IzPack Documentation

Foreword

This documentation is a collective work that received many inputs over the years from many people, notably Julien Ponge, Elmar Grom, Fabrice Mirabile, Tino Schwarze, Klaus Bartz and many more.

We tried to keep it as up-to-date as possible despite a few source format changes and many times where we did not check that new features were properly documented.

If you believe that some portions could be enhanced, fixed, or if you find that some features are not properly documented, feel-free to help us!

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Introduction

Welcome to IzPack !

IzPack is a tool that will help you to solve your software installation problems. It is a JavaTM based software installer builder that will run on any operating system coming with a *Java Virtual Machine (JVM)* that is compliant with the Sun JVM 1.5 or higher. Its design is very modular and you will be able to choose how **you** want your installer to look and you will also be able to customize it using a very simple *Application Programming Interface (API)*. Although IzPack is essentially a JavaTM only application (it can run on virtually any operating system), it can interact in a clean way with the underlying operating system. Native code can interact with it on a specific platform without disturbing the operation on incompatible operating systems. For instance, you can develop Unix-specific code that will be silent if run on Windows. To put it in a nutshell, whereas most of the other JavaTM installers force you to go their way, IzPack will let you go **your way**. Some respectable companies have been using it in order to produce customized installers for their *very* specific needs.

"So, if it's so good, how much is it ?" : well, you can get it for free. **BUT** IzPack is not a *freeware*. It's not *free* as in *"free beer"* but *"free as in free speech"*. So it's neither *freeware* nor *public domain*. It is software covered by the Apache Software License 2.0. You have access to the IzPack source code and you can modify it to make it suit your needs.

You are not required to publish your modifications per the terms of the Apache Software License. However if you have made general-purpose changes, please consider **contributing them back** as it will benefit to the larger IzPack community. Another benefit of contributing back your changes is that you won't have to maintain your own patches and apply them back whenever we publish a new version of the software...

To learn more about the Apache Software License 2.0, visit http://www.apache.org/licenses/LICENSE-2.0.html

The Features

IzPack uses XML files to describe installations. When you make an installer, you have a choice of panels. You can see panels as a kind of plugin that composes the installer. For instance, a panel can choose the installation path, the packs to install, prompt the user for a license agreement and so on. This approach is very modular. You can also create your own panels if you have specific needs. In some cases you even have a choice from

multiple panel versions for the same task. You can also choose the order in which panels appear during the installation process. IzPack can be used in a number of different ways:

- by writing the XML installation file "by hand" and compiling it with the command line compiler
- by invoking the compiler from the great Apache Ant tool (see http://ant.apache.org/) as IzPack can be used as a task for Ant

Here is a brief (and certainly incomplete !) list of the main IzPack features :

- XML based installation files
- easy internationalization using XML files (10 translations are already available)
- Ant integration, command-line compiler
- easy customization with the panels and a rich API (even an XML parser is included !)
- powerful variable substitution system that you can use to customize scripts and more generally any text-based file
- powerful condition system that can be used to conditionally show panels, user input fields and execute files conditionally
- different kinds of installers (standard, web-based, multi-volume, ...)
- launching of external executables during the installation process and Unix executable flag support (useful for the scripts for instance)
- layout of the installation files in packs (some can be optional)
- native code integration facilities
- jar files nesting support
- *... more things to discover and create !.*

The Development

I started writing IzPack in April 2001 and many people have helped me improving it since. i prefer not to mention them here as i would for sure forget some of them, so please check the file named `Thanks.txt` which i try to get as up-to-date as possible in order to mention everyone who helped me. As far as i'm concerned, i'm a french student and i rather see this as a fun activity in my free time where i can learn a lot of great things. The contributors to the project are both individuals and companies. Help can take any form :

- translations
- new features and various fixes
- bug fixes
- writing manuals

- ... anything else you like :-)

The official IzPack homepage is located at http://izpack.org/. The IzPack developer services are generously hosted by Codehaus at http://izpack.codehaus.org/. The project is grateful to the BerliOS community for havinh hosted the services in the past.

3rd party code used in IzPack

IzPack uses several 3rd party libraries and i would like to mention them in respect for their respective authors work :

- *NanoXML* by Marc De Scheemaecker: the XML parser used inside IzPack and released under a *zlib/png*-style license - see http://nanoxml.sourceforge.net/
- *Kunststoff Look and Feel* by Incors Gmbh: a SwingTM Look and Feel that can be used for installers. Released under the LGPL license - see http://www.incors.org/
- *Tango Icons*: icons from the Tango project at http://tango.freedesktop.org/
- *Some Apache Jakarta classes and libraries*: released under the *Apache License*
- *Metouia Look and Feel* by Taoufik Romdhane: released under the *LGPL license* - see http://mlf.sf.net/
- *Liquid Look and Feel* by Miroslav Lazarevic: released under the *LGPL license* - see liquidlnf.sf.net/
- *JGoodies Looks* by Karsten Lentzsch: released under a *BSD-style license* - see http://looks.dev.java.net/
- *Nimbus look and feel* by Sun Microsystems under a LGPL license - see https://nimbus.dev.java.net/

So, now let's dive into understanding how IzPack works. You'll be surprised to see how powerful and simple it can be :-)

Getting started

Overview

To begin with, you should know how IzPack is organized if you want to use it. Let's go into the directory where you have installed IzPack on your machine. There are 3 text files and a set of directories. The most important for the moment are bin/ doc/ sample/. If you are reading this, you already know that doc contains this documentation :-)

So let's go into bin/. The icons/ directory contains some directories for your system, in case you would like an icon to launch a component of IzPack . But the most important things you can see in bin are the compile scripts (in both unix* and windows formats). Compile is used to compile a ready-to-go xml installation file from a command-line context or from an external tool.

Note : these scripts can be launched from anywhere on your system as the installer has customized these scripts so that they can inform IzPack of where it is located.

Installation of IzPack

First go get the latest stable version of IzPack from: http://izpack.org/downloads

If needed download the Latest Java Run Time from Sun's website http://java.sun.com/. You should get the JRE if you intend to ONLY run the installer and get the SDK if you're willing to compile as well.

On Windows

Don't forget to set up the environment variables:

If using the SDK:

```
set JAVA_HOME="C:\j2sdk1.4.2_04"
set JRE_HOME=%JAVA_HOME%/jre
set CLASSPATH=%JAVA_HOME%/bin;%CLASSPATH%
set PATH=%JAVA_HOME%/bin;%JRE_HOME%/bin;%PATH%
```

This is obvioulsy assuming that SDK has been installed to "C:j2sdk1.4.2_04"

If using the JRE:

```
set JAVA_HOME="C:\Program Files\Java\j2re1.4.2_05"
set CLASSPATH=%JAVA_HOME%/bin;%CLASSPATH%
set PATH=%JAVA_HOME%/bin;%PATH%
```

This is obviously assuming that SDK has been installed to "C:Program FilesJavaj2re1.4.2_05" Once this is done, you can install IzPack using the following command:

```
java -jar izpack.jar
```

Where izpack.jar is the latest release you downloaded from IzPack website.

On UNIX/Linux

If needed download the Latest Java Run Time from Sun's website http://java.sun.com/. You should get the JRE if you intend to ONLY run the installer, but you should get the SDK if you're willing to compile as well.

If using the SDK:

```
export JAVA_HOME=/usr/java/j2sdk1.4.2_06
export JAVA_JAR=/usr/java/java_jar
export JRE_HOME=/usr/java/j2sdk1.4.2_06/jre
export CLASSPATH=/usr/java/j2sdk1.4.2_06/bin
export PATH=/usr/java/j2sdk1.4.2_06/bin:/usr/java/j2sdk1.4.2_06/jre/bin:$PATH
```

This is obviously assuming that java has been installed to /usr/java/j2sdk1.4.2_06

If using the JRE:

```
export JAVA_HOME=/usr/java/j2re1.4.2_05
export CLASSPATH=$JAVA_HOME/bin:$CLASSPATH
export PATH=$JAVA_HOME/bin:$PATH
```

This is obviously assuming that SDK has been installed to "/usr/java/j2re1.4.2_05" You can put them into any script launched at startup if you don't want to have to do it everytime. For example, .bashrc of your user, so that whenever you'll start a bash console the variables will be set.

To verify that the environment is correct, type SET in the command prompt and check if those variables are set before running any compilation.

Then you install IzPack using the following command:

```
java -jar izpack.jar
```

By default it will be installed in /usr/local/IzPack. Therefore you can create two scripts, one for compiling your code and the second to execute the installer.

Compile.sh:

```
#!/bin/sh
/usr/local/IzPack/bin/compile /yourpath/Install.xml -b /yourpath -o /yourpath/yourjar
```

Install.sh:

```
#!/bin/sh
java -jar yourjaroutput.jar
```

BUGS and TROUBLESHOOTING

1. This is assuming that you're current Unix/Linux allows the use of the server X. In cas it doesn't here is a way to install IzPack using cygwin (thanks to Shrish Buradkar and Bartz Klaus for this trick):

   Install cygwin on a remote machine. Cygwin can be downloaded from http://www.cygwin.com/ Firstly, start the XWindows server on your PC. This could be done by using the startxwin-multiwindow batch file or running /usr/X11R6/bin/startxwin.sh From the cygwin Xterm, type xhost + Then telnet to the remote UNIX/Linux machine and set the DISPLAY to your PC. So after you have logged into the remote machine, do export DISPLAY=pc-ip-adress:0.0 xterm & java -jar installer.jar This should do the job by displaying an xterm from the remote machine onto yor PC.

2. Normally launching packages created by IzPack under Gnome, KDE or XFCE works fine. If when trying to launch a pack you receive this error message:

```
Exception in thread "main" java.lang.InternalError: Can't connect to X11
window server using ':0.0' as the value of the DISPLAY variable.
        at sun.awt.X11GraphicsEnvironment.initDisplay(Native Method)
```

```
        at
sun.awt.X11GraphicsEnvironment.<clinit>(X11GraphicsEnvironment.java:134)
        at java.lang.Class.forName0(Native Method)
        at java.lang.Class.forName(Class.java:141)
        at
java.awt.GraphicsEnvironment.getLocalGraphicsEnvironment(GraphicsEnvironment.java
        at java.awt.Font.initializeFont(Font.java:308)
        at java.awt.Font.<init>(Font.java:344)
        at
com.izforge.izpack.gui.IzPackMetalTheme.createFont(IzPackMetalTheme.java:62)
        at
com.izforge.izpack.gui.IzPackMetalTheme.<init>(IzPackMetalTheme.java:52)
        at
com.izforge.izpack.gui.IzPackKMetalTheme.<init>(IzPackKMetalTheme.java:59)
        at sun.reflect.NativeConstructorAccessorImpl.newInstance0(Native
Method)
        at
sun.reflect.NativeConstructorAccessorImpl.newInstance(NativeConstructorAccessorIm
        at
sun.reflect.DelegatingConstructorAccessorImpl.newInstance(DelegatingConstructorAc
        at java.lang.reflect.Constructor.newInstance(Constructor.java:274)
        at java.lang.Class.newInstance0(Class.java:308)
        at java.lang.Class.newInstance(Class.java:261)
        at
com.izforge.izpack.installer.GUIInstaller.loadLookAndFeel(GUIInstaller.java:297)
        at
com.izforge.izpack.installer.GUIInstaller.<init>(GUIInstaller.java:100)
        at sun.reflect.NativeConstructorAccessorImpl.newInstance0(Native
Method)
        at
sun.reflect.NativeConstructorAccessorImpl.newInstance(NativeConstructorAccessorIm
        at
sun.reflect.DelegatingConstructorAccessorImpl.newInstance(DelegatingConstructorAc
        at java.lang.reflect.Constructor.newInstance(Constructor.java:274)
        at java.lang.Class.newInstance0(Class.java:308)
        at java.lang.Class.newInstance(Class.java:261)
        at com.izforge.izpack.installer.Installer.main(Installer.java:47)
```

Then, it's most probably the fact that in some distribution the console and environment variables are "erased" when switching between users. So, you can type 'su -' in order to obtain all commands. With 'su -' $DISPLAY variables is erased and all X11 connections is refused. So, a best and fast practice in this way is:

1. *Log in your system by user*
2. *In shell type: '$ echo $DISPLAY'*
3. *the result seems to be ':0.0'. If the response isn't there you can type:*
4. *'$ export $DISPLAY=":0.0"'*
5. *Now type $su for a "normal" alias by root.*
6. *Run: $ java -jar "package.jar"*

First Compilation

Now you probably can't wait to build your first installer. So go on open a command-line shell and navigate to sample/. The following should work on both unix* and windows systems. for the latter, just change the path separator (slash '/') to a backslash. So type ($ is your shell prompt !) :

```
$ ../bin/compile install.xml -b . -o install.jar -k standard
 (installer generation text output here)
$ java -jar install.jar
```

There you are! The first command has produced the installer and the second one did launch it.

How to develop and debug IzPack using Eclipse

(thanks to Bartz Klaus)

Here are the steps needed to develop adn debug IzPack with Eclipse:

1. IzPack Installation

   Install the latest stable release of IzPack with the sources ! For more details see the section "IzPack Installation".

2. Custom class sources and build.xml

   Put your custom class sources under %IZPACK_HOME%srclib may be %IZPACK_HOME%srclibcomizforgeizpackpanelsMyPanel.java Add a create rule into %IZPACK_HOME%srcbuild.xml under target "build.panels"

3. Eclipse

   You can get Eclipse from http://www.eclipse.org/downloads/index.php

4. Create IzPack project

   Select File > New > Project... Java > Java Project > next > give a project name like "IzPack" deselect "Use default" (2.x) or select "Create project at external location" (3.x) Browse to %IZPACK_HOME%srclib select it Next > In "Libraries" select "Add External JARs..." select ant.jar and jakarta-regexp-1.3.jar from %IZPACK_HOME%lib Finish

5. Debug compile (create installation)

   Select Run > Debug... Java Application New give a name e.g. “CompileMyInstall” select in “Main” the project “IzPack” select as “main class” “Compile” (from package com.izforge.izpack.compiler) As “Program arguments” put in (for %SOME_THING% use your local value) %SRC_ROOT%%CONFIG_SUBPATH%install.xml -b %SRC_ROOT% -o %INSTALLER_DEST%install.jar As “VM arguments” put in “-DIZPACK_HOME=n:homebartzkauworkxt150_forIzPackizpack-src”

   No you can debug the compiling of your installation.

5. Debug installation

   Compile your installation; now you have %INSTALLER_DEST%install.jar Run > Debug... Java Application New give a name e.g. “InstallMyInstall” select in “Main” the project “IzPack” select as “main class” “Installer” (from package com.izforge.izpack.installer) as “VM arguments” use -DTRACE=true select the tab “Classpath” select “User classes” (2.x) or “User Entries” (3.x) select “Add External JARs...” select %INSTALLER_DEST%install.jar (may be, that’s the trick...) install.jar must be under the project entry

   BUGS and TROUBLESHOOTING

   If you get this error when running the application could not create shortcut instance

```
java.lang.Exception: error loading library
at com.izforge.izpack.util.Librarian.loadLibrary(Librarian.java:249)
at com.izforge.izpack.util.os.ShellLink.initialize(ShellLink.java:461)
at com.izforge.izpack.util.os.ShellLink.<init>(ShellLink.java:349)
at com.izforge.izpack.util.os.Win_Shortcut.initialize(Win_Shortcut.java:79)
at com.izforge.izpack.panels.ShortcutPanel.<init>(ShortcutPanel.java:473)
at sun.reflect.NativeConstructorAccessorImpl.newInstance0(Native Method)
at sun.reflect.NativeConstructorAccessorImpl.newInstance(Unknown Source)
at sun.reflect.DelegatingConstructorAccessorImpl.newInstance(Unknown Source)
at java.lang.reflect.Constructor.newInstance(Unknown Source)
at com.izforge.izpack.installer.InstallerFrame.loadPanels(InstallerFrame.java:203
at com.izforge.izpack.installer.InstallerFrame.<init>(InstallerFrame.java:160)
at com.izforge.izpack.installer.GUIInstaller.loadGUI(GUIInstaller.java:391)
at com.izforge.izpack.installer.GUIInstaller.<init>(GUIInstaller.java:128)
at sun.reflect.NativeConstructorAccessorImpl.newInstance0(Native Method)
at sun.reflect.NativeConstructorAccessorImpl.newInstance(Unknown Source)
at sun.reflect.DelegatingConstructorAccessorImpl.newInstance(Unknown Source)
at java.lang.reflect.Constructor.newInstance(Unknown Source)
at java.lang.Class.newInstance0(Unknown Source)
at java.lang.Class.newInstance(Unknown Source)
at com.izforge.izpack.installer.Installer.main(Installer.java:62)
```

then it means you forgot to put the shelllink.dll into the correct source folder in that case, copy %IZPACK_HOME%binnativeizpackShellLink.dll to %IZPACK_HOME%srclibcomizforgeizpackutilosShellLink.dll

Now you can debug the installation. With 2.x you can edit on demand, if %INSTALLER_DEST%install.jar is shown in "Classpath" under the project. With 3.x it seems so, that always the JAR will be loaded; therefore the contents of install.jar and the sources should be synchron.

6. Debug uninstallation

   Install your installation to %INSTALL_PATH% Run > Debug... Java Application New give a name e.g. "UninstallMyInstall" select in "Main" the project "IzPack" select as "main class" "Uninstaller" (from package com.izforge.izpack.installer) as "VM arguments" use -DTRACE=true select the tab "Classpath" select "User classes" (2.x) or "User Entries" (3.x) select "Add External JARs..." select %INSTALL_PATH%Uninstalleruninstall.jar uninstall.jar must be under the project entry

   Now, you can debug your uninstallation. Don't worry if you get first a NullPointerException in SelfModifier. This should be; it is a hint, that the class files of your eclipse session are used. If debugging not working, look whether: there is a fresh installation the uninstall.jar is in the "Classpath" tab under the project entry

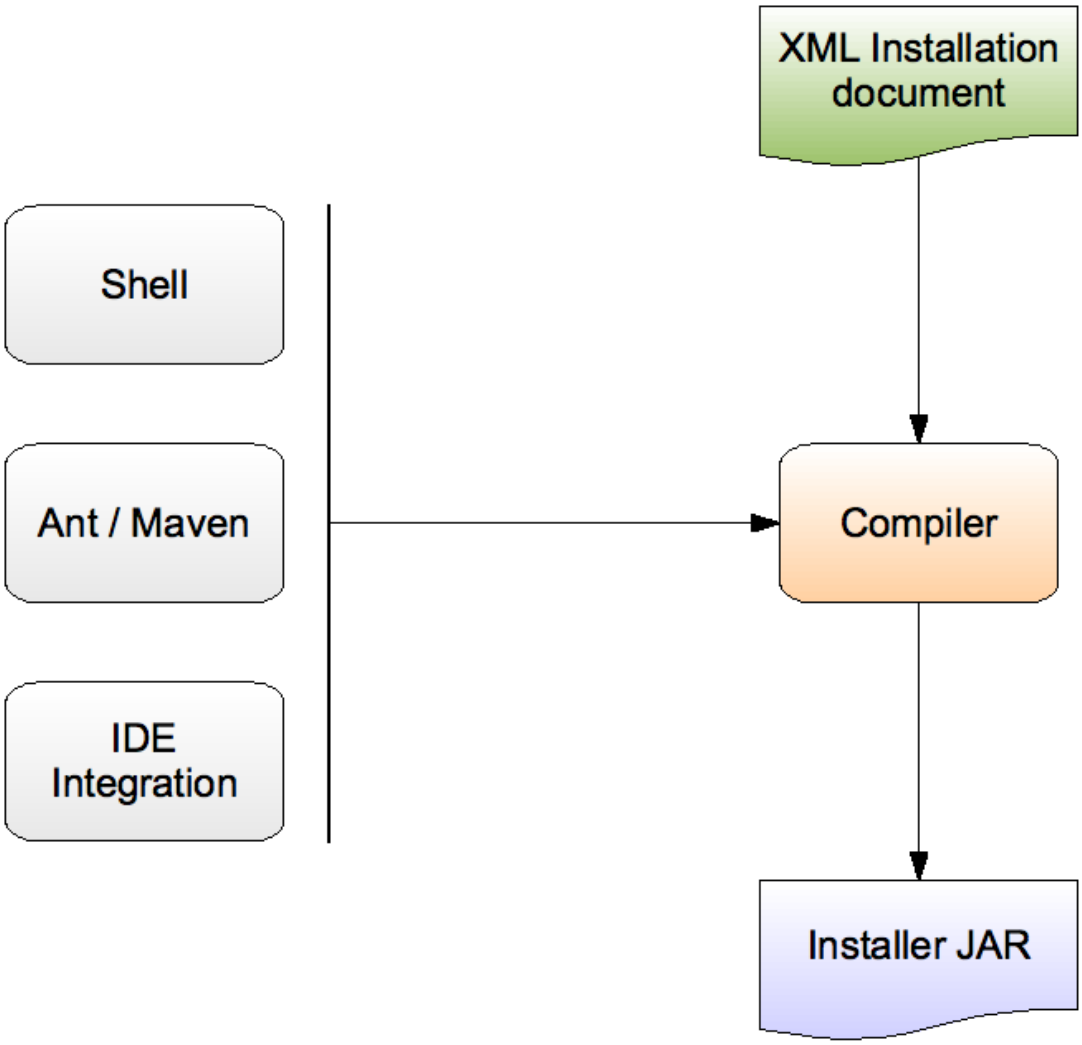
The IzPack architecture

Now that you have packaged your first installer, it's time for you to understand how the whole thing works.

The compilation system

The compilation system is quite modular. Indeed, you can use the compiler in 2 ways :

- from a command-line
- from jakarta ant



The compilation architecture.

The compiler takes as its input an xml installation file that describes (at a relatively high-level) the installation. this file contains detailed information such as the application name, the authors, the files to install, the panels to use, which resources to load and much more.

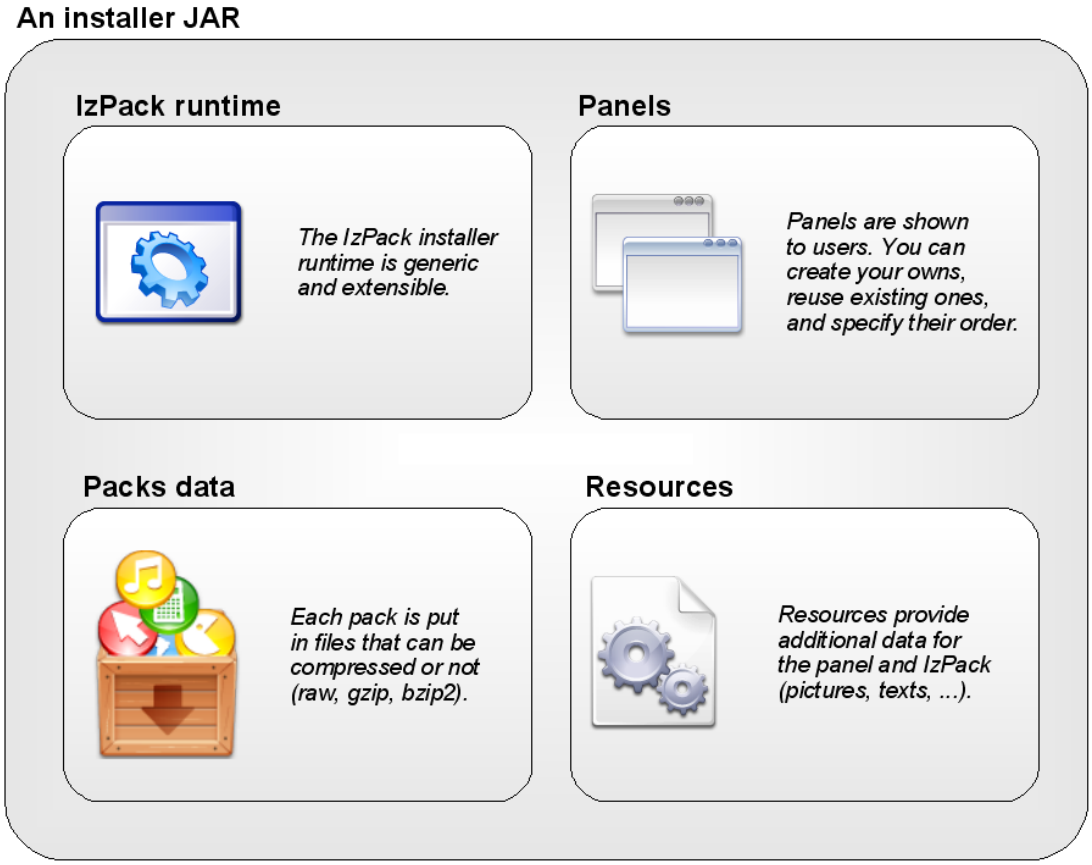
The compiler can generate different kinds of installers, but this information is not located inside the xml file as it is not were it should be. On the contrary, this is a compiler parameter.

The compilation options for a command-line installer are the following:

-? Gives a list of the available options. -b Specifies the base path, ie the one that will be used to resolve the relative paths. if your xml file contains absolute paths, specify it to an empty string (-b “”). -k Specifies the installer kind, for instance most users will want standard here. -o Specifies the resulting installer jar file name.

How an installer works

An installer presents its panels to the end-user. for instance, there is one to select the packages, one to prompt for the license agreement, one to select the installation path and so on. You have a choice from a variety of panels to place in the installer. For example, you can choose between a plain text and a html text panel for the license agreement. also, if you don't want of the hellopanel, you just don't include it.



The content of an installer.

It is very important to understand that some of the panels may need extra data. for instance, the license agreement panel needs the license text. A simple approach to specify such data would have been to add as many xml tags as needed for each panel. However, this makes the xml file too specific and not easy to maintain. The approach that has been chosen is to put the data in files and we call these files resource files. They are specified with a unique xml tag. this is a much cleaner approach.

You might wonder how your files are packaged. They can be grouped in packs. For instance, you can have one pack for the core files, one for the documentation, one for the source code and so on. In this way, your end-users will have the choice to install a pack or not (provided that the pack they don't want to install is not mandatory). Inside

the jar file (which is a zip file), a sub directory contains the pack files. Each pack file contains the files that are part of it. Could we do it simpler ? :-)

The different kinds of installers

There are 2 kinds of installers available :

- Standard : a single-file ready-to-run installer
- Web : a web based installer (pack data is located on an http server, and the installer retrieves it at install time (see section 3.6))

Installers for older vm versions

By default the installer will be made for the current most used version of the java runtime environment. It is possible to create an installation that is runable with an older vm version.

What version is used can be detected in the ant properties file that is used to build izpack. It is [izpackroot]/src/ant.properties. The value of the property "source" determines the vm version.

If compatibility to older versions is needed, a recompilation of the jar files of the izpack system should be done. For this the sources of izpack and an ant installation are needed. the sources of izpack are selectable at installation time of izpack. Before a recompilation of all can be triggered, the version of byte code should be changed. This can be done simple by changing the "source" entry in [izpackroot]/src/ant.properties to the needed value. The recompilation should be performed with the current most used vm version because there are classes of it referenced in the izpack code. Usage of an older vm version at installation time will be possible because the classes of the newer vm version are only used after a vm version check. Of course, some features of izpack will be missing at using an old vm version. To recompile izpack go into [izpackroot]/src. Use a current jdk (not jre) for this. call

```
ant clean
```

followed by

```
ant all
```

then all jar files in [izpackroot]/lib, [izpackroot]/bin/panels and [izpackroot]/bin/customactions should be recompiled with the selected source version.

Writing Installation XML Files

What You Need

Your editor

In order to write your XML installation files, you just need a plain text editor. Of course it's always easier to work with color coded text, so you might rather want to work with a text editor having such a feature. Here is a list of free editors that work well :

- Jext : http://www.jext.org/
- JEdit : http://www.jedit.org/
- classics like Vim and (X)Emacs.

If you are a developer and tend to write your own patches, extension or features to IzPack sources, or, if you wish to debug your compilation, installation and uninstallation, we recommend these IDE:

- IntelliJ IDEA : http://www.jetbrains.com/idea/
- Eclipse : http://www.eclipse.org/
- Netbeans : http://www.netbeans.org/

For the first one, JetBrains has granted us an Open Source License. All project members can ask the Licence Key to one of the project manager.

The other ones are well know open source projects (Just like us :-)). We provide a tutorial on how to develop/debug IzPack using Eclipse in the chapter ''Getting Started > How to develop and debug IpPack using Eclipse''

Writing XML

Though you might not know much about XML, you have certainly heard about it. If you know XML you can skip this subsection as we will briefly present how to use XML.

XML is a markup language, really close to HTML. If you've ever worked with HTML the transition will be fast. However there are a few little things to know. The markups used in XML have the following form : `<markup>`. Each markup has to be closed somewhere with its ending tag : `</markup>`. Each tag can contain text and other markups. If a markup does not contain anything, it is just reported once : `<markup/>`. A markup can contain attributes like : `<markup attr1="123" attr2="hello !"/>`. Here is a sample of a valid XML structure :

```
<chapter title="Chapter 1">
  <section name="Introduction">
    <paragraph>
    This is the text of the paragraph number 1. It is available
    for the very low
    price of <price currency="dollar">1 000 000</price>.
```

```
    </paragraph>
  </section>
  <section name="xxx">
  xxx
  </section>
</chapter>
```

You should be aware of the following common mistakes :

- markups **are** case sensitive : `<markup>` is different from `<Markup>`.
- you **must** close the markups in the same order as you create them : `<m1><m2>(...)</m2></m1>` is right but " <m1><m2>(...)</m1></m2>" is not.

Also, an XML file must start with the following header : `<?xml version="1.0" encoding="iso-8859-1 standalone="yes" ?>`. The only thing you should modify is the encoding (put here the one your text editor saves your files to). The " standalone" attribute is not very important for us.

This (brief !) introduction to XML was just meant to enable you to write your installation specification. For a better introduction there are plenty of books and articles/tutorials dealing with XML on the Internet, in book stores, in magazines and so on.

Variable Substitution

During the installation process IzPack can substitute variables in various places with real values. Obvious targets for variable substitution are resource files and launch scripts, however you will notice many more places where it is more powerful to use variables rather then hard coded values. Wherever variables can be used it will be explained in the documentation.

There are three types of variables:

- Built-In variables. These are implemented in IzPack and are all dynamic in nature. This means that the value of each variable depends on local conditions on the target system.
- Environment variables. These are provided by the operating system the installer is run on.
- Variables that you can define. You also define the value, which is fixed for a given installation file.

You define your own variables in the installation XML file with the `<variable>` tag. How to do this is explained in detail later in this chapter.

Please note that when using variables they must always appear with a '$' sign as the first character, even though they are not defined this way.

The Built-In Variables

The following variables are built-in :

- `$INSTALL_PATH` : the installation path on the target system, as chosen by the user
- `$APPLICATIONS_DEFAULT_ROOT` : the default path for applications
- `$JAVA_HOME` : the JavaTM virtual machine home path
- `$CLASS_PATH` : the Class Path used mainly for Java Applications
- `$USER_HOME` : the user's home directory path
- `$USER_NAME` : the user name
- `$APP_NAME` : the application name
- `$APP_URL` : the application URL
- `$APP_VER` : the application version
- `$ISO3_LANG` : the ISO3 language code of the selected langpack.
- `$IP_ADDRESS` : the IP Address of the local machine.
- `$HOST_NAME` : the HostName of the local machine.
- `$FILE_SEPARATOR` : the file separator on the installation system
- `$DesktopShortcutCheckboxEnabled` : When set to true, it automatically checks the "Create Desktop Shortcuts" button. To see how to use it, go to The Variables Element ‘‘<variables>‘ Be careful this variable is case sensitve !
- `$InstallerFrame.logfilePath` : The path to the install log. This file contains the paths of all installed files. If set to "default" then the "$INSTALL_PATH/Uninstaller/install.log" path will be used. To see how to use it, go to The Variables Element ‘‘<variables>‘. If this variable is not set, no install.log will be created.

Environment Variables

Environment variables can be accessed via the syntax `${ENV[variable]}`. The curly braces are mandatory. Note that variable names are case-sensitive and usually in UPPER CASE.

Example: To get the value of the OS environment variable "CATALINA_HOME", use `${ENV[CATALINA_HOME]}`.

Dynamic Variables

Dynamic variables can be defined in the installation XML with the `<variable>` tag inside the `<dynamicvariables>` element. The value of dynamic variables will be evaluated every time a panel is switched, i.e. between the panels. Dynamic variables can have a condition which will be evaluated first. If it's true, the value would be assigned, otherwise nothing happens to the variable.

As and addition to normal variables, the value of a variable can either be defined by using the value attribute or by using a child element called value.

Example1: To change a certain directory based on user input, use the following `<variable name="test" value="/test/${USER_INPUT}" condition="hasuserinput" />` The condition has userinput has to be specified in the condition section of installation XML.

Example2: To comment out something in a xml file if a certain pack with id mycoolfeature is not activated, you could use "two" dynamic variables to create a xml comment or not.

```
<variable name="XML_Comment_Start" condition="!izpack.selected.mycoolfeature">
        <value><![CDATA[<!--]]></value>
</variable>
<variable name="XML_Comment_End" condition="!izpack.selected.mycoolfeature">
        <value><![CDATA[-->]]></value>
</variable>
<variable name="XML_Comment_Start" value="" condition="izpack.selected.mycoolfeature"
<variable name="XML_Comment_End" value="" condition="izpack.selected.mycoolfeature" /
```

The condition izpack.selected.mycoolfeature is generated automatically when a pack with id mycoolfeature was specified. You would now use `${XML_Comment_Start}` and `${XML_Comment_End}` in a file which should be parsed.

Parse Types

Parse types apply only when replacing variables in text files. At places where it might be necessary to specify a parse type, the documentation will mention this. Depending on the parse type, IzPack will handle special cases -such as escaping control characters- correctly. The following parse types are available:

- `plain` - use this type for plain text files, where no special substitution rules apply. All variables will be replaced with their respective values as is.
- `javaprop` - use this type if the substitution happens in a Java properties file. Individual variables might be modified to function properly within the context of Java property files.
- `java` - use this type for Java files.
- `xml` - use this type if the substitution happens in a XML file. Individual variables might be modified to function properly within the context of XML files.
- `shell` - use this type if the substitution happens in a shell script. Because shell scripts use `$variable` themselves, an alternative variable marker is used: `%variable` or `%{variable}`.
- `at` - use this type if the substitution must occure on files where paramters are marked with leading AT characters. The example: `@variable`.

- `ant` - use this type if the substitution must occure on files where parameters are surrounded with AT characters (similar to ANT filters, hence the type name). The example: `@variable@`.

Unless using braces to surround variable's name (`${variable}` or `%{variable}`), the variable name can contain following characters: letters, digits, dots, dashes (-), underbars (_). Example: `$this.is-my_variable`

If you want to have two variables separated by character that is allowed to appear in variable name, for example: `$major-version.$minor-version`, then you must use braces, and the above example should look like: `${major-version}.${minor-version}`.

The IzPack Elements

When writing your installer XML files, it's a good idea to have a look at the iZPACK installation DTD.

The Root Element `<installation>`

The root element of an installation is `<installation>`. It takes one required attribute : `version`. The attribute defines the version of the XML file layout and is used by the compiler to identify if it is compatible with the XML file. This should be set to **1.0** for the moment.

The Information Element `<info>`

This element is used to specify some general information for the installer. It contains the following elements :

- `<appname>` : the application name
- `<appversion>` : the application version
- `<appsubpath>` : the subpath for the default of the installation path. A variable substitution and a maskable slash-backslash conversion will be done. If this tag is not defined, the application name will be used instead.
- `<url>` : the application official website url
- `<authors>` : specifies the author(s) of the application. It must contain at least one `<author>` element whose attributes are :
  - `name` : the author's name
  - `email` : the author's email
- `<uninstaller>` : specifies whether to create an uninstaller after installation, and which name to use for it. This tag has the `write` attribute, with default value " yes". If this tag is not specified, the uninstaller will still be written. The `name` attribute can be used to change the default name of the generated uninstaller, *i.e.* " uninstaller.jar". The `condition` attribute can be used to

specify a condition which has to be fullfilled for creating the uninstaller. The `path` attribute can be used to define the destination path where the uninstaller is written to, *i.e.* `${INSTALL_PATH}/Uninstaller`.

- `<javaversion>` : specifies the minimum version of Java required to install your program. Values can be `1.2`, `1.2.2`, `1.4`, etc. The test is a lexical comparison against the `java.version` System property on the install machine.
- `<requiresjdk>`: (yes or no) specifies wether a JDK is required for the software to be installed and executed. If not, then the user will be informed and given the option to still proceed with the installation process or not.
- `<webdir>` : Causes a ''web installer'' to be created, and specifies the URL packages are retrieved from at install time. The content of the tag must be a properly formed URL.
- `<summarylogfilepath>` : specifies the path for the logfile of the SummaryLoggerInstallerListener.
- `<writeinstallationinformation>` : (yes or no) specifies if the file .installinformation should be written which includes the information about installed packs. The default if not specified is yes.
- `<pack200/>`: adding this element will cause every JAR file that you will add to your packs to be compressed using Pack200 (see http://java.sun.com/j2se/1.5.0/docs/guide/deployment guide/pack200.html). As a special exception, signed JARs are not compressed using Pack200, as it would invalidate the signatures. This makes the compilation process a little bit longer, but it usually results in drasticaly smaller installer files. The decompression is relatively fast. Please note that Pack200 compression is destructive, i.e., after decompression a JAR won't be identical to its original version (yet the code in the class files remains semantically equivalent).
- `<run-privileged/>`: adding this element will make the installer attempt to launch itself with administrator permissions. Il also supports a `condition` attribute to reference a condition id so that the elevation is not always attempted (e.g., you may want to activate it only for Windows Vista). This is not supported on all platforms, in which case a message will be provided to the user before continuing the installation. You can disable this feature for the uninstaller by specifying `uninstaller="yes"` as an attribute. Only use this feature if you really need to be an administrator as part of your installation process.

Here is an example of a typical `<info>` section :

```
<info>
  <appname>Super extractor</appname>
  <appversion>2.1 beta 6</appversion>
  <appsubpath>myCompany/SExtractor</appsubpath>
  <url>http://www.superextractor.com/</url>
  <authors>
```

```
    <author name="John John Doo" email="jjd@jjd-mail.com"/>
    <author name="El Goyo" email="goyoman@mymail.org"/>
  </authors>
  <javaversion>1.2</javaversion>
</info>
```

Here is one where the privileges elevation is attempted on Windows Vista and Mac OS X :

```
<info>
    <appname>IzPack</appname>
    <appversion>4.2.0</appversion>
    <authors>
        <author email="" name="Julien Ponge (project founder)"/>
        <author email="" name="The fantastic IzPack developers and contributors"/>
    </authors>
    <url>http://izpack.org/</url>
    <javaversion>1.5</javaversion>
    <requiresjdk>no</requiresjdk>
    <run-privileged condition="izpack.windowsinstall.vista|izpack.macinstall"/>
    <summarylogfilepath>$INSTALL_PATH/installinfo/Summary.htm</summarylogfilepath>
</info>
```

The Packaging Element `<packaging>`

This element allows to specify packaging options. If not specified, the default will be to create an all in one installer. This element will usually be used to create an installer which spans over multiple volumes, e.g. the output will be two CDs. The packaging-element contains the following elements:

- `<packager>` : specifies options used by the packager. The packager tag has the `class` attribute, which specifys the class to use for packaging. Currently two implementations are available (com.izforge.izpack.compiler.Packager, com.izforge.izpack.compiler.MultiVo
  The packager-element can contain the `<options>` element which can have different attributes for the different implementations of packagers. For the MultiVolumePackager, it can have the following attributes:
  - `volumesize`: the size of the volumes
  - `firstvolumefreespace`: free space on the first volume used for the installer jar and additional resources like readme-files etc.
- `<unpacker>` : *specifies which unpacker class should be used. Currently there are two unpacker implementations* (com.izforge.izpack.compiler.UnPacker, com.izforge.izpack.compiler.MultiVolumeUnPacker).

Here's an example how to specify an installer which will create multiple volumes. In this example the volumes shall be CDs with 650 megabytes. There will be an additional

free space of 150 megabytes on the first volume. This will result in the creation of an installer.jar and multiple installer.pak* files. The installer.jar plus installer.pak plus the additional resources have to be copied on the first volume, each installer.pak.<number> on several volumes.

```
<packaging>
  <packager class="com.izforge.izpack.compiler.MultiVolumePackager">
              <!-- 650 MB volumes, 150 MB space on the first volume -->
      <options volumesize="681574400" firstvolumefreespace="157286400"/>
  </packager>
  <unpacker class="com.izforge.izpack.installer.MultiVolumeUnpacker" />
</packaging>
```

The Variables Element `<variables>`

This element allows you to define variables for the variables substitution system. Some variables are built-in, such as `$INSTALL_PATH` (which is the installation path chosen by the user). When you define a set of variables, you just have to place as many `<variable>` tags in the file as needed. If you define a variable named `VERSION` you need to type $VERSION in the files to parse. The variable substitutor will then replace it with the correct value. One `<variable>` tag take the following attributes :

- `name` : the variable name
- `value` : the variable value

Here's a sample `<variables>` section :

```
<variables>
  <variable name="app-version" value="1.4"/>
  <variable name="released-on" value="08/03/2002"/>
</variables>
```

Here's a precise sample on how to use desktopshortcutcheckboxenabled and InstallerFrame.logfilePath variables:

```
<variables>
  <variable name="InstallerFrame.logfilePath" value="$INSTALL_PATH
  /My-install.log"/>
    <!-- This means that the log name will be My-install and that
  it will be stored at the root of the installation. -->
    <!-- Any path is fine. If value is set to "Default" then
  "$INSTALL_PATH/uninstall/install.log" is used. -->
    <!-- And if variable isn't defined then no log is written. -->
  <variable name="desktopshortcutcheckboxenabled" value="true"/>
    <!-- This automatically checks the "Create Desktop Shortcuts"
  button. Default value is "False". -->
</variables>
```

The dynamic Variables Element `<dynamicvariables>`

This element allows you to define dynamic variables for the variables substitution system. In contrast to the static `<variables`, dynamic variables will be evaluated every time, a panel switch is done.

When you define a set of variables, you just have to place as many `<variable>` tags in the file as needed. Normally you would use the condition attribute to specify, when a certain value will be set.

One `<variable>` tag take the following attributes :

- `name` : the variable name
- `value` : the variable value
- `condition` : a condition for this variable, which has to be true to set the value

Here's a sample `<dynamicvariables>` section :

```
<dynamicvariables>
  <variable name="app-version" value="1.4" condition="mycondition1" />
  <variable name="app-version" value="1.4b" condition="!mycondition1" />
  <variable name="released-on" value="08/03/2002" />
</dynamicvariables>
```

The Conditions Element `<conditions>`

This element allows you to define conditions which can be used to dynamically change the installer, e.g. the panels shown, the variables set, files parsed, files executed and much more. When you define a condition it will get a type and an id. The id has to be unique. Conditions can be referenced based on this id (e.g. with the `RefCondition`).

There are several built-in types of conditions. At the time of writing this, Izpack has the following built-in types:

- `VariableCondition`: a condition based on the value of a certain variable
- `PackSelectionCondition`: a condition based on a pack selected for installation
- `JavaCondition`: a condition based on a static java field or method.
- `CompareNumericsCondition`: a condition based on the comparison of a certain variable with a given value and operator.

There are also boolean types to combine more than one condition:

- `AndCondition`: both conditions have to be true
- `OrCondition`: only one of both conditions has to be true
- `XOrCondition`: one condition has to be true, the other one has to be false
- `NotCondition`: the condition has to be false

When you define a set of conditions, you just have to write as many `<condition>` tags as you like. A condition can take the following attributes:

- `type`: the type of the condition. For built-in types, this is the lowercase portion of the condition class
  name without condition appended (variable,packselection,java, ...). Custom condition types should be referenced by the full qualified class name, e.g. de.dr.rules.MyCoolCondition.
- `id`: the id of the condition. This will be used to refer to this conditions in other elements

The condition element can have several child elements depending on the type of this conditions. E.g. the VariableCondition has a name and value child element to specify, which variable should have a certain value to fullfil this condition.

This is an example which defines four conditions, two VariableConditions, a JavaCondition and a AndCondition which will refer to two of the first conditions.

```
<conditions>
   <condition type="variable" id="standardinstallation">
      <name>setup.type</name>
      <value>standard</value>
   </condition>
   <condition type="variable" id="expertinstallation">
      <name>setup.type</name>
      <value>expert</value>
   </condition>
   <condition type="java" id="installonwindows">
             <java>
                     <class>com.izforge.izpack.util.OsVersion</class>
                     <field>IS_WINDOWS</field>
             </java>
             <returnvalue type="boolean">true</returnvalue>
       </condition>
       <condition type="and" id="standardinstallation.onwindows">
             <condition type="ref" refid="standardinstallation"/>
             <condition type="ref" refid="installonwindows" />
       </condition>
</conditions>
```

Note, from IzPack 3.11 on normally, you don't have to define the compound conditions because you can use a simple expression language. The language has the following operators:

- `+`: an operator for the Andcondition
- `|`: an operator for the OrCondition

- \: an operator for the XOrCondition
- !: an operator for the NotCondition

Neverthless if you define really complex conditions it's much easier to define them using the xml structure.

More types of conditions can be defined by inheriting com.izforge.izpack.Condition class.

Built-in conditions

A number of built-in condition IDs are available for you.

Name	Condition
izpack.windowsinstall	The OS is Windows
izpack.windowsinstall.xp	The OS is Windows XP
izpack.windowsinstall.2003	The OS is Windows Server 2003
izpack.windowsinstall.vista	The OS is Windows Vista
izpack.windowsinstall.7	The OS is Windows 7
izpack.macinstall	The OS is Mac OS X
izpack.linuxinstall	The OS is a Linux variant
izpack.solarisinstall	The OS is a Solaris variant
izpack.solarisinstall.x86	The OS is a Solaris,x86 variant
izpack.solarisinstall.sparc	The OS is a Solaris sparc variant

The Installer Requirements Element `<installerrequirements>`

This element allows to specify requirements for running the installation. This will be done based on conditions defined in the conditons section.

An installer requirement consists of a condition and a message which will be shown if the condition is not fulfilled. If so, the installer will show the message and exit after that.

- `installerrequirement`: specifies a single installer requirement. You can define an unlimited number of them.

Installerrequirements have the following attributes: - `condition`: an id of a condition defined in the conditions section - `message`: a message text or a langpack key defining which message should be shown before exiting the installer in case of a missing requirement.

```
<installerrequirements>
   <installerrequirement conditon="installonwindows" message="This installer could on
```

```
</installerrequirements>
```

The GUI Preferences Element `<guiprefs>`

This element allows you to set the behavior of your installer GUI. This information will not have any effect on the command-line installers that will be available in future versions of IzPack. The arguments to specify are :

- `resizable` : takes `yes` or `no` and indicates whether the window size can be changed or not.
- `width` : sets the initial window width
- `height` : sets the initial window height.

Here's a sample :

```
<guiprefs resizable="no" width="800" height="600"/>
```

Starting from IzPack 3.6, the look and feel can be specified in this section on a per-OS basis. For instance you can use the native look and feels on Win32 and OS X but use a third-party one on Unix-like platforms. To do that, you have to add some children to the `guiprefs` tag:

- `laf`: the tag that specifies a look and feel. It has a `name` parameter that defines the look and feel name.
- Each `laf` element needs at least one `os` tag, specified like in the other parts of the specification that support this tag.
- Like you can add `os` elements, you can add any number of `param` elements to customize a look and feel. A `param` elements has two attribues: `name` and " value".

The available look and feels are:

- Kunststoff: `kunststoff`
- Liquid: `liquid`
- Metouia: `metouia`
- JGoodies Looks: `looks`
- Substance: `substance`

If you don't specify a look and feel for a particular operating system, then the default native one will be used: Windows on Windows, Aqua on Mac OS X and Metal on the Unix-like variants.

The *Liquid Look and Feel* supports the following parameters:

- `decorate.frames`: `yes` means that it will render the frames in Liquid style

- `decorate.dialogs`: `yes` means that it will render the dialogs in Liquid style

The *JGoodies Looks* look and feel can be specified by using the `variant` parameters. The values can be one of:

- `windows`: use the Windows look
- `plastic`: use the basic Plastic look
- `plastic3D`: use the Plastic 3D look
- `plasticXP`: use the Plastic XP look (default).

Here is a small sample:

```
<guiprefs height="600" resizable="yes" width="800">
    <laf name="metouia">
        <os family="unix" />
    </laf>
    <laf name="looks">
        <os family="windows" />
        <param name="variant" value="extwin" />
    </laf>
</guiprefs>
```

The *Substance* look and feel *toned-down* themes can be specified using the `variant` parameter, with the value being one of: `business, business- blue, business-black, creme, sahara, moderate, officesilver`. We have reduced the choice to the toned-down themes since they are the only ones to actually look decent (the other families colors are way too saturated). Please consult https://substance.dev.java.net/docs/skins/toneddown.html for a gallery of the different toned-down themes.

Starting from IzPack 3.7, some characteristics can be customized with the `<modifier>` tag. There is a separate description in the Advanced Features chapter paragraph Modifying the GUI.

The Localization Element `<locale>`

This element is used to specify the language packs (langpacks) that you want to use for your installer. You must set one `<langpack>` markup per language. This markup takes the " iso3" parameter which specifies the iso3 language code.

Here's a sample :

```
<locale>
  <langpack iso3="eng"/>
  <langpack iso3="fra"/>
  <langpack iso3="spa"/>
</locale>
```

The supported ISO3 codes are :

ISO3 code	Language
cat	Catalunyan
chn	Chinese
cze	Czech
dan	Danish
glg	Galician
deu	German
eng	English
eus	Basque
fin	Finnish
fra	French
hun	Hungarian
ita	Italian
jpn	Japanese
mys	Malaysian
ned	Nederlands
nor	Norwegian
pol	Polnish
por	Portuguese (Brazilian)
prt	Portuguese (European)
rom	Romanian
rus	Russian
scg	Serbian
spa	Spanish
svk	Slovakian
swe	Swedish
ukr	Ukrainian

The Resources Element `<resources>`

Several panels, such as the license panel and the shortcut panel, require additional data to perform their task. This data is supplied in the form of resources. This section describes how to specify them. Take a look at each panel description to see if it might need any resources. Currently, no checks are made to ensure resources needed by any panel have been included. The “ <resources>“ element is not required, and no `<res>` elements are required within. The `<resources>` element is the only element besides the `<packs>` element that is taken into consideration in referenced pack-files (see ‘`<packs>` element‘_ for more info)

You have to set one `<res>` markup for each resource. Here are the attributes to specify :

- `src` : the path to the resource file which can be named freely of course (for instance `my-picture.jpg`).
- `id` : the resource id, depending on the needs of a particular panel
- `parse` : takes `yes` or `no` (default is `no`) - used to specify whether the resource must be parsed at the installer compilation time. For instance you could set the application version in a readme file used by `InfoPanel`.
- `type` : specifies the parse type. This makes sense only for a text resource - the default is `plain`, other values are `javaprop, xml, plain, java, shell, at, ant` (Java properties file and XML files)
- `encoding` : specifies the resource encoding if the receiver needs to know. This makes sense only for a text resource.

Here's a sample :

```
<resources>
  <res id="InfoPanel.info" src="doc/readme.txt" parse="yes"/>
  <res id="LicencePanel.licence" src="legal/License.txt"/>
</resources>
```

Please note that in general a resource `id` is unique. Thus if you define multiple resources with the same `id` the later definition (e.g. a resource defined in a referenced pack-file) will overwrite the previous definition. However there is an exception for `packsLang.xml_xyz` files (see Internationalization of the PacksPanel). If multiple packsLang-files were defined, all files will be merged into a single temporary file. This allows `refpack` files to provide their own internationalization-information.

The Panels Element `<panels>`

Here you tell the compiler which panels you want to use. They will appear in the installer in the order in which they are listed in your XML installation file. Take a look at the different panels in order to find the ones you need. The `<panel>` markup takes the following attributes:

- `classname`: which is the classname of the panel.
- `id`: an identifier for a panel which can be used e.g. for referencing in userinput panel definitions.
- `condition`: an id of a condition which has to be fullfilled to show this panel
- `jar`: jar file where the classes for this panel can be found. This attribute is optional. If it is empty (jar="") the classes for this panel must be murged using the <jar> tag.

Here is a sample :

```
<panels>
    <panel classname="HelloPanel"/>
    <panel classname="LicencePanel"/>
    <panel classname="TargetPanel"/>
    <panel classname="InstallPanel"/>
    <panel classname="UserInputPanel" id="myuserinput" condition="pack2selected" />
    <panel classname="FinishPanel" jar="MyFinishPanel.jar"/>
</panels>
```

The following sections describe the tags available for a `<panel>` section.

`<help>` - optional file for a help

The content of the help file is shown in a small window on the panel, when User clicks on the help button. The button is only shown, when a help in the language exists.

The `<help>` takes the following attributes :

- `iso3`: iso3 representation of the language the help is written
- `src`: path to the help file to display

Here's a sample :

```
<panel classname="HelloPanel">
  <help iso3="deu" src="HelloPanelHelp_deu.html" />
  <help iso3="eng" src="HelloPanelHelp_eng.html" />
</panel>
```

`<validator>` - optional validation on idata

This validation is done, when going on for the next panel. It is also done in case of an automatic installation. The class must implement the interface com.izforge.izpack.installer.DataValidator.

The `<validator>` takes the following attributes :

- `classname`: The class implementing com.izforge.izpack.installer.DataValidator

Here's a sample :

```
<panel classname="UserInputPanel" id="jdbc.connection.parameters">
  <validator classname="JdbcConnectionValidator" />
</panel>
```

`<actions>` - optional actions for the panel

Here you can define multiple actions that are done during the lifetime of the panel. The class must implement the interface com.izforge.izpack.installer.PanelAction. The actions are also called during an automated installation.

The `<actions>` tag has no attributes but has `<action>` markups with the following attributes :

- `stage`: The stage when the action should be triggered.
  Possible values are `preconstruct`, `preactivate`, `prevalidate` or `postvalidate`.
- `classname`: The class implementing com.izforge.izpack.installer.PanelAction

Here's a sample :

```
<panel classname="UserInputPanel" id="jdbc.connection.parameters">
  <actions>
    <action stage="preconstruct" classname="ConnectionPreConstructAction" />
    <action stage="preactivate" classname="ConnectionPreActivateAction" />
    <action stage="prevalidate" classname="ConnectionPreVAlidateAction" />
    <action stage="postvalidate" classname="ConnectionPostValidateAction" />
  </actions>
</panel>
```

The Packs Element `<packs>`

This is a crucial section as it is used to specify the files that need to be installed. The `<packs>` section consists of several `<pack>`, `<refpack>` and `<refpackset>` tags.

The `<pack>` takes the following attributes :

- `name`: the pack name
- `required`: takes `yes` or `no` and specifies whether the pack is optional or not.
- `os`: optional attribute that lets you make the pack targeted to a specific *operating system*, for instance `unix`, `mac` and so on.
- `preselected`: optional attribute that lets you choose whether the pack is by default selected for installation or not. Possible values are `yes` and `no`. A pack which is not preselected needs to be explicitly selected by the user during installation to get installed.
- `loose`: can be used so that the files are not located in the installer Jar. The possible values are `true` or `false`, the default beeing `false`. The author of this feature needed to put his application on a CD so that the users could run it directly from this media. However, he also wanted to offer them the possibility to install the software localy. Enabling this feature will make IzPack take the files on disk instead of from the installer. *Please make sure that your relative files paths are correct !*

- `id`: this attribute is used to give a unique id to the pack to be used for internationalization via `packsLang.xml` file.
- `packImgId`: this attribute is used to reference a unique resource that represents the pack's image for the ImgPacksPanel. The resource should be defined in the `<resources>` element of the installation XML using the same value for the `id` attribute of the `<res>` element.
- `condition`: an id of a condition which has to be fullfilled to install this package.
- `hidden`: takes `true` or `false` and specifies whether the pack shall be shown in the packs panel. The bytes of such a hidden pack will be used to calculate the required space, but the pack itself won't be shown. A hidden pack can be selected conditionally. So you have to specify a condition to enable it for installation. The default for this attribute is `false`

The `<refpack>` takes only one attribute `file`, which contains the relative path (from the installation compiler) to an externally defined packs-definition. This external packs definition is a regular IzPack installation XML. However the only elements that are used from that XML file are the `<packs>` and the `<resources>` elements. This enables a model in which a single developer is responsible for maintaining the packs and resources (e.g. separate `packsLang.xml_xyz` files providing internationalization; see Internationalization of the PacksPanel) related to the development-package assigned to him. The main install XML references these xml-files to avoid synchronization efforts between the central installation XML and the developer-maintained installer XMLs.

The `<refpackset>` tag can be used in situations were there is no predefined set of `<refpack>` files, but a given directory should be scanned for `<refpack>` files to be included instead. This element takes the following parameters:

- `dir`: the base directory for the refpackset (relative path)
- `includes`: a pattern of files in `<refpack>` format that must be included

An example:

```
<refpackset dir="" includes="**/refpack.xml" />
```

Internationalization of the PacksPanel

In order to provide internationalization for the PacksPanel, so that your users can be presented with a different name and description for each language you support, you have to create a file named `packsLang.xml_xyz` where `xyz` is the ISO3 code of the language in lowercase. Please be aware that case is significant. This file has to be inserted in the resources section of " install.xml" with the `id` and `src` attributes set at the name of the file. The format of these files is identical with the distribution langpack files located at " $IZPACK_HOME/bin/langpacks/installer". For the name of the panel you just use the pack `id` as the txt `id`. For the description you use the pack `id` suffixed with `.description`.

An example:

```
<resources>
    <res id="packsLang.xml_eng" src="i18n/myPacksLang.xml_eng"/>
</resources>
```

The `packsLang.xml_eng` file:

```
<langpack>
    <str id="myApplication" txt="Main Application"/>
    <str id="myApplication.description" txt="A description of my main application"/>
    [...]
</langpack>
```

The following sections describe the tags available for a `<pack>` section.

`<description>` - pack description

The contents of the `<description>` tag describe the pack contents. This description is displayed if the user highlights the pack during installation.

`<depends>` - pack dependencies

This can be used to make this pack selectable only to be installed only if some other is selected to be installed. The pack can depend on more than one by specifying more than one “ <depends>“ elements. Circular depedencies are not supported and the compiler reports an error if one occurs.

This tag takes the following attribute:

- `packname`: The name of the pack that it depends on

`<os>` - OS restrictions

It is possible to restrict a panel to a certain list of operating systems. This tag takes the following attributes:

- `family`: unix, windows or mac
- `name`: the exact OS name (ie Windows, Linux, ...)
- `version`: the exact OS version (see the JVM `os.version` property)
- `arch`: the machine architecture (see the JVM `os.arch` property).

`<updatecheck>`

This feature can update an already installed package, therefore removing superfluous files after installation. Here's how this feature author (Tino Schwarze) described it on the IzPack development mailing-list:

> Each pack can now specify an `<updatecheck>` tag. It supports a subset of ant fileset syntax, e.g.:

```
<updatecheck>
  <include name="lib/**" />
  <exclude name="config/local/** />
</updatecheck>
```

> If the paths are relative, they will be matched relative to `$INSTALL_PATH`. Update checks are only enabled if at least one `<include>` is specified. See " com.izforge.izpack.installer.Unpacker" for details.

`<file>` - add files or directories

The `<file>` tag specifies a file (a directory is a file too) to include into the pack. It takes the following attributes:

- `src`: the file location (relative path) - if this is a directory its content will be added recursively. It may contain previously defined static variables (see `<variables>`).
- `targetdir`: the destination directory, could be something like `$INSTALL_PATH/subdirX`
- `os`: can optionally specify a target operating system (`unix, windows, mac`) - this means that the file will only be installed on its target operating system
- `override`: if `true` then if the file is already installed, it will be overwritten (use `false` otherwise). Alternative values: `asktrue` and `askfalse` - ask the user what to do and supply default value for non-interactive use. Another possible values is `update`. It means that the new file is only installed if it's modification time is newer than the modification time of the already existing file (note that this is not a reliable mechanism for updates - you cannot detect whether a file was altered after installation this way.) By default it is set to " update".
- `unpack`: if `true` and the file is an archive then its content will be unpacked and added as individual files
- `condition`: an id of a condition which has to be fullfilled to install this file

`<additionaldata>`

This tag can also be specified in order to pass additional data related to a file tag for customizing.

- `<key>`: key to identify the data
- `<value>`: value which can be used by a custom action

`<singlefile>` - add a single file

Specifies a single file to include. The difference to `<file>` is that this tag allows the file to be renamed, therefore it has a `target` attribute instead of " targetdir".

- `src`: the file location (relative path). It may contain previously defined static variables (see `<variables>`).
- `target`: the destination file name, could be something like `$INSTALL_PATH/subdirX/fileY`
- `os`: can optionally specify a target operating system (`unix, windows, mac`) - this means that the file will only be installed on its target operating system
- `override`: see `<file>` for description
- `condition`: an id of a condition which has to be fullfilled to install this file

A `<additionaldata>` tag can also be specified for customizing.

`<fileset>`: add a fileset

The `<fileset>` tag allows files to be specified using the powerful Jakarta Ant set syntax. It takes the following parameters:

- `dir`: the base directory for the fileset (relative path)
- `targetdir`: the destination path, works like for `<file>`
- `casesensitive`: optionally lets you specify if the names are case- sensitive or not - takes `yes` or `no`
- `defaultexcludes`: optionally lets you specify if the default excludes will be used - takes `yes` or `no`.
- `os`: specifies the operating system, works like for `<file>`
- `override`: see `<file>` for description
- `includes`: comma- or space-separated list of patterns of files that must be included; all files are included when omitted. This is an alternative for multiple include tags.
- `excludes`: comma- or space-separated list of patterns of files that must be excluded; no files (except default excludes) are excluded when omitted. This is an alternative for multiple exclude tags.
- `condition`: an id of a condition which has to be fullfilled to install the files in this fileset

You specify the files with `<include>` and `<exclude>` tags that take the `name` parameter to specify the Ant-like pattern :

- `**` : means any subdirectory
- `*` : used as a wildcard.

Here are some examples of Ant patterns :

- `<include name="lib"/>` : will include `lib` and the subdirectories of `lib`
- `<exclude name="**/*.java"/>` : will exclude any file in any directory starting from the base path ending by `.java`
- `<include name="lib/*.jar"/>` : will include all the files ending by `.jar` in `lib`
- `<exclude name="lib/**/*FOO*"/>` : will exclude any file in any subdirectory starting from `lib` whose name contains `FOO`.

There area set of definitions that are excluded by default file-sets, just as in Ant. IzPack defaults to the Ant list of default excludes. There is currently no equivalent to the <defaultexcludes> task. Default excludes are:

```
**/*\~{}
**/\#*\#
**/.\#*
**/%*%
**/.\_*
**/CVS
**/CVS/**
**/.cvsignore
**/SCCS
**/SCCS/**
**/vssver.scc
**/.svn
**/.svn/**
**/.DS\_Store
```

A `<additionaldata>` tag can also be specified for customizing.

`<parsable>` - parse a file after installation

Files specified by `<parsable>` are parsed after installation and may have variables substituted.

- `targetfile` : the file to parse, could be something like `$INSTALL_PATH/bin/launch-script.sh` A slash will be changed to the system dependant path separator (e.g. to a backslash on Windows) only if no backslash masks the slash.

- `type` : specifies the type (same as for the resources) - the default is `plain`
- `encoding` : specifies the file encoding
- `os`: specifies the operating system, works like for `<file>`
- `condition`: an id of a condition which has to be fullfilled to parse this file

`<executable>` - mark file executable or execute it

The `<executable>` tag is a very useful thing if you need to execute something during the installation process. It can also be used to set the executable flag on Unix-like systems. Here are the attributes :

- `targetfile` : the file to run, could be something like `$INSTALL_PATH/bin/launch-script.sh` Slashes are handled special (see attribute `targetfile` of tag `<parsable>`).
- `class` : If the executable is a jar file, this is the class to run for a JavaTM program
- `type` : `bin` or `jar` (the default is `bin`)
- `stage` : specifies when to launch : `postinstall` is just after the installation is done, `never` will never launch it (useful to set the +x flag on Unix). `uninstall` will launch the executable when the application is uninstalled. The executable is executed before any files are deleted. `never` is the default value.
- `failure` : specifies what to do when an error occurs : `abort` will abort the installation process, `ask` (default) will ask the user what to do and `warn` will just tell the user that something is wrong
- `os`: specifies the operating system, works like for `<file>`
- `keep` : specifies whether the file will be kept after execution. The default is to delete the file after is has been executed. This can be changed by specifying `keep="true"`.
- `condition`: an id of a condition which has to be fullfilled to execute this file

A `<args>` tag can also be specified in order to pass arguments to the executable:

- `<arg>`: passes the argument specified in the `value` attribute. Slashes are handled special (see attribute `targetfile` of tag `<parsable>`.

`<os>` - make a file OS-dependent

The `<os>` tag can be used inside the `<file>`, `<fileset>`, `<singlefile>`, `<parsable>`, `<executable>` tags to restrict it's effect to a specific operating system family, architecture or version using the following attributes:

- `family`: `unix, windows, mac` to specify the operating system family
- `name`: the operating system name

- `version`: the operating system version
- `arch`: the operating system architecture (for instance the Linux kernel can run on i386, sparc, and so on)

Here's an example installation file fragment:

```
<packs>

(...)

    <pack name="Core" required="yes">

    (...)

        <executable targetfile="$INSTALL_PATH/bin/compile" stage="never">
            <os family="unix"/>
        </executable>

    (...)

    </pack>

(...)

</packs>
```

The Native Element `<native>`

Use this if you want to use a feature that requires a native library. The native libraries are placed under `bin/native/...` There are 2 kinds of native libraries : the iZPACK libraries and the third-party ones. The IzPack libraries are located at `bin/native/izpack`, you can place your own libraries at " bin/native/3rdparty". It is possible to place a native library also into the uninstaller.

It is usable from CustomActions. If one or more are referenced for it, the needed support classes are automatically placed into the uninstaller. To place it only on operating systems for which they are build, it is possible to define an OS restriction. This restriction will only be performed for the uninstaller. The markup takes the following attributes :

- `type` : `izpack` or `3rdparty`
- `name` : the library filename
- `stage`: stage where to use the library (install|uninstall|both)
- `src` : source directory where to find the library to build the installer

Note for developers: `com.izforge.izpack.util.Librarian.loadLibrary()` must be used to load custom native libraries, as it performs some housekeeping.

`<os>` - make a library OS-dependent

The `<os>` tag can be used to restrict the inclusion into the uninstaller to a specific operating system family, architecture or version. The inclusion into the installer will be always done.

Here's a sample :

```
<native type="izpack" name="ShellLink.dll">
    <os family="windows"/>
</native>
```

The Jar Merging Element `<jar>`

If you adapt iZPACK for your own needs, you might need to merge the content of another jar file into the jar installer. For instance, this could be a library that you need to merge. The `<jar>` markup allows you to merge the raw content of another jar file into the installer and the uninstaller. It is necessary that the paths in the jars are unique because only the contained files of the jar are added to the installer jar, not the jar file self. The attributes are:

- `src` : the path at compile time
- `stage`: stage where to use the contents of the additional jar file (install|uninstall|both)

A sample :

```
<jar src="../nicelibrary.jar"/>
```

XInclude-style constructs

The xi:include element is used to include xml or text documents in your configuration files.

The xi:include element can be used anywhere in pretty much any of the xml files used by IzPack. It is supported by the javax DocumentBuilder. It follows the XInclude recommandation produced by the W3C (http://www.w3.org/TR/xinclude/) and should be able to be used as decribed in that document.

To use the xi:include, you have to specify the namespace xmlns:xi="http://www.w3.org/2001/XInclude" in your xml.

If a logical error appear in an included file, the line number shown will indicate the xinclude element in the main xml file.

The xi:include element has the following attributes:

href
: The location of the file to include. If this is a relative path (e.g. href='../bob.xml') then the file is resolved relative to the document that includes the xinclude element. The href element can be a remote url (e.g. href='http://example.com/file.txt') but this is not recommended.

parse
: Indicates that the included file should be treated as xml, forcing the included file to be parsed (which results in all xinclude elements in the included file to also be included), or as text which includes the specified file as a text node. It can have a value of 'xml' or 'text' and defaults to 'xml' if ommitted.

xpointer
: In case in parse="xml", you can use xpointer to get a part of the included xml. The details of the xpointer framework can be found http://www.w3.org/TR/2003/REC-xptr-framework-20030325/.

encoding
: This is used when the parse attribute is 'text' to specify the character encoding of the included text document. It has no effect if parse is 'xml'.

accept
: Used if the href attribute specifies a url accessible via HTTP. The value of this attribute will be added as the accpet header on the HTTP request.

The fallback element

The xi:fallback element is used to provide a fallback if the xi:include element fails. It can be empty or can contain a valid xml. If it is empty then a failure to include the specified document is supressed. If it contains a xml then a failure to include the specified document causes the xml specified in the fallback is parsed (evaluating nested xinclude elements) and inserted into the document in its place.

For example the following use of xi:include

```
<?xml version="1.0" encoding="iso-8859-1" standalone="yes" ?>
<aaa xmlns:xi="http://www.w3.org/2001/XInclude">
  <xi:include href="does-not-exist.xml">
      <xi:fallback>
          <bbb/>
      </xi:fallback>
  </xi:include>
</aaa>
```

will result in

```
<?xml version="1.0" encoding="iso-8859-1" standalone="yes" ?>
<aaa>
  <bbb/>
</aaa>
```

if the file 'does-not-exist.xml' does indeed not exist.

The xfragment element

The xfragment element allows document fragments (xml documents without a single top level element) to be included. Simply use the xfragment as the top level element in the included document. It will be removed when the document is included.

e.g. If I want to use xi:include to include a file containing the following fragments:

```
<ffff>
    <gggg>hello</gggg>
</ffff>
<hhhh>
    <iiii>there</iiii>
</hhhh>
```

I could use the xfragment element to enable it

```
<?xml version="1.0" encoding="iso-8859-1" standalone="yes" ?>
<xfragment>
    <ffff>
        <gggg>hello</gggg>
    </ffff>
    <hhhh>
        <iiii>there</iiii>
    </hhhh>
</xfragment>
```

The Available Panels

In this section I will introduce the various panels available in IzPack. The usage for most is pretty simple and described right here. The more elaborate ones are explained in more detail in the *Advanced Features* chapter or in their own chapter. The panels are listed by their class name. This is the name that must be used with the `classname` attribute. Please be aware that the classname is Case-Sensitive, meaning that if the case from the install.xml and the founded class file differs the installation will break. In this last case, the installer will Throw an IllegalArgumentException in the compiler if the declared class name in the xml file differs in case from the founded class file.

HelloPanel

This panel welcomes the user by displaying the project name, the version, the URL as well as the authors.

HTMLHelloPanel

This panel allows an HTML document to be used as the “welcome” panel. It operates like the ’HTMLInfoPanel’, except that the resource name “HTMLHelloPanel” is used

(i.e., “HTMLHelloPanel.info”).

CheckedHelloPanel

This panel welcomes the user also by displaying the project name, the version, the URL as well as the authors.

Additonal on windows the registry will be scanned for an entry which determines that the product is already installed. If so, a dialog will be shown which ask whether to install a second version of the product or not. If you use this panel do not forget to add the registry feature into your installation.

InfoPanel and HTMLInfoPanel

This is a kind of 'README' panel. It presents text of any length. The text is specified by the `(HTML)InfoPanel.info` resource. Starting from IzPack 3.7.0, variables substitution is allowed. To add an image to the HTMLInfoPanel you simply need to add a ressource to your install.xml with an ID decided by you, then you can call this image by refering it by this same ID.

In install.xml:

```
<resources>
  <res src="logo.jpg" id="GHGHGH"/>
  .....
```

and in file.html:

```
<img src="GHGHGH" />
```

Note that variables are being substituted in HTMLINfoPanel (e.g., `$JINSTALL_PATH` will be replaced with the installation path).

You can define multiple HTMLInfoPanel with individual HTML texts by giving them a specific id. The resources are named `HTMLInfoPanel.<panelid>` :

```
<resources>
<res id="HTMLInfoPanel.readme" src="readme.html"/>
<res id="HTMLInfoPanel.disclaimer" src="disclaimer.html"/>
...
<resources>
...
<panels>
<panel classname="HTMLInfoPanel" id="readme" />
<panel classname="HTMLInfoPanel" id="disclaimer" />
...
</panels>
```

LicencePanel and HTMLLicencePanel

Note:* There is a mistake in the name - it should be LicensePanel. In France the word is Licence ... and one of my diploma is a 'Licence' so ...:* -)

Adding images to HTMLLicencePanel works exactly the same way as with HTMLInfoPanel.

These panels can prompt the user to acknowledge a license agreement. They block unless the user selects the 'agree' option. To specify the license agreement text you have to use the " (HTML)LicencePanel.licence" resource.

PacksPanel

Allows the user to select the packs he wants to install. This panel also allows grouping of packs. Look at `InstallationGroupPanel` description to get more details.

ImgPacksPanel

This is the same as above, but for each pack a different picture is shown to the user. The pictures are specified using the packImgId attribute for each pack in the installer XML. The initial image will be the image of the first pack that has a packImgId. The image is updated each time the user (de)selects a pack that has a packImgId. Of course it's up to you to specify an image for each pack in your installation with a unique packImgId. For instance if you have 2 packs `core` and `documentation` (in this order), and you assign both packs a packImgId that is identical to the pack's name then the resource for `core` will be `core` and the resource for `documentation` will be `documentation`. The initially shown image will be the resource `core`. The supported image formats depend on what your client's JVM supports, but starting from J2SE 1.3, *GIF*, *JPEG* and *PNG* are supported.

TreePacksPanel

This panel is very similar to `PacksPanel`, but instead of simple list of available packs, the tree-like list is constructed. By using the `parent` attribute of `pack` element, one can specify the hierarchy of the tree. This panel supports grouping just like `PacksPanel` does.

example

```
<installation version="1.0">
   (...)
    <panels>
        (...)
        <panel classname="TreePacksPanel"/>
        (...)
    </panels>
```

```
    <packs>
        <pack name="Base"
            required="yes">
            (...)
        </pack>
        <pack name="Themes"
            required="no">
            (...)
        </pack>
        <pack name="Black"
            parent="Themes"
            required="no">
            (...)
        </pack>
        <pack name="Red"
            parent="Themes"
            required="no">
            (...)
        </pack>
    </packs>
</installation>
```

The result tree contains Base element with no children, and Themes with two children named Black and Red.

TargetPanel

This panel allows the user to select the installation path. It can be customized with the following resources (they are text files containing the path) :

- `TargetPanel.dir.f` where f stands for the family (`mac, macosx, windows, unix`)
- `TargetPanel.dir` : the directory name, instead of the software to install name
- `TargetPanel.dir.d` where d is a "dynamic" name, as returned by the JavaTM virtual machine. You should write the name in lowercase and replace the spaces with underscores. For instance, you might want a different setting for Solaris and GNU/Linux which are both Unix-like systems. The resources would be `TargetPanel.dir.sunos, TargetPanel.dir.linux`. You should have a Unix-resource in case it wouldn't work though.

The 'ShowCreateDirectoryMessage' variable may be used to suppress the "target directory will be created" dialog. If the 'ShowCreateDirectoryMessage' variable is set to "false" then the dialog will not be shown. If the 'ShowCreateDirectoryMessage' variable is set to "true" or is not specified then the dialog will be shown if the target directory

does not exist. See the "Variables Element" section for information on how to specify variables.

DefaultTargetPanel

The default installation directory is specified as in the TargetPanel (using identical names (TargetPanel... not DefaultTargetPanel...), but will not allow the user to change the installation path. It can be used when software must be installed in a specific location.

InstallPanel

You should always have this one as it launches the installation process !

XInfoPanel

A panel showing text parsed by the variable substitutor. The text can be specified through the `XInfoPanel.info` resource. This panel can be useful when you have to show information after the installation process is completed (for instance if the text contains the target path). The font can be set on this text through the optional variable `XinfoPanel.font`, and its value is to be formatted consistent with the support provided by java.awt.Font.decode().

In the following example the font size and type are omitted, but they can also be part of the value:

```
<variable name="XInfoPanel.font" value="monospaced"/>
```

FinishPanel

A ending panel, able to write automated installer information. For details see the chapter on 'Advanced Features'.

SimpleFinishPanel

Same as `FinishPanel`, but without the automated installer features. It is aimed at making the life easier for end-users who will never encounter the automated installer extra feature.

ShortcutPanel

This panel is used to create desktop shortcuts. For details on using the ShortcutPanel see the chapter 'Desktop Shortcuts'.

UserInputPanel

This panel allows you to prompt the user for data. What the user is prompted for is specified using an XML file which is included as a resource to the installer.

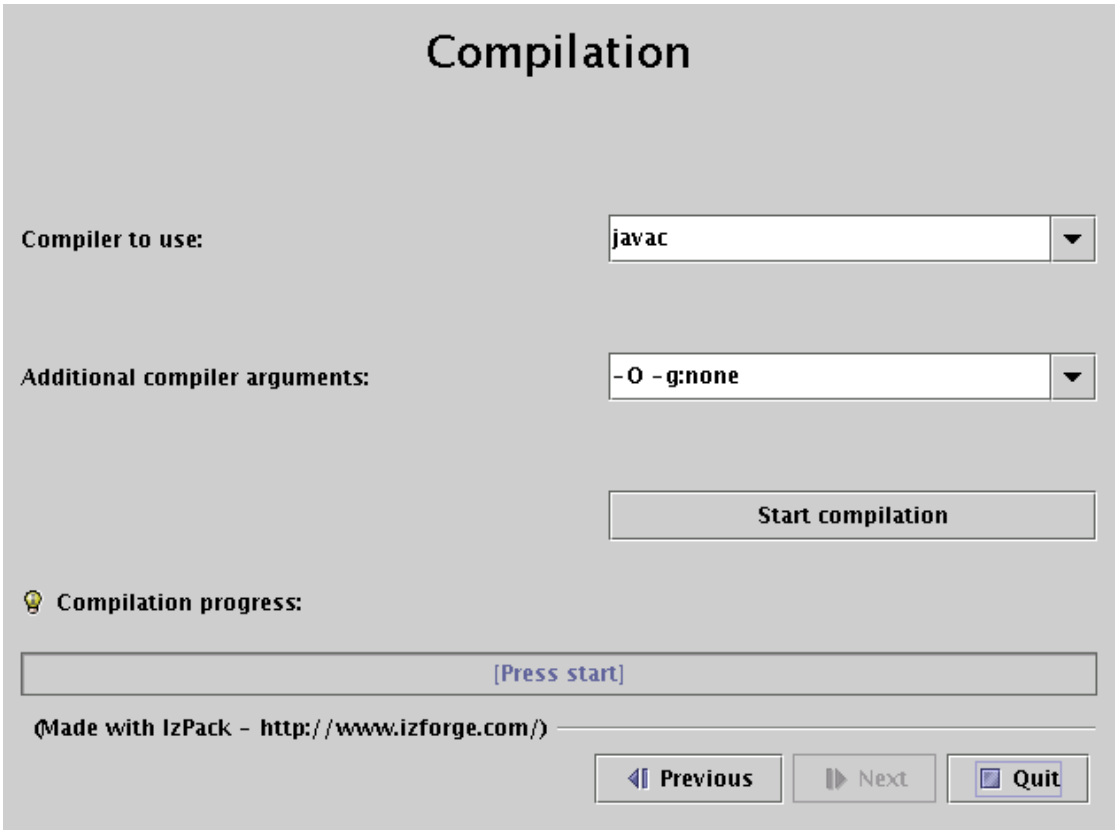
CompilePanel

This panel allows you to compile just installed Java sourcecode. The details for the compilation are specified using the resource `CompilePanel.Spec.xml`. The XML file has the following format:

```
<compilation>
  <global>
    <compiler>
      <choice value="$JAVA_HOME/bin/javac" />
      <choice value="jikes" />
    </compiler>
    <arguments>
      <choice value="-O -g:none" />
      <choice value="-O" />
      <choice value="-g" />
      <choice value="" />
    </arguments>
  </global>
  <jobs>
    <classpath add="$INSTALL_PATH/src/classes/" />
    <job name="optional name">
      <directory name="$INSTALL_PATH/src/classes/xyz" />
    </job>
    <job name="another job">
      <packdepency name="some package name" />
      <classpath sub="$INSTALL_PATH/" />
      <directory name="$INSTALL_PATH/src/classes/abc" />
      <file name="$INSTALL_PATH/some/file.java" />
    </job>
  </jobs>
</compilation>
```

In theory, jobs can be nested but this has not been tested at all. A change to the classpath within a job only affects this job and nested jobs. The classpath should be specified before any files or directories.

The user can change the compiler to use and choose from some default compilation options before compilation is started.



ProcessPanel

This panel allows you to execute arbitrary files after installation. The details for the compilation are specified using the resource `ProcessPanel.Spec.xml`.

The XML file has the following format:

```
<processing>
  <job name="do xyz">
    <os family="windows" />
    <executefile name="$INSTALL_PATH/scripts/xyz.bat">
      <arg>doit</arg><arg>$variable</arg>
    </executefile>
  </job>
  <job name="do xyz">
    <os family="unix" />
    <executefile name="$INSTALL_PATH/scripts/xyz.sh">
      <arg>doit</arg><arg>$variable</arg>
    </executefile>
  </job>
</processing>
```

Each job may have an `<os>` attribute.

In addition to `<arg>` elements, the `<executefile>` element also accepts `<env>` elements to set variables in the environment of the target process. This can be useful if this process requires some environment variables, such as its installation directory, to work properly. An `<env>` element has the following syntax: `<env>variable=value</env>`. Note the value supports variable substitution, for example: `<env>MY_PRODUCT_HOME=$INSTALL_PATH</env>`.

The ProcessPanel now also supports configurable behaviour for the panel's "Previous" and "Next" buttons. By adding `<onFail>` and `<onSuccess>` childs to the `<processing>` element, you define which buttons you want unlocked in case of failure and in case of success, respectively.

```
<processing>
  <job name="do xyz">
    <executefile name="$INSTALL_PATH/scripts/xyz.bat">
      <arg>doit</arg><arg>$variable</arg>
    </executefile>
  </job>
  <onFail previous="true" next="false" />
  <onSuccess previous="true" next="true" condition="mycondition" />
  <onSuccess previous="false" next="true" condition="!mycondition" />
</processing>
```

In the above example the job *do xyz* would be run, and if it returned with an error, the *next* button would be greyed out, and the button to the *previous* page would be enabled. If it returned without an error, the conditions of the `<onSuccess>` elements would be checked and the respective action would be taken.

`<executeclass>` - Execute Java Classes

It is also possible to execute Java classes from this panel. Here's what this feature author (Alex Bradley) says:

> i've been able to work around my requirements by extending the `ProcessPanelWorker` functionality to run user-specified classes. i've extended the DTD of the " ProcessPanel.Spec.xml" to include a new element:

```
<executeclass name="classname">
<args..../>
</executeclass>
```

> i've also added a new sub-class of `Processable` called `executeclass`. This will run a user-specified class in the context of the installer JVM with a single method :

```
run( AbstractUIProcessHandler handler, String[] args]);
```

> It can do everything i need and more. In particular, it allows me to write a process extension and still be able to provide feedback to the user through the feedback panel, and to add new functionality to the installer, after its been built.

To use the executeclass facility, you will need to create a jar file with your class and then add it to the installer with the The Jar Merging Element.

`<executeForPack>` - Only execute the job for certain packs

This can be be used to run the job only if the pack is enabled. For example, the batch file will if either the `Sources` or `Executables` packs are selected at install time.

```
<processing>
 <job name="List files">
  <executeForPack name="Sources"/>
  <executeForPack name="Executables"/>
  <os family="windows" />
  <executefile name="$INSTALL_PATH\batch\ListFiles.bat" />
 </job>
</processing>
```

`<logfiledir>` - Output of the processPanel saved to a log

New with version 3.7 is the possibility to tee output that is written to the ProcessPanel's textarea into an optional logfile. Using this feature is pretty much straightforward, you only have to add a line in `ProcessPanel.Spec.xml` that will tell IzPack the location, where the logfile should be stored.

Variable substitution is performed, so you can use `$INSTALL_PATH` as example.

The name of the logfile is not (yet) configurable but should fit in most cases. It will be named

```
Install_V<$APP_VER>_<YYYY>-<MM>-<DD>_<hh>-<mm>-<ss>_<RandomId>.log
```

Here's an example:

```
<processing>
  <logfiledir>$INSTALL_PATH</logfiledir>
  <job name="do xyz">
    <os family="windows" />
    <executefile name="$INSTALL_PATH/scripts/xyz.bat">
      <arg>doit</arg><arg>$variable</arg>
    </executefile>
</processing>
```

This will generate a logfile named e.g. `Install_V1.3_2004-11-08_19-22-20_43423.log` located in `$INSTALL_PATH`.

`ProcessPanelWorker` will write all output that is directed to `stdout` and `stderr` to this file if `ProcessPanel.Spec.xml` contains the `logfiledir` entry.

Please note that this one file is used for storing the complete output of all jobs and not a file for each job that is run.

JDKPathPanel

This panel allows the user to select a JDK path. The variable JAVA_HOME does not point to a JDK, else to a JRE also the environment variable points to a JDK. This is not a bug, this is the behavior of the VM. But some products needs a JDK, for that this panel can be used. There is not only a selection of the path else a validation. The validation will be done with the file JDKPath/lib/tools.jar. If JAVA_HOME points to the VM which is placed in the JDK, the directory will be used as default (JAVA_HOME/..). If there is the variable

```
JDKPathPanel.skipIfValid
```

defined with the value "yes", the panel will be skiped if the path is valid. Additional it is possible to make a version control. If one or both variables

```
JDKPathPanel.minVersion
JDKPathPanel.maxVersion
```

are defined, only a JDK will be accepted which has a version in the range of it. The detection is a little bit pragmatically, therefor it is possible, that the detection can fail at some VMs. The values in the install.xml should be like

```
<variables>
  <variable name="JDKPathPanel.minVersion" value="1.4.1" />
  <variable name="JDKPathPanel.maxVersion" value="1.4.99" />
  <variable name="JDKPathPanel.skipIfValid" value="yes" />
</variables>
```

If all is valid, the panels isValidated method sets the variable

```
JDKPath
```

to the chosen path. Be aware, this variable exist not until the JDKPanel was quitted once. At a secound activation, the default will be the last selection.

SelectPrinterPanel

This panel will look at the local printers installed and propose a list box with all of them. Once chosen, the variable $SELECTED_PRINTER is set to the user choice.

DataCheckPanel

DataCheckPanel is not for inclusion in an actuall install, but is a debugging resource for developers writing custom panels or code to be included in IzPack. It creates a list of all the variables in InstallData, their values and a list of all packs, indicating which are selected. This list is printed to the console and appears in a scrollable text area on the panel. Put the panel in wherever you want to see any variables in InstallData or a listing of the packs with a line like this in the <panels> section of install.xml:

<panel classname="DataCheckPanel" />

It will automatically give you a full list of all the variables and packs whenever the panel is made active.

SummaryPanel

This panel gives a summary of all shown panels. The best place for it is just infront of the InstallPanel. Normaly it contains a warning that this is the last panel before installation. The panel contains a scrollable HTML text area to display the summary. The informations are collected from each panel by calling the methods `getSummaryCaption` and `getSummaryBody`. `getSummaryCaption` is implemented in `IzPanel` with a panel name default text. `getSummaryBody` has to be implemented in all panels which should be presented in the summary. If the secound method is not implemented, no summary of this panel will be shown.

Additional it is possible to log the contents of the summary panel into a HTML file.

InstallationGroupPanel

This Panel groups the pack together. A panel which displays the available *installGroups* found on the packs to allow the user to select a subset of the packs based on the pack *installGroups* attribute. This panel will be skipped if there are no pack elements with an *installGroups* attribute. For example

```
<installation version="1.0">
   (...)
    <panels>
        (...)
        <panel classname="InstallationGroupPanel"/>
        <panel classname="PacksPanel"/>
        (...)
    </panels>

    <packs>
        <pack name="Base"
            installGroups="Group1"
            required="yes">
            (...)
        </pack>
        <pack name="Docs"
            installGroups="Group1,Group2"
            required="no">
            (...)
        </pack>
        <pack name="Sources"
            installGroups="Group3,Group2"
```

```
            required="no">
            (...)
        </pack>
    </packs>
</installation>
```

In above example when InstallationGroupPanel is displayed, it contains three radios named Group1, Group2 and Group3. Depending on what user selects, the respective Packs will be displayed in PacksPanel. InstallationGroupPanel will look for a description corresponding to the key "InstallationGroupPanel.description.Group1", "InstallationGroupPanel.description.Group2" etc in installation langpacks and variables and displays this description for each of the Group_i.

You may also define a sortKey in the variables section of the installer.xml to define an alternative sorting. The default sorting is based on the Group Name.

Here is an example for alternative sorting of groups:

```
(...)
<variables>
   (...)
    <variable
    name="InstallationGroupPanel.sortKey.Group2" value="A"/>
    <variable
    name="InstallationGroupPanel.sortKey.Group1" value="B"/>
    <variable
    name="InstallationGroupPanel.sortKey.Group3" value="C"/>
</variables>
(...)
```

By default, your group name (and description) are displayed as-is in the installer. If you want them to be localized, add localized names to your `packsLang.xml` resources. The string ID has to be InstallationGroupPanel.group.‘‘‘group_name‘‘.

Here is an example to localize groups into French (these lines have to be put in your `packsLang.xml_fra` resource) :

```
<str id="InstallationGroupPanel.group.Core" txt="Noyau de l'application" />
<str id="InstallationGroupPanel.description.Core" txt="Fichiers principaux, indispens
<str id="InstallationGroupPanel.group.Samples" txt="Fichiers d'exemple" />
<str id="InstallationGroupPanel.description.Samples" txt="Fichiers d'exemples" />
```

If you want to add html markup to those strings, add `.html` at the end of the string id (after the group name).

UserPathPanel

This panel allows the user to select a path similar to the installation path. Like the installation path, this panel will allow the directory to be created if it does not already exist. It can also be pre-loaded with a path and set to only display if a certain pack is selected using the following variables:

```
<variable name="UserPathPanelVariable" value="@{default.dest.dir.sql}"/>
<variable name="UserPathPanelDependsName" value="Install Database Server"/>
```

Final path selection can be accessed using the variable "UserPathPanelVariable".

Messages for the UserPathPanel can be customized by creating a custom lang pack and overriding the following values (attribute values wrapped for readability):

```
<str id="UserPathPanel.required" txt="The chosen directory should exist."/>
<str id="UserPathPanel.info" txt="Select the path: "/>
<str id="UserPathPanel.browse" txt="Browse"/>
<str id="UserPathPanel.exists_warn" txt="The directory already exists!
            Are you sure you want to install here and possibly overwrite existing fil
<str id="UserPathPanel.empty_target" txt="You have not specified a target
            location! Is this correct?"/>
<str id="UserPathPanel.createdir" txt="The target directory will be created: " />
<str id="UserPathPanel.nodir"  txt="This file is not a directory! Please
            choose a directory!"/>
<str id="UserPathPanel.notwritable" txt="This directory can not be written!
            Please choose another directory!"/>
```

Advanced features

Apache Ant integration

IzPack can be easily integrated inside an Ant build process. To do so you first need to tell Ant that you would like to use IzPack:

```
<!-- Allows us to use the IzPack Ant task -->
<taskdef name="IzPack" classpath="${basedir}/lib/compiler.jar"
         classname="com.izforge.izpack.ant.IzPackTask"/>
```

If you want to use the standalone compiler (and therefore don't need an IzPack installation for building), the task needs to be defined as follows:

```
<!-- Allows us to use the IzPack Ant task -->
<taskdef name="IzPack" classpath="${basedir}/lib/standalone-compiler.jar"
         classname="com.izforge.izpack.ant.IzPackTask"/>
Don't forget to add compiler.jar or standalone-compiler.jar to the classpath of the A
```

Then you can invoke IzPack with the IzPack task which takes the following parameters:

- 'input': the XML installation file. The installation can be specified as an external file, or embedded using a config child element (see section 3.2).
- 'output': the output jar installer file
- 'installerType': optional. standard or web. If web, the <webdir> attribute must be specified in the input file (see section 3.7). Used to force creation of a standard installer when the <webdir> attribute has been used.
- 'baseDir': the base directory to resolve the relative paths
- 'IzPackDir': the IzPack home directory. Only necessary if you do not use the standalone compiler.

Here is a sample of the task invocation:

```
<!-- We call IzPack -->
<echo message="Makes the installer using IzPack"/>
<IzPack input="${dist.dir}/IzPack-install.xml"
        output="${dist.dir}/IzPack-install.jar"
        installerType="standard"
        basedir="${dist.dir}"
        IzPackDir="${dist.dir}/"/>
```

Embedding the installation file using a config element

Instead of using the 'install' attribute to specify an external installation document, you can embed the installation config as a child of the IzPack task using a config child element with a CDATA section. For example:

```
<property name="jboss.home.url" value="http://www.jboss.com/" />
...

<!-- Call IzPack with an embedded install using the config element -->
<IzPack output="${dist.dir}/IzPack-install.jar"
        installerType="standard"
        basedir="${dist.dir}"
        IzPackDir="${dist.dir}/">
        <config><![CDATA[
<installation version="1.0">
   <info>
      <appname>JBossAS</appname>
      <appversion>4.0.2</appversion>
      <appsubpath>jboss-4.0.2</appsubpath>
      <authors>
         <author name="JBoss Inc." email="sales@jboss.com"/>
```

```
        </authors>
        <url>@{jboss.home.url}</url>
        <javaversion>1.4</javaversion>
    </info>
...
         ]]></config>
</IzPack>
```

Property references of the form

```
@{x}
```

are replaced by the associated x ant property if it is defined.
A few variables are made available by both Ant and IzPack:

- `basedir` (base directory from Ant)
- `izpack.file`
- `UNPACKER_CLASS` the name of the unpacker class
- `user.dir` the user directory.

System properties as variables

All system properties are available as '$SYSTEM_<variable>' where '<variable>' is the actual name but with all separators replaced by '_'. Properties with null values are never stored.

Examples:
'$SYSTEM_java_version' or '$SYSTEM_os_name'

Automated Installers

When you conclude your installation with a FinishPanel, the user can save the data for an automatic installation. With this data, he will be able to run the same installation on another similar machine. In an environment where many computers need to be supported this can save a lot of time.

So run once the installation on a machine and save your automatic installation data in auto-install.xml (that's just a sample). Then put this file in the same directory as the installer on another machine. Run it with:

```
java -jar installer.jar auto-install.xml
```

It reproduced the same installation.

Console (headless) installers

An IzPack installer can be run in a full headless mode, i.e., without needing a graphical user interface. This is useful, e.g., in the case of remotely accessed servers through SSH or similar means.

It differs from automated installers in the sense that a console installer is not "just" a replay of a previous installation but a true console-based installation. It shares a common feature though: it can be automated as well.

To launch an installer in console mode rather than in GUI mode (the default), you can specify one of the following parameters on the command line:

- `-console`: to run the installation in interactive console mode
- `-options-template`: to generate a properties file whose name is specified in args[1]
- `-options`: to run an installation while reading the properties from the properties file specified in args[1].
- `-language`: specifies the iso3 code of the language pack to use in the next argument. Note: the first specified language pack will be used if this argument was not passed.

As an example, to launch an interactive console installation, just type in a console:

```
java -jar installer.jar -console
```

Picture on the Language Selection Dialog

You can add a picture on the language selection dialog by adding the following resource : 'installer.langsel.img'. GIF, JPEG and PNG pictures are supported starting from J2SE 1.3.

Picture in the installer

It is possible to specify an optional picture to display on the left side of the installer. To do this, you just have to define a resource whose id is 'Installer.image'. For instance

```
<res id="Installer.image" src="nice-image.png" />
```

will do that. If the resource isn't specified, no picture will be displayed at all. GIF, JPEG and PNG pictures are supported starting from J2SE 1.3.

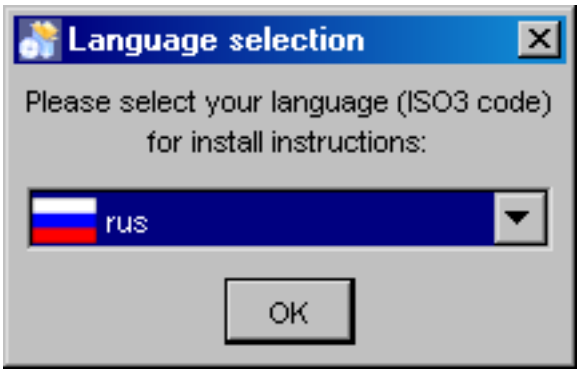
You can also give a specific picture for a specific panel by using the 'Installer.image.n' resource names where is the panel index. For instance if you want a specific picture for the third panel, use 'Installer.image.2' since the indexes start from 0.

Modifying the GUI

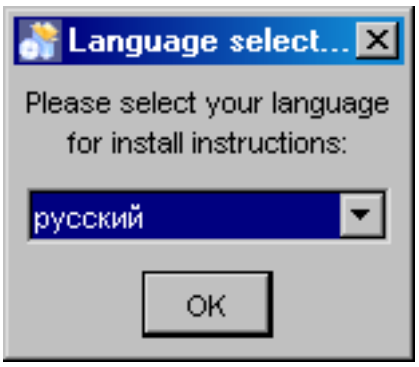
There are some options to modify the graphic user interface. Most of them are managed with key/value pairs of the element '<modifier>' which will be located in the element '<guiprefs>' in the installation description file.

Modifying Language Selection Dialog

Additional to the picture in the language selection dialog it is possible to modify flags and the type of showing the language name. Following different views (without an images to reduce space).



Standard language selection dialog



Alternative language selection dialog

- 'useFlags': possible are "yes" or "no". Default is "yes". If it is set to "no", no flag will be displayed in the language selection dialog. For "no" it is recommended to define also 'langDisplayType' other then "iso3".
- 'langDisplayType': possible are "iso3", "native" and "default". Default is "iso3". With "iso3" the text for a language will be displayed as ISO 639-2:1998 code. With "native" the notation of the language will be used if possible, else the notation of the default locale. Using "default" will be presented the language in the notation of the default locale of the VM.

Modifying IzPack Panels

There are some graphic elements and behavior which are preferred by some people and deprecate by other. The following keys are related to the whole installation (all panels).

- 'useButtonIcons': possible are "yes" or "no". Default is "yes". If it is set to "no", all buttons which are created via the ButtonFactory contains no icon also a icon id was submitted. Directly created buttons are not affected.
- 'useLabelIcons': possible are "yes" or "no". Default is "yes". If it is set to "no", all labels which are created via the LabelFactory contains no icon also a icon id was submitted. Directly created labels are not affected.
- 'labelFontSize': A float value used as a multiplier for the font size on labels created via the LabelFactory and IzPanel. Directly created labels are not affected.
- 'layoutAnchor':layout anchor for IzPanels. Valid are "NORTH", "NORTHWEST", "SOUTHWEST", "SOUTH" and "CENTER". Only panels which are using the layout helper of IzPanels are supported. These are not all standard panels. At developing custom panels it is recommended to use the layout helper with an IzPanelLayout. Note: The anchor definition will be used for all panels!
- Gaps: there are defined different gaps between different components of a IzPanel if using IzPanelLayout. The gaps can be set also via the element '<modifier>' of '<guiprefs>'. It is possible to declare different values for X and Y axis. This will be determined in the key word name. X Gaps are insert after Y gaps under the control for which the gap was declared. Following key words are defined:
  - 'labelXGap | labelYGap': gap in pixel between two labels in X or Y direction.
  - 'textXGap | textYGap': gap in pixel between two text fields.
  - 'controlXGap | controlYGap': gap in pixel between two controls other than label or textfield.
  - 'paragraphYGap': gap in pixel for a paragraph. A paragraph will be created in the panel source for controls which should be separated. paragraphXGap is declared, but not used.
  - 'labelToTextXGap | labelToTextYGap': gap in pixel between a label (left or top) and a text field (right or bottom).
  - 'labelToControlXGap | labelToControlYGap': gap in pixel between a label (left or top) and a control other than a label or a textfield.
  - 'textToLabelXGap | textToLabelYGap': gap in pixel between a text field (left or top) and a label.
  - 'controlToLabelXGap | controlToLabelYGap': gap in pixel between a control other than a label or a text field and a label.
  - 'controlToTextXGap | controlToTextYGap': gap in pixel between a control other than a label or a text field and a text field.

  - 'textToControlXGap | textToControlYGap': gap in pixel between a text field and a control other than a label or a text field .
  - 'firstYGap': gap in pixel between the top border and the first control.
  - 'filler[N]XGap | filler[N]YGap': gap in pixel created by the layout manager. Filler are used by some panels. [N] is a number between 1 and 5 to allow to use different filler e.g. filler3XGap or filler1YGap.
  - 'allXGap | allYGap': gap in pixel between all controls in X or Y direction. If this is declared all gaps for which no own declaration exists gets this value. If a gap has an own declaration this will be used instead.

- 'layoutYStretchType | layoutXStretchType': the IzPanelLayout manager allows to declare stretch factors for controls. This means, that a control will be stretched if there is place in the line. The amount of stretching will be determined by the stretch factor. But what to do if the hole stretch factor for a line or column is not 1.0? To determine this these settings are exist. Valid values are "RELATIVE", "ABSOLUTE" and "NO". With "NO" no stretch will be performed. with "RELATIVE" the values are normalized, with "ABSOLUTE" the values will be used as they are (may be a part will be clipped if the sum is greater than 1.0).
- 'layoutFullLineStretch | layoutFullColumnStretch': as described there are controls which should be stretched. Beside fixed values there are the symbolic values FULL_LINE_STRETCH and FULL_COLUMN_STRETCH which are computed at layout. E.g. MultiLineLabels has this stretch factor for x direction. But what to do if a centered layout is chosen? With a control like this the lines will be stretch to the hole size. With this settings it can be changed. E.g. a factor of 0.7 creates a nice centered layout. The default is 1.0, valid are 0.0 up to 1.0.

It is possible to use an alternatively frame title. Normally the title has the aspect "IzPack - Installation of " + '$APP_NAME'. If the langpack key 'installer.reversetitle' is defined, the value of that key will be used instead of the key 'installer.title'. There is no string added, but it is possible to use IzPack variables. The third heading example contains such a alternatively frame title. It is only possible to use predefined variables like '$APP_NAME' because the title will be created before the frame will be shown. It is common to use the name of the installation toolkit in the frame title.

Using a Separated Heading Panel

Some standard panels have headings (e.g. ShortcutPanel). These headings are integrated in the IzPanel. In opposite to this following heading will be displayed in a separated panel potential for all panels with the same design. There is no need to modify existent java classes else declaration of some key/value pairs are enough.

There can be one real head and zero or more info lines. The headline will be written bold, the font size can be changed. Info lines will be indented and written with the normal used font. The heading message has to be written into the langpack (or custom langpack)

file with the key '<panel class name>.headline'. Examples can be seen in eng.xml. May be the entries for standard panels are not present in other languages. Messages for info lines have the key '<panel class name>.headinfo<info line number>'. First info line has number zero. If no or empty headline messages will be declared in the chosen language no heading panel will be shown. This behavior can be used to suppress heading for special panels.

It is also possible to declare head and info lines additional dependent on the 'panelid'. The result is, that it is possible to declare different messages for panels which are shown more than one time (e.g. the UserInputPanel. In this case the key for heading is

```
<panel class name>.headline.<panelid>
```

and for info lines

```
<panel class name>.headinfo<info line number>.<panelid>
```

Panelids are declared in 'ELEMENT %lt;panel>'. See The Panels Element '<panels>' . The standard strings are declared in the standard langpack file. For customized panels it is common to write the string into the custom langpack (see The Internationalization of custom panels. If (as example) in install.xml was following written:

```
<panels>
    ...
    <panel classname="UserInputPanel" id="one"/>
    <panel classname="UserInputPanel"id="two"/>
    ...
</panels>
```

Then the messages can be declared in 'CustomLangpack.xml_eng' like

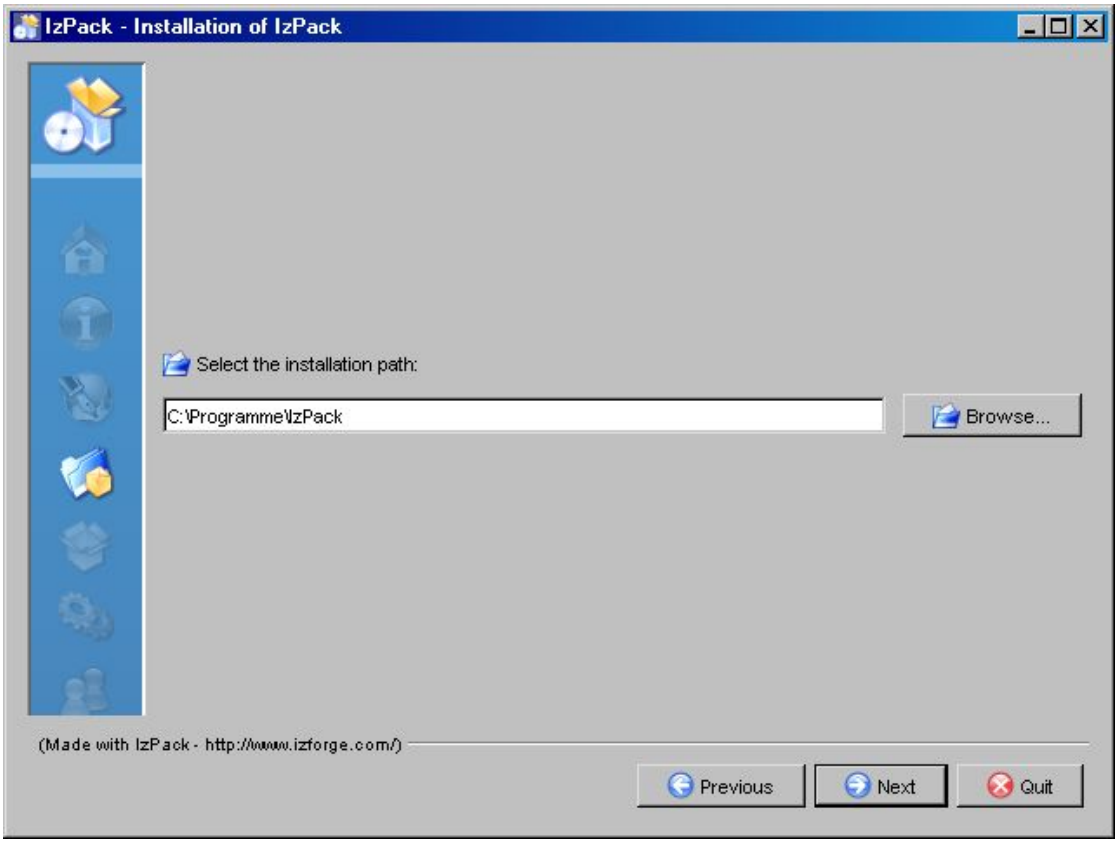
```
<langpack>
    ...
    <str id="UserInputPanel.headline.one" txt="User Data one"/>
    <str id="UserInputPanel.headline.two" txt="User Data two"/>
    <str id="UserInputPanel.headinfo0.one" txt="Info 1 one"/>
    <str id="UserInputPanel.headinfo1.one" txt="Info 2 one"/>
    <str id="UserInputPanel.headinfo0.two" txt="Info 1 two"/>
    <str id="UserInputPanel.headinfo1.two" txt="Info 2 two"/>
    ...
<langpack>
```

It is possible to place an icon on the right side of the heading (see below to display on left side). To do this a simple resource entry will be needed:

```
<resources>
  ...
  <res id="Heading.image" src="[my path in the source tree]"/>
  ...
</resources>
```

There are some guiprefs modifier keys to use and modify heading (see above). Additionally it is possible to count the general not hidden panels in the heading or navigation panel.

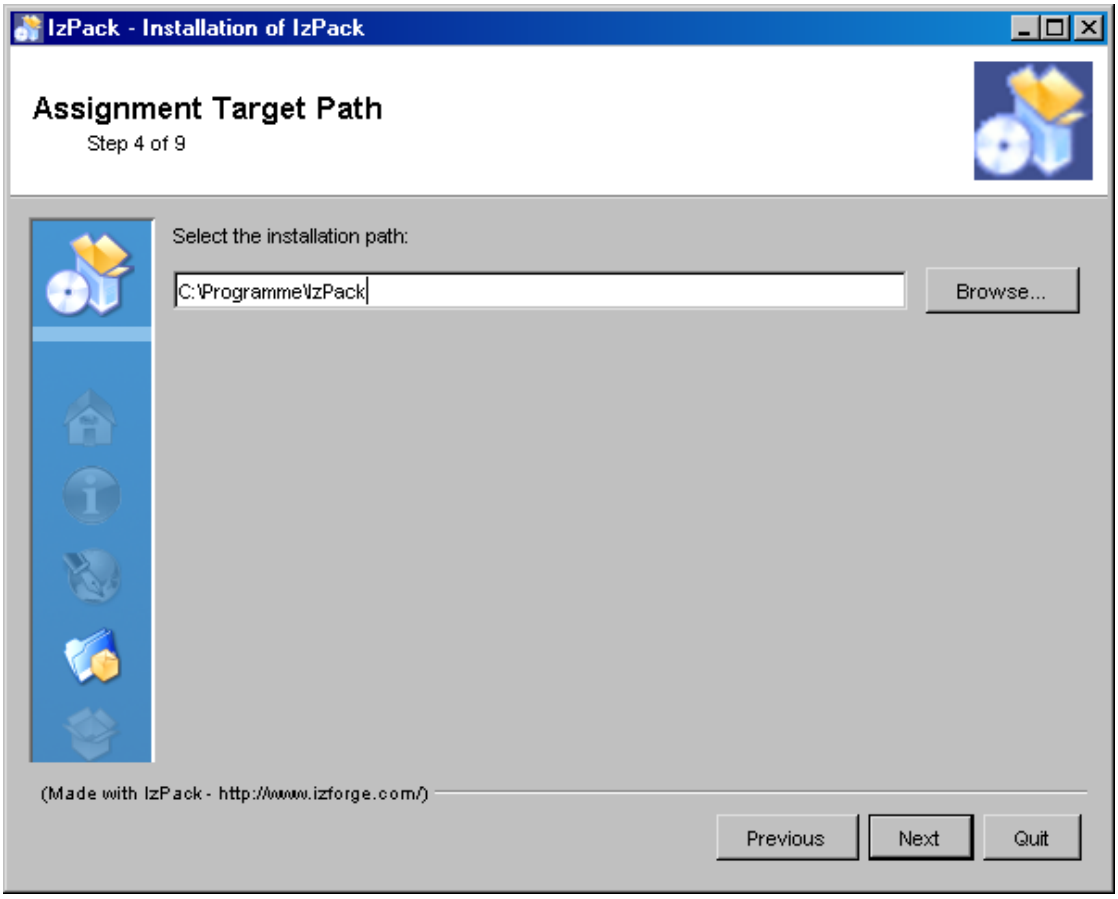
- 'useHeadingPanel': General switch for heading. If this key does not exist or does not have the value "yes" no heading panel will be shown.
- 'headingImageOnLeft': Option to allow displaying the heading image on the left of the header instead of the default (right side). Only valid if heading panel is used.
- 'useHeadingForSummary': In the language files there are entries for the heading text ('[Panel name].headline') and the summary caption ('[Panel name].summaryCaption'). If this modifier is set to "yes", the text of the heading will be also used for the summary caption.
- 'headingLineCount': Number of heading lines. If no info lines should be shown the value should be one (not zero).
- 'headingFontSize': A float value used as multiplier for the standard font size.
- 'headingBackgroundColor': Background color of the heading panel as integer. Often used is 0x00ffffff (white).
- 'headingForegroundColor': Font color of the heading panel as integer. Often used is 0x00ffffff (white).
- 'headingPanelCounter': Draw a panel counting. Possible values are "text" or "progressbar". inHeading the progressbar will be not the best choice.
- 'headingPanelCounterPos': Declares where the counter will be shown. Possible are "inHeading" or "inNavigationPanel". If "inNavigationPanel" is chosen, the panel counter can be used also no heading was selected.



Normal look of an IzPack frame (TargetPanel)

Key/value pairs to create IzPack installation with heading, no button and label icons and a panel text counter in the heading panel.

```
<guiprefs width="600" height="480" resizable="no">
  <modifier key="useButtonIcons" value="no"/>
  <modifier key="useLabelIcons" value="no"/>
  <modifier key="labelGap" value="2"/>
  <modifier key="layoutAnchor" value="NORTHWEST"/>
  <modifier key="useHeadingPanel" value="yes"/>
  <modifier key="headingImageOnLeft" value="yes"/>
  <modifier key="headingLineCount" value="1"/>
  <modifier key="headingFontSize" value="1.5"/>
  <modifier key="headingBackgroundColor" value="0x00ffffff"/>
  <modifier key="headingPanelCounter" value="text"/>
  <modifier key="headingPanelCounterPos" value="inHeading"/>
</guiprefs>
```



IzPack frame (TargetPanel) with heading panel and a text counter in the heading panel with panel image.

Changed resources and langpack keys to create IzPack installation with alternatively frame title, heading, no button and label icons and a text counter in the heading panel.

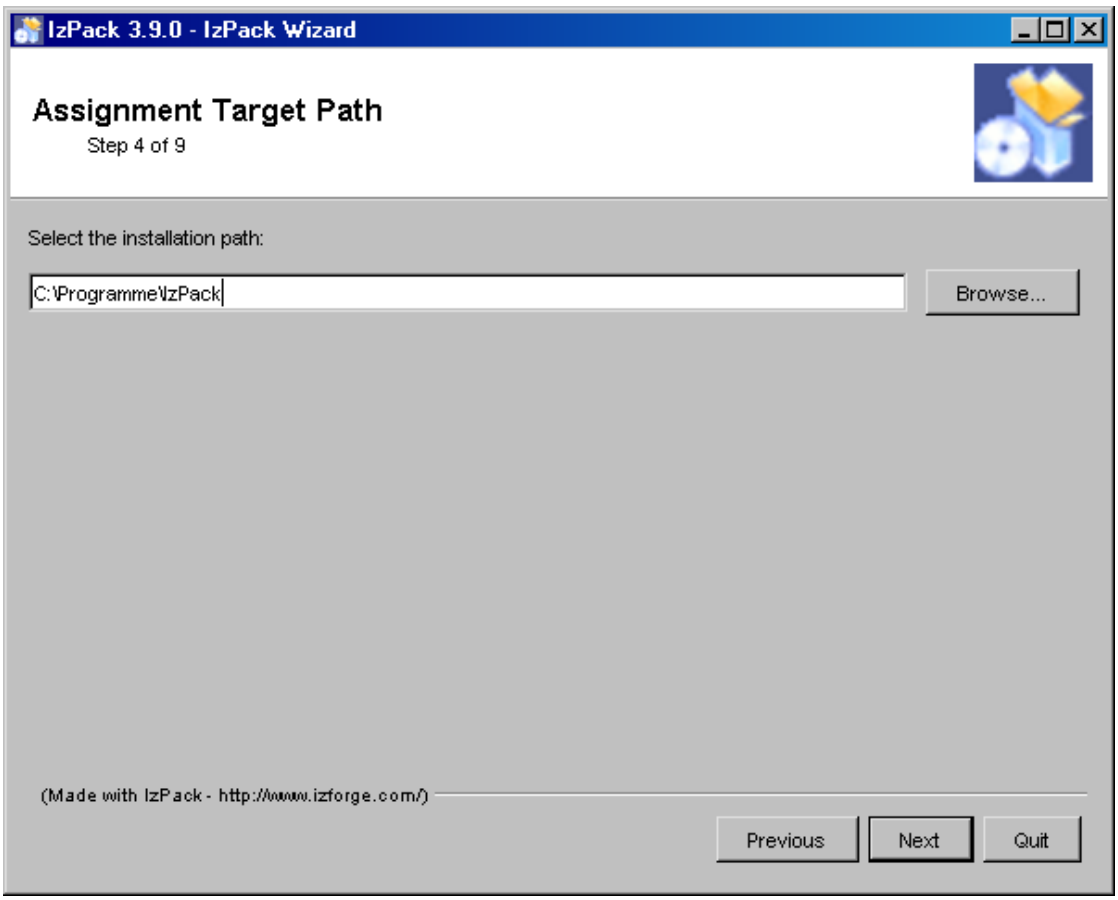
In install.xml

```
<installation version="1.0">
  ...
  <resources>
    ...
    <res src="border4.png" id="Installer.image.3"/> REMOVED
    ...
  </resources>
</installation>
```

Add in '<ISO3>.xml' or 'CustomLangpack.xml_<ISO3>'

```
<langpack>
  ...
```

```
    <str id="installer.reversetitle" txt="$APP_NAME $APP_VER - IzPack Wizard "/>
    ...
  </langpack>
```



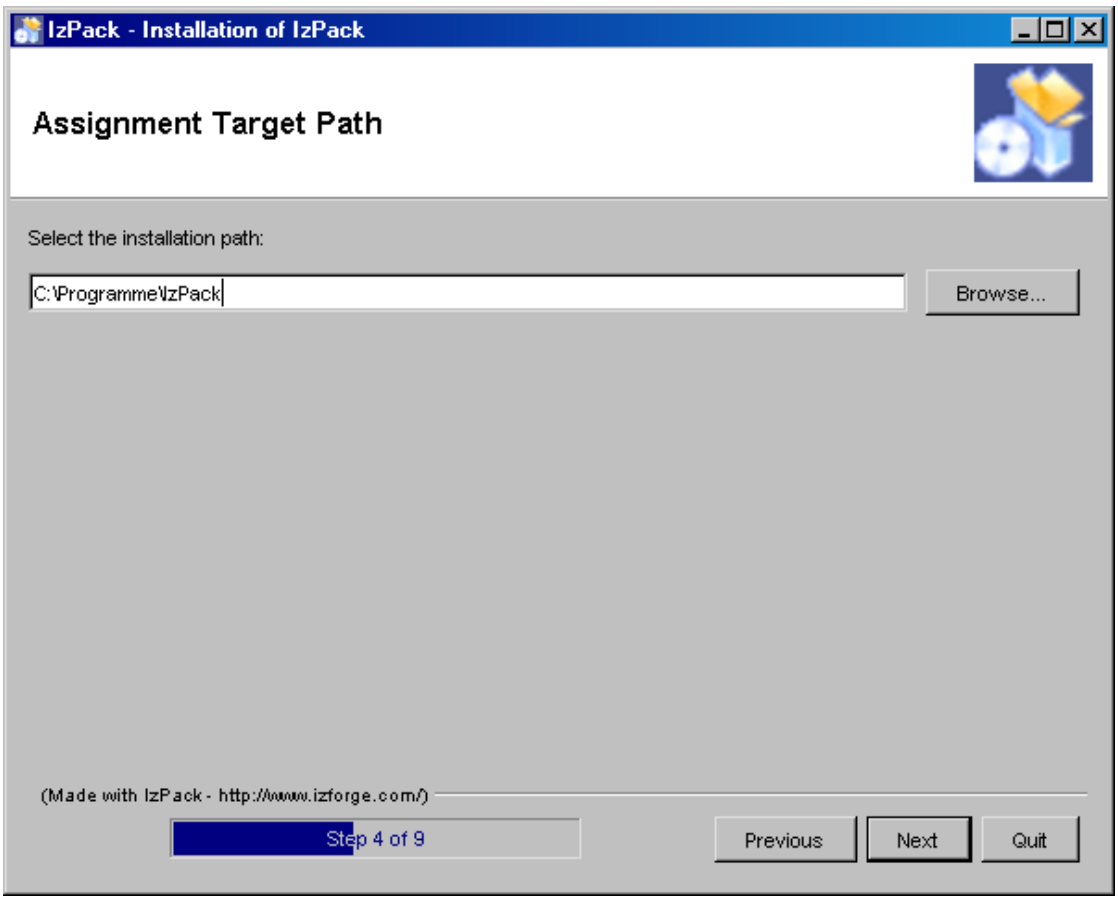
IzPack frame (TargetPanel) with heading panel and a text counter in the heading panel with alternative frame title, no panel image.

Changed key/value pairs to create IzPack installation with heading, no button and label icons and a panel progressbar counter in the navigation panel.

Key/value pairs for modifying IzPack GUI (references for panel images removed):

```
<guiprefs width="640" height="480" resizable="no">
  <modifier key="useButtonIcons" value="no"/>
  <modifier key="useLabelIcons" value="no"/>
  <modifier key="layoutAnchor" value="NORTHWEST"/>
  <modifier key="labelGap" value="2"/>
  <modifier key="useHeadingPanel" value="yes"/>
  <modifier key="headingLineCount" value="1"/>
  <modifier key="headingFontSize" value="1.5"/>
  <modifier key="headingBackgroundColor" value="0x00ffffff"/>
```

```
  <modifier key="headingPanelCounter" value="progressbar"/>
  <modifier key="headingPanelCounterPos" value="inNavigationPanel"/>
</guiprefs>
```



IzPack frame (TargetPanel) with heading panel and a progressbar counter in the navigation panel without panel image.

Don't show pack size in PacksPanel

The PacksPanel dialog supports the modifier `doNotShowPackSizeColumn` which hides the third column showing the size of each pack. With `doNotShowPackSizeColumn` set to true, the third column will not be shown. The required size of all packs is still shown with this setting. The required size can be hidden by setting the `doNotShowRequiredSize` to true.

Example :

```
<guiprefs width="640" height="480" resizable="no">
   ...
   <modifier key="doNotShowPackSizeColumn" value="true"/>
   <modifier key="doNotShowRequiredSize" value="yes"/>
```

```
    ...
  </guiprefs>
```

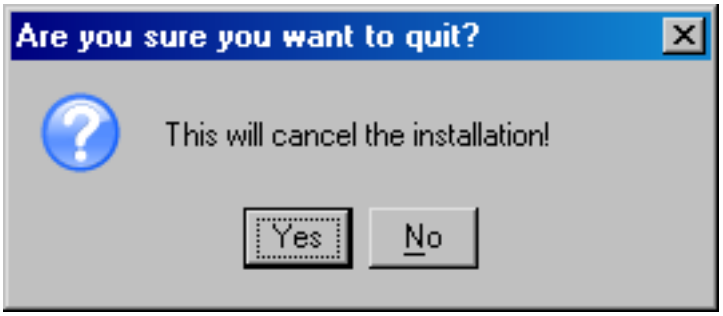
The PacksPanel will not show the column with the sizes of each pack, but will show the total required space.

Alternative Cancel Dialog

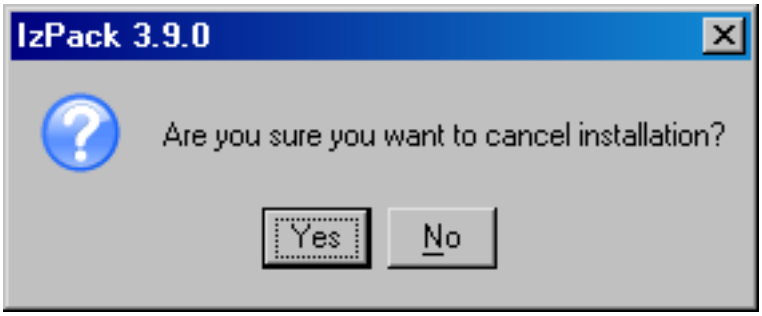
The cancel dialog will be shown if the cancel button or the close button of the frame was pushed. In the standard dialog the title contains the question and the message an affirmation. In other dialogs often the title is a common heading and the question will be called in the dialog as message. The standard behavior will be modified if the messages 'installer.quit.reversemessage' and 'installer.quit.reversetitleare' declared.

Add in '<ISO3>.xml' or 'CustomLangpack.xml_<ISO3>'

```
<langpack>
  ...
  <str id="installer.quit.reversemessage" txt="Are you sure you want to cancel instal
  <str id="installer.quit.reversetitle" txt="$APP_NAME $APP_VER"/>
  ...
</langpack>
```



Standard cancel dialog.



Alternative cancel dialog.

Logging the Installation

Logging was made as co-product at implementing other features. There was no common design for it. Therefor there is no one way to made logging of any kind else for each group a different logging stuff exist. Not nice, but reality.

1. Debug Information

   There is a rudimentary debug capability in IzPack. The class 'com.izforge.IzPack.util.Debug' is used by some other classes to write debug information on 'stdout'. The class can be used by custom panels or actions or other custom classes. To activate it, add '-DTRACE=TRUE' in front of '-jar' of the installer call.

2. Summary of Panels

   There is a summary panel which shows some information of previous shown panels. The same contents can be written to a summary log file.

3. Logging of Installed File Set

   The files which are installed are logged into the uninstaller jar file to be used at uninstallation. The contents can be also duplicated into a logfile.

4. Logging of the Process Panel

   The process panel logs information of each performed process in a scrollable text area. The contents can be duplicated into a logfile where the used directory can be selected (but not the logfile name).

5. Logging of Ant Actions

   It is possible to perform ant actions with the 'AntActionInstallerListener'. The grade of logging and the path of a logfile can by determined.

Web Installers

The web installers allow your users to download a small installer that does not contain the files to install. These files will be downloaded from an HTTP server such as Apache HTTPD. If you have many optional packs, this can save people's resources. Its very easy: people download a small Jar file containing the installer, they launch it and choose their packages. Then the installer will get the required packages from individual Jar files located on a server, only downloading those required. It's that simple.

To create a web installer, add the '<webdir>' element to the <info> element. The text must be a valid, fully qualified URL for a directory on the web server.

```
<info>
  <appname>Super extractor</appname>
  <appversion>2.1 beta 6</appversion>
  <url>http://www.superextractor.com/</url>
  <webdir>http://www.superextractor.com/download</url>
</info>
```

By default, the compiler will create a standard installer even if 'webdir' is specified. You can generate your web installer with the 'web' option like this :

```
compile installer.xml -k web
```

It will generate a jar for each pack and an installer jar. For instance, the sample installation will generate those 4 jars.

```
install.jar
install.pack-Base.jar
install.pack-Docs.jar
install.pack-Sources.jar
```

The pack jars must be copied in the webdir. The installer generated is configured as a web installer and will download those packs if necessary.

When installing, if the user is behind a firewall, attempting download the jar files may fail. If this happens, the user will be prompted to enter the name host name and port of their firewall.

You may password protect the files using mechanisms provided by your web server, IzPack will prompt for a password at install time, when required.

More Internationalization

Special resources

IzPack is available in several languages. However you might want to internationalize some additional parts of your installer. In particular you might want this for the 'InfoPanel' and 'LicencePanel'. This is actually pretty easy to do. You just have to add one resource per localization, suffixed with the ISO3 language code. At runtime these panels will try to load a localized version.

For instance let's suppose that we use a 'HtmlInfoPanel'. Suppose that we have it in English, French and German. We want to have a French text for french users. Here we add a resource pointing to the French text whose name is 'HtmlInfoPanel.info_fra'. And that's it! English and German users (or anywhere other than in France) will get the default text (denoted by 'HtmlInfoPanel.info') and the French users will get the French version. Same thing for the other Licence and Info panels.

To sum up: add '_<iso3 code>' to the resource name for 'InfoPanel', 'HtmlInfoPanel', 'LicencePanel' and 'HtmlLicencePanel'.

Packs

Thanks to Thorsten Kamann, it is possible to translate the packs names and descriptions. To do that, you have to define a special identifier in the elements of the XML installation file and add the related entries in the suitable langpacks. For instance if you have the following XML snippet:

```
<pack name="core" id="core.package" ...>
  <description/>
</pack>
```

then the related entries of the langpacks will look like this:

```
<str id="core.package" txt="Core Package"/>
<str id="core.package.description" txt="The core package provides
```

Validators for Packs

It's possible to create custom java validators (as you may know from Panels). To do that, add the validator element to your packs definition like this:

```
<pack name="foo" id="foo.package" ...>
  <validator>my.Validatorclass</validator>
</pack>
```

Now you have to create and include a class implementing the 'PackValidator' interface:

```
package my;
import com.izforge.izpack.installer.InstallData;
import com.izforge.izpack.installer.PackValidator;
import com.izforge.izpack.util.AbstractUIHandler;
public class Validatorclass implements PackValidator {
  public boolean validate(AbstractUIHandler handler,
      InstallData idata, String packsId, boolean isSelected) {
    [ your validation code here ]
    return false; // returns to the pack selection without further notice
    return true; // passes on to the next defined validator for this pack
  }
}
```

Automatic privileges elevation on Windows

As an alternative to using the `<run-privileged> element`, a Java launcher EXE with the name `setup.exe` or `install.exe` can be used (see http://msdn.microsoft.com/en-us/library/bb530410.aspx).

Windows Vista has a feature called "installer detection". When an EXE file name contains one of the words `install`, `setup` or `update`, the operating system automatically prompts the user for UAC privilege elevation when the program is started. This automatic privilege elevation can be overridden using a manifest file for the EXE and setting the requestedExecutionLevel in the manifest.

Under Windows XP, when the following conditions are met, the operating system prompts the user to run
the program with the administrator account:

- the user is not part of the administrators group, and
- the name of the EXE file is `setup.exe` or `install.exe`, and
- the EXE is started via Windows Explorer, e.g. by double-clicking on the icon of the EXE file.

Desktop Shortcuts

(by Elmar GROM and Marc EPPELMANN)

Defining Shortcuts

Introduction

On todays GUI oriented operating systems, users are used to launching applications, view web sites, look at documentation and perform a variety of other tasks, by simply clicking on an icon on the desktop or in a menu system located on the desktop. Depending on the operating system these icons have different names. In this context we will refer to them collectively as shortcuts.

Apart from actually placing an application on the target system, users routinely expect an installer to create the necessary shortcuts for the application as well. For you as application developer, this means that for a professional appearance of your product you should also consider creating shortcuts.

In contrast to the general specification of an IzPack installer, the specification of shortcuts in IzPack requires a little more effort. In addition, some of the concepts are a bit more complex and there are some operating system specific issues to observe. Fortunately, you only need to worry about operating system specifics if you want to deploy your application to multiple different operating systems. In any case, it will pay off to spend some time to study this documentation and the example spec files before you start to implement your own shortcuts.

At the time of writing this Chapter the current IzPack Version 3.7.0-M3 is only capable to creating shortcuts on

1. Microsoft Windows, and
2. Unix and Unix-based operating systems (like Linux), which use the X11 GUI-System and ‘ FreeDesktop.org‘ based shortcut handling (such as KDE and Gnome).

Other operating or GUI systems, such as MacOS X are not supported. However, there is a special UI-variant that automatically pops up on unsupported systems. It informs the user about the intended targets of your shortcuts and allows the user to save this

information to a text file. While this is not an elegant solution, at least it aids the user in the manual creation of the shortcuts.

Note

There is no support from the IzPack project of this feature for Windows 95, Windows 98 and Windows ME. Please check the patches at http://jira.codehaus.org/browse/IZPACK-58 if you need to support those platforms.

If you would like to review what an end user would see if the target operating system is not supported, you can do the following. Simply place the tag `<notSupported/>` in the spec file. This tag requires no attributes or other data. It must be placed under `<shortcuts>`, just like the individual shortcut specifications. Be sure to remove this tag before getting your application ready for shipment.

We expect other operating systems to be supported in the near future and as always, contributions are very welcome. At present someone is actively working on Mac support.

What to Add to the Installer

There are some things that you have to add to your installer to enable shortcut creation. Obviously you need to add the panel responsible for creating shortcuts. This panel is aptly enough called ShortcutPanel. However, in order for the ShortcutPanel to work properly a number of additional items are required. These must be added manually to the installer, as all other resourcs, since the front-end will be rewritten. In this chapter we will explain which of these items are required and for what reason.

First, we would like to discuss items that are supplied with IzPack and only need to be added to the installer. After that, we move on to the things you have to prepare yourself before you can add them. The way in which shortcuts are created varies widely among operating systems. In some cases it is possible to do this with pure Java code, while other systems -such as MS- Windows- require native code to accomplish this task. On the other side, the current implementation, which creates shortcuts on Unix based systems needs no native library at all, since it works with 'these' pure Java code. The native library required for the Windows operating systems are supplied with IzPack is called `ShellLink.dll`. Note: They will not be automatically added to your installer file. You need to list them yourself in the XML file for the installer. A describtion how to do this follows in the next section.

Native libraries can be added to the installer by using the `<native>` tag. To add the `ShellLink.dll`, you just have to add the following line to the installer XML file: `<native type="izpack" name="ShellLink.dll"/>` For more details about the use of the `<native>` tag see the chapter about the format of the XML file.

You have also to add an extra specification file for each platform family to enable shortcut creation on these platforms. At least one (the default file) is required by the shortcut panel. The format of all spec files is XML and they must be added to the installer as a resource. The source name of this specification does not matter, however its resource name (also called id or alias) when added to the installer must be

`(prefix)+shortcutSpec.xml`. At this release, there are only two prefixes supported: "Win" for the Windows family and "Unix" for all Unixes. If the prefix is ommited the shortcut panel searches for a named resource: '' shortcutSpec.xml''. This is the default resource name. As the default resource name will be used on Windows platforms, the `"Win_shortcutSpec.xml"` can be ommited. Hint: If the shortcut panel does not find one of these named resources, it will never appears. So, do not use different resource names and do not add a path to these.

ShortcutSpecs can be localized, see "Localizing shortcuts" below.

Example

```
<res src="C:\MyDocuments\Installer\default_shortcut_specification.xml"
     id="shortcutSpec.xml"/>
<res src="C:\MyDocuments\Installer\unix_shortcut_specification.xml"
     id="Unix_shortcutSpec.xml"/>
```

Why use different shortcut spec files?

1. The Target filenames are most different.(batch files on Windows vs. shell scripts on Unix.)
2. The Icon file formats are different. ICOs on Windows-, PNGs on Unix- platforms.
3. The Target locations can be different.
4. If your installer is localized, your users sure will expect their shortcuts names and descriptions to be as well. Moreover, some paths can be different when OS are localized (`My Documents` becomes `Mes Documents` on Windows in french for example). See "Localizing shortcuts" below.

This is the simple reason.

Why Native Code to do the Job on Windows?

by Elmar

This little chapter is not strictly part of the documentation but i have been asked this question sufficiently often that i think it's worth explaining right here. It is certainly a natural question to ask. After all IzPack is an application completely written in Java and primarily targeted for the installation of Java based programs. So why wouldn't we try to keep everything pure Java and avoid the use of native code altogether? There must be some personal preference of the developer hidden behind this approach you might think. Well, not really, but i admit at first it seems quite feasible to write it all in Java. On virtually any operating system or GUI surface around, Shortcuts are simply files on the local file system. Files can be created and accessed directly from within Java, so why should there be a need for using native code?

Well, it turns out that just creating a file is not good enough, it also needs to have the right content. Shell Links as they are called in Windows land are binary files. i actually

managed to find documentation on the format. Naturally this was hacker data, you won't get this sort of thing from Microsoft (by the way: thanks a lot to Jesse Hager for a smash job!). Armed with this information i tried to create these files myself in Java. The problem was that the documentation was not entirely accurate and had some gaps as well. i tried for over a month to get this to work but finally i had to give up. Even if i would have succeeded, it would have been a hack, since a shell link requires some information that is impossible to obtain from within Java. Usually you can successfully create a shell link by only filling in the bare minimum information and then ask Windows to resolve the link. Windows then repairs the shell link. Unfortunately this was only the beginning, soon i encountered a host of other problems. For one thing, the installer needs to know the correct directories for placing the links and it turns out they are named differently in different countries. In addition, there are ways of manually modifying them, which some people might actually have done. The only way to place the shortcut files reliably is through accessing the Windows Registry. Naturally, this operation also required native code. Same thing with asking Windows to resolve the link... On the bottom line, at every step and turn you run into an issue where you just need to use native code to do the trick. So i decided that i would do it the proper way all the way through. That is in a nutshell the reason why i used native code to create shortcuts on MS-Windows.

As i am writing this i am at work with a friend to replicate this work for the Mac and it looks very much like we need to take the same approach there as well. On the various Unix GUIs on the other hand, we are lucky that we can do the job without native libraries.

The Shortcut Specification

As we say above, the specification for shortcuts is provided to the ShortcutPanel in the XML fileformat. At the time of this writing (for IzPack version 3.7.0-M3) the front-end will be rewritten. Until these work is in progress you have to write the specification files manually. For your convenience, there are two annotated sample specification files in the sample subdirectory of your IzPack installation. At the beginning you might want to experiment with these files.

Both specification files have one root element called `<shortcuts>`. This root elements recognizes 3 different child elements: `<programGroup>`, `<skipIfNotSupported/>`, `<defaultCurrentUser/>` and `<shortcut>`.

`<skipIfNotSupported/>` can be used to avoid the panel to show the alternative UI which shows the shortcut information that would have been created on a system that supports it. In other words, using this tag will make the panel be silent on non-supported systems. The default is to show the alternative UI.

`<defaultCurrentUser/>` may be specified to make "current user" be the default selection on the panel. If not specified then "all users" will be the default selection (if available).

The `<programGroup>` tag allows you to specify the name of the menu, or more precise, the folder in which the shortcuts will be grouped. The exact location and appearance of the program group depends on the specific target system on which the application will

be installed, however you can partially control it. Please note that `<programGroup>` may only appear once in the specification. If more than one instance occurs, only the first one will be used. This tag requires two attributes: `defaultName` and `location`. `defaultName` specifies the name that the group menu should have on the target system. You should be aware that the ShortcutPanel will present this name to the user as a choice. The user can then edit this name or select a group that already exists. As a result, there is no guarantee that the actual name of the program group on the target system is identical with your specification. `location` specifies where the group menu should show up. There are two choices: `applications` and `startMenu`. If you use `applications`, then the menu will be placed in the menu that is ordinarily used for application shortcuts. `applications` is recommended for Unix shortcuts. If you use `startMenu`, the group menu will be placed at the top most menu level available on the target system. Depending on the target system, it might not be possible to honor this specification exactly. In such cases, the ShortcutPanel will map the choice to the location that most closely resembles your choice. Unix shortcuts do not need to support the `startMenu`, because the `applications` menu is already on the highest level. This means this has no affect on thess platform.

For each shortcut you want to create, you have to add one `<shortcut>` tag. Most details about the shortcut are listed as attributes with this tag. The following sections describe what each attribute does, which attributes are optional and which ones are required and what the values are that are accepted for each of the attributes. Note that all attributes that have a yes/no choice can also be omitted. Doing so has the same effect as using a value of no. The shortcut attributes can be divided into two groups

- attributes that describe properties of the shortcut
- attributes that define the location(s) at which a copy of the shortcut should be placed.

The following attributes are used to define location:

- `programGroup`
- `desktop`
- `applications`
- `startMenu`
- `startup`

Shortcut Attributes

There are three classes of attributes. Some are required, most are completely optional and some are semi-optional. The set of semi-optional attributes are all the attributes used to define the location of a shortcut. These are semi- optional because for any individual one it is your choice if you want to include it or not. However they are not completely optional. You must specify at least one location. If all were omitted, the instruction would essentially tell the panel that a copy of this shortcut is to be placed at no location. In other words no copy is to be placed anywhere.

name - `required`

The value of this attribute defines the name that the shortcut will have. This is the text that makes up the menu name if the shortcut is placed in a menu or the caption that is displayed with the shortcut if it is placed on the desktop.

target - `required`

The value of this attribute points to the application that should be launched when the shortcut is clicked. The value is translated through the variable substitutor. Therefore variables such as `$INSTALL_PATH` can be used to describe the location. **You should be aware that the use of this tag is likely to change once other operating systems are supported**.

commandLine - `optional`

The value of this attribute will be passed to the application as command line. i recommend to work without command line arguments, since these are not supported by all operating systems. As a result, your applications will not be portable if they depend on command line arguments. Instead, consider using system properties or configuration files.

workingDirectory - `optional`

This attribute defines the working directory for the application at the time it is launched. i would recommend some caution in relying on this too heavily if your application should be portable, since this might not be supported by all operating systems. At this time i don't have enough information to make a definite statement one way or the other. The value is translated through the variable substitutor. Therefore variables such as `$INSTALL_PATH` can be used to describe the directory.

description - `optional`

The value of this attribute will be visible to the user when a brief description about associated application is requested. The form of the request and the way in which this description is displayed varies between operating systems. On MS-Windows the description is shown as a tool tip when the mouse cursor hovers over the icon for a few seconds. On some operating systems this feature might not be supported but i think it is always a good idea to include a brief description.

iconFile - `optional`

The value of this attribute points to the file that holds the icon that should be displayed as a symbol for this shortcut. This value is also translated through the variable substitutor and consequently can contain variables such as $INSTALL_PATH. If this attribute is omitted, no icon will be specified for the shortcut. Usually this causes the OS to display an OS supplied default icon. **The use of this attribute is also likely to change once other operating systems are supported. Read the Section about Icons below, for more information.**

iconIndex - `optional`

If the file type for the icon supports multiple icons in one file, then this attribute may be used to specify the correct index for the icon. i would also advise against using this feature, because of operating system incompatibilities in this area. In file formats that do not support multiple icons, this values is ignored.

initialState - `optional`

There are four values accepted for this attribute: `noShow`, `normal`, `maximized` and `minimized`. If the target operating system supports this feature, then this value will have the appropriate influence on the initial window state of the application. `noShow` is particularly useful when launch scripts are used that cause a command window to open, because the command window will not be visible with this option. For instance on MS-Windows starting a batch file that launches a Java application has the less than pretty side effect that two windows show: the DOS command prompt and the Java application window. Even if the shortcut is configured to show minimized, there are buttons for both windows in the task bar. Using `noShow` will completely eliminate this effect, only the Java application window will be visible. *On Unix use* `normal` *, because this is not supported.*

programGroup - `semi-optional`

The value for this attribute can be either yes or no. Any other value will be interpreted as no. If the value is yes, then a copy of this shortcut will be placed in the group menu. *On Unix (KDE) this will always be placed on the top level.*

desktop - `semi-optional`

For this attribute the value should also be yes or no. If the value is yes, then a copy of the shortcut is placed on the desktop. *On Unix the shortcuts will only be placed on the (KDE-) desktop of the user, who currently runs the installer. For Gnome the user can simply copy the *.desktop files from* `/Desktop` *to* `/gnome-desktop`. (This is already a TODO for the Unix- shortcut implementation.)

applications - `semi-optional`

This is also a yes/no attribute. If the value is yes, then a copy of the shortcut is placed in the applications menu (if the target operating system supports this). This is the same location as the applications choice for the program group. *This makes no sense on Unix.*

startMenu - `semi-optional`

This is a yes/no attribute as well. If the value is yes, then a copy of the shortcut is placed directly in the top most menu that is available for placing application shortcuts. *This is not supported on Unix. see above.*

startup - `semi-optional`

This is also a yes/no attribute. If the value is yes, then a copy of the shortcut is placed in a location where all applications get automatically started at OS launch time, if this is available on the target OS. *This is also not supported on Unix.*

Unix specific shortcut attributes

This extension was programmed by MARC EPPELMANN. This is still in development and may be changed in one of the next releases of IzPack.

type - `required`

This must be one of `Application` or `Link`

- Application: To start any application, native, Java or shell-script based, the **type** has to be `Application`. The GUI-System will launch this Application, so as is, thru their native shell or application launcher. In this case, note that the

right `workingDirectory` is always important on Unix platforms. If the users PATH environment variable does not contain the path, where the application is located, this can never be run, until the `workingDirectory` does not contain these path. The needed current path: ".", this is the case on most systems, should be in the users PATH environment variable. Consult the Unix manuals for more details.

- Link: If you want to open a URL in the users default Webbrowser, you have to set the **type** to `Link`. Note: The `url` attribute must be set to work properly.
- Other: There are more supported types on KDE, like FSDevice, but these types makes no sense for IzPack, in my opinion.

Without the type the Unix shortcut does not work.

url - `semi-optional`

If you want to create a shortcut as type *Link*, then you have to set the `url` attribute. The value can be a locally installed html or another document, with a known MIME type, like plain text, or a WWW Url i.e. 'http://izpack.org/'.

A local document can be referenced by i.e. "$INSTALL_PATH/doc/index.html".

The IzPack variable substitution system is supported by the **url**.

encoding - `required`

This should always set to **UTF-8**.

terminal - `optional`

If you want, the user can see the console output of a program (in Java applications "System.outs"), set the `terminal` attribute to **true**.

KdeSubstUID - `optional`

This is the sudo option for a shortcut. If set to **true** you will be asked for the password of the following `KdeUsername`.

KdeUsername - `optional`

This sould be the user, with the right permission. This is `root` in most cases.

createForAll - `optional`

If an user with administrative rights, such as root, performs the installation this flag allows to determine, if the shortcut should be appear to the other users or only for root.

Categories - `optional`

This is the category where to put in the Desktop Application Menu.

Here are some Sample Categories and their apps examine the desktop files in /usr/share/applications ... Categories="Application;Network;WebDevelopment;" - Nvu, Categories="Qt;Development;GUIDesigner;" - QtDesigner3, Categories="Application;System;" - VMwareServer-console, Categories="Network;WebBrowser;" - Opera, Categories="Development;Deb - DDD debugger, Categories="Development;IDE;" - Eclipse IDE, Categories="SystemSetup;X-SuSE-Core-System;" - Yast2, Categories="System;Archiving;" - Sesam archiving, Categories="System;Database;" - MySQL Administrator,

TryExec - `optional`

TryExec="aTryExecCommand" will passes raw thru and tries to execute the command.

Selective Creation of Shortcuts

Usually all shortcuts that are listed will be created when the user clicks the 'Next' button. However it is possible to control to some degree if specific shortcuts should be created or not. This is based on install conditions. By including one or more `<createForPack name=''a pack name'' />` tags in the specification for a shortcut, you can direct the ShortcutPanel to create the shortcut only if any of the listed packs are actually installed. The 'name' attribute is used to define the name of one of the packs for which the shortcut should be created. You do not need to list all packs if a shortcut should always be created. In this case simply omit this tag altogether.

A word of caution

For any shortcut that is always created, i would recommend to omit this tag, since i have seen a number of problems related to changing pack names. You can save yourself some troubleshooting and some Aspirin by not using this feature if it's not required. On the other hand if you need it i would advise to be very careful about changing pack names.

Localizing shortcuts

The izPack installer allows localization of your installer. Obviously, you will want your shortcuts labels to be localized, too. Thus, you can provide shortcutSpec files for each language you support.

This works just like localizing other specs for other panels : add an underscore and the iso3 language code to the end of the resource name, and set the source name to the appropriate localized spec file. As for the platforms, if a specific spec file is not declared for the current language, the installer will revert to the default `shortcutSpec.xml` resource. This way, you can for example have a resource `shortcutSpec.xml_fra` for french installs and have the default resource `shortcutSpec.xml` (maybe containing strings in english) be used for other languages.

The platform prefix and language suffix are combined like in this example : `Unix_shortcutSpec.xml_fra`.

When the installer can't find such a platform-and-language-specific resource, it will fallback to a suitable default using the following search order : `shortcutSpec.xml_<iso3>` (default platform, language-specific) `<platform>_shortcutSpec.xml` (default language, platform-specific) `shortcutSpec.xml` (default platform and language)

Reminder: If the shortcut panel does not find one of these named resources, it will never appear. So, do not use different resource names and do not add a path to these.

Example

```
<res src="C:\MyDocuments\Installer\default_shortcut_specification.xml"
id="shortcutSpec.xml"/>
   <res src="C:\MyDocuments\Installer\default_shortcut_specification_fr.xml"
```

```
id="shortcutSpec.xml_fra"/>
   <res src="C:\MyDocuments\Installer\unix_shortcut_specification_en.xml"
id="Unix_shortcutSpec.xml"/>
   <res src="C:\MyDocuments\Installer\unix_shortcut_specification_fr.xml"
id="Unix_shortcutSpec.xml_fra"/>
```

DesktopShortcutCheckboxEnabled Builtin Variable

`$DesktopShortcutCheckboxEnabled` : When set to true, it automatically checks the "Create Desktop Shortcuts" button. To see how to use it, go to The Variables Element ‘‘<variables>‘

Be careful this variable is case sensitve !

ApplicationShortcutPath Builtin Variable

`$ApplicationShortcutPath` : To define the path for the application shortcuts, absolute or relative to the `$$INSTALL_PATH`. If undefined, the application shortcuts will be directly written in the `$$INSTALL_PATH`.

From Version 4.1.1 the `xdg-desktop-icon` commandline tool will be used to copy this application shortcuts to your, or all users desktop.

Summary

Native Libraries

- ShellLink.dll - `required by Microsoft Windows`
- 'Nothing' - `for KDE/Gnome shortcuts`

Names of the Specification Files `shortcutSpec.xml` for Windows and as default. `Unix_shortcutSpec.xml` for Unix.

Specification File Layout - Windows

```
<shortcuts>
  <skipIfNotSupported/>
  <programGroup defaultName="MyOrganization\MyApplication"
                location="applications||startMenu"/>
  <shortcut
    name="Start MyApplication"
    target="$INSTALL_PATH\Path\to\MyApplication\launcher.bat"
    commandLine=""
    workingDirectory="$INSTALL_PATH\Path\to\MyApplication"
    description="This starts MyApplication"
    iconFile="$INSTALL_PATH\Path\to\MyApplication\Icons\start.ico"
    iconIndex="0"
    initialState="noShow||normal||maximized||minimized"
```

```
      programGroup="yes||no"
      desktop="yes||no"
      applications="yes||no"
      startMenu="yes||no"
      startup="yes||no">

      <createForPack name="MyApplication Binaries"/>
      <createForPack name="MyApplication Batchfiles"/>
    </shortcut>
  </shortcuts>
```

A sample Specification File for Unix is at the end of this chapter

Shortcut Tips

I wrote this section to provide additional information about issues surrounding the creation of shortcuts. Reading this section is not necessary to successfully create shortcuts, but it might help you creating an installation that works more smoothly. In addition, it might give you some knowledge about operating systems that you don't know so well. In fact most of the issues described in this section are focused on differences in operating system specifics.

The Desktop

You should recognize that the desktop is precious real estate for many people. They like to keep it uncluttered and keep only the things there that they use on a regular basis. This is not true for everybody and you might personally think different about this. Still, the fact remains that a lot of people might have different feelings about it, so you should not automatically assume that it is ok to place all of your shortcuts on the desktop proper. While your application is certainly one of the most important things for you, for your customers it is probably one of many applications they use and maybe not even the most important one. Accordingly, placing more shortcut icons there than they feel they will use on a regular basis and especially doing this without asking for permission might trigger some bad temper.

Annotation: But even the experienced user should be able to organize their Desktop. On Linux the users desktop is the only place, which supports any kind of shortcuts.

It is common practice to create a program group in the application menu system of the OS and place all shortcuts that go with an application in that program group. In addition, only one shortcut to the key access point of the application is placed directly on the desktop. Many installers first ask for permission to do so, as does the ShortcutPanel in IzPack.

I would like to recommend that you always create a shortcut in the menu system, even if your application has only one access point and you are placing this on the desktop. Note that shortcuts can also be placed directly in the menu, they don't need to be in a program group. There are two reasons for doing so.

- If the user elects not to create shortcuts on the desktop, they will end up with no access point to your application
- Even if this works fine, occasionally people 'clean up' their desktop. They might later find that they accidentally deleted the only access point to your application. For the less technology savvy users, recreating the shortcut might be a rough experience.

Icons

Icons are supplied in image files, usually in some kind of bitmap format. Unfortunately there is no format that is universally recognized by all operating systems. If you would like to create shortcuts on a variety of operating systems that use your own icons, you must supply each icon in a number of different formats. This chapter discusses icon file formats used on various operating systems. Fortunately there are good programs available that allow you to convert between these formats, so that creating the different files is not much of a problem once the icons themselves are created.

Microsoft Windows

Windows prefers to use its native icon file format. Files of this type usually use the extension .ico. These so called ICO files can hold multiple icons in one file, which can be useful if the same icon is to be provided in a number of sizes and color-depths.

Windows itself selects the icon with the most matching dimensions and displays it. While the Start menu displays the icon with 16x16 pixel if available, the desktop displays the 32x32 pixel resolution of the same ICO if this is in.

In other words, a ICO file has embedded one or more dimensions of the same Icon. We recommend to play with microangelo.

Dlls and Exe files on the other side, can store, amongst other things, a collection of different Icons. You can select your desired Icon by its index. The lowest index is 0. Use the iconIndex attribute in the spec file to specify this index.

As a sample look into

```
%SystemRoot%\system32\shell32.dll
```

These contains a lot of Windows own icons. You can use the PE Explorer or another Resource Editor to extract or modify Icons in dlls or exe files. But be warned. You can also destroy a working application with these kind of tools.

At least Windows also supports the use of bitmap files in the .bmp format as icons. Note that this format does not support multiple icons.

We might have overlooked other file formats that are supported by Windows. However, we suggest to test other formats for compatibility as they might not work all the way back to Windows 95 or on the NT/non-NT strain. Sticking with one of these two formats should keep you out of trouble.

Apple

Apple Macintosh systems use the Macintosh PICT format, extension .pct. If you are working with an apple system you know a whole lot more about this format than i do.

If you don't but would like to be able to install your application on a Mac, simply start with any bitmap format that you feel comfortable to work with. Then find an application that is capable of converting this format into a .pct file. i like to use Paint Shop Pro (PC based), because it provides conversion capabilities among several dozen different file formats.

UNIX flavors

by Marc Eppelmann

As my knowledge, all X based Unix Window systems supports the (ASCII-) XBM (X-Bitmap) and the better XPM (X-PixMap) format. The modern GUI systems like KDE and Gnome can display additionally a lot of other ImageIcon formats, such as GIF, JPG, and PNG.

i suggest to use PNG, because this can lossless compress like the GIF format, however this format is absolutely free. And not least, this can store true transparency informations (It has an alpha channel).

Targets

So, you thought you could escape the ugly mess of operating system dependencies at least with the way how your Java application is started? Sorry but i have just another bad message. The one positive thing is that here you have a way of escaping, even if doing so has a few less pretty side effects. At first, i would like to discuss various launching options you have available on different operating systems. At the end of the chapter i write about a way to make launching your application OS independent.

Microsoft Windows

On Microsoft Windows you have a variety of options for launching your application. Probably the most simple case is directly starting the Java VM from the command line and typing out all parameters, such as class path, the class name etc. In principle, this can be placed right in a shortcut and should work.

A little more elegant solution is to place this in a batch file and have the shortcut point to this batch file. This will also make it more likely that users can repair or recreate shortcuts. Recreating shortcuts with sophisticated command lines is practically impossible.

Another method is less commonly used but just as possible. Implement a native executable that launches the VM with your Java application. The VM comes as DLL and is used by java.exe in just the same way. As a sample look at the exlipse.exe provided by the Eclipse-IDE

Clearly, even though the first option is a bit ugly and has some restrictionss, it is the most portable solution among the three.

Apple

We hope, there is a IzPack developer currently researching for the details for the Mac environment. We expect an updated chapter in one of the next releases.

UNIX

UNIX provides essentially the same options as Windows. You can simply use the command line option, you can write a shell script and you can write a native launcher.

Naturally this stuff is in no way compatible with the equivalent Windows implementations. The native option is even more problematic in this environment, since the code can not even be moved from one UNIX platform to another, without recompilation.

OS Independent Launching

So, after all this rather discouraging news, there is actually a portable way to launch Java applications? You bet! although i have to admit that it is not necessarily the most pretty way of doing things.

This approach is currently used by IzPack. Package your application in a .jar file if you don't already do so and make it executable by including the necessary metaINF/MANIFEST.MF information file. i am not going into all the details on how exactly to do this, the Java documentation will have to do. You might have noticed that even though the instructions to install IzPack say to type :

```
java -jar IzPack-install.jar
```

You can just as well double click on IzPack-install.jar and it will start up. This procedure will work on all GUI based Java supported operating systems -though you might have to replace double clicking with dropping the file on the VM. In just the same way, you can make the .jar file itself the target of a shortcut. Note: This works only, if jars are registered as files, which have to launch by the installed JRE (with: javaw.exe -jar)

The one restriction with this approach is that a .jar file can only have one main file. So, if you have multiple targets, they need to be packaged each into a different .jar file. They can be in one .jar file but then you have to start them explicitly, which gets you back to the problems that i mentioned before. This brings me to the ugly part. If you have just one target, then you are all set. If you have multiple targets, you need to create a .jar file for each of them. In addition, you have a much harder time setting the classpath, because each of the .jar files that contain supporting code must be listed. In fact, at present there is no way of setting this during the installation, because IzPack does not yet (version 3.0) support the setting and modification of environment variables.

Command Line

Before i start to write a lot about the use of command line arguments let me state this: If you can avoid using them, do it! Not that there is anything wrong with command line arguments as such. The issue is simply that if you want your application to be usable cross platform (the big Java promise) you should shy away from using command line arguments. The problem here is that not all operating systems actually support command line arguments. To be more precise, to my knowledge only Apple operating systems do not support command line parameters. If you don't care for running your application on a Mac, then you might not worry about his at all. If you are interested to support the Mac as well, read on.

In fact the Mac lower than MacOSX supports command line parameters in a way. More to the point, it supports a single parameter that your application should interpret as the name of a data file to open. You have no way of supplying this to your application through the command line attribute. The operating system generates this when the user

drops the file on your application and then passes it as command line argument. That's it. This same behavior will probably fly well on pretty much any system and should therefore be an ok implementation.

So what to do if you want to modify program behavior based on runtime switches? For one thing, you could set system properties accordingly. The disadvantage here is the same as with the command line parameters: the way of setting these might vary between operating systems. The best way seems to be using a property file that contains the configuration data.

Trouble Shooting

by Elmar

It has been some time since i wrote this chapter during which a good number of users had a chance to gather experience. Unfortunately i never know how many have used it successfully without much difficulty. i only hear from those that have encountered one problem or another. The type of problems that i have seen prompted me to write this section, because i think it will help you in locating most problems that you might encounter or at least give you some idea where the problem might be located.

Problems You Can Solve

If you see an exception that essentially says that a library can not be loaded (ShellLink.dll) you have an easy problem to deal with. Your installer file is probably missing the native tag that adds the Windows dll to the installer or something with this tag is no quite right. Read 'What to Add to the Installer' for all details on this topic.

Most other problems cause the ShortcutPanel not to show at all during the installation process. The reason is simply that the ShortcutPanel skips if it does not know what to do or if it has nothing to do (no point showing then and confusing the user). The problem is that this is not always what you intended. The most simple but not so uncommon case is, that the ShortcutPanel cannot find their spec file. This can be caused by a number of reasons. The associated resource tag might be missing in the installer specification file, the target file name might be misspelled (the name you specify for the `id` attribute) or the target file name has a path or package name pre-pended. You have only to use `shortcutSpec.xml` or `Unix_shortcutSpec.xml` and nothing else, just as described in 'What to Add to the Installer'. You can always verify if this part is ok by inspecting the content of the installer .jar file. The file shortcutSpec.xml should be located in the directory `res`. This inspection can be performed with any zip tool. If the file is not there, first correct this before proceeding.

If the file is there and the panel does not appear, you have a problem within the specification file. In most cases that i have seen, it comes down to a spelling mistake of an attribute or tag name. You just have to carefully make sure that everything is spelled correctly. Don't forget that all names are case sensitive! In a few cases it is also happend, that required or semi- optional attributes are omitted, so you might want to verify if all attributes that you need are actually supplied.

If everything is correct up to this point the problem becomes more elusive. Most likely the panel will not be displayed, because it is instructed not to show. There are be several reasons for this. The simple case is that no location has been specified for the shortcuts in your installation. This can happen if all five location attributes are omitted or if all the ones that are listed are set to `no`. Remember, you have to specify at least one location for every shortcut. If this is also correct, you might have used the `<createForPack>` tag. Review the details in 'Selective Creation of Shortcuts'. One possibility for the panel not to show is that based on the packs that are currently selected for installation no shortcut qualifies for creation. In this case the panel will not show, this is perfectly normal behavior. More likely this condition is true because of some accident and not because it's intended. Make sure the packs that you list for the shortcut are actually defined in your installation and verify that they are all spelled correctly. Remember: case matters! Did the ShortcutPanel use to work in your installation and all of a sudden stopped working? Very likely you are dealing with the last problem. A package name might have been modified and the shortcut spec was not adjusted to stay in sync.

Problems That Have No Solution (yet)

Unfortunately one problem has been very persistent and only recently one user found the reason. The problem occurs when installing on some target systems where non-English characters are used in the storage path for the shortcuts. The problem is that these characters don't seem to be properly translated across the Java Native Interface. This leads to a situation where the proper path can not be located and the shortcut creation fails. i write 'some target systems' because it does not fail everywhere. After much agonizing over this problem, one user found the solution: The shortcut creation works fine if a Sun virtual machine is installed, but fails if a version from IBM happens to be installed. So far i have no solution for this problem but i am trying to find a workaround the problem.

A sample shortcut specification file for Unix

```
<?xml version="1.0" encoding="UTF-8" standalone="yes" ?>

<shortcuts>

  <programGroup defaultName="IzForge/IzPack"
  location="applications"/>

    <!-- Disabled since there is no Frontend
  shortcut
     name="IzPack"
     programGroup="yes"
     desktop="yes"
     applications="no"
```

```
  startMenu="yes"
  startup="no"
  target="$INSTALL_PATH/bin/izpack-fe.sh"
  commandLine=""
  workingDirectory="$INSTALL_PATH/bin"
  description="Front-End for IzPack installation tool"
  iconFile="$INSTALL_PATH/bin/icons/izpack.png"
  iconIndex="0"
  type="Application"
  encoding="UTF-8"
  terminal="true"
  KdeSubstUID="false"
  initialState="normal">
  <createForPack name="Core"/>
</shortcut -->

<shortcut
  name="IzPack Documentation"
  programGroup="yes"
  desktop="yes"
  applications="no"
  startMenu="yes"
  startup="no"
  target="konqueror"
  workingDirectory=""
  commandLine=""
  initialState="noShow"
  iconFile="help"
  iconIndex="0"
  url="$INSTALL_PATH/doc/izpack/html/izpack-doc.html"
  type="Link"
  encoding="UTF-8"
  description="IzPack user documentation (html format)">

  <createForPack name="Documentation-html"/>
</shortcut>

<shortcut
  name="Documentation"
  programGroup="yes"
  desktop="yes"
  applications="no"
  startMenu="yes"
  startup="no"
```

```
      target="acroread"
      workingDirectory=""
      commandLine="$INSTALL_PATH/doc/izpack/pdf/izpack-doc.pdf"
      initialState="noShow"
      iconFile="acroread"
      iconIndex="0"
      url="$INSTALL_PATH/doc/izpack/pdf/izpack-doc.pdf"
      type="Application"
      encoding="UTF-8"
      description="IzPack user documentation (PDF format)">

      <createForPack name="Documentation-PDF"/>
    </shortcut>

    <shortcut
      name="Uninstaller"
      programGroup="yes"
      desktop="yes"
      applications="no"
      startMenu="no"
      startup="no"
      target="/usr/lib/java/bin/java"
      commandLine="-jar
      &quot;$INSTALL_PATH/Uninstaller/uninstaller.jar&quot;"
      initialState="noShow"
      iconFile="trashcan_full"
      iconIndex="0"
      workingDirectory=""
      type="Application"
      encoding="UTF-8"
      description="IzPack uninstaller">
      <createForPack name="Core" />
    </shortcut>

</shortcuts>
```

Creating Your Own Panels

In IzPack all of the actual work of installing an application is done in panels. The IzPack framework is primarily there to support the operation of the panels and to manage the navigation through the installation process. This enables a user to decide which operations are carried out during an installation and the order in which they are carried out, simply by listing the appropriate panels in the desired order.

As far as extending the functionality of IzPack is concerned, the result of this design is that new functionality can be integrated by adding new panels to the framework and then listing them in the install spec. Because the existing panels all have a visible GUI and because the term panel hints at something visible, it is not obvious that a panel does not have to contain any visible GUI to function in this framework. There are more details on this subject later on in this chapter.

How to get started

To get started with writing your own panels, it is best to place all the IzPack code into a separate working directory, from where you can compile it. Then try to compile the code as is and get that to work.

The next step would be to have a look at another panel implementation, so you can see how things are done. Make sure you look at the less complicated panels, as the panels with advanced features will only be confusing. All the code for building UI and such, only detracts from the essentials of what a panel needs to do. This means that you shouldn't start with " UserInputPanel" or `ShortcutPanel`. `HelloPanel` is probably a much better choice at this stage. The source code for panels is located at: `/src/lib/com/izforge/izpack/panels`.

You will find that all panels are derived from `IzPanel`; do the same thing with your new panel. Please note that the `IzPanel` class itself is located in the " com.izforge.izpack.installer" package but your panels need to belong to `com.izforge.izpack.panels`. Perhaps you can just copy the code of a panel, remove all the functional stuff and then start filling in your own code. Start with something very simple to begin with, just to see how it works. The implementation is really quite straight forward.

Next Steps

Once you have a successful compilation, you must place the compiled result of your panel code at a special place, so that the installer compiler can fetch it when building an installer that uses your panel. Go to: `/bin/panels`

You will see that there is a subdirectory for each panel. Make a subdirectory for your new panel with the exact same name as your panel and place your compiled panel code there.

Once this is accomplished, you are ready to use your panel in an installer. Just list it in the spec file like any other panel, compile and in theory it will show up when running the installer. Once you made it this far, you can dig deeper and get going with your specific needs.

Oh, and one other thing: If you think the your code might be useful for a larger audience, please think about a contribution to IzPack.

Access to the Variable Substitution System

One thing many developers ask about is how to get access to the variable substitution system. This is not surprising, because customizing an installation for a particular target

environment is one of the most important functions of an installer and the variable substitution system plays a big part in this operation.

You can get access to the variable substitution system through the protected variable `idata` in `IzPanel`. This variable is of the type `InstallData`, which is in turn subclassed from `AutomatedInstallData`. The Javadoc documentation will give you more details on these classes. Of particular interest in this context are the methods " getVariable()", `setVariable()` and `getVariableValueMap()` in `AutomatedInstallData`.

Controlling Flow

Some of the interesting methods in `com.izforge.izpack.InstallerFrame` that you might want to explore are `lockPrevButton()` and `lockNextButton()`. They allow you to block the use of the button to move back to the previous panel and the button that moves to the next panel respectively. Being able to control the availability of these buttons to the user is important if one of your panels performs a task where the effects cannot be undone. If the user would navigate back to the previous panel your installation might get into an unknown or even unstable state. On the other hand, if the operations in one panel vitally depend that a task in the previous panel is completed, then you should block the use of the next button until that task is completed.

Reading XML

If you need configuration files for your panel you would want to use XML for that purpose. To read XML files you should use NanoXML, as it is guaranteed to be available at installation time. In fact, all of the IzPack infrastructure uses NanoXML to read XML files. First you should read the NanoXML documentation. The documentation is included as PDF file with the IzPack distribution, have a look in `/doc/nanoxml`. In addition to that, the Javadoc-generated class documentation is an excellent resource to get help on NanoXML. And then, there is always the code of other panels to see practical examples. Generally, it is a much simpler matter to use NanoXML then to use the DOM included with the Java distribution, so don't hesitate to explore NanoXML.

Supporting Classes

If your panel requires any supporting classes that are part of the panels package, then you must place the .class files into the same directory with your panel .class file.

It is also possible to have supporting classes that are not part of the panels package. In fact, these classes don't even have to be in the `com.izpack...` tree. You simply have to ensure that the .class files are located in the proper directory structure inside `/lib/installer.jar`. If this is done, they will be available at install time. For your first experiments you can simply compile your classes and add them to the .jar file using the jar tool or a zip utility. However, ultimately it is much easier to use Ant and the IzPack build script to accomplish this task.

Panels that are not visible

If you have a task that needs to be performed at a particular step in the installation process, but that does not need any user interaction, you can implement a panel that is not visible. To implement this, you should first familiarize yourself with the Javadoc documentation of `com.izforge.izpack.InstallerFrame`. In your panel code you get access to the right instance of `InstallerFrame` through the protected variable `parent` in `IzFrame`.

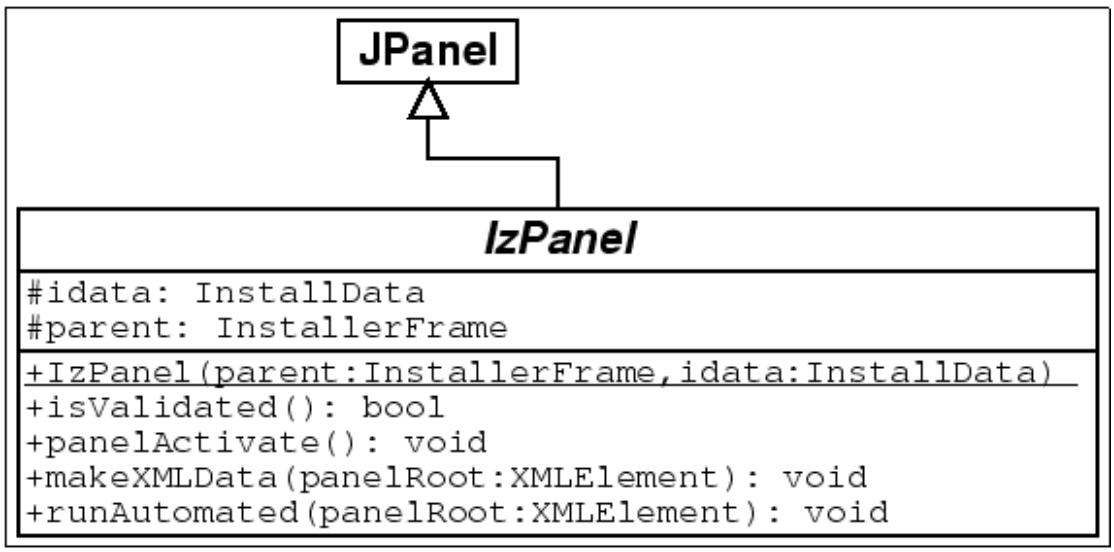
To begin with, do not configure any UI. In other words, do not set a layout and do not place any GUI elements on your panel. In this context the method `skipPanel()` is what gets the job done. In your `panelActivate()` method you simply perform your task and then call `parent.skipPanel()`. This gets the job done without the user being aware that there was another panel in the flow.

A word about building IzPack

If you don't already use Jakarta Ant to support your development work, i highly recommend you have a look at it. It is a great help in organizing practically all routine tasks connected with building and packaging your application. For example, building and getting IzPack ready for distribution is not a straight forward process but with Ant this all comes down to starting a single command. In addition, IzPack provides its own Ant task, which supports the integration of building a complete installer into your regular build scripts. You can find more details about this in the chapter about advanced features. To get a look at Ant you can visit the following link: http://ant.apache.org/index.html.

You can find the Ant build script for IzPack itself at: `/src/build.xml`

The `IzPanel` Class



The two data members are : the install data (refer to the `InstallData` Javadoc reference) and a reference to the parent installer frame.

The methods have the following functionality :

- *(constructor)* : called just after the language selection dialog. All the panels are constructed at this time and then the installer is shown. So be aware of the fact that the installer window is **not** yet visible when the panel is created. If you need to do some work when the window is created, it is in most cases better do it in `panelActivate`.
- `isValidated` returns `true` if the user is allowed to go a step further in the installation process. Returning `false` will lock it. For instance the LicencePanel returns `true` only if the user has agreed with the license agreement. The default is to return `true`.
- `panelActivate` is called when the panel becomes active. This is the best place for most initialization tasks. The default is to do nothing.
- `makeXMLData` is called to build the automated installer data. The default is to do nothing. `panelRoot` refers to the node in the XML tree where you can save your data. Each panel is given a node. You can organize it as you want with the markups you want starting from `panelRoot`. It's that simple.
- `runAutomated` is called by an automated-mode installation. Each panel is called and can do its job by picking the data collected during a previous installation as saved in " panelRoot" by `makeXMLData`.
- `setInitialFocus` with this method it is possible to set a hint which component should be get the focus at activation of the panel. It is only a hint. Not all components are supported. For more information see java.awt.Component.requestFocusInWindow or java.awt.Component.requestFocus if the VM version is less than 1.4.
- `getInitialFocus` returns the component which should be get the focos at activation of the panel. If no component was set, null returns.
- `getSummaryBody` this method will be called from the SummaryPanel to get the summary of this class which should be placed in the SummaryPanel. The returned text should not contain a caption of this item. The caption will be requested from the method getCaption. If null returns, no summary for this panel will be enerated. Default behaviour is to return null.
- `getSummaryCaption` this method will be called from the SummaryPanel to get the caption for this class which should be placed in the SummaryPanel. Default behaviour is to return the string given by langpack for the key ClassName.summaryCaption.

Additionally, there are some helper methods to simplify grid bag layout handling and creation of some common used components.

The `Internationalization` of custom panels

A common way to define language dependant messages for custom panels is to add entries into the common langpacks which are stored in the directory

```
[IzPackRoot]/bin/langpacks/installer
```

New with version 3.8 is the possibility to define a resource for custom langpacks. Define e.g.

```
<resources>
    ...
    <res id="CustomLangpack.xml_deu"
        src="myConfigSubPath/CustomLangpack_deu.xml"/>
    ...
</resources>
```

in the install.xml file.The id should be written as shown, the file sub path and name can be other than in the example. This file should be using the same DTD as the common langpack. For each language a separate file with the ISO3 extension in the id should be used.

User Input

(by Elmar GROM)

Most of the panels that come with IzPack take user input in some form. In some panels this is through a simple user acknowledgment in others the user can enter text or select a directory through a file open dialog. In all of those cases the user input is used for the specific purpose needed by the panel that takes the input. However, if you need user input during installation that will later on be available to your application then you need to use the user input panel.

To use this panel, list it in the install file with the class name `UserInputPanel`. In addition, you must write a XML specification and add it to the install resources. The name of this resource must be `userInputSpec.xml`.

A UserInputPanel can be highly dynamic from IzPack 4.3 on, as it will be refreshed every time the user input changes and will be rendered based on conditions. Thus it would be possible to enable or disable some more options by clicking a checkbox.

Here's an example userInputSpec.xml showing 3 panels. There are some advanced features in this example, but the general flow should be looked at first.

The user input panel is a blank panel that can be populated with UI elements through a XML specification file. The specification supports text labels, input elements, explanatory text and some minor formatting options.

The following types of user input elements are supported:

- Text

- Combo Box
- Radio Buttons
- Check Box
- Password
- File
- Multiple files
- Directory
- Rule Input Field
- Search Field

Additionally visual elements can be added using the following types:

- Static Text
- Title
- Space
- Divider

The way in which this panel conveys the user input to your application is through the variable substitution system. User input is not directly inserted into your configuration files but the variables that you specify for this panel are set in the variable substitution system. After this operation has taken place the variables and associated values are available for all substitutions made. This way of operation has a number of implications that you should be aware of.

First, not only can you set additional variables in this way but you can also modify variables that are defined elsewhere -even built in variables. For this reason you should be careful to avoid overlaps when choosing variable names. Although there might be cases when it seems useful to modify the value of other variables, it is generally not a good idea to do so. Because you might not exactly know when other variables are set and when and where they are used throughout the installation process, there might be unintended side effects.

Second, the panel must be shown at a point during the installation process before the variables are used. In most cases you will use the values to substitute variables in launch and configuration files that you supply with your installation. For this to work you place this panel before the install panel, because the install panel uses the variable substitutor to replace all such variables. Although using this panel any later in the process will correctly set the variables internally, there won't be any affect on the files written to disk. You can also use variables set in this way in other panels that you have written yourself. There is a section in the chapter on writing your own panel that explains how to do this. Also in this case it is important to place the associated input panel in the process before the variables are used.

At this point I would also like to mention that it is possible to hide every field element based on conditions.

It would also be possible to hide select elements on the panel or the panel altogether if certain packs are not selected. For this to work you must place this panel after the packs panel. One side effect of using this feature is that it is not possible to step back once the user input panel is displayed. This is because the user might make changes in the packs selection that would require a complete rebuild of the UI. Unfortunately, building the UI is an irreversible process, therefore the user can not be allowed to go back to the packs panel.

The Basic XML Structure

The top level XML section is called `<userInput>`. For most panels it does not make sense to present them more than once, however you might want to present multiple user input panels -with different content of course. Therefore the `<userInput>` section can contain multiple tags that each specify the details for one panel instance. The tag name for this is `<panel>`.

The `<panel>` tag uses the following attributes:

order - `required`

This is the order number of the user input panel for which this specification should be used. Counting starts at 0 and increments by 1 for each instance of the user input panel. So if a spec should be used for the second occurrence of the user input panel use `order="1"`.

layout - `optional`

There are three general layout rules this panel uses, they are `left`, `center` and `right`. While i think left is most commonly used, you might want to experiment with this attribute and see which you like best. The default is `left`.

Concepts and XML Elements Common to All Fields

Before we dive into the details of defining the various UI elements I would like to present XML elements and general concepts that apply throughout. This saves me a lot of work in writing and you a lot of repetitive reading and maybe a tree or two.

The UI elements are generally laid out top to bottom in the order they appear in the XML file. The only exception to this rule is the title, which always appears at the very top. The layout pattern for the input fields is as follows: If a description is defined, it appears first, using the full available layout width. The input field is placed beneath the description. With fields such as the text field or the combo box, the label is placed to the left and the input field to the right. Fields such as radio buttons and check boxes are somewhat indented and have the label text appear to their right.

Each UI element is specified with a `<field>` tag. The `type` attribute is used to specify what kind of field you want to place. Obviously, the `type` attribute is not optional.

Each field that takes user input must also specify the variable that should be substituted. This is done with the `variable` attribute.

Almost all fields allow a description. When a description is allowed it is always added in the same way. The description is part of the data within the field tag. There can only be one description per field. If you add more than one, the first one is used and the others ignored. There are three attributes used with this tag. The text is specified through the `txt` or the `id` attribute. The details on using them are described below. The attributes are all optional but you must specify text to use, either directly or through the `id` attribute. In addition, you can set the text justification to `left`, `center` and `right` with the `align` attribute.

The following example illustrates the general pattern for field specification:

```
<field type="text" variable="myFirstVariable">
  <description align="left" txt="A description" id="description1"/>
  .
  .
  .
</field>
```

A very frequently used pattern is for the definition of text. Where ever text is needed (labels, descriptions, static text, choices etc.) it can be specified in place using the `txt` attribute. This is convenient if you are only supporting a single language. However, if you would like to separate your text definitions from the panel specification or if you need to support multiple languages you might want to use the `id` attribute instead to only specify an identifier. You can then add multiple XML files with the same name as this spec file (userInputSpec.xml) appended with an underscore '_' and the the appropriate three letter ISO3 language code. The content of those files must conform to the specification for IzPack language packages. For more details on this topic see the chapter on language packages under advanced features. `id` defines an identifier that is also defined in the language package, together with the localized text to use. It is possible to use both the `txt` and the `id` attribute. In this case the text from the language package is used. If for some reason the language package is not available or the `id` is not defined there, the text specified with `txt` is used as default.

All input fields can be pre-set with a value of your choice. Although the details vary a bit from field type to field type, the `set` attribute is always used to accomplish this. The `set` attribute is of course optional. Please note that if you use the `set` attribute, you would have to keep in mind, that the UserInputPanel will be rendered after each user input. Thus it will be set back to the default value if you don't use a condition to handle that. IzPack generates builtin conditions for every variable used as target for a field to be able to check if there's any input.

All fields that take user input use a `<spec>` tag to define the details of the input field. In the some cases the content of this tag is rather simple. Input fields with a more complex nature tend to have accordingly complex content in this tag. Since the details vary widely, they are explained with each input field.

Any number of `<createForPack name=''a pack name'' />` tags can be added to the `<panel>` and `<field>` sections. This tag has only one attribute and no data. The

attribute is `name` and specifies the name of one of the installation packs that you have defined. Here is how it works: if no `<createForPack ...>` tag exists in a section, the entity is always created. However, if the tag exists, the entity is only created if one or more of the listed packs are selected for installation. As mentioned before, if you are using this feature, make sure the user input panel shows up after the packs panel.

Also, any number of `<createForUnselectedPack name=''a pack name'' />` tags can be added to the `<panel>` and `<field>` sections. This tag has only one attribute and no data. It works exactly like createForPack except that once added user input panel will appear for only NOT Selected packs. As mentioned earlier, you need to make sure that the user input panel shows up after the packs panel for this feature to work.

There is a possibility to use variables in those elements where the text is supplied via `txt` attribute. This includes static fields and input fields (spec, description). The text can contain unlimited number of variables that will be substituted. Variable substitution also works with language packs, just use variables in your language pack, and they will be still substituted properly.

Example

In the following example, the variables: name1, name2, name3 will be substituted.

```
<field type="text" variable="value1">
  <description align="left" txt="Configuration for $name1 and $name2" id=""/>
  <spec txt="The value for $name3:" id="" size="20" set="default value" />
</field>
```

Internationalization

To provide internationalization you can create a file named `userInputLang.xml_xyz` where `xyz` is the ISO3 code of the language in lowercase. Please be aware that case is significant. This file has to be inserted in the resources section of `install.xml` with the `id` and `src` attributes set at the name of the file.

Example:

If you have the following userInputSpec.xml and you want to internationalize `input.comment`, `input.proxy`, `input.port` for English and French you have to create two files named userInputLang.xml_eng and userInputLang.xml_fra:

```
<userInput>
<panel order="0">
  <field type="staticText" align="left" txt="My comment is here."
  id="input.comment"/>
  <field type="text" variable="proxyaddress">
        <spec txt="Proxy Host:" id="input.proxy" size="25"
        set=""/>
  </field>
  <field type="text" variable="proxyPort">
       <spec txt="Proxy Port:" id="input.port" size="6"
       set=""/>
```

```
    </field>
  </panel>
  </userInput>
```

userInputLang.xml_eng file contains:

```
  <langpack>
    <str id="input.comment" txt="English:My comment is here."/>
    <str id="input.proxy" txt="English:Proxy Host:"/>
    <str id="input.port" txt="English:Proxy Port:"/>
  </langpack>
```

userInputLang.xml_fra file contains:

```
  <langpack>
    <str id="input.comment" txt="French:My comment is here."/>
    <str id="input.proxy" txt="French:Proxy Host:"/>
    <str id="input.port" txt="French:Proxy Port:"/>
  </langpack>
```

you will also have to add the following to the install.xml file

```
  <resources>
    ...
    <res id="userInputSpec.xml" src="userInputSpec.xml"/>
    <res id="userInputLang.xml_eng" src="userInputLang.xml_eng" />
    <res id="userInputLang.xml_fra" src="userInputLang.xml_fra" />
    ...
  </resources>
```

Panel Title

You can place an optional title at the top of the panel. Though it is not possible to select a font for the title that is different form the one used on the rest of the panel, it is possible to modify the font to some extent. To specify the title create a `<field>` tag and use the `type` attribute with the value `title`. In addition to the `txt` and `id` attributes, the following attributes are supported:

italic - `optional`

With a value of `true` specifies that the title font should be in italics.

bold - `optional`

With a value of `true` specifies that the title font should be bold.

size - `optional`

This attribute specifies the size of the title font. Please note that the size is not specified in points but as a relative size multiplier compared to the body font on the panel. The default value is 2.

Static Text

Static text is simply text that is placed on the panel without direct connection to any of the input elements. It is laid out to use the entire layout width available on the panel and is broken into multiple lines if necessary. To specify static text create a `<field>` tag and use the `type` attribute with a value of `staticText`. In addition to the " txt" and `id` attributes, the text can be justified `left`, `center` or `right` with the `align` attribute. It is not possible to format this text in any way. You can also use variables in the text (as it was mentioned above), they will be substituted with variable's value.

Example

The following example inserts some static text in the panel.

```
<field type="staticText" align="left"
       txt="This is just some simple static text with variable substitution in here:
       id="staticText.text"/>
```

Visual Separation

Sometimes it is desirable to separate different entities visually. This can be accomplished by inserting a space or a divider. A space simply inserts a vertical separation of the average height of a single line entity, such as a line of text or a an input field. A divider inserts the same amount of space but also draws a division line which can be either aligned at the top or bottom of the separation.

```
<field type="divider" />
<field type="space" />
```

Text Input

A text input field allows the user to enter and edit a single line of text, without length restriction. The input field can have a label, which will show to the left of the input field and a description, which can span multiple lines. The description is placed above the input field and uses the entire available layout width. The width of the input field must be explicitly set, otherwise it will only accommodate a single character. To specify a text input field create a `<field>` tag and use the `type` attribute with a value of `text`. The `txt` and `id` attributes are not supported here. The `variable` attribute specifies the variable that should be replaced with the text taken from the input field.

The Data

The data consists of two items, a description and the spec. The `<spec>` tag uses four attributes. The label text is specified with `txt` and/or `id` as described above. In addition, the width of the input field as it appears on the panel can be set with the `size` attribute. The value must be an integer and sets the field width based on the average character width of the active font. If this is not specified, then you will end up with a very narrow field that is practically unusable.

The fourth attribute `set` is optional. It takes a text string to pre-fill the input field.

Example

The following example creates a text input field with a label and description. The width of the input field will be enough to accommodate 15 characters. The field will be pre-set with the text 'some text' when the UI is first presented.

```
<field type="text" variable="textInput">
  <description align="left" txt="A description for a text input field"
      id="description.text"/>
  <spec txt="Enter some text:" id="text.label" size="15" set="some text"/>
</field>
```

Radio Buttons

The radio buttons are useful when the user needs to select a specific option out of a pre-defined list of choices. This field offers an arbitrary number of mutually exclusive buttons, each with its own label. The placement of the buttons and labels is different form other fields. First, the button is placed to the left and the label text to the right. Second, the buttons are not lined up all the way to the left as other labels are but they are indented from that location. As with other fields, the description is placed above the list of radio buttons and uses the entire available layout width. To specify a set of radio buttons create a `<field>` tag and use the `type` attribute with a value of `radio`. The `txt` and " id" attributes are **not** supported here. As with all other input fields, the `variable` attribute specifies that variable that should be replaced with the user selection.

The Data

The data consists of two items, a description and the spec. The `<spec>` tag has no attributes, instead the specification details are entered as data within the " <spec>" tag. The `<spec>` data consists of one or more `<choice>` tags. One `<choice>` tag is required for each radio button. The " <choice>" tag accepts the usual `txt` and `id` attributes, which are used to specify the label text. In addition the following attributes are supported:

value - `required`

The `value` attribute is used to specify which value to insert if this associated radio button is selected. In other words, the label text has nothing to do with the value that is actually substituted for the variable. For this reason there is never an issue if multiple languages are used, the value is always the same for a given selection.

set - `optional`

The `set` attribute accepts the values `true` and `false`. Since the attribute is optional it can also be omitted, which is interpreted as `false`. If a value of `true` is used, the associated radio button will be selected when the UI is first presented. Obviously, only one of the buttons in a set should be set to `true`.

Example

The following example creates a set of four radio buttons with description. The second button will be selected when the UI is first presented.

```
<field type="radio" variable="radioSelection">
  <description align="left" txt="This is a description for radio buttons"
```

```
            id="description.radio"/>
    <spec>
            <choice txt="the first choice" id="radio.label.1" value="1 selected" />
            <choice txt="the second choice" id="radio.label.2" value="2 selected" set="
            <choice txt="the third choice" id="radio.label.3" value="3 selected" />
            <choice txt="the fourth choice" id="radio.label.4" value="4 selected" />
    </spec>
  </field>
```

Combo Box

The combo box provides essentially the same functionality as do the radio buttons, just in a different presentation stile. The advantage of the combo box is that it is easier to deal with a long list of choices.

Check Box

If there are a number of choices and any combination of them could be selected, not just a single one, then radio buttons are not the way to go. You might be better off using a number of check boxes. The layout for a check box works in the same way as for radio buttons. The check box is placed indented from the left most edge and the label text is placed to the right of it. Other than with radio buttons, you cannot define any number of check boxes. This field allows the definition of only one check box, which is associated with one variable. If you need multiple check boxes you need to define one field for each of them. To make it look like a cohesive group you simply provide a description only for the first check box. All of the check boxes will be positioned in such a way that they look like a group, even though they are separate entities and their selections are conveyed to different variables. The description is placed above the check box and uses the entire available layout width. To specify a check box create a `<field>` tag and use the `type` attribute with a value of `check`. As with all other input fields, the `variable` attribute specifies the variable that should be replaced with the user input.

The Data

The data consists of two items, a description and the spec. The `<spec>` tag accepts the usual `txt` and `id` attributes, which are used to specify the label text. In addition, the following attributes are supported:

true - `required`

The `true` attribute specifies the value to use for substitution when the box is selected.

false - `required`

The `false` attribute specifies the value to use for substitution when the box is not selected.

set - `optional`

The `set` attribute accepts the values `true` and `false`. Since the attribute is optional it can also be omitted, which is interpreted as `false`. If a value of `true` is used, the check box will be selected when the UI is first presented.

Example

The following example creates a check box with description. The check box will not be selected when the UI is first presented. This could also be accomplished by omitting the `set` attribute.

```
<field type="check" variable="checkSelection.1">
  <description align="left" txt="This is a description for a check box"
           id="description.check.1"/>
  <spec txt="check box 1" id="check.label.1" true="on" false="off"
      set="false"/>
</field>
```

Password Field

The password field allows masked user input to accept password values. Normally, a spec is created with 2 'pwd' elements to allow equality validation (below) and ensure the user typed the password correctly. The password field also allows **multiple validators** (see below). This is a very powerful feature for chaining validation operations based on user input. See the PasswordKeystoreValidator for an example.

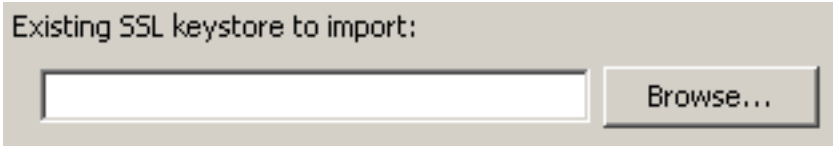
```
<field type="password" align="left" variable="the.password">
  <spec>
    <pwd txt="The Password:" size="25" set=""/>
    <pwd txt="Retype Password:" size="25" set=""/>
  </spec>
</field>
```

File Field

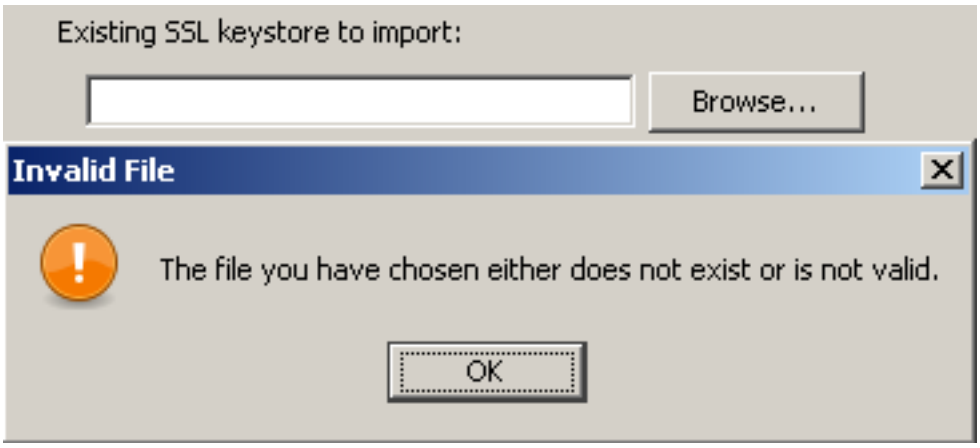
This field allows the user to select a file from the file system. Text can be added before the selection or a static text element can be added to display above the selection box (a little more visually appealing).

```
<field type="file" align="left" variable="the.file">
  <spec txt="" size="25" set=""/>
</field>


<field type="staticText" align="left" txt="Existing SSL keystore to import:"/>
 <field type="file" align="left" variable="existing.ssl.keystore">
   <spec txt="" size="25" set="$myconfig" />
 </field>
```



Pressing 'Next' without a file selected show the following message:



Messages for the file field can be customized by creating a custom lang pack and overriding the following values (attribute values wrapped for readability):

```
<str id="UserInputPanel.file.nofile.message"   txt="You must select a valid file."/>
<str id="UserInputPanel.file.nofile.caption"   txt="No File Selected"/>
<str id="UserInputPanel.file.notfile.message"   txt="The file you have chosen either
            does not exist or is not valid."/>
<str id="UserInputPanel.file.notfile.caption"   txt="Invalid File"/>
```

Note: Mixing file fields with other fields that have text in front of them can lead to formatting (layout) issues. Placing these types of elements on different panels can provide a much better user experience.

Multiple File Field

This field allows the user to select multiple files from the file system. Text can be added before the selection or a static text element can be added to display above the selection box (a little more visually appealing).

The files in the list can be created as a semi-colon separated string in one varibale. It's also possible to let the input field create multiple variables with the given variable appended with indexes. E.g. specifying a variable with name the.file and three files selected in the box would lead to three variables in the installer (the.file, the.file_1, the.file_2).

Set-Parameter :

visibleRows How many rows shall be shown in the list box.

prefX The preferred width of the list box. The default is 200.

prefY The preferred height of the list box. The default is 100.

fileext The file extension to search for. This will be used in the FileChooserDialog.

fileextdesc The description of the file extension. This will be used in the FileChooser-Dialog.

multipleVariables If set to true, multiple variables will be created. Each file will get one variable.

allowEmptyValue If set to true, no file has to be selected and the box can be left empty.

```
<field type="multifile" align="left" variable="the.file">
  <spec txt="" size="25" set=""/>
</field>


<field type="staticText" align="left" txt="Existing SSL keystore to import:"/>
 <field type="file" align="left" variable="existing.ssl.keystore">
   <spec txt="" size="25" set=""/>
 </field>
```

Messages for the file field can be customized by creating a custom lang pack and overriding the following values (attribute values wrapped for readability):

```
<str id="UserInputPanel.file.nofile.message"   txt="You must select a valid file."/>
<str id="UserInputPanel.file.nofile.caption"   txt="No File Selected"/>
<str id="UserInputPanel.file.notfile.message"   txt="The file you have chosen either
            does not exist or is not valid."/>
<str id="UserInputPanel.file.notfile.caption"   txt="Invalid File"/>
```

Note: Mixing multiple file fields with other fields that have text in front of them can lead to formatting (layout) issues. Placing these types of elements on different panels can provide a much better user experience.

Directory Field

The directory field is essentially the same as the file field except the field will ensure a directory is selected.

```
<field type="dir" align="left" variable="existing.jboss.home">
  <spec txt="" size="25" set="$INSTALL_PATH$FILE_SEPARATOR${jboss.version}" mustExist
</field>
```

The directory supports the following two special attributes for the `<spec>` element:

mustExist - optional (default: true) Specifies whether or not the selected path must be an existing directory.

create - optional (default: false) Specifies whether or not the selected directory should be created if it does not exist (requires mustExist=true).

Messages for the directory field can be customized by creating a custom lang pack and overriding the following values (attribute values wrapped for readability):

```
<str id="UserInputPanel.dir.nodirectory.message"   txt="You must select a valid direc
<str id="UserInputPanel.dir.nodirectory.caption"   txt="No Directory Selected"/>
<str id="UserInputPanel.dir.notdirectory.message"   txt="The directory you have chose
            either does not exist or is not valid."/>
<str id="UserInputPanel.dir.notdirectory.caption"   txt="Invalid Directory"/>
```

Note: Mixing directory fields with other fields that have text in front of them can lead to formatting (layout) issues. Placing these types of elements on different panels can provide a much better user experience.

Rule Input

The rule input field is the most powerful and complex one of all the input fields offered by this panel. In its most simple incarnation it looks and works like a regular text input field. There is also only an incremental increase of the complexity in the specification for this case. However, it is unlikely that you would use it for such a purpose. The real power of this input field comes from the fact that rules can be applied to it that control many aspects of its look as well as overt and covert operation.

Layout and Input Rules

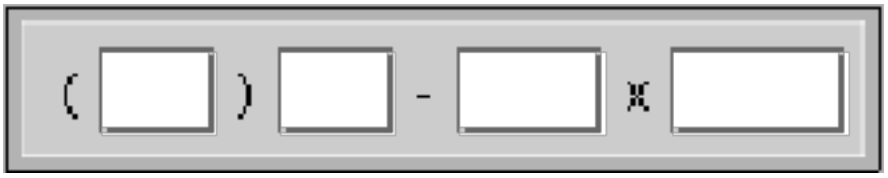
The basic nature of this input field is that of a text input field and as mentioned before, in its most simple incarnation that is what it looks like and how it operates. However, the layout of the field can be defined in such a way that there are multiple logically interconnected text input fields, adorned with multiple labels. Further more, each of these fields can be instructed to restrict the type of input that will be accepted. Now you might ask what this could be useful for. As an answer, let me present a few examples that show how this feature can be used. Before i do this however, i would like to describe the specification syntax, so that the examples can be presented together with the specifications that make them work in a meaningful way.

The actual specification of the layout, the labels and the type of input each field accepts all happens in a single string with the `layout` attribute. First let us have a look at the specification format for a single field. This format consists of a triplet of information, separated by two colons ':'. A typical field spec would look like this: `N:4:4`, where the first item is a key that specifies the type of input this particular field will accept - numeric input in the example. The second item is an integer number that specifies the physical width of the field, this is the same as in the with of any regular text field. Therefore the field in the example will provide space to display four characters. The third item specifies the editing length of the string or in other words, the maximum length of the string that will be accepted by the field. In the `layout` string you can list as may fields as you need, each with its own set of limitations. In addition you can add text at the

front, the end and in between the fields. The various entities must be separated by white space. The behavior of this field is such that when the editing length of a field has been reached, the cursor automatically moves on to the next field. Also, when the backspace key is used to delete characters and the beginning of a field has been reached, the cursor automatically moves on to the previous field. So let us have a look a some examples.

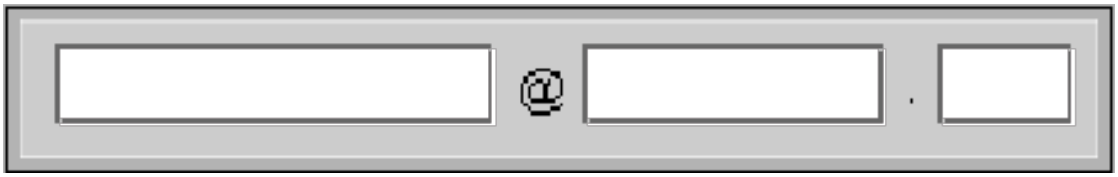
Phone Number

The following specification will produce a pre formatted input field to accept a US phone number with in-house extension. Even though the pattern is formatted into number groups as customary, complete with parentheses '(' and dash '-', entering the number is as simple as typing all the digits. There is no need to advance using the tab key or to enter formatting characters. Because the fields only allow numeric entry, there is a much reduced chance for entering erroneous information. `"( N:3:3 ) N:3:3 - N:4:4 x N:5:5"`. Each of the fields uses the 'N' key, indicating that only numerals will be accepted. Also, each of the fields only accepts strings of the same length as the physical width of the field.



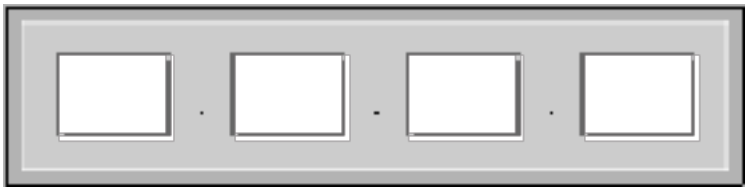
E-Mail address

This specification creates a pattern that is useful for entering an e-mail address `"AN:15:U @ AN:10:40 . A:4:4"`. Even though the first field is only fifteen characters wide it will accept a string of unlimited length, because the 'U' identifier is used for the edit length. The second field is a bit more restrictive by only accepting a string up to forty characters long.



IP address

It might not be uncommon to require entering of an IP address. The following simple specification will produce the necessary input field. All fields are the same, allowing just three digits of numerical entry. `"N:3:3 . N:3:3 . N:3:3 . N:3:3"`



Serial Number or Key Code

If you ship your product with a CD key code or serial number and require this information for registration, you might want to ask the customer to transcribe that number from the CD label, so that it is later on accessible to your application. As this is always an error prone operation, the predefined pattern with the easy editing support and restriction of accepted data helps to reduce transcription errors `"H:4:4 - N:6:6 - N:3:3"`. This particular specification will produce three fields, the first accepting four hexadecimal, the second six numerical and the third three numerical digits.

Limitations

Even though the above examples all use single character labels between fields, there is no restriction on the length of these labels. In addition, it is possible to place label text in front of the first field and after the last field and the text can even contain spaces. The only limitation in this regard is the fact that all white space in the text will be reduced to a single space on the display. This means that it is not possible to use multiple spaces or tabs in the text.

The following table lists and describes all the keys that can be used in the specification string.

Key	Meaning	Description
N	numeric	The field will accept only numerals.
H	hexadecimal	The field will accept only hexadecimal numerals, that is all numbers from 0-F.
A	alphabetic	The field will accept only alphabetic characters. Numerals and punctuation marks will not be accepted.
AN	alpha-numeric	The field will accept alphabetic characters and numerals but no punctuation marks.
O	open	The filed will accept any input, without restriction.
U	unlimited	This key is only legal for specifying the editing length of a fields. If used, the field imposes no length restriction on the text entered.

Setting Field Content

Like all other input fields the rule input field can also be pre-filled with data and as usual, this is accomplished thought the `set` attribute. As you might expect, the details of setting this field are rather on the complicated side. In fact you can set each sub

field individually and you can leave some of the fields blank in the process. The `set` specification for all sub fields is given in a single string. Each field is addressed by its index number, with the count starting at 0. The index is followed by a colon ':' and then by the content of the field. The string "0:1234 1:af415 3:awer" would fill the first subfield with `1234`, the second one with `af415` and the fourth with `awer`. The third subfield would stay blank and so would any additional fields that might follow.

The individual field specs must be separated with spaces. Spaces within the pre-fill values are not allowed, otherwise the result is undefined.

The Output Format

The user input from all subfields is combined into one single value and used to replace the variable associated with the field. You can make a number of choices when it comes to the way how the subfield content is combined. This is done with the `resultFormat` and `separator` attributes. The `resultFormat` attribute can take the following values:

Value	Meaning
`plainString`	The content of all subfields is simply concatenated into one long string.
`displayFormat`	The content of all subfields and all labels (as displayed) is concatenated into one long string.
`specialSeparator`	The content of all subfields is concatenated into one string, using the string specified with the `separator` attribute to separate the content of the subfields.
`processed`	The content is processed by Java code that you supply before replacing the variable. How to do this is described below.

Validating Field Content

You can provide runtime validation for user input into a text field and rule field via the `validator` element (which is a child of the `field` element. There are two types of built-in validators already provided: a `NotEmptyValidator` and a `RegularExpressionValidator`. You can also easily create your own validator. In all cases, if the chosen validator returns `false`, a messagebox will display the contents of the `txt` attribute and the user will be unable to continue to the next panel.

You can specify a processor for a combobox:

```
<choice processor="fully.qualified.class.name"
        set="selectedValue"/>
```

so that you can fill a combobox with data on a simple way.

NotEmptyValidator

The `NotEmptyValidator` simply checks that the user entered a non-null value into each subfield, and returns `false` otherwise.

RegularExpressionValidator

The `RegularExpressionValidator` checks that the user entered a value which matches a specified regular expression, as accepted by the Jakarta Regexp library (http://jakarta.apache.org/regexp/). The syntax of this implementation is described in the javadoc of the `RE` class (http://jakarta.apache.org/regex

You can specify the regular expression to be tested by passing a parameter with a name of `pattern` to the validator (via the `param` element), with the regular expression as the `value` attribute. For example, the following would validate an e-mail address:

The example of using Regexp validator in rule input field:

```
<field type="rule" variable="EMAILaddress">
  <spec
      txt="Your Email address:" layout="0:12:U @ 0:8:40 .
      A:4:4"
      set="0: 1:domain 2:com" resultFormat="displayFormat"
  />
  <validator
  class="com.izforge.izpack.util.RegularExpressionValidator"
      txt="Invalid email address!">
    <param
        name="pattern"
        value="[a-zA-Z0-9._-]{3,}@[a-zA-Z0-9._-]+([.][a-zA-Z0
        -9_-]+)*[.][a-zA-Z0-9._-]{2,4}"
    />
  </validator>
</field>
```

The example of using Regexp validator in text input field:

```
<field type="text" variable="EMAILaddress">
  <spec
      txt="Your Email address:" set="you@domain.com" size="20" id=""
  />
  <validator
  class="com.izforge.izpack.util.RegularExpressionValidator"
      txt="Invalid email address!">
    <param
        name="pattern"
        value="[a-zA-Z0-9._-]{3,}@[a-zA-Z0-9._-]+([.][a-zA-Z0
        -9_-]+)*[.][a-zA-Z0-9._-]{2,4}"
```

```
    />
  </validator>
</field>
```

An example of using regexp validator in a password field (attribute text wrapped for readability):

```
<field type="password" align="left" variable="db.password">
  <spec>
    <pwd txt="DB Password:" size="25" set=""/>
    <pwd txt="Retype Password:" size="25" set=""/>
  </spec>
  <validator class="com.izforge.izpack.util.PasswordEqualityValidator"
               txt="Both DB passwords must match." id="key for the error text"/>
  <validator class="com.izforge.izpack.util.RegularExpressionValidator"
               txt="Service password must begin with a character and be 8-20
                                  mixed-case characters, numbers, and special characte
                                  id="key for the error text">
    <param name="pattern" value="^(?=[a-zA-Z])(?=.*[0-9])(?=.*[#@!$_])
               (?=.*[A-Z])(?=.*[a-z])(?!.*[^a-zA-Z0-9#@!$_])(?!.*\s).{8,20}$"/>
  </validator>
</field>
```

You can test your own regular expressions using the handy applet at http://jakarta.apache.org/regexp/app

PasswordEqualityValidator

This validator uses a password field specification to compare the values in each field for equality. Normally, this would be to ensure a password was typed correctly before any other validation takes place.

```
<field type="password" align="left" variable="the.password">
  <spec>
    <pwd txt="The Password:" size="25" set=""/>
    <pwd txt="Retype Password:" size="25" set=""/>
  </spec>
  <validator class="com.izforge.izpack.util.PasswordEqualityValidator"
        txt="Both passwords must match." id="lang pack key for the error text"/>
</field>
```

PasswordKeystoreValidator

This validator uses the password field and parameters you send in from previous user input or predefined properties to open a keystore and optionally try to get a specified key.

You must specify the parameter 'keystoreFile', and optionally 'keystoreType' (defaults to JKS), 'keystoreAlias' (to check for existence of a key), and 'aliasPassword' (for trying to retrieve the key).

An additional parameter 'skipValidation' can be set to 'true' in a checkbox and allow the validator framework to run, but not actually do the validation.

Optionally checking the key password of multiple keys within a keystore requires the keystore password (if different from the key password) be set in the 'keystorePassword' parameter.

```
<field type="password" align="left" variable="keystore.password">
  <spec>
    <pwd txt="Keystore Password:" size="25" set=""/>
    <pwd txt="Retype Password:" size="25" set=""/>
  </spec>
  <validator class="com.izforge.izpack.util.PasswordEqualityValidator"
              txt="Both keystore passwords must match." id="key for the error text"
  <validator class="com.izforge.izpack.util.PasswordKeystoreValidator"
              txt="Could not validate keystore with password and alias provided." i
    <param name="keystoreFile" value="${ssl.keystore}"/>
    <param name="keystoreType" value="${ssl.keystore.type}"/>
    <param name="keystoreAlias" value="${keystore.key.alias}"/>
    <param name="skipValidation" value="${skip.keystore.validation}"/>
  </validator>
</field>
```

Creation Your Own Custom Validator

You can create your own custom Validator implementation simply by creating a new class which implements the `com.izforge.izpack.panels.Validator` interface. This interface specifies a single method: `validate(ProcessingClient client)` , which returns a `boolean` value. You can retrieve the value entered by the user by casting the input ProcessingClient as a `RuleInputField` and calling the `RuleInputField.getText()` method. You can also retrieve any parameters to your custom `Validator` by calling the `RuleInputField.getValidatorParams()` which returns a `java.util.Map` object containing parameter names mapped to parameter values. For an example, take a look at `com.izforge.izpack.util.RegularExpressionValidator`.

Set values in the RuleInputField can be preprocessed. At now you can specify a processor class to pre process a value to be set at initial value of a RuleInputField. Syntax:

```
<spec set="0:defaultVal:classname" .../>
```

The class name is an optional value. The class must implement the `Processor` interface.

Processing the Field Content

This feature needs to be documented.

Summary Example

```
<field type="rule" variable="test1">
  <description align="left" txt="A description for a rule input
  field."
               id="description.rule.1"/>
  <spec txt="Please enter your phone number:"
        layout="( N:3:3 ) N:3:3 - N:4:4 x N:5:5"
        resultFormat="specialSeparator" separator="."/>
  <validator class="com.izforge.izpack.util.NotEmptyValidator"
             txt="The phone number is mandatory!" />
  <!--processor class=""/-->
</field>
```

Search

The search input field allows the user to choose the location of files or directories. It also supports auto-detection of the location using a list of suggestions. The field is basically a combobox with an extra button to trigger auto-detection (again).

Specification

The `<description>` tag is the same as with other fields
The `<spec>` tag supports the following attributes:

- `filename` - the name of the file or directory to search for
- `type` - what to search for
  - `file` - search for a file
  - `directory` - search for a directory
- `result` - what to return as the search result
  - `file` - result of search is whole pathname of file or directory found
  - `directory` - only return directory where the file was found (this is the same as `file` when searching for directories)

  - `parentdir` - return the full path of the parent directory where the file was found

- `checkfilename` - the name of a file or directory to check for existence (this can be used to validate the user's selection)

Example

```
<field type="search" variable="java_sdk_home">
  <description align="left"
               txt="This is a description for a search
               input field."
               id="description.java_sdk_home"/>
  <spec txt="Path to Java SDK:" checkfilename="lib/tools.jar"
        type="file" result="directory">
  <choice value="/usr/lib/java/" os="unix" />
  <choice value="/opt/java" os="unix" />
  <choice value="C:\Program Files\Java" os="windows" />
  <choice value="C:\Java" os="windows" />
  </spec>
</field>
```

Custom Actions

(by Klaus BARTZ)

Overview

The implementation of custom actions presume knowledge of java. Custom actions are not a good starting point for learning java. Learners can use existent custom actions but should not implement them as exercise.

In general the installation procedure is separated into several steps. The first step, let's call it the *data collection phase*, is getting specific data needed for the installation process. Typically this is done by typing all neded data into one or more panels, if a GUI is used, or automatically by reading the data from a config file. In general nothing will be changed on the system until all needed data is obtained. But mostly - depending on to the information, e.g. the destination path - different input panels are involved.

If all needed data is collected the second step will be perfomed, let us call it the *action phase*. During this step the state of the locale machine will be changed, e.g. files will be copied to the installation destination or some short cuts will be registered. Each of this subsequent steps are denoted as actions. There are actions intended to be reused, so called common actions, and actions for one special purpose only, so called custom actions. In IzPack there are already some common actions, for example "file transfer", "parse" or "execute".

The third step, the *reporting phase*, is normally represented by a panel that reports the result state of the installation (OK, or not OK) and a simple good bye message.

With IzPack there are two ways to implement custom actions. Firstly it is always possible to define a custom panel that perfoms the desired actions too. Secondly, and that's the new, custom actions are supported.

Panels still may be used for actions that are perfomed, e.g. before files are transferred or after the "execute" action. But if the needed action depends on the selected or already installed packages, this works also, but the implementation effort is much higher.

If the action should be performed for several amount of elements of a pack, using custom actions will be more easy than using panels. Additional custom actions may be defined for installation, but also for packaging and uninstallation purposes. If a custom action is also needed for uninstallation purposes, it'll be always a good idea to implement a corresponding installation action as custom action, but not as panel.

How It Works

Custom actions are implemented as listeners. Each listener implements callback methods that will be called at well-defined points. The method `InstallerListener.afterFile` for example will be called after a file has been copied. There are different interfaces intended for being used at packaging time, at installation time and at uninstallation time.

Each interface is implemented by a class with the prefix "Simple" (e.g. SimpleCompilerListener) that implements all declared interface methods with an empty body. These classes may be used as base classes for own listener implementations.

To apply custom actions to the installer, an entry in the apropriate install.xml file is needed. The configuration of listeners starts with the facultative ELEMENT "listeners" which can contain one or more ELEMENTs of "listener". For a "listener" there are three attributes which determine the "compiler", "installer" and "uninstaller" custom action pupose. Additionally it is possible to make the listener OS dependent using the "os" ELEMENT.

If file related data will be set, the facultative ELEMENT "additionaldata" is defined for the ELEMENTs "file", "singlefile" and "fileset". This data will be automatically moved to the corresponding PackFile objects in the install.jar. Extraction and usage should be implemented in a install custom action (see example).

Custom Action Types

Custom actions are intended to be used at packaging time, at installation time and at uninstallation time. The interfaces are:

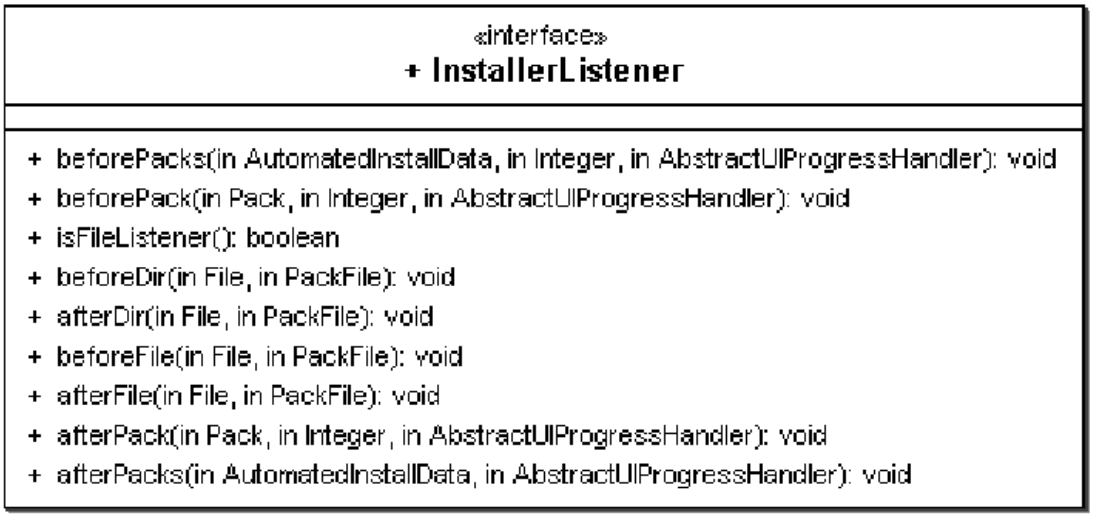
Custom action type	**Interface name**
Packaging	com.izforge.izpack.event.CompilerListener
Installation	com.izforge.izpack.event.InstallerListener

Custom action type	Interface name
Uninstallation	com.izforge.izpack.event.UninstallerListener

Custom Actions At Packaging

- *(constructor)*: only the default constructor will be used. It is called from Compiler just after creating the packager. Therefore initializing will be better during in the first `notify` call.
- `reviseAdditionalDataMap` gives the facility to add data to each `PackFile` object. This is the place where file related data can be transferred from the install xml file into the install jar file. Although each key and value of the map can be any type, but the class definitions of all used types must therfore be contained in the installer jar file or in the VM's classpath. In general strings are the best choice for being used as keys or values. All keys must be unique over all registered `CompilerListeners`. Each call of this method adds own key value pairs to the given `existenDataMap` because more than one listener can be used. If the given map is null, a new one will be created.
- `notify` is called at the beginning and at the end of each "add" method call which is called in `Compiler.executeCompiler`.

Custom Actions At Installing Time



- *(constructor)*: only the default constructor will be used. It is called from `Unpacker.run` before unpacking.
- `beforePacks` will be called each time before an unpacking call is performed.
- `beforePack` is called before a package is installed. Pack object and the number of the pack are passed.
- `isFileListener` determines whether the next four methods are called or not. This is a little performance optimizing.
- `beforeDir` is called before a directory is created. In this case, when file listeners exist, directories are created recursively and the method is called at each step. The file and the current `PackFile` object are passed.
- `afterDir` is called directly after the directory creation.
- `beforeFile` is called before a file is created. The file and `PackFile` object are passed as parameters.
- `afterFile` is the best place to perform file related actions. The given `PackFile` objects contains the additional data which was set at packaging.
- `afterPack` will be just called after the pack is closed.
- `afterPacks` is the last step before the handler will be stopped.

Custom Actions At Uninstalling Time

- *(constructor)* : only the default constructor will be used. It is called from `Destroyer.run` as first call.
- `beforeDeletion` will be called after execute files was performed. The given list contains all *File* objects which are marked for deletion.
- `isFileListener` determines whether the next two methods are called or not.
- `beforeDelete` is the method which, is called before a single file is deleted. The *File* object is given as parameter.
- `afterDelete` will be invoked after the delete call for a single file.
- `afterDeletion` is the last call before the cleanup of created data is performed.

Package Path

Custom actions must always implement one of the given listener interfaces. As mentioned above, it is also possible to derive from one of the "Simple" listeners. The package path is facultative, only the class name must be unique over all custom actions. The preparation of a custom action for providing it with an installation is very similar to panels. Custom actions must also be packed into a jar file with the name of the custom action class name. This jar file should be placed in `[IzPackRoot]/bin/customActions`, may be

```
[IzPackRoot]/bin/customActions/MyCompilerListener.jar
[IzPackRoot]/bin/customActions/MyInstallerListener.jar
[IzPackRoot]/bin/customActions/MyUninstallerListener.jar
```

In the default Ant definition file (build.xml) there are some targets for this stuff.

Native Libraries for Uninstallation

If a custom action uses JNI at installation time, often the associated uninstall custom action needs JNI too. For this situation it is possible to declare a native library for unstallation. The only work to do is to add a `stage` attribute to the `native` tag in the install xml file like

```
<!-- The native section. We specify here our os dependant
libs..--> <native type="3rdparty"
name="MyOSHelper.dll"stage="both" >
   <os family="windows" />
</native>
```

The needed additional classes are packed into lib/uninstaller-ext.jar. If a native library is defined for uninstallation, this file will also be packed into the installer.jar as IzPack.unistaller-ext and used at its right position.

What You Have To Do

Follow the steps that are needed to create and use custom actions with the "normal" source environment (not standalone compiler) using Ant. Of course, it works also with the standalone compiler.

Custom Actions at Packaging (CompilerListener)

- Implement `com.izforge.izpack.event.CompilerListener` or extend `com.izforge.izpack.event.S` Place it as " [IzPackRoot]/src/lib/[MyPackagePath]/MyCompilerListener.java".
- Add a "`build-compiler-listener`" macro call in to the `build.listeners` target in `[IzPackRoot]/src/build.xml`. Note that the name attribute value in the build-instealler-listener must match `CompilerListener` implementation class name (not including the package). You should include the actual Listener implementation, as well as any other classes required by the listener.

  ```
  <build-compiler-listener
  name="MyCompilerListener">
      <include
      name="[MyPackagePath]/MyCompilerListener.java"/>
      <include
      name="[MyPackagePath]/SomeOtherHelperClass.java"/>
  </build-compiler-listener>
  ```

- Run `[IzPackRoot]/src/build.xml`. An `ant` alone will execute the required targets.
- Add a "listeners" ELEMENT with a "listener" ELEMENT with a "compiler" attribute in to [MyProjectPath]/install.xml

```
<listeners>
  <listener compiler="MyCompilerListener" />
<listeners>
```

- Compile with the following command, or an ant task you have set up.

```
java -jar [IzPackRoot]/lib/compiler.jar -HOME [IzPackRoot]
  [MyProjectPath]/install.xml -b [MyProductPath] -o
  [MyBuildPath]/install.jar
```

- Test it

Custom Actions at Installation Time (InstallerListener)

Perform the same steps as above, replace all occurrences of "CompilerListener" with "InstallerListener" and "compiler" with "installer".

Custom Actions at Uninstallation Time (UninstallerListener)

Perform the same steps as above, replace all occurrences of "CompilerListener" with "UninstallerListener"and "compiler" with "uninstaller".

Example

Let us say, we want to set access rights for files and directories on Unix. The Java sources are placed in the directory `[IzPackRoot]/sample/src/com/myCompany/tools/install/listener`. There are the files ChmodCompilerListener.java and ChmodInstallerListener.java.

- Copy the files to `[IzPackRoot]/src/lib/com/myCompany/tools/install/listener`
- In `[IzPackRoot]/src/build.xml` there are the lines

```
<!-- CUSTOM ACTION test START
CUSTOM ACTION test END -->
```

  Uncomment them (activate the lines between them).

- Build IzPack new.
- Compile a test installation with

```
java -jar [IzPackRoot]/lib/compiler.jar -HOME [IzPackRoot]
  [IzPackRoot]/sample/listener/install.xml
  -b [IzPackRoot]/sample/listener -o
  [IzPackRoot]/sample/listener/install.jar
```

- Install it

```
java -jar install.jar
```

Ant Actions (InstallerListener and UninstallerListener)

In this section the common ant task custom actions are described in detail. It is only for developers who are not acquainted with `IzPack` or it's custom actions. In addition to the basics there are some recapitulations of the common custom action techniques and some hints for pitfalls. In the package `com.izforge.izpack.event` there are the ant related custom actions `AntActionInstallerListener` and `AntActionUninstallerListener`. As recapitulation, to add any custom action a reference in install.xml will be needed, as example:

```
<listeners>
    <listener installer="AntActionInstallerListener"
        uninstaller="AntActionUninstallerListener" />
</listeners>
```

For all referenced listeners a jar file with the same name must exist in `[IzPackRoot]/bin/customActions`. If compilation (packaging) fails with a "not found" error, first verify, that the jar file exists. If not, create it. With this custom action it is possible to perform ant calls at installation and/or uninstallation time. It is not only a wrapper for a comand-line ant call, but also an intersected description file defining what target of the ant build file should be performed at what time of (un)installation and specifies which properties for what IzPack `pack` are to be used. The intersected description file is written as XML, the corresponding dtd is placed in src/dtd/event/antaction.dtd. The description file should be declared as a resource in the install.xml with the id " AntActionsSpec.xml" e.g.

```
<resources>
    ...
    <res id="AntActionsSpec.xml"
    src="myInstallSpecs/MyAntActionsSpec.xml" />
    ...
</resources>
```

The precise spelling of the id is important. The base path of `src` is the installation project path. If you want to use ant, you have to specify it here. IzPack is designed for running without dependencies on external software or libraries. Therefore it is necessary to include everything needed, in this case ant self. The field `<jar>` in installation.xml is predestinated for such cases, e.g.

```
<jar src="jar/ant/ant.jar" stage="both" />
```

Be aware, that an "extended" ant use needs more than one jar, for example often `xercesImpl.jar`. If an obscure "class not found" exception is raised during testing, check first for missing jar files. For supporting uninstallation the jar field was extended by the attribute `stage`. If an ant uninstaller custom action is used, the uninstaller also needs the jar files. If " stage" is "both" or "uninstall", the contents of the referenced jar file will be packed into uninstaller.jar. Be aware that not the jar file itself, but the contents

of it are required. This implies, that the paths of the contained files are unique and the information in `meta-inf/Manifest.mf` will be lost.

The Basic XML Struture

An ant action will be defined in the resource with the id "AntActionsSpec.xml". Sometimes it will help to lock into `[IzPackRoot]/src/dtd/event/antaction.dtd` or validate a written xml file with the dtd.

On this xml file a substitution will be performed using all defined `IzPack` variables. It is performed just before processing the packs. This is a common way of loading spec files into custom actions. For more information see method `com.izforge.izpack.util.SpecHelper.readSpec`. If you want to substitute some custom item, simply add a variable via idata.setVariable in a custom panel before `InstallPanel`. The given variable name (id) should be written into the xml file in the common variable notation.

The top level XML section is called `<antactions>`. Only one is possible. The `<antactions>` are segregated in one or more `<pack>` elements. The single attribute `<name>` of the `<pack>` corresponds to the same structure in install.xml (for more information see also installation.dtd). Only the "things" included in the `<pack>` are performed, if a pack with the same name was chosen to be installed. The "things" to be done to self are defined by the element `<antcall>` (without ssss).

The `<antcall>` takes the following attributes:

- `order`: required. Determine at what point of installation the antcalls defined by element `target` should be performed. Possible are `beforepack`, `afterpack`, `beforepacks` or `afterpacks`. Be aware that with beforepack(s) there are no installed files and also no installed build file. With this order only preexistent build files are useable.
- `uninstall_order`: optional. Determine at what point of uninstallation the antcalls defined by element `uninstall_target` should be performed. Possible are `beforedeletion` and `afterdeletion`. As opposed to the behaviour of `order` the referenced files are also accessible in the order `afterdeletion`. The uninstaller action copies the files into tempfiles before deletion which are marked as deleteOnExit.
- `quiet`: optional. To quit or not. Possible are yes or no. Default is no.
- `verbose`: optional. To output verbose information or not. Possible are yes or no. Default is no.
- `logfile`: optional. Path of the file for logging should be performed. The logfile should be not marked for uninstallation otherwise it will be deleted too.
- `buildfile`: either `buildfile` or `buildresource` is required but not both. Path of the file which contains the antcall. This is the file you normally use as `-buildfile` during an ant call via the command line. In this file variables are not substituted. For substitution there are properties in ant which can be used. Never write an `IzPack` variable in an ant buildfile.

- `buildresource`: either `buildresource` or `buildfile` is required but not both. The value is the id of the resource which contains the antcall. This resource will be extracted out into a temporary file and the path to this file will be passed as if `-buildfile` were specified during the ant call via the command line. The temporary file is removed after the ant call. In this file variables are not substituted. For substitution there are properties in ant which can be used. Never write an `IzPack` variable in an ant buildfile.
- `messageid`: optional. A string ID which refers to `bin/langpacks/installer/<lang>.xml`. If it is defined, the message will be displayed in the InstallPanel whilst performing the ant call.

In addition to the possible attributes there are some elements. All elements can be defined more than one time in one `<antcall>`. All are optional, but with no `<target>` element the `<antcall>` makes no sense. Do not confuse the following: "required"s are related to the attributes of the elements, not to the elements themselfs.

`<property>`: define a property

Property to be used with all `target` and `uninstall_target` which are defined for this antcall.

- `name`: required. The name (id) of the property.
- `value`: required. The value of the property.

`<propertyfile>`: define properties in a file

Properties to be used with all targets and uninstall_targets which are defined for this antcall given by the path of a properties file.

- `path`: required. Path of a file which contains properties in the syntax which is used by ant. Some ant calls need properties files. For these this element is used. One way to fill specific data into it is to create a new file in a custom panel and fill it with values given by input fields. The file path can be set at installation time, if there is a variable in AntActionSpec.xml and an IzPack variable was defined before InstallPanel. That file can be only created with deleteOnExit, if no `<uninstall_target>` was defined in this " <antcall>". This implies, that other `<antcall>''s can have a ''<uninstall_target>`.

`<target>`: target to call at installation

Targets to perform with this antcall at installation time. The targets should be defined in the given buildfile or else an ant exception will be raised. This is that what you use, if you don't want to perform the default target. e.g. cleaning the `IzPack` project with `ant clean`

- `name`: required. The name of the target.

<uninstall_target>: target to call on uninstallation

Targets to perform with this antcall at uninstallation time. The targets should be defined in the given buildfile otherwise an ant exception will be raised. With this target it will be possible to undo the things done at installation time.

- name: required. The name of the uninstall target.

Registry access (InstallerListener and UninstallerListener)

The event package of IzPack contains an installer and an uninstaller listener for Windows registry access. The listeners uses the separated pack *com.coi.tools* which is also available as source under the src subtree of IzPack. The registry will be called by JNI.

There is no support from the IzPack project of this feature for Windows 95, Windows 98 and Windows ME. Please check the patches at http://jira.codehaus.org/browse/IZPACK-58 if you need to support those platforms.

The registry stuff was implemented in all conscience, but certainly WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND

The listeners themselves are only able to write into the Windows registry at installation and delet the writing at uninstall time. But it is also possible to use the registry handler as a registry reader in custom panels or costum actions. The CheckedHelloPanel reads the registry and can be used as example for it.

To add registry support to an installation some changes in the installation definition file (often called‘‘install.xml‘‘) are to be made. First the declaration of the listener themselves:

```
<listeners>
    <listener installer="RegistryInstallerListener"
        uninstaller="RegistryUninstallerListener" >
        <os family="windows"/>
    </listener>
</listeners>
```

It is also recomanded to add the uninstaller listener because it is usual to cleanup the registry at uninstallation. The listeners are only used on Windows, therefore we declare it.

As with other listeners a jar file with the same name has to exist in [IzPackRoot]/bin/customActions. If compilation (packaging) fails with an “not found” error, verify, that the jar file exists. If not, create it. The jar files are RegistryInstallerListener.jar and RegistryUninstallerListener.jar.

As second change in install.xml we have to declare the native part JNI needs the dll

```
<native type="3rdparty" name="COIOSHelper.dll" stage="both">
    <os family="windows"/>
</native>
```

The dll should be placed in `[IzPackRoot]/bin/native/3rdparty`. The stage "both" marks this dll not only to be put into the installation jar file but also to be put into the uninstallation jar file. This will automatically be performed by the packager and installation.

With these two changes the registry support will be incorporated into your installation. Without any more actions an uninstall key will be crated in the registry at the installation. If you open the software manager of Windows, there will be an entry with the variables $APP_NAME $APP_VER, e.g.:

```
IzPack 4.6.8 (build 2007.02.15)
```

The variables will be defined from the entries <appname> and <appversion> in the <info> element of the installation definition file.

If you would like to have more informations in the uninstaller key or to create other keys or values in the registry, you should create a specification file. The file should be then refered to in `install.xml` as resource:

```
<resources>
    ...
    <res src="mySubPath/MyRegistrySpec.xml"
    id="RegistrySpec.xml"/>
</resources>
```

The id has to be `RegistrySpec.xml`. The real file name is not of any importance but should be written the same as in your source tree. It will be securer if you do not use special chars like blanks or umlauts. Be aware! If you forget to refer to `registrySpec.xml` in your `install.xml` no exception will be made because this is a facultative file

The Basic XML Struture

The specification file for registry entries will be defined in the resource with the id "ReigstrySpec.xml". Sometimes it will help to lock into `[IzPackRoot]/src/dtd/event/registry.dtd` or validate a written xml file with the dtd.

On this xml file a substitution will be performed using all defined `IzPack` variables. It is performed just before processing the packs. This is a common way of loading spec files into custom actions. For more information see method `com.izforge.izpack.util.SpecHelper.readSpec`. If you want to substitute some custom item, simply add a variable via idata.setVariable in a custom panel before `InstallPanel`. The given variable name (id) should be written into the xml file in the common variable notation.

The top level XML section is called `<registry>`. Only one is possible. The `<registry>` is segregated in one or more `<pack>` elements. The single attribute `<name>` of the `<pack>` corresponds to the same structure in install.xml (for more information see also installation.dtd). `<pack>` elements can have a condition attribute to express that a certain pack shall only be performed if the condition is fulfilled. Only the "things" included in the `<pack>` are performed, if a pack with the same name was chosen to be installed. Valid "things" are <key> <value>.

The registry stuff self allows to create keys and values directly under a registry root. But Windows self allows this not on “real” roots like HKEY_LOCAL_MACHINE or HKEY_USERS. Only link like roots as HKEY_CLASSES_ROOT are writeable. A try e.g. on HKLM will be cause an exception and the installation fails. The error number in this case normally will be 87 with the meaning “wrong parameter”, not “permission denied”.

We do NOT recommend to create a key or a value directly on a registry root. IzPack allows it now as a result of some user requests about it. Most it is not needed. E.g. an extension entry under HKEY_CLASSES_ROOT is really an entry on HKEY_LOCAL_MACHINESoftwareClasses. Why not write directly there?Reading is in opposite to writing no problem.

`<key>`: define a key

Key to be set at installation time into the Windows registry.

- `keypath` : required. The path of the key in Windows syntax without the root. If the key should be placed directly under a registry root (not recommended; often not possible)) write the key name without any backslash.
- `root` : required. The root of the key as symbol. Valid is one of HKCR HKCU HKLM HKU HKPD HKCC HKDDS.

`<value>`: define a value

Value to be set at installation time into the Windows registry.

- `condition‘`: optional. The id of condition which has to be fulfilled to write this value into the registry.
- `name` : required. The name of the value to be set or modified without a path. The default value will be written as the empty string “”.
- `keypath` : required. The key path under which the value should be placed in Windows syntax without the root and value name. If the key of the value should be placed directly under a registry root (if not exist, not recommended; often not possible)) write the key name without any backslash. If the value should be placed directly under a registry root (also not recommended and often not possible) write as keypath the empty string “”.
- `root` : required. The root of the key as symbol. Valid is one of HKCR HKCU HKLM HKU HKPD HKCC HKDDS.
- `override` : optional. Override an existent value or not. Valid is “true” or “false”, default is “true”.
- `saveprevious` : optional. Save the previous value or not. Valid is “true” or “false”, default is “true”. Setting to “false” can result in better uninstall behavior when an install is performed on top of an existing installation.

- `Contents part`: accurately one of the following content elements should be defined. It implicit defines the type of the value.
  - `string` : contents for value to be set if it is a string (REG_SZ).
  - `string` : if the string value starts with %, then the string is considered as an expandable string (REG_EXPAND_SZ) which is useful to reference Windows environment variables (e.g., in paths, etc).
  - `dword` : contents for value to be set if it is an integer (Windows DWORD). Only digits are valid. "48" is valid, "0x30" will be raise an NumberFormatException from `java.lang.Long.parseLong`.
  - `<bin>` : element to handle one "line" of binary data.
    - `data` : contents for value of type BINARY written as comma separated list of hex. Only hex-digits are valid. "48, f4" is valid, "0x48, 0xf4" will be raise an NumberFormatException from `java.lang.Integer.parseInt`.
  - `<multi>`: element to handle one contents string for MULTI_STRINGs.
    - `data` : the contents for the element <multi>.

In the case of string values being updated, it is possible to reuse the old value and have it for substitution through the `OLD_KEY_VALUE` variable, like in the following example:

```
<value condition="izpack.windowsinstall.7" name="PATH"
       keypath="Environment"
       root="HKCU"
       string="$OLD_KEY_VALUE;&quot;$INSTALL_PATH\bin&quot;"/>
<value name="PATH"
       keypath="SYSTEM\CurrentControlSet\Control\Session Manager\Environment"
       root="HKLM"
       string="$OLD_KEY_VALUE;&quot;$INSTALL_PATH\bin&quot;"/>
```

Please note that the first value will only be written if the installation is running on Windows 7. This is expressed through the reference to the builtin condition izpack.windowsinstall.7.

Maybe the descriptions for type BINARY and MULTI_STRING are not fully descriptive. Therefore as example the test entries in the registry specification file of IzPack:

```
<registry>
  ...
  <pack name="Core" condition="izpack.windowsinstall.vista">
    <value name="Path"
      keypath="SOFTWARE\IzForge\IzPack\$APP_VER"
      root="HKLM"
      string="$INSTALL_PATH"/>
    <value name="DWORD"
```

```
      keypath="SOFTWARE\IzForge\IzPack\$APP_VER"
      root="HKLM"
      dword="42"/>
    <value name="BIN"
      keypath="SOFTWARE\IzForge\IzPack\$APP_VER"
      root="HKLM" >
      <bin data="42, 49, 4e, 20, 54, 45, 53, 54" />
      <bin data="42, 49, 4e, 20, 54, 45, 53, 54" />
    </value>
    <value name="MULTI"
      keypath="SOFTWARE\IzForge\IzPack\$APP_VER"
      root="HKLM" >
      <multi data="A multi string with three elements" />
      <multi data="Element two"/>
      <multi data="Element three"/>
    </value>
  </pack>
</registry>
```

Extended Uninstall Key

There is a special pack named `UninstallStuff`. If a pack will be declared like

```
<name="UninstallStuff">
```

the incorporated elements will be used for creating the uninstall key and values instead of the build-in behavior. This pack name should be not used at an other point of the installation. It is a virtual and should be used only in `RegistrySpec.xml`.

The registry handler self cannot ensure the uniqueness of an uninstaller key. There is the special panel `CheckedHelloPanel` which does it. If no pack `UninstallStuff` will be used, this will be performed full automatically. If the pack was declared, **all** keypaths under it should be written as following:

```
...
<value name="DisplayName"
  keypath="SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\$UNI
  NSTALL_NAME"
  root="HKLM"
  string="$UNINSTALL_NAME"/>
...
```

The IzPack variable `$UNINSTALL_NAME` will be defined in the `CheckedHelloPanel`. With the "normal" `HelloPanel` it is undefined and the uninstall key catches the name "$UNINSTALL_NAME".

Uninstall Behavior

During uninstallation the deletion or modification of written keys or values will be performed depending to the following rules:

- A review of the registry will be performed only on supported operating systems (current only on Windows).
- A review of the registry will be performed only if the registry stuff was bound for uninstallation.
- Keys: Keys can only be deleted, a modification is not possible.
  - A previous existent key will be NOT deleted.
  - A newly created key will be deleted, if...
    - no new values or subkeys are added after installation.
    - no changes are made at the contents of values after installation.

    With other words: if under the key something was changed between installation and uninstallation, the key will be persist.
- Values:
  - A newly created value will be deleted, if the contents at uninstall time is the same as after installation.
  - The contents of a previos existent value will be changed to the previous contents (the contents before installation) if the contents at uninstall time is the same as after installation.

  In other words: if the contents of a value was changed between installation and uninstallation this contents will be persist. There is no handling of parts of the contents (important for type MULTI_STRING).

This conservative behavior cannot be changed to a user dependant voting because there is no user interface for custom actions at uninstall time. Additional the registry handler to not support voting.

Examples

There are the files

```
[IzPackRoot]/src/dist-files/IzPack-install-reg.xml
[IzPackRoot]/src/dist-files/RegistrySpec.xml
```

`IzPack-install-reg.xml` contains additional to the normal definition the stuff needed to create an `IzPack` installer which sets on Windows an extended uninstall key and some keys and values under a "private" key. Compare with the "normal" installation definition of IzPack.

`RegistrySpec.xml` will be referred by `IzPack-install-reg.xml` as resource. It contains the special pack named `UninstallStuff` for Izpack and defines some additional keys and values.

Summary Logger (InstallerListener)

The listener `SummaryLoggerInstallerListener` can be used to log the summary of panels into a file. To use it, add following element to the listener section of your installation config file.

```
<listeners>
    <listener installer="SummaryLoggerInstallerListener"
        uninstaller="SummaryLoggerInstallerListener" >
        <os family="windows"/>
    </listener>
</listeners>
```

The default path is

```
$INSTALL_PATH/Uninstaller/InstallSummary.htm
```

It can be changed with the subelement `summarylogfilepath` of the element `info` of the installation description file. As example:

```
<info>
    ...
    <summarylogfilepath>
        $INSTALL_PATH/Uninstaller/MySummary.htm
    </summarylogfilepath>
</info>
```

BSF (Bean Scripting Framework) Actions (InstallerListener and UninstallerListener)

In this section the BSF custom actions are described in detail. It is only for developers who are not acquainted with `IzPack` or it's custom actions. In addition to the basics there are some recapitulations of the common custom action techniques and some hints for pitfalls. In the package `com.izforge.izpack.event` there are the BSF related custom actions `BSFInstallerListener` and `BSFUninstallerListener`. As recapitulation, to add any custom action a reference in install.xml will be needed, as example:

```
<listeners>
    <listener installer="BSFInstallerListener"
        uninstaller="BSFUninstallerListener" />
</listeners>
```

For all referenced listeners a jar file with the same name must exist in `[IzPackRoot]/bin/customActions`. If compilation (packaging) fails with a "not found" error, first verify, that the jar file exists. If not, create it. With this custom action it is possible to perform BSF calls at installation and/or uninstallation time. It is not only a wrapper for a comand-line ant call, but also an intersected description file defining what target of the BSF script should

be performed at what time of (un)installation and specifies which properties for what IzPack `pack` are to be used. The intersected description file is written as XML, the corresponding dtd is placed in src/dtd/event/bsfaction.dtd. The description file should be declared as a resource in the install.xml with the id " BSFActionsSpec.xml" e.g.

```
<resources>
    ...
    <res id="BSFActionsSpec.xml"
    src="myInstallSpecs/MyBSFActionsSpec.xml" />
    ...
</resources>
```

The precise spelling of the id is important. The base path of `src` is the installation project path. If you want to use bsf, you have to specify it here. IzPack is designed for running without dependencies on external software or libraries. Therefore it is necessary to include everything needed, in this case ant self. The field `<jar>` in installation.xml is predestinated for such cases, e.g.

```
<jar src="jar/bsf/bsf.jar" stage="both" />
```

In addition, you must also include the jar file for the language which you are going to use in your BSF scripts, including any additional language dependencies, e.g.

```
<jar src="jar/groovy/groovy-all.jar" stage="both" />
```

Finally, if you are NOT going to embed your script content in the "BSFActionsSpec.xml", but instead will be including it in an external resource, you must also define that resource in your installer.xml file (see below for an explanation)

```
<res id="actions.groovy" src="myInstallSpecs/actions.groovy" />
```

The Basic XML Struture

A BSF action will be defined in the resource with the id "BSFActionsSpec.xml". Sometimes it will help to lock into `[IzPackRoot]/src/dtd/event/bsfaction.dtd` or validate a written xml file with the dtd.

On this xml file a substitution will be performed using all defined `IzPack` variables. It is performed just before processing the packs. This is a common way of loading spec files into custom actions. For more information see method `com.izforge.izpack.util.SpecHelper.readSpec`. If you want to substitute some custom item, simply add a variable via idata.setVariable in a custom panel before `InstallPanel`. The given variable name (id) should be written into the xml file in the common variable notation.

The top level XML section is called `<bsfactions>`. Only one is possible. The `<bsfactions>` are segregated in one or more `<pack>` elements. The single attribute `<name>` of the `<pack>` corresponds to the same structure in install.xml (for more information see also installation.dtd). Only the "things" included in the `<pack>` are performed, if a pack with the

same name was chosen to be installed. The "things" to be done to self are defined by the element `<script>`.

The `<script>` takes the following attributes:

- `language`: required. The name of the BSF language which is being used. The exact name of the language is dependent upon the BSF engine integration of that particular language. Some example values are "javascript" and "groovy".
- `src`: optional. The name of a resource, defined in your installer.xml, which contains the script contents. This may be used in lieu of embeddeding the script contents in the BSFActionsSpec.xml file itself.

In addition to the possible attributes `<script>` can contain a `CDATA` section which contains the script content, rather than using the "src" attibute. The different installer/uninstaller phases are scripted by creating a symbol definition for that particular phase. The symbol will then be called by the listener (if present), and the appropriate phase variables defined. If a particular phase is not defined, it will be skipped.

NOTE: In some languages, such as groovy and jython, you must create the function as a closure, so that the symbol is globally defined. In other languages (such as beanshell), you can create the function normally.

```
<script language="groovy" src="actions.groovy" />
```

OR

```
<script language="groovy"><![CDATA[
  // Variables defined
  //   idata - installer data, of type AutomatedInstallerData
  //   npacks - # of packs selected
  beforePacks = {
    print "before packs";
  }

  // Variables defined
  //   idata - installer data, of type AutomatedInstallerData
  afterPacks = {
    print "after packs";
  }

  // Variables defined
  //   pack - pack information, of type Pack
  //   i - the package index
  beforePack = {
    print "before pack " + pack.name;
  }
```

```
// Variables defined
//   pack - pack information, of type Pack
//   i - the package index
afterPack = {
  print "before pack " + pack.name;
}

// Variables defined
//   pack - pack information, of type Pack
//   file - the dir which is to be created, of type File
beforeDir = {
  print "before dir " + file.absolutePath;
}

// Variables defined
//   pack - pack information, of type Pack
//   file - the dir which was created, of type File
afterDir = {
  print "after dir " + file.absolutePath;
}

// Variables defined
//   pack - pack information, of type Pack
//   file - the file which is to be installed, of type File
beforeFile = {
  print "before file " + file.absolutePath;
}

// Variables defined
//   pack - pack information, of type Pack
//   file - the file which was installed, of type File
afterFile = {
  print "after file " + file.absolutePath;
}

// Variables defined
//   files - pack information, of type Pack
//   variables - the variables which were used during the original install, of type
beforeDeletion = {
  print "before deletion";
}

// Variables defined
//   files - pack information, of type Pack
```

```
    //   variables - the variables which were used during the original install, of type
    afterDeletion = {
      print "after deletion";
    }

    // Variables defined
    //   file - the file which is to be deleted, of type File
    //   variables - the variables which were used during the original install, of type
    beforeDelete = {
      print "before delete";
    }

    // Variables defined
    //   file - the file which was to be deleted, of type File
    //   variables - the variables which were used during the original install, of type
    afterDelete = {
      print "after delete";
    }
  ]]></script>

  <script language="beanshell"><![CDATA[
  void beforePacks() {
      print "INSTALL_PATH=${INSTALL_PATH}";
  }
  ]]></script>
```

More detailed examples can be downloaded from http://jira.codehaus.org/secure/attachment/39246/samp and http://jira.codehaus.org/secure/attachment/39379/sample2.tar.gz

IzPack utilities

The IzPack project includes a set of utilities that you may find useful.

These projects live outside the regular IzPack installer Subversion repository. You can access it from http://svn.berlios.de/svnroot/repos/izpack/izpack-utils/ instead of http://svn.berlios.de/svnroot/repos/izpack/izpack-src/ for IzPack itself.

They will be shipped in the official IzPack releases under their own pack.

Windows executable wrapper (izpack2exe)

Description

The 7-Zip project (see http://www.7-zip.org/) provides a so-called SFX for installers, i.e., an image that can be use to create self-extracting Windows executables. Once its content has been extracted, such a self-extracting executable can launch an executable

or a file. In the later case, it is assumed that there exists an association between a file extension and a software component.

7-Zip SFX for installers works as follows:

1. an executable image is provided
2. a configuration file has to be written, specifying among other things the executable or the file to be launched after the extraction phase
3. a 7-Zip archive containing the files (including the executable of file to be launched)
4. these files simply need to be concatenated to form a SFX Windows executable.

The IzPack Windows executable wrapper takes an IzPack-generated installer JAR file, and wraps it inside a Windows SFX executable. This has several advantages, among these two ones:

1. some users may find it strange to have a JAR and not an executable
2. by naming it with *setup* or *install*, Windows VISTA will perform a rights elevation whereas IzPack cannot enforce it when launched as a regular JAR.

And of course, you can ship a JAR and a Windows executable from the very same IzPack installer descriptor!

We have customized the SFX image from the 7-Zip project as follows:

- we have changed the icon
- we have customized some strings to mention that this is a customized version.

While the rest of the work is licensed under the Apache License version 2, the sole SFX module is licensed under the Lesser GNU General Public License version 2 or later as required by the 7-Zip project.

Requirements

izpack2exe is written in Python. It depends on 7-Zip and optionnaly UPX, a tool that can compresses executables.

In official IzPack releases, we provide this tool *batteries-included* on Windows, i.e., we will provide:

- **izpack2exe** as a Windows executable, so that you don't need to install Python, and
- 7-Zip and UPX executables, so you don't have to download them.

Usage

The usage is quite easy:

```
usage: izpack2exe.py [options]

options:
  -h, --help       show this help message and exit
  --file=FILE      The installer JAR file / files (1 per bundled file, specify at lea
  --output=OUTPUT  The executable file
  --with-7z=P7Z    Path to the 7-Zip executable
  --with-upx=UPX   Path to the UPX executable
  --no-upx         Do not use UPX to further compress the output
  --launch-file    File to launch after extract (e.g., native launcher)
```

A typical wrapping will be done like:

```
izpack2exe --file=installer.jar
```

Mac OS X Application bundle wrapper (izpack2app)

Description

izpack2app is the Mac OS X brother of **izpack2exe**. It bundles a JAR installer inside an application bundle, so that your installer will look like a regular Mac OS X application.

To do that, we started from the Mac OS X *Jar Bundler* tool that you can find under */Developer/Java*. We bundled a Jar installer, then stripped it. Indeed, an application bundle is nothing else but a structured set of files and directories.

What **izpack2app** does is simply:

1. copy the bundle files structure,
2. put your Jar at the good place, and
3. edit the *Info.plist* to reference your Jar.

Requirements

izpack2app is written in Python. It does not require any third-party module to work. Python is bundled with Mac OS X and is mainstream on Linux and other Unix variants. We ship it as a Windows executable in the official IzPack releases (and of course also as a Python application!).

Usage

The usage is straightforward:

```
izpack2app.py installer.jar Installer.app
```

wraps *installer.jar* as *Installer.app*

Java Web Start JNLP file generator (izpack2jnlp)

Description

izpack2jnlp is able to generate Java Web Start JNLP files so that IzPack-based installers can also be shipped via Java Web Start.

Requirements

izpack2jnlp is written in Python and does not need third-party modules to work.

Please note that it only generates JNLP files: **you must sign your installer JAR** before you actually upload them to a web server as **Java Web Start refuses to launch unsigned JARs**.

Usage

You need to pass a few arguments on the command-line, run:

```
izpack2jnlp.py --help
```

to see them.

Apache License, Version 2.0

Overview

IzPack is license under the terms of the **Apache License version 2.0**.

Please note that IzPack may use some third-party libraries that are not released under the same conditions (see the **legal/** directory of an IzPack source or binary distribution).

Finally, note that IzPack is not affiliated to the Apache Software Foundation.

License

```
                                 Apache License
                           Version 2.0, January 2004
                        http://www.apache.org/licenses/

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      the copyright owner that is granting the License.
```

"Legal Entity" shall mean the union of the acting entity and all
other entities that control, are controlled by, or are under common
control with that entity. For the purposes of this definition,
"control" means (i) the power, direct or indirect, to cause the
direction or management of such entity, whether by contract or
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CookBooks

1. How To create an ODBC connection with IzPack (by Fabrice Mirabile)

a. Problem

ODBC can be used as a layer between app servers and databases. It is quite convienent to setup an ODBC connection at installation time when the installer can actually retrieve all info needed for such setup. How can we achieve that? And for which OS ?

b. Solution

After looking at many solutions, I found one that is very convenient in the sense that it applies to both Windows and UNIX environment. In fact, the Windows ODBC Manager applet offers two type of setup:

- The system source
- The file source

Basically, the system source writes in the registry and unfortunately does something else that I couldn't figure out. However, the file source is very similar to ODBC.ini under UNIX. In ODBC.ini, you can define all connections into this file. For windows it's a bit different as you will have as many files as connections. But even though, there's a trick!

A fileDSN (the name given to this type of connection) for a connection to an Oracle database will look like this :

```
[ODBC]
DRIVER=Oracle in OraHome92
UID=%{UID}
PWD=%{PWD}
DBQ=%{DBName}
SERVER=%{DBName}
```

Therefore you can realize straightforwardly that by changing the UID and PWD you will make your connection point to any schemas you want.

In my company's software, we use ODBC to make the connection between the application and the database. Therefore, we use a batch to launch the server with a bunch of parameters. One of them is the ODBC DSN. This one, using fileDSN, should be defined as follows:

```
SET DSN=filedsn=$INSTALL_PATH\whateveryoulike.dsn
```

A very nice trick is to put in this batch the UID and the PWD so that it's not needed in the file directly and therefore you make the installer create different batch loaders for different Schemas ! That's very usefull when you have on the same DB many schema and you want the same application server to access both of them without reinstalling the whole thing !

In the following discussion, I'll show you an example on how to prepare the installer for creating a file at the root of the installation path which will permit to connect to an Oracle DataBase.

c. Discussion

Install.xml:

<file src="dsn.dsn" targetdir="$INSTALL_PATH"/> <parsable type="shell" targetfile="$INSTALL_PATH/whateveryoulike.dsn"/>

UserInputSpec.xml:

```
<userInput>
    <panel order="0">
            <field type="staticText" align="left" txt="Server Only:
Enter the settings for the ODBC Connection (DSN) environment variable:"
id="staticText3.text"/>
            <field type="divider" align="center"/>
            <field type="text" variable="UID">
                    <description align="left" txt=""
id="description2.text"/>
                    <spec txt="-> Enter UID:" id="text.label"
size="15" set=""/>
```

```
            </field>
            <field type="divider" align="center"/>
            <field type="password" variable="PWD">
                    <description align="left" txt=""
id="description3.text"/>
                    <spec>
                    <pwd txt="-> Type the password for the
connection:" id="pwd.label" size="10" set=""/>
                              <pwd txt="-> Retype the password for the
connection:" id="pwd.label2" size="10" set=""/>
                    </spec>
                    <validator
class="com.izforge.sample.PWDValidator" txt="Both versions of the
password must match" id="error.label"/>
                    <processor
class="com.izforge.sample.PWDEncryptor"/>
            </field>
            <field type="space" align="center"/>
            <field type="divider" align="center"/>
            <field type="space" align="center"/>
            <field type="text" variable="DBName">
                    <description align="left" txt=""
id="description4.text"/>
                    <spec txt="-> Enter the name of the Database:"
id="text.label" size="15" set=""/>
            </field>
            <field type="text" variable="DBPortNo">
                    <description align="left" txt="-> Enter the port
number for the database connection" id="description5.text"/>
                    <spec txt="(usually 1521 for oracle and 1433 for
MS SQL Server)" id="text.label" size="15" set=""/>
            </field>
    </panel>
</userInput>
```

BatchLoader.bat:

```
SET DSN=filedsn=$INSTALL_PATH\whateveryoulike.dsn;UID=$UID;PWD=$PWD
start $INSTALL_PATH\yourpath\yourapp
```

whateveryoulike.dsn:

```
[ODBC]
DRIVER=Oracle in OraHome92
DBQ=%{DBName}
```

```
SERVER=%{DBName}
```

Now during the installation the user will be prompt for the parameters (UID, PWD...) and the file will be parsed.

Pretty simple !

What about SQL Server or other db you would say ? Well, there's many ways to do it, a simple would be to have a skeleton for kind of db and then during the userinput ask for the database type (DB2, SQLSERVER,ORACLE...) and switch to the corresponding file before parsing.

Let's imagine you choose SQL Server in the userinputpanel, then instead of copying whateveryoulike.dsn, you can copy whateveryoulikeforMS.dsn which looks like this:

```
[ODBC]
DRIVER=SQL Server
WSID=%{DBName}
APP=Microsoft Open Database Connectivity
SERVER=%{DBName}
```

In our installer, we create four packs, one for each DataBase. These packs copy the corresponding file and parse them. Again, pretty simple !

Another remark, is that in this way if you choose more than one pack you could setup more than one connection at once on different DB as long as UID and PWD are the same. If not you'll need a little trick...

I hope this helps and if anyone has a question, don't hesitate to contact me via http://developer.berlios.de/sendmessage.php?touser=12462 or post into the user/devel list.

Done by Fabrice Mirabile on 20th of april 2005

2. Work around for pack and process dependence And Execution of Java Classes that runs SQL/PLSQL

a. Problem

I've encountered in many cases the need to have a relation between job being executed with the processpanel and a pack. Since IzPack doesn't provide yet such feature I worked out something that does the job.

I'll explain it using an example on how to execute a java class that runs SQL statements.

b. Solution

Here is what you will need:

- UserInputSpec.xml
- Install.xml

- ProcessPanel.Spec.xml

Which are at the root of the installation folder.
Then you could have a folder with the SQL Stuffs, let's call it update. So in update you'll have:

- JDBCGeneral.class, I use JDBC to make a DataBase connection
- launchsql.bat, which runs the class with all kind of arguments
- ojdbc14.jar, oracle JDBC drivers
- mssqlserver.jar, msutil.jar and msbase.jar, SQL server drivers (You could have also drivers for other DB such as DB2 or Sybase)
- Two folders for the SQL scripts:
  - sqlsms, for SQL Server scripts
  - sqlsoracle, for oracle scripts

Inside those folders you can have any number of SQL scripts. The scripts can be written in this way for example: delete from task_category; insert into task_category values('LoadSource','Data Source Loading','source_loader_task.bat');
Once you have this tree of files prepared you need to setup each file. The idea is that the install should copy on the client side the SQL scripts depending on the pack(s) chosen, plus the class and the batch file and then run the batch using the processpanel job. Therefore only the scripts for a specific pack would be run and there is the dependence we're looking for!

c .Discussion

Install.xml:

```
<?xml version="1.0" encoding="iso-8859-1" standalone="yes" ?>
<installation version="1.0">
....
  <resources>
     <res id="ProcessPanel.Spec.xml"
     src="ProcessPanel.Spec.xml"/>
    <res id="userInputSpec.xml" src="UserInputSpec.xml"/>
....
  </resources>
  <panels>
  .....
    <panel classname="UserInputPanel"/>
    <panel classname="ProcessPanel"/>
  .....
  </panels>
```

```
  <packs>
......
    <pack name="16-12-04" preselected="no" required="no"
    os="windows">
      <description>jar and SQL</description>
      <singlefile src="updates\sqlsms\sql161204.txt"
      target="$INSTALL_PATH\updates\sqlsms\sql161204.txt"/>
      <singlefile src="updates\sqlsoracle\sql161204.txt"
      target="$INSTALL_PATH\updates\sqlsoracle\sql161204.txt"/>
      <file src="uninstaller.bat"
      targetdir="$INSTALL_PATH\Uninstaller"/>
      <file src="uninstall.ico"
      targetdir="$INSTALL_PATH\Uninstaller"/>
      <singlefile src="updates\msbase.jar"
      target="$INSTALL_PATH\updates\msbase.jar"/>
      <singlefile src="updates\mssqlserver.jar"
      target="$INSTALL_PATH\updates\mssqlserver.jar"/>
      <singlefile src="updates\msutil.jar"
      target="$INSTALL_PATH\updates\msutil.jar"/>
      <singlefile src="updates\ojdbc14.jar"
      target="$INSTALL_PATH\updates\ojdbc14.jar"/>
      <singlefile src="updates\jdbcgeneral.class"
      target="$INSTALL_PATH\updates\JDBCGeneral.class"/>
      <singlefile src="updates\class\axiom_lang.jar"
      target="$INSTALL_PATH\class2\axiom_lang.jar"/>
      <singlefile src="updates\class\axiom_lib.jar"
      target="$INSTALL_PATH\class2\axiom_lib.jar"/>
      <singlefile src="updates\launchsql.bat"
      target="$INSTALL_PATH\updates\launchsql.bat"/>
      <parsable
      targetfile="$INSTALL_PATH\updates\launchsql.bat"/>
      <parsable
      targetfile="$INSTALL_PATH\Uninstaller\uninstaller.bat"/>
    </pack>

    <pack name="17-12-04" preselected="no" required="no"
    os="windows">
      <description>jar and SQL</description>
      <singlefile src="updates\sqlsms\sql171204.txt"
      target="$INSTALL_PATH\updates\sqlsms\sql171204.txt"/>
      <singlefile src="updates\sqlsoracle\sql171204.txt"
      target="$INSTALL_PATH\updates\sqlsoracle\sql171204.txt"/>
      <file src="uninstaller.bat"
      targetdir="$INSTALL_PATH\Uninstaller"/>
```

```
      <file src="uninstall.ico"
      targetdir="$INSTALL_PATH\Uninstaller"/>
      <singlefile src="updates\msbase.jar"
      target="$INSTALL_PATH\updates\msbase.jar"/>
      <singlefile src="updates\mssqlserver.jar"
      target="$INSTALL_PATH\updates\mssqlserver.jar"/>
      <singlefile src="updates\msutil.jar"
      target="$INSTALL_PATH\updates\msutil.jar"/>
      <singlefile src="updates\ojdbc14.jar"
      target="$INSTALL_PATH\updates\ojdbc14.jar"/>
      <singlefile src="updates\jdbcgeneral.class"
      target="$INSTALL_PATH\updates\JDBCGeneral.class"/>
      <singlefile src="updates\launchsql.bat"
      target="$INSTALL_PATH\updates\launchsql.bat"/>
      <singlefile src="updates\class\axiom_lang.jar"
      target="$INSTALL_PATH\class2\axiom_lang.jar"/>
      <singlefile src="updates\class\axiom_lib.jar"
      target="$INSTALL_PATH\class2\axiom_lib.jar"/>
      <parsable
      targetfile="$INSTALL_PATH\updates\launchsql.bat"/>
      <parsable
      targetfile="$INSTALL_PATH\Uninstaller\uninstaller.bat"/>
    </pack>
.....
  </packs>
</installation>
```

UserInputSpec.xml:

```
<userInput>
  <panel order="0">
    <field type="title" align="Left" txt="Database Connection
    Parameters" bold="true" size="1" id="DBParam"/>
    <field type="staticText" align="left" txt="The following
    information are needed for making the connection with the database."
    id="staticText1.text"/>
    <field type="staticText" align="left" txt="Careful   These
    fields are case sensitive !" id="staticText2.text"/>
    <field type="divider" align="center"/>
    <field type="divider" align="center"/>
    <field type="combo" variable="SQLServerType">
      <spec txt="Select the type of DataBase you're using    "
      id="SqlServerType.spec">
      <choice processor="" txt="Not Needed !"
```

```
      id="SQLServerType.notneeded" value="None" set="true"/>
      <choice processor="" txt="Oracle"
      id="SQLServerType.Oracle" value="Oracle"/>
      <choice processor="" txt="Microsoft SQL Server"
      id="SQLServerType.MS" value="SQLServer"/>
      </spec>
    </field>
    <field type="text" variable="ServerNameTextInput">
      <description align="left" txt="" id="description1.text"/>
      <spec txt="Enter server name  " id="text.label" size="15"
      set="localhost"/>
    </field>
    <field type="divider" align="center"/>
    <field type="text" variable="PortNbTextInput">
      <description align="left" txt="-> Enter the port number
      for the database connection" id="description5.text"/>
      <spec txt="(usually 1521 for oracle and 1433 for MS SQL
      Server)" id="text.label" size="15" set="1433"/>
    </field>
    <field type="divider" align="center"/>
    <field type="text" variable="DBNameTextInput">
      <description align="left" txt="" id="description3.text"/>
      <spec txt="Enter Database name  " id="text.label"
      size="15" set="axiom"/>
    </field>
    <field type="divider" align="center"/>
    <field type="text" variable="UserNameTextInput">
      <description align="left" txt="" id="description4.text"/>
      <spec txt="Enter Schema/User name for the Database  "
      id="text.label" size="15" set="axiom"/>
    </field>
    <field type="text" variable="UserPwdTextInput">
      <description align="left" txt="" id="description5.text"/>
      <spec txt="Enter Schema/User name password for the
      Database  " id="text.label" size="15" set="okta007"/>
    </field>
  </panel>
</userInput>
```

ProcessPanel.Spec.xml:

```
<processing>
  <job name="Executing the Needed Queries">
    <os family="windows" />
```

```
    <executefile name="$INSTALL_PATH\updates\launchsql.bat"/>
  </job>
</processing>
```

Launchsql.bat:

```
echo "Execution of SQL Queries \n"
java -classpath $INSTALL_PATH\updates\msutil.jar;$INSTALL_PATH\update
s\msbase.jar;$INSTALL_PATH\updates\mssqlserver.jar;$INSTALL_PATH\updates\
ojdbc14.jar;$INSTALL_PATH\updates\
JDBCGeneral
$INSTALL_PATH\updates\
$ServerNameTextInput
$PortNbTextInput
$DBNameTextInput
$UserNameTextInput
$UserPwdTextInput
$SQLServerType
```

JDBCGeneral.java: (of course you need the compiled .class !!! but I'm showing the source code)

```
/**
 * Parses a .sql file and runs them depending on DB settings
 * through jdbc.
 *
 * @author  Fabrice Mirabile
 * @version 2.0
*/


import java.*;
import java.sql.*;
import java.io.*;
import java.util.*;
import java.io.File;


public class JDBCGeneral{
    private java.sql.Connection  con = null;
    private final String selectMethod = "cursor";

     // Constructor
     public JDBCGeneral(){}
```

```
 public static void main(String[] argv) throws Exception
{
  String folderpath = "";

  final String folderpathbase = argv[0];
  final String serverName= argv[1];
  final String portNumber = argv[2];
  final String databaseName= argv[3];
  final String userName = argv[4];
  final String password = argv[5];
  final String SQLServerType = argv[6];

  if (SQLServerType.equals("SQLServer")) {
    final String url = "jdbc:microsoft:sqlserver://";
    folderpath = folderpathbase.concat("sqlsms");
    String classforname =
    "com.microsoft.jdbc.sqlserver.SQLServerDriver";
    JDBCGeneral myDbTest = new JDBCGeneral();
    //myDbTest.displayDbPropertiesMS(classforname,url,ser
    verName,portNumber, databaseName, userName, password);
    String[] files =
    myDbTest.getfilenamesMS(classforname,url,folderpath, serverName,
    portNumber, databaseName, userName, password);
  }
  else if (SQLServerType.equals("Oracle")) {
    final String url = "jdbc:oracle:thin:@";
    folderpath = folderpathbase.concat("sqlsoracle");
    //test if there's no need for SQL Execution,
    //check if null value is returned from file selection
    on selecte path
   String classforname =
   "oracle.jdbc.driver.OracleDriver";
   JDBCGeneral myDbTest = new JDBCGeneral();
   //myDbTest.displayDbPropertiesOracle(classforname,url,s
   erverName,portNumber, databaseName, userName, password);
   String[] files =
   myDbTest.getfilenamesOracle(classforname,url,folderpath,
   serverName, portNumber, databaseName, userName, password);
  }

}

 public void displayDbPropertiesOracle(String classforname,
 String url,String serverName, String portNumber, String
```

```
databaseName, String userName, String password){
     java.sql.DatabaseMetaData dm = null;
     java.sql.ResultSet rs = null;
     try{
          con=
          this.getConnectionOracle(classforname,url,serverName,
          portNumber, databaseName, userName, password);
          if(con!=null){
               dm = con.getMetaData();
               System.out.println("Driver
               Information");
               System.out.println("\tDriver
               Name: "+ dm.getDriverName());
               System.out.println("\tDriver
               Version: "+ dm.getDriverVersion ());
               System.out.println("\nDatabase Information ");
               System.out.println("\tDatabase Name: "+
               dm.getDatabaseProductName());
               System.out.println("\tDatabase Version: "+
               dm.getDatabaseProductVersion());
               System.out.println("Avalilable Catalogs ");
               rs = dm.getCatalogs();
               while(rs.next()){
               System.out.println("\tcatalog: "+
                    rs.getString(1));
               }
               rs.close();
               rs = null;
               closeConnection();
          }else System.out.println("Error: No
          active Connection");
     }catch(Exception e){
          e.printStackTrace();
     }
     dm=null;
}

public void displayDbPropertiesMS(String classforname,
String url,String serverName, String portNumber, String
databaseName, String userName, String password){
     java.sql.DatabaseMetaData dm = null;
     java.sql.ResultSet rs = null;
     try{
          con=
```

```
            this.getConnectionMS(classforname,url,serverName,
            portNumber, databaseName, userName, password);
            if(con!=null){
                 dm = con.getMetaData();
                 System.out.println("Driver
                 Information");
                 System.out.println("\tDriver
                 Name: "+ dm.getDriverName());
                 System.out.println("\tDriver
                 Version: "+ dm.getDriverVersion ());
                 System.out.println("\nDatabase Information ");
                 System.out.println("\tDatabase Name: "+
                 dm.getDatabaseProductName());
                 System.out.println("\tDatabase Version: "+
                 dm.getDatabaseProductVersion());
                 System.out.println("Avalilable Catalogs ");
                 rs = dm.getCatalogs();
                 while(rs.next()){
                 System.out.println("\tcatalog: "+
                      rs.getString(1));
                 }
                 rs.close();
                 rs = null;
                 closeConnection();
            }else System.out.println("Error: No
            active Connection");
       }catch(Exception e){
            e.printStackTrace();
       }
       dm=null;
  }

  private java.sql.Connection getConnectionMS(String
  classforname, String url,String serverName, String portNumber,
  String databaseName, String userName, String password){
       try{
            Class.forName(classforname);
            con = java.sql.DriverManager.getConnect
            ion(getConnectionUrlMS(url,serverName, portNumber,
            databaseName),userName,password);
            if(con!=null)
            System.out.println("Connection Successful!");
       }catch(Exception e){
            e.printStackTrace();
```

```
          System.out.println("Error Trace in
          getConnection() : " + e.getMessage());
    }
     return con;
 }

private String getConnectionUrlMS(String url,String
serverName, String portNumber, String databaseName){
     return url+serverName+":"+portNumber+";databaseNa
     me="+databaseName+";selectMethod="+selectMethod+";";
}

private java.sql.Connection getConnectionOracle(String
classforname, String url,String serverName, String portNumber,
String databaseName, String userName, String password){
     try{
          Class.forName(classforname);
          con = java.sql.DriverManager.getConnect
          ion(getConnectionUrlOracle(url,serverName, portNumber,
          databaseName),userName,password);
          if(con!=null)
          System.out.println("Oracle Connection Successful!");
     }catch(Exception e){
          e.printStackTrace();
          System.out.println("Error Trace in
          getConnectionOracle() : " + e.getMessage());
    }
     return con;
 }

private String getConnectionUrlOracle(String url,String
serverName, String portNumber, String databaseName){
     return
     url+serverName+":"+portNumber+":"+databaseName;
}

private String[] getfilenamesOracle(String classforname,
String url, String folderpath, String serverName, String portNumber,
String databaseName, String userName, String password) throws
FileNotFoundException,IOException{
    String newfolderpath = folderpath + "\\";
    File toto = new File(newfolderpath);
    String [] thelist = toto.list();
    for (int j=0; j<thelist.length; ++j)
```

```
    {
            //System.out.println("file n?" + j
            + " = " +  thelist[j] + "\n");
            String[] StatementsSQL =
            SQLFileInput(newfolderpath + thelist[j]);
            RunSQLOracle(StatementsSQL,classforname,url,serverName,
            portNumber, databaseName, userName, password);
    }
    return thelist;
}

private String[] getfilenamesMS(String classforname, String
url, String folderpath, String serverName, String portNumber, String
databaseName, String userName, String password) throws
FileNotFoundException,IOException{
    String newfolderpath = folderpath + "\\";
    File toto = new File(newfolderpath);
    String [] thelist = toto.list();
    for (int j=0; j<thelist.length; ++j)
   {
         //System.out.println("file n?" + j + " =
         " +  thelist[j] + "\n");
         String[] StatementsSQL =
         SQLFileInput(newfolderpath + thelist[j]);
         RunSQLMS(StatementsSQL,classforname,url,serverName,
         portNumber, databaseName, userName, password);
   }
    return thelist;
}

/*
public String[] addToArray(String[] array, String s)
{
  String[] ans = new String[array.length+1];
  System.arraycopy(array, 0, ans, 0, array.length);
  ans[ans.length - 1] = s;
  return ans;
}
*/

public String[] SQLFileInput(String sqlinput) throws
FileNotFoundException,IOException {
   BufferedReader br = new BufferedReader(new
   FileReader(sqlinput));
```

```
    List lines = new ArrayList();
    int i = 0;
    int h = 0;
    String thisLine;
    String[] SQLStatements = new String[1000];

    while ((thisLine = br.readLine()) != null)
    {
       //System.out.println(thisLine);
       SQLStatements[h] = thisLine;
        h++;
    }

    /*for(String line = br.readLine();line != null;line =
    br.readLine()) {
        // split by semi-colon
        InsertRows = line.split(";");
        i++;
    }

    for (int j=0; j<SQLStatements.length; ++j)
    {
        if (SQLStatements[j] != null)
            System.out.println("query n?" + j + "
            = " +  SQLStatements[j]);
    }*/

    return SQLStatements;
}

 public void RunSQLOracle(String[] StatementsSQL, String
 classforname, String url, String serverName, String portNumber,
 String databaseName, String userName, String password){
     try {
        con=
        this.getConnectionOracle(classforname,url,serverName,
        portNumber, databaseName, userName, password);
        Statement stAddUser = con.createStatement();

        for (int i=0; i<StatementsSQL.length; ++i)
        {
             if (StatementsSQL[i] != null)
             {
                 System.out.print(StatementsSQL[i] + "...");
```

```
                int rowsAffected =
                stAddUser.executeUpdate(StatementsSQL[i]);
                if (rowsAffected == 1)
                System.out.println("OK");
             }
       }
       closeConnection();
    }
    catch(SQLException e) {
     e.printStackTrace();
     System.out.println("\nError Trace in
     RunSQLOracle(): " + e.getMessage());
    }
}

public void RunSQLMS(String[] StatementsSQL, String
classforname, String url, String serverName, String portNumber,
String databaseName, String userName, String password){
    try {
       con= this.getConnectionMS(classforname,
       url,serverName, portNumber, databaseName, userName,
       password);
       Statement stAddUser = con.createStatement();

       for (int i=0; i<StatementsSQL.length; ++i)
       {
           if (StatementsSQL[i] != null)
            {
               System.out.print(StatementsSQL[i] + "...");
               int rowsAffected =
               stAddUser.executeUpdate(StatementsSQL[i]);
               if (rowsAffected == 1)
                   System.out.println("OK");
            }
       }
       closeConnection();
    }
    catch(SQLException e) {
     e.printStackTrace();
     System.out.println("\nError Trace in RunSQLMS():
     " + e.getMessage());
    }
}
```

```
        private void closeConnection(){
             try{
                  if(con!=null)
                       con.close();
                  con=null;
             }catch(Exception e){
                  e.printStackTrace();
             }
        }
   }
```

To sum up:
The install.xml copy the files, the userinput ask for the DB connections, the process.xml launch the class which takes as arguments the following entries:

- a folder that will contain the sql files (each file is a sequence of sql queries semi-colon separated). This folder contains subfolder for each type of DB
- the server name of the machine hosting the DB
- the port number of the connection (1433 for sql server and 1521 for oracle for example)
- name of the DB
- username
- username password
- type of DB (oracle, sqlserver...) in order to execute the sql inside the corresponding sub-folder

Once again, i hope you'll find this useful and if anyone has a question, don't hesitate to contact me via http://developer.berlios.de/sendmessage.php?touser=12462 or post into the user/devel list.

Done by Fabrice Mirabile on 20th of april 2005

Sample Install Definition

This shows an example of how to use many of the features and advanced features discussed in many of the other sections of this documentation. Look in the sample directory for a more basic example and all the necessary files and instructions to build your first IzPack installer.

Normally, a build process will call IzPack from Ant using something like the following:

```
<!-- Allows us to use the IzPack Ant task, standalone-compiler.jar added to Ant lib -
<taskdef name="izpack" classpath="${install.lib}/standalone-compiler.jar"
    classname="com.izforge.izpack.ant.IzPackTask"/>
```

```
<!-- Run installer build -->
<echo message="Running IzPack to build the installer..."/>
<izpack input="install-definition.xml"
        output="${output.dir}/${product.short.name}-${product.version}-install.jar"
        installerType="standard"
        inheritAll="true"
        basedir="${temp.dir}"
        compression="deflate"
        compressionlevel="9"/>
<!-- Clean working directory -->
<echo message="Cleaning up working directory..."/>
<delete dir="${temp.dir}" quiet="true" includeemptydirs="true"/>
<echo message="Done."/>
```

install-definition.xml

```
        <?xml version="1.0" encoding="iso-8859-1" standalone="yes" ?>

        <installation version="1.0">
          <!-- Ant properties in this file can be referenced with @{},
               otherwise use variables below in installer files with ${} -->
          <info>
            <appname>@{product.name}</appname>
            <appversion>@{product.version}</appversion>
            <uninstaller name="remove.task" path="${INSTALL_PATH}/Uninstall" write="y
          </info>

          <guiprefs width="600" height="480" resizable="no">
            <laf name="kunststoff">
              <os family="unix" />
            </laf>
            <modifier key="useHeadingPanel" value="yes"/>
            <modifier key="useHeadingForSummary" value="yes"/>
<modifier key="headingImageOnLeft" value="yes"/>
            <modifier key="headingLineCount" value="2"/>
            <modifier key="headingFontSize" value="1.5"/>
            <modifier key="headingBackgroundColor" value="0x00ffffff"/>
            <modifier key="headingPanelCounter" value="text"/>
            <modifier key="headingPanelCounterPos" value="inHeading"/>
          </guiprefs>

          <locale>
            <langpack iso3="eng"/>
          </locale>
```

```
<!-- Need to define ant properties we want to use during install as variabl
<variables>
  <variable name="app.name" value="@{app.name}"/>
  <variable name="UserPathPanelVariable" value="@{default.dest.dir.sql}"/>
  <variable name="UserPathPanelDependsName" value="Install Database Server"
  <variable name="jboss.version" value="@{jboss.version}"/>
  <variable name="install.jboss.service" value="true"/>
</variables>

<resources>
  <res id="box-out-32.png" src="@{install.res}/box-out-32.png"/>
  <res id="customicons.xml" src="@{install.res}/custom.icons.xml"/>
  <res id="CustomLangpack.xml_eng" src="@{install.res}/custom.eng.xml"/>
  <res id="HTMLInfoPanel.info" src="@{install.res}/license-notice.html"/>
  <res id="Heading.image" src="@{install.res}/heading-image.png"/>
  <res id="Installer.image" src="@{install.res}/side-image.png" />
  <res id="ProcessPanel.Spec.xml" src="@{build.dir}/processing-tasks.xml"/>
  <res id="userInputSpec.xml" src="@{build.dir}/userInputSpec.xml" />
  <res id="uninstaller.warning" src="@{install.res}/uninstall-warn.txt"/>
  <!-- default-dir.txt is written by the calling build.xml -->
  <res id="TargetPanel.dir" src="@{install.res}/default-dir.txt"/>
</resources>

<panels>
  <panel classname="HelloPanel"/>
  <panel classname="HTMLInfoPanel"/>
  <panel classname="TargetPanel"/>
  <panel classname="InstallationGroupPanel"/>
  <panel classname="PacksPanel"/>
  <panel classname="UserInputPanel" id="UserInputPanel.0"/>
  <panel classname="UserInputPanel" id="UserInputPanel.1"/>
  <panel classname="UserInputPanel" id="UserInputPanel.2"/>
  <panel classname="UserPathPanel"/>
  <panel classname="SummaryPanel"/>
  <panel classname="InstallPanel"/>
  <panel classname="ProcessPanel"/>
  <panel classname="SimpleFinishPanel"/>
</panels>

<listeners>
    <listener installer="SummaryLoggerInstallerListener">
        <os family="windows"/>
    </listener>
```

```
</listeners>

<packs>
  <pack name="Main Application" required="yes" installGroups="New Applicati
    <description>The first application deployed in a new JBoss application
    <file src="@{jboss.version}" targetdir="$INSTALL_PATH"/>
  </pack>
  <pack name="Install Database Server" required="no" preselected="yes" os="
    <description>New server installation of the selected database as requir
    <file src="postgresql" targetdir="$INSTALL_PATH"/>
    <file src="sql" targetdir="$INSTALL_PATH"/>
    <executable
      targetfile="$INSTALL_PATH/postgresql/postgres_install_windows.bat"
      stage="postinstall"
      keep="true"
    >
      <args>
        <arg value="${UserPathPanelVariable}"/>
        <arg value="$HOST_NAME"/>
        <arg value="${db.service.name}"/>
        <arg value="${db.service.password}"/>
        <arg value="${db.su.password}"/>
      </args>
    </executable>
  </pack>
  <pack name="JBoss Source Code" required="no" preselected="no" installGrou
    <description>The JBoss application server source is available as requir
    <file src="src" targetdir="$INSTALL_PATH/@{jboss.version}" />
  </pack>
  <pack name="Update Application" required="yes" installGroups="Update Exis
    <description>The required application files to update an existing insta
    <file src="update" targetdir="$INSTALL_PATH"/>
  </pack>
  <pack name="Post-Install Tasks" required="yes">
    <description>Configuration and cleanup required for the installation.</
    <file src="ant" targetdir="$INSTALL_PATH"/>
    <file src="post-install-tasks.bat" targetdir="$INSTALL_PATH"/>
    <file src="build.xml" targetdir="$INSTALL_PATH"/>
    <file src="Uninstall_PostgreSQL_and_Application.bat" targetdir="$INSTAL
    <file src="Uninstall_Application_Only.bat" targetdir="$INSTALL_PATH"/>
    <parsable targetfile="$INSTALL_PATH/post-install-tasks.bat"/>
    <parsable targetfile="$INSTALL_PATH/build.xml"/>
    <parsable targetfile="$INSTALL_PATH/@{jboss.version}/bin/system.propert
    <parsable targetfile="$INSTALL_PATH/Uninstall_PostgreSQL_and_Applicatio
```

```
            <parsable targetfile="$INSTALL_PATH/Uninstall_Application_Only.bat"/>
          </pack>
        </packs>

        <!-- The native libraries to add. This is required for creating shortcuts o
        <native type="izpack" name="ShellLink.dll"/>

      </installation>
```

Sample userInputSpec.xml

Here's an example 3 panel userInputSpec.xml file. You specify the use of this XML document inside your install definition in the resource section like this (assuming your ant build.xml uses a property called build.dir):

```
<resources>
  <res id="userInputSpec.xml" src="@{build.dir}/userInputSpec.xml" />
</resources>
```

userInputSpec.xml

```
<userInput>
  <!-- Install -->
    <panel order="0">
        <createForPack name="Main Application" />
        <field type="title" txt="Import Keystores" bold="true" size="1" />
        <field type="divider" align="top"/>
        <!-- Keystore -->
        <field type="staticText" align="left" txt="Existing SSL keystore to import:"/
        <field type="file" align="left" variable="existing.ssl.keystore">
          <spec txt="" size="25" set=""/>
        </field>
        <field type="space"/>
        <!-- Truststore -->
        <field type="staticText" align="left" txt="Existing SSL truststore to import:
        <field type="file" align="left" variable="existing.ssl.truststore">
          <spec txt="" size="25" set=""/>
        </field>
        <field type="space"/>
        <!-- Signing Keystore -->
        <field type="staticText" align="left" txt="Existing signing keystore to impor
        <field type="file" align="left" variable="existing.signing.keystore">
          <spec txt="" size="25" set=""/>
        </field>
```

```
    <field type="space"/>
    <field type="divider" align="bottom"/>
</panel>
<panel order="1">
  <!-- Validate access to keystores with information from last panel -->
    <createForPack name="Main Application" />
    <field type="title" txt="SSL Keystore Settings" bold="true" size="1" />
    <field type="divider" align="bottom"/>
    <!-- Skip validation in case customer has something wrong they want to fix la
    <field type="check" align="left" variable="skip.keystore.validation">
      <spec txt=" Skip keystore password validation (not recommended)" size="25"
    </field>
    <field type="divider" align="top"/>
    <!-- Keystore -->
    <field type="combo" variable="existing.ssl.keystore.type">
      <spec txt="Keystore type:" id="existing.ssl.keystore.type">
        <choice txt="JKS" value="JKS" set="true"/>
        <!--
        <choice txt="PKCS12" value="PKCS12"/>
        -->
      </spec>
    </field>
    <field type="space"/>
    <field type="text" align="left" variable="keystore.key.alias">
        <spec txt="Keystore Key Alias:" size="25" set="alias-1"/>
    </field>
    <field type="password" align="left" variable="keystore.password">
      <spec>
        <pwd txt="Keystore Password:" size="25" set=""/>
        <pwd txt="Retype Password:" size="25" set=""/>
      </spec>
      <validator class="com.izforge.izpack.util.PasswordEqualityValidator" txt="B
      <validator class="com.izforge.izpack.util.PasswordKeystoreValidator" txt="C
        <param name="keystoreFile" value="${existing.ssl.keystore}"/>
        <param name="keystoreType" value="${existing.ssl.keystore.type}"/>
        <param name="keystoreAlias" value="${keystore.key.alias}"/>
        <param name="skipValidation" value="${skip.keystore.validation}"/>
      </validator>
    </field>
    <field type="space"/>
    <!-- Truststore -->
    <field type="combo" variable="existing.ssl.truststore.type">
      <spec txt="Truststore type:" id="existing.ssl.truststore.type">
        <choice txt="JKS" value="JKS" set="true"/>
```

```
        <!--
        <choice txt="PKCS12" value="PKCS12"/>
        -->
      </spec>
    </field>
    <field type="space"/>
    <field type="password" align="left" variable="truststore.password">
      <spec>
        <pwd txt="Truststore Password:" size="25" set=""/>
        <pwd txt="Retype Password:" size="25" set=""/>
      </spec>
      <validator class="com.izforge.izpack.util.PasswordEqualityValidator" txt="B
      <validator class="com.izforge.izpack.util.PasswordKeystoreValidator" txt="C
        <param name="keystoreFile" value="${existing.ssl.truststore}"/>
        <param name="keystoreType" value="${existing.ssl.truststore.type}"/>
        <param name="skipValidation" value="${skip.keystore.validation}"/>
      </validator>
    </field>
    <field type="divider" align="bottom"/>
</panel>
<panel order="2">
  <!-- Validate access to signing keystore with information from last panel -->
    <createForPack name="Main Application" />
    <field type="title" txt="Signing Keystore Settings" bold="true" size="1" />
    <field type="divider" align="bottom"/>
    <!-- Skip validation in case customer has something wrong they want to fix la
    <field type="check" align="left" variable="skip.keystore.validation">
      <spec txt=" Skip keystore password validation (not recommended)" size="20"
    </field>
    <field type="divider" align="top"/>
    <!-- Keystore -->
    <field type="combo" variable="existing.signing.keystore.type">
      <spec txt="Keystore type:" id="existing.signing.keystore.type">
        <choice txt="JKS" value="JKS" set="true"/>
        <!--
        <choice txt="PKCS12" value="PKCS12"/>
        -->
      </spec>
    </field>
    <field type="space"/>
    <field type="password" align="left" variable="signing.keystore.password">
      <spec>
        <pwd txt="Keystore Password:" size="20" set=""/>
        <pwd txt="Retype Password:" size="20" set=""/>
```

```
  </spec>
  <validator class="com.izforge.izpack.util.PasswordEqualityValidator" txt="B
  <validator class="com.izforge.izpack.util.PasswordKeystoreValidator" txt="C
    <param name="keystoreFile" value="${existing.signing.keystore}"/>
    <param name="keystoreType" value="${existing.signing.keystore.type}"/>
    <param name="skipValidation" value="${skip.keystore.validation}"/>
  </validator>
</field>
<field type="space"/>
<!-- Signing Key 1 -->
<field type="text" align="left" variable="first.signing.keystore.key.alias">
    <spec txt="First Signing Alias:" size="20" set="alias-1"/>
</field>
<field type="password" align="left" variable="first.signing.password">
  <spec>
    <pwd txt="First Signing Password:" size="20" set=""/>
    <pwd txt="Retype Password:" size="20" set=""/>
  </spec>
  <validator class="com.izforge.izpack.util.PasswordEqualityValidator" txt="B
  <validator class="com.izforge.izpack.util.PasswordKeystoreValidator" txt="C
    <param name="keystoreFile" value="${existing.signing.keystore}"/>
    <param name="keystoreType" value="${existing.signing.keystore.type}"/>
    <param name="keystorePassword" value="${signing.keystore.password}"/>
    <param name="keystoreAlias" value="${first.signing.keystore.key.alias}"/>
    <param name="skipValidation" value="${skip.keystore.validation}"/>
  </validator>
</field>
<field type="space"/>
<!-- Signing Key 2 -->
<field type="text" align="left" variable="second.signing.keystore.key.alias">
    <spec txt="Second Signing Alias:" size="20" set="crate-cmd-alias"/>
</field>
<field type="password" align="left" variable="second.signing.password">
  <spec>
    <pwd txt="Second Signing Password:" size="20" set=""/>
    <pwd txt="Retype Password:" size="20" set=""/>
  </spec>
  <validator class="com.izforge.izpack.util.PasswordEqualityValidator" txt="B
  <validator class="com.izforge.izpack.util.PasswordKeystoreValidator" txt="C
    <param name="keystoreFile" value="${existing.signing.keystore}"/>
    <param name="keystoreType" value="${existing.signing.keystore.type}"/>
    <param name="keystorePassword" value="${signing.keystore.password}"/>
    <param name="keystoreAlias" value="${second.signing.keystore.key.alias}"/
    <param name="skipValidation" value="${skip.keystore.validation}"/>
```

```
          </validator>
        </field>
        <field type="divider" align="bottom"/>
    </panel>
</userInput>
```