges.xml to the <*$SPECROOT*>/custom/console/config directory.
2. Open this file with a text editor.

   Note: Define all new privileges inside the <privileges> element, which is the root element for the file.
3. Create the privilege. Use the elements shown in the table that follows this procedure.
4. Save and close the custom-privileges.xml file.
5. Restart the Tomcat web server, and then restart OneClick so that changes to the custom-privileges.xml file are available in OneClick.
6. You can now use the privilege to do the following:
   - Create a custom menu item, column, or subview that is accessible to only users who have the privilege. For more information, see Reference a Privilege When Defining a Menu Item, Column, or Subview (see page 136).
   - Create a search that is accessible only to users who have the privilege.

     Note: For more information, see the *Administrator Guide*.

You can use the elements in the following table to create a privilege:

Element	Parent Element	Description
<privileges>	Not applicable	The root element for the custom-privileges.xml file.
<*your_privilege_name*>	<privileges> or <*your_group_name*>	Defines the privilege. You create an element for each new privilege. The type attribute for this element defines the default role to which you assign the privilege. Possible values for the type attribute are “read” or “write”. If you are grouping privileges, place all defined privileges for that group within the element that defines your group.
<label>	<*your_privilege_name*>	The name of the privilege, which will be shown on the privilege list.
<desc>	<*your_privilege_name*>	The description of the privilege.
<model-view-*attr*>	<privileges>	For more information, see Restrict Access to Attribute Values in Model Subviews (see page 133).
<model-write-*attr*>	<privileges>	For more information, see Restrict Access to Attribute Values in Model Subviews (see page 133).
<group>	<*your_privilege_name*>	The new privilege appears in one of the existing groups if you use the <group> element. The scope attribute defines group scope. The following list includes existing groups and their scope values: <group scope=“alarm”> alarm-manager </group> <group scope=“topo”>tools</group> <group scope=“topo”>model-tab</group> <group scope=“topo”>model-view-group</group> <group scope=“topo”>model-write-group</group> For more information see Group Privileges (see page 134).

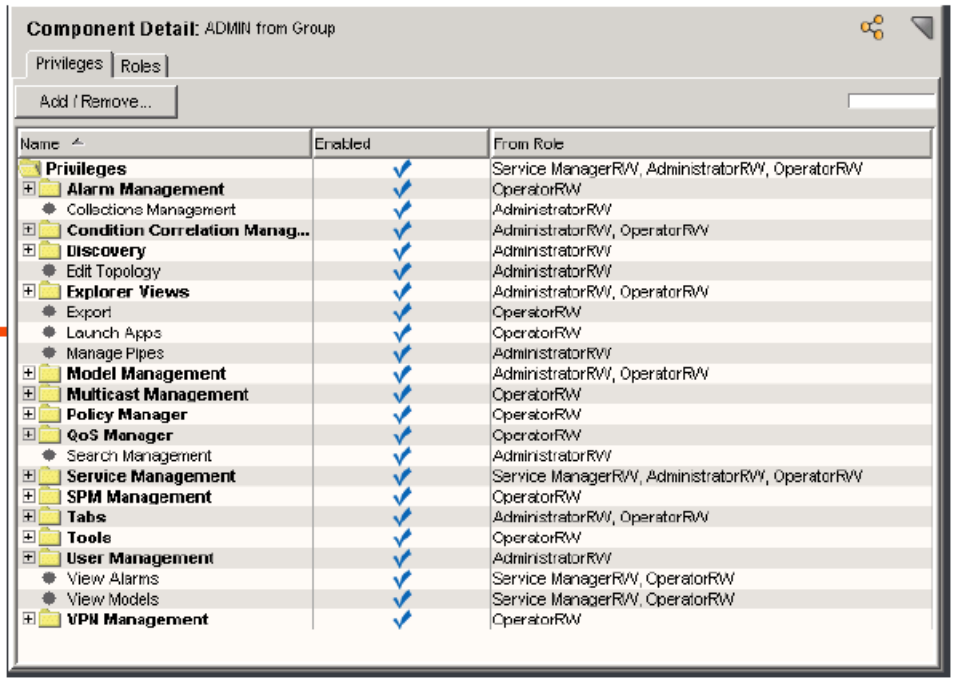
Example: Create a Privilege

Note: When you create a privilege, you are creating a new XML element. In the example above, the <launch-app> element creates the launch-app privilege. The type attribute defines the default role to which the privilege is assigned. Two values are possible: “read” and “write”. A privilege with the “read” type is assigned to the OperatorRO role, and a privilege with the “write” type is assigned to the OperatorRW role.

The following example defines the launch-app privilege, as shown in the image:

```
<privileges>
    <launch-app type="write">
        <label>Launch Apps</label>
        <desc>Ability to launch application from the tools menu.</desc>
    </launch-app>
</privileges>
```

A newly defined "Launch Apps" privilege is made available in the privileges list.



More information:

Customizing the OneClick Console Menu (see page 17)
Customizing a Model's Information View (see page 101)
Customizing OneClick Tables (see page 41)
Reference a Privilege When Defining a Menu Item, Column, or Subview (see page 136)
Group Privileges (see page 134)
Restrict Access to Attribute Values in Model Subviews (see page 133)

Restrict Access to Attribute Values in Model Subviews

You can restrict a user's access to certain attributes using the <model-view-attr> and <model-write-attr> elements, where attr is equal to the attribute ID of the attribute you want to restrict. These elements are used in the custom-privileges.xml file and regulate the attributes that show up in the OneClick Privilege list's Model Management>View Attributes folder and the Model Management>Model Write folder.

The <model-view-attr> element enables you to create a privilege that determines whether or not a user can see an attribute. For example, if you added the following XML to the custom-privileges.xml file, you will create a privilege called Community Name. This privilege restricts view access to attribute 10024, community name. This privilege will appear in the Model Management > View Attributes folder as specified with the <group> element. If the user does not have this privilege in any access group, they will not be able to see the community name attribute.

```
<model-view-10024 type="read">
    <label>Community Name</label>
    <group scope="topo">model-view-group</group>
</model-view-10024>
```

The <model-write-attr> element enables you to create a privilege that determines whether or not a user can edit an attribute. For example, if you added the following XML to the custom-privileges.xml file, you will create a privilege called Community Name. This privilege restricts write access to attribute 10024, community name. This privilege will appear in the Model Management > Model Write folder as specified with the <group> element. If the user does not have this privilege in any access group, they will not be able to edit the community name attribute.

```
<model-write-10024 type="write">
    <label>Community Name</label>
    <group scope="topo">model-write-group</group>
</model-write-10024>
```

Group Privileges

If you want to group privileges together, you can create groups in the custom-privileges.xml file. To specify a group, nest the element that defines the privilege (<*your_privilege_name*>) between the element that defines the group (<*your_group_name*>). The group's <label> element defines the name that represents the group in the privileges tree (see the image later in this section).

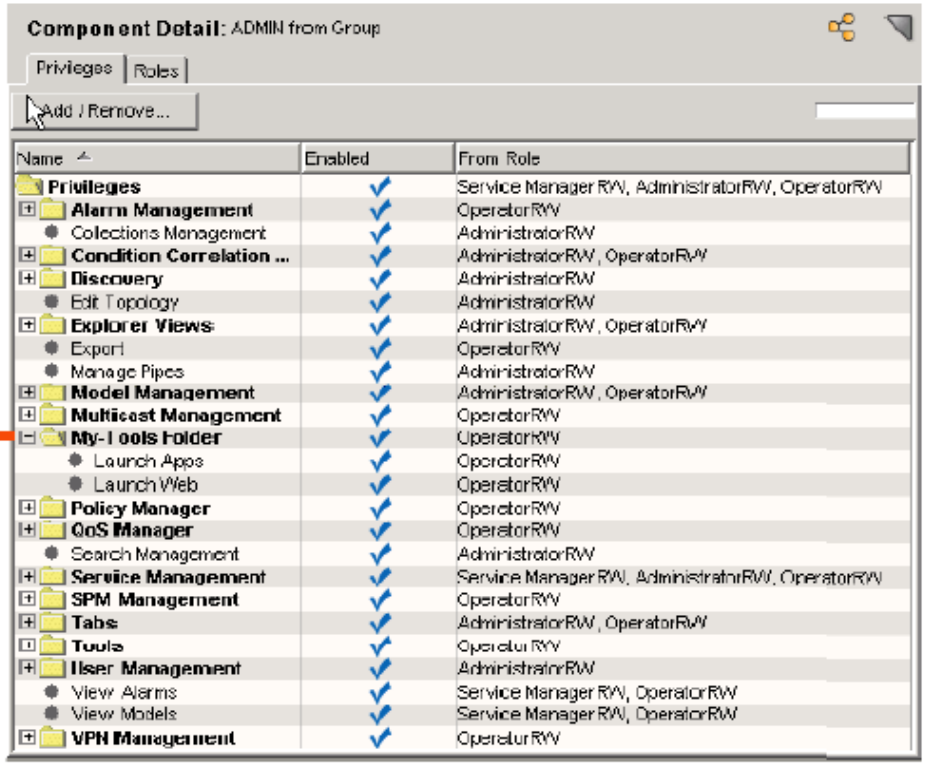
Element	Parent Element	Description
<privileges>	Not applicable	This is the root element for the custom-privileges.xml file.
<your_group_name>	<privileges>	This element defines the group. You create a new element for each group you define.
<label>	<your_group_name>	The name of the group, which will be shown on the privilege list.

Note: In order for changes made to the custom-privileges.xml file to be available in OneClick, you must restart the Tomcat web server and then restart OneClick.

In the following example, the <my-tools> element creates a group in which privileges can be nested. The value defined for the group's <label> is "My-Tools Folder". This will create a "My-Tools Folder" group in the privileges list as shown in the image that follows. The <launch-app> and <launch-web> privileges will appear in this group.

```
<privilege>
    <my-tools>
        <label>My-Tools Folder</label>
        <launch-app type="read">
                <label>Launch Apps</label>
                <desc>Ability to launch Applications.</desc>
        </launch-app>
        <launch-web type="read">
                <label>Launch Web</label>
                <desc>Ability to launch Web URLS.</desc>
        </launch-web>
    </my-tools>
</privilege>
```

My-Tools Folder directory groups the Launch Apps and Launch Web privileges



Reference a Privilege When Defining a Menu Item, Column, or Subview

When you create a menu item, column, or subview, you can use the <privilege> element to reference a custom privilege. Custom privileges are defined in the custom-privileges.xml file. For example, if you have defined the "launch-app" privilege in the custom-privileges.xml file, you can use the following XML when you define a menu item, column, or subview:

```
<privilege>
    <name>launch-app</name>
</privilege>
```

This XML associates the "launch-app" privilege with the menu item, column, or subview. The user must have an associated role that grants the launch-app privilege in order for the menu item, column, or subview to be displayed. If granted, the menu item is always enabled.

Note: For more information, see the *Administrator Guide*.

Chapter 10: XML Usage Common to All Customization Files

This section explains common XML elements and strategies that can be used across customization files.

This section contains the following topics:

About Parameters

You can use the <param> element in a number of different instances to reference parameter values within a OneClick XML file. Here are several common cases where you will likely use the <param> element.

- If you need to pass a parameter to a web page, use the <param> element as a child element of the <url> element. See Launch a Browser for an example.
- If you need to pass a parameter to an application, use the <param> element as a child element of the <launch-application> element. See Launch an Application From OneClick for an example.
- If you need to pass a parameter to a command, use the <param> element as a child element of the <command> element. See Launch a Browser, Launch an Application From OneClick, and Launch a Web Server Script.
- If you need to format a series of values, use the <param> element in conjunction with standard HTML formatting elements. See Define Model Icon Tooltips for an example.
- If you need to manipulate the value of an attribute, you may need to use the <param> element when accessing one of the renderers.

See Acquire Data Render a Value for information on what you can specify using the <param> tag.

More information:

Launch a Browser (see page 29)
Launch an Application From OneClick (see page 33)
Launch a Web Server Script (see page 36)
Define Model Icon Tooltips (see page 98)
Manipulate Attribute Output Using Renderers (see page 139)
Acquire Data—Render a Value (see page 138)

Acquire Data—Render a Value

Acquiring data from OneClick about a model type parameter that you then act on is a fundamental process in customizing the OneClick interface. A set of elements provide the ability to acquire or render data from OneClick. These elements or tags are used in acquiring data to display in a table column, a field-subview column, a <param> element for a menu item, and the <render> element in a <dynamic-renderer>, and are shown in the following table.

Element	Description
<attribute>	Used to specify a CA Spectrum attribute
<select>	Used to specify something based on the value of another attribute, parameter, etc. Used to select a value based on certain criteria being met. Very generally, <select> this <if>condition1, <select> that <if> condition2.
<expression>	Used to define an arithmetic expression.
<renderer>	Used to define or access any number of renderers that process raw data and refine into a specific format for presentation to the user.
<dynamic-renderer>	Specifies a renderer based on the value of an attribute criteria filter.
<message>	Used for specifying a plain text value for the column.

You can use any number and combination of these elements chained together, with the output from one element serving as the input to the next element in the chain. The <attribute> tag must be first in a chain of elements because it yields an attribute value and does not accept input. The <message> tag must be first in a chain of elements used to render a value. because it does not accept input.

More information:

Manipulate Attribute Output Using Renderers (see page 139)
Use a Select Case (see page 139)
About Expressions (see page 147)
About <dynamic-renderer> (see page 145)

Use a Select Case

If you want to conditionally display something in the OneClick interface, you may use the <select> and the <case> elements to create a decision structure similar to those used in many programming languages. Use the <select> and <case> elements as follows:

```
<select>
    <case>
        <expression>the expression to evaluate</expression>
        <yield>what to yield if the expression is true</yield>
    </case>
    <case>
        <expression>the expression to evaluate</expression>
        <yield>what to yield if the expression is true</yield>
    </case>
        .
        .
        .
    <default>what to yield if no matches are found</default>
</select>
```

Example: Image Definition File shows an example of the <select> and <case> elements used to select the image to be displayed on a OneClick device model icon depending on the model's condition.

More information:

Define Image Components (see page 84)

Manipulate Attribute Output Using Renderers

There are several built-in attribute renderers that you can use to manipulate how the attributes you have specified in a OneClick table are displayed. You use the <renderer> element to access one of these renderers. The text of the element must be a fully-qualified Java class name; each allowable Java class name is explained below.

Note: You will need some background in programming to fully understand the renderer concepts presented below.

You can pass parameters to a renderer using the <param> element. The text of the <param> element is the parameter value. A <param> element must have a name attribute that specifies the name of the parameter.

Example

The following example specifies the BooleanRenderer with parameter trueTag set to No and parameter falseTag set to Yes. Each renderer has a set of parameters, and each renderer is defined differently.

```
<renderer>
    <param name="trueTag">Enabled</param>
    <param name="falseTag">Disabled</param>
    com.aprisma.spectrum.app.util.render.BooleanRenderer
</renderer>
```

Boolean Renderer

The class name for the boolean renderer is com.aprisma.spectrum.app.util.render.BooleanRenderer. This renderer outputs an enumerated String for an input Boolean value. By default, "Yes" is rendered for TRUE and “No” is rendered for FALSE, but other elements or text may be specified via the following parameters:

- trueTag – the tag or text to render for TRUE
- falseTag - the tag or text to render for FALSE

The following example reverses the TRUE/FALSE output:

```
<renderer>
    <param name="trueTag">No</param>
    <param name="falseTag">Yes</param>
    com.aprisma.spectrum.app.util.render.BooleanRenderer
</renderer>
```

If the input value is TRUE, “No” is rendered and if FALSE, “Yes” is rendered.

Commented Text Renderer

The class name for the commented text renderer is com.aprisma.spectrum.app.util.render.CommentedTextRenderer. This renderer strips off the HTML-commented prefix that is added by some renderers (for example, DateRenderer). It searches for the first occurrence of the ending character sequence of an HTML comment, such as <!---comment text --->, and returns the rest of the string.

Date Renderer

The class name for the date renderer is com.aprisma.spectrum.app.util.render.DateRenderer. This renderer outputs a date and time using Java's DateFormat. If the input to the renderer is a long integer (for example, of type java.lang.Long), it is assumed to represent the date and time in milliseconds. If the input is any other numeric type, it is assumed to be an integer representing the date and time in seconds. Otherwise, the only other valid input type is java.util.Date. The output string is prefixed by the numeric date and time value enclosed in HTML comments (<!---comment text --->). An example output would be:

```
<!--1089808869000-->Jul 14, 2004 8:41:09 AM EDT
```

You use the numeric value prefix in the comments tag for sorting. Without the prefix, CA Spectrum would sort on the formatted date and time string, and this would not work correctly. Therefore, you should only use the DateRenderer in the <content> element section of a column. To strip off the prefix for display, use the CommentedTextRenderer in the <swing-cell-template> section. For example:

```
<content>
    <attribute>0x11620</attribute>
    <!—an attribute that contains an integer date/time in seconds >
    <renderer>
        com.aprisma.spectrum.app.util.render.DateRenderer
    </renderer>
</content>
<swing-cell-template>
    <text>
        <renderer>
                com.aprisma.spectrum.app.util.render.CommentedTextRenderer
        </renderer>
    </text>
</swing-cell-template>
```

Enumerated Attribute Renderer

Classname: com.aprisma.spectrum.app.util.render.EnumeratedAttrRenderer.

This renderer outputs an enumerated String for an attribute value. The renderer obtains the enumerations from the CA Spectrum database. You must specify the attribute ID via the "attrID" parameter. This renderer is most commonly preceded by an <attribute> element with the same attribute ID as the "attrID" parameter. The following sample XML renders the enumerated value for the Model_Class attribute (ID 0x11ee8):

```
<attribute>0x11ee8</attribute>
<renderer>
    <param name="attrID">0x11ee8</param>
    com.aprisma.spectrum.app.util.render.EnumeratedAttrRenderer
</renderer>
```

List Renderer

The classname for the list renderer is com.aprisma.spectrum.app.util.render.ListRenderer. This renderer outputs the components of a Java Collection or an array of any type as a comma-separated string.

Null Renderer

Classname: com.aprisma.spectrum.app.util.render.NullRenderer.

This renderer outputs a null input value as an empty string.

Object ID Renderer

This renderer outputs an object identifier (OID). The expected input value is type CsObjectID.

Classname: com.aprisma.spectrum.app.util.render.ObjectIDRenderer.

Supported parameters:

- term—an integer value that specifies the index of a particular term of the OID to render
- startTerm—an integer value that specifies the index of the first term of the OID to render
- endTerm—an integer value that specifies the index of the last term of the OID to render

The term indices start at 1. If you specify the startTerm without the endTerm, then the portion of the OID from the startTerm to the last term of the OID is rendered. If you specify the endTerm without the startTerm, then the portion of the OID from the first term to the endTerm is rendered.

The ObjectIDRenderer is most commonly used to render the row instance of a MIB table. You obtain the row instance via the getRowId() method in an <expression> element. You can then pass the result to the ObjectIDRenderer. For example, the following column renders the first term of the row instance:

```
<column>
    <name>com.aprisma.spectrum.app.topo.client.ifIndex</name>
    <content>
        <expression>getRowId()</expression>
        <renderer>
                <param name="term">1</param>
                com.aprisma.spectrum.app.util.render.ObjectIDRenderer
        </renderer>
    </content>
</column>
```

The following example renders terms 5 through 8:

```
<column>
    <name>com.aprisma.spectrum.app.topo.client.NetworkAddr</name>
    <content>
        <expression>getRowId()</expression>
        <renderer>
                <param name="startTerm">5</param>
                <param name="endTerm">8</param>
                com.aprisma.spectrum.app.util.render.ObjectIDRenderer
        </renderer>
    </content>
</column>
```

The following example combines an expression with the ObjectID renderer to enable you to display the last term of an OID value in a table:

```
<column>
    <name>com.aprisma.spectrum.app.topo.client.ifIndex</name>
    <content>
        <expression>
                ((com.aprisma.spectrum.global.CsObjectID)value()).get_sub_oid(
                ((com.aprisma.spectrum.global.CsObjectID)value()).get_term_count(
        ),
                ((com.aprisma.spectrum.global.CsObjectID)value()).get_term_count(
        ))
        </expression>
        <renderer>
                <param name="term">1</param>
                com.aprisma.spectrum.app.util.render.ObjectIDRenderer
        </renderer>
    </content>
</column>
```

Round Number Renderer

The classname for this renderer is com.aprisma.spectrum.app.util.render.RoundNumberRenderer. This renderer outputs a number rounded to the nearest 100th (or 2 decimal places).

System Up Time Renderer

This renderer outputs a numeric time value represented in one hundredths of a second. The time representation is used in MIB objects such as sysUpTime. The output is expressed in days, hours, and minutes (for example, 30 days 1 hr 55 min).

Classname: com.aprisma.spectrum.app.util.render.SysUpTimeRenderer

Byte Renderer

This renderer outputs an integer value in byte units (byte, KB, MB, GB, or TB).

Classname: com.aprisma.spectrum.app.util.render.ByteRenderer

Inet Address Renderer

This renders a MIB object of type InetAddress as defined in RFC-3291.

Classname: com.aprisma.spectrum.app.util.render.InetAddressRenderer

Supported parameters:

- addressAttrID - the ID of the InetAddress attribute
- type - the InetAddressType as defined in RFC-3291
- typeAttrID - the ID of an attribute used to obtain the InetAddressType

List Instance Renderer

Renders the value of a specific instance of a list-type attribute.

Classname: com.aprisma.spectrum.app.util.render.ListInstanceRenderer

Supported parameters:

- oid—the OID of the instance to render
- index—the index of the instance to render

You must specify either the oid or index parameter.

Simple Integer Renderer

Renders an integer value without using comma grouping; 123456 instead of 123,456. Use this to substitute an integer value in a URL used in a menu item where commas are not acceptable input.

Classname: com.aprisma.spectrum.app.util.render.SimpleIntegerRenderer

Type Prepended Inet Address Renderer

Renders a MIB object of type InetAddress as defined in RFC-4293 with the type added to the beginning of the address.

Classname: com.aprisma.spectrum.app.util.render.TypePrependedInetAddressRenderer

Supported parameter:

addressAttrID - the ID of the InetAddress attribute

About <dynamic-renderer>

Use the <dynamic-renderer> element to specify a renderer that depends on the value of an attribute criteria such as <model_class>, <model-type>, or other attribute criteria. You select an attribute ID as the key and specify one or more <dynamic-renderer> elements in the custom-app-config.xml file. Each <dynamic-renderer> element defines a criteria and the renderer to use if the criteria is satisfied.

The structure to use with <dynamic-renderer> is as follows:

```
<dynamic-renderer>
    <attribute><KEY_ATTRIBUTE_ID></attribute>
    CRITERIA
        <render>
        .
        .
        .
        </render>
    <default/>
</dynamic-renderer>
```

The following table describes the elements you can use with <dynamic-renderer>.

Element	Usage and Description
<attribute>	Specifies the <KEY_ATTRIBUTE_ID> used to bind or tie together a set of dynamic-renderers.
CRITERIA	Defines an attribute filter criteria used to determine which renderer is used based on the filter output.
<render>	Defines what to render.
<default>	Specifies the dynamic-renderer to use as the default when none of the other dynamic-renderer criteria are met.

Attribute Filter Criteria and <dynamic-renderer>

It is common to use <model-class> and <model-type> for attribute filter criteria. You can use any attribute and any set of complex attribute filters with any combination of nested “and” and “or” filters. The file <*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/common/schema/attributefilter.xsd contains the complete syntax for attribute filters.

Specify a Default <dynamic-renderer>

You define the default dynamic renderer for use when none of the conditions for using the <dynamic-renderer> specified in the CRITERIA statement are met. You can specify only one default dynamic-renderer per dynamic renderer set. Do not specify a filter criteria for the default.

Example: Using Attribute Filtering Criteria with <dynamic-renderer>

This example creates a column that displays an attribute based on the value of the model_type attribute. The attribute displayed for the model_type filter criteria conditions are shown in the following table.

Attribute to display...	if model_type is...
<attribute> 0xffff0000	<model-type> 0x12
<attribute> 0xffff0001	<model-type> 0x34 and 0x56
<attribute> 0xffff0002	for all other model types (default)

You must select one of the attributes specified in your filter criteria to be the key. This example uses 0xffff0002. Add the following <dynamic-renderer> elements to the custom-app-config.xml file:

```
<dynamic-renderer>
    <attribute>0xffff0002</attribute>
    <model-type>0x12</model-type>
    <render>
        <attribute>0xffff0000</attribute>
    </render>
</dynamic-renderer>
<dynamic-renderer>
    <attribute>0xffff0002</attribute>
    <or>
        <model-type>0x34</model-type>
        <model-type>0x56</model-type>
    </or>
    <render>
        <attribute>0xffff0001</attribute>
    </render>
</dynamic-renderer>
<dynamic-renderer>
    <attribute>0xffff0002</attribute>
    <render>
        <attribute>0xffff0002</attribute>
    </render>
    <default/>
</dynamic-renderer>
```

Example: Use a Key Attribute ID with <content>

This example creates a column specifying the <dynamic-renderer> element with the key attribute ID defined in the <content> element.

```
<column>
    <name>My Column</name>
    <content>
        <dynamic-renderer>0xffff0002</dynamic-renderer>
    </content>
</column>
```

More information:

Manipulate Attribute Output Using Renderers (see page 139)

About Expressions

When you are customizing the OneClick interface, there are several places where you may want to use an expression to display a calculated value. For example, you may want to display a calculated value in a table or subview. The section below explains how to use expressions to manipulate attribute information.

Note: Expressions are created using standard Java expressions. You must be familiar with Java code in order to implement the following instructions that create expressions in the OneClick XML files. If you are not familiar with Java code, you should refer to a Java reference before attempting to create expressions when customizing OneClick files.

Manipulate Attribute Information

The most common use of an expression is to manipulate attribute information. The attribute information available is dependent upon the OneClick context in which you are using the expression.

You can use the methods listed in the following table in the context of an expression to retrieve attribute information:

java.lang.Object	attr (int attrID)
boolean	attrBoolean (int attrID)
byte	attrByte (int attrID)
char	attrChar (int attrID)
double	attrDouble (int attrID)
float	attrFloat (int attrID)

java.lang.Object	attr (int attrID)
int	attrInt (int attrID)
long	attrLong (int attrID)
short	attrShort(int attrID)

The following example shows a column configuration that displays the contact person for a device. In this example, an expression displays the attribute 0x23000c (AttributeID.CONTACT_PERSON) if the attribute 0x10b5a (AttributeID.SYS_CONTACT) is null or has no value.

Example: Specifying a Contact for a Device Using an Expression

```
<column id="column-contact-config"
    xmlns ="http://www.aprisma.com"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.aprisma.com
    ../../common/schema/column-config.xsd">
    <name>Contact Person</name>
    <content>
        <expression>
                ( attr( AttributeID.SYS_CONTACT ) == null ||
                ((String)attr(AttributeID.SYS_CONTACT)).length() == 0) ?
                attr( AttributeID.CONTACT_PERSON ) : value()
        </expression>
    </content>
</column>
```

Another way to accomplish the same result is to use the attribute renderer to retrieve the SYS_CONTACT attribute value. You can then access the value returned using an expression that uses the value() method.

Example: Using Attribute Renderer to Retrieve Attribute Value

```
<column id="column-contact-config"
    xmlns ="http://www.aprisma.com"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.aprisma.com
    ../../common/schema/column-config.xsd">
    <name>Contact Person</name>
    <content>
        <attribute>AttributeID.SYS_CONTACT</attribute>
        <expression>
                (value() == null || ((String)value()).length() == 0) ?
                attr( AttributeID.CONTACT_PERSON ) : value()
        </expression>
    </content>
</column>
```

The two examples shown above produce the same value for the column.

Append Suffix to Values

Use an expression to append a suffix to values to increase readability of information displayed in tables.

Example

This example appends a “%” character to a value so that the value displays in a table as <value>%.

<expression>value().toString() + "%"</expression>

You can use this method to append a “%” character to a “percentage of disk space used” value, so that the value displays in a table as <percentage of disk spaced used>%, or 64%.

Precautions for Using Expressions

The following list describes major exceptions to the rules for standard Java code that are used to create OneClick expressions.

Comparison Operator

You cannot use the comparison operator, &&, due to restrictions on XML formatting. In place of && you must use &&.

Less Than, Greater Than Operators

You cannot use the less than (<) or greater than (>) operators. Instead, you must use < and > respectively.

Subtraction Expressions

OneClick processes subtraction expressions using non-standard associativity. Subtraction is done using a right-to-left associativity instead of the standard left-to-right associativity.

OneClick processes subtraction as follows:

A - B - C = A - (B - C)

compared with standard subtraction expression processing:

A - B - C = (A - B) - C

Reference XML Files

As you are customizing OneClick XML files, you may find it necessary to split a single XML file into two or more XML files for the following reasons:

- Some XML files are so complex that they become unreadable. In this case breaking the XML file down into two or more files assists you in keeping your code organized and making it readable and editable in the future.
- You may want to reuse certain sections of XML code. Putting this XML code in a separate file allows you to reference it from multiple files instead of copying and pasting it into new files, or new sections of the same file.

Use the standard XML id and idref attributes to label and reference the split up code.

Note: For information on XML standards, including id and idref, see www.w3.org.

Reference Images

You may need to reference image files from within your XML. When you reference image files in either the factory *<$SPECROOT>*/tomcat/webapps/spectrum/images directory or the custom *<$SPECROOT>*/custom/images directory, express the path starting from the images directory, for example, images/myimage.png. See Example: Icon Configuration File for an example.

You must place all image files that you add or customize in the *<$SPECROOT>*/custom/images directory. Otherwise, all new or customized images you add will be deleted or overwritten during a CA Spectrum or OneClick upgrade or reinstallation.

More information:

Define Image Components (see page 84)

Verify User Input Using Verifiers

You can verify user input by specifying a verifier class along with the <editable> element before committing the change. If the input is invalid, an error message is displayed. The verifiers available are described in the following section.

Specify the <verifier> element inside the <editable> element. Inside the <verifier>, you specify a verifier Java class and optional parameters to pass to the verifier class.

Example: Using Verifiers

This verifies the input value is from 0-100, inclusive.

```
<editable>
    <verifier>
        <class>
                com.aprisma.spectrum.app.swing.widget.IntegerContainedInRangeInpu
        tVerifier
        </class>
        <param name="lowValue">0</param>
        <param name="upperValue">100</param>
    </verifier>
</editable>
```

OneClick Input Verifiers

IntegerContainedInRangeInputVerifier

Description: Verifies the input is an integer value within a specified range.

Class:com.aprisma.spectrum.app.swing.widget.IntegerContainedInRangeInputVerifier

Parameters:

- lowValue - the lower bound of the range
- upperValue - the upper bound of the range

AttrIDInputVerifier

Description: Verifies the user input is a valid attribute.

Class: com.aprisma.spectrum.app.swing.widget.AttrIDInputVerifier

DoubleInputVerifier

Description: Verifies the user input is a valid real number.

Class: com.aprisma.spectrum.app.swing.widget.DoubleInputVerifier

IPAddressInputVerifier

Description: Verifies the user input is a valid IP address.

Class: com.aprisma.spectrum.app.swing.widget.IPAddressInputVerifier

IntegerInputVerifier

Description: Verifies the user input is a valid integer.

Class: com.aprisma.spectrum.app.swing.widget.IntegerInputVerifier

LongInputVerifier

Description: Verifies the user input is a valid long integer.

Class: com.aprisma.spectrum.app.swing.widget.LongInputVerifier

MACAddressInputVerifier

Description: Verifies the user input is a valid MAC address.

Class: com.aprisma.spectrum.app.swing.widget.MACAddressInputVerifier

NonEmptyStringInputVerifier

Description: Verifies the user input is a non-empty string.

Class: com.aprisma.spectrum.app.swing.widget.NonEmptyStringInputVerifier

UnsignedIntInputVerifier

Description: Default verifier for all integer attributes; verifies the user input is an unsigned integer.

Class: com.aprisma.spectrum.app.swing.widget.UnsignedIntInputVerifier

Chapter 11: Customizing OneClick for CA Service Desk

For a CA Spectrum and CA Service Desk integration, you can modify the behavior of finding and creating Service Desk assets from OneClick. This customization is done by changing the attribute mapping between CA Spectrum models and Service Desk assets. Customizing asset reporting lets you prioritize the information used to identify a device and determine which information to record within Service Desk. How information is recorded in Service Desk can enhance the user's efficiency and reporting capabilities to best suit your organization.

Note: For more information about customizing asset reporting for CA Service Desk, see the *CA Spectrum and CA Service Desk Integration Guide*.

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