

**NETWORKING & SYSTEM ADMINISTRATION LAB****Experiment No.: 27****Aim**

**Build and install software from source code, familiarity with make and cmake utilities expected.**

**Procedure**

1. We can obtain information of a package and its dependencies using the apt command. Doing that for cmake:

**\$ apt show cmake**

```
mca@514:~/Documents/CMake$ sudo apt show cmake
[sudo] password for mca:
Package: cmake
Version: 3.10.2-1ubuntu2
Priority: optional
Section: devel
Origin: Ubuntu
Maintainer: Ubuntu Developers <ubuntu-devel-discuss@lists.ubuntu.com>
Original-Maintainer: Debian CMake Team <pkg-cmake-team@lists.alioth.debian.org>
Bugs: https://bugs.launchpad.net/ubuntu/+filebug
Installed-Size: 17.3 MB
Depends: cmake-data (= 3.10.2-1ubuntu2), procps, libarchive13 (>= 3.0.4), libc6 (>= 2.15), libcurl4 (>= 7.16.2), libexpat1 (>= 2.0.1), libgcc1 (>= 1:3.0), libjsoncpp1 (>= 1.7.4), libhash0 (>= 1.2.6), libstdc++6 (>= 5.2), libuv1 (>= 1.4.2), zlib1g (>= 1:1.2.3.3)
Recommends: gcc, make
Suggests: cmake-doc, ninja-build
Homepage: https://cmake.org/
Supported: 5y
Download-Size: 3.138 kB
APT-Sources: http://in.archive.ubuntu.com/ubuntu bionic/main amd64 Packages
Description: cross-platform, open-source make system
 CMake is used to control the software compilation process using
 simple platform and compiler independent configuration files. CMake
 generates native makefiles and workspaces that can be used in the
 compiler environment of your choice. CMake is quite sophisticated: it
 is possible to support complex environments requiring system
 configuration, pre-processor generation, code generation, and template
 instantiation.
.
 CMake was developed by Kitware as part of the NLW Insight
 Segmentation and Registration Toolkit project. The ASCI VIEWS project
 also provided support in the context of their parallel computation
 environment. Other sponsors include the Insight, VTK, and VXL open
 source software communities.
```

2. To install cmake , g++ and make using the apt command, type:

**\$ sudo apt install cmake g++ make**

```
mca@S14:~/Documents/CMake$ sudo apt install cmake g++ make
Reading package lists... Done
Building dependency tree
Reading state information... Done
g++ is already the newest version (4:7.3.0-3ubuntu2).
make is already the newest version (4.1-9.1ubuntu1).
make set to manually installed.
The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl libfile-stripnondeterminism-perl libglew2.0 libmail-sendmail-per
  libopenal-data libopenal1 libpcrc16-3 libpcrc3-dev libpcrc32-3 libpcrcpp0v5 libstdl2-2.0-0 libstdl2-image-2.0-0 libssl-dev libssl-doc
  libsys-hostname-long-perl php-common php-pear php-xml php7.2-cli php7.2-common php7.2-json php7.2-openssl php7.2-readline php7.2-xml
  pkg-php-tools po-debconf shtool supertux-data
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  cmake-data libcurl4 libjsoncpp1 libhash0 libuv1
Suggested packages:
  cmake-doc ninja-build
The following NEW packages will be installed:
  cmake cmake-data libcurl4 libjsoncpp1 libhash0 libuv1
0 upgraded, 6 newly installed, 0 to remove and 9 not upgraded.
Need to get 4,900 kB of archives.
After this operation, 25.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 cmake-data all 3.10.2-1ubuntu2 [1,331 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libcurl4 amd64 7.58.0-2ubuntu3 [214 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libjsoncpp1 amd64 1.7.4-3 [73.6 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libhash0 amd64 1.3.6-2 [78.1 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libuv1 amd64 1.18.0-3 [64.4 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 cmake amd64 3.10.2-1ubuntu2 [3,138 kB]
Fetched 4,900 kB in 1s (6,162 kB/s)
Selecting previously unselected package cmake-data.
(Reading database ... 185275 files and directories currently installed.)
Preparing to unpack .../0-cmake-data_3.10.2-1ubuntu2_all.deb ...
Unpacking cmake-data (3.10.2-1ubuntu2) ...
Selecting previously unselected package libcurl4:amd64.
Preparing to unpack .../1-libcurl4_7.58.0-2ubuntu3_amd64.deb ...
```

## A Sample CMake project

```
mca@T70:~/Documents/CMake$ mkdir projectzero
mca@T70:~/Documents/CMake$ cd projectzero
mca@T70:~/Documents/CMake/projectzero$ gedit hello_world.cpp
mca@T70:~/Documents/CMake/projectzero$ gedit CMakeLists.txt
```

### CMakeLists.txt

```
#include <iostream>

int main() {
    std::cout<<"Hello World!"<<std::endl;
    return 0 ;
}
```

```
cmake_minimum_required(VERSION 3.10)
project(MyProject)
add_executable(hello Hello_world.cpp)
```

A directory to which CMake was executed is called “Built Directory

```
mca@T70:~/Documents/Cmake/projectzero$ mkdir build
mca@T70:~/Documents/Cmake/projectzero$ cd build
mca@T70:~/Documents/Cmake/projectzero/build$ cmake ..
-- The C compiler identification is GNU 7.3.0
-- The CXX compiler identification is GNU 7.3.0
-- 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
-- Detecting C compile features
-- Detecting C compile features - 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
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Configuring done
-- Generating done
-- Build files have been written to: /home/mca/Documents/Cmake/projectzero/build
mca@T70:~/Documents/Cmake/projectzero/build$ cmake --build .
Scanning dependencies of target hello
[ 50%] Building CXX object CMakeFiles/hello.dir/hello_world.cpp.o
[100%] Linking CXX executable hello
[100%] Built target hello
mca@T70:~/Documents/Cmake/projectzero/build$ ./hello
Hello World!
mca@T70:~/Documents/Cmake/projectzero/build$
```