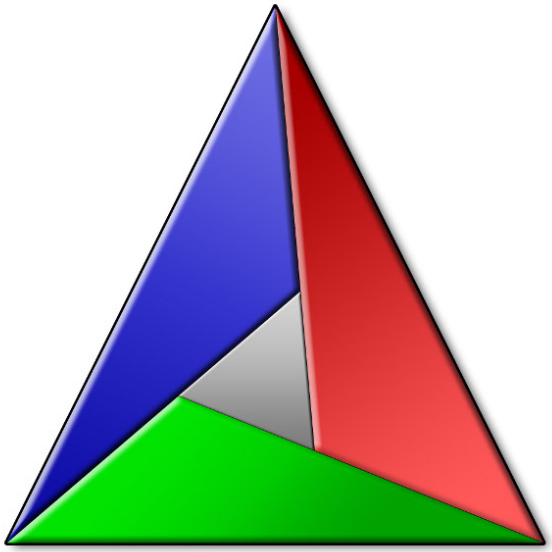

CMake

Cross-platform Make

Pierre AUBERT

http://www.cmake.org/

Plan

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3. Few basic examples
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5. How to create a library
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Why use CMake ?

- Easier than Make
  - but the same way of thinking
  - generate the *Makefile*
- Separate the compilation from the sources
- Multi-platfoms
- Very flexible
- Check if the libraries/programs are available on your system
- File generator (**configure_file**)
- Calling programs or scripts (**doxygen**)
- One of the new standards

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How to install CMake

Ubuntu/Debian

```
sudo apt-get install cmake
```

Mac

```
fink install cmake
```

Fedora

```
yum install cmake
```

Others

`https://cmake.org/download/`

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First example

C++ program (main.cpp)

```
#include <iostream>
int main(int argc, char** argv){
    std::cout << "Hello world" << std::endl;
    return 0;
}
```

CMakeLists.txt

```
project(Example)
cmake_minimum_required(VERSION 2.8)

add_executable(test main.cpp)
```

Compiling time

```
cd path/to/your/project
mkdir build
cd build
cmake ..
make
./test
```

Compiling time : result

```
$cmake ..
– The C compiler identification is GNU 4.9.1
– The CXX compiler identification is GNU 4.9.1
– Check for working C compiler : /usr/bin/cc
– Check for working C compiler : /usr/bin/cc – works
– Detecting C compiler ABI info
– Detecting C compiler ABI info - done
– Check for working CXX compiler : /usr/bin/c++
– Check for working CXX compiler : /usr/bin/c++ – works
– Detecting CXX compiler ABI info
– Detecting CXX compiler ABI info - done
– Configuring done
– Generating done
– Build files have been written to : ...../1-HelloWorld/build
$ make
Scanning dependencies of target test
Building CXX object CMakeFiles/test.dir/main.cpp.o
Linking CXX executable test
Built target test
$ ./test
Hello world
```

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C++ program (main.cpp)

```
#include <iostream>
int main(int argc, char** argv){
    std::cout << "Hello world" << std::endl;
    return 0;
}
```

CMakeLists.txt

```
project(Example)
cmake_minimum_required(VERSION 2.8)
add_executable(test main.cpp)
install(TARGETS test RUNTIME DESTINATION bin)
```

Install options

- **TARGETS** : install the programs and libraties
- **FILES** : install files like headers, configs...
- **PROGRAMS** : install executable scripts (bash python ...)
- **DIRECTORY** : install a directory (documentation)

Where is my program now ?

In the install path

- **CMAKE_INSTALL_PREFIX** : by default */usr/local*

In the terminal

```
cmake .. -DCMAKE_INSTALL_PREFIX=$HOME/usr
```

In the *CMakeLists.txt* (But it's not a good idea)

```
project(Example)
cmake_minimum_required(VERSION 2.8)
set(CMAKE_INSTALL_PREFIX my/install/prefix)
add_executable(test main.cpp)
install(TARGETS test RUNTIME DESTINATION bin)
```

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Library (shadok.h)

```
#ifndef __SHADOK_H__
#define __SHADOK_H__
#include <string>
void myPrint(const std::string & str);
#endif
```

Library (shadok.cpp)

```
#include <iostream>
#include "shadok.h"
void myPrint(const std::string & str){
    std::cout << str << std::endl;
}
```

C++ program (main.cpp)

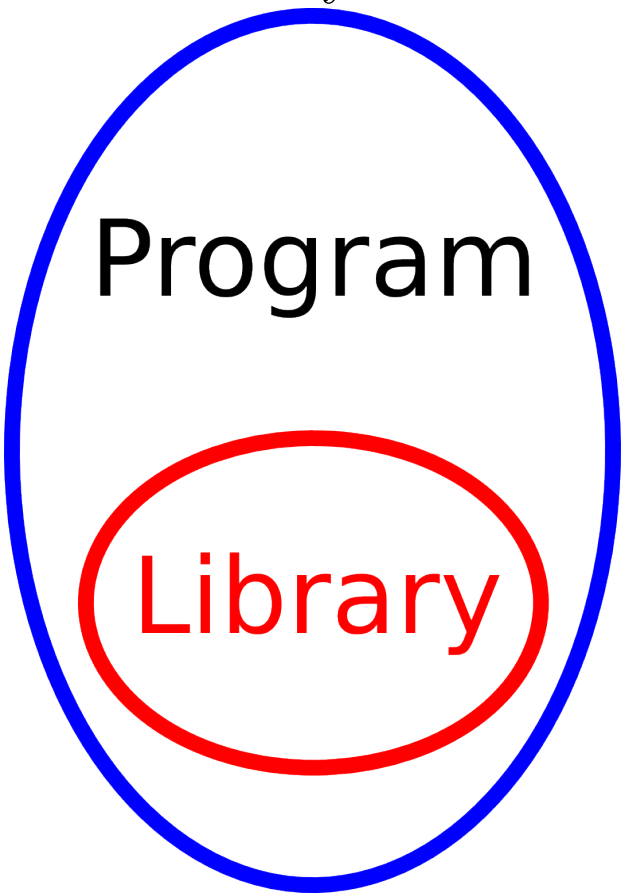
```
#include <iostream>
#include "shadok.h"
int main(int argc, char** argv){
    myPrint("Hello world");
    return 0;
}
```

Library creation example

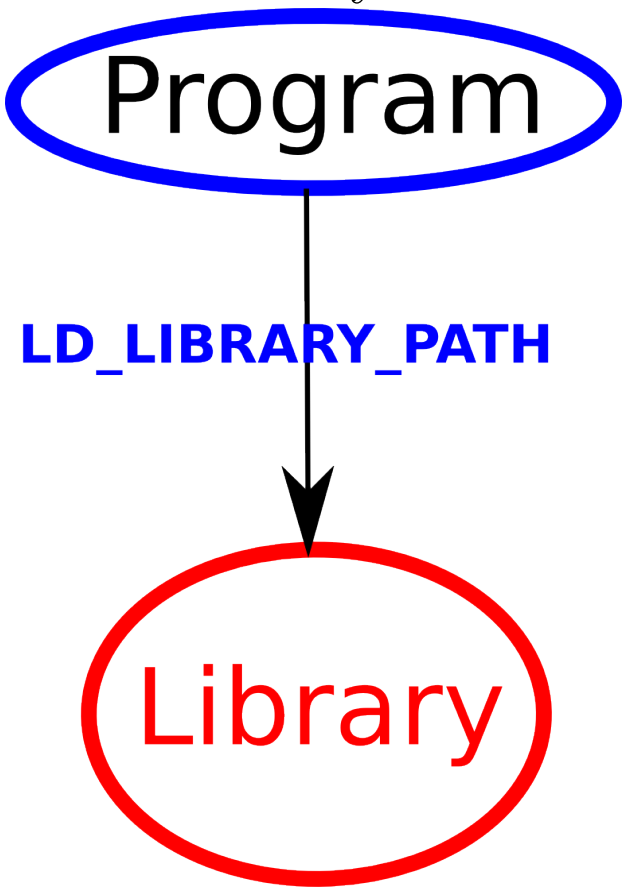
CMakeLists.txt

```
project(Example)
cmake_minimum_required(VERSION 2.8)

add_library(shadok SHARED shadok.cpp)
install(TARGETS shadok DESTINATION lib)

add_executable(test main.cpp)
target_link_libraries(test shadok)

install(TARGETS test RUNTIME DESTINATION bin)
```

Static library



Shared library



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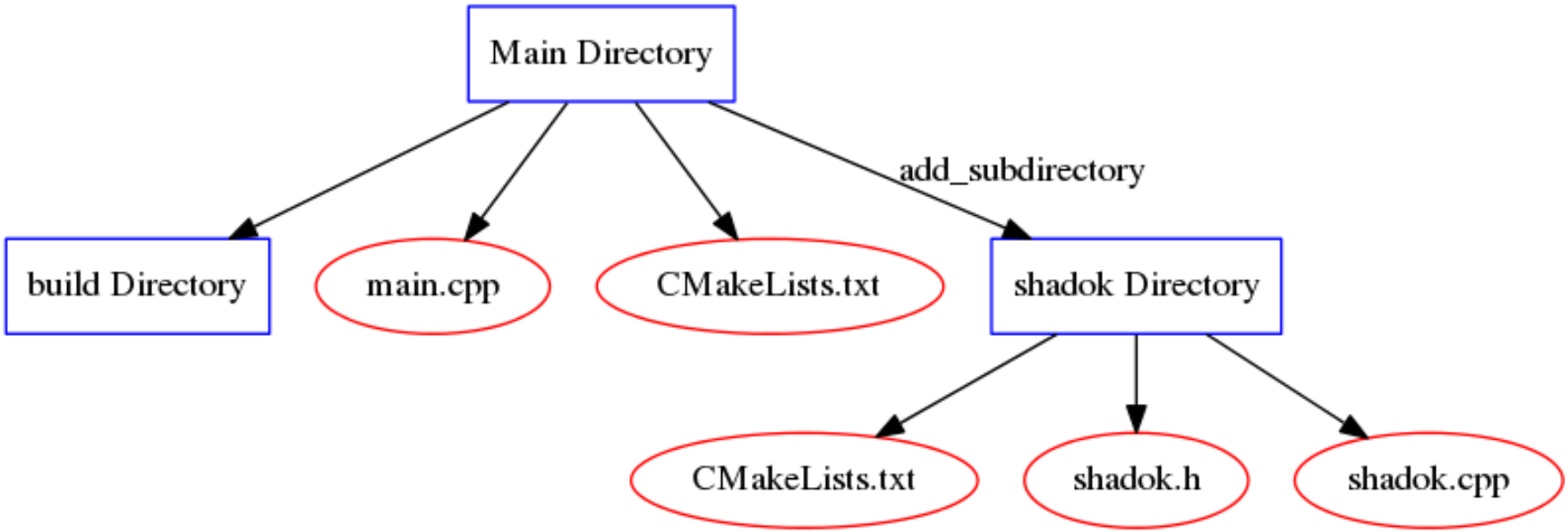
Library creation with subdirectory example



Library creation with subdirectory example

Lib directory *shadok/CMakeLists.txt*

```
project(Example)
cmake_minimum_required(VERSION 2.8)

add_library(shadok SHARED shadok.cpp)
install(TARGETS shadok DESTINATION lib)
```

Main directory *CMakeLists.txt*

```
project(Example)
cmake_minimum_required(VERSION 2.8)

include_directories(shadok)

add_executable(test main.cpp)
target_link_libraries(test shadok)

install(TARGETS test RUNTIME DESTINATION bin)

add_subdirectory(shadok)
```

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Usefull CMake variables

- **${CMAKE_INSTALL_PREFIX}** : the install directory
- **${CMAKE_CURRENT_SOURCE_DIR}** : the directory of the current *CMakeLists.txt*
- **${CMAKE_CURRENT_BINNARY_DIR}** : the build directory of the current *CMakeLists.txt*
- **${CMAKE_MODULE_PATH}** : the directory of the modules/libraries finders

Usefull CMake variables

- **include_directories** : like the **-I**
- **link_directories** : like the **-L**

Get all the sources files in the current directory

```
file(GLOB sources
"${CMAKE_CURRENT_SOURCE_DIR}/*.cpp")
add_executable(prog ${sources})
```