OpenLB technical report: Installing OpenLB in Cygwin

Robin Trunk, Louis Kronberg

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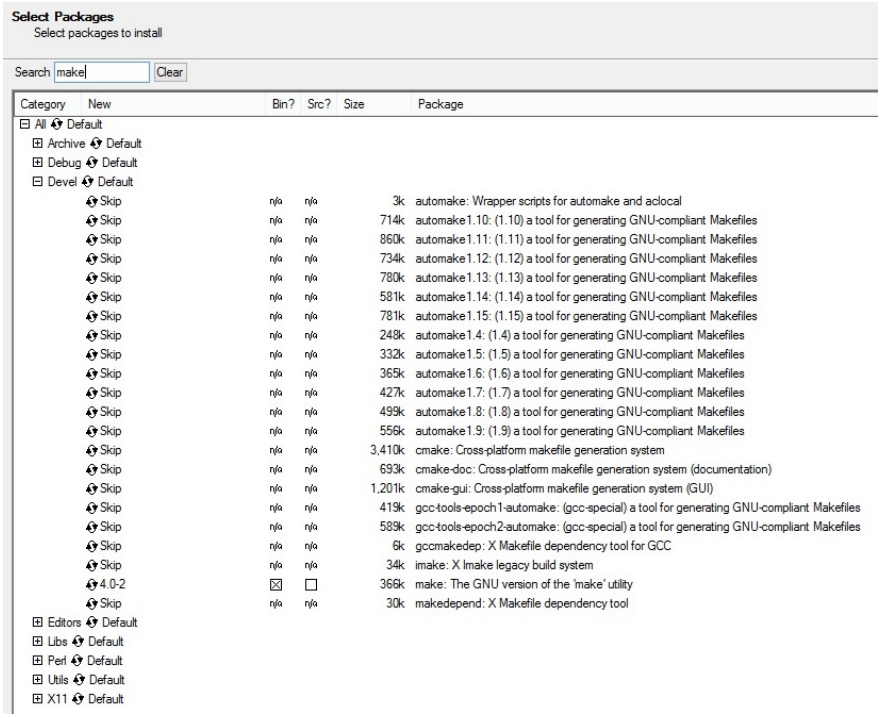
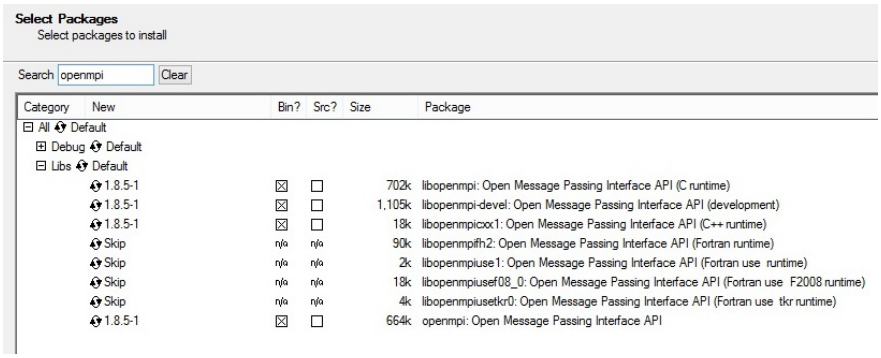
The here described installation procedure has been tested in the past with OpenLB 0.9 and Cygwin 2.0.4 on Windows 8.1. The most recently tested configuration comprises OpenLB 1.4 and Cygwin 3.1.6 on Windows 10 with gcc 9.3.0.

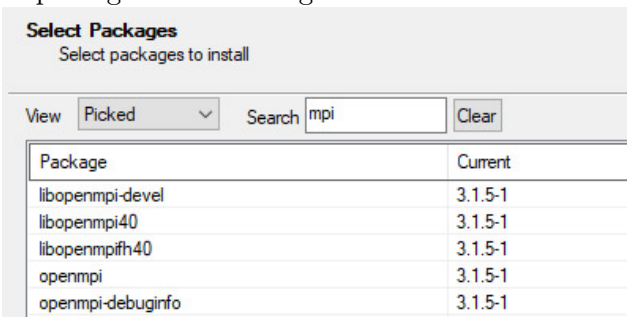
1. Download Cygwin from `https://www.cygwin.com/`
2. Follow the installation instructions
3. During the setup additional packages have to be selected. Since the Cygwin installer is capable of updating an existing installation it can be used to add the packages later.
   (a) To install GNU make, the following packages are required: *make*



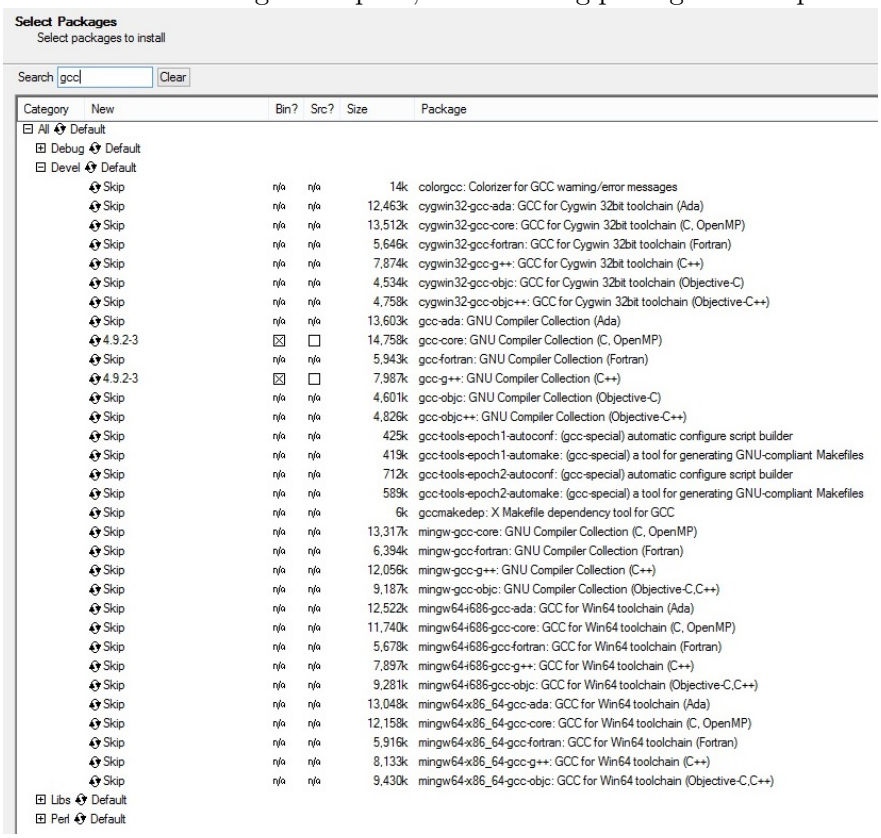
   (b) To install openMPI, the following packages are required: *libopenmpi*, *libopenmpi-devel*, *openmpi*.



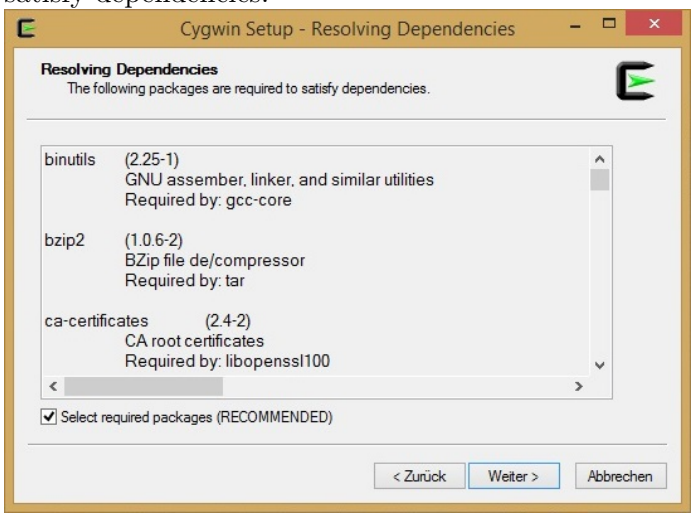
Note that, in order for the OpenLB compilation to work correctly, the versions of the corresponding openMPI packages might need to be adjusted. A working configuration of package versions for gcc 9.3.0 on Windows 10 is given below.



(c) To install the GNU gcc compiler, the following packages are required: *gcc-core*, *gcc-g++*



4. After this step the Cygwin installer automatically selects additional packages required to satisfy dependencies.



5. Download OpenLB from `http://www.openlb.net/` and unzip it to a folder in your Cygwin installation (e.g. C:\cygwin64\home\USERNAME\).

6. To compile a program, use the command `make` in the Cygwin terminal. For sequential execution type `./PROGRAMNAME.exe`. To run in parallel mode the config.mk in the OpenLB folder has to be modified.

```
##############
## DEFINITIONS TO BE CHANGED

CXX              := g++
#CXX              := icpc -D__aligned__=ignored
#CXX              := mpiCC
CXX              := mpic++

OPTIM            := -O3 -Wall
DEBUG            := -g -DOLB_DEBUG

CXXFLAGS         := $(OPTIM)
#CXXFLAGS         := $(DEBUG)

#CXXFLAGS         += -fdiagnostics-color=auto
#CXXFLAGS         += -std=c++0x

ARPRG            := ar
#ARPRG            := xiar                  # mandatory for
intel compiler

LDFLAGS          :=

PARALLEL_MODE    := OFF
PARALLEL_MODE    := MPI
#PARALLEL_MODE    := OMP
#PARALLEL_MODE    := HYBRID

MPIFLAGS         :=
OMPFLAGS         := -fopenmp

#BUILDTYPE        := precompiled
BUILDTYPE        := generic
```

To run the program using X processes, type `mpirun -np X PROGRAMNAME.exe`