

# GSS Installation: How to Compile GSS-0.4x from Source Code

create a folder called TCAD and copy cgnslib\_2.5.zip, gss-0.46-p11.zip and petsc-2.3.3-p16.zip to that folder

## Step1: Prepare your System and Compiler

GSS can be installed on Linux/Unix system and Cygwin under Windows platform. It is reported that GSS has been successfully installed on the following system:  
Mandriva 2005-2008, RedHat AS 3-6, Ubuntu 6-7 and Sun Solaris 10 for both Sparc and Intel CPU with gcc.

For any system, please make sure your c/c++ compiler works, flex-2.5.4 and bison-2.0 are also needed. Although gcc 3.3/3.4/4.1/4.2 works, but vendor compiler (such as Intel c/c++ on PC) works much faster (50% faster than gcc). That mainly because the math library used by gcc compute  $\text{pow}(x,y)$  in an inefficient way but icc seems using an hardware float point accelerator. Please use the latest version of flex and bison. Some one has reported that bison-1.x stops work when compiling GSS.

## Step2: Install Critical Libraries

You should install two important libraries first. The first one is **[petsc-2.3.3](#)** which contains basic nonlinear and linear solvers.

Until petsc-2.3.3-p8, a **bug** which will break Newton damping method still exists. I had reported it to PETSC development term, but they only promise to fix it in the next patch level. You should put this patched **[ls.c](#)** into your \$PETSC\_DIR/src/snes/impls/ls and replace the existing file.

Note 1:

**unzip petsc-2.3.3-p16.zip**

petsc must be configured with --with-clanguage=cxx to support c++ call and --with-mpi=0 to disable parallel mechanism.

Note 2:

GSS can be compiled with long double float number (default is double) to achieve better convergence rate and more accurate result. To support long double, configure PETSC with additional arguments: --with-precision=longdouble --download-c-blas-lapack=1

PETSC will compile a special version of Blas/Lapack for long double.

Here is some configure examples for petsc:

- using g++, download FORTRAN blas and lapack (as a result, g77 is also needed).

```
$ ./config/configure.py --with-mpi=0 --with-clanguage=cxx --download-f-blas-lapack=1 --with-shared=0
```

### make all test

- using Intel c/c++ compiler and Intel MKL for best performance on EM64T system. Besides of default LU solver shipped with PETSC, external direct solvers (LU) SuperLU and UMFPACK are also installed. I should say, UMFPACK usually has the best performance in the three LU solvers.

```
$ ./config/configure.py --with-clanguage=cxx --with-mpi=0 --with-debugging=0 --with-vendor-compilers=intel \
--with-blas-lapack-dir=/opt/intel/mkl/8.0/lib/em64t --with-shared=0 --with-superlu=1 --download-superlu=1 \
--with-umfpack=1 --download-umfpack=1
```

- using g++, download c blas and lapack to support long double

```
$ ./config/configure.py --with-clanguage=cxx --with-mpi=0 --with-debugging=0 --download-c-blas-lapack=1 \
```

```
--with-precision=longdouble --with-shared=0
```

Another required library is **cgnslib-2.5-1** which supports reading and writing CGNS file. The compile and installation of this library is fairly easy. Just type the following command under the directory of cgnslib:

```
$ ./configure
$ make
$ make install
```

At last, if **libtiff** and **libtiff-devel** have been installed on your system, the screen dump function will be compiled into GSS. You can save the plot image to a file with TIFF format. These libraries should be included in any distribution of Linux/Unix. You only need to check if they have been installed.

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### Step3: Set GSS\_DIR environment variable

You need to set environment GSS\_DIR point to the directory of gss-0.46. For example, you can add the following line to your .bashrc or .bash\_profile

```
export GSS_DIR=/home/gdiso/gss-0.46 <your gss directory>
export PETSC_DIR= <your petsc directory>
```

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### Step4: Compile GSS-0.46

In the directory of \$GSS\_DIR, type

```
$ ./configure
$ make      make clean
$ make install
```

Note 1:

The default installation dir of cgnslib is /usr/local/lib, if you change that, use "configure --with-cgns=CGNSdir". More help can be got by "configure --help".

If some library or head file can't be find, you can modify make.def file by yourself.

Note 2:

"Make install" will copy binary file to \$GSS\_DIR/bin and material data file to \$GSS\_DIR/lib

Note 3:

GSS use X11 system for graphic plotting by default. You can change to use Win32 native API for plotting under Cygwin by "configure --with-Win32". However, it is not as beautiful as X11 API.

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### Step5: Run Test Examples

If everything is ok, Add \$GSS\_DIR/bin to your path. You can go to example directory to check gss.

```
export PATH="$GSS_DIR/bin:$PATH"
$ gss xxxx.inp
```

GSS has a simple text editor written by Tk, which can be invoked by

```
$ gssui
```

make a scrip with  
PETSC\_DIR, GSS\_DIR and  
GSS\_DIR/bin that you  
source when you start the session

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**GSS:** open source TCAD software.

