

# RSTT/SLBM Installation Guide

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Version 3.0  
May 6, 2013

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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 degees
- 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

FORTRAN: SLBM\_Root/SLBM\_Fort\_shell/doc/html/index.html

Java: SLBM\_Root/SLBM\_JNI/java/SlbmInterface/doc/index.html

## **CONTACT INFORMATION**

For questions/issues/comments about the software:

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