

RSTT/SLBM Installation Guide

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SYSTEM REQUIREMENTS

The following subsections describe the compilers required to build SLBM on the three platforms that are currently supported.

Linux:

gcc for C/C++ compilation
gfortran for fortran compilation
Java 1.6

Mac OS X:

gcc version 4.2.1 delivered with XCode version 3 or greater for C/C++ compilation
gfortran for fortran compilation
Java 1.6

Solaris:

cc for C compilation
CC for C++ compilation
f95 for Fortran compilation
Java 1.6
GNU make (gmake) (not Sun's version of make)

Configurations on which the code has been tested:

RedHat Linux (2.6.18) with gcc 4.1.2 (includes gfortran) and Java 1.6
Solaris 10 (with SunOS version 5.10) with cc/CC compilers and Java 1.6
Mac OS X (10.6.8) with gcc version 4.2.1 and gfortran 4.2.1
(gfortran obtained from <http://r.research.att.com/tools/>)

BUILD INSTRUCTIONS

SLBM_Root can be downloaded with prebuilt binaries for Red Hat Linux, SunOS, or Macs, or it can be downloaded without prebuilt binaries. Source code is included with all downloads, so it is possible for users to compile the code regardless of which package was downloaded.

All downloaded packages come with prebuilt jar files for the java interface and the java test program. Those jar files will run on all platforms that support the Java Virtual Machine. Users do not have to build those jar files.

SLBM_Root libraries and test programs are compiled using the makefile found in the main SLBM_Root directory. If you downloaded a version of SLBM_Root with precompiled binaries for your platform, and the regression test for the interface language you want to use passes without error, then you don't need to compile the program.

The following targets in the make file build the indicated components:

Note: On Sun OS, you must use "gmake" instead of "make".

`make all` build all C++, C and Fortran libraries and tests, and the Java JNI library. Does not build Java jar files.

`make cc` the main C++ library and the C++ test program

`make c` the C interface library and the C test program

`make fortran` the fortran interface library and the fortran test program

`make javajni` the java native interface (JNI) library (code is in C++)

`make javajar` slbmjni.jar file. Users don't generally need to do this since the java jar files are delivered with SLBM_Root and should run on all platforms.

`make slbmcc` only the main C++ library

`make slbmshell` only the C interface library

`make slbmshell` only the fortran interface library

`make slbmjni` only the java native interface (JNI) library (C++ code)

`make testcc` only the C++ test program

`make testc` only the C test program

`make testfort` only the fortran test program

`make testjava` only the java test program. Users don't generally need to do this since the java jar files are delivered with SLBM_Root and should run on all platforms.

`make cleanobjs` clean all previously built object files

Note that nothing will work unless the main C++ library builds successfully.

ENVIRONMENT VARIABLES

Add {INSTALL_DIRECTORY}/SLBM_Root/bin to your \$PATH

Add {INSTALL_DIRECTORY}/SLBM_Root/lib to your \$LD_LIBRARY_PATH
(on a Mac: \$DYLD_LIBRARY_PATH)

where {INSTALL_DIRECTORY} is the location where you installed SLBM_Root.

\$JAVA_HOME must be set properly in order to compile the JNI library

REGRESSION TESTS

Regression tests can be run using the make file in SLBM_Root directory:

make slbmtest run all the regression tests: C++, C, fortran and java

make slbmtestcc	run only the C++ test
make slbmtestc	run only the C test
make slbmtestfort	run only the fortune test
make slbmtestjava	run only the java test

or they can be run directly from the command line (from SLBM_Root directory):

```
slbmtestfort
slbmtestc models/na1010pn models/na1010pn/regression_na1010pn.dat
slbmtestcc models/na1010pn models/na1010pn/regression_na1010pn.dat
java -jar bin/slbmtest.jar models/na1010pn models/na1010pn/regression_na1010pn.dat
```

Each test should indicate a "PASSED" result.

SINGLE PATH TESTS

There is a Single Path Test for C++, C and Java, but not for Fortran.

In general, each test expects either 2 or 8 command line parameters, described below:

2 parameters - run the regression tests described above:

- 1: directory where the slbm velocity model is located
- 2: file containing the regression test data

If running this program from SLBM_Root, try:

```
bin/slbmtestcc models/na1010pn models/na1010pn/regression_na1010pn.dat
```

8 parameters - run a single path test:

- 1: directory where the slbm velocity model is located
- 2: phase (one of Pn, Sn, Pg, Lg)
- 3: source latitude in degrees
- 4: source longitude in degrees

5: source depth in km below sea level

6: receiver latitude in degees

7: receiver longitude in degrees

8: receiver DEPTH (!!!) in km BELOW sea level

If running this program from SLBM_Root, try:
`bin/slbmtestcc models/na1010pn Pn 10 20 5 15 25 -0.1`

SLBM_ROOT DIRECTORY STRUCTURE

Within the main "SLBM_Root" directory, you will find the following directories:

bin: contains executables for tests in all 4 interface languages

lib: contains the libraries (.so and .jar files)

doc: contains the documentation files

SLBM: the main C++ library

SLBM/models: the earth model(s)

SLBM_C_shell: the C interface to the SLBM library

SLBM_Fort_shell: the FORTRAN interface to the SLBM library

SLBM_JNI: the Java Native Interface to the SLBM library

SLBM_test_c: code to test the c shell interface

SLBM_test_cc: code to test the c++ code

SLBM_test_fort: code to test the FORTRAN interface

SLBM_test_java: code to test the Java Native Interface

SOURCE CODE DOCUMENTATION

Each interface has its own documentation, all of which can be viewed using any HTML browser. Links to the documentation for all four language interfaces can be found in

`SLBM_Root/doc/source_code_documentation.html`

The documentation for individual language interfaces is found in the following directories:

C++: SLBM_Root/SLBM/doc/html/index.html

C: SLBM_Root/SLBM_C_shell/doc/html/index.html

FORTTRAN: SLBM_Root/SLBM_Fort_shell/doc/html/index.html

Java: SLBM_Root/SLBM_JNI/java/SlbmInterface/doc/index.html

CONTACT INFORMATION

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