SourcePro
by Perforce

Evaluating SourcePro®

Rogue Wave® Software SourcePro®

Version 2023.1

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EVALUATING SOURCEPRO

ACKNOWLEDGMENTS

Rogue Wave by Perforce
https://www.perforce.com/products/sourcepro
https://help.perforce.com/sourcepro

Contents

Chapter 1, Introduction

Welcome

Thank you for evaluating SourcePro® products from Perforce Software.

Each SourcePro product provides an integrated, comprehensive set of classes that addresses a specific programming area in C++. SourcePro products simplify development projects and reduce development time by providing intuitive, easy-to-use, C++ interfaces to complex constructs. Whatever your area of development, you can save both time and effort using tested, reliable SourcePro C++ components.

This free, 30-day Evaluation Edition of SourcePro contains prebuilt versions of SourcePro libraries for use on supported platforms, as described in the ***Supported_Platforms.pdf***, in the distribution under `<installdir>\`. This document is also on the web at https://help.perforce.com/sourcepro/current/Supported_Platforms.pdf.

The SourcePro Evaluation also includes complete documentation for each library, and code examples illustrating the key features of each library.

When you purchase SourcePro, full source code is included for the operating systems for which you are licensed, allowing easy integration into any supported build environment.

NOTE: This document applies only to the evaluation version of SourcePro, available upon request from the SourcePro website, perforce.com/products/sourcepro. It assumes the presence of prebuilt binaries, which is not true of the full product.

Note also that the prebuilt libraries are built in **release** mode. If you link them into an application being built in debug mode, the resulting application may experience runtime exceptions.

Product Overview

SourcePro products are organized into four functional areas:

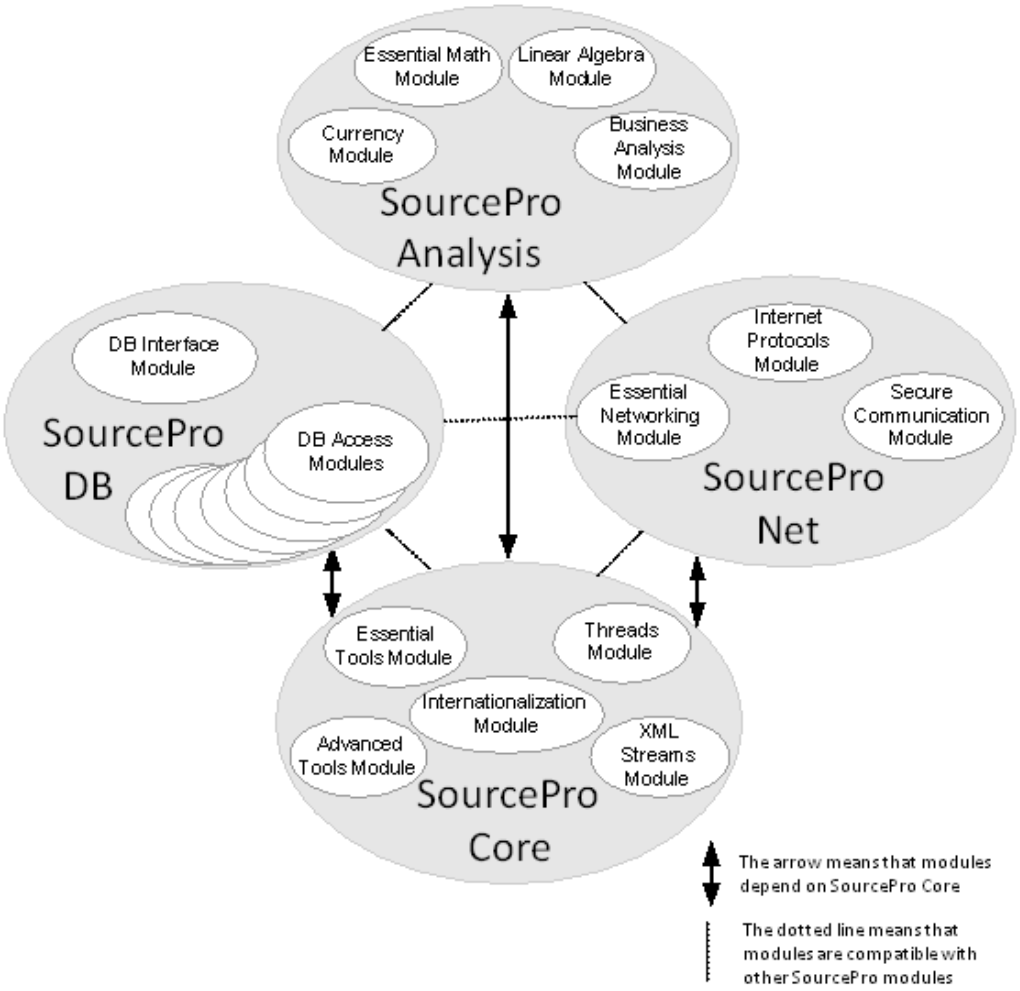
- *SourcePro Core* contains an extensive set of fundamental C++ components, including classes for multithreading, advanced streaming, and XML object serialization. SourcePro Core also provides a complete Unicode-based framework for internationalization and localization.
- *SourcePro DB* contains database and data manipulation classes that encapsulate SQL 92 in a C++ interface that is consistent across all supported platforms and databases. The included access modules provide access support for ODBC, PostgreSQL, MySQL, DB2 CLI, Sybase, Oracle OCI, and Microsoft SQL Server.
- *SourcePro Analysis* contains a full range of C++ classes that encapsulate essential computational and analytical tools for business and research.
- *SourcePro Net* contains network, Internet, and secure communication classes that provide a high-level C++ API to complex services, techniques, and protocols. SourcePro Net implements the most widely used protocols for traffic on the Internet, including HTTP, HTTPS, SMTP, POP3, FTP, FTPS, and the MIME message format.

NOTE: The Web Services Module has been removed from SourcePro. Perforce offers a more complete SOAP solution with its HydraExpress product. For information on HydraExpress, please contact your sales representative.

Within these areas, each SourcePro product is composed of ***modules***; modules are composed of either ***packages*** or ***class groups***; packages and class groups are composed of ***classes***.

The four SourcePro products and their modules are shown in Figure 1.

Figure 1 – The SourcePro products with their modules



For a more in-depth overview of the SourcePro products, and code examples demonstrating interoperability, see the *Introduction to SourcePro*. This overview document is available through the main documentation access page at `<buildspace>\docs\index.html`, where `<buildspace>` indicates the location where you installed the SourcePro Evaluation Edition.

Software Requirements

The SourcePro Evaluation contains precompiled dynamic or shared libraries, also called “DLLs” on Windows. These dynamic libraries are built with multithreading support and using the native C++ Standard Library. The included DB Access Modules provide support for a limited set of databases, as specified in the section below.

General Software Requirements

To use the SourcePro Evaluation Edition, you must have the following software installed:

- A supported combination of operating system and compiler, as specified in the *Supported_Platforms.pdf*, in the distribution under `<installdir>\` or on the web at https://help.perforce.com/sourcepro/current/Supported_Platforms.pdf.

  The compiler is needed to build the examples.

- If you intend to connect to a database and create examples using SourcePro DB components, you need to install the database client software and establish connectivity with the database server. The supported databases for each access module are also identified in the *Supported_Platforms.pdf*.

  To view documents in the Portable Document Format (PDF), you must have Adobe Acrobat Reader.

Module Dependencies

Many SourcePro modules depend on other modules. For example, all SourcePro modules depend on the Essential Tools Module. In the SourcePro Evaluation, all such dependencies among SourcePro products are fully satisfied for you.

Third-Party Libraries

Some SourcePro modules depend on third-party libraries or products, as shown in Table 1. With the exception of any database client software you may need, the SourcePro Evaluation includes prebuilt versions of all required third-party libraries.

Table 1 – Module third-party dependencies

Name of Module	Third-Party Dependencies
DB Interface Module and your chosen DB Access Module	The database modules require the client software for your database, as described in General Software Requirements.
Internationalization Module	The SourcePro Evaluation includes prebuilt binaries of the Unicode® Consortium International Components for Unicode (ICU). For more information about the ICU, see http://site.icu-project.org/
Secure Communication Module	The SourcePro Evaluation includes prebuilt binaries of the required open source OpenSSL secure sockets library. For more information on OpenSSL, see http://www.openssl.org/
Essential Math Module Linear Algebra Module Business Analysis Module	The SourcePro Evaluation includes prebuilt binaries of the required Netlib CLAPACK Linear Algebra Package. For more information on CLAPACK, see www.netlib.org.
Essential Tools Module	The SourcePro Evaluation includes prebuilt binaries of the Google® Snappy compressor. For more information, go to http://code.google.com/p/snappy.

Documentation

The SourcePro products come with a full set of documentation to help you write professional quality applications quickly and efficiently. The free Evaluation Edition includes documentation as listed at `<buildspace>\docs\index.html`, where `<buildspace>` is the directory location where you installed this product. This page provides single-point access to the HTML and PDF documentation. Table 2 lists the individual documents and shows their locations.

Table 2 – Documentation resources for SourcePro products

Name, location, and description
HTML documentation `<buildspace>\docs\html\index.html` All HTML documentation in a single, unified document set. The set includes this evaluation guide, the ***Introduction to SourcePro***, all user guides, and the API reference guide.
Evaluating SourcePro: `<buildspace>\docs\pdf\Evaluating_SourcePro.pdf` An introduction to the SourcePro Evaluation Edition. (This document)
Introduction to SourcePro: `<buildspace>\docs\pdf\Introduction_to_SourcePro.pdf` Organization of the SourcePro products and code examples demonstrating interoperability.
User Guide, one per module: `<buildspace>\docs\pdf\<module-name>_<document-name>.pdf` Task-oriented instruction on using a module.
Reference Guide: `<buildspace>\docs\html\sourceproref\index.html` Descriptions of classes and other significant elements of a module's API.
Release Notes `<buildspace>\Release_Notes.html` The release notes contain information on: new features and enhancements, migration from the immediately preceding release, known issues and limitations, and bugs fixed in the release.

NOTE: There are references in the documentation to RCB, the Rogue Wave Component Builder, a wizard-like interface that builds SourcePro components from their source form into libraries. Although the RCB books are included in the documentation set, RCB is not relevant to the SourcePro Evaluation because the Evaluation Edition contains prebuilt libraries.

Conventions

SourcePro documentation uses the following conventions.

Pathname Conventions

The SourcePro products use special pathname conventions, summarized in Table 3 :

Table 3 – Placeholder conventions

Convention	Use	Example
`<buildspace>`	The name you gave the directory where your SourcePro components are installed.	`<buildspace>\docs\index.html`
`<ver>`	SourcePro version number	`c:\RogueWave\SourcePro\<ver>-eval`
`<lib-ver>`	library version number	
`<package-name>`	The name of a SourcePro package. Some modules have just a single package of the same name, but other modules have multiple packages.	`c:\RogueWave\SourcePro\<ver>-eval\examples\<package-name>`

Typographic Conventions

Documentation for the SourcePro products uses special typographic conventions. These conventions are summarized in Table 4:

Table 4 – Typographic conventions

Conventions	Use	Example

`courier`	Function names, code, directories, file names, examples, operating system commands, URLs.	`RWWinSockInfo info;`
		`cout << "Error Processing:"`
		Visit us at
		`https://www.perforce.com/products/sourcepro`.

italic	Conventional uses, such as new terms and titles.	*Functors,* or *function objects* *Essential Tools Module Reference Guide*
bold italic	Class names, emphasis, and some subheads.	***RWCollectable***
bold	Conventional uses, such as emphasis. Commands from an interface.	You should **always** read the manual. Click the **OK** button

ellipsis	Indicates part of the code is missing from an example.	`foo(){`
		`  ... //something happens`
		`}`

pathnames `/` or `\`	When the context for a pathname could be either Windows or UNIX, the path is written with a Windows "`\`" separator.	Windows path: *`buildspace`*`\sproenv_vars.bat` UNIX path: *`buildspace`*`/sproenv_vars.sh` OS-neutral path: `<`*`buildspace`*`>\docs\index.html`

Using This Manual

This manual assumes that you are familiar with the basic features of the C++ programming language. There are many widely-available books on learning C++.

Organization

This manual is divided into the following chapters:

- Chapter 1, Introduction, (this chapter) describes the SourcePro Evaluation.
- Chapter 2, Installing the Libraries, describes how to install the SourcePro Evaluation.
- Chapter 3, Building and Running the Examples, discusses how to build and run the code examples included with each SourcePro library. Studying these examples is one of the best ways to learn how to use a library effectively.
- Chapter 4, The SourcePro DB Examples, describes how to build and run the examples included with SourcePro DB. These examples require some special attention due to the complexity of establishing a database connection.
- Chapter 5, Writing Your Own Applications, describes how to get started building your own applications using SourcePro components.

Support Services

Evaluation support is available to you for the entire 30-day evaluation period. Contact your sales representative for details.

Purchasing SourcePro

For information on purchasing SourcePro, contact us at: https://www.perforce.com/contact-us.

Chapter 2, Installing the Libraries

Overview

The SourcePro Evaluation contains prebuilt versions of all the provided SourcePro libraries. This chapter describes:

- How to install the libraries
- The resulting directory structure
- Environment variables set by the installation program
- The nature of the free evaluation period
- How to uninstall the libraries

For information on how to get started using the libraries, see Chapter 3.

Installing the Libraries

To download and install the SourcePro Evaluation:

1. **Request a download of the Evaluation version** from https://www.perforce.com/products/source-pro/free-c-library. You will need to have an account.
2. **Look for an email from Rogue Wave with instructions on downloading the SourcePro Evaluation**. Save it to a known location.
3. **The email will also have the license.key file.** Save the file to a known location on your system. You will be asked for this location during installation.
4. **Install the product**:
   - On Windows, double-click the installer executable `sourcepro_<ver>_eval*.exe`.
   - On Linux and Solaris, invoke `sourcepro_<ver>_eval*.run` at the command prompt.

   If you need a new `license.key` file, please contact license@perforce.com.

Directory Structure

The installation program places the Rogue Wave components in a *buildspace* of your choosing. For example, your buildspace might be `c:\RogueWave\SourcePro\<ver>-eval`. Files are installed in the following buildspace directory structure:

```
<buildspace>
  3rdparty    // third-party libraries
  docs        // release and user documentation
  examples
     ...      // examples for each module and package
  lib         // prebuilt libraries (.lib, .so, and/or DLL)
  rw          // header files for installed modules
     ...      // header files for each module and package
```

Environment Variables

The SourcePro Evaluation Edition is a binary version of the SourcePro product. The installation program places the SourcePro link libraries (`.lib` on Win32, `.so` on UNIX) in the `<buildspace>\lib` directory. Copies of the included third-party dynamic libraries are placed within the `<buildspace>\3rdparty\...` directory tree.

To run applications using SourcePro components, your system must be able to find the dynamic libraries for all dependent libraries. To simplify your use of the SourcePro Evaluation Edition, this version uses the environment variable `RW_SOURCEPRO_HOME`, which specifies your installation location. The Windows `PATH` and UNIX `LD_LIBRARY_PATH` or `LD_LIBRARY_PATH_64` must be modified to point to the Rogue Wave and 3rd-party dynamic libraries.

Windows: Batch file `sproenv_vars.bat` defines the environment variable `RW_SOURCEPRO_HOME` and adds the Rogue Wave and 3rd-party libraries to your `PATH`. Simply execute `<buildspace>/sproenv_vars.bat` at the command prompt.

UNIX: On UNIX, `sproenv_vars.sh` defines the environment variable `RW_SOURCEPRO_HOME` and adds the Rogue Wave and 3rd-party libraries to your `LD_LIBRARY_PATH` or `LD_LIBRARY_PATH_64`. If you are using bash or ksh (or a compatible shell), simply "dot" or source `<buildspace>/sproenv_vars.sh` as follows:

```
. <buildspace>/sproenv_vars.sh
```

NOTE: If you are using a shell compatible with csh, you will have to modify sproenv_vars.sh to accommodate csh syntax.

Evaluation Period

The SourcePro Evaluation is provided free of charge for a 30-day evaluation period, beginning on the day that the license key is generated. Any application containing SourcePro code that is built or run after the evaluation period expires will fail.

Uninstalling the Libraries

The installer for the evaluation includes an uninstall executable.

Uninstalling on Windows

On Windows you can access the uninstaller from the Start menu. The executable can also be found in the root of the installation directory.

Uninstalling on UNIX

On UNIX you must run the uninstaller from the root of the installation directory.

If you have altered your startup scripts to set `RW_SOURCEPRO_HOME` or `LD_LIBRARY_PATH`, you may wish to undo those changes.

Chapter 3, Building and Running the Examples

Overview

Each SourcePro module or package includes code examples illustrating the key features of the library. Studying these examples is one of the best ways to learn how to use a library effectively. This chapter describes how to build and run the examples.

Building and running the examples for SourcePro DB requires that you establish database connectivity. See Chapter 4 for more information on these examples. For information on how to develop your own applications using SourcePro components, see Chapter 5.

Building the Examples

The examples for each library are located in the `<buildspace>\examples\<mnemonic>` directory:

```
<buildspace>
    examples
       analytics    // examples for analytics module
       currency     // examples for currency module
       ...          // examples for other modules and packages
```

For instance, the examples for the Threads Module are located in a subdirectory under `<buildspace>\examples\thread`.

Building the Examples from the Command Line

The installation program places makefiles in the `<buildspace>\examples\<module>\12d` directory within the `examples` directory for each library.

The provided makefiles contain the necessary include paths, link libraries, and compiler flags for each example.

Windows

1. Open a command prompt window.
2. Ensure that the environment variables `lib` and `include` are set for the Microsoft Visual C++ compiler. If not, run `vcvarsall.bat`, located in the `VC` subdirectory of your compiler installation. You must pass the argument `amd64`:

   ```
   <MS-visual-studio-installdir>\VC\vcvarsall.bat amd64
   ```

   For more information, see the MSVC documentation.
3. Change to the `12d` subdirectory below the examples you want to build.
4. Type `nmake`. The program looks in the current directory and executes the commands found in the `makefile`.

For instance, to build the examples for the Essential Tools Module on Windows, type `nmake` in the `<buildspace>\examples\tools\12d` directory.

UNIX

1. Verify that the supported compiler for your platform is working as your compiler. If not, set your environment for the supported compiler.
2. Within your SourcePro Evaluation installation, change to the `12d` directory below the examples you want to build.
3. Type `make`. The program looks in the current directory and executes the commands found in the `makefile`.

For instance, to build the examples for the Essential Tools Module on UNIX, type `make` in the `<buildspace>/examples/tools/12d` directory.

Building from Microsoft Visual Studio

Below are instructions for setting up a project in Microsoft Visual Studio to build and run the examples. You can also use this for guidance in setting up a project for your own application that depends on SourcePro libraries.

1. Open Visual Studio and select File | New | Project.
2. Select Win32 Console Application, give the project a name, and click OK.

   The Win32 Application Wizard appears.
3. Click Next.
4. In Application Settings, select the Empty Project option and click Finish.
5. In the Solution Explorer, right-click on Source and select Add | Existing Item.
6. Navigate to and add the source code for the examples you are interested in.
7. Again, in the Solution Explorer, right click on Source and select Add | Existing Item.
8. Navigate to and add the library files the examples depend on.

   If you are uncertain what these are, look in the makefiles for the examples you want to build. For example, to build the Essential Tools Module tutorial examples, look in `<installdir>\examples\tools\tutorial\12d\makefile`. The `REQLIBS` entry specifies all required libraries.
9. In the Solution Explorer, right click on the project and choose Properties.
10. Under VC++ Directories, edit the Executable Directories to contain the path to the DLL files.

    If the buildspace is located at `c:\RogueWave\SourcePro\<ver>-eval`, the additional executable path needed is `c:\RogueWave\SourcePro\<ver>-eval\lib`.
11. Edit the Include Directories to contain the path to the `rw` directory.

    If the buildspace is located at `c:\RogueWave\SourcePro\<ver>-eval`, the additional include path needed is `c:\RogueWave\SourcePro\<ver>-eval`.
12. Expand the C/C++ section.
13. Select Preprocessor and edit the Preprocessor Definitions to add `_RWCONFIG=12d`.
14. Select Precompiled Headers | Precompiled Header and from the dropdown list for this item, select Not Using Precompiled Headers.
15. Click OK.

Your project is now set up to compile and run the examples you have selected.

Running the Examples

To run the examples in the SourcePro Evaluation Edition, your system must be able to find the dynamic libraries (`.dll` on Win32, `.so` on UNIX). Windows users can execute the batch file `<buildspace>\sproenv_vars.bat` to set the `PATH`, while UNIX users can execute the shell script `<buildspace>/sproenv_vars.sh` to set the `LD_LIBRARY_PATH` or `LD_LIBRARY_PATH_64`, as described in Environment Variables.

Running from the Command Line

To run an example from the command line, run the executable in the `12d` subdirectory below the example source file. For instance, to run the `timedate` example for the Essential Tools Module from a command prompt, type `.\timedate` in the *`buildspace`*`\examples\tools\tutorial\12d` directory. This directory also contains any input files required by the example; any generated output files are sent to the same directory.

Running from Microsoft Visual Studio

If you have set up a Microsoft Visual Studio solution for the example you want to run, you can do the following:

1. Open the appropriate solution in Visual Studio. (See Building from Microsoft Visual Studio.)
2. Right-click the example project file in the solution explorer and select **Set as Startup Project**.
3. Select **Debug | Start Without Debugging** from the main menu bar.

Input files required by the example and any generated output files are located in the **Other Files** folder.

Chapter 4, The SourcePro DB Examples

Overview

The SourcePro DB examples require special attention due to the complexity of establishing a connection to a database.

SourcePro DB provides a set of examples that illustrate how to transfer data from a relational database into a client program and back again. The examples are:

- SourcePro DB video rental store tutorials
- Bulk operation example
- Data callback example
- Cache manager example

You can also use these short, simple examples to cut-and-paste into your own database-enabled applications. See the ***DB Interface Module User's Guide*** for more information about the examples.

The SourcePro Evaluation Edition includes several access modules, as shown in the table below. Since SourcePro DB provides a consistent API across all supported databases, all access modules use the same examples, located in the `<buildspace>\examples\dbcore` directory.

Table 5 – DB Access Modules and corresponding mnemonic

Module	Mnemonic (module)
DB Access Module for ODBC	`odbc`
DB Access Module for Microsoft SQL Server	`mssql`
DB Access Module for MySQL Server	`mysql`
DB Access Module for Oracle OCI	`oraoci`
DB Access Module for PostgreSQL Server	`pgs`

Table 5 – DB Access Modules and corresponding mnemonic

Module	Mnemonic (module)
DB Access Module for DB2 CLI	`db2cli`
DB Access Module for Sybase	`sybasect`

Makefiles for the examples are located in the directories named as follows:

`<buildspace>\examples\<module>\12d`

where `<module>` corresponds to your database (`odbc`, `mssql`, `mysql`, `oraoci`, `sybasect`, `db2cli`, or `pgs`).

To build and run the SourcePro DB examples:

1. Ensure that your database client software has been installed and that you can connect to your database, as specified in Software Requirements.
2. Modify the tutorial configuration file `tutdefs.h` to reference your database server.
3. Build the tutorials and the `bulkcopy`, `datacb`, and `memcache` examples.
4. To run the SourcePro DB video store tutorials:
   - Run `tutinit.exe` to create all dependent database objects.
   - Run the individual tutorial programs.
   - Run `tutclean.exe` to clean up all the tables the tutorials create and use.
5. To run the `bulkcopy`, `datacb`, and `memcache` examples, run `bulkcopy.exe`, `datacb.exe`, and `memcache.exe` respectively.

The following sections describe these steps in more detail.

Modifying Files for Database Connection

The examples use include files with hard-coded values for database name, database server, database user name and database user password. You must change these values to reflect your own organizational settings.

The file `<buildspace>\examples\<package-name>\12d\tutdefs.h` contains configuration variables used by the examples. Modify this file with values for your own database connection.

Modify this file as follows:

- Do *not* change **DBSERVER_TYPE**.
- Change **DBSERVER_NAME** to the name of your database server.
- Change **DBUSER_NAME** and **DBPASSWORD** to a valid user name and password for your database; the user account must have permission to create tables on the database in order to run the tutorials.
- If your database requires it, specify the database name using **DBDATABASE_NAME**.
- If your database requires it, specify the property string using **DBDATABASE_PSTRING**. Please refer to the Access Module Reference Guide of the access module you are using for the contents of the property string.

For example, your configuration file might look like this:

```
#define DBSERVER_TYPE "msq<lib-ver>12d.dll"
#define DBSERVER_NAME "DataSource"
#define DBUSER_NAME "username"
#define DBPASSWORD "password"
#define DBDATABASE_NAME "database"
#define DBDATABASE_PSTRING ""
```

NOTE: These values are compiled into the tutorials when you build them. If you need to change the values at a later time, you must clean the example object files with an `nmake clean`, then rebuild the tutorials. (See Building the DB Examples.)

Building the DB Examples

Building from the Command Line

On Windows

To build the examples for a given module `<module-name>`, open a command prompt window set with the Visual Studio environment, as described in Building the Examples from the Command Line, and type `nmake` in the `<buildspace>\examples\<package-name>\12d` directory.

On UNIX

To build the examples for a given module `<module-name>`, type `make` in the `<buildspace>/examples/<package-name>/12d` directory.

Running the DB Examples

This section describes running the video store tutorials in detail, including the purpose of each tutorial, its inputs and outputs. For the `bulkcopy` and `datacb` examples, simply follow the instructions in Running the Examples.

Populate Your Database

From the command line, run `tutinit.exe` to create all dependent database objects for the tutorials. File `setuperr.txt` reports any errors that occur during setup.

Run the Tutorials

To run the tutorials, enter the executable name in a command prompt window.

Table 6 contains a list of the video store tutorials, their related files, and a description of their content. Filenames containing the word `out` give the output of the tutorial program. Filenames containing the word `err` contain error messages.

Input files required by the tutorials and generated output files are placed in the `<buildspace>\examples\<package-name>\12d` directory.

Table 6 – The SourcePro DB video store tutorials

Tutorial Name	Related Files	Tutorial Description

Retrieving Data from a Table	`t1.exe`
	`t1out.txt`
	`t1err.txt`
		Demonstrates how to retrieve data from a table in a database and how to use an arbitrary struct or class

Retrieving Data Selectively	`t2.exe`
	`t2out.txt`
	`t2err.txt`
		Demonstrates selective retrieval of data from a table in a database

Inserting Data into a Table	`t3.exe`
	`t3out.txt`
	`t3err.txt`
		Demonstrates how to insert data into a table in a database

Inserting and Updating Data	`t4.exe`
	`t4out.txt`
	`t4err.txt`
		Demonstrates how to insert and update data in a database

Deleting Rows from a Table	`t5.exe`
	`t5out.txt`
	`t5err.txt`
		Demonstrates how to delete rows from a table in a database

A Complicated Query	`t6.exe`
	`t6out.txt`
	`t6err.txt`
		Demonstrates a complicated query with the entire result set brought directly into memory. Uses a template-based collection from the Essential Tools Module to store query data

Updating Data in Multiple Tables	`t7.exe`
	`t7out.txt`
	`t7err.txt`
		Demonstrates how to enter new data and update existing data in multiple tables within a database

In-Memory Caching	`memcache.exe`
	`memcacheout.txt`
	`memcacheerr.txt`
		Demonstrates how to create and install an in-memory cache and the performance benefit of using one

Clean Up Your Database

From the command line, run `tutclean.exe` to clean up all the tables the tutorials create and use. File `tutclean.txt` reports errors that occur during cleanup.

Chapter 5, Writing Your Own Applications

Overview

Once you have succeeded in building and running the examples, you can start developing your own applications with SourcePro components. This chapter describes:

- How to use SourcePro components in your applications by including the appropriate header files
- How to build your applications, including how to specify proper include paths, linked libraries, and compiler flags
- How to run your applications

Using SourcePro Components

To use a Rogue Wave class, simply include its header file in your application. SourcePro header files are organized in the buildspace as shown below:

```
buildspace
   ...
   rw           // Essential Tools Module, Essential Math Module,
                // and Linear Algebra Module header files
     analytics  // Business Analysis Module header files
     currency   // Currency Module header files
     ...        // header files for other modules or packages
```

The `#include` directives for all SourcePro components must contain the path to each header file from the `rw` directory. For example:

```
#include <rw/cstring.h>
#include <rw/http/RWHttpClient.h>
#include <rw/https/RWHttpsSecureSocketClient.h>
```

```
#include <rw/secsock/RWSecureSocketContext.h>
#include <rw/network/RWWinSockInfo.h>
```

Building Your Applications

When you build your applications, you may find it useful to copy and modify the makefiles used to build the SourcePro examples. Another way of displaying command lines is to build an example with `nmake` (Win32) or `make` (UNIX), and capture the command line from the console.

On Windows, a compiler command line to build an application should contain these elements:

```
<compiler_invocation> -D_RWCONFIG=<buildtype> <include_paths>
  <system-flags-and-macros> -c <cpp-file-name>
```

A link line should contain these elements:

```
<compiler_invocation> /Fe <executable_name> <object_file_name>
  <import_libraries> /link /LINKPATH <import_library_paths> -logo
```

For example, to compile and link an application on Windows that depends on the Essential Tools Module and the trace package of the Threads Module:

```
cl -D_RWCONFIG=12d -Ic:\RogueWave\SourcePro\<ver>-eval
-nologo -EHsc -MD -W3 -O2 -arch:SSE2 -GR -D_CRT_SECURE_NO_DEPRECATE
-D_SCL_SECURE_NO_DEPRECATE -D_CRT_NONSTDC_NO_DEPRECATE -c myapp.cpp

cl /Fe myapp.exe myapp.obj trace12d.lib tls12d.lib user32.lib
/link /LIBPATH c:\RogueWave\SourcePro\<ver>-eval\lib -nologo
```

where `<ver>` means the current SourcePro version number.

Below are the equivalent lines for UNIX. UNIX specifies link paths with `-L` and import libraries with `-l`, and the executable name that follows `-o` has no extension.

```
CC -D_RWCONFIG=12d -I/usr/local/RogueWave/<ver>-eval -m32  -g -errtags
-mt -c myapp.cpp

CC -m32 -mt -L/usr/local/RogueWave/<ver>-eval/lib -o myapp myapp.o
-ltrace<lib-ver>12d -ltls<lib-ver>12d -lpthread -lnsl
```

where `<ver>` means the current SourcePro version number and `<lib-ver>` means the library version number, which differs from the SourcePro version number.

The sections that follow describe how to set the include paths, the `_RWCONFIG` macro, the system flags, and the link libraries.

Setting the Include Paths

For all SourcePro components, the include path must point to the buildspace root. Do not point to the `rw` directory because the `#include` directive in SourcePro code already includes this directory. For example:

```
#include <rw/rstream.h>
```

Thus, if the buildspace is located at `c:\RogueWave\SourcePro\<ver>-eval`, the command line include path is `-Ic:\RogueWave\SourcePro\<ver>-eval`.

Defining the _RWCONFIG Macro

The `_RWCONFIG=<buildtype>` command line macro defines for you all the preprocessor macros required by a particular build type of SourcePro. The prebuilt SourcePro libraries in the Evaluation Edition are shared libraries, also called dynamically linked libraries (DLLs) on Windows.

On Windows, the shared libraries are built with multithreading support and using the Microsoft Visual C++ or Microsoft Visual Studio .NET implementation of the C++ Standard Library. For this build type, set the command line macro as `-D_RWCONFIG=12d`.

On UNIX, the shared libraries are built with multithreading support and using the compiler's implementation of the C++ Standard Library. Set the following command line macro for this build type `-D_RWCONFIG=12d`.

Specifying Compiler Flags and System Libraries

You must use the same compiler flags to build your application that were used to build the SourcePro libraries you are linking to. The macro `_RWCONFIG=12d` handles all SourcePro-specific command line requirements, but not system-specific requirements.

To determine the system requirements, you can look at SourcePro example makefiles. For best results, look at the files for the link library with the most dependencies. For instance, since the trace package depends on the Essential Tools Module, the trace files will include the requirements for both libraries.

Here are a few lines from an example makefile, including the critical line with the `COMPILEFLAGS` variable:

```
#C++ macros
TAG=12d
CPPINVOKE=cl
COMPILEFLAGS=-nologo -EHsc -MD -W3 -O2 -arch:SSE2 -GR \
-D_CRT_SECURE_NO_DEPRECATE -D_SCL_SECURE_NO_DEPRECATE \
-D_CRT_NONSTDC_NO_DEPRECATE
CONFIGDEF=-D_RWCONFIG=$(TAG)
```

The `COMPILEFLAGS` variable tells you the flags you need: `-nologo -EHsc -MD -W3 -O2 -arch:SSE2 -GR -D_CRT_SECURE_NO_DEPRECATE -D_SCL_SECURE_NO_DEPRECATE -D_CRT_NONSTDC_NO_DEPRECATE`.

Linking to the Libraries

For the link libraries, use the path to the SourcePro libraries and the paths to the third-party libraries if your application requires them. The SourcePro libraries are located in the `lib` subdirectory of the buildspace; that is, if the Rogue Wave buildspace is `c:\RogueWave\SourcePro\<ver>-eval`, then the libraries are in `c:\RogueWave\SourcePro\<ver>-eval\lib`.

Rogue Wave gives a specific name to SourcePro Evaluation link libraries. For example, if you link the Essential Tools Module, your command line would include the link line that pertains to your platform as shown in Table 7.

Table 7 – Link libraries

Platform	Command Line for Platform Specific Link Libraries
Win32	`/LIBPATH:<buildspace>\lib tls12d.lib`
UNIX	`-L<buildspace>/lib -ltls<lib-ver>12d`

If your applications use SourcePro features dependent on third-party libraries (Third-Party Libraries), you also need to link to those libraries. Third-party libraries are located in the buildspace directory structure as shown in Table 8.

Table 8 – Locations of third-party libraries

Library	Location

OpenSSL	*Windows*:
	`<buildspace>\3rdparty\windows\<arch>-<compiler>\openssl-<ver>\lib`
	Red Hat or SuSE Linux:
	`<buildspace>/3rdparty/linux/<arch>/openssl-<ver>/lib`
	Solaris:
	`<buildspace>/3rdparty/solaris/<arch>/openssl-<ver>/lib`

icu	*Windows*:
	`<buildspace>\3rdparty\windows\<arch>-<compiler>\icu-<ver>\lib`
	Red Hat or SUSE Linux:
	`<buildspace>/3rdparty/linux/<arch>/icu-<ver>/lib`
	Solaris:
	`<buildspace>/3rdparty/solaris/<arch>/icu-<ver>/lib`

Table 8 – Locations of third-party libraries

Library	Location

clapack	*Windows*:
	`<buildspace>\3rdparty\windows\<arch>-<compiler>\clapack-<ver>\lib`
	Red Hat or SUSE Linux:
	`<buildspace>/3rdparty/linux/<arch>/clapack-<ver>/lib`
	Solaris:
	`<buildspace>/3rdparty/solaris/<arch>/clapack-<ver>/lib`

Snappy	*Windows*:
	`<buildspace>\3rdparty\windows\<arch>-<compiler>\snappy-<ver>\lib`
	Red Hat or SUSE Linux:
	`<buildspace>/3rdparty/linux/<arch>/snappy-<ver>/lib`
	Solaris:
	`<buildspace>/3rdparty/solaris/<arch>/snappy-<ver>/lib`

Additional Parameters

Your application may, of course, require additional include paths, system flags and macros, and link libraries. Note that any additional link libraries should be built in the same configuration as the SourcePro libraries, and preferably with the same system flags and macros. If you specify system flags and macros not used in building the SourcePro libraries, there could be conflicts.

Running Your Applications

To run your application, your system must be able to find the DLL or shared library versions of any dependent libraries.

- Windows users may simply execute the `<buildspace>\sproenv_vars.bat` batch file to set the Windows `PATH`.
- UNIX users may simply source the `<buildspace>/sproenv_vars.sh` script to set the UNIX `LD_LIBRARY_PATH` or `LD_LIBRARY_PATH_64`.

For more information about setting your environment on Windows or UNIX, see Environment Variables.

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