

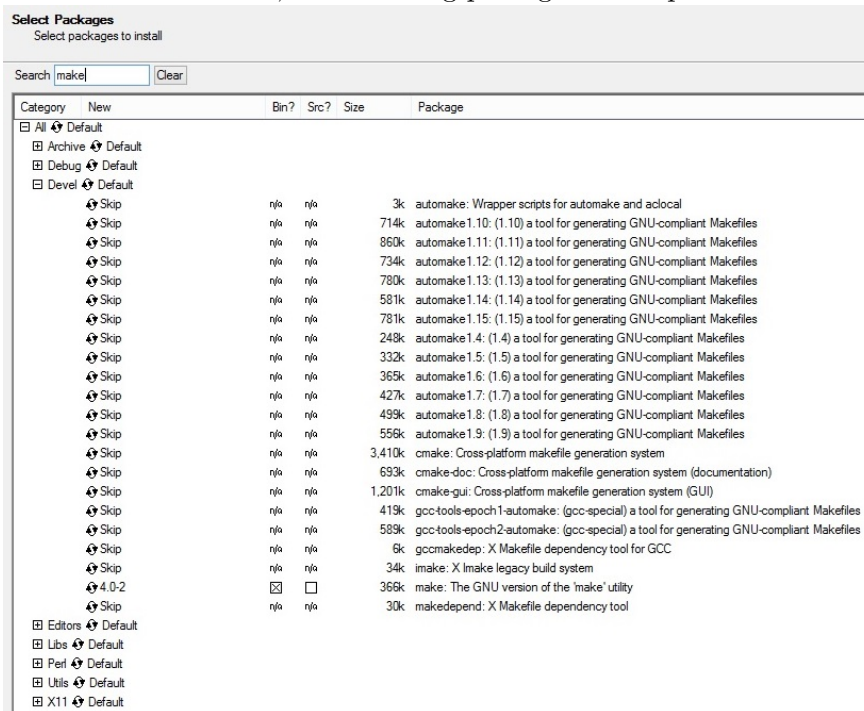
# OpenLB technical report: Installing OpenLB in Cygwin

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The here described installation procedure has been tested with OpenLB 0.9 and Cygwin 2.0.4 on Windows 8.1.

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*, *libopenmpicxx1*, *openmpi*

Select Packages  
Select packages to install

Search

Category	New	Bin?	Src?	Size	Package
[-] All	Default				
[-] Debug	Default				
[-] Libs	Default				
	1.8.5-1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	702k	libopenmpi: Open Message Passing Interface API (C runtime)
	1.8.5-1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1,105k	libopenmpi-devel: Open Message Passing Interface API (development)
	1.8.5-1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	18k	libopenmpi-ox1: Open Message Passing Interface API (C++ runtime)
	Skip	n/a	n/a	90k	libopenmpfh2: Open Message Passing Interface API (Fortran runtime)
	Skip	n/a	n/a	2k	libopenmpiuse1: Open Message Passing Interface API (Fortran use runtime)
	Skip	n/a	n/a	18k	libopenmpiusef08_0: Open Message Passing Interface API (Fortran use F2008 runtime)
	Skip	n/a	n/a	4k	libopenmpiusefkr0: Open Message Passing Interface API (Fortran use tkr runtime)
	1.8.5-1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	664k	openmpi: Open Message Passing Interface API

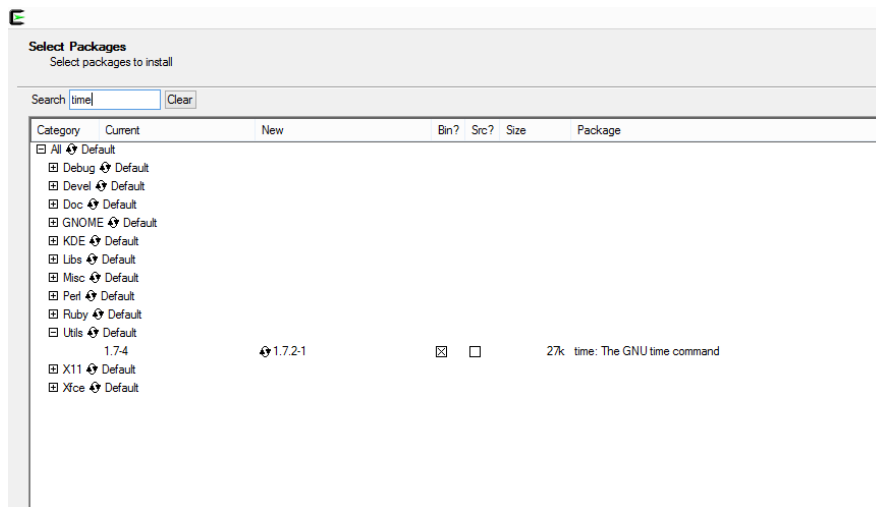
(c) To install the GNU gcc compiler, the following packages are required: *gcc-core*, *gcc-g++*

Select Packages  
Select packages to install

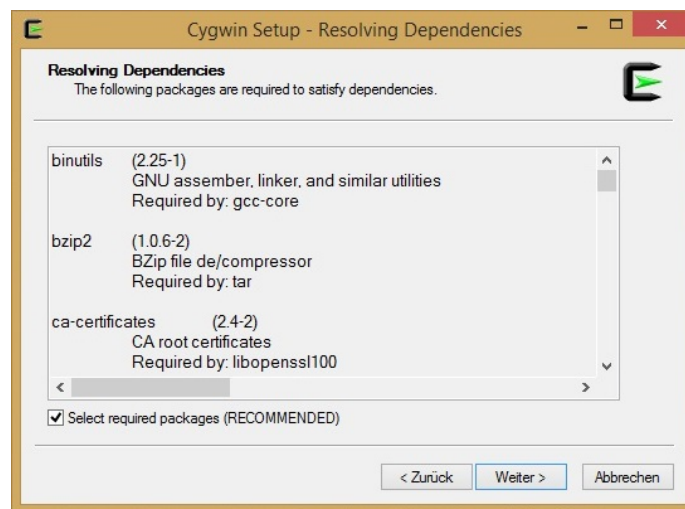
Search

Category	New	Bin?	Src?	Size	Package
[-] All	Default				
[-] Debug	Default				
[-] Devel	Default				
	Skip	n/a	n/a	14k	colorgcc: Colorizer for GCC warning/error messages
	Skip	n/a	n/a	12,463k	cygwin32-gcc-ada: GCC for Cygwin 32bit toolchain (Ada)
	Skip	n/a	n/a	13,512k	cygwin32-gcc-core: GCC for Cygwin 32bit toolchain (C, OpenMP)
	Skip	n/a	n/a	5,646k	cygwin32-gcc-fortran: GCC for Cygwin 32bit toolchain (Fortran)
	Skip	n/a	n/a	7,874k	cygwin32-gcc-g++: GCC for Cygwin 32bit toolchain (C++)
	Skip	n/a	n/a	4,534k	cygwin32-gcc-objc: GCC for Cygwin 32bit toolchain (Objective-C)
	Skip	n/a	n/a	4,758k	cygwin32-gcc-objc++: GCC for Cygwin 32bit toolchain (Objective-C++)
	Skip	n/a	n/a	13,603k	gcc-ada: GNU Compiler Collection (Ada)
	4.9.2-3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	14,758k	gcc-core: GNU Compiler Collection (C, OpenMP)
	Skip	n/a	n/a	5,943k	gcc-fortran: GNU Compiler Collection (Fortran)
	4.9.2-3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7,987k	gcc-g++: GNU Compiler Collection (C++)
	Skip	n/a	n/a	4,601k	gcc-objc: GNU Compiler Collection (Objective-C)
	Skip	n/a	n/a	4,826k	gcc-objc++: GNU Compiler Collection (Objective-C++)
	Skip	n/a	n/a	425k	gcc-tools-epoch1-autconf: (gcc-special) automatic configure script builder
	Skip	n/a	n/a	419k	gcc-tools-epoch1-automake: (gcc-special) a tool for generating GNU-compliant Makefiles
	Skip	n/a	n/a	712k	gcc-tools-epoch2-autconf: (gcc-special) automatic configure script builder
	Skip	n/a	n/a	589k	gcc-tools-epoch2-automake: (gcc-special) a tool for generating GNU-compliant Makefiles
	Skip	n/a	n/a	6k	gcmakedep: X Makefile dependency tool for GCC
	Skip	n/a	n/a	13,317k	mingw-gcc-core: GNU Compiler Collection (C, OpenMP)
	Skip	n/a	n/a	6,394k	mingw-gcc-fortran: GNU Compiler Collection (Fortran)
	Skip	n/a	n/a	12,056k	mingw-gcc-g++: GNU Compiler Collection (C++)
	Skip	n/a	n/a	9,187k	mingw-gcc-objc: GNU Compiler Collection (Objective-C, C++)
	Skip	n/a	n/a	12,522k	mingw64-686-gcc-ada: GCC for Win64 toolchain (Ada)
	Skip	n/a	n/a	11,740k	mingw64-686-gcc-core: GCC for Win64 toolchain (C, OpenMP)
	Skip	n/a	n/a	5,678k	mingw64-686-gcc-fortran: GCC for Win64 toolchain (Fortran)
	Skip	n/a	n/a	7,897k	mingw64-686-gcc-g++: GCC for Win64 toolchain (C++)
	Skip	n/a	n/a	9,281k	mingw64-686-gcc-objc: GCC for Win64 toolchain (Objective-C, C++)
	Skip	n/a	n/a	13,048k	mingw64-x86_64-gcc-ada: GCC for Win64 toolchain (Ada)
	Skip	n/a	n/a	12,158k	mingw64-x86_64-gcc-core: GCC for Win64 toolchain (C, OpenMP)
	Skip	n/a	n/a	5,916k	mingw64-x86_64-gcc-fortran: GCC for Win64 toolchain (Fortran)
	Skip	n/a	n/a	8,133k	mingw64-x86_64-gcc-g++: GCC for Win64 toolchain (C++)
	Skip	n/a	n/a	9,430k	mingw64-x86_64-gcc-objc: GCC for Win64 toolchain (Objective-C, C++)
[-] Libs	Default				
[-] Perl	Default				

(d) For some applications, also a package for the GNU time command is required: *time*



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 Makefile.inc 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

LDLFLAGS     :=

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`