

Ice Sheet System Model

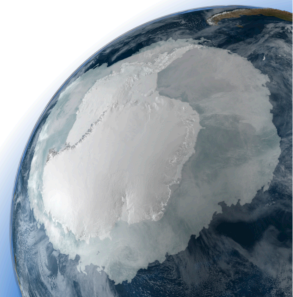
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Operating System Requirements:

- Mac OS X
- LINUX 32/64, UNIX
- Windows XP (via Cygwin or equivalent)

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Obtaining ISSM Distribution

Download Instructions:

<http://issm.jpl.nasa.gov/installation/download/>

- Download and install SVN (Apache Subversion)
- Checkout ISSM:

```
$ svn -username anon -password anon checkout  
https://issm.ess.uci.edu:80/svn/issm/issm
```
- Update ISSM:

```
$ svn update
```

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Environment Variables

Website:

<http://issm.jpl.nasa.gov/installation/installation/>

ISSM needs the following Environment Variables to be set:

- **.bashrc**
#ISSM
export ISSM_TIER=ISSMPATH
export ISSM_ARCH=ARCH
source \$ISSM_TIER/etc/environment.sh
- **.cshrc**
#ISSM
setenv ISSM_TIER ISSMPATH
setenv ISSM_ARCH ARCH
source \$ISSM_TIER/etc/environment.csh

ISSMPATH is the path of ISSM main directory

- ex: /home/user1/svn/issm/trunk

ARCH is the system architecture

- ex: linux-gnu-amd64, macosx-gnu,...

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External Packages: Fortran Compiler

A Fortran compiler is required for some of the PETSc packages

- Mac OS X:
Xcode does Not have a Fortran compiler
- Download and install binaries:
<http://gcc.gnu.org/wiki/GFortranBinaries>

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External Packages

Website:

<http://issm.jpl.nasa.gov/installation/installation/>

External Packages to Install: Order Matters!

- mpich2 (Installed first)
- petsc (after mpich2)
- metis
- matlab (only a softlink to the actual matlab directory)
- triangle (after matlab)
- autoconf
- automake (after autoconf)

External Packages are located in the trunk folder
(i.e. `$ cd $ISSM_TIER/externalpackages/`)

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External Packages: Installing

Configuring the External Packages:

- Each external package library has a "configs" directory (sometimes multiple versions of the package are available)
- Each "configs" directory has subdirectories with custom configuration files for a variety of machine types/names

Installation Process:

- Copy the files (configure.sh) corresponding to the machine type/name to the external package directory
- Run ./install.sh

For example: Astrid

```
$ cd $ISSM_TIER/externalpackages/mpich2
$ cp configs/astrid/* .
$ ./install.sh
```

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Example: PETSc

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Tweaking the configure.sh file may be necessary for custom installations

- configure.sh files for a Mac OS X and an Astrid (Linux) installation:

```
#!/bin/bash
./config/configure.py \
--prefix="$ISSM_TIER/externalpackages/petsc/install" \
--PETSC_DIR="$ISSM_TIER/externalpackages/petsc/src" \
--PETSC_ARCH=macosx-gnu \
--with-mpi-dir="$ISSM_TIER/externalpackages/mpich2/install" \
--with-debugging=0 \
--with-shared-libraries=0 \
--download-numps=yes \
--download-scalapack=yes \
--download-blacs=yes \
--download-blas=yes \
--download-plapack=yes \
--download-parmetis=yes \
--download-f-blas-lapack=yes

#!/bin/bash
./config/configure.py \
--prefix="$ISSM_TIER/externalpackages/petsc/install" \
--with-mpi-dir="$ISSM_TIER/externalpackages/mpich2/install" \
--with-c-language=C++ \
--PETSC_ARCH=linux-gnu-and64 \
--PETSC_DIR="$ISSM_TIER/externalpackages/petsc/src" \
--with-debugging=0 \
--with-shared-libraries=0 \
--download-numps=yes \
--download-scalapack=yes \
--download-blacs=yes \
--download-blas=yes \
--download-f-blas-lapack=yes \
--download-plapack=yes \
--download-parmetis=yes \
--with-pic=1 \
--FFLAGS=-I$ISSM_TIER/externalpackages/mpich2/install/include \
--COPTFLAGS="-march=opteron -O2" \
--FOPTFLAGS="-march=opteron -O2" \
--CXXOPTFLAGS="-march=opteron -O2"
```

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ISSM Configuration

Generate the makefiles needed to compile ISSM:

- ISSM uses autotools to make the source-code packages portable to many Unix-like systems

- Re-configure ISSM:

```
$ cd $ISSM_TIER
```

```
$ ./scripts/automakererun.sh
```

Configure ISSM for your Operating System

- Run one of the configure.sh files corresponding to your machine type (several have been provided)
- For example: `$./configs/astrid/configure.sh`

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Custom ISSM Installation

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Other platforms may require the user to write their own configure.sh file

- configure.sh files for a Mac OS X and an Astrid (Linux) ISSM installation:

The image shows two side-by-side screenshots of a text editor window. The left window is titled 'File Edit Options Buffers Tools Insert Help' and shows a configure.sh file for Mac OS X. The right window is also titled 'File Edit Options Buffers Tools Insert Help' and shows a configure.sh file for Astrid (Linux). Both files start with '#!/bin/sh' and define variables for PETSC and MPICH versions. They then use a series of 'with-' options to configure the installation, including paths for external packages like triangle, metis, and lapack, and various compiler and linker options.

```
#!/bin/sh

#petac 3.2
#mpich 1.4

./configure \
    --prefix=$ISSM_TIER \
    --with-matlab-dir=$MATLAB_DIR \
    --with-triangle-dir=$ISSM_TIER/externalpackages/triangle/install \
    --with-metis-dir=$ISSM_TIER/externalpackages/metis/install \
    --with-petac-dir=$ISSM_TIER/externalpackages/petac/install \
    --with-mpi-include=$ISSM_TIER/externalpackages/mpich2/install/include \
    --with-mpi-lib=$ISSM_TIER/externalpackages/mpich2/install/lib/libmpich.a $ISSM_TIER/externalpackages/mpich2/install/lib/libmpich.a $ISSM_TIER/externalpackages/mpich2/install/lib/libmpich.a $ISSM_TIER/externalpackages/mpich2/install/lib/libmpich.a \
    --with-petac-arch=$ISSM_ARCH \
    --with-dakota-dir=$ISSM_TIER/externalpackages/dakota/install \
    --with-blas-lapack-dir=$ISSM_TIER/externalpackages/petac/install \
    --with-lapack-lib=$ISSM_TIER/externalpackages/petac/install/-lLAPACK \
    --with-lapack-include=$ISSM_TIER/externalpackages/petac/install/include \
    --with-blas-dir=$ISSM_TIER/externalpackages/petac/install \
    --with-scalapack-dir=$ISSM_TIER/externalpackages/petac/install \
    --with-sump-dir=$ISSM_TIER/externalpackages/petac/install \
    --with-fortran-lib=$usr/local/lib/libgfortran.a \
    --with-math-lib=$usr/lib/libc.dylib \
    --with-graphics-lib=$usr/lib/libc.dylib \
    --with-compilerflags="-fno-common -no-pp-precop -fexceptions -arch x86_64 -maccsse" \
    --version=0.0.0 \
    --with-maththreads=0

--with-maththreads=0
```

```
#!/bin/sh

#External packages versions:
#petac 3.1
#mpich 1.3.1

./configure \
    --prefix=$ISSM_TIER \
    --with-matlab-dir=$MATLAB_DIR \
    --with-triangle-dir=$ISSM_TIER/externalpackages/triangle/install \
    --with-metis-dir=$ISSM_TIER/externalpackages/metis/install \
    --with-petac-dir=$ISSM_TIER/externalpackages/petac/install \
    --with-mpi-include=$ISSM_TIER/externalpackages/mpich2/install/include \
    --with-mpi-lib=$ISSM_TIER/externalpackages/mpich2/install/lib/libmpich.a \
    --with-petac-arch=$ISSM_ARCH \
    --with-dakota-dir=$ISSM_TIER/externalpackages/dakota/install \
    --with-blas-lapack-dir=$ISSM_TIER/externalpackages/petac/install \
    --with-lapack-lib=$ISSM_TIER/externalpackages/petac/install/-lLAPACK \
    --with-lapack-include=$ISSM_TIER/externalpackages/petac/install/include \
    --with-blas-dir=$ISSM_TIER/externalpackages/petac/install \
    --with-scalapack-dir=$ISSM_TIER/externalpackages/petac/install \
    --with-sump-dir=$ISSM_TIER/externalpackages/petac/install \
    --with-fortran-lib=$usr/lib/libc.dylib \
    --with-math-lib=$usr/lib/libc.dylib \
    --with-graphics-lib=$usr/lib/libc.dylib \
    --with-compilerflags="-fno-common -no-pp-precop -fexceptions -arch x86_64 -maccsse" \
    --version=0.0.0 \
    --with-maththreads=0

--with-maththreads=0
```

- All of the options available for configuring ISSM can be listed by running `$./configure -help`

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ISSM Compilation

Compile ISSM:

- ISSM can now be compiled:

```
$ cd $ISSM_TIER
```

```
$ make
```

```
$ make install
```

ISSM installation is done!

Compiling Troubleshooting:

- <http://issm.jpl.nasa.gov/installation/compilationtroubleshooting/>

Thank you!

