ISSM Workshop 2016

Ice Sheet System Model
Installation Guide

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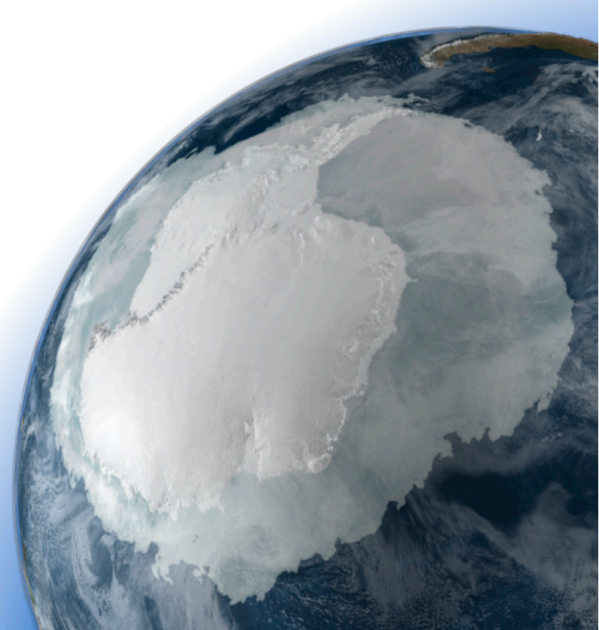

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Outline

Preparing Your Environment

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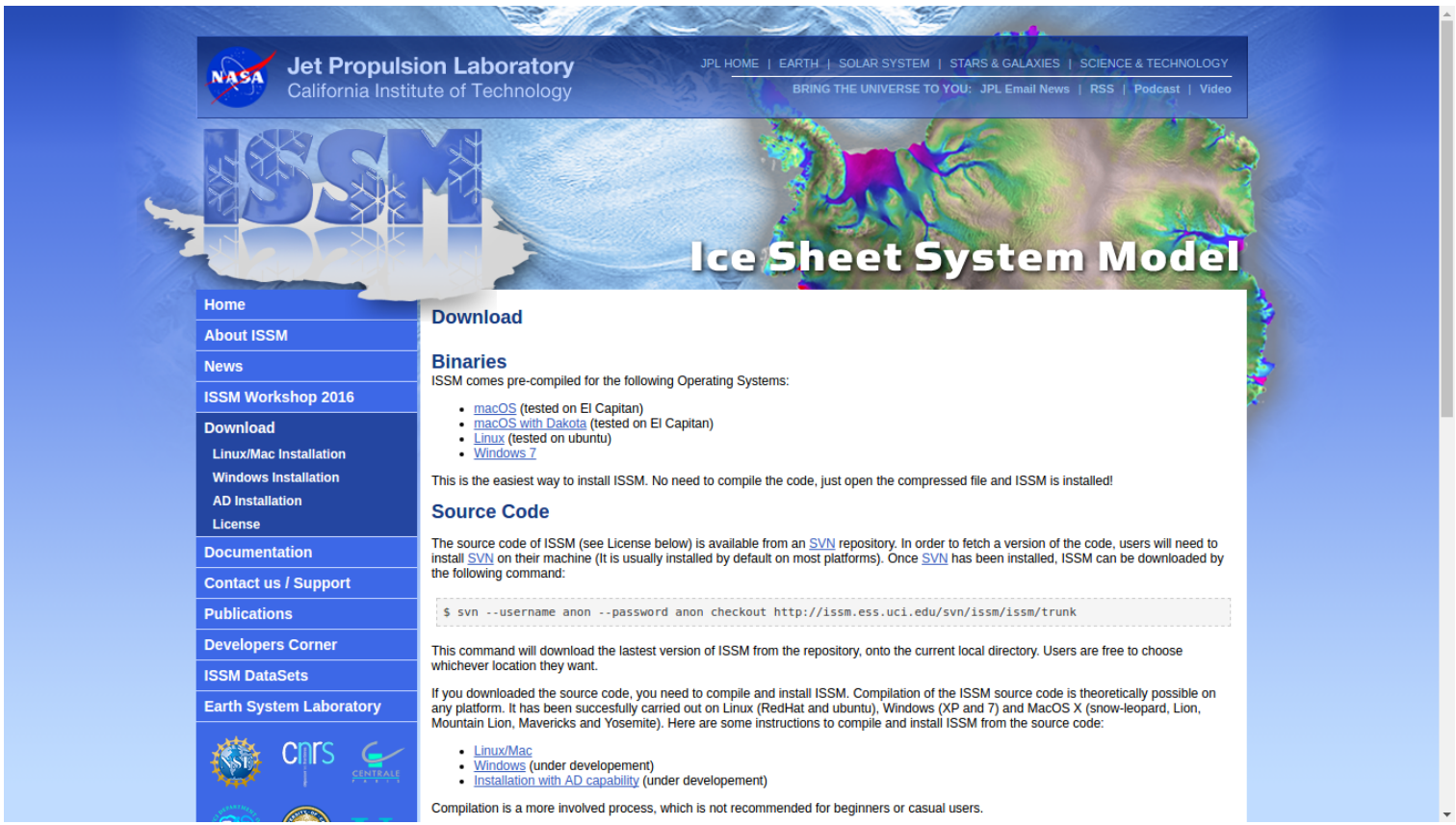
- MATLAB or Python
- Compiler Toolchain(GCC, LLVM, MSVC)

Pre-compiled

The ISSM team maintains pre-compiled binaries that are easy to install and use. They can be found on our website:

`https://issm.jpl.nasa.gov/download/`



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Disadvantages

- Much larger installation size than when compiling yourself
- Not optimized for your system
- Only available for MATLAB

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You are now ready to start using ISSM! Follow these steps:

1. Launch MATLAB
2. Addpath the `lib` and `bin` directories in `$ISSM_DIR`
3. Run `issmversion` to make sure everything was loaded correctly

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- Your MATLAB version might be incompatible. Try upgrading it!
- Double check that your environment variables are set correctly
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If you're still having issues you can always try compiling ISSM yourself!

Build ISSM Yourself

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- Optimized for your machine
- Configured with more or fewer features to meet your needs
- Choose what external packages and versions you want

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The ISSM website provides great guides for how to build ISSM for all 3 major operating systems:

- **Linux/MacOSX**: `https://issm.jpl.nasa.gov/download/unix/`
- **Win10**: `https://issm.jpl.nasa.gov/download/windows/`

Build ISSM Yourself

Your first step should be to checkout our code from our Subversion repository. This can be accomplished from the command line:

```
$ svn --username anon --password anon checkout http://issm.ess.uci.edu/svn/issm/issm/trunk
```

Change directory into `trunk`:

```
$ cd trunk
```

Now set and export `ISSM_DIR` and `MATLAB_DIR`:

```
$ export ISSM_DIR=$PWD
$ export MATLAB_DIR=/path/to/MATLAB
```

External Packages

Here is where compiling ISSM really gets interesting, as there are many different choices you can make. However, it is highly recommended that you stick to the basics before experimenting with more specialized builds. For Linux and MacOSX respectively the following external packages should be installed in the given order:

Linux
autotools install.sh
cmake install.sh
mpich: install-3.0-linux64.sh
petsc: install-3.7-linux64.sh
triangle: install-linux64.sh
m1qn3: install.sh

MacOSX
autotools: install.sh
cmake: install.sh
mpich: install-3.0-macosx64.sh
m1qn3: install.sh
petsc: install-3.6-macosx64.sh
triangle: install-macosx64.sh

External Packages Python

There are two ways to get a Python build working:

1. Through our external packages
2. Through a package management tool such as apt-get

If you choose to install through our external packages, then you will have to install the following extra external packages

```
python (recommended version: 2.7)
nose
blas
lapack
numpy
cython
scipy
hdf5
netcdf
netcdf-python
```

If you choose second options, then simply install Numpy, Scipy and Matplotlib.

External Packages

Installing any one external package is straight forward and can be repeated each time. The process is as follow:

```
$ cd $ISSM_DIR/autotools
$ ./install.sh
```

At this point it is recommended that you source our environment script. This is actually not required after every external package, but it is easier to do it every time.

```
$ source $ISSM_DIR/etc/environment.sh
```

Configuring

Once you have finished installing all of the external packages it is time to configure ISSM. Like the external packages there are many different ways to configure ISSM, but the following configuration is considered standard for MacOSX:

MacOSX

```
./configure \
--prefix=$ISSM_DIR \
--with-matlab-dir="$MATLAB_DIR" \
--with-triangle-dir="$ISSM_DIR/externalpackages/triangle/install" \
--with-mpi-include="$ISSM_DIR/externalpackages/mpich/install/include" \
--with-mpi-libflags="-L$ISSM_DIR/externalpackages/mpich/install/lib/ -lmpich" \
--with-petsc-dir="$ISSM_DIR/externalpackages/petsc/install" \
--with-metis-dir="$ISSM_DIR/externalpackages/petsc/install" \
--with-blas-lapack-dir="$ISSM_DIR/externalpackages/petsc/install" \
--with-scalapack-dir="$ISSM_DIR/externalpackages/petsc/install/" \
--with-mumps-dir="$ISSM_DIR/externalpackages/petsc/install/" \
--with-m1qn3-dir="$ISSM_DIR/externalpackages/m1qn3/install" \
--with-numthreads=2
```

Configure

Similarly for Linux:

Linux

```
./configure \
--prefix="$ISSM_DIR" \
--with-triangle-dir="$ISSM_DIR/externalpackages/triangle/install" \
--with-python-dir=/usr\
--with-python-numpy-dir=/usr/lib/python2.7/dist-packages/numpy\
--with-mpi-include="$ISSM_DIR/externalpackages/mpich/install/include" \
--with-mpi-libflags="-L$ISSM_DIR/externalpackages/mpich/install/lib -lpmpich -lm
--with-petsc-dir="$ISSM_DIR/externalpackages/petsc/install" \
--with-scalapack-dir="$ISSM_DIR/externalpackages/petsc/install/" \
--with-mumps-dir="$ISSM_DIR/externalpackages/petsc/install/" \
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--with-numthreads=2
```

Installation

Finally, it is time to preconfigure, run our configure script, make and make install:

```
$ autoreconf -ivf
$ make
$ make install
```

If all goes well, then you have successfully installed ISSM.

Troubleshooting

If something went wrong with your build please check the following things:

- You installed all the necessary external packages
- The directories you provided in your configuration script match the directories where you installed everything
- You sourced our environment script after every external package you installed
- You used the same compilers throughout the process

If you are still unable to get your build to work please checkout our forum. There are many useful threads there and it is the easiest way to get help with your build.

`https://issm.ess.uci.edu/forum/`