How to compile Delft3D under Linux

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How to compile Delft3D under Linux
Use subversion to get the source.

Delft3D can be found here.
https://svn.oss.deltares.nl/repos/delft3d/trunk

Get it using subversion software, which can be found here:
http://subversion.apache.org/
How do I download the Delft3D source code?

```
svn co https://svn.oss.deltares.nl/repos/delft3d/trunk delft3dtrunk

# > The program 'svn' is currently not installed. You can install it by typing:
# > sudo apt-get install subversion

# Install subversion
sudo apt-get install subversion

# Retry to get the sourcecode
svn co https://svn.oss.deltares.nl/repos/delft3d/trunk delft3dtrunk

# A delft3dprepared/src/tools_gpl/mormerge/packages/mormerge_version_number/
mormerge_version_number.vcproj

# ...

# Checked out revision 1163.

# Tagged versions are more stable (we'll use the trunk today)
svn co https://svn.oss.deltares.nl/repos/delft3d/tags/4.00.02.0423 delft3drelease
```
Branches

- The main developments are happening in the trunk
- New developments are done in branches/research
- Old releases are maintained at branches/release
How do I keep up to date with the latest developments?

```bash
# Go to the directory where delft3d was downloaded
cd delft3dtrunk

# Use the subversion update command to get over the latest changes
svn up
```
How do I keep up to date with the latest developments?

```bash
ls
# examples gpl-3.0.txt lgpl-2.1.txt src tsvn-auto-props
cd src
ls
# AUTHORS common.am engines_gpl
   plugins_lgpl tools_lgpl
```
What do I need installed to build Delft3D?

- Linux (official supported: CentOS 5, today we use ubuntu)
- Build tools (autoconf, automake, libtool, make)
- Compilers (gcc, g++, gfortran (≥ 4.5), g77?, official supported ifort)
- Compiler-compiler (bison/flex)
- Scripting (tclsh, probably temporary)
- Subversion (svnversion)
- Libraries (expat, pthread)
- MPI (mpif90, build with same compiler as fortran compiler, only mpich2 supported)
What do I need to know?

- Basics (system maintainer available): bash, less
- Intermediate (maintaining own system): editor (emacs/vim), package manager (apt, yum, port, emerge)
- Advanced (debugging, contributing): gdb, gprof, valgrind, nm, ldd, strace
Statistics of the Delft3D sourcecode (sloccount)

Totals grouped by language (dominant language first):

- **f90**: 187893 (56.87%)
- **ansic**: 87491 (26.48%)
- **cpp**: 24480 (7.41%)
- **sh**: 12983 (3.93%)
- **fortran**: 12973 (3.93%)
- **tcl**: 1953 (0.59%)

... 

Total Physical Source Lines of Code (SLOC) = $330,382$

(46968 in third party)
How do I configure the Delft3D source?

**Typical issues**
In the next examples I assume you did not install any of the prerequisites. The goal is to show some common errors.

**Steps in building linux software**
Prepare → Configure → Build → Install
How do I prepare the Delft3D source?

```bash
./autogen.sh
# Preparing the Delft3D build system... please wait

# ERROR: Unable to locate GNU Autoconf.

# ERROR: To prepare the Delft3D build system from scratch,
# at least version 2.52 of GNU Autoconf must be installed.

sudo apt-get install autoconf
```
How do I prepare the Delft3D source?

```
./autogen.sh
# Preparing the Delft3D build system... please wait

# Found GNU Autoconf version 2.68
# Found GNU Automake version 1.11.1
# ...
# ERROR: Unable to locate GNU Libtool.

# ERROR: To prepare the Delft3D build system from scratch,
# at least version 2.0.0 of GNU Libtool must be installed.

sudo apt-get install libtool
```
How do I prepare the Delft3D source?

```
./autogen.sh
# Automatically preparing build ... done

# The Delft3D build system is now prepared. To build here, run:
# ./configure
# make
```
How do I configure the Delft3D source?

```
./configure
# checking for lex... no
# configure: error: Can't find lex, please install or
  set the LEX variable
sudo apt-get install flex
```
How do I configure the Delft3D source?

```bash
./configure
# checking for mpif90... no
# configure: error: cannot compile a simple Fortran program
# See 'config.log' for more details
sudo apt-get install gfortran mpich2
```
How do I configure the Delft3D source?

```
./configure
# checking for mpif90... yes
#configure: error: Compiler can't find libstdc++
sudo apt-get install g++
```
How do I configure the Delft3D source?

```bash
./configure
# configure: error: Compiler can't find <expat.h>
sudo apt-get install libexpat1 libexpat1-dev
```
How do I configure the Delft3D source?

```
1. ./configure
# 240x config.status: * / Makefile
# config.status: creating config.h
make
```
How do I compile the Delft3D source?

```make
make
# This generates a lot of .o, .a, .la, .so, .exe files.
# .....  
# make[1]: Leaving directory `delft3trunk/src'
```
What now?

Figure: Things to do while Delft3D compiles (src:xkcd.com)
# This installs the executables in /usr/local/lib and /
usr/local/bin
make install

# This is the install method that is used to build a
release
# It installs all the executables in ../bin, only works
  if you did ./configure --prefix=$(pwd)
# It also groups the executables
make ds-install
Running an example

1. `./configure --prefix=$(pwd)/build`
   ```
   make install
   ```
2. `ls build/bin`
3. `cd ...examples/01_standard`
4. `deltares_hydro.tcl` # will be called .exe
5. `# deltabase_hydro.tcl: command not found`
6. `export PATH=$buildpath/bin:$PATH`
Running an example

deltares_hydro.tcl # will be called .exe
# Executing "build/bin/d_hydro.exe
    TMP_config_flow2d3d_7257.xml" ...
# d_hydro ABORT: Cannot load component library "
    libflow2d3d.so": libflow2d3d.so: cannot open shared
    object file: No such file or directory
export LD_LIBRARY_PATH=$buildpath/lib:$LD_LIBRARY_PATH
Running an example

deltares_hydro.tcl  # will be called .exe again
# ERROR: Start "deltares_hydro.exe" with 1 or 2
  arguments.
# Usage:
# deltares_hydro.exe <config.ini> [−keepXML]
deltares_hydro.tcl config_flow2d3d.ini
# ...
#
# FINISHED Delft3D–FLOW
#  runid : f34
#  date, time : 2012–01–10, 14:28:26
#  0 errors and 0 warnings
# returning to main program from domain f34
#
How do customize the compilation process?

```bash
# install in a custom directory
./configure --prefix=$(pwd)/build

export LD_LIBRARY_PATH=$(pwd)/build/lib:
    $LD_LIBRARY_PATH
export PATH=$(pwd)/build/bin:$PATH

# switch compilers
make clean
FC=ifort ./configure
# this assumes ifort was also used to build mpi

# Pass extra options, this can be needed for some
    AMD 64-bit systems
FCFLAGS=-fPIC ./configure

# Customize the MPI compiler
MPIFC=openmpif90 ./configure
```
How can I get help?

Service packages
Get pre-built tested executables from the service packages.
http://www.deltaressystems.com/hydro/service-packages

Community support
Through the forums:
http://oss.deltares.nl
How do I report bugs?

delft3d.support@deltaires.nl
How can I contribute my own sourcecode?

Getting write access

If you want to contribute sourcecode, please ask for write access. You will get access to a branch.
oss-webmaster@deltanet.