

## 02-编译安装PCL点云库

### 官网及文档

源码官网: <https://github.com/PointCloudLibrary/pcl>

### 安装方式

#### 方式一: 编译源码安装 (最稳妥)

##### 1. 准备编译环境及工具

```
sudo apt-get update
sudo apt-get install git build-essential linux-libc-dev
sudo apt-get install cmake cmake-gui
sudo apt-get install libusb-1.0-0-dev libusb-dev libudev-dev
sudo apt-get install mpi-default-dev openmpi-bin openmpi-common
sudo apt-get install libpcap-dev
sudo apt-get install libflann1.9 libflann-dev
sudo apt-get install libeigen3-dev
sudo apt-get install libboost-all-dev
sudo apt-get install vtk6 libvtk6.3 libvtk6-dev libvtk6.3-qt
libvtk6-qt-dev
sudo apt-get install libqhull* libgtest-dev
sudo apt-get install freeglut3-dev pkg-config
sudo apt-get install libxmu-dev libxi-dev
sudo apt-get install mono-complete
sudo apt-get install libopenni-dev libopenni2-dev
# sudo apt-get install qt-sdk openjdk-8-jdk openjdk-8-jre
```

##### 1. 编译PCL (PointCloudLibrary)

下载源码:

```
git clone https://gitee.com/mirrors/pcl.git
```

进入下载后的pcl目录, 创建并进入release目录, 执行编译:

```
cd pcl
# 切换到指定版本v1.9.1再编译
git checkout pcl-1.9.1
# 创建目录
mkdir release
# 进入目录
cd release

# 配置cmake
cmake -DCMAKE_BUILD_TYPE=None \
      -DCMAKE_INSTALL_PREFIX=/usr/local \
      -DBUILD_GPU=ON \
      -DBUILD_apps=ON \
      -DBUILD_simulation=ON \
      -DBUILD_examples=ON ..

# 进行编译
make -j8
```

## 1. 安装

编译可能比较久，等他编完后，执行安装：

```
sudo make install
```

## 1. 测试

测试是否成功，打开窗口看到logo点云即为成功安装

```
pcl_viewer ../test/pcl_logo.pcd
```

## 方式二：在线安装（100M下载，释放后1G）

```
sudo add-apt-repository ppa:v-launchpad-jochen-sprickerhof-de/pcl
sudo apt-get update
sudo apt-get install libpcl-dev # 或 libpcl-all
```

## 问题及处理

### 问题：没有pcl\_viewer

- 解决:

说明编译的时候, cmake参数有误, 或install有问题, 可以检查参数后重新执行  
cmake make

或通过以下命令安装 bash

```
sudo apt install pcl-tools
```

## 问题: 加载pcd文件异常

描述: 执行 `pcl::io::loadPCDFile<PointType>("./assets/xxxx.pcd", *cloud) == -1)`, 控制台报错

```
Process finished with exit code 139 (interrupted by signal 11: SIGSEGV)
```

- 解决:

此时, 很可能是eigen3有问题, 从此处下载离线版eigen3库

<http://bitbucket.org/eigen/eigen/get/3.2.0.tar.bz2>

[http://eigen.tuxfamily.org/index.php?title=Main\\_Page](http://eigen.tuxfamily.org/index.php?title=Main_Page) 在该网站中, 可以下载任意版本对应的文件, 本例下载了Eigen 3.2.0. tar.bz2 格式压缩文件。文件名: eigen-eigen-ffa86ffb5570.tar.bz2

执行如下操作:

1. 卸载原有eigen3:

```
sudo apt-get remove libeigen3-dev --purge
```

1. 重装eigen3

```
# 解压
```

```
tar -jxvf eigen3_3.2.0.orig.tar.bz2
```

```
# 重命名
```

```
mv eigen-eigen-ffa86ffb5570/ eigen3
```

```
# 复制到/usr/local/include/  
sudo cp -r eigen3 /usr/local/include/eigen3  
# 复制到/usr/include/  
sudo cp -r eigen3 /usr/include/eigen3
```

## 问题：metslib cmake 错误

```
no metslib found.
```

- 解决:

```
wget https://www.coin-or.org/download/source/metslib/metslib-  
0.5.3.tgz  
tar xzvf metslib-0.5.3.tgz  
cd metslib-0.5.3  
./configure  
make  
sudo make install
```

## 问题：libpq.so和libvtkIO.so错误

```
[ 13%] Built target pcl_pcd_convert_NaN_nan  
[ 13%] Linking CXX executable ../../bin/pcl_pcd_introduce_nan  
//usr/lib/x86_64-linux-gnu/libpq.so.5: undefined reference to  
`SSL_get_peer_certificate@OPENSSL_1.0.0'  
/usr/lib/libvtkIO.so.5.10.1: undefined reference to  
`TIFFReadDirectory@LIBTIFF_4.0'  
//usr/lib/x86_64-linux-gnu/libpq.so.5: undefined reference to  
`CRYPTO_num_locks@OPENSSL_1.0.0'  
//usr/lib/x86_64-linux-gnu/libpq.so.5: undefined reference to  
`SSL_get_current_compression@OPENSSL_1.0.0'  
//usr/lib/x86_64-linux-gnu/libpq.so.5: undefined reference to  
`SSL_CTX_free@OPENSSL_1.0.0'
```

- 解决:

```
sudo apt-get remove libpq5  
sudo apt-get install libpq-dev
```

## 问题: make时libproj.so

```
make[2]: *** No rule to make target '/usr/lib/x86_64-linux-gnu/libproj.so', needed by 'lib/libpcl_io.so.1.9.1.99'. 停止。
CMakeFiles/Makefile2:499: recipe for target 'io/CMakeFiles/pcl_io.dir/all' failed
```

- 解决:

建立软连接, 终端中输入:

```
sudo ln -s /usr/lib/x86_64-linux-gnu/libproj.so.9 /usr/lib
/x86_64-linux-gnu/libproj.so
```

## 问题: libpng16.so错误

```
//home/ty/anaconda3/lib/libpng16.so.16: undefined reference to
`inflateValidate@ZLIB_1.2.9'
collect2: error: ld returned 1 exit status
src/CMakeFiles/pcl_test.dir/build.make:253: recipe for target
'../build/debug/bin/pcl_test' failed
make[3]: *** [../build/debug/bin/pcl_test] Error 1
```

- 解决:

```
cd /usr/lib/x86_64-linux-gnu
sudo ln -sf ~/anaconda/lib/libpng16.so.16 libpng16.so.16
cd /usr/lib/
sudo ln -sf ~/anaconda/lib/libpng16.so.16 libpng16.so.16
sudo ldconfig
```

或

```
conda remove libpng
sudo apt-get install libpng16-16 --reinstall
```

实在不行编译安装源码:

```
wget https://download.sourceforge.net/libpng/libpng-1.6.37.tar.gz
tar -zxvf libpng-1.6.37.tar.gz
cd libpng-1.6.37/
./configure --prefix=/usr/local/
sudo make && make install
```

问题: /usr/bin/ld: cannot find -lxxx

- 以 `/usr/bin/ld: cannot find -lvtkproj4` 为例
- 解决:

**原因1:** libvtkproj4.so的链接不正确或没有链接, 注意规则是libxxx.so

```
cd /usr/lib
ll | grep -i vtkproj4
# 输出
lrwxrwxrwx    1 root root      21 4月  5  2016
libvtkproj4.so.5.10 -> libvtkproj4.so.5.10.1
-rw-r--r--    1 root root  312320 4月  5  2016
libvtkproj4.so.5.10.1
```

说明没有libvtkproj4.so链接, 则执行以下命令即可:

```
sudo ln -s libvtkproj4.so.5.10 libvtkproj4.so
```

**原因2:** 系统缺少对应的so库, 即/usr/lib下找不到类似的so

则进行搜索并安装

```
sudo apt-cache search libvtkproj4-dev
sudo apt-get install libvtkproj4-dev
```