4D Pop: Developer Components

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Abstract

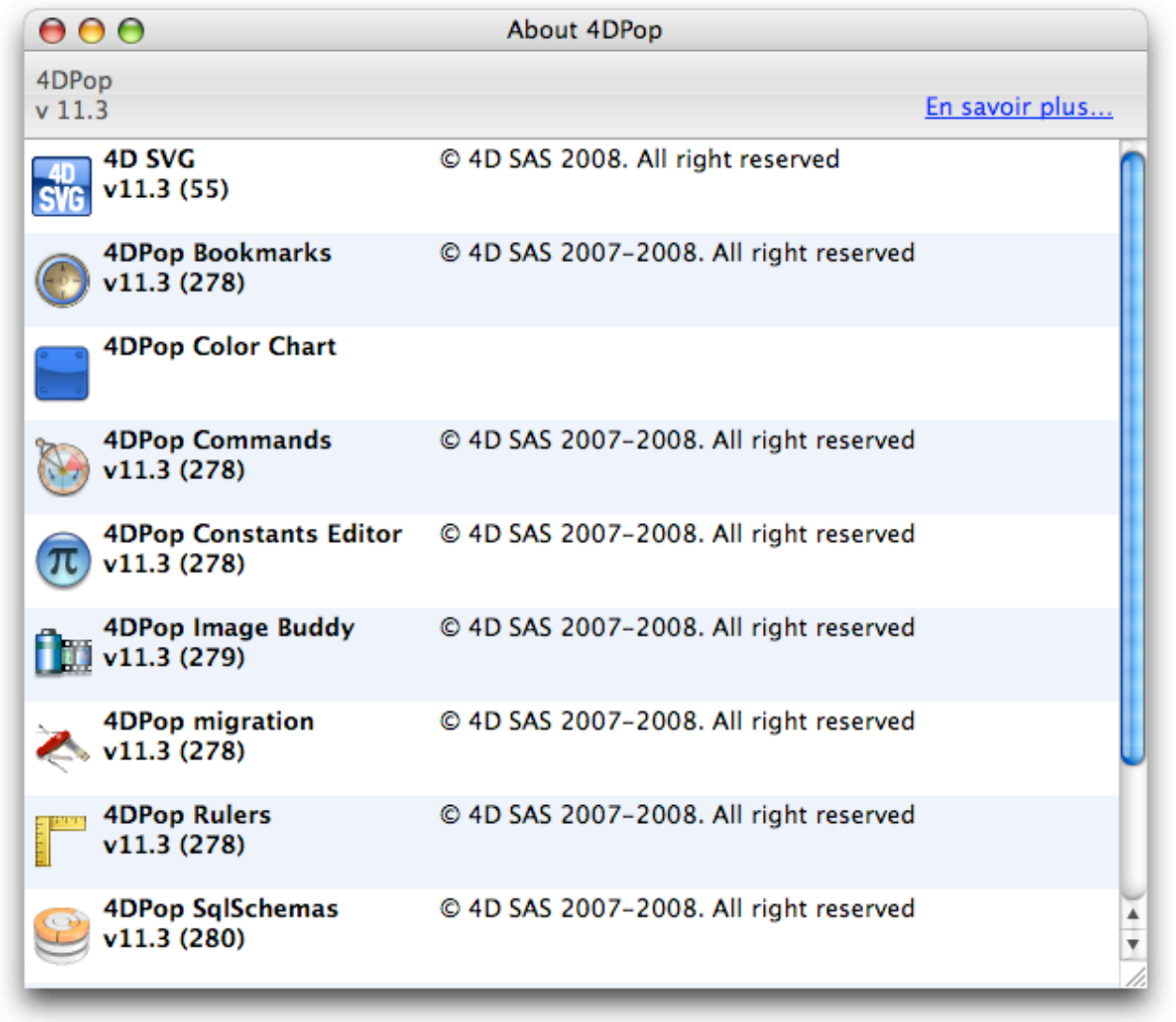
4D v11 SQL introduced enhancements to the component architecture which opens up new possibilities for developers. One of those new possibilities is the idea of a developer component, created to help with the development process. This is where 4D Pop comes in. 4D Pop is a series of productivity components that were created to help with the development process. This Tech Note covers what 4D Pop is and provides details on the different components within 4D Pop.

Introduction

Changes to the component architecture in 4D v11 SQL has made it easier to create and install components. Among other things, this more streamlined process opened up the possibility of easily creating components that are designed specifically for developers. In a nutshell, 4D Pop was created to help developers develop.

4D Pop is a series of components. The 4D Pop component provides a palette window that is displayed in Design mode. Once installed, other 4D Pop components (or compatible components) can be added to the palette window. These components are designed to perform a variety of development related tasks; ranging from simple tasks like providing a bookmarks list, creating custom colors, and navigating the design windows, to more complex tasks like managing Schemas, creating XLIFF files, and migrating constants and macros.

Note *This Tech Note uses 4D Pop v11.3 (Note the specific build numbers in the screenshot below). The 4D Pop components are all open source and updates are made on a consistent basis. So while the basic functionality of the components will not change, there could be minor differences and added features in subsequent versions.*



Downloading 4D Pop

4D Pop can be downloaded when installing 4D v11 SQL (11.3 or higher) or from the following locations:

4D Website - http://www.4d.com/products/4dpop.html

4D Pop forum - http://forums.4d.fr

The 4D Pop forum is also a great resource for getting information about 4D Pop, sharing your own components, finding out about new components, getting updated components, and interacting with the 4D developer community.

Installation and Basics

Installing 4D Pop palette

To install the 4D Pop component:

- Create a folder next to the structure file of your database and name it "Components"
- Put the 4DPop.4dbase folder in the "Components" folder
- Open the database
- Place the following code in the database method "On Startup"

```
If (Not(Is compiled mode))
  ARRAY TEXT($tTxt_Components;0)
  COMPONENT LIST($tTxt_Components)
  If (Find in array($tTxt_Components;"4DPop")>0)
    EXECUTE METHOD("4DPop_Palette")
  End if
End if
```

Note *A macro has been created to insert this code. Simply type "Install 4DPop" and hit the Tab key.*

- Reopen the database.

At this point the 4D Pop palette window will be displayed when you are in Design Mode.

It is important to note that the 4D Pop component is not required to use the other 4D Pop components. All the 4D Pop (non-3rd party) components have methods that bring up the necessary windows to use the particular component. This allows the developer to decide how the components will be called. A developer can bring the windows up by running a method, or they can build their own interface.

Once installed, the palette window will be displayed in Design Mode.

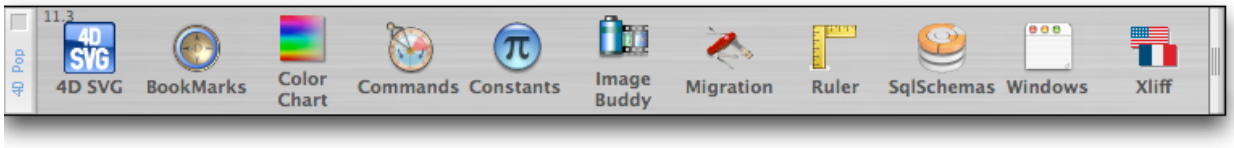
Adding components

After the palette has been installed, compatible components (see next section) can be added two ways:

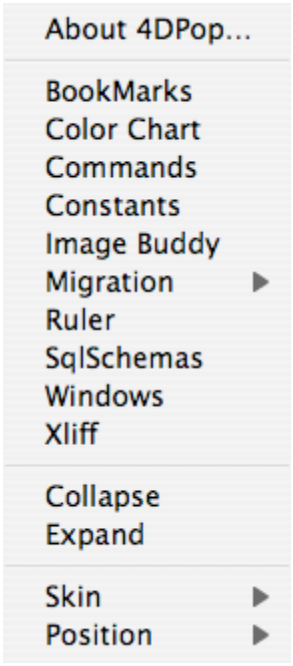
- Placing the component in the "Components" folder and then restarting the database.

- Dragging the component onto the palette opens a wizard to install the component.

As other 4D Pop (or compatible) components are installed, they will be displayed in the palette window.



The components and a few other 4D Pop features are available from the 4D Pop menu, which is accessed by right-clicking on the 4D Pop title bar.



Compatible components

For a component to be compatible with the 4D Pop palette, it must include the file "4DPop.xml" in its "Extras" folder. This file defines the interaction with the component when it is in the palette window.

Here is an example of the contents of this file:

```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<tools name="Constants" picture="4DPop.png">
    <tool method="Constant_Editor"/>
</tools>
```

The <tools> tag is the main XML tag of the file and is mandatory. This tag can have the following attributes:

- name – the name to be displayed in the palette window for the component (mandatory)
- picture – name of the file to be used in the palette window for the component (must be located at the root of the components "Resources" folder)
- helptip – the text of the help tip for the component
- initproc – component method to be run when the palette is loaded
- ondrop – component method to be run when something is dropped on the component
- default – component method run upon a single click
- popup – display the pop-up arrow for the component (True or False)

The <tool> tag is included within the <tools> tag and it defines what happens when the component is clicked. Also, there can be multiple <tool> tags. This tag can have the following attributes:

- name – name of the component to be used in the menu for the button (mandatory if there is more than one <tool> tag)
- method – component method to be run when clicked (mandatory)
- picture - the picture file for the menu item (must be located at the root of the components "Resources" folder)

Here is an example of a "4DPop.xml" file with multiple <tool> tags:

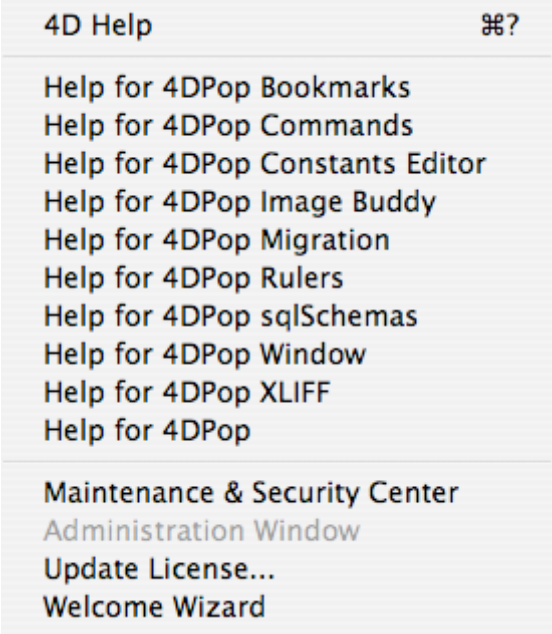
```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<tools name="Migration" picture="Tool.png" ondrop="Tool_ON_DROP">
   <tool name="ShortcutEditor" method="Edit_Shortcut" picture="Keyboard.png"/>
   <tool name="MigrateConstants" method="Migration_Constant"
picture="Constant.png"/>
   <tool name="MigrateMacros" method="Migration_Macros" picture="macros.png"/>
</tools>
```

Regarding the methods included in this XML file:

- The methods must be shared (Meaning the method property "Shared by components and host database" must be checked).
- The methods must begin with **C_Pointer**($1) because 4D Pop sends a pointer to the button in the palette (which is useful for drag & drop or the positioning of a menu).

Help page

Lastly, once a component is installed, a help page can be added by creating an html file with the same name, for example "MyComponent.html", and placing the file next to the component's structure file. The help page will then be accessible from the Help menu and can also be accessed by holding down ALT/Option while clicking on the component in the pallet window. Most 4D Pop components distributed by 4D come with an html Help page.



Client/Server

The 4D Pop components can also be used from any 4D Client accessing a 4D Server, but components can not be added from 4D Client. The components 4D Pop XLIFF and 4D Pop Image Buddy manage local resources, but upon saving any changes, they will be sent to the server, which will in turn push the update to the clients.

Deployment

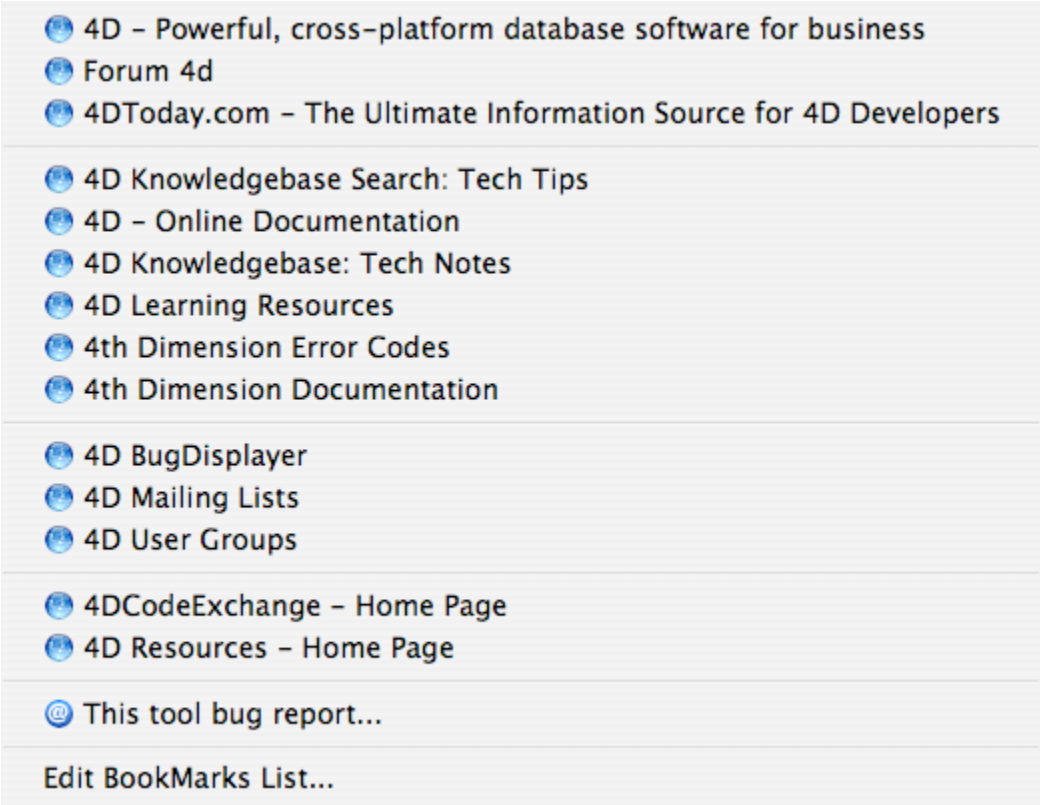
The 4D Pop components were designed to be used as development tools. Typically, these components will not be included in the final application that is deployed to an end user. The functionality of the components is generally not relevant outside of the development environment. Certain features, however, may be useful in a deployed application. When building a merged application, you can uncheck all 4D Pop components in the build application dialog, and they will not be included in resulting application.

4D Pop Components: Created by 4D

The following components were all created by 4D and are provided free of charge. The download includes the prebuilt compiled components and the interpreted versions of the components. This section describes how to use each component's features.

Bookmarks

4D Pop Bookmarks provides a bookmark list within the development environment. Clicking on the Bookmarks icon in the palette brings up the following menu:



Depending on the content of the bookmark, selecting it performs one of three tasks:

- **Open a website** – Opens the bookmark URL with the default browser
- **Send an email** – Creates a new email with the default email client, addressed to the email address specified in the bookmark
- **Open a local file** – Opens the local file with the default application for that file type (Mac OS only)

This list is customized using the "Edit BookMarks List…" option, which brings up the following dialog:

A bookmark can be added by:

- Double-clicking on an empty line and manually typing in the Bookmark and URL.
- Dragging the URL onto this Edit dialog, from a browser or from any text area.
- Dragging a local file onto this Edit dialog.
- Dragging a URL, file, or folder onto the 4D Pop Bookmark button in the palette. This adds the new bookmark to the end of the list.

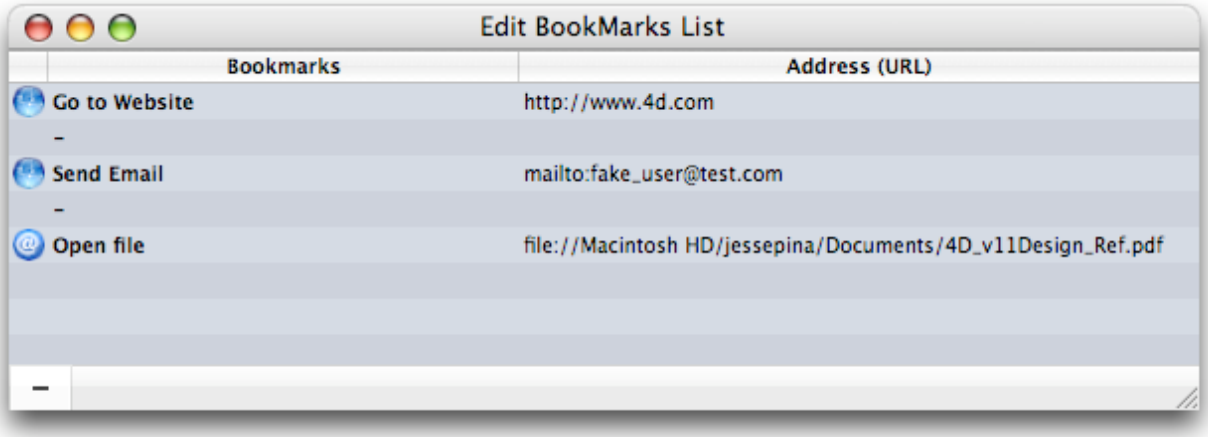
To delete a bookmark, simply select it and click on the icon in the bottom left corner.

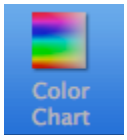
To rearrange the bookmarks list, simply select a bookmark and drag it to the desired location.

As mentioned previously, the Bookmarks can be either a web URL, a path to a local file, or an email link. Here is the syntax for the 3 different options:

- **Open a website** – URL (adhering to the OS requirements)
- **Send an email** – mailto: recipient email address
- **Open a local file** – file://path_name_to_file

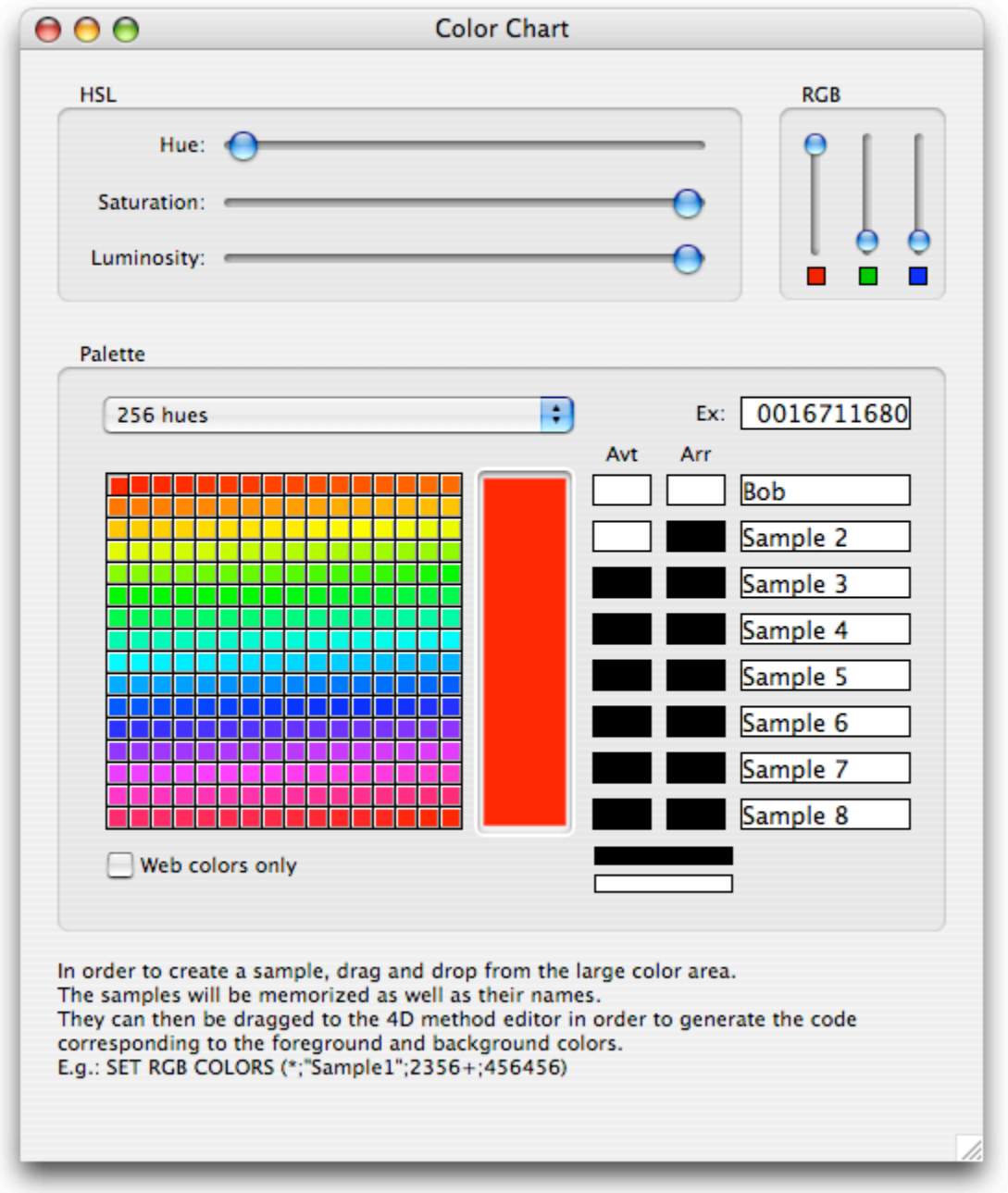
Here are examples of each's syntax:





Color Chart

4D Pop Color Chart helps you choose background and foreground colors. It provides a window to facilitate creating a wide range of colors and generates the appropriate code that can be dropped into methods. The 4D Pop Color Chart component consists of a single window:



The main item in the Color Chart window is a color grid that displays the 256 colors which are available based on the HSL group settings, the RGB group settings, and by the filter just above the grid.

HSL

The terms in the HSL group may be new for some developers, so here are their definitions, just in case.

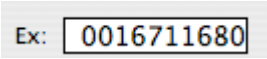
Hue - A gradation or variety of a color.

Saturation - Vividness of hue; degree of difference from a gray of the same lightness or brightness.

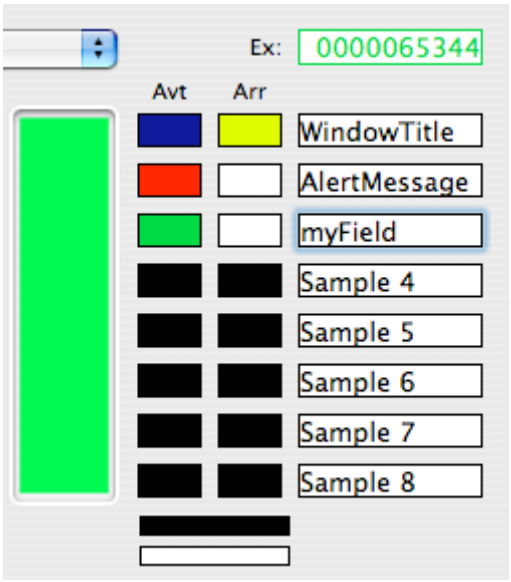
Luminosity – The quality or state of being luminous. (AKA brightness)

Next to the color grid is a large box that displays the selected color. This box is used in inserting the actual command into a method.

Also, when a color is chosen, the number for that color will be displayed in the "Ex." text box on the right side of the window. This is handy if you already have the code written and all you need is the number for a specific color.



Also, since more then likely an object will not have the same foreground and background color, this component allows for the creation of both colors. The next area of the window is used to create foreground and background combinations and for specifying object names to be used.



The "Avt' column holds the foreground color, the "Arr" column holds the background color and the object name can be specified in the right text box. To add a color, simply drag the color from the big box onto one of the "Avt" or "Arr" cells. Also, since black and white are commonly used in foregrounds and backgrounds, they are included underneath the 2 columns, so they can be used quickly without having to find them in the grid.

Instructions

Insert color where background and foreground are the same:

- Display the desired range of colors in the color grid by adjusting the HSL settings, the RGB settings, and the filter.
- Select a color from the color grid.
- Click on the large box and drag it onto the appropriate method.

This will insert the **SET RGB COLORS** command with that color set as the foreground and background colors. Here is an example:

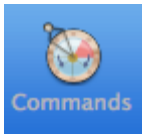
```
SET RGB COLORS(*;"objectname";16411680;16711680)
```

Insert color where background and foreground are different:

- Select a color and drag it onto the box in the "Avt" column. This will be the background color.
- Select a color and drag it onto the box in the 'Arr' column. This will be the foreground color.
- Enter the object name in the text box (optional).
- Click on either box and drag it onto the appropriate method.

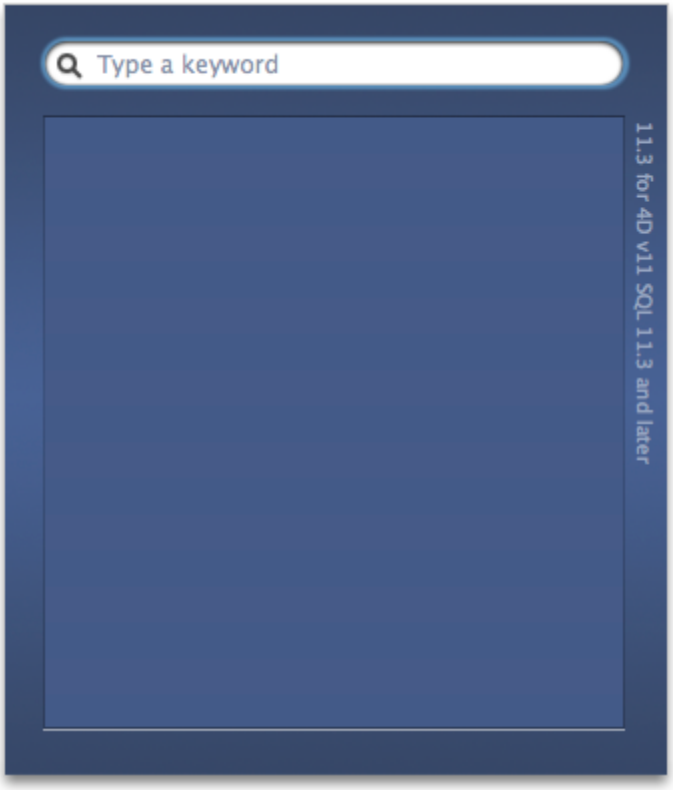
The command inserted into the method will have the foreground color set, the background color set, and the object name set.

```
SET RGB COLORS(*;"WindowTitle";786570;14286592)
```



Commands

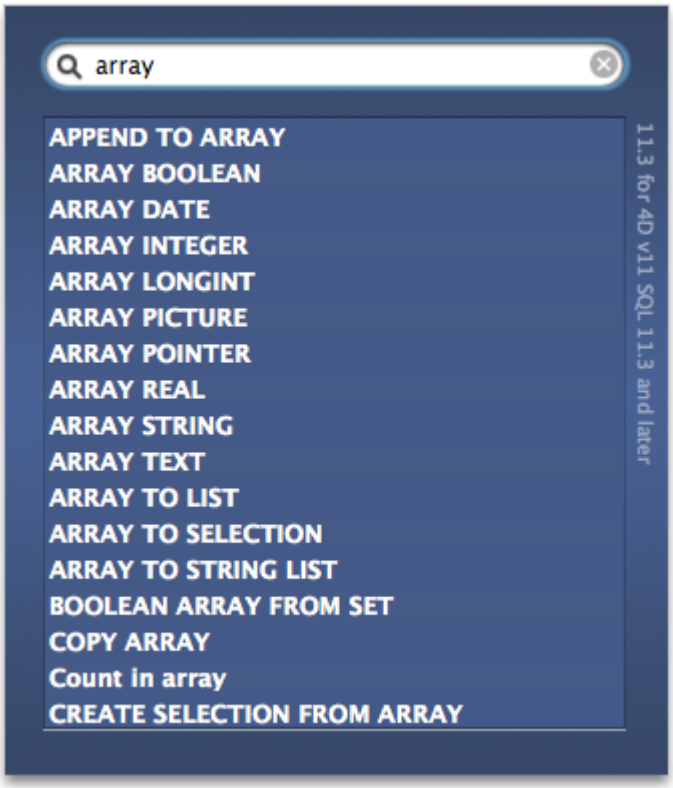
4Pop Commands helps you find and insert 4D commands quickly. It also provides easy access to the online documentation. The 4D Pop Commands component consists of a single window:



To find a command simply type a keyword or phrase into the search window. The component will return

- all commands that start with the keyword or phrase, and
- all commands that contain the keyword or phrase

For example, here are the results from typing in the keyword “array”:

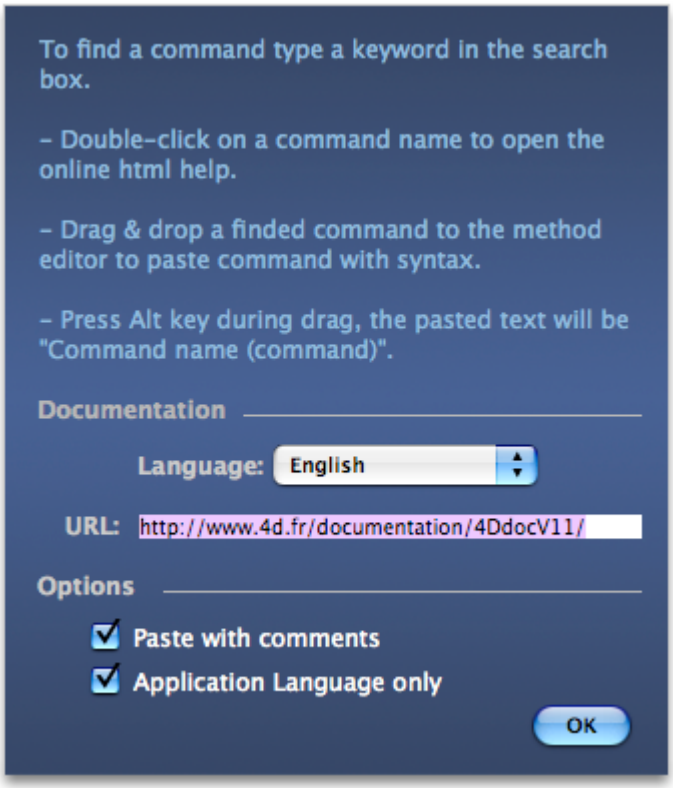


If there are more results then can fit in the window, you can use the up and down arrows to scroll through the list.

Once a command is listed in the window, 3 things can be done:

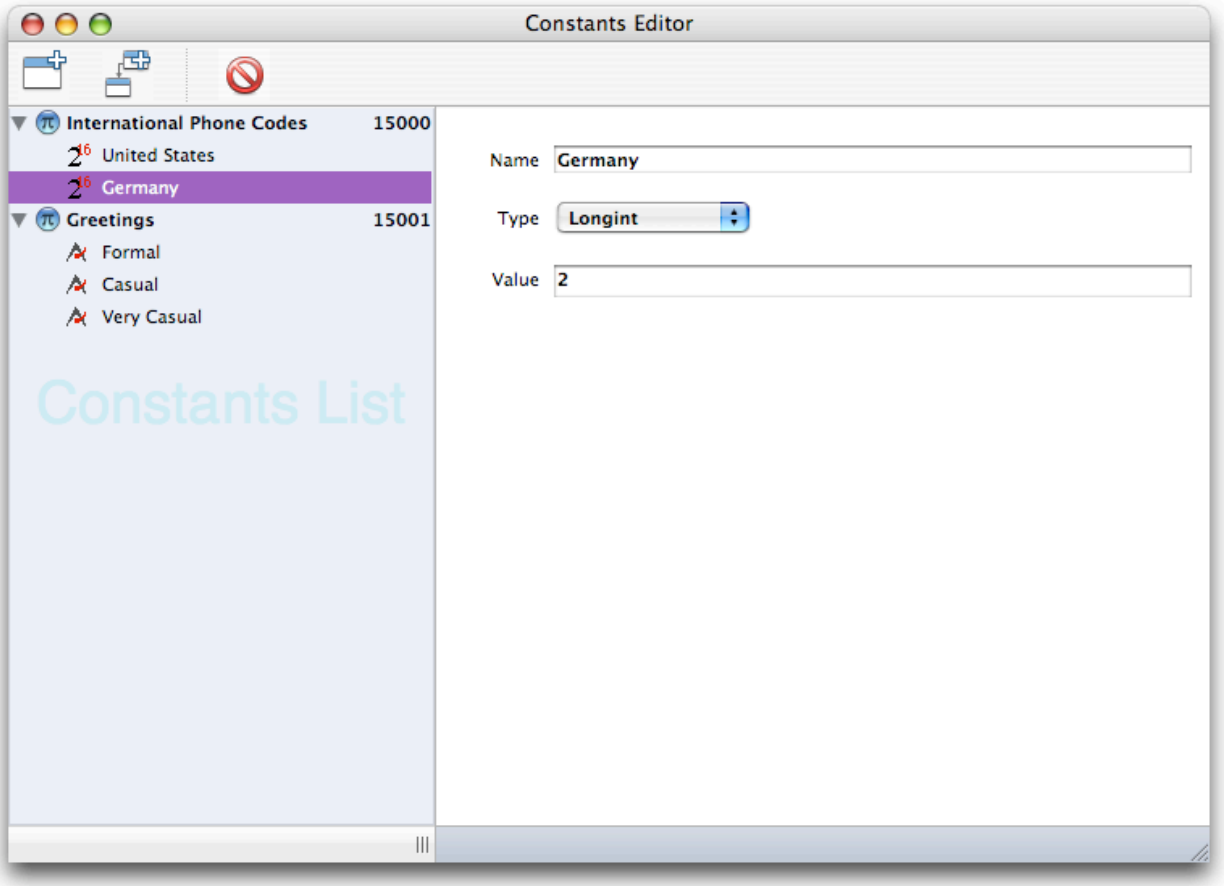
- Go to the online documentation by double-clicking on the command.
- Insert the command in a method by dragging the command onto the method. By default, the command will be inserted along with the parameter descriptions, but this can be turned off in the preferences for this component.
- Insert the command **Command name** with the parameter being the number of the chosen command.

The "*i*" button in the top right corner will display the help window for this component, as well as a few preferences that can be set.



Constants Editor

4D Pop Constants Editor helps to create and modify Constants. The 4D Pop Constants Editor consists of a single window:

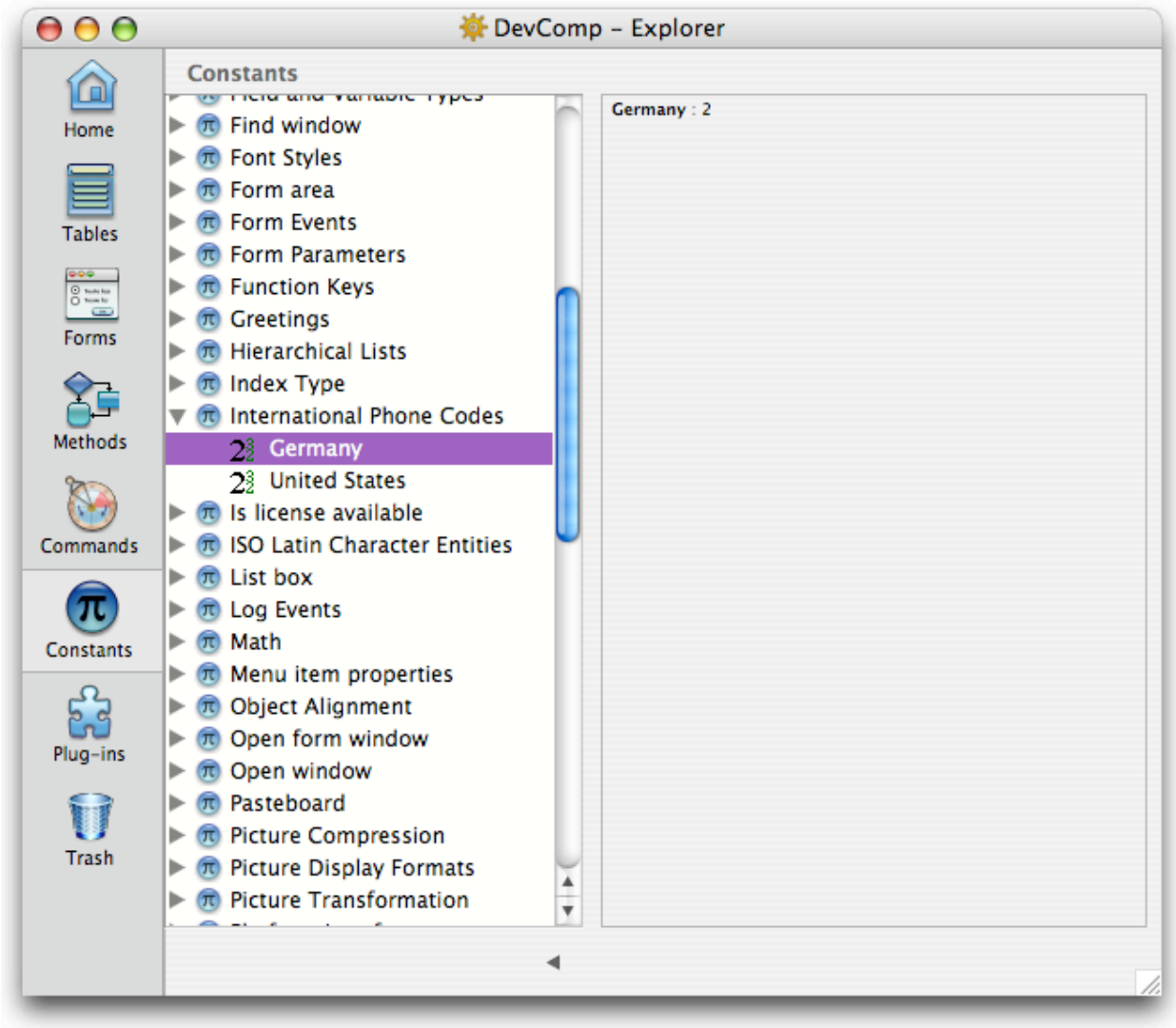


From within this window you can:

- Create a new theme
- Add/modify/delete constants within a theme
- Load constants from an existing resource file

All these features are made available from either the File menu or the toolbar. When the constants are saved, the package "User Constants.bundle" is created and saved within the Plugins folder of the Host database.

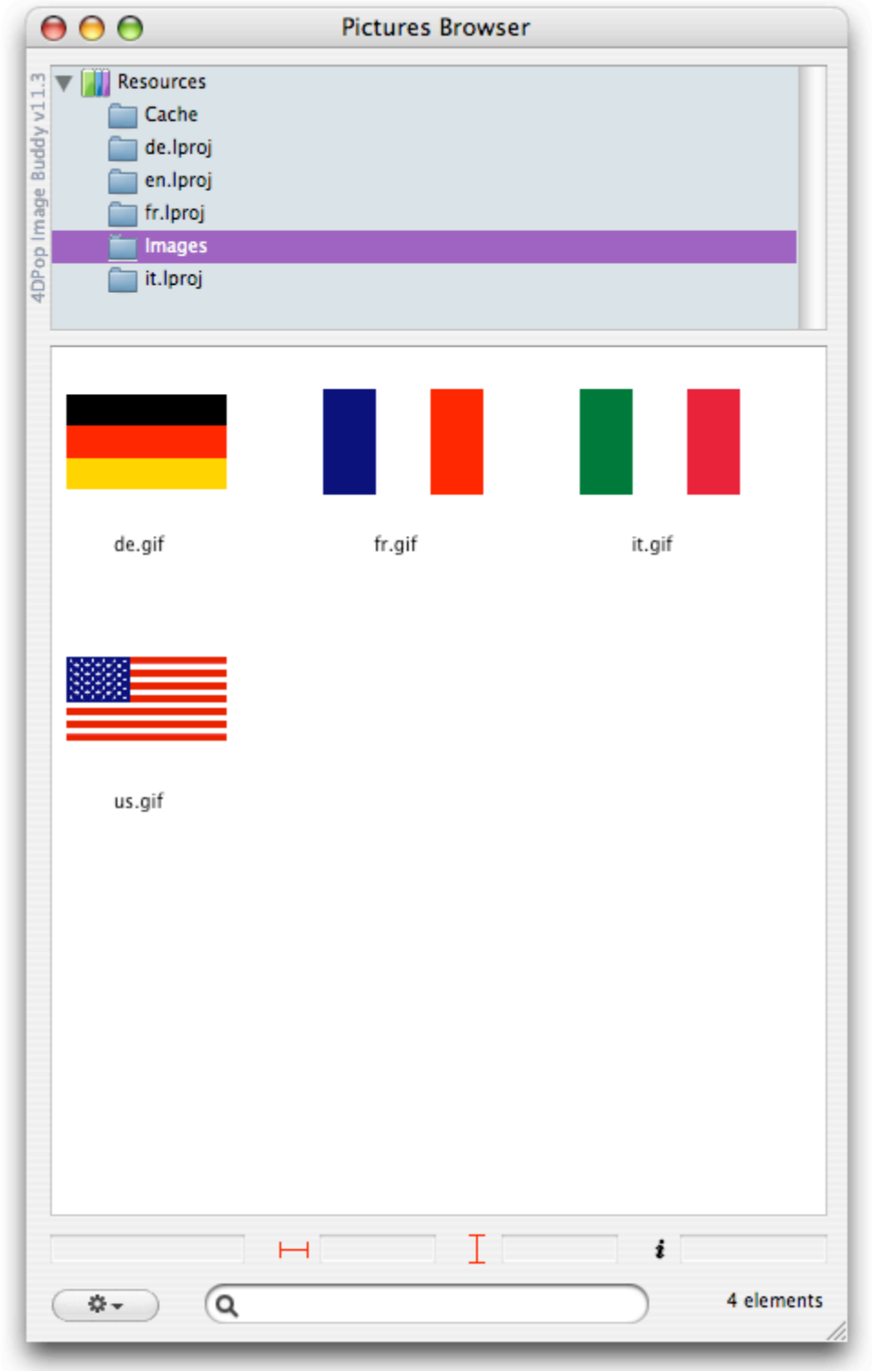
After creating the constants from this component, they will be viewable in the Constants tab of the Explorer and they will be usable within the method editor



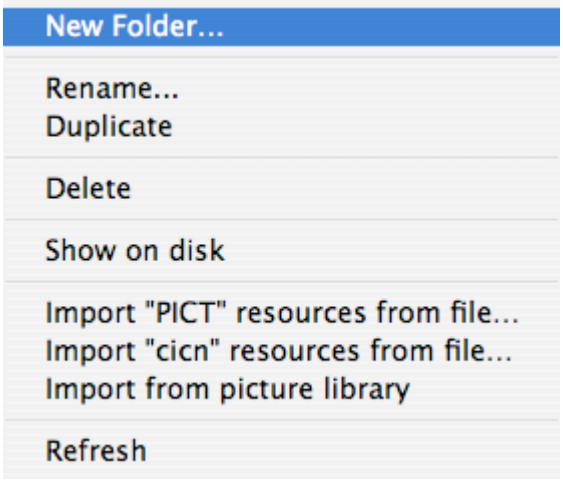
Note *Constants are loaded when a database starts up. So when adding constants, the database needs to be restarted before the constants can be used.*

Image Buddy

4D Pop Image Buddy helps manage the images in a databases Resources folder, similar to the Resources Explorer in the Toolbox. Also, Image Buddy can be used to import image resources and can perform limited transformations of images. Image Buddy consists of 2 windows. Here is the main window (AKA the Pictures Browser):

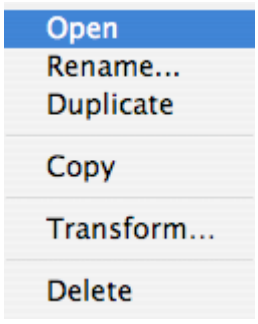


The top portion displays the folder hierarchy of the Resources Folder. Using the contextual menu within this area, the following actions can be performed:



- New Folder – Creates a new folder in the Resources Folder
- Rename – Renames the folder.
- Duplicate – Creates a new copy of the selected folder and all its contents and places it in the resources folder.
- Delete – Deletes the selected folder and its contents.
- Show on disk – Displays the folder's contents in a new Finder window/system window.
- Import (These import items are covered below.)
- Refresh – The Picture Browser does not automatically update the display. So in the case where the Picture Browser is open in 4D at the same time image files are being moved/updated/deleted within the file system, the Refresh option will need to be used to update the display.

The middle portion displays all images in the selected folder. When an image is selected, directly underneath the window, the file details are displayed; file name, width and height (in pixels), and file size. Using the contextual menu within this section allows you to do the following:



- Open – Opens the selected file with the default application that had been specified within the operating system to open files of the specified type.
- Rename – Renames the file. File extensions cannot be modified using this feature.
- Copy – Places the image in the Pasteboard. To be used either in 4D or outside of 4D.

- Transform –Opens the file up in the Transform window. See below for details.
- Delete – Deletes the selected file.

Transform Window

This window allows developers to make a few changes to images, including:

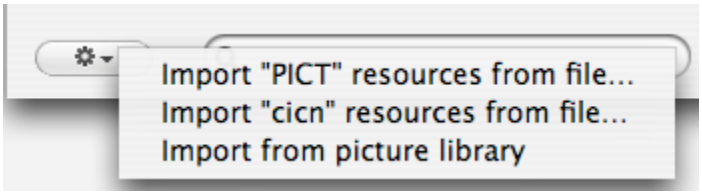
- Flipping the image horizontally
- Flipping the image vertically
- Changing the image to use the grey scale
- Scaling the image to a certain ratio

The changes are not saved until the "Transform" button is clicked.

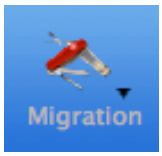
Going back to the Picture Browser window, the bottom portion consists of 2 items: a search field and an import menu.

The search field searches the entire Resources folder.

The import menu imports pictures from a picture library, a "PICT" resource from a resources file, or a "cicn" resource from a resources file. The images are imported as .PNG files.

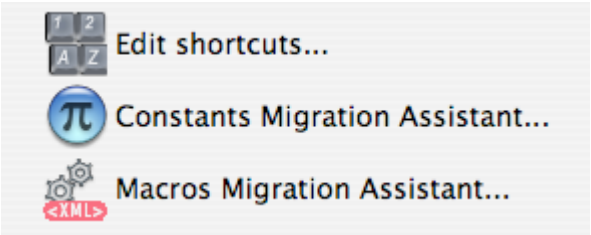


Lastly, the Picture Browser also supports drag-and-drop. Images can be dragged onto the Picture Browser from within 4D and from outside of 4D. Images can be dragged from the Picture Browser to another window within 4D, or outside of 4D.



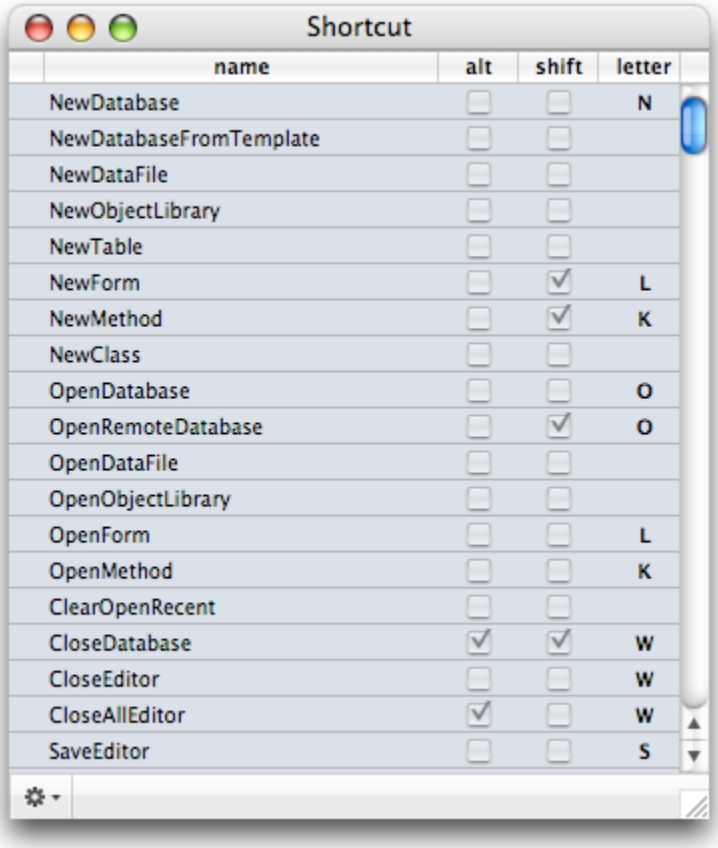
Migration

4D Pop Migration assists with migrating databases to 4D v11 SQL by migrating Macros and Constants. This component also allows you to Edit Shortcuts of the 4D application itself. When you click on this component from the palette, it gives you three options:

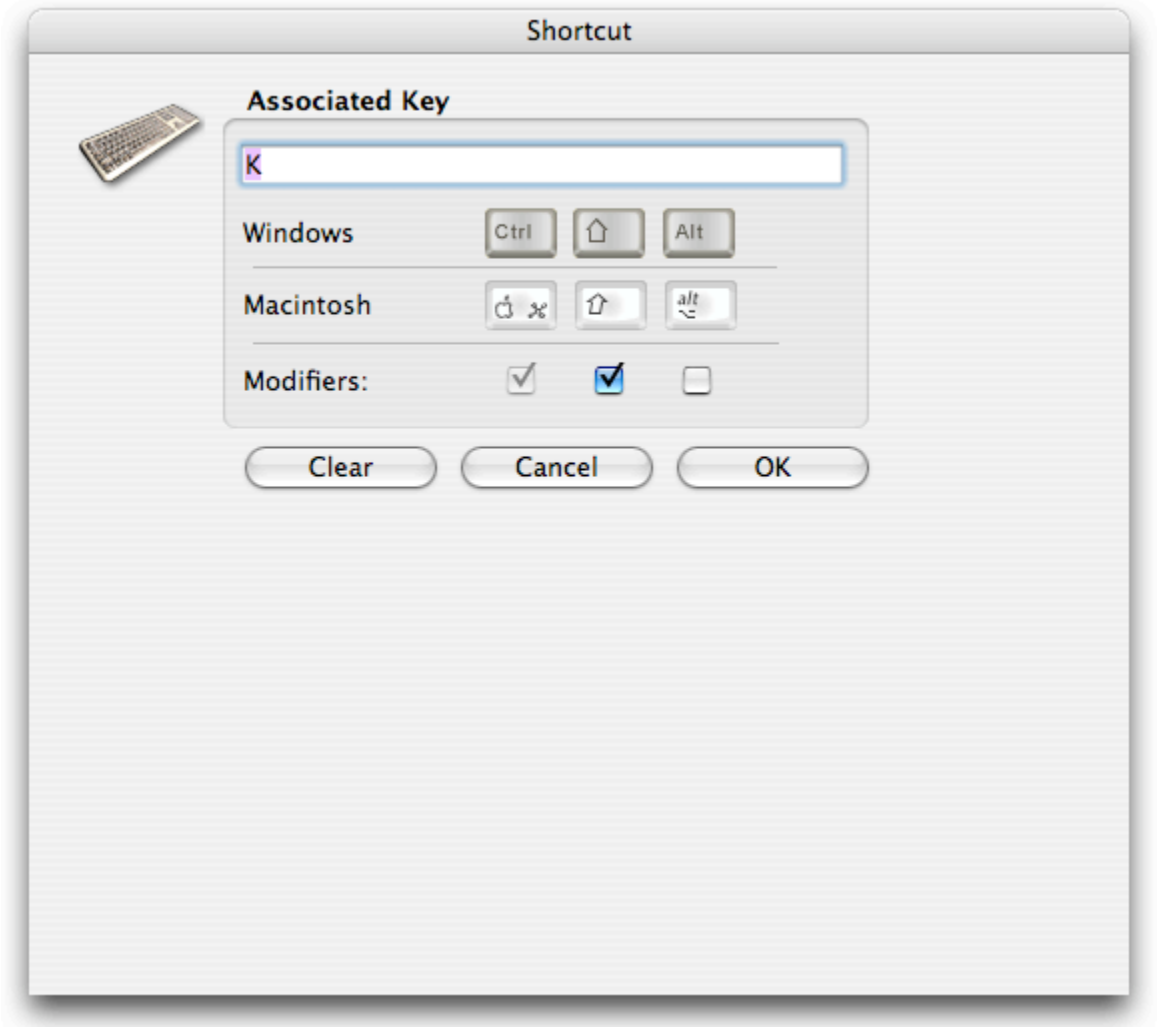


Edit Shortcuts

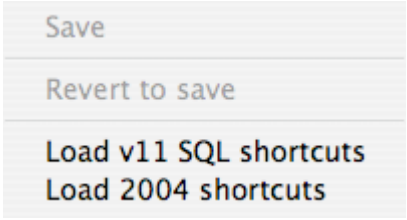
Using this option brings up the Shortcut window which lists all active shortcuts:



To change either the letter or the key combination for any of the shortcuts listed, simply double-click on the shortcut to bring up the editor:



Also at the bottom of the Shortcut window, there is a menu with a few additional options.



save – saves the changes you've made

revert to save – undoes all changes made since the last save

Load v11 SQL shortcuts – This will restore the shortcuts to the default settings that are set when 4D v11 SQL is first installed.

Load 2004 shortcuts – This will restore the shortcuts to the default settings that are set when 4D 2004 is first installed.

All changes made are saved to the "4DShortcuts.xml" file located in the user preferences folder, which is at the following location:

Windows Vista

C:\Users\user_name\AppData\Roaming\4D

Windows XP

C:\Documents and settings\user_name\Application Data\4D

Mac OS X

Macintosh HD/users/username/library/Preferences/4D

Constants Migration Assistant

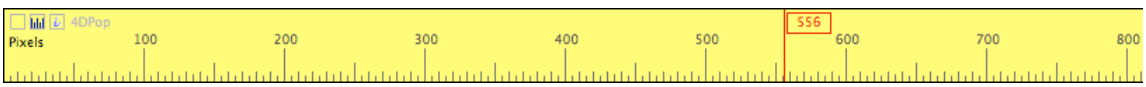
The Constants Migration Assistant converts "4DK#" resources to an empty plug-in, which is where constants need to be stored in 4D v11 SQL. The assistant guides you through the process step-by-step and explains what it is doing.

Macros Migration Assistant

The Macros Migration Assistant checks the macros files in the Macros v2 folder of the active 4D folder (you can get this folder by executing the following command: **Get 4D folder**(Active 4D Folder)). As with the Constants Assistant, the Macros Assistant guides you through the process step-by-step and details what is happening.

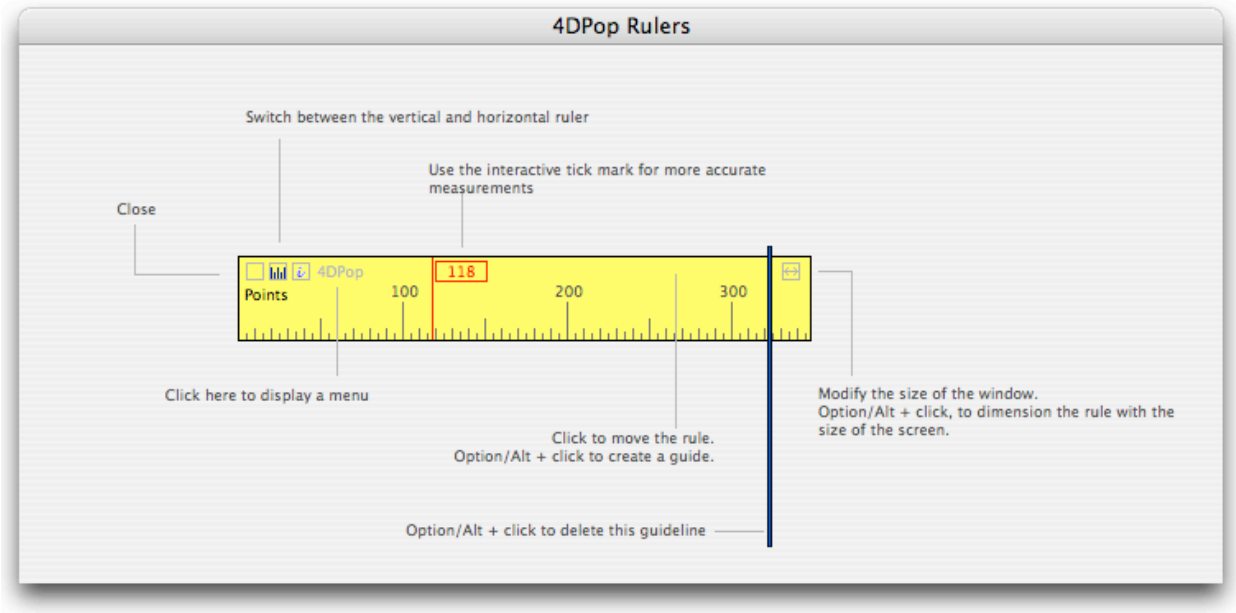
Rulers

4D Pop Rulers assists with the development of forms by providing a ruler and guides that help to make precise measurements. The main item in 4D Pop Rulers is the ruler, whose scale is in pixels:

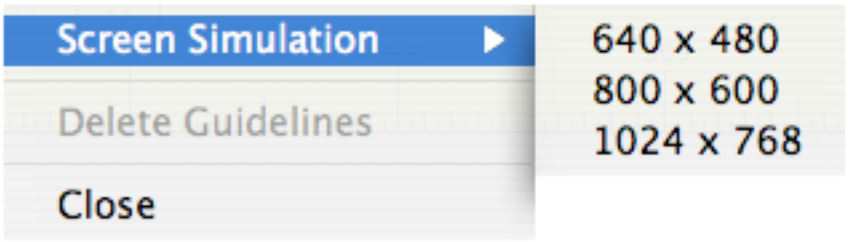


The ruler can be resized, moved, and flipped to be vertical.

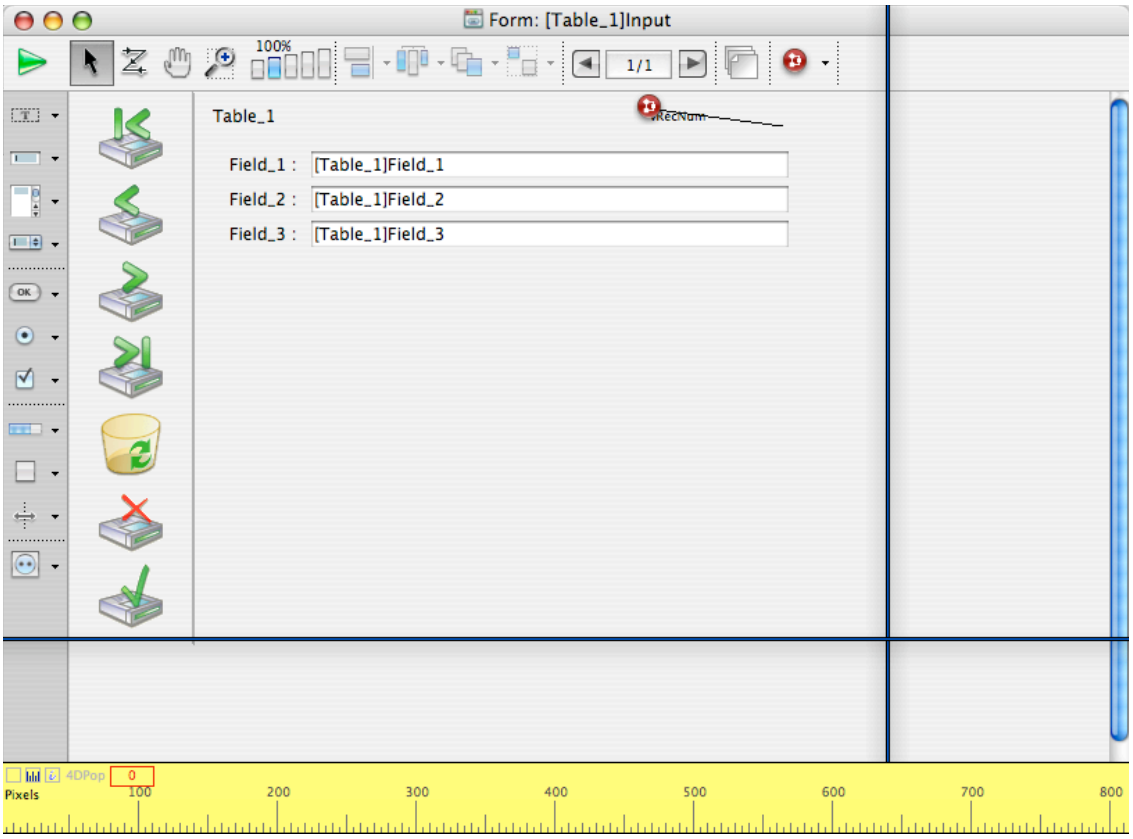
Clicking on the information icon  brings up a help window that covers the features available:



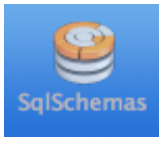
Clicking on the 4D Pop icon  brings up the following menu:



Selecting a Screen Simulation option displays guidelines at the pixel limit of the chosen screen resolution. Here is an example.

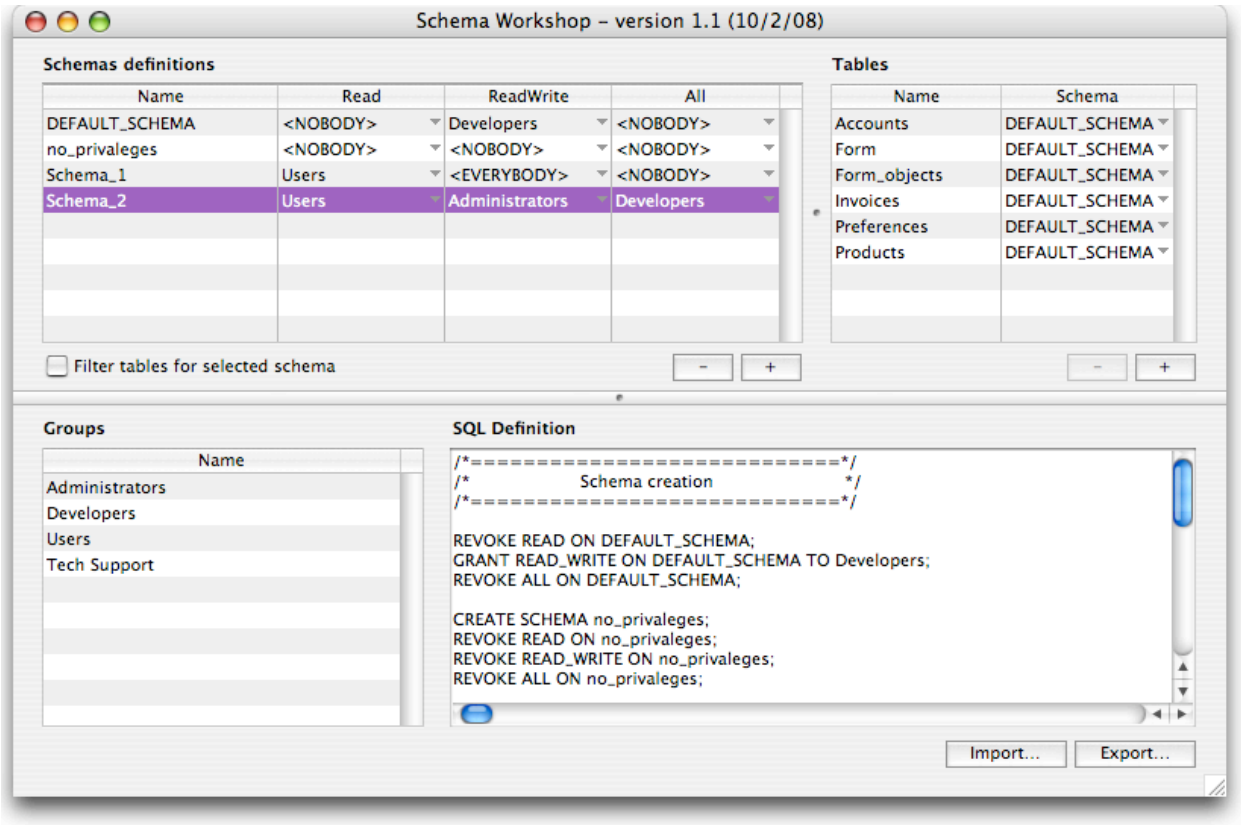


These guidelines can be moved by clicking and dragging them and they can be deleted by Alt/Option clicking on them.



SqlSchemas

4D Pop SqlSchemas provides a graphical interface for working with SQL Schemas in 4D. This component consists of a single window:



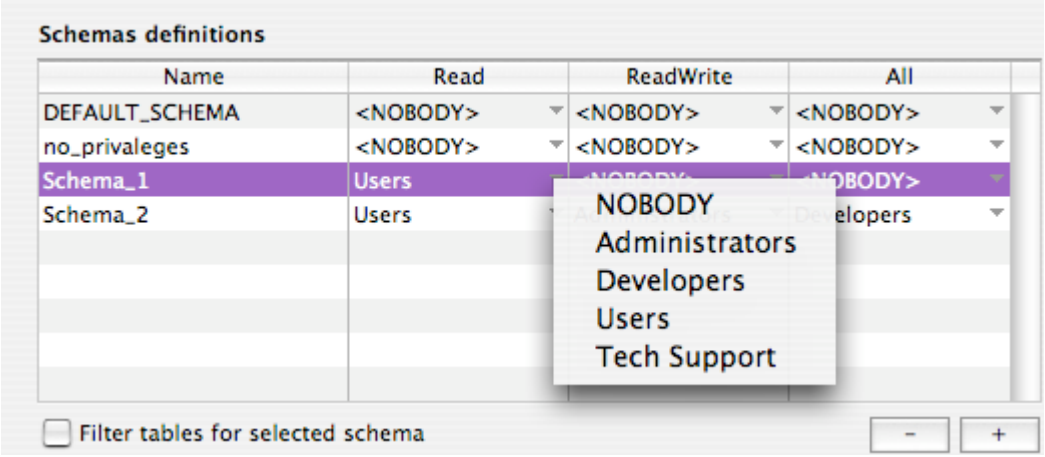
Within this editor you can:

- Add and delete schemas (you can delete all but the Default_Schema)
- Add and delete tables
- Assign and revoke rights to groups
- Assign a schema to a table
- Export a schema definition as a .SQL file (the resulting file contains the SQL code for creating the schemas)
- Import a schema definition from a .SQL file

Instructions

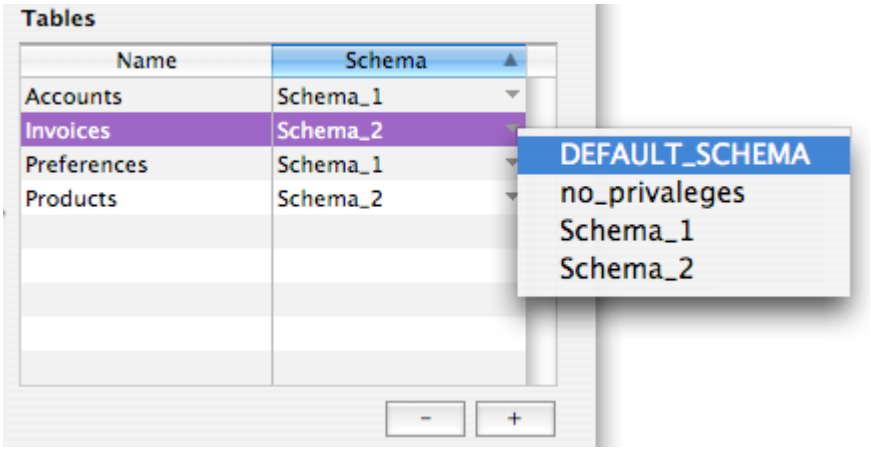
To add or delete schemas, use the "+" and "-" buttons under the Schemas definitions section.

Within the Schemas definitions section, to assign rights to a group, use the dropdown arrow for the specific Schema group (Read, ReadWrite, or All) and select the group to have that privilege.



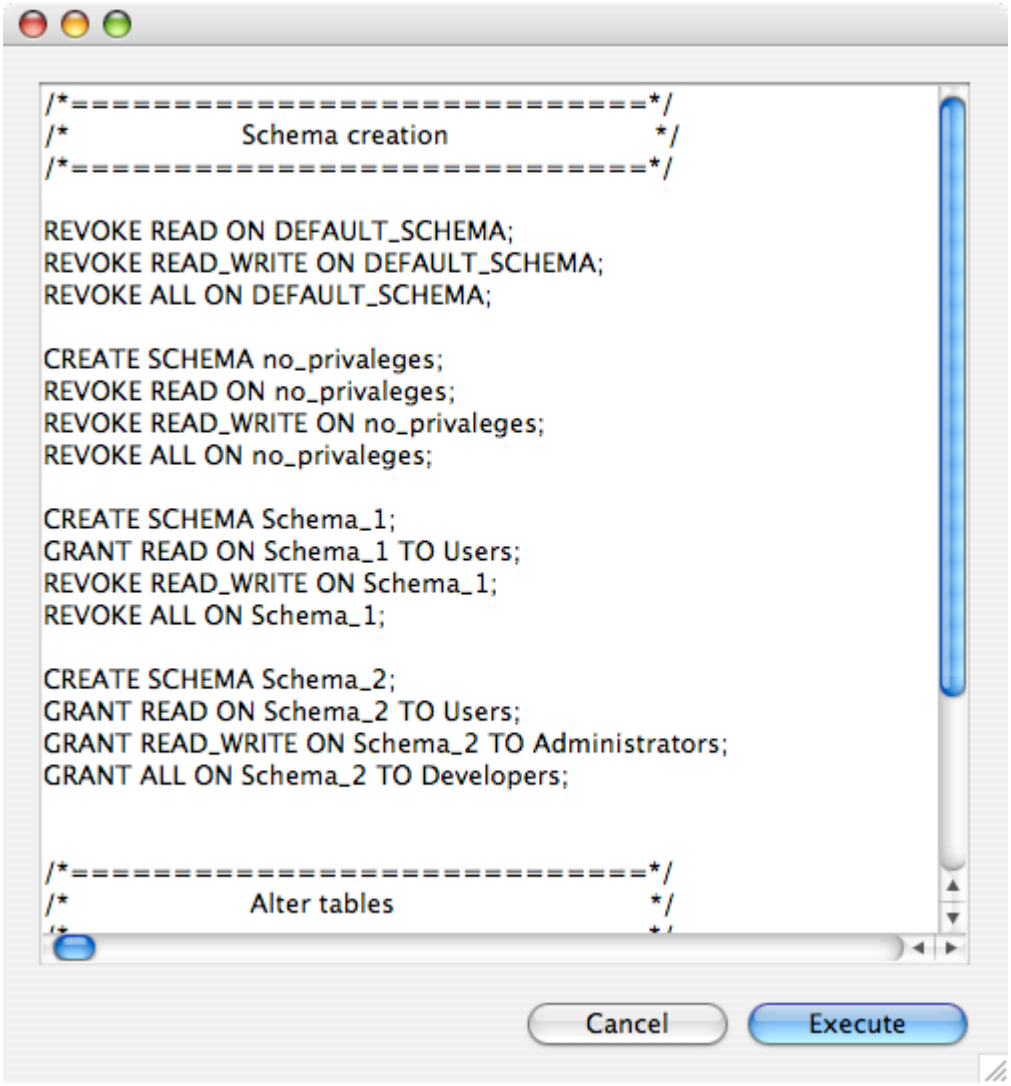
To add or delete tables, use the "+" and "-" buttons under the Tables section.

Within the Tables section, to assign a schema to a table, use the drop down arrow in the schemas column and select the appropriate schema.



The SQL Definition section displays the SQL code necessary to create the schemas with the specified settings. This is the code that is exported when the "Export" button is clicked.

Also, when a .SQL file is imported, the contents are displayed in a new dialog and then you can click on "Execute" to run the file on the database.

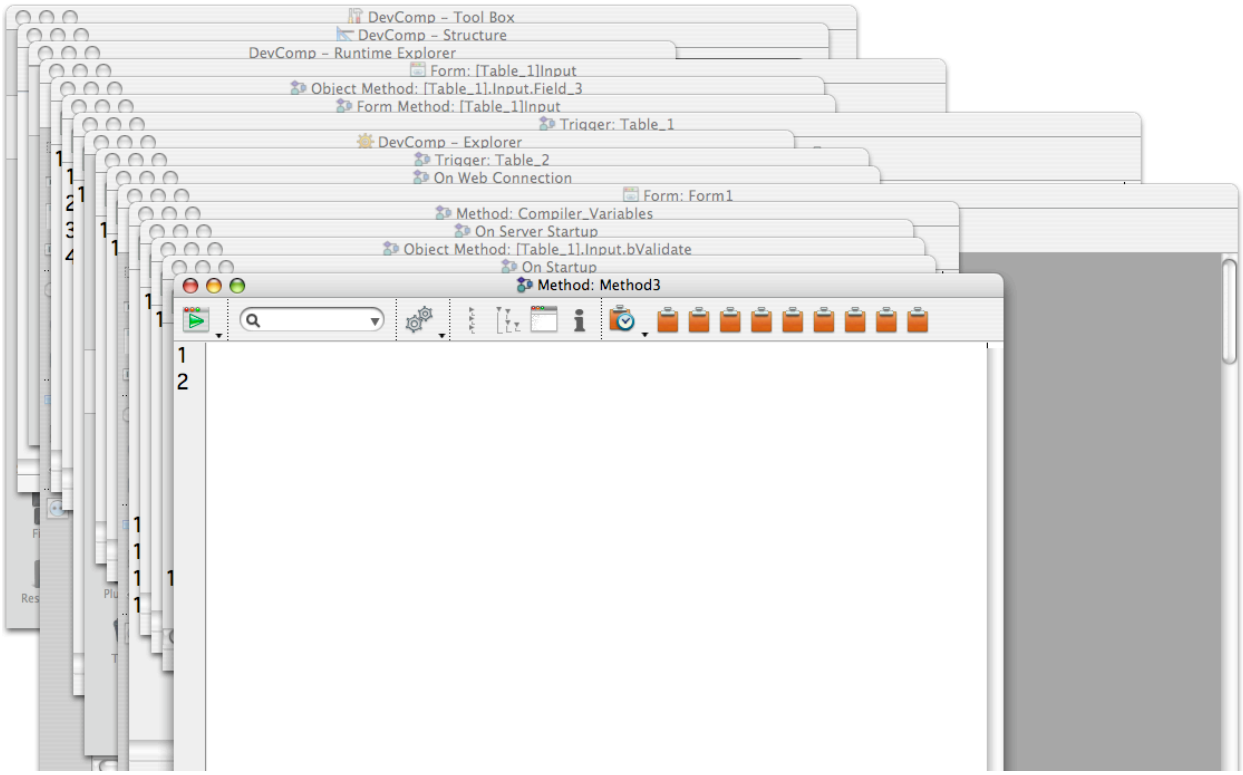


Window

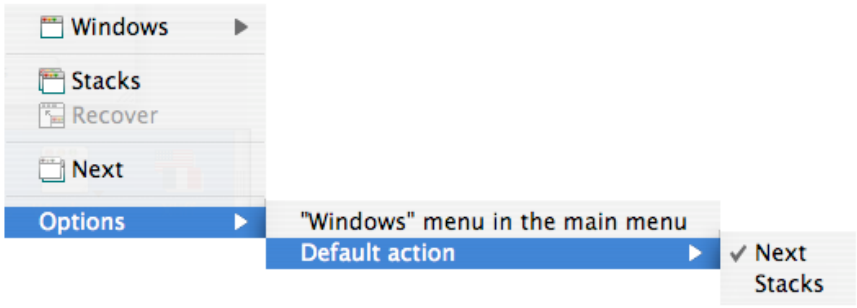
4D Pop Windows assists with managing the various windows in the development environment. This component is used to navigate through and arrange the open windows.

Clicking on the Windows icon in the 4D Pop palette performs the default action, which is one of 2 things:

- Next (AKA "previous window") – Makes the previously opened window the current window and makes the currently opened window the previously opened window.
- Stacks (AKA "arrange all") – Cascades all open windows. (see below for an example).

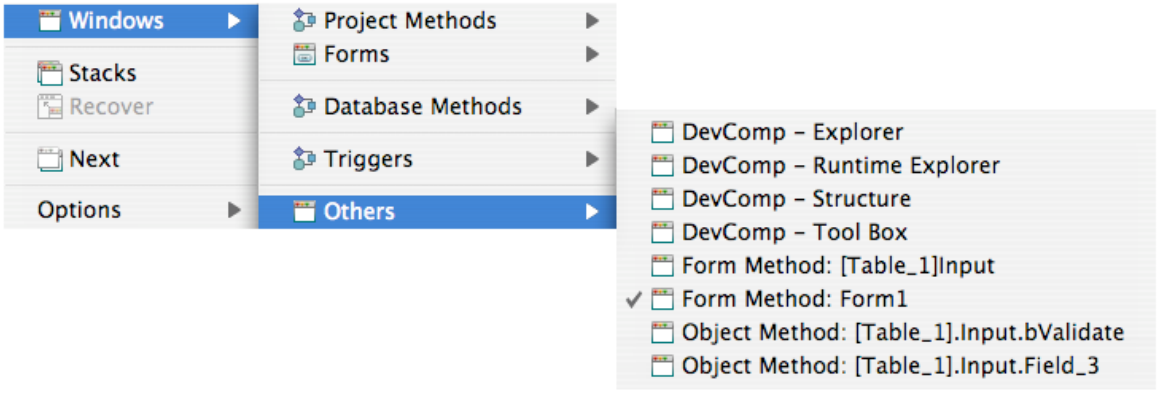


This default action can be set using the Options menu item.



Navigating through the various open windows can be done through the Windows menu.

Forms, Project Methods, Database Methods, and Triggers are each kept under their own menu item. All other windows are kept in the "Others" menu, including: Object Methods, Form Methods and the Development windows (Explorer, Tool Box, Structure editor …).



To bring up a specific window, simply navigate to and click on the specific item within the Windows menu.

Note *The Options within the Windows menu can be moved to the top menu by choosing Options-> "Windows" menu in the main menu*

Recover

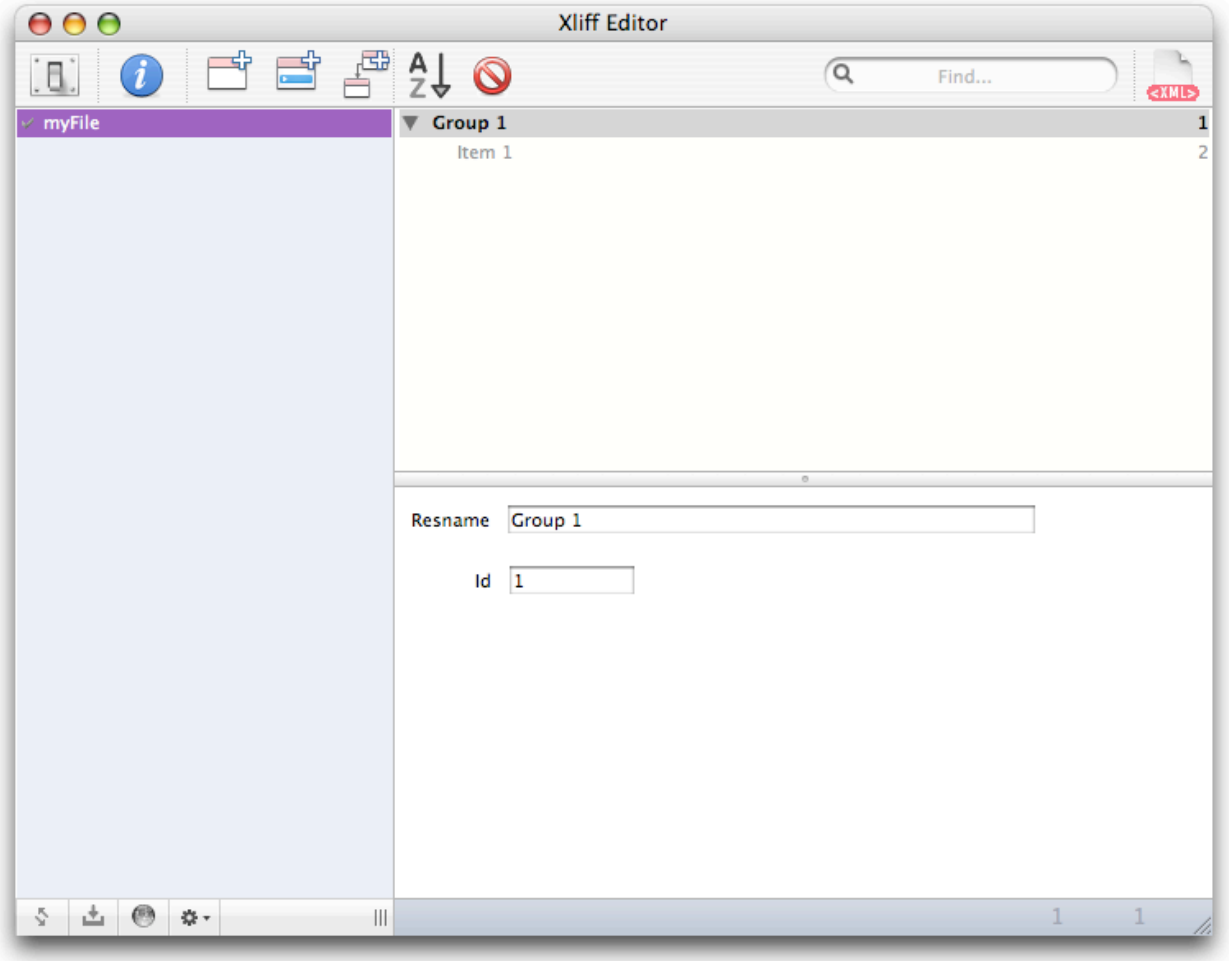
Lastly, there is the Recover feature, which is useful to bring off-screen windows onscreen. Using this option brings the current window onscreen and positions it in the top left corner of the 4D Window. The Recover functionality is also built into the other features of the 4D Pop Windows component: Next, Stacks… So if the current window is off-screen when you use the feature, it will be brought onscreen.

XLIFF

4D Pop XLIFF assists with creating and modifying XLIFF files. XLIFF is an XML based format that was developed to standardize localization and, as of 4D v11 SQL, all string resources should be stored in XLIFF files. For more information regarding XLIFF and its implementation within 4D v11 SQL, please see the 4D v11 SQL Design Reference, Appendix C available at:

http://4d.com/support/documentation.html

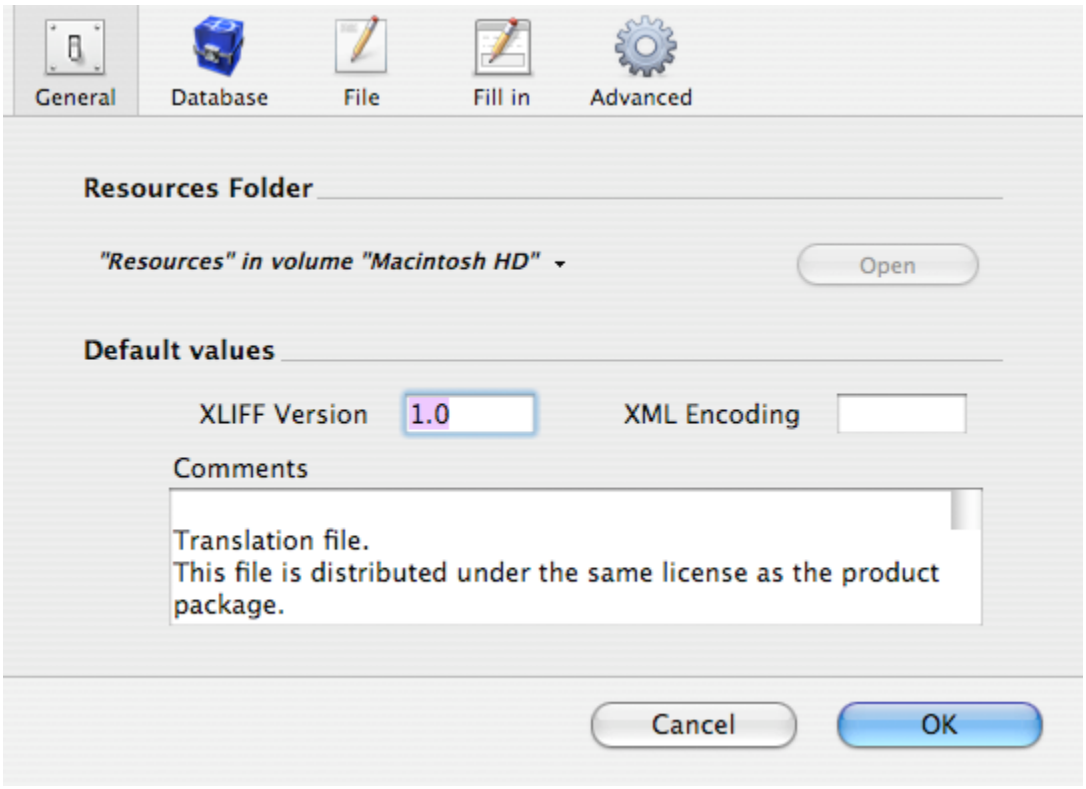
The main window of this component is the XLIFF editor:



The Toolbar at the top of the window allows you to carry out the following tasks:

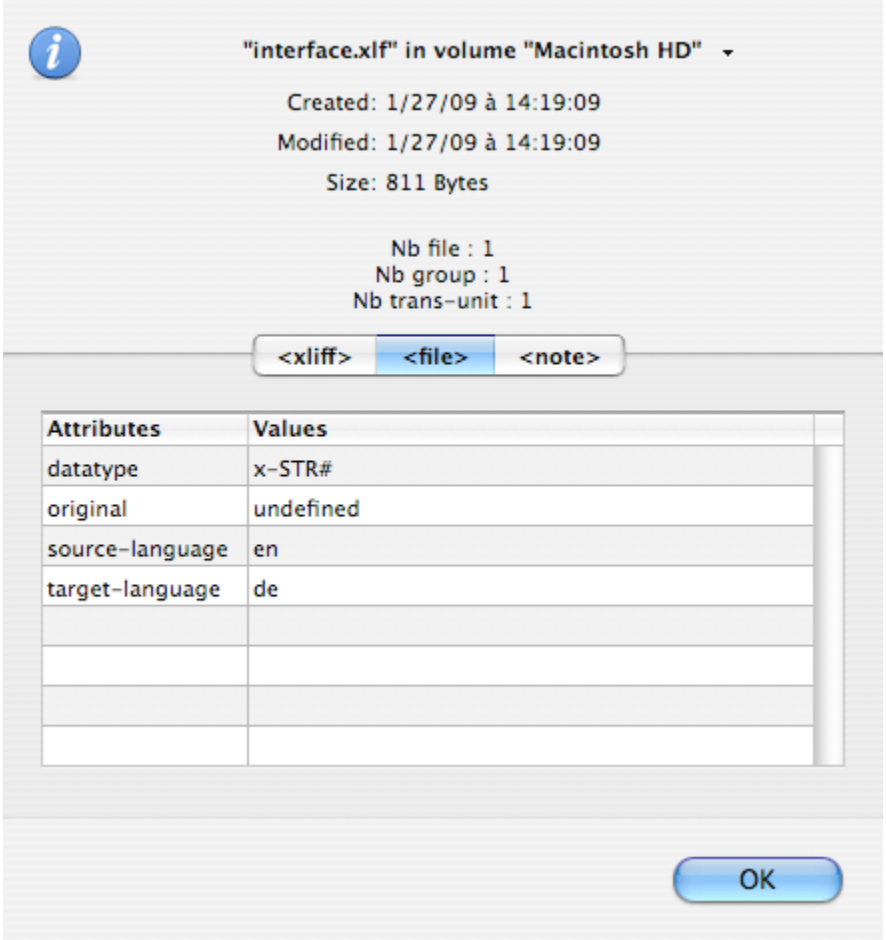
Preferences

Choosing this option brings up the Preferences window. The settings in this window pertain to the setup of the XLIFF file such as, XML version, XML encoding, source and target language. There are also a few other settings including: which characters should be escaped and what syntax to use when xliff strings are dropped on a form.



Information

This option displays a quick summary of the currently selected file.



New File

This creates a new XLIFF file, which can then be customized using the Preferences window and the other items in the tool bar.

New Group

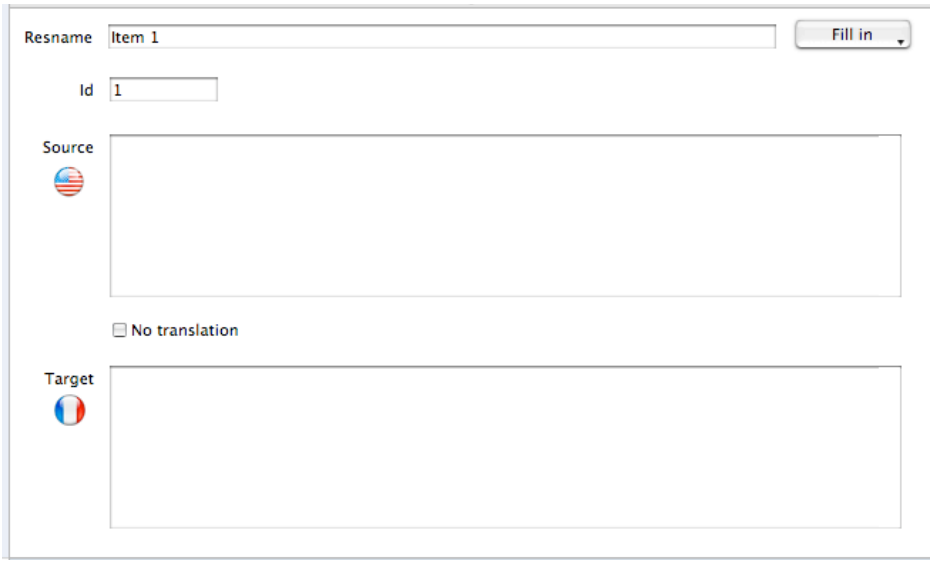
This adds a new group to the XLIFF file. All trans-unit elements need to be part of a group. Once the group has been added, you can specify the Resname and ID attributes.

New Item

This adds a new trans-unit element to the currently selected group. Depending on the language setting for the current file, you will be presented with one of the following two windows within the XLIFF Editor:

Option 1: source language = target language

Option 2: source language # target language

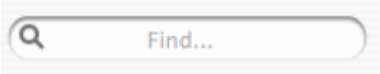


Sort

This sorts the trans-unit elements within the current group. This only sorts the display within the editor; the actual XML elements within the XLIFF file remain unchanged.

Delete

This deletes the currently selected File, Group, or trans-unit element.

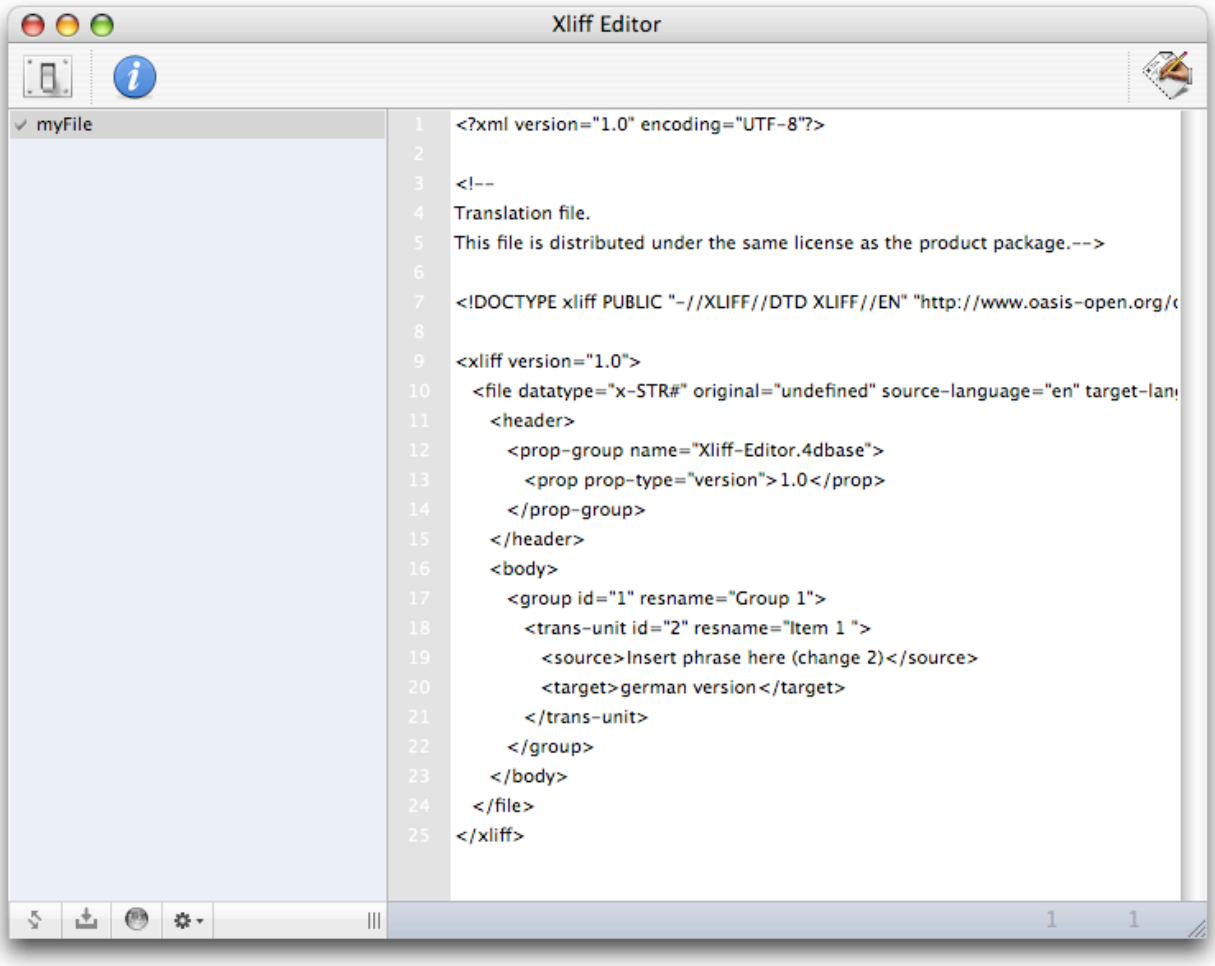


Find

Search for trans-unit items, by Resname, within a group.

XML

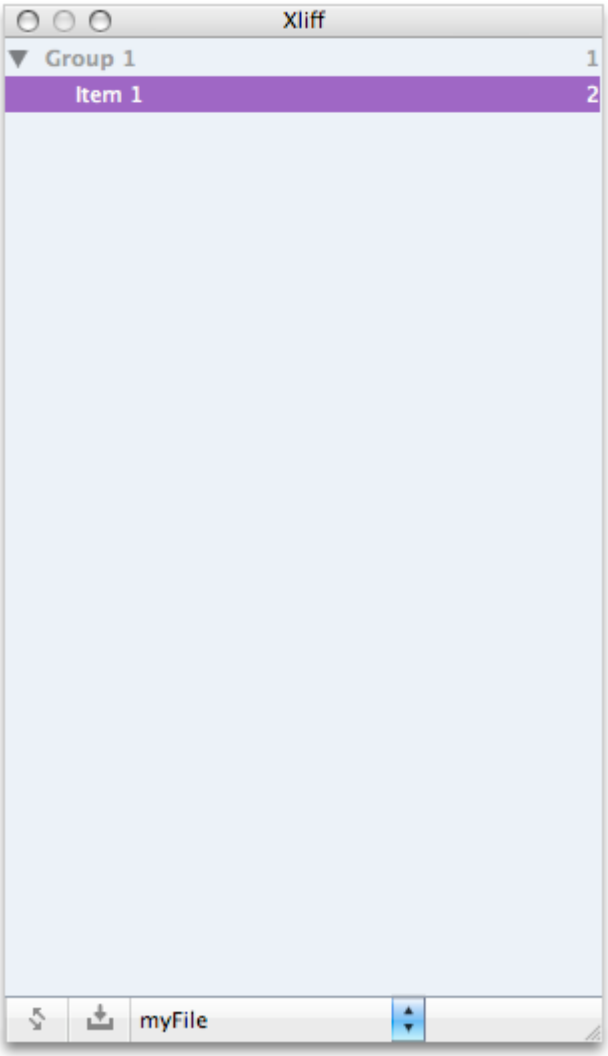
Using this option displays the XML source code for the current XLIFF file.



There is also a Toolbar at the bottom left that allows you to carry out a few additional tasks:

Switch

This removes the XLIFF Editor window out and replaces it with the Insertion window. This window is useful for dragging trans-unit elements onto forms or methods



Attributes

This adds a small window with the attributes of the currently selected group or trans-unit element.

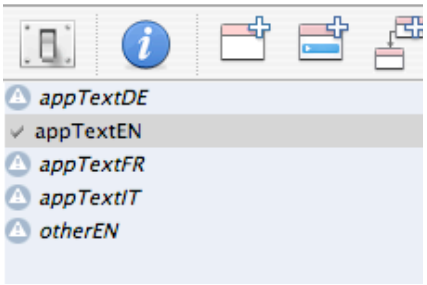
XLIFF Specification

This is a link to the OASIS website, which details the XLIFF Specification.

Shortcuts menu

Some items in this menu have been previously covered, but here are the new items.

Validate using the DTD – this checks the current XLIFF file to see if it is well-formed and if it is valid according to the XLIFF DTD and report any errors. If a file is valid, it will have a check mark; otherwise it will be marked with a warning sign.



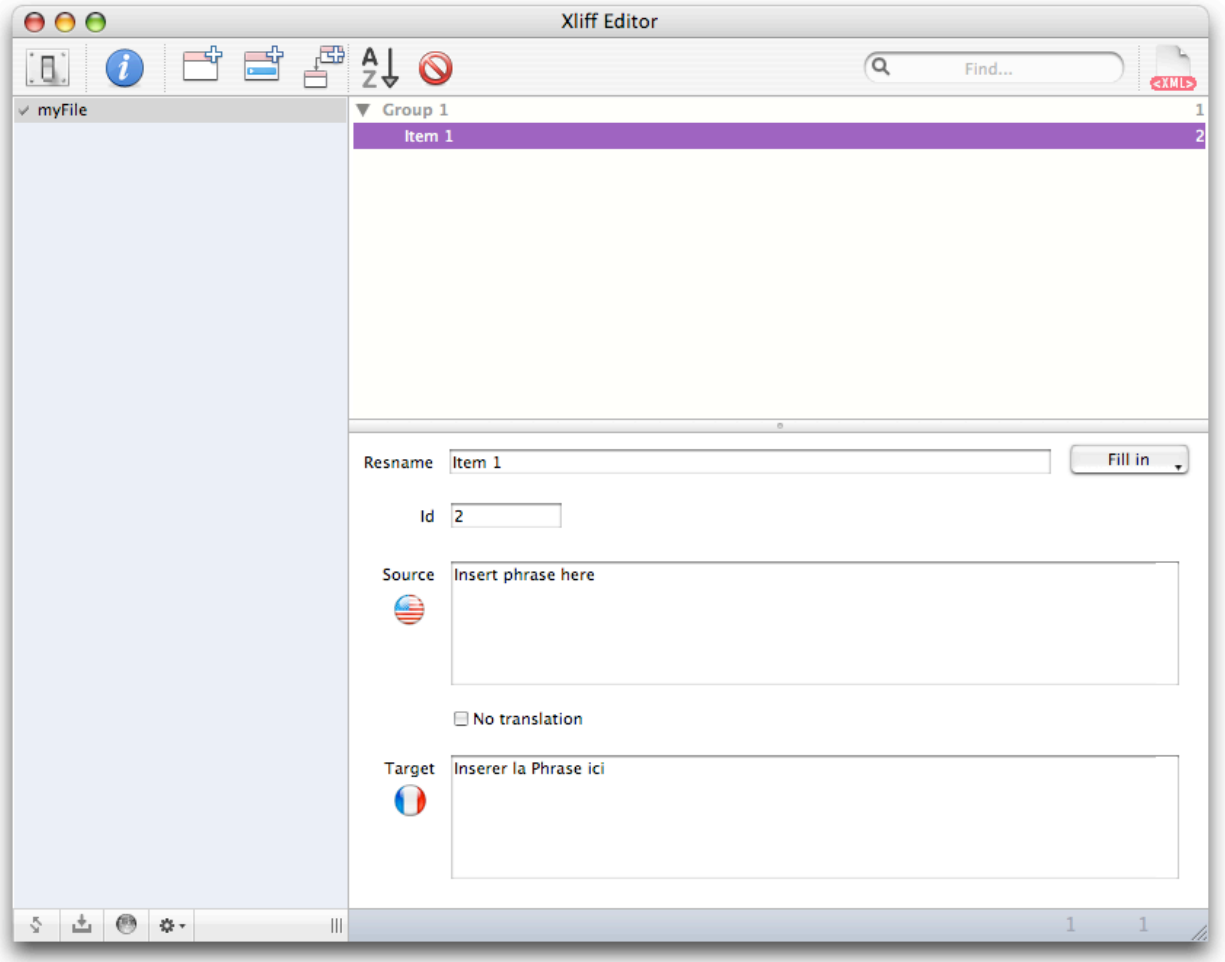
Import STR# Resource – this converts a group of STR# resources from a resource file to XLIFF. For each group of STR# resources, follow the following steps:

- Change the name of the resources file(s) containing the STR# resources to "Localized.rsrc"
- Put the file(s) in the .lproj folder (for the current language), within the Resources folder.
- Select the "Import STR# Resource" option
- In the prompt that comes up, enter the resource ID for the STR# resource you would like to import.

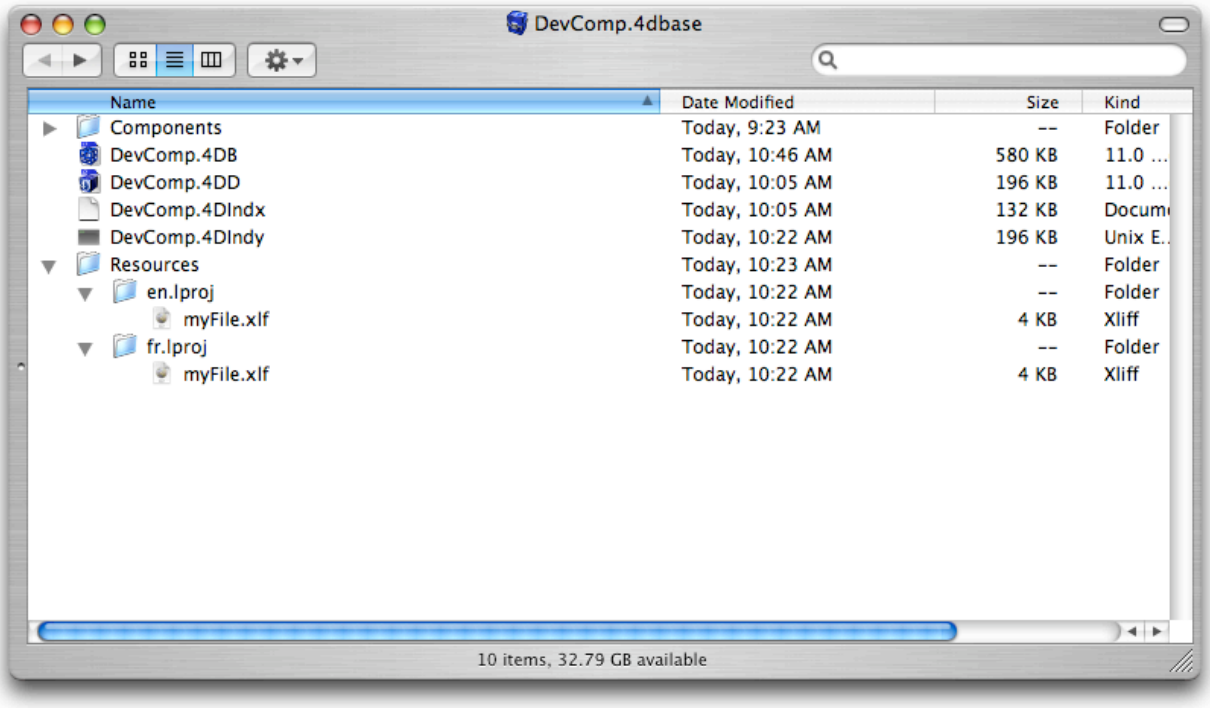
Example

Here is an example of how to use this component to create an XLIFF file with English translations and an XLIFF file with French translations

- Create new file (Ctrl + N or Command + N)
- Open the XLIFF preferences
- In the Database tab of the preferences dialog, change the source to "English" and change the target to "French"
- Create new group (Ctrl + R or Command + R)
- Create new item (Ctrl + L or Command + L)
- Input the English and French phrases in the windows

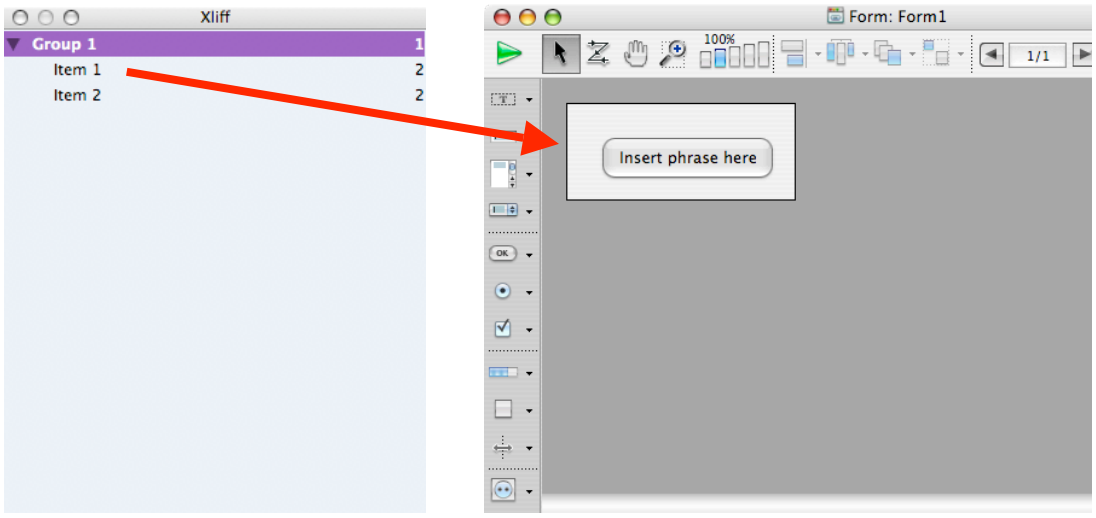


After saving these changes, 2 folders will be created in the database's Resources folder, and each folder will contain an XLIFF file for the specific language.



To add an XLIFF item to a form,

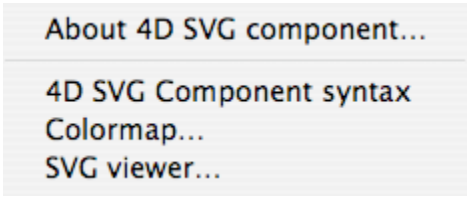
- use the Switch button to display the Insertion window
- drag the XLIFF item onto the form



Note *Resources are loaded when a database is opened, so when creating new XLIFF files, the database needs to be restarted for the changes to take affect. When making changes to existing files, the saved changes can be re-loaded by switching to a different application and then back to 4D.*

SVG

The SVG component provides a wide variety of commands that help with creating and manipulating common SVG objects, and also provides a few other tools that help with developing applications with SVG. The SVG component is not a 4D Pop component, but it is compatible with 4D Pop. When this component is added to the 4D Pop pallet, it provides quick links to the major features of the SVG component:



This component is not be covered in this document as all of the features are covered extensively in the document "4D SVG Component" which can be downloaded at the following link:
http://www.4d.com/support/documentation.html

4D Pop Components: Created by Third Parties

The following components were all created by third parties and posted to the 4D Pop forum (4D Pop forum - http://forums.4d.fr). These components are in no way associated with 4D, Inc. and the descriptions included here are taken for the most part from the author. They are mentioned in this Tech Note to give an idea of the type of functionality that can be put into a development tool and to serve as examples of what is possible within the new 4D v11 SQL component architecture.

b3Dcreate

Author: Eric Juhel.

This component lets you create 4-state icons (active, onclick, rollover, inactive) from one image to use as a 3D button.

BarcodeMaker

Author: Keiji Hosaka

This component is used to generate barcodes.

ButtonMaker

Author: Keiji Hosaka

This component is used to generate and modify icons for buttons.

CodeGenerator

Author: Keiji Hosaka

This component can be used to generate certain codes.

Chrome4D

Author: Eric Juhel

This component can be used to select colors using a spectrum or an image of your choice.

RegexLab

Author: Maurice Inzirillo

Regex Lab offers high-level commands to use regular expressions in 4D, and a lab where you can test different Regex functions with your search patterns.

Conclusion

4D Pop provides a variety of tools that are meant to help developers be more productive. 4D Pop introduces features that streamline different development tasks, but more importantly it introduces the idea of developer tools within 4D, meaning tools created by developers for developers. The 4D Pop components were created to help developers and the 4D Pop forum was created to facilitate the

development and sharing of these components. However, both were created to ultimately help users to develop faster, and to develop better applications.

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