Stream Weaver
Users Guide

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Introduction

This manual describes how to use “Stream Weaver” to transform an application into the StreamFlow stream format. Additionally, it provides a description of the test environment for streamed applications.

What is StreamFlow Application Streaming?

StreamFlow Application Streaming is a secure method to access and run applications that does not require application installation or application removal. Applications are virtually installed and available on an on-demand basis over the Internet and/or corporate network.

The benefits of streamed applications are many - Centralized application management, access to more applications, instant upgrades, lower application management costs, reduced licensing compliance complexities, and controllable application access are just a few benefits.

What is Stream Weaver?

Stream Weaver is a software tool that encodes a Microsoft Windows®-based PC application into a network/Internet streamable format to take advantage of the streaming benefits. All that is required to use Stream Weaver is a PC running Windows® XP or Windows® Vista and the installer for the application to be encoded.

Development Environment

To transform an application into a streamed application, at least two PCs are required. One should be a Windows® XP or Windows® Vista system for Stream Weaver processing of the application and the other a PC with any supported Windows® target operating system for testing the streamed application. There can be a separate PC for each target operating system or there can be a single testing PC that is re-imaged for each operating system.

“Imaging” is taking a snapshot of a PC’s hard drive so that an exact duplicate of a PC’s configuration can be restored to the PC. “Re-imaging” is using the snapshot of the PC to restore the PCs configuration. This is much more efficient and reliable than reloading the operating system, drivers, support programs, and removing unneeded applications.

Target Audience

This manual is written for a technician or engineer who is responsible for processing Windows®-based PC applications into a format that can be streamed over the Internet and/or corporate networks using Stream Theory®’s Stream and Token servers. The Stream Weaver tool is designed to process Windows®-based PC applications that have a standard application installer. For applications without an installer, a different tool is recommended: Stream Weaver Professional (available in the future) is designed for application developers that desire to transform their applications into a streaming format.

Recommended Technical Knowledge

Following is a list of recommended technical knowledge for making the best use of this guide and troubleshooting applications:

- Installing Applications
- Hardware drivers
- Windows Registry

Guide Organization

This guide is organized as follows:

- Introduction
- Chapter 1 - System Requirements
- Chapter 2 - Using Stream Weaver

- Appendix A - Applying Patches and Updates
- Index

Typographic Conventions

The following typefaces are used throughout this guide:

Bold text	Names of windows, dialog boxes, menus, commands, buttons, predefined folders, and keyboard keys. Examples: Click on **OK**. Press **Enter**. Navigate to the **My Documents** folder.
italic text	Indicates references to a chapter or section within this guide or other documentation. Also used to emphasize new terms. Example: Refer to the *Stream Theory Player Users Guide* for further information.
> symbol	Sequence in which you should select a menu option. Example: **File > New > Document** means click on the **File** menu first, then click on **New**, and then click on **Document**.
1, 2, 3	Numbered items indicate sequential steps in a procedure. Sub steps are indicated with indented bullets. Relevant graphics or screen captures may follow steps.
Screen captures	The screen captures in this guide are examples only. Your software is configured according to your Company's requirements. Therefore, the sample screens used in this guide may not exactly match the user interface on your system.

The following icons are used throughout this guide:

A *note* icon identifies information of which you should be aware.

⚠CAUTION

This icon identifies information about actions that might cause problems within the application, with the system or with your data, including data loss.

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Chapter 1

System Requirements

This chapter covers the following topic:

- Overview
- Processing System Requirements
- Testing System Requirements

Overview

You need multiple Windows® PCs to process and test streaming applications. At least one PC is required for processing the application and one or more PCs for testing the streamed version of the application.

Processing System Requirements

This section describes the software and hardware requirements of the system on which application processing is performed.

Software Requirements

- **Operating System -** one of the following:
  - Windows® XP (32-bit only)
  - Windows® Vista (32-bit only)

  Although Stream Weaver requires Windows® XP or Windows® Vista to run, applications may be targeted at other Windows® operating systems such as Windows® 2000. In particular, Stream Weaver provides the option of running the

target application installer in compatibility mode. Compatibility mode may be required for processing applications that are targeted at older operating systems.

Supported target operating systems are Windows® 2000, Windows® XP, and Windows® Vista. Please note that although Windows® 9x/Me and Windows® NT are not directly supported as target operating systems, applications designed for those platforms may run on supported target platforms in compatibility mode.

The installation of Stream Weaver and the Windows® operating system should be a clean install. A clean install is NOT the configuration in which most new PCs arrive. Typically, a PC arrives with many extra programs installed that may conflict with Stream Weaver.

- **Processing Software:** Stream Weaver 3.4 or later.
- **Privilege Level:** administrator

  In order to run properly, Stream Weaver must be installed and launched with administrator privileges.

Hardware Requirements

- **CPU:** 1.5 GHz or higher)
- **RAM:** 512 MB or greater
- **Disk Space:** 40 GB or greater (estimated), depending on the installation size of the application to be processed

Testing System Requirements

One application may require testing on multiple systems. Most applications will map into one or more of the following testing scenarios:

Application OS	Target System OS	Compatibility Mode
Windows® Vista	Windows® Vista	No
Pre-Windows® Vista	Windows® Vista	No
Pre-Windows® Vista	Windows® Vista	Yes
Windows® XP	Windows® XP	No
Pre-Windows® XP	Windows® XP	No
Pre-Windows® XP	Windows® XP	Yes

Application OS	Target System OS	Compatibility Mode
Windows® 2000	Windows® 2000	No
Pre-Windows® 2000	Windows® 2000	No

Going through several of the above testing scenarios may require processing the application multiple times since there may be a different installation for each operating system. In this case, a clean version of the Processing PC needs to be made and a new stream file created for each different installation.

The Test PC can be one machine or multiple machines. Multiple PC's would allow testing to occur in parallel. The only requirement for the Test PC is that a clean installation of the operating system be present.

Additionally, the Processing PC must *not* be used for stream testing. This is mainly because at the end of the installation, the application resides entirely on the Processing PC. So if the streamed version of the application is tested on that PC and a component is missing from the stream file, the Stream Theory® Player is likely to find the installed component instead, which would give the appearance that the application is working fine.

The remainder of this section describes the software and hardware requirements of the system on which processed applications are tested.

Software Requirements

- **Operating System:**

  The requirements for the Test PC depends on the target operating system for the processed application. If the application is compatible with multiple operating systems, then the application will need to be tested on a PC with each of the supported operating systems or in compatibility mode under Windows® XP or Windows® Vista.
- **Streaming Software:** Stream Theory® Player 6.3 or later.

  Please refer to the Stream Theory Player Users Guide for additional requirements.
- **Support Software:** As required by the streamed application.

  Depending on the application, specific video card drivers (e.g. DirectX) may be required. See the website of the streamed application's manufacturer for current updates.

Hardware Requirements

- As required by the streamed application and the Stream Theory Player (both sets of requirements must be satisfied).

Chapter 2

Using Stream Weaver

This chapter covers the following topic:

- Getting Started
- Initial Preparation Steps
- Processing Steps

Getting Started

The transformation of an application from being installer based requiring an install and reboot to a streamed application requiring only a selection of an HTML link requires a number of processing steps. These steps are described below.

Initial Preparation Steps

Processing PC Configuration

To process an application for streaming, a clean PC is needed. A clean PC contains only the Windows® XP or Windows® Vista operating system and is free of any other unnecessary applications. This differs from a basic PC you might purchase from the store or have around the office. These machines may have extra applications, browsers, etc., that require removal. Just removing the extraneous applications might not be enough since “uninstalling” the applications may leave behind pieces. Though unlikely, not removing these applications could cause conflicts during processing, cause extra data to be included in the project, or for the application not to run properly.

Step 1: To properly configure the Processing PC, format the disk drive and install the Windows® XP or Windows® Vista operating system. Make sure that you have the manufacture's Recovery Disk or Original Driver Disk when doing this step.

Step 2: Install any needed drivers. Driver discs for various system components such as the network card, video drivers, etc. should come with the PC; however, you may have to go on-line to get the drivers.

Step 3: Find any driver updates from the PC manufacture or hardware card manufactures and install the latest version of the driver.

This will form your base system that, when imaged, can be used for processing other applications. Therefore, we recommend that you save an image of this configuration. Imaging is making a digital copy of the entire PC configuration to a separate disk or disk partitions for later reconfiguration of the same or another PC.

One utility that works well for this task is Norton Ghost™.

Step 1: Install Stream Weaver

The Stream Weaver installer is supplied by either CD or email. There are two versions of the installer, one for the English language version and the other for the Japanese version.

Run the installer "StreamWeaver_*.*_Eng_Setup.exe" for the English version or "StreamWeaver_*.*_JPN_Setup.exe" for the Japanese version.

Figure 2-1: Installer Setup Dialog

First, agree to the licensing agreement or cancel the installation.

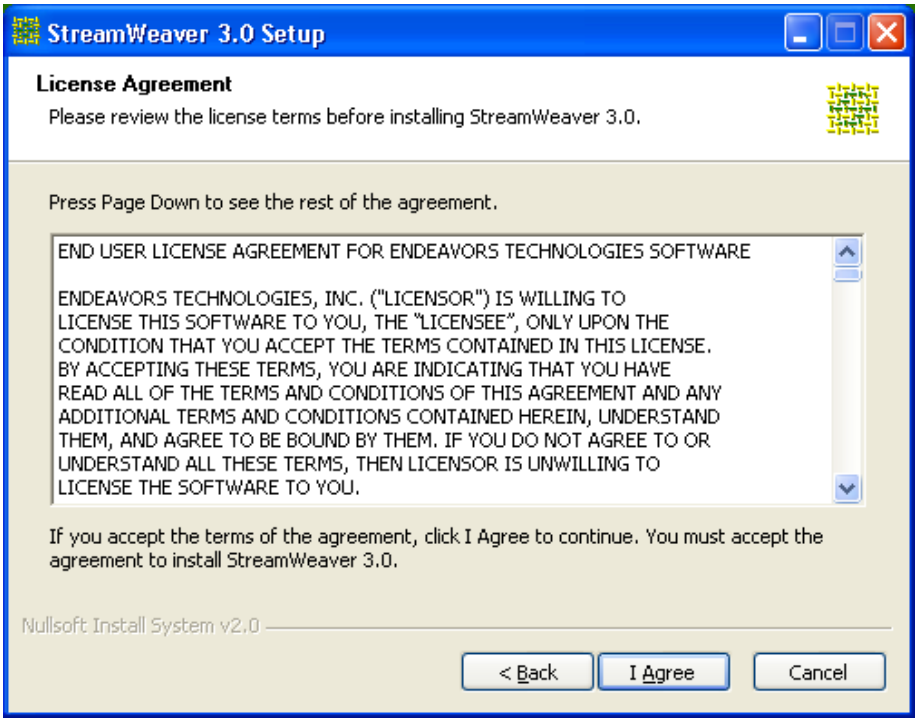


Figure 2-2: License Agreement Dialog

Next, choose the directory in which you want to install Stream Weaver. The default location is “C:\Program Files\Stream Theory\Stream Weaver”.

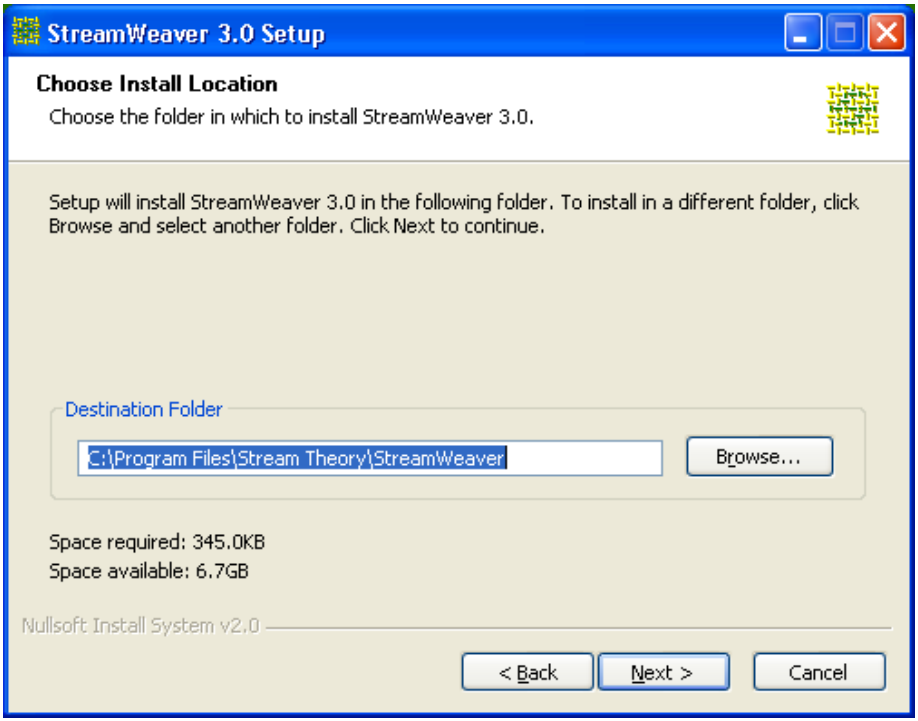


Figure 2-3: Installation Directory Dialog

Then, choose the “Start Menu Folder” in which you would like Stream Weaver to be accessible. The default folder is “C:\Program Files\Stream Theory\Stream Weaver”. Enter your choice of folders of select “Install” to proceed.

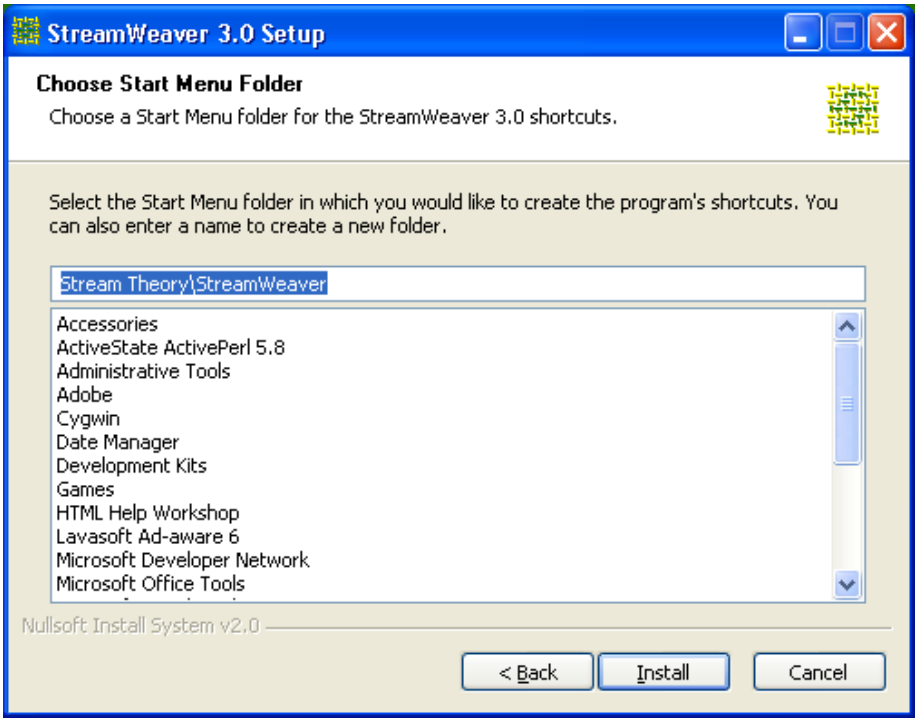


Figure 2-4: Menu Folder Selection Dialog

The dialog as shown in Figure 2-5 is displayed upon successful installation.

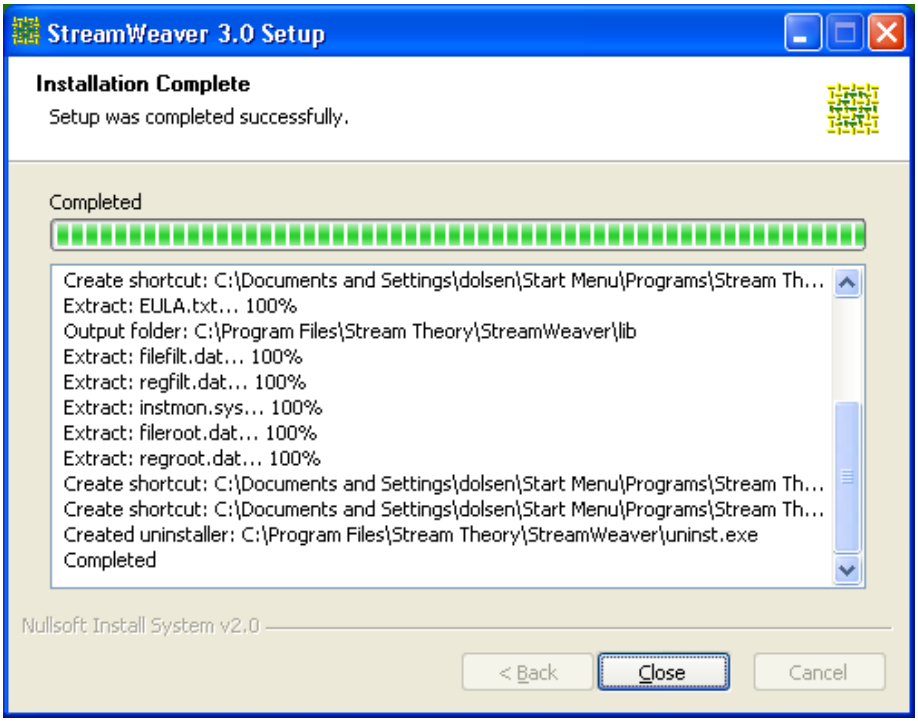


Figure 2-5: Installation Completion Dialog

The last step of installation is to put the license file (License.swl) into the “lib” directory under the installation directory. For example:

“C:\Program Files\Stream Theory\Stream Weaver\lib\license.swl”.

Stream Theory® supplies the license file (License.swl). This file will either be mailed to the licensee or will be supplied on a removable media such as a CD.

Keep a copy of license file in case Stream Weaver is uninstalled and the license deleted.

Step 2: Imaging the Processing PC

Next, create an image of the above PC configuration. (Imaging is explained in the beginning of this section.)

If a newer version of Stream Weaver is required, then a new image needs to be made to incorporate the new version of Stream Weaver. Remember, you should already have made an image of the original base configuration without Stream Weaver. In order to make an image with a new version of Stream Weaver, simply re-image the system using the base configuration and install the new version of Stream Weaver. After installation, image this new configuration for use in future application processing.

Step 3: Test PC Configuration

For testing, a separate PC should be available, cleanly configured, loaded with the Stream Theory Player, the required support programs, latest device drivers, and loaded with the requisite operating system. The same steps should be followed in configuring the PC as was followed in creating the Processing PC in “Processing PC Configuration” on page 21, except that Stream Weaver is not installed. Instead, install the Stream Theory Player on the Test machine.

Depending on the number of operating systems being tested, more than one Test PC may be required. Alternatively, you can have one test machine with multiple images of various operating systems.

Step 4: Test PC Imaging

Next, create an image of the above PC configuration. Norton Ghost™ is one utility that will accomplish this task.

If a newer version of the Stream Theory® Player is required, then a new image of each configuration is required.

Processing Steps

If an image, as specified in “Step 2: Imaging the Processing PC” on page 27, of a Processing PC configuration is not available, go to this section and create an image for processing.

Step 1: Re-image the Processing PC

Load the image of the clean operating system with Stream Weaver on the PC with which the application is to be processed, then start Windows®.

If you have already processed an application and choose to process another application without re-imaging the processing machine, you should at least reboot the machine. Not doing so, may prevent Stream Weaver for capturing installation changes for the second processing session.

Step 2: Start Stream Weaver

Either select Stream Weaver from the start menu or double click the Stream Weaver icon on the desktop. The dialog shown in figure 6 should be displayed. If work on a previously saved file is to be continued, then close the "*Untitled1"* project window and use the *File* pull down to open the desired project.

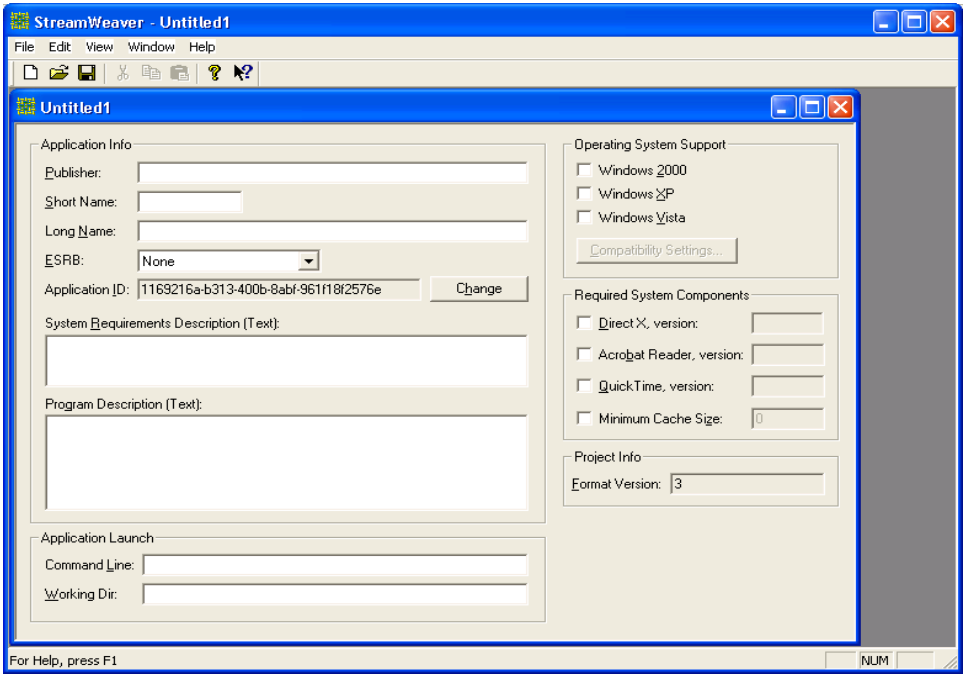


Figure 2-6: Stream Weaver Project Window

Step 3: Capture Installer Settings

The next step is to capture the installer settings. This includes the capture of all the application files and their associated directory locations, directory creation, the registry values, and environment variables. To capture these settings, the installer is run and Stream Weaver monitors what and where files are loaded and what and where registry values set during the application installation.

Note the following points for the capture installer settings stage of processing:

- The information in the project window does not have to be filled out at first.
- Even though the program may require a specific version of DirectX, Acrobat, or QuickTime; these programs/plug-ins are not needed for the processing system. They will need to be installed into the testing system. One exception to this requirement is

if the application that is actually installed on the streaming machine needs to be tested. If problems running the streamed application occur, one step is to verify that the installed application properly works on the processing machine. In this case, this would require that any support applications like, Adobe Reader, Internet Explorer, QuickTime, be loaded and any required driver updates, DirectX for example) be updated on the processing machine.

As shown in Figure 2-7, from the file menu, select “Merge Installer Run”.

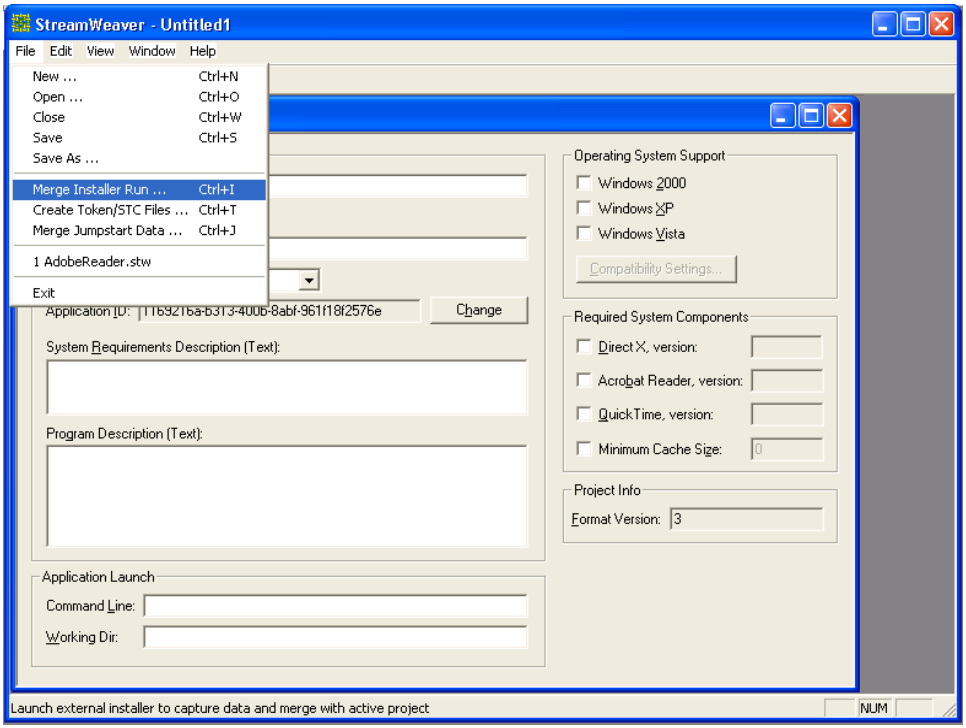


Figure 2-7: Project Setting’s Menu

This will bring up the dialog box shown below in Figure 2-8.

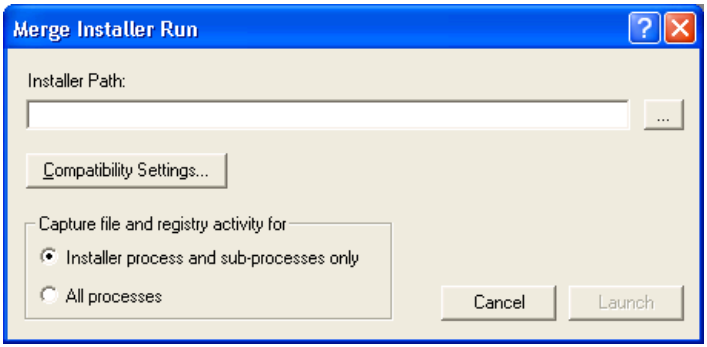


Figure 2-8: Merge Installer Run Dialog

Merger Installer Run Dialog Box

Compatibility Settings (Windows® XP and Windows® Vista only) – This button brings up a dialog that allows adjusting several compatibility options to be used when launching the installer. For instance, this may be needed for installers designed for an operating system older than the Processing PC operating system. Which options are accessible depends on the Processing PC operating system. For instance, under Windows® XP, new compatibility settings introduced in Windows® Vista will be disabled.

For information on the available compatibility options, please refer to “Compatibility Settings Dialog” on page 43.

Installer process and sub-processes only - When this option is selected, the install monitor to record only file and registry activity coming from the installer processes and its sub-processes.

All processes - When this option is selected, the install monitor to record file and registry activity coming from all processes.

It is not recommended to have other programs installed and/or active while processing an application. However, Microsoft has parts of its installer run as a “Service” under Windows® and sometimes all of the installation activities are not captured. This is because the “Service” activities are not a sub-process of the installer process. Therefore, to capture all the install activities, the process level filtering needs to be turned off so that all process level activities are captured. However, first one should try running the installer without disabling the filter in that it may work. Disabling the filter runs the risk of capturing unneeded information and causing the Stream and Token file to be larger than required.

Type in the path for the Installer file. To browse for the Installer path, use the “…” button on the right of the “Installer Path:” field. For our example, the application “Acrobat Reader™” by Adobe is processed into a streaming format. The installer for this application was previously downloaded and the running of the “Acrobat Reader” installer from Stream Weaver looks like what is shown below in Figure 2-9.

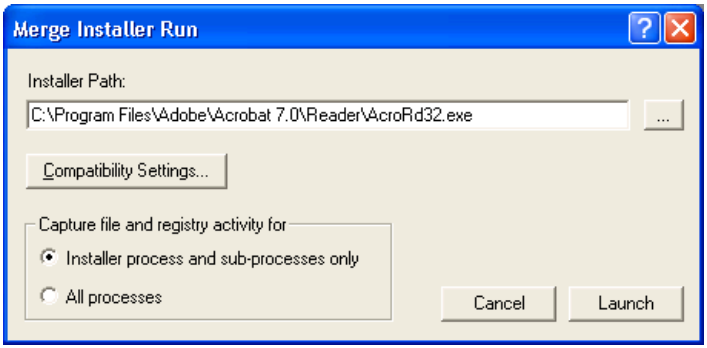


Figure 2-9: Setting Install Path

Start the installer by selecting the “Launch” button. During capture, the installer runs and installs the application. Stream Weaver watches the installer and monitors and creates a record of all installed files and registry keys created.

CAUTION

If the installer directory is not carefully selected in reference to the application, it is possible that the installer filter will remove application related files. Therefore, the following restrictions should be followed for choosing the installer directory. IMPORTANT! Care must be taken in the selection of the directory in which the application is installed and the directory from which the installer is run. The application should not be installed in a directory under where the installer is found and additionally the

installer should not be located at the root directory. This is because there is an implicit filter for the files associated with the installer directory. Installers will often create temp files as part of the installation process. These files would be captured as part of the application installation process but actually are not part of the installed application. Therefore, an implied installer filter is built into Stream Weaver. To prevent the capture of the temp installer files, all files in the directory below the installer directory are filtered out by Stream Weaver.

Installer Directory Restrictions

- The installed application should not be in the same directory as the installer executable or in a subdirectory of the installer directory.
- The installer should not be the directory "C:\". This will cause a null filter to be created. If Stream Weaver detects a null filter, instead of filtering everything, it filters nothing. Though technically this won't prevent proper application streaming, the token and stream files will contain unneeded data and be larger than required.
- The application has to be installed to a C: drive.
- Do not use special characters in the installation directory name. No umlauts, ~, !, @, #, à. Á …

Once Stream Weaver launches the application installer, all the normal application specific installation dialogs are displayed. For "Acrobat Reader", the Installer dialog as shown in Figure 2-10 appears.

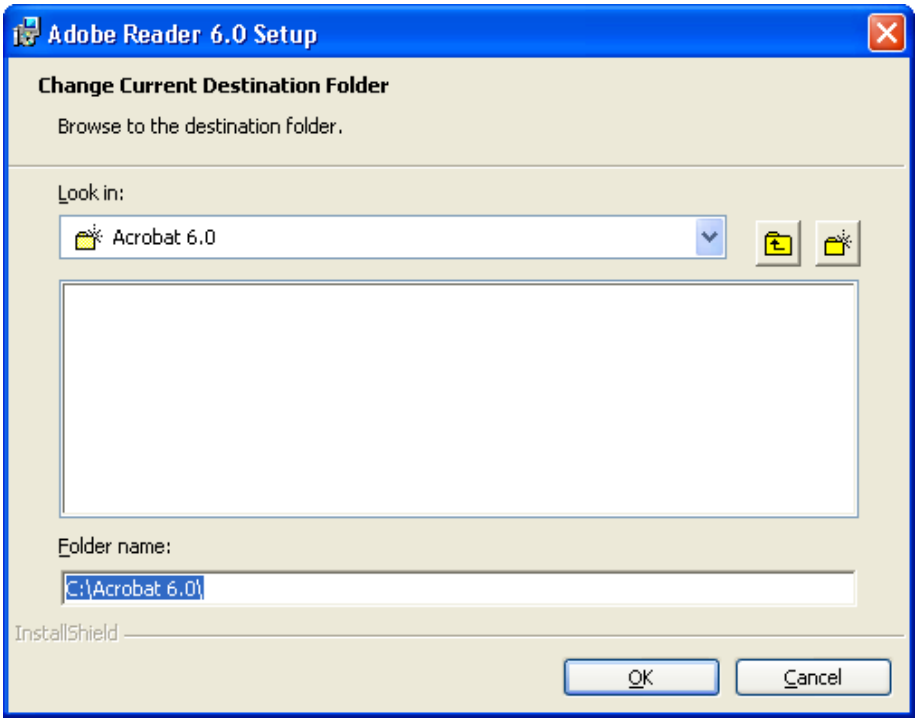


Figure 2-10: Acrobat Installer Dialog

For the “Acrobat Reader” installer, a series of installation windows are provided ending with the window shown in Figure 11.

Select the finish button to complete and end the installer for “Acrobat Reader”.

Figure 2-11: Final Acrobat Installer Menu

Stream Weaver can not determine when an application Installer has completed, so the dialog window as shown in Figure 2-12 is displayed once the Installer starts. By selection "OK" you are telling Stream Weaver that the application installation is complete. "OK" should not be selected if there are patches to be added to the application. See Appendix A: Program Patches.

Select the "OK" button shown in Figure 2-12. This completes the process of capturing the installer settings. In the following steps, the information gathered during installation will be used to create the Stream and Token files.

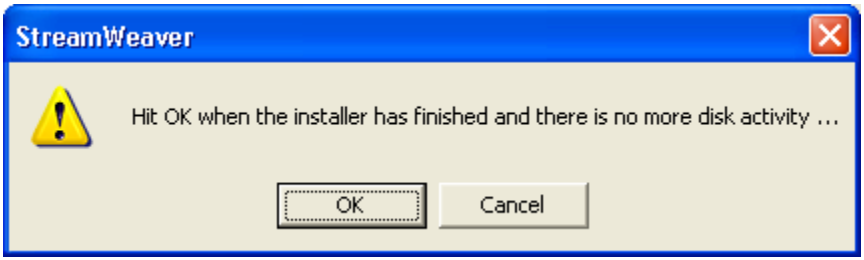


Figure 2-12: Status window for Installer Processing

Viewing Captured Information

It is possible to browse through the files or the registry settings. To view the files select **Files** from the **View** menu, or press the key sequence <Ctrl>F. The Files view is shown below.

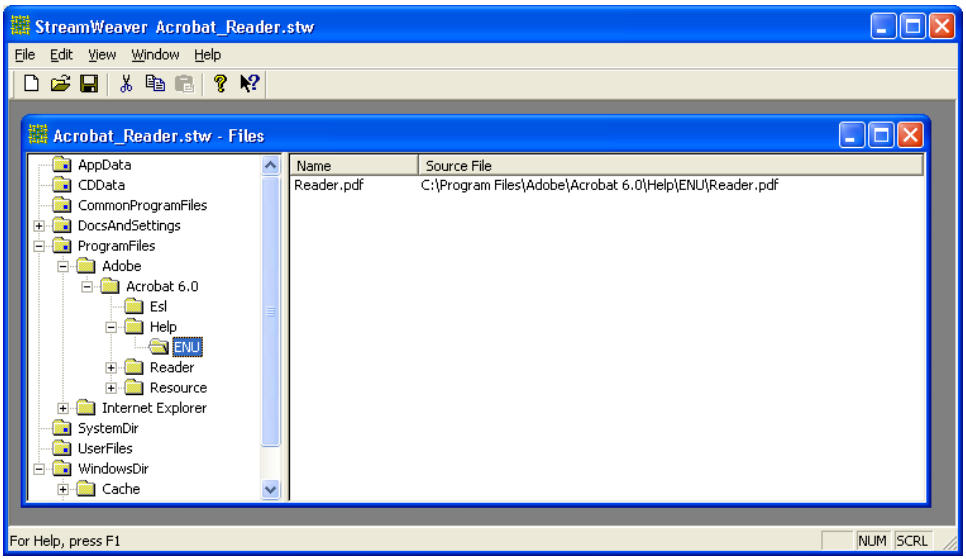


Figure 2-13: Files View

To view the registry settings, select **Registry** from the **View** menu or press the key sequence <Ctrl>R. The Registry view is shown below.

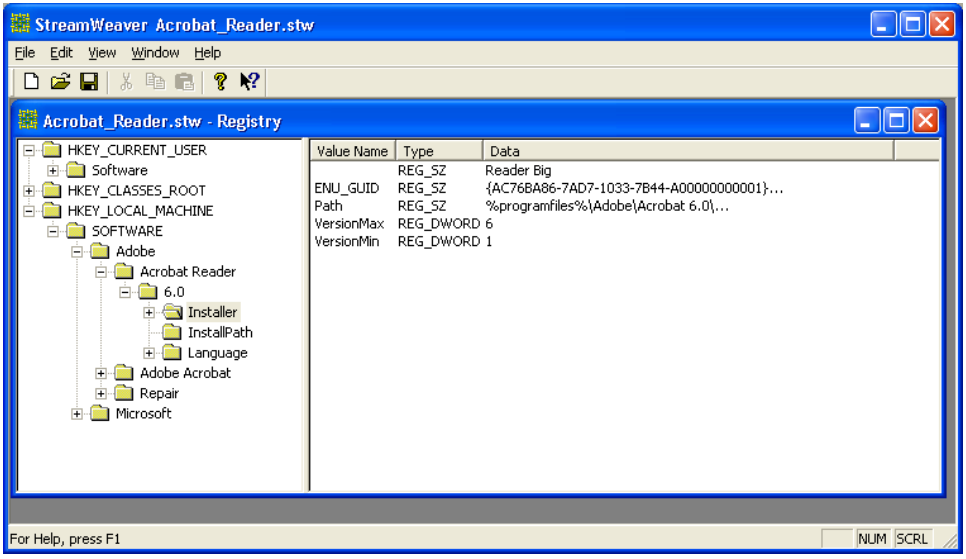


Figure 2-14: Registry View

To view the environment variables, select **Environment** from the **View** menu or press the key sequence <Ctrl>E. The Environment view is shown below.

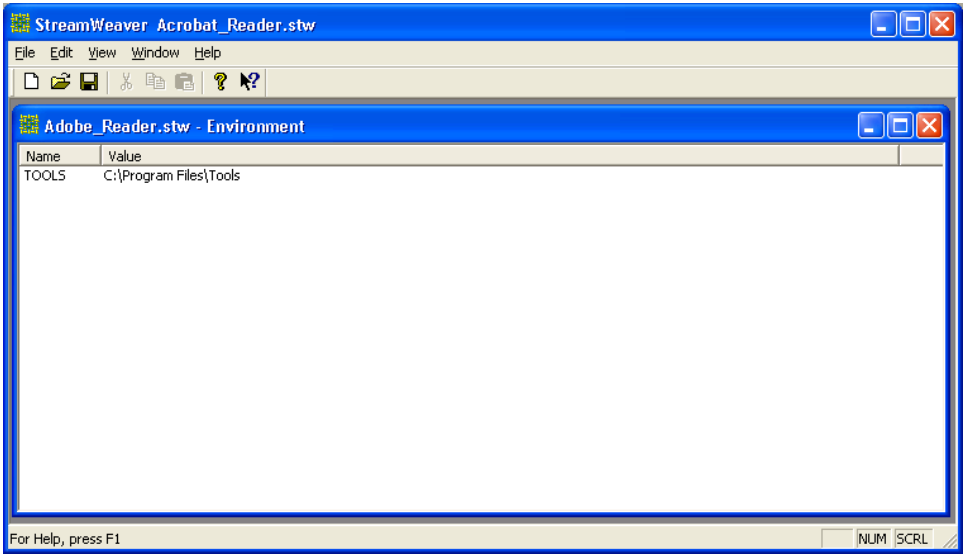


Figure 2-15: Environment View

Note that the information shown it the Files, Registry and Environment views can be augmented, removed or changed if necessary (see “Editing Captured Information” on page 58). This information is stored in the *.stw file and initially represents what was installed. Changes to the files, registry values or environment variables using Stream Weaver are not reflected in the actual system directory. These values are incorporated into the token file and are used by the Player’s registry overlay.

Step 4: Fill-Out App Info

Before creating the Stream file and Token file, application information must be filled out. To fill out this information, open the “Project Settings” window by going to the “View” pull down menu and selecting “Project Settings” or selecting <Ctrl>P. For our sample application, “Acrobat Reader”, the figure below shows what the project dialog would look like after filling in the dialog. If returning to Stream Weaver after closing the application, the project can be reopened by selecting the menu pull-down “File” and selecting “Open”. This will bring up a dialog for browsing and selecting the stream file for which you were searching.

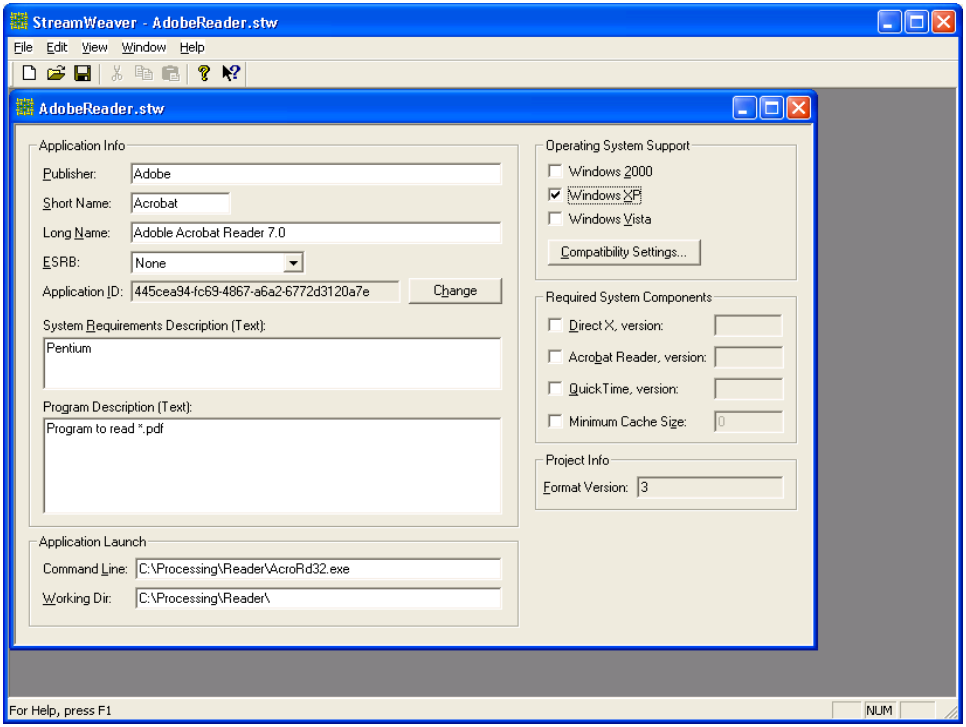


Figure 2-16: Figure 15: Project Dialog Window

Application Info Pane

In the Application Information Pane, you can see general information about a title. This information is stored within the *.stw file and is typically used to track processed titles. Additionally, Stream Weaver uses some of the information in generating the Stream and Token files. The short name is used in naming the Token and Stream files and the Long name determines the title name the end user sees on the Stream Theory® Player. Also this information is used in creating an application install file for the server. Most of this information comes from the application publisher but there is a field for the processing organization to add their own comments for their own information about the application. This information can also be pulled into a database to manage the processed applications.

- **Publisher –** Is the name of the application publisher and is important for the tracking of licensed applications. Information is stored in the Stream Weaver file, “app_name.stw”, the server install file, and gets stored on the server. It is often used in the tracking of application usage to determine royalty payments.
- **Short Name –** This will be the name used for the creation of the token, stream, and install file.
- **Long Name –** This name is the name displayed in the Stream Theory® Player history window after the game being selected
- **ESRB –** (Entertainment Software Rating Board) This selection field is the application’s rating. For games, the publisher will provide this information. For business applications, this field can be set to none. This information is stored in the server installation file.
- **System Requirements Description –** These are the requirements provided by the application publisher and is usually just copied off the box.
- **Program Description –** This is a field to describe the program. It is stored in the Stream Weaver file, *.stw, and also stored in the install file that is uploaded to the server. This information is mainly used for informational purposes.

Application Launch Pane

The Application Launch fields define the command line that starts the application and the working directory from which the application locates the rest of the files.

- **Command Line –** Specifies the command line used to start the program. The easiest way to populate it properly is to navigate in the Files view to the application’s executable that is to be launched, right-click on it, then choose **Copy to Command Line**. If you’re not sure where the executable is located, one way it can be found is by looking at the properties of the shortcut created when the application was installed.

  If you want to launch a non .exe file such as a .doc file, for instance, please refer to “Processing Non Application Files” on page 75.
- **Working Dir** – Specifies the folder that contains the application’s executable or some related files. A vast majority of the time, using the same directory as used in the command line will work. On occasion using the same directory as where the program executable is found will not work. In these cases, it may be required to set the Working Directory to the application root directory. The easiest way to populate this field is to navigate in the Files view to the folder that you want to set as the working folder, right-click on it, then choose **Set As Working Folder**.

Operating System Support Pane

Operating System Support Pane specifies the Operating Systems for which the application is compatible. This information is stored in the token file so that when a token file is accessed, the Stream Theory® Player can determine if the application is compatible with user's Operating System. Location of Operating System compatibility information is usually found in the product information for the application, or on the application box, on the publisher's web site or through testing.

For each Operating System, the streamed application should be tested on the target Operating System.

If the processed application is run on a machine for an unsupported Operating System, the Stream Theory® Player will display a dialog indicating that the Operating System is not supported and will not start the application. Sometimes testing indicates that an application is compatible with an Operating System where the product literature does not specify that particular Operating System. This often happens with applications created before the Windows® XP release. To test a standalone stream file on XP, the Windows® XP check box must be selected. For the version that is streamed from the Server, one should not check the Windows® XP option. The Token server has the capability to override the Operating System settings. When done this way, the ST Player will display a dialog warning the user. The dialog provides a warning that testing indicates that the application works with Windows® XP though the vendor information does not specify Windows® XP compatibility

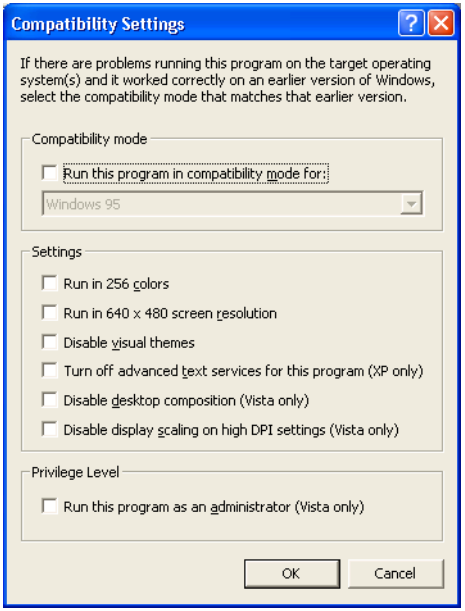
- **Windows® 95 – Windows® XP –** Check the boxes for the Operating Systems that are supported by the applications.
- **Compatibility Settings (Windows® XP and Windows® Vista only) –** This button brings up a dialog that allows adjusting several compatibility options to be used when launching the processed application. For instance, this may be needed for applications designed for an operating system older than the target operating system(s). Which options are accessible depends on the selected target operating systems. For instance, if only Windows® XP is selected, then new compatibility settings introduced in Windows® Vista will be disabled.

  For information on the available compatibility options, please refer to "Compatibility Settings Dialog" on page 43.

The “Compatibility Settings” button is enabled only if Windows® XP and/or Windows® Vista is selected as a target operating system as compatibility settings are not supported by the Windows® 2000 operating system.

Compatibility Settings Dialog

The Compatibility Settings dialog offers several options that affect the environment in which a program is launched. In the context of Stream Weaver, the program may be either a processed application installer (see) or the processed application itself, upon streaming (see). Those options are useful for programs designed to run on older operating systems than the ones on which they will actually be run. If some of those options are set for a given program, then Windows® automatically modifies the run-time environment upon launching the program to make it as close as possible to the environment required for the program to function properly.



Run this program in compatibility mode – This setting is used when a program is only compatible with an operating system older than the one on which it will run. For instance, since Stream Weaver only runs on Windows® XP or Windows® Vista, this option should be checked for processing all Windows® 9x-only applications. If the application indicates compatibility with Windows® 9x and Windows® XP, then this option does not need to be selected. As a rule of thumb, the most recent supported operating system should be selected for compatibility mode.

Run in 256 colors – This setting forces the entire screen to 256 colors while the program is running. This may be necessary for older programs, especially games, that do not support 16-bit colors and higher.

Run in 640x480 screen resolution – This setting forces the entire screen to 640x480 resolution while the program is running. This may be necessary for older programs, especially games, that do not support higher resolutions. Try this setting if the graphical user interface appears jagged or is rendered improperly.

Disable visual themes – This setting turns off all visual themes while the program is running. Try this setting if you notice problems with the menus or buttons on the title bar of the program.

Turn off advanced text services for this program (Windows® XP only) – This setting disables advanced text services such as speech recognition.

Disable desktop composition (Windows® Vista only) – This setting turns off transparency and other advanced display features. Choose this setting if window movement appears erratic or you notice other display problems.

Disable display scaling on high DPI settings (Windows® Vista only) – This setting turns off automatic resizing of programs if large-scale font size is in use. Try this setting if large-scale fonts are interfering with the appearance of the program.

Run this program as an administrator (Windows® Vista only) – This setting causes Windows® to elevate the program to administrator level before running it. Some programs require administrator privileges to run properly.

For more information on a particular setting, search one of the following web sites:

- http://support.microsoft.com/
- http://windowshelp.microsoft.com/

Required System Components Pane

Required Components to Run (DirectX, QuickTime, Acrobat) - For some applications, additional system components are required for the applications to either run or run completely. The Player will check the local machine for the specified components. The Player will not prevent the application from running but if a component is not installed, the Player will put up a warning dialog before starting the application.

The components referenced in this section are not streamed but are installed on the end client's PC.

The component information is stored in the token file and is checked at application stream time against the client PC configuration.

The "Minimum Cache Size" field refers to the cache used by the Player. All stream blocks read by the Player are stored in the cache and if the cache is too small a phenomena called disk thrashing occurs. For every new block read, a block is flushed from the cache and shortly again has to be read from the network. This can greatly slow the application's performance.

The solution for this problem is to make the cache large enough to prevent cache thrashing. However, typically no specification of cache size is required given that the default Player installation is for 512 Mbytes of cache. This is more than adequate for 99% of the applications. For exceeding large applications, one may want to set this field. If this field is set and the current cache is not large enough, then the application will not run and will present an error dialog.

Step 5: Stream File Creation

The next step is to create the initial Token and Stream files. The process of generating Stream files will be repeated multiple times. The first generation of the Stream files does not contain jumpstart information. In the next regeneration of the Stream Files, the *.stw file will contain jumpstart information. Upon doing the secondary jumpstart, the third generation of the Stream files will contain the secondary jumpstart information. Further regeneration of the Stream files may be required to fine tune the jumpstarts.

Creation of these files only requires a couple of simple steps. First select the "File" pull down menu, and selecting as shown below "Create Token/STC Files…" or pressing <CTRL>T as shown in Figure 2-17.

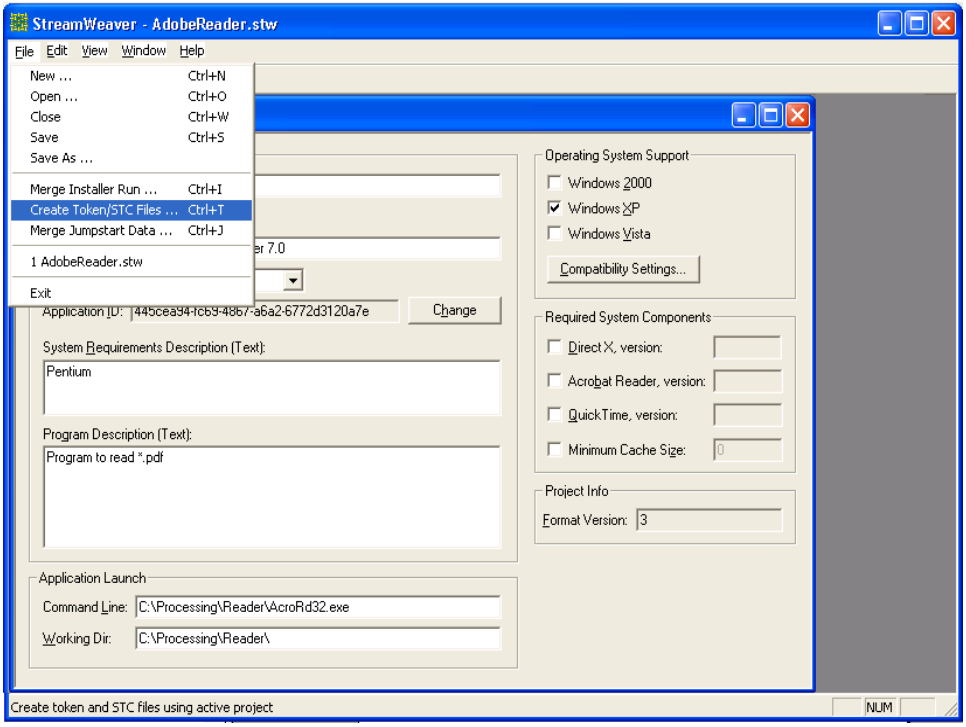


Figure 2-17: Token & Stream File Creation

The dialog shown below should appear. Within this dialog, you can specify the file name and directory. The file name will be used to create the “file_name.tok” file or the “file_name.stc” file.

Press “OK” to generate the stream files (*.stc) and token files (*.tok).

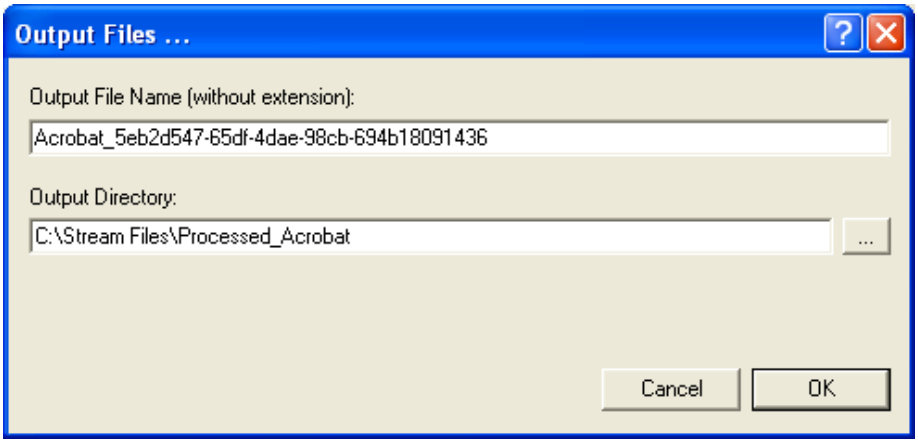


Figure 2-18: Stream File Generation Dialog

The number after the title name is a UUID code and is used to create uniquely identified files for each build.

The dialog below in Figure 2-19 should appear. The progress bar will show the status of the processing. For a program of the size of Adobe's Acrobat Reader, this should only require 2-3 minutes.

Multiple CD applications with large amounts of data may require a few hours to process.

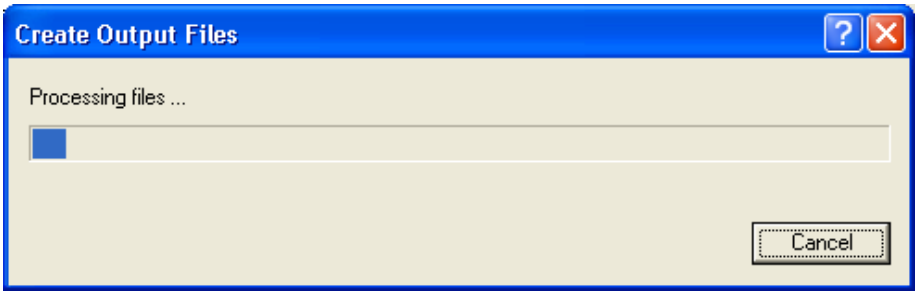


Figure 2-19: Stream File Processing Status Dialog

Upon successful processing of the applications description, as defined by the "Reader.stw" files, three files are created and stored into the specified directory. Below, in Figure 2-20, is a screen shot of this directory.

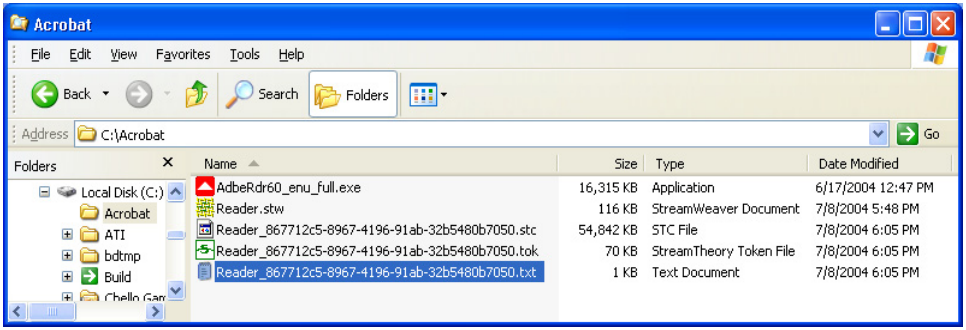


Figure 2-20: Stream File Processing Status Dialog

The files created by stream processing are:

- "app_name"_"uuid".stc - This is the file that will be put on the Stream Server. The long number appended to the end of the application name is what is referred to as a UUID (Universal Unique Identifier). The UUID is used to guarantee the unique naming of the stream files.
- "app_name"_"uuid".tok -This file is the initial version of the token file. The file could be put on the Token Server, but would be missing the jumpstart information.
- "app_name"_"uuid".txt - This text file is used to install the application onto the server.

If using Stream Weaver, changes are made to the configuration and the application reprocessed, a new set of files will be created giving a new UUID. If you change the name of the token file, you will have to change the name of the STC file as well.

Step 6: Test Streamed Application

Now that the application is in a streaming format, it can and should be tested. Testing of a streamed application does not require installation the Stream Flow Servers but can be tested stand-alone on the Test PC. To test our example application, Acrobat Reader, copy the build files (Reader_*.tok and Reader_*.stc) to a clean and re-imaged test machine with an appropriate Operating System. See section of "A. Initial Preparation Steps" for requirements on imaging the PC's.

Double click on the Reader_*.tok file. This will start the Stream Theory® Player and the Acrobat Reader program. Test the program and verify that it works properly.

Step 7: Primary Jumpstart

Jumpstarting an application is optional, so if you don't wish to use that feature then you are done processing the application and you can skip the remainder of this chapter.

Once it has been verified that the streamed application's executes properly on the Test PC's , the streamed application can be jumpstarted.

The Primary and Secondary jumpstarting and stream file testing should always be done on the Test PC and not on the Processing PC.

Jumpstarting is the process of specifying which stream blocks of the application need to be in the Player cache before the application starts to run. The amount of the application that is jumpstarted, i.e. pre-cached, is a trade-off between the first-run start time and later delays as blocks are loaded on demand. The background secondary jumpstart will be described later.

The second time the application is run, unless flushed from the cache, the application start-up times will be much faster given that the application is loaded from the disk cache.

1. The first step in jumpstarting an application is creating a Stream Theory® Player shortcut on the Test PC with a special command line for capturing jumpstarting information. To create this shortcut, go to the Player install location and created a shortcut to the Player. For our example, Let's assume that the Player is in the directory "C:\Program Files\Stream Theory®". To create the Player shortcut, right click on the file "C:\Program Files\Stream Theory\STPlayer.exe" and select "Create Shortcut". Your directory should look as Figure 20 shown below.

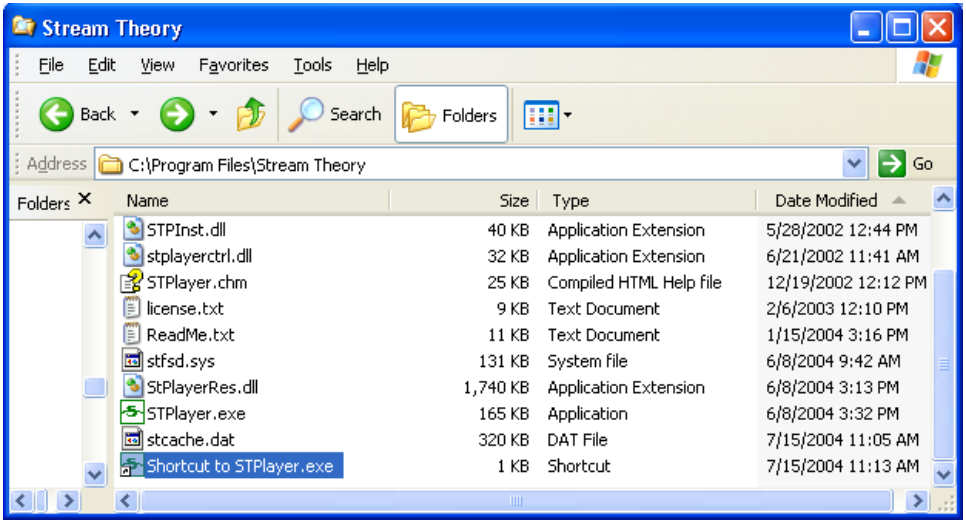


Figure 2-21: Player Short Cut

2. Select the short cut and right click on the mouse. Select properties. The dialog shown in Figure 2-22 should appear. The "Target" field needs to be modified for jumpstarting.

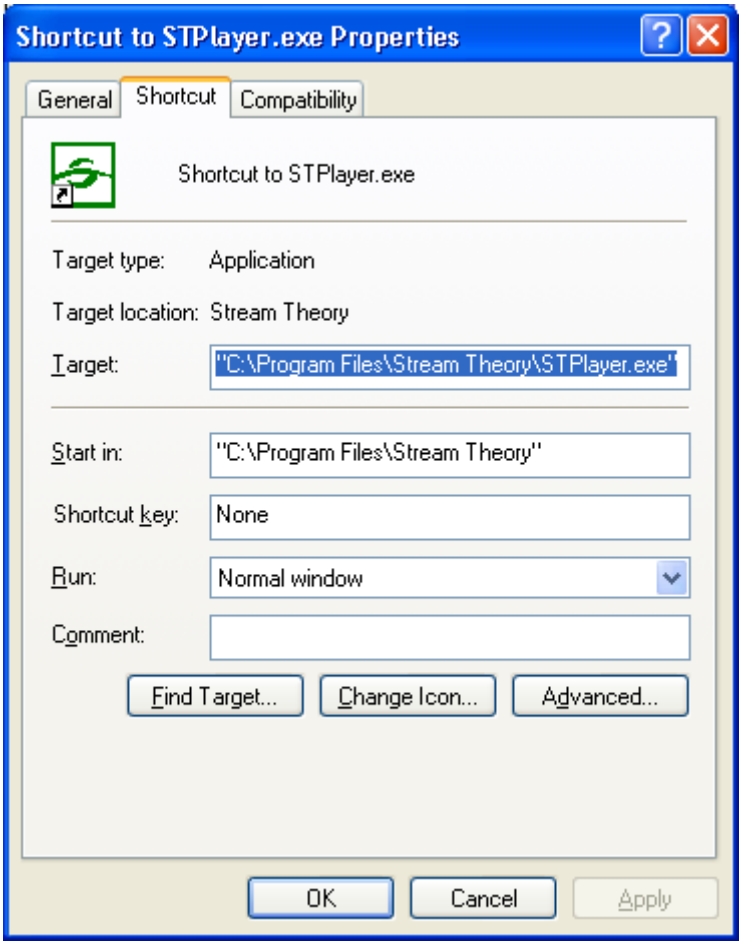


Figure 2-22: Player Shortcut Properties Dialog

Next add to the string in the “Target” field, the following

“/captureJumpstartdata /IgnoreJumpstart”

The full string should appear exactly as shown below including the quote marks:

“C:\Program Files\Stream Theory\STPlayer” /captureJumpstartdata /IgnoreJumpstart

The dialog below shows the dialog after modification.

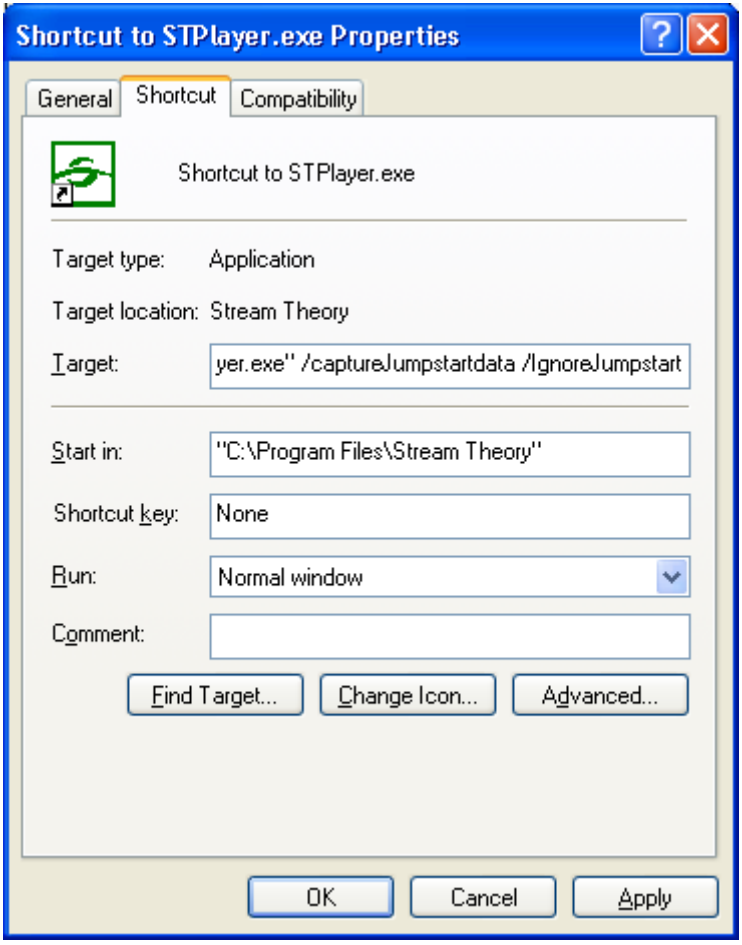


Figure 2-23: Player Shortcut Properties Dialog

Select the “Apply” button after modifying the “Target” field followed by selecting the OK button.

3. Care now has to be taken to start the Player with the modified short cut. Otherwise, the jumpstart information will not be created. To assure this, now double click on the modified shortcut icon and start the Stream Theory® Player.

4. Copy the Stream and Token files from the processing PC to the Test PC. Now double click on the token file for the processed application. Each stream block that is loaded into the cache is recorded and saved into a jumpstart file named ‘“app_name”_”uuid”.stj’. For the example application, this would be the file ‘Reader_”uuid”.stj’. Go through as much of the application as you feel that the user should have before the application starts. For games, this is usually the first level of play. The secondary jumpstart, as will be discussed later, might be the second level of play. Once you have done with the first level (Or first jumpstart point), exit the application.
5. Exit the Player.
6. Copy the Reader_*.stj file over to the processing machine. This file is found in the processing directory that was specified. In this example, the file is found at “c:\Stream Files\Processed_Acrobat\Reader_*.stj”.

Step 8: Merge Primary Jumpstart Data

Merging Jumpstart data is the process of taking the jumpstart information that was captured in the Reader*.stj file and putting it into the Reader_*.stw Stream Weaver file. The next time that Stream Weaver is used to generate a Token and Stream file, the jumpstart information will be included in the Token file.

To merge the jumpstart data, make sure that the *.stj file is copied into the same directory as is the corresponding *.stw file.

1. Start the Stream Weaver application or by double clicking on the *.stw file.
2. Open the Stream Weaver file for the application being processed. In this case, it is “Reader_***.stw”. Make sure that the window for this application is the active window.
3. As the dialog shows in Figure Pull down the “File” menu item and select “Merge Jumpstart Data… Ctrl+J.” or select <CTRL>J from the keyboard.

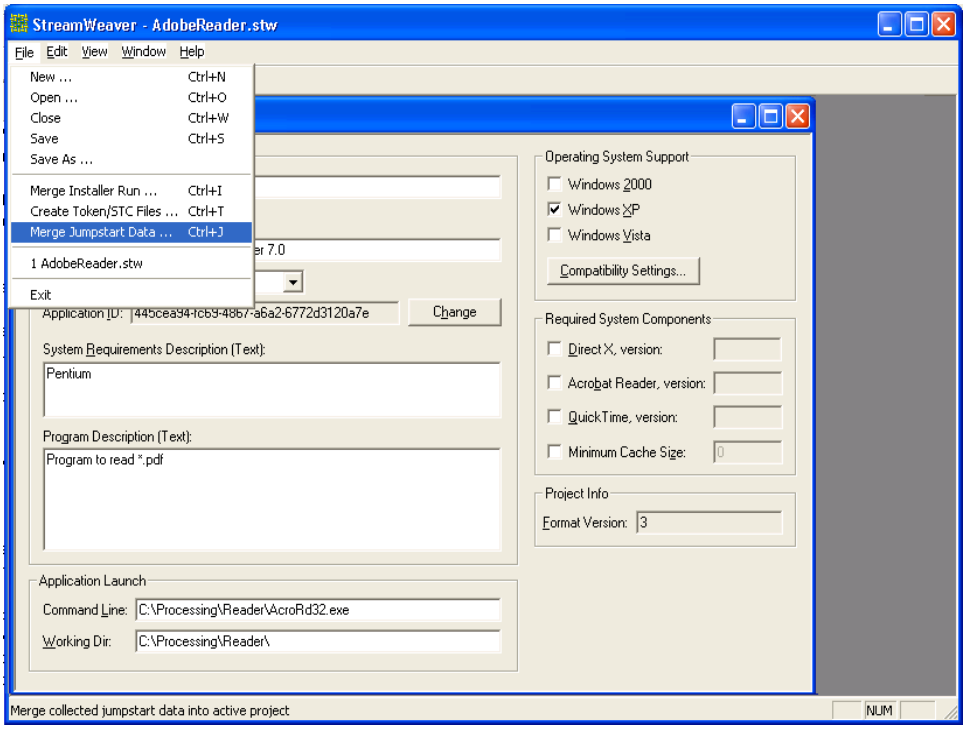


Figure 2-24: Player Shortcut Properties Dialog

This will bring up the "Merge Jumpstart Data …" dialog as shown in Figure 2-25. Enter the path for the jumpstart file, *.stj. Note that an "App ID" is assigned for each application and for each build of the application. Stream Weaver will check the application ID of the *.stw file against the *.stj file. If they don't match, Stream Weaver won't merge the jumpstart information to prevent using incorrect jumpstart information.

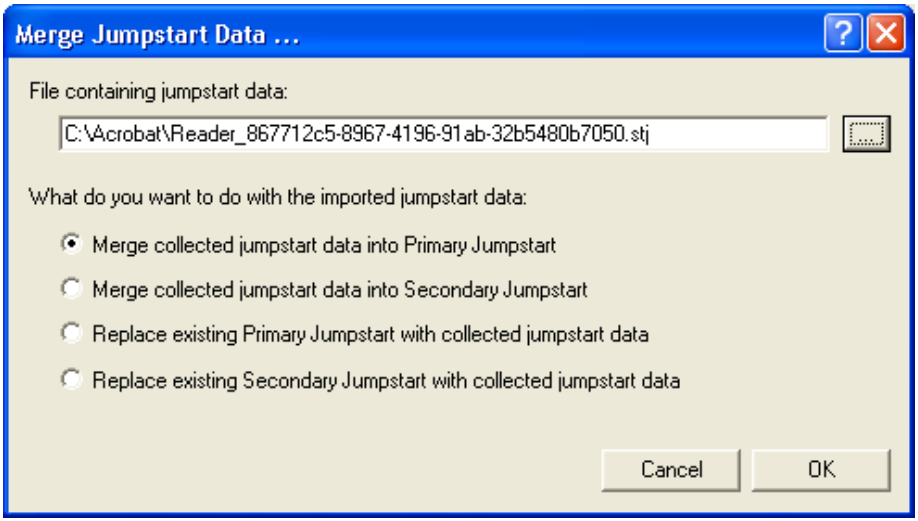


Figure 2-25: Jumpstart Dialog

4. Select the first option “Merge collected jumpstart data into Primary Jumpstart” and press “OK”. It should be less that a couple of seconds for the primary jumpstart data to be merged into the file.

If there is already primary jumpstart data in the Stream Weaver *.stw file, then the merge will only add stream blocks that are not already in the *.stw file. If the goal is to completely replace the current primary jumpstart with the new jumpstart, then instead of selecting the first option, “Merge collected jumpstart data into Primary Jumpstart”, select the third option “Replace existing Primary Jumpstart with collected jumpstart data”.

Removing Jumpstart Information

Should you need to remove jumpstart information for any reason, do the following:

- From the **Edit** menu, choose **Clear Captured Jumpstart Data**.

This will remove both the primary and secondary jumpstart information.

At this point you have the option to either add a secondary jumpstart as described in the next step or rebuild the stream files as described in “Step 10: Rebuild Stream Files” on page 58 to incorporate jumpstart information.

Step 9: Secondary Jumpstart

The secondary jumpstart is an optional step that specifies which stream blocks of the application are streamed to the Player cache after the primary jumpstart and typically after the application has started. An example of a secondary jumpstart might be the loading the second level of a game or various application options for a business application.

The use of a secondary jumpstart is best suited for games and applications that are complex or offer a high level of functionality. Small or basic programs such as Winzip or Winamp are not large enough to create much difference in secondary jumpstart information.

If you don’t wish to add a secondary jumpstart, you can go to the next step to rebuild the stream files if you have added a primary jumpstart. Otherwise you are done processing the application and you can skip the remainder of this chapter.

The secondary jumpstart typically occurs at a slower rate than the primary jumpstart. This is so that the data requested during the secondary jumpstart does not interfere with data/executable requests that might be required by the application during its normal execution.

1. Repeat the steps in “Step 7: Primary Jumpstart ” on page 49, steps 3-7 except run the application further than when you ran it for the primary jumpstart.
2. With the new *.stj file transferred to the processing machine, the “Secondary Jumpstart” information can now be merged into the Stream Weaver file.

Even though the *.stj file contains information about stream blocks found in the primary jump, Stream Weaver will only put blocks that do not exist in the primary jumpstart into the secondary jumpstart.

3. From the Stream Weaver application, open the application being processed.
4. Start the Stream Weaver application or double click on the Stream Weaver file, *.stw.
5. Open the Stream Weaver file for the application being processed. In this case, it is “Reader_***.stw”. Make sure that the window for this application is the active window.

6. Pull down the “File” menu item and select “Merge Jumpstart Data… Ctrl+J.” or select <CTRL>J from the keyboard. This will bring up the “Merge Jumpstart Data …” dialog shown below. Enter in the path for the jumpstart file, *.stj, that was created during the secondary jumpstart. Note that an “App ID” is assigned for each application and for each build of the application. Stream Weaver will check the application ID of the *.stw file against the *.stj file. If they don’t match, Stream Weaver won’t merge the jumpstart information and prevent using the incorrect jumpstart information.

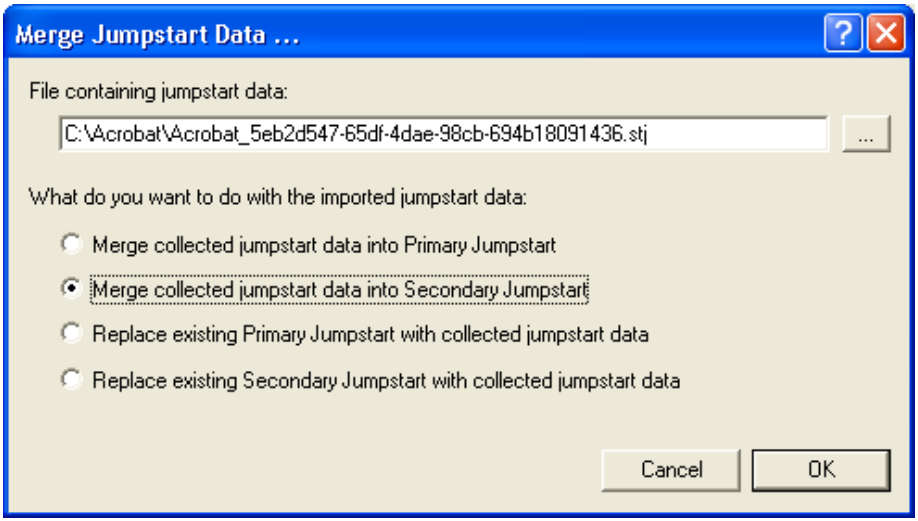


Figure 2-26: Merge Jumpstart Data Dialog

7. Select the second option “Merge collected jumpstart data into Secondary Jumpstart” and press “OK”. It should be less that a couple of seconds for the secondary jumpstart data to be merged into the file.

   If the goal is to completely replace the current secondary jumpstart with the new jumpstart, then instead of selecting the second option, “Merge collected jumpstart data into Secondary Jumpstart”, select the fourth option “Replace existing Secondary Jumpstart with collected jumpstart data”.

If necessary, you can remove jumpstart data as described in “Removing Jumpstart Information” on page 55

At this point you should rebuild the stream files as described in the next step.

Step 10: Rebuild Stream Files

The last step is to rebuild the stream (*.stc) and token (*.tok) files to incorporate jumpstart information. If you have not created any jumpstart information, then you are done processing the application and you can skip this step.

To rebuild the stream files, simply go to the File menu and select the “Create Token/STC File” option as you did before. The new token and stc files should be retested on a clean Test PC to verify that the jumpstart information is now included and to verify proper operation. If the jumpstart performance of these files are acceptable, then all three files, the *.stc, *.tok, and *.txt files are complete and ready to be uploaded to the server. See the “StreamFlow Server Architecture, Installation, and Administration Manual for further details about installing applications. If further refinements to jumpstarting is required, then repeat steps 7, 8, 9 & 10.

Editing Captured Information

Some times it may be necessary to make modifications to the captured information either to add some things that were not captured or to remove “noise” that was introduced as a side effect of the application installation. This section describes some of the common operations you may need to perform.

Files View Operations

The Files view is accessed by selecting **Files** from the **View** menu.

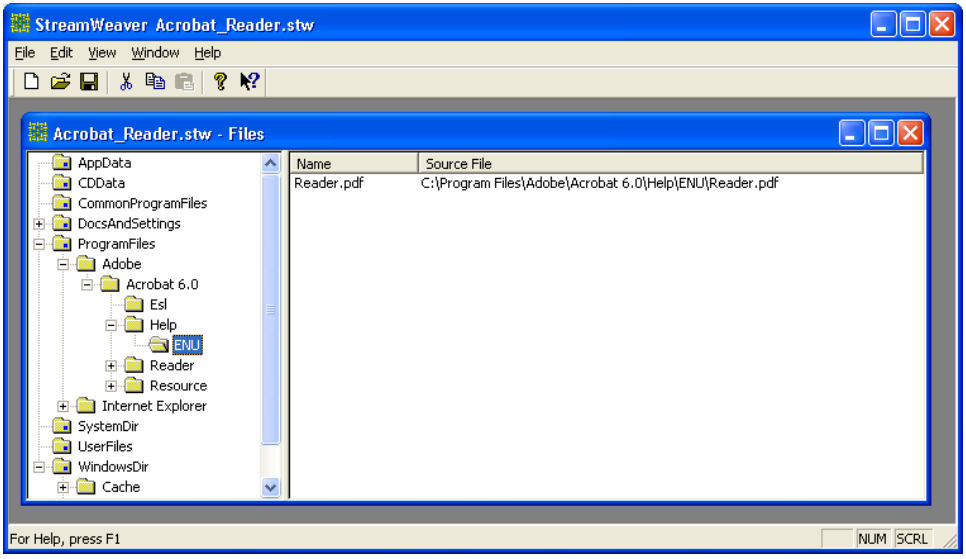


Figure 2-27: Files View

Most commands can be accessed either from the **Edit** menu or by right-clicking on a folder in the folders (left) pane or on a file in the files (right) pane.

Adding Folders

Two types of top-level folders appear in the folders pane: *system folders* and *install folders*. System folders are operating system-specific folders that are always present and cannot be manually added or removed. They are identified with a small black square at the bottom of the folder icon. Install folders are those created during installation or added manually. They are identified with a small red diamond at the bottom of the folder icon. Subfolders may be created under both types of folders.

To add an install folder

1. Right-click on any folder or on a blank area of the folders pane.
2. Choose **Add Install Folder** from the popup menu. The **Add Install Folder** dialog will appear.

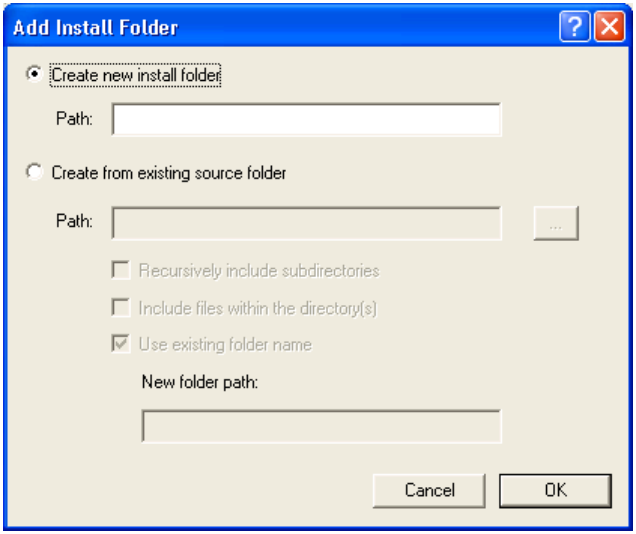


Figure 2-28: Add Install Folder Dialog

3. If you wish to create a new install folder, select **Create new install folder** and enter a path for it. If you wish to add an existing folder instead, select **Create from existing source folder**.
4. If you chose to add an existing folder, you can also select one or more of the following options:
   - **Recursively include subdirectories** – Selecting this option will cause all subfolders under the selected folder to be added as well. Otherwise only the selected folder is added.
   - **Include files within the directory(s)** – Selecting this option will add all the files in the folders being added. Otherwise only the folders are added.
   - **Use existing folder name** – Normally the selected folder is added with its current name. If you wish to add the folder under a different name, clear this option and specify the new name to be given to the folder.
5. Click **OK**.

The Files view will be updated to reflect the added folders and files.

To add a subfolder

1. Right-click on any install or system folder.
2. Choose **Add Folder** from the popup menu. The **Add Folder** dialog will appear.

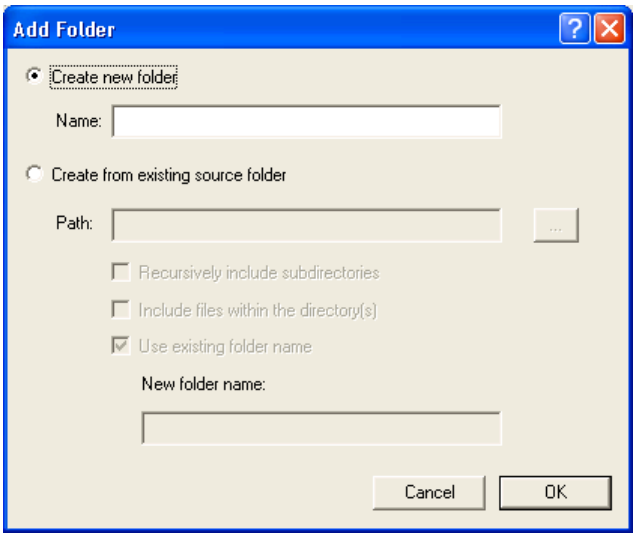


Figure 2-29: Add Folder Dialog

3. If you wish to create a new folder, select **Create new folder** and enter a name for it. If you wish to add an existing folder instead, select **Create from existing source folder**.
4. If you chose to add an existing folder, you can also select one or more of the following options:
   - **Recursively include subdirectories** – Selecting this option will cause all subfolders under the selected folder to be added as well. Otherwise only the selected folder is added.
   - **Include files within the directory(s)** – Selecting this option will add all the files in the folders being added. otherwise only the folders are added.
   - **Use existing folder name** – Normally the selected folder is added with its current name. If you wish to add the folder under a different name, clear this option and specify the new name to be given to the folder.
5. Click **OK**.

The Files view will be updated to reflect the added subfolders and files.

Adding Files

Stream Weaver allows you to add any files to any folder.

To add a file to a given folder

1. Right-click on the desired folder or on a blank area of the files pane if the desired folder is currently selected.
2. Choose **Add File** from the popup menu. The **Add File** dialog will appear.

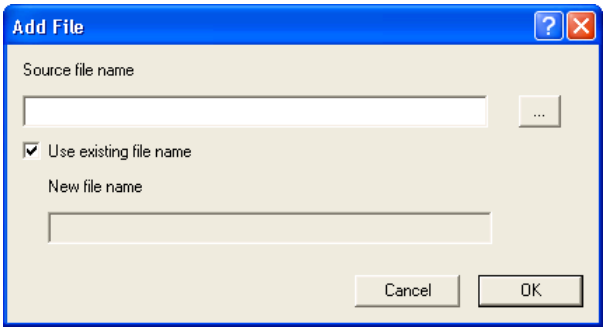


Figure 2-30: Add File Dialog

3. Enter the path of the file you wish to add or browse to it.
4. Normally the selected file is added with its current name. If you wish to add the file under a different name, clear the **Use existing file name** option and specify the new name to be given to the file.
5. Click **OK**.

The Files view will be updated to reflect the added file.

Changing the Source or Name of a File

If after adding a file you realize that you have added the wrong file or you decide that you wish to change its name, you can do so without the need to delete the file and add it again.

To change the source or name of a file

1. Right-click on the file whose source or name you wish to change.
2. Choose **Edit File** from the popup menu. The **Edit File** dialog will appear.

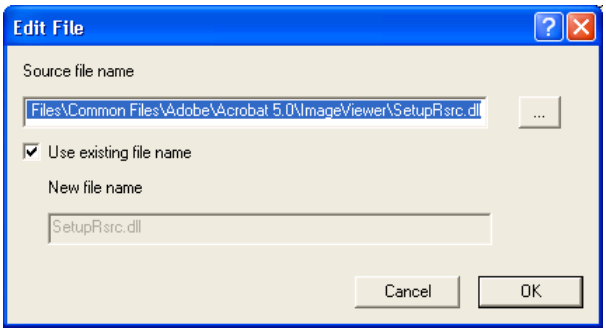


Figure 2-31: Edit File Dialog

3. To change the source of the file, enter the new path of the source file or browse to it.
4. To change the name of the file, make sure the **Use existing file name** option is not checked and specify the new file name.
5. Click **OK**.

The Files view will be updated to reflect the changes made.

Deleting Files and Folders

It is possible to delete any file or install folder that was created during installation or that was added manually.

To delete a file or folder

1. Right-click on the file or folder that you wish to delete.
2. Choose **Delete** from the popup menu.
3. Choose **OK** when prompted for confirmation.

Setting the Working Folder

For information on setting the working folder, please refer to page 41.

Setting the Command Line

For information on setting the command line, please refer to page 41.

Editing File Properties

A file has a number of security and jumpstart settings that can be modified to suit your specific needs.

To edit a file's properties

1. Right-click on the file whose properties you wish to change.
2. Choose **File Properties** from the popup menu. The **Edit File Properties** dialog will appear.

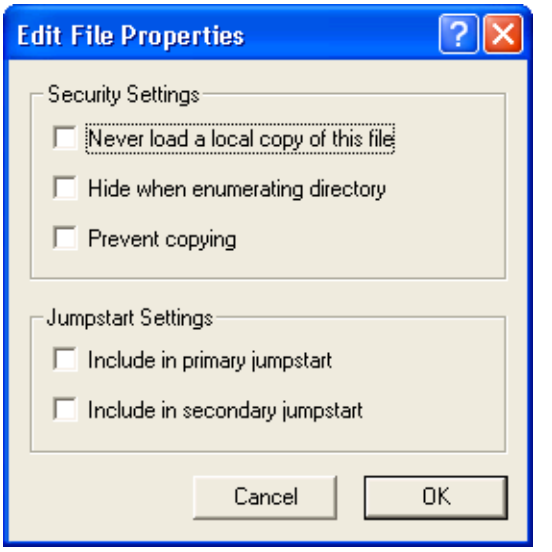


Figure 2-32: Edit File Properties Dialog

3. The following security settings may be configured:

For .exe files, all security settings are enabled by default.

- **Never load a local copy of this file**

  You should enable this option if you want to prevent the Stream Theory Player from loading a local copy of a streamed application file. Otherwise, when the Stream Theory Player needs to load an application file on the end user system, it will first attempt to load a local copy of it if one is present, otherwise it will try to

load it from the cache and, if it does not find the file in the cache, it will stream it from the server.

- **Hide when enumerating directory**

  If this setting is enabled, the selected files will not appear as part of the file listing of the folder to which it belongs. In this case, for instance, the file will not appear in Windows Explorer or in the File Open and File Save dialog boxes, and it will not show up in a Windows search.

When processing applications that launch other .exe files, you may need to disable this setting for these .exe files, otherwise a “missing file” error may result when the processed application attempts to launch them.

- **Prevent copying**

  If this setting is enabled, it will not be possible to make a copy of the file.

4. The following jumpstart settings may be configured:
   - **Include in primary jumpstart**

     This setting allows you to explicitly include the file in the primary jumpstart without the need to do a jumpstart capture.
   - **Include in secondary jumpstart**

     This setting allows you to explictely include the file in the secondary jumpstart without the need to do a jumpstart capture.
5. Click **OK**.

The Files view will be updated to reflect the changes made.

Registry View Operations

The Registry view is accessed by selecting **Registry** from the **View** menu.

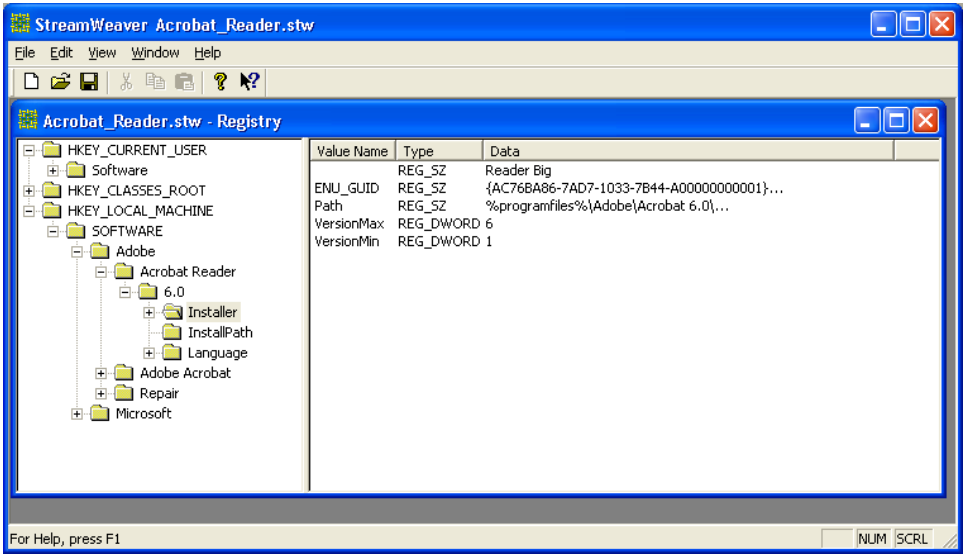


Figure 2-33: Registry View

Most commands can be accessed either from the **Edit** menu or by right-clicking on a key in the registry keys (left) pane or on a value in the registry values (right) pane.

Adding Registry Keys

You can create a new subkey or add an existing subkey under any key in the Registry view including *root keys* (or *hives*). However, you cannot create new root keys.

To add a subkey

1. Right-click on any key in the registry keys pane on the left.
2. Choose **Add Key** from the popup menu. The **Add Registry Key** dialog will appear.

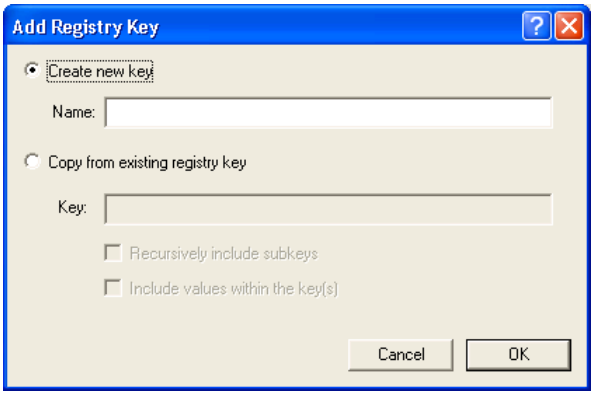


Figure 2-34: Add Registry Key Dialog

3. If you wish to create a new key, select **Create new key** and enter a name for it. If you wish to add an existing key instead, select **Create from existing registry key**.
4. If you chose to add an existing key, you can also select one or more of the following options:
   - **Recursively include subkeys** – Selecting this option will cause all subkeys under the selected key to be added as well. Otherwise only the selected key is added.
   - **Include values within the directory(s)** – Selecting this option will add all the values in the keys being added. Otherwise only the keys are added.
5. Click **OK**.

The Registry view will be updated to reflect the added subkeys and values.

Adding Registry Values

Stream Weaver allows you to add values to any folder.

To add a registry value to a given key

1. Right-click on the desired key or on a blank area of the registry values pane if the desired key is currently selected.
2. Choose **Add Value** from the popup menu. The **Add Registry Value** dialog will appear.

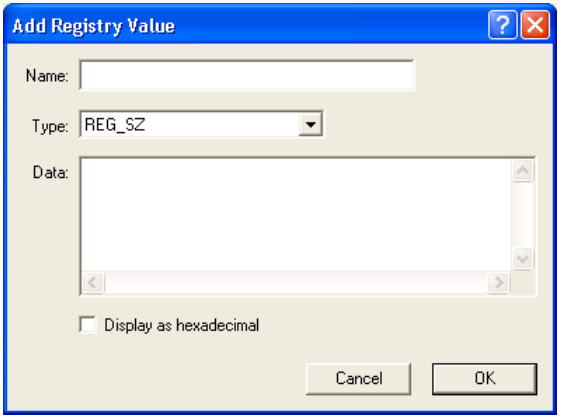


Figure 2-35: Add Registry Value Dialog

3. Enter the name of the value you wish to add in the **Name** field.
4. Select the data type of value from the **Type** drop-down list.
5. If you wish to view or enter the data in hexadecimal format, check the **Display as hexadecimal** option. Otherwise, data is assumed to be in decimal format.
6. Enter the data in the **Data** field.
7. Click **OK**.

The Registry view will be updated to reflect the added value.

Editing Registry Values

You can edit registry values after they have been added.

To edit a registry value

1. Right-click on the desired value you wish to edit.
2. Choose **Edit Value** from the popup menu. The **Edit Registry Value** dialog will appear.

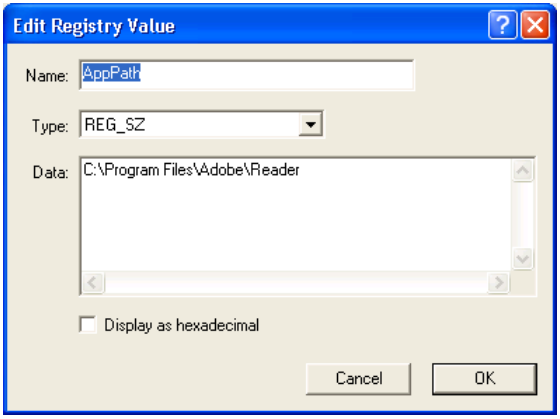


Figure 2-36: Edit Registry Value Dialog

3. Make the necessary changes (see “Adding Registry Values” on page 67 for more information).
4. Click **OK**.

The Registry view will be updated to reflect your changes.

Deleting Registry Keys and Values

It is possible to delete any registry key or value that was created during installation or that was added manually.

To delete a registry key or value

1. Right-click on the registry key or value that you wish to delete.
2. Choose **Delete** from the popup menu.
3. Choose **OK** when prompted for confirmation.

Environment View Operations

The Environment view is accessed by selecting **Environment** from the **View** menu.

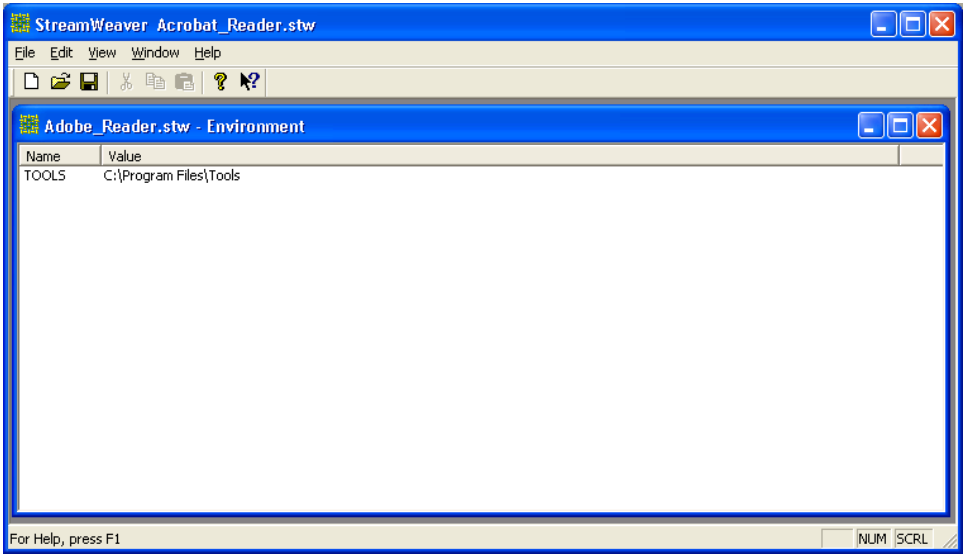


Figure 2-37: Environment View

This view displays environment variables that have been created either during installation or manually. Most relevant commands can be accessed either from the **Edit** menu or by right-clicking on an environment variable.

Adding Environment Variables

You can create new environment variables as described below.

To add an environment variable

1. Right-click on a blank area of the Environment view.
2. Choose **Add Environment Variable** from the popup menu. The **Add Environment Variable** dialog will appear.

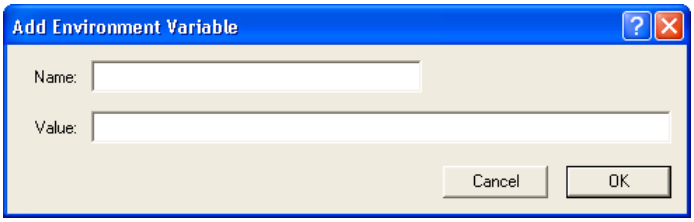


Figure 2-38: Add Environment Variable Dialog

3. Enter a name for the new environment variable in the **Name** field.
4. Enter a value for the variable in the **Value** field.
5. Click **OK**.

The Environment view will be updated to reflect the added variable.

Editing Environment Variables

You can edit any environment variable that was created manually or during installation.

To edit an environment variable

1. Right-click on the environment variable that you wish to edit.
2. Choose **Edit Environment Variable** from the popup menu. The **Edit Environment Variable** dialog will appear.

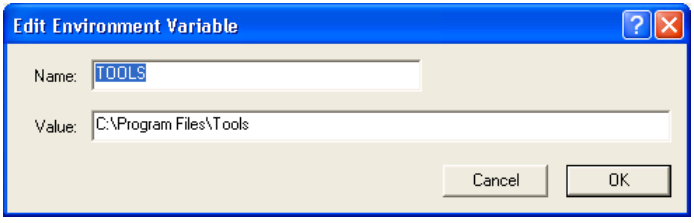


Figure 2-39: Edit Environment Variable Dialog

3. Make the necessary changes (see “Adding Environment Variables” on page 70 for more information).
4. Click **OK**.

The Environment view will be updated to reflect your changes.

Deleting Environment Variables

It is possible to delete any environment variable was created during installation or that was added manually.

To delete an environment variable

1. Right-click on the environment variable that you wish to delete.
2. Choose **Delete** from the popup menu.
3. Choose **OK** when prompted for confirmation.

Appendix

A

Applying Program Patches & Updates

Some applications require program patches and theses patches must be incorporated into the stream files. Capturing patch information is conducted by launching the patch application from within Stream Weaver and Stream Weaver will capture the additional installation information about which files are added, deleted, or registry settings added, or deleted. Existing files or applications that are modified are captured during the step of creating the stream and token file. This new information about files and registers modified is stored within the *"application_name.stw"* file and is utilized to create the stream and token files.

The original program must be installed on the Processing PC in order for a patch to be properly integrated. A patch cannot be placed on a Token/STC file that has been completed and is no longer resident on a Processing Machine.

So for our current example, say that a patch is required for the application. Follow these steps.

1. Start up Stream Weaver.
2. Open the Stream Weaver file for the application for which the patch is to be applied.

CAUTION

Important: Make sure that only one *.stw file is open. This includes the "Untitled*.stw" file. The patch installer information will be loaded into whichever file window is selected. If by accident the "Untitled1.stw" is selected, then the patch information will be loaded into the "Untitled1.stw" file and not added to the "Reader1.stw" file.

3. Now select under the Stream Weaver File Menu, "Merge File Data" or <Cntl>I. As was done before, type the path of the Patch into the Installer Path field.
4. Launch the Patch Installer.

5. Once the Patch application has completed, hit the OK button in the dialog that Stream Weaver put up.

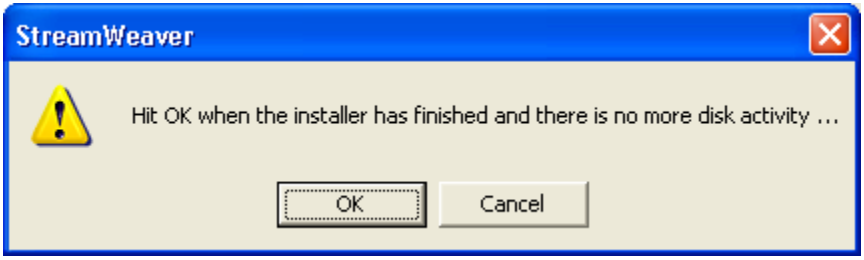


Figure A-1: Installation Complete Indicator

6. Now the Patch Installer information has been captured into the Reader*.stw file. Save this file by hitting <Cntl>S or clicking on the control bar save icon.
7. Now the Stream and Token files need to be regenerated. Select “Create Token/STC Files …” from the File menu. This will generate new stream files. These files should be tested or retested as specified in “Step 6: Test Streamed Application” on page 49.

Appendix

B

Processing Non Application Files

With Stream Weaver it is possible to process not only applications, but also documents, images, etc. So, for instance, it would possible to process a book whose file name is MyBook.pdf. However, since the command line must always specify an executable to be launched such as an .exe or .com file, you can't simply specify the full path of MyBook.pdf because the Stream Theory Player will not be able to open it. Instead, you must specify on the command line a program that can open MyBook.pdf and pass the path of MyBook.pdf as an argument as shown in the following example:

"C:\Program Files\Adobe\Acrobat 7.0\Reader\AcroRd32.exe" "C:\Books\MyBook.pdf"

Full paths must be surrounded with double quotes if they contain spaces.

How to specify the appropriate application for opening the document

To specify the appropriate application to open the desired document, we distinguish the following three cases.

The application is part of the operating system.

This is the simplest case since no additional files need to be processed. The application can be specified on the command line either without path or with full, parameterized, path, as shown in the following examples:

notepad "C:\My Docs\Doc.txt"

%SystemRoot%\System32\mspaint.exe "C:\My Images\Image.bmp"

Be careful not to hardcode the program folder in the case as the operating system may be installed in different folders on different systems (e.g. C:\WINDOWS, D:\WINNT, etc.).

The application can be processed as part of the stream files.

In this case it would be like processing the application itself in addition to the document and specifying the document as a command line parameter. In the case of the MyBook.pdf example, for instance, you would process the Adobe Acrobat Reader along with MyBook.pdf and specify the command line as described at the beginning of the section.

The application can not be added as part of the stream files.

This may be the case if, for instance, the third-party application needs to be purchased, or if there are legal usage restrictions, etc. In this case, you can build a simple program whose sole purpose is to open a document, with the assumption that the end user will have the third-party application installed on their system. For information on how to build such a program, please contact Technical Support.

This program would have to be specified on the command line and take the document to be opened as a parameter. So if, for instance, the name of the program is Launcher.exe, you would do the following:

1. Follow steps 1-4 as outlined in “Processing Steps” on page 28.
2. Place the Launcher.exe file in the working folder that you specified.
3. In the Files view, right-click on the working folder and click **Add File**.
4. Browse to the Launcher.exe file and double-click on it, then click **OK**.
5. Right-click on the newly added Launcher.exe file and click **Copy to Command Line**.
6. The **Command Line** field of the Project Settings window will now be populated with the path of the Launcher.exe program. Add a space after it followed by the path of the document to be opened (don’t forget to include double quotes if the path contains spaces).
7. Continue to follow steps 5-10 in “Processing Steps” on page 28.

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