**Installing and Using CACTUS on Windows using Cygwin**

If you do not have access to Intel Visual Fortran, this is a free (but more difficult) option. CACTUS can be compiled in Windows using the free GCC Fortran. The simplest way to set up GCC Fortran and other library dependencies for CACTUS is by installing Cygwin.

Once you have installed Cygwin and compiled CACTUS you will have two options:

1. Run CACTUS from the Cygwin terminal.
2. Run CACTUS from the Windows terminal (requires additional steps).

The instructions for compiling CACTUS using GCC Fortran under Windows are described in this document.

Note 1: You do not need DAKOTA or Octave to run CACTUS.

Note 2: You need to have Python installed to run the regression tests.

**Install Cygwin**

Cygwin is a package which provides a simulated Linux shell in a Windows environment. It includes a package manager which simplifies the installation of CACTUS dependencies.

1. Download and install Cygwin
   1. Download the Cygwin installer from [http://cygwin.com/](http://cygwin.com/install.html).
   2. Run the executable you downloaded (setup-x86\_64.exe). Select the following options:
      1. Install from the internet
      2. Set the root directory C:\cygwin (or C:\cygwin64) and install for All Users
      3. Choose Direct Connection or set up a proxy settings as needed
      4. Select any Download Site from the list, or add one yourself from: <http://cygwin.com/mirrors.html>.
      5. Select the following packages in addition to those selected by default:
         1. Devel >> make
         2. Devel >> gcc-fortran
         3. Math >> lapack
         4. Math >> liblapack0
         5. Math >> liblapack-devel
         6. Libs >> libgomp1 (for OpenMP acceleration)
         7. Libs >> libgmp10 (for OpenMP acceleration)
         8. Libs >> libgmp-devel (for OpenMP acceleration)
         9. Math >> octave (for using geometry creation scripts)
      6. Click next and accept downloading all required packages (for dependencies)
2. After the installation is complete, open up the Cygwin program, which should present you with a terminal. The Cygwin terminal always opens up in the

C:\cygwin\home\yourUserName\

directory, which for Cygwin is

/home/yourUserName/

That is, Cygwin uses Linux commands and directory paths, and has C:\cygwin as the root directory.

**Install CACTUS**

1. Create a directory for CACTUS that is on the Cygwin path (say C:\cygwin\yourUserName\CACTUS\) and put all the CACTUS source files there.
2. Open the Cygwin terminal. Navigate into the Makefiles directory. (/home/yourUserName/CACTUS/make/). You should be able to see the makefiles with an ‘ls’ command.
3. Compile CACTUS with the command:

make -f Makefile.gfortran

Or, for OpenMP acceleration.

make –f Makefile.gfortran.omp

The executable will be called cactus.exe and be located in (/home/yourUserName/CACTUS/bin/). NOTE: The executable generally only works if you are in the Cygwin terminal. If you want to run it from the windows command line you will need to follow extra steps. This will be described in the following step.

1. To be able to run cactus.exe from the Windows command line (instead of the Cygwin terminal) you need to add all the Cygwin libraries to your Windows path. Also add the path to the cactus.exe executable so that you can call the function by simply typing cactus in the command line rather than the complete path to the executable. For Windows 7:
   1. Left click on the Start button. Right click on ‘Computer’. Select ‘Properties’.
   2. Click on ‘Advanced System Settings’. Click ‘Yes’.
   3. Clock on ‘Environment Variables’
   4. Either edit or create (if nonexistent) the variable ‘PATH’
   5. The value of PATH is a set of directories separated by semicolons ‘;’. Add the following three directories:

C:\cygwin\bin;C:\cygwin\lib\lapack;C:\cygwin\home\YourUserName\CACTUS

* 1. You will need to restart your computer for the path settings to take effect. Afterward, you should be able to call cactus from the Windows command line.

**Run the regression test**

1. Check that the compiling and installation is working by running the included regression test.
   1. Navigate to the test/RegTest directory

cd ./test/RegTest

Run the test by executing runreg.py with the path to the CACTUS executable as an argument.

python runreg.py ../../bin/cactus.exe

The output should say 'No differences' for all three tests. Note: if you have Python 3 installed use runreg\_p3.py instead. If you don’t have Python installed you will need to install it.