Cincom

Cincom Smalltalk™
VisualWorks®

Installation Guide

VisualWorks 8.3

P46-0105-28

Notice

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1

Overview

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This release of Cincom VisualWorks® 8.3 includes object engines, virtual image, and add-on products. The release contains new features, as well as many fixes.

The release is distributed on one CD containing all necessary components.

System Requirements

VisualWorks 8.3 runs on workstations with the following minimum system configurations.

Disk and Memory Requirements

- 512 MB of memory recommended, minimum
- Apx. 610 MB disk space for default installation
- Apx. 780 MB disk space for full, single platform installation
- Apx. 1.2 GB disk space for full installation with all platforms
- CD-ROM drive (for installation)

Microsoft Windows x86

- A PC or compatible with an Intel Pentium compatible processor
- Windows 7, 8.x, 10, Windows Server 2008

Microsoft Windows x64

- Windows 7, 8.x, 10, Windows Server 2008 R2, 2012

Solaris

- 32-bit requires at least SPARC V7 processor architecture
- 64-bit requires at least SPARC V9 processor architecture
- Solaris 10, 11

IBM AIX

- AIX workstation with POWER processor
- 6.x, 7.x

Apple OS X

- OS X Snow Mountain Lion (10.8.x) through Yosemite (10.11.x).

Apple OS X - X11

- OS X Snow Mountain Lion (10.8.x) through Yosemite (10.11.x)
- X11 libraries for Mac OS X

Linux x86/x86-64

- 32-bit requires a Intel Pentium compatible processor
- 64-bit requires an AMD x86-64 compatible processor
- Linux kernel version 2.4 or later
- GNU glibc version 2.5 or later

Linux POWER

- A POWER-compatible processor
- Linux kernel version 2.6 or later
- GNU glibc version 2.5-42 or later

Distribution Designations

Three different versions of the VisualWorks release media are provided: full, NE, and PUL.

That is, in addition to the full distribution of VisualWorks, and in compliance with U.S. security requirements, separate no-encryption (NE) and personal-use license (PUL) distributions of VisualWorks are provided without encryption code. No security libraries are included in the NE and PUL distributions. The personal-use license distribution was formerly known as VisualWorks Non-Commercial.

The names of the installation directories created by the Installer indicate the version, as follows:

`<user-files>/vw8.3`

>   Full commercial distribution, including all security libraries

`<user-files>/vw8.3ne`

>   No encryption (NE) distribution, which lacks security libraries

`<user-files>/vw8.3pul`

>   Personal-use license (PUL, non-commercial), which lacks security libraries and VM source code

where `<user-files>` is the selected installation directory.

Getting Help

There are many sources of technical help available to users of VisualWorks. technical support options are available to commercial licensees. Public support options are available to both commercial and personal-use license holders.

Commercial Licensees

If, after reading the documentation, you find that you need additional help, you can contact Technical Support. provides all customers with help on product installation.

Before contacting Technical Support, please be prepared to provide the following information:

- The release number, which is displayed in the Welcome Workspace when you start VisualWorks.
- Any modifications (patch files, auxiliary code, or examples) distributed by that you have loaded into the image. To obtain a summary of all modifications, choose **Help > About VisualWorks** in the VisualWorks Launcher window, and copy the list under **Patches** on the **System** tab.
- The complete error message and stack trace, if an error notifier is the symptom of the problem. Use **Copy Stack**, in the error notifier window (or in the stack view of the Debugger). Then paste the text into a file that you can send to Technical Support.
- The platform, operating system, and memory specification of the hardware you are using.

You can contact Technical Support as follows:

E-mail	Send questions about VisualWorks to: helpna@cincom.com.
Web	Visit: http://supportweb.cincom.com and choose the link to Support.
Telephone	Within North America, call Technical Support at . Operating hours are Monday through Friday from 8:30 a.m. to 5:00 p.m., Eastern time. Outside North America, contact the local authorized reseller of products.

Personal-Use Licensees

VisualWorks Personal-Use License (PUL) is provided "as is," without any technical support from Cincom. There are, however, on-line sources of help available for VisualWorks and its add-on components. Be assured, you are *not* alone. Many of these resources are valuable to commercial licensees as well.

The University of Illinois at Urbana-Champaign very kindly provides an important public resource for VisualWorks developers:

• A mailing list for users of VisualWorks PUL, which serves a growing community of users. To subscribe or unsubscribe, send a message to: vwnc-request@cs.uiuc.edu with the SUBJECT of **subscribe** or **unsubscribe**. You can then address emails to: vwnc@cs.uiuc.edu.

The Smalltalk news group, comp.lang.smalltalk, carries on general discussions about different dialects of Smalltalk, including VisualWorks, and is a good source for advice.

Chapter

2

Installing VisualWorks

Topics

VisualWorks can be installed either from CD or by downloading it from the Cincom Smalltalk website (non-commercial only).

The VisualWorks installer is the recommended option for most users. The installer launches automatically from the distribution CD, or can be downloaded from the Cincom Smalltalk site.

Experienced VisualWorks users may prefer simply to extract files from the CD or website. For this, configuration details, such as setting paths and file associations, must be performed manually. Detailed instuctions for this approach to installation are provided on the Cincom Smalltalk download page.

Running the VisualWorks Installer

The VisualWorks Installer can be run from either the Cincom website (non-commercial version only) or a distribution CD (commercial or non-commercial versions).

- To install from the web, visit the Cincom Smalltalk site, select and download the appropriate version.
- To install from the Cincom Smalltalk CD, insert the CD in a drive. On many systems the Installer starts automatically. If it does not, start it using the method appropriate to your platform:

Windows

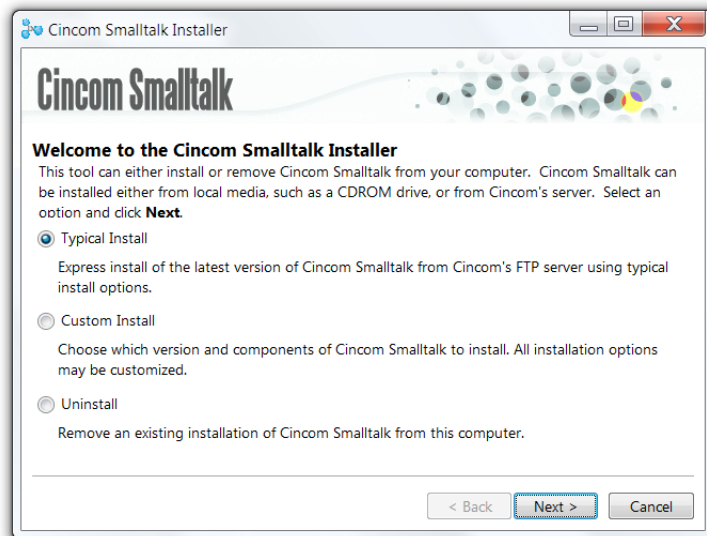Double-click on the `installWin.bat` script file.

Unix/Linux

Execute the installer shell script `installUnix`.

OS X

Double-click on the `installMacOSX.app` file.

Upon startup, the Installer provides three options:

Select and follow the instructions for either of the installation options:

Typical Install

>   Installs the most popular components for the current platform.

Custom Install

>   Gives you complete control over the components to install and the installation location.

Select an option, and click **Next**. Follow the onscreen instructions to complete the installation.

After all components have been installed, the Installer indicates successful completion. Click **Exit** to finish.

This completes the installation.

For OS X, Linux, and Unix installations an informational screen is displayed with instructions for setting your Unix system variables. This information is also saved in the text file `userActions.txt`, located in the install directory.

Installation on MS-Windows may require an additional DLL, which can be provided by the VisualWorks installer. For details, see: MS-Windows Installation Specifics in the appendix to this guide.

Installing Additional VisualWorks Components

After the initial VisualWorks installation, you can use the Installer application again to install additional add-on components.

1. If you installed from the Cincom Smalltalk CD, load it in your computer's CD-ROM drive.
2. Start the installer:

Windows

>   Go to **Start > Programs > VisualWorks 8.3 > Install/Uninstall**

Unix

>   Execute the script: `vw8.3nc/Install_Uninstall`

OS X

Double-click on the installation image file:

`vw8.3nc:image:install.im`

3. Once the **Welcome** screen appears, select **Custom Install**, follow the initial steps as described in the previous section, clicking **Next** until you reach the **Components to Install** screen.

4. Select the components you wish to add, and click **Next**.

5. When the installation is complete, click **Close** to exit.

Starting VisualWorks the First Time

Depending on your operating system, there may be several ways to launch a session.

The preferred method is to launch the Project Manager, and create or open a project image from that central point. On Windows and OS X platforms, a desktop icon is available to launch the Project Manager.

On all platforms, command-line execution is an option as well. Refer to the *Application Developer's Guide* for the full range of these options.

Project Manager

The VisualWorks Project Manager is a simple application (`LaunchPad.im`) that helps you manage (create, launch or delete) your VisualWorks development projects.

Each project is created as a Smalltalk image file in its own directory, which the manager creates in a user-writable location separate from the VisualWorks installation.

The VisualWorks installer places a **VisualWorks Projects** launcher on the desktop (a shortcut on Windows, or an applet on OS X).

Double-click on this to start the LaunchPad application:
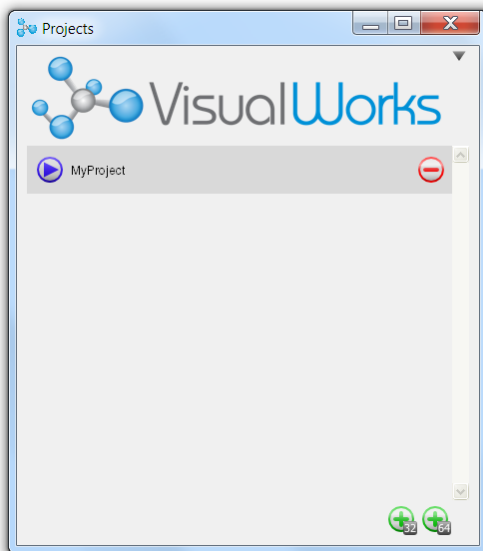
With the LaunchPad application, you can:

- Create and launch a new project (with the [+] button)
- Launch an existing project (with its arrow button)
- Remove an existing project (with its [-] button)
- Change the VisualWorks Projects root directory (using the drop-down icon at top-right)

The default VisualWorks Projects root directory is:

- on Windows, a subdirectory of the standard `My Documents` folder, e.g.,

  C:\Documents and Settings\<username>\My_Documents\VisualWorks Projects

- On OS X and Linux/Unix platforms this is a subdirectory of the standard `$HOME` location, e.g.,

  /Users/<username>/VisualWorks Projects

The VisualWorks Projects root directory is persisted in the environment variable, `VWPROJECTS`. This is managed automatically by the `LaunchPad` application on Windows (through the Windows registry) and on OS X (via the VM's `.plist` file). On Linux and Unix

platforms, you manage this environment variable in your shell scripts the same way you currently manage setting the `$VISUALWORKS` environment variable.

Launching from the Command Line

To start VisualWorks, you run the object engine (also called the virtual machine) with the image file passed as the argument, e.g.:

```
object_engine image_file
```

On MS-Windows systems, the virtual machine name is `visual.exe`, and on OS X and Unix systems it is simply `visual`. By default, the virtual machine is installed in the `bin/<platform>` subdirectory of the root VisualWorks installation directory.

The initial image file on all platforms is `visual.im`, (`visualnc.im` for non-commercial) and is installed in the `image` subdirectory. The image is exactly the same on all platforms. This file should be write-protected, and you should never save over it. Instead, you will want to save one or more "working" images and use those for your development work.

To launch VisualWorks the first time then, using this command line interface, start by changing to the `image` subdirectory, and execute the object engine with the image as argument. For example, on Windows:

```
> cd c:\vw8.3nc\image\
> ..\bin\win\visual.exe visual.im
```

and on a Unix or Linux system:

```
$ cd /usr/local/vw8.3nc/image
$ exec ../bin/linux86/visual visual.im
```

Note that the paths may be different on your system.

This approach makes the image directory the current directory for execution, so images will be saved there by default.

On OS X, you must use the `open` command:

```
user% open -a visual.app visual.im
```

On some platforms, several engines are located under the `/bin` subdirectory. For development work, it is recommended that you use the engines named `vw<platform>`, such as `vwnt.exe` for Windows platforms, and `vwlinux86` on Linux. Using these engines can make debugging easier in the rare case of an engine crash.

For details on the available engines, command line options, and backward compatibility, see "Virtual Machines" in the *Application Developer's Guide*.

When VisualWorks is successfully opened, the Launcher and Workspace windows are displayed:
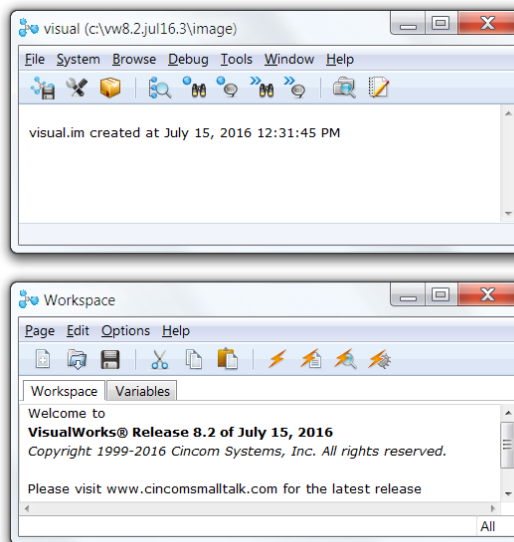
Loading Parcels

VisualWorks is divided into separate *parcels*, which are external Smalltalk binary and source code components (also known as packages). By selectively loading and unloading parcels, you can control the size of the image, adding only the functionality you need.

Loading parcels is much faster than loading and compiling Smalltalk source code.

To load a parcel/component that has already been installed by the Cincom Smalltalk Installer:

1. Start VisualWorks, and open the Parcel Manager (click on **System > Parcel Manager** in the Launcher):

2. Browse the categories (folders) of parcels under the **Suggestions** tab, especially the **Essentials** and **Developer Tools** categories.

VisualWorks has default parcel paths for many add-on products, but if the path for the product you are installing is either not set, or is set incorrectly, the parcel will not appear in the parcel list. In this case, an additional path needs to be added.

To add or correct the parcel path for the product you are installing, use the **Parcel Path** page in the Settings Tool (**System > Settings**).

3. To load a parcel in the Parcel Manager, select the desired parcel and then pick **Parcel > Load**.

A dialog may open, explaining that additional code may be loaded. Typically you should click the **Yes to all** button to continue.

Additional configuration may be required by add-on products. If so, instructions are provided in the configuration or installation instructions for that product.

Each parcel file (`.pcl`) has an associated source file (`.pst`) that holds the source for all the code in the parcel. Both files are effectively binary and must not be altered except by the parcel publishing mechanism.

Note: If you extract parcels from an archive (zip) format, you should disable any conversion options provided by your archiver. For example, if you use WinZip, turn-off **Tar file smart CR/LF conversion.** Failure to do so will result in errors when trying to browse the source for a parcel within VisualWorks.

Setting Up a Network Environment

The section Starting VisualWorks the First Time explains how to configure a stand-alone, single-user environment. In a networked environment there are additional considerations. The following recommendations are targeted at this networked style of configuration.

Here is a recommended setup:

1. Make all the original installation files and directories read-only.

While this is a good idea in a single-user environment as well, it is especially important in multi-user environments. Allowing several developers to write to the same files will cause serious data corruption errors.

2. Each user creates directories for their own images and parcels.

Typically, this will be on the users' local drives or in their private working area of a network drive. For example:

On Windows:

```
C:\vwwork\myimages
C:\vwwork\myparcels
```

On Unix/Linux:

```
<yourhome>/myimages
<yourhome>/myparcels
```

3. Set up a launcher mechanism (e.g., shortcuts on Windows, or execution scripts on Unix) to run the shared virtual machine, but with the programmer's personal image directory as the "current" directory.

For example, in a Windows shortcut, specify the user's personal image directory as the **Start in:** directory. On Unix systems, a startup command file can be created in the user's /bin directory which can be executed while the personal image directory is "current," but invoking the shared object engine. (Examples of both of these setups are included by the Installer.) Refer to

the VisualWorks *Application Developer's Guide* for more setup details.

4. Start VisualWorks on the original image (`visual.im`), and open the Settings Tool (**System > Settings**). On the **Parcel Path** page, add your parcels directory (created in step 2).

This will include the user's personal working parcels in lists of parcels available for loading. You can drag the new name to the top of the list to have it searched first.

5. Select **File > Save Image As**… in the Visual Launcher, and save a *working* image.

Enter a name for the image, such as working, including path information to your own image directory (step 2).

Because the original image is a read-only (step 1) file, you will not be able to save over it.

6. When saving a parcel, programmers specify the path to their personal parcels directory.

Specifying a relative pathname, especially one relative to the VisualWorks home directory, facilitates moving the image to other platforms. The directory path specified is remembered and proposed as the path in subsequent saves of that parcel.

7. When starting VisualWorks, make the directory containing your image file the current directory before launching VisualWorks.

Set the VisualWorks Home Directory

In order to correctly find additional files, the VisualWorks Home directory must be properly set. For client installations, this is typically configured correctly during installation (Windows and OS X), or is set in the startup script (Unix/Linux).

For network installations, in which VisualWorks is run from a shared server installation, the home directory must be set in the client.

To set the home directory for the current session, select **File > Set VisualWorks Home** in the Launcher window. The Settings Tool opens on the home directory page:
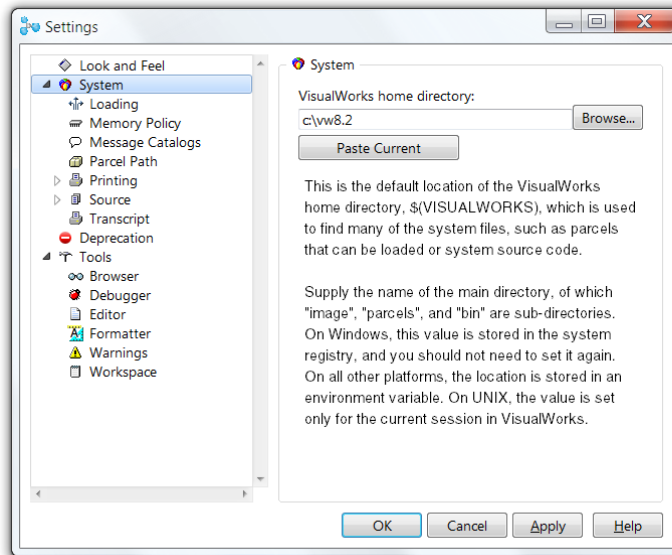
Set the **VisualWorks Home Directory** to the root VisualWorks installation directory, typically `c:\vw8.3` on Windows systems or `/usr/local/vw8.3nc` on Unix or Linux systems. Then click **OK**.

On Windows systems, the `VisualWorks Home` is saved in the system registry. On Unix and Linux systems, it needs to be set in a system variable, as described in an information screen at the end of the installation (and in the file `userActions.txt`).

Uninstalling Products

The VisualWorks Installer comes with an Uninstall option. To use it:

1. Launch the Installer on your platform:

Windows

> From the **Start** menu, select **Programs > VisualWorks 8.3 > Install_Uninstall**.

Unix

> Execute the script `~vw8.3nc:/Install_Uninstall`.

OS

Double-click `~vw8.3nc:image:install.im`

2. On the first page of the Installer, select **Uninstall** and click **Next**.
3. The Installer displays all VisualWorks installations in a drop-down menu. Select the version you wish to uninstall and click **Next**.
4. The Uninstaller will prompt you for the disposition of various aspects of the VisualWorks installation, such as whether you want to delete non-empty directories. Answer these prompts accordingly.
5. When the Uninstaller is finished, you may need to manually remove files and/or directories, such as directories containing files that you created using VisualWorks.

Chapter
3

Thank You…

... for installing and trying Cincom Smalltalk. We hope, and expect, that you will find this to be an enjoyable and productive development environment.

There are a variety of resources available to help you become productive with VisualWorks and ObjectStudio. Complete documentation is provided with both products. The *VisualWorks Walk Through* provides a simple overview of building an application in VisualWorks.

A variety of web sites also provide information for VisualWorks developers. Visit the Cincom Smalltalk site for information and additional links.

Appendix

A

MS-Windows Installation Specifics

Topics

- DLL Requirements
- Registry Keys

This appendix discusses some important technical details of the VisualWorks installation on MS-Windows, especially regarding the significance of various registry keys, DLLs, and the handling of 32- and 64-bit virtual machines.

DLL Requirements

On MS-Windows, the VisualWorks Virtual Machine requires that sufficient support for the VisualStudio 2015 runtime be present. On a machine that runs Windows 10, or that runs Windows 7 or later and accepts Windows Updates, only `vcruntime140.dll` is needed. If this DLL is not already present in `System32` and/or `SysWOW64`, as appropriate for the OS, the VisualWorks installer takes action to ensure the runtime is present.

On Windows, a special component in the VisualWorks Installer — **VM Windows - Install VS2015 Redist** — is selected by default. If you do not deselect this, and if `vcruntime140.dll` is absent, the Installer modifies the Windows Virtual Machine component to install the VisualStudio 2015 runtime, requesting admin permissions if needed. (Unless the Installer is running headless, the runtime opens a window which records the installation's progress and can be cancelled to abort it.) After installation, an information screen tells you this has been done.

Installation of the runtime guarantees the VisualWorks Virtual Machine can run, whether the machine has had Windows Updates or not. If the runtime fails to install or is cancelled (or is never attempted because its component was deselected), the VisualWorks Installer instead performs an 'App Local' install, putting `vcruntime140.dll` into `bin/win`, `bin/win/assert` and `bin/win/debug` (but not `bin/win/static` since the point of the statically-linked VM is not to need it), and likewise for `bin/win64`. This is normally enough to allow the non-statically-linked VMs to run, but it may not be on a basic Windows installation (older than Windows 10) that has never been updated. In that case, the user should either run Windows Updates or locate the redistributable `.exe` on the VisualWorks installation disk (in `bin/win` and `bin/win64` inside the `vw8.3` directory) and run it with the right permissions.

It is a known Microsoft limitation that the VisualStudio 2015 redistributable(s) fail on Windows 8 or Windows Server 2012 R2, when the machine has not installed the update KB2919355. If a problem is seen on these platforms, apply that update and re-run the redistributable `.exe` files.

Registry Keys

On MS-Windows, the VisualWorks installer writes to
`HKEY_LOCAL_MACHINE` if it has permissions to do so. The installer
we distribute on CD or ISO has a manifest that requests user
permissions. If the user performing the install has these
permissions, then the the installer silently gets them. If not, the
user will see a prompt requesting a username and password with
admin permissions. If they supply it, VisualWorks-related data will
be written to `HKEY_LOCAL_MACHINE`. If they do not, data is written to
`HKEY_CURRENT_USER`.

The installer is a 32-bit application. On a 64-bit Windows machine,
it installs both the 32-bit and the 64-bit VMs and images, and it also
writes registry keys for both 32-bit and 64-bit. If the installer can
write to `HKEY_LOCAL_MACHINE`, this means writing separate registry
keys for 32-bit and 64-bit. For VisualWorks release 8.3, expect to
see:

```
Computer\HKEY_LOCAL_MACHINE\Wow6432Node\Cincom Systems, Inc.
\VisualWorks\8.3
```

for 32-bit, and,

```
Computer\HKEY_LOCAL_MACHINE\Cincom Systems, Inc.\VisualWorks\8.3
```

for 64-bit. (Both will have the same value.) On a 32-bit machine,
only the latter key would be written (i.e. the one that on a 64-bit
machine would serve for 64-bit, not 32-bit — yes, the way Windows
handles this can be a little confusing at first).

If it can only write to `HKEY_CURRENT_USER`, the same key serves both:

```
Computer\HKEY_CURRENT_USER\Cincom Systems, Inc.\VisualWorks\8.3
```

There is no separate `Wow6432Node` subarea within `HKEY_CURRENT_USER`.

(Contriving to use the 64-bit installer by running `install64.im`
instead of `install.im` gives the same result. The autoplay is set to
invoke the 32-bit installer. There is no reason at this time to use the
64-bit installer for installing or uninstalling.)

After installation, a user can choose to reset VisualWorks home from any VisualWorks image. This sets a single `HKEY_CURRENT_USER` entry:

```
Computer\HKEY_CURRENT_USER\Cincom Systems, Inc.\VisualWorks\8.3
```

which (for that user only) hides the machine-wide `HKEY_LOCAL_MACHINE` entries. (A second user would continue to see the `HKEY_LOCAL_MACHINE` entry unless they also reset VisualWorks home and so wrote an `HKEY_CURRENT_USER` entry for themselves.) If the user later resets VisualWorks home back to the same value as is in the `HKEY_LOCAL_MACHINE` 32-bit and 64-bit keys, this does not delete their `HKEY_CURRENT_USER` entry: it just has the same value.

If the `HKEY_LOCAL_MACHINE` entries exist, deleting the `HKEY_CURRENT_USER` entry from the registry sets that user back to using the machine-wide defaults. (We provide no UI in VisualWorks to do that; use Regedit or a similar program. This can also be done programmatically from a VisualWorks image, but we recommend Regedit to users unfamiliar with that area of VisualWorks.)

Be aware that the `image/install.im` and `image/install64.im` that appear on the user's machine after the install do *not* have a permissions-raising manifest. Thus, the keys written when a user runs an install with them can differ from those written when the same user installs from the ISO/CD.

This can also impact uninstall. We offer:

```
c:\Program Files\Cincom\vw8.3
```

as a default install location, but in Windows 7 and 8, some users may prefer to install to a less permissions-bound location. If uninstalling from the default location encounters permissions issues, the quick solution is to uninstall using the CD/ISO, whose manifest can raise the permissions level, not using the menu pick we provide since it invokes the installed image/install.im, whose manifest cannot.

These VisualWorks registry keys are not removed by uninstalling. Over time, users who upgrade from VisualWorks release to VisualWorks release on the same machine may acquire a number of

old registry keys. Users who are certain noone will ever again open images of a certain vintage on that machine may choose to prune old keys via `regedit` but there is no necessity to do this.