OpenALPR Compilation from sources on CentOS 7

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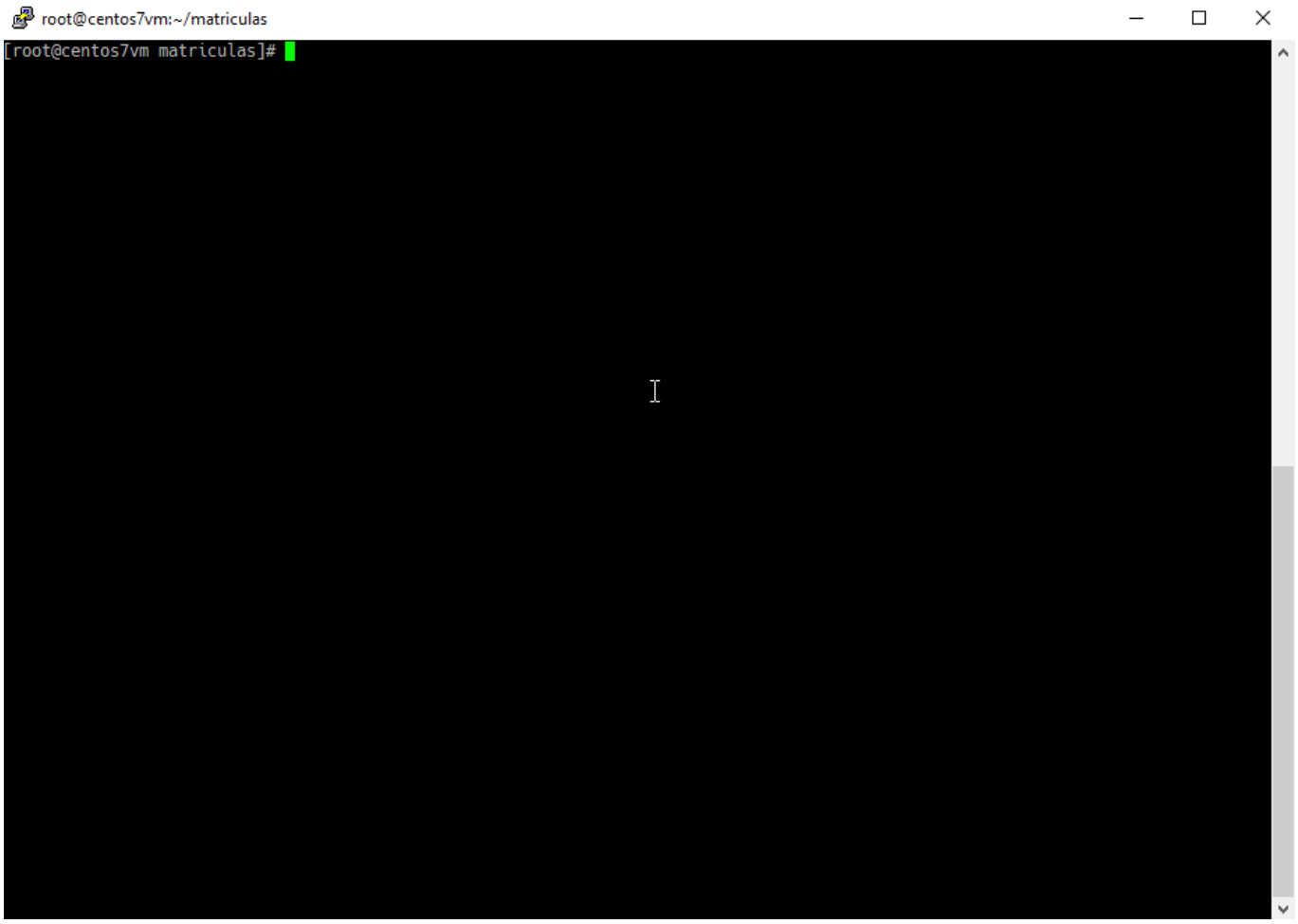
This is my guide to compile **OpenALPR** under Linux CentOS 7 / RedHat, which was a pain since I didn't find any other similar how-to: the official page about OpenALPR just talks about Ubuntu.

OpenALPR is an open source Automatic License Plate Recognition library written in C++ [...] that analyzes images and video streams to identify license plates. The output is the text of any license plate characters found.

Under Windows you can easily test OpenALPR using the official OpenALPR windows installers, but we want binaries for Linux CentOS...

The “rabbit hole” reference:

- OpenALPR github wiki about OpenALPR compilation instructions for Ubuntu Linux - The Easy Way



Too Long, Won't read

If you're feeling lucky, you could put all of this on a bash shell script and execute it, to see if you end up having the `alpr` command available to use.

```
# Installing OpenALPR from sources under CentOS 7

# some "easy" pre-requisites to be able to compile OpenALPR
sudo yum -y install epel-release
sudo yum -y install git wget
sudo yum -y groupinstall "Development tools"
sudo yum -y install cmake cmake3 curl curl-devel log4cplus-devel

# get OpenALPR sources
mkdir ~/src; cd ~/src
git clone https://github.com/openalpr/openalpr.git
cd ~/src/openalpr/src && mkdir build; cd build

# compile Tesseract (and Leptonica), required by OpenALPR
sudo yum -y install autoconf-archive libjpeg-turbo-devel libpng-devel
libtiff-devel zlib-devel
cd ~/src
wget http://www.leptonica.org/source/leptonica-1.81.1.tar.gz
tar -zxvf leptonica-1.81.1.tar.gz
cd leptonica-1.81.1
./configure
make
sudo make install

cd ~/src
wget
https://github.com/tesseract-ocr/tesseract/archive/refs/tags/4.1.1.tar.gz -O
tesseract-4.1.1.tar.gz
tar -zxvf tesseract-4.1.1.tar.gz
cd tesseract-4.1.1
./autogen.sh
export PKG_CONFIG_PATH=/usr/local/lib/pkgconfig && export
LIBLEPT_HEADERSDIR=/usr/local/include
./configure --with-extra-includes=/usr/local/include --with-extra-
libraries=/usr/local/lib LDFLAGS="-L/usr/local/lib" CFLAGS="-
I/usr/local/include"
make -j$(nproc)
sudo make install
sudo ldconfig
cd ~/src/openalpr/runtime_data/ocr/tessdata
wget https://github.com/tesseract-ocr/tessdata/raw/master/spa.traineddata
```

```
# compile OpenCV,  required by OpenALPR
sudo yum -y install epel-release git gcc gcc-c++ cmake3 qt5-qtbase-devel
python python-devel python-pip cmake python-devel python34-numpy gtk2-devel
libpng-devel jasper-devel openexr-devel libwebp-devel libjpeg-turbo-devel
libtiff-devel libdc1394-devel tbb-devel numpy eigen3-devel gstreamer-
plugins-base-devel freeglut-devel mesa-libGL mesa-libGL-devel boost boost-
thread boost-devel libv4l-devel

mkdir ~/src/opencv_build; cd ~/src/opencv_build
git clone https://github.com/opencv/opencv.git
git clone https://github.com/opencv/opencv_contrib.git
cd ~/src/opencv_build/opencv && mkdir build; cd build
cmake3 -D CMAKE_BUILD_TYPE=RELEASE -D CMAKE_INSTALL_PREFIX=/usr/local -D
INSTALL_C_EXAMPLES=ON -D INSTALL_PYTHON_EXAMPLES=ON -D
OPENCV_GENERATE_PKGCONFIG=ON -D
OPENCV_EXTRA_MODULES_PATH=~/src/opencv_build/opencv_contrib/modules -D
BUILD_EXAMPLES=ON ..
# this is going to take some minutes...
make -j$(nproc)
sudo make install
sudo ln -s /usr/local/lib64/pkgconfig/opencv4.pc /usr/share/pkgconfig/
sudo ldconfig
pkg-config --modversion opencv4

# finally, compile OpenALPR
cd ~/src/openalpr/src/build
cmake3 -DCMAKE_CXX_FLAGS="-std=c++11" -DCMAKE_INSTALL_PREFIX:PATH=/usr/local
-DCMAKE_INSTALL_SYSCONFDIR:PATH=/etc ..
make
sudo make install
```

Finally as **root** user:

```
# if [ ! -f /etc/ld.so.conf.d/usrlocal.conf ] ;then echo "/usr/local/lib" >
/etc/ld.so.conf.d/usrlocal.conf; echo "/usr/local/lib64"
>>/etc/ld.so.conf.d/usrlocal.conf; fi
# sudo ldconfig -v
```

This is needed so alpr doesn't complain about finding libraries...

Test it:

```
# alpr --version

alpr  version: 2.3.0
```

```
# alpr --help
[...]
```

LONG VERSION AHEAD:

Step 1. Prepare after a fresh MINIMAL CentOS 7 installation

This guide assumes:

1. A sweet, bare-bones, really Minimal CentOS 7 installation, because I love it that way.
2. Commands will be issued by a non-root user that can `sudo`.

We'll need EPEL repo, wget, git and basic development tools like a C/C++ compiler etc.

```
$ sudo yum -y install epel-release
$ sudo yum -y install git wget
$ sudo yum groupinstall "Development tools"
```

Now we can install cmake (2) and cmake3 (3.17) which is found on EPEL repo

```
# sudo yum install cmake cmake3
```

Now the problem is `cmake` command is 2.8 and `cmake3` the version we need. Thanks to this guide about Installing the latest git/cmake versions on RHEL/Centos.

The relevant part is to execute the following two commands, assuming you have installed `cmake` AND `cmake3`:

```
sudo alternatives --install /usr/local/bin/cmake cmake /usr/bin/cmake 10 \
--slave /usr/local/bin/ctest ctest /usr/bin/ctest \
--slave /usr/local/bin/cpack cpack /usr/bin/cpack \
--slave /usr/local/bin/ccmake ccmake /usr/bin/ccmake \
--family cmake

sudo alternatives --install /usr/local/bin/cmake cmake /usr/bin/cmake3 20 \
--slave /usr/local/bin/ctest ctest /usr/bin/ctest3 \
--slave /usr/local/bin/cpack cpack /usr/bin/cpack3 \
--slave /usr/local/bin/ccmake ccmake /usr/bin/ccmake3 \
--family cmake
```

Test `cmake` version:

```
$ cmake --version
cmake3 version 3.17.5
```

So in case we need to switch back `cmake` to be 2 or 3, we'll be able to change the default `cmake` version using:

```
$ sudo alternatives --config cmake
```

Step 2. Let's try to compile OpenALPR, that requires Tesseract

Prepare to build OpenALPR:

```
$ mkdir ~/src; cd ~/src
$ git clone https://github.com/openalpr/openalpr.git
$ cd ~/src/openalpr/src && mkdir build; cd build
```

First shot, **note** that CMAKE_INSTALL_PREFIX has to be `/usr/local` in CentOS distro, otherwhise problems will arise regarding “Set runtime path” to a blank path for binaries and libraries when we execute the command `sudo make install` later.

```
$ cmake -DCMAKE_INSTALL_PREFIX:PATH=/usr/local -
DCMAKE_INSTALL_SYSCONFDIR:PATH=/etc ..
[...]
**ERROR: Required library Tesseract NOT FOUND.
```

If you get this other error: CMake 3.1 or higher is required. You are running version 2.8.12.2 then you didn't properly follow the step 1 of this guide, or just use `cmake3` command instead of `cmake`.

So... **ERROR: Required library Tesseract NOT FOUND.**

Fine... **Tesseract** is a an *OCR engine* that OpenALPR needs so we need to install it too.

A) The Short path: we can install the default, Old `tesseract` version from our distro repos, which is 3.04 and it's aged.

```
$ sudo yum install tesseract tesseract-devel tesseract-langpack-spa
```

Or we can go...

B) The Long path: install the shiny Tesseract version 4, reference: https://www.hoangdung.net/2020/01/how-to-install-tesseract-4-on-centos-7.html

First we need to compile **Leptonica** (a software for image processing and analysis), which is a dependency of Tesseract.

```
$ sudo yum -y install autoconf-archive libjpeg-turbo-devel libpng-devel
libtiff-devel zlib-devel
$ cd ~/src
$ wget http://www.leptonica.org/source/leptonica-1.81.1.tar.gz
$ tar -zxvf leptonica-1.81.1.tar.gz
$ cd leptonica-1.81.1
$ ./configure
$ make
$ sudo make install
```

Check if libpng is installed: type `whereis libpng` and expect to see a directory; a blank line is not

good

Check if leptonica is installed: type `ls /usr/local/include` and expect to see “leptonica”

Now let's compile the latest Tesseract released, 4.1.1 at the time of this writing. The process was smooth too:

```
$ cd ~/src
$ wget
https://github.com/tesseract-ocr/tesseract/archive/refs/tags/4.1.1.tar.gz -O
tesseract-4.1.1.tar.gz
$ tar -zxvf tesseract-4.1.1.tar.gz
$ cd tesseract-4.1.1
$ ./autogen.sh
$ export PKG_CONFIG_PATH=/usr/local/lib/pkgconfig && export
LIBLEPT_HEADERSDIR=/usr/local/include
$ ./configure --with-extra-includes=/usr/local/include --with-extra-
libraries=/usr/local/lib LDFLAGS="-L/usr/local/lib" CFLAGS="-
I/usr/local/include"
$ make -j$(nproc)
$ sudo make install
$ sudo ldconfig
```

We have additional trained data here: https://github.com/tesseract-ocr/tessdata/

```
$ sudo yum install mlocate
$ sudo updatedb
$ locate traineddata
$ cd ~/src/openalpr/runtime_data/ocr/tessdata
```

Latest Spanish trained data:

```
$ wget https://github.com/tesseract-ocr/tessdata/raw/master/spa.traineddata
```

Step 3. We have Tesseract, now we need OpenCV

Let's try to configure `openalpr` using cmake again:

```
$ cd ~/src/openalpr/src/build
```

The next complain will be about OpenCV not installed.

```
$ cmake -DCMAKE_INSTALL_PREFIX:PATH=/usr/local -
DCMAKE_INSTALL_SYSCONFDIR:PATH=/etc ..
[...]
```

```
blablah OpenCV blah blah
```

So we need **OpenCV**, a real-time optimized Computer Vision library, another dependency of *OpenALPR*.

We have a “opencv-devel” package from official CentOS 7 repos, but...

```
$ sudo yum list opencv-devel
```

OpenCV from CentOS 7 repos is version 2.4.5 which won't be enough:

```
$ cmake -DCMAKE_INSTALL_PREFIX:PATH=/usr/local -
DCMAKE_INSTALL_SYSCONFDIR:PATH=/etc ..
[...]
ERROR: OpenCV version is not compatible : 2.4.5
```

Sweet... Let's cleanup if we installed it:

```
$ sudo yum remove opencv-devel opencv opencv-core
```

Why not, we're going to build OpenCV from sources to get OpenCV **4.x**, which is a bit of extra pain, but this guide helped: https://linuxize.com/post/how-to-install-opencv-on-centos-7/

```
$ sudo yum -y install epel-release git gcc gcc-c++ cmake3 qt5-qtbase-devel
python python-devel python-pip cmake python-devel python34-numpy gtk2-devel
libpng-devel jasper-devel openexr-devel libwebp-devel libjpeg-turbo-devel
libtiff-devel libdc1394-devel tbb-devel numpy eigen3-devel gstreamer-
plugins-base-devel freeglut-devel mesa-libGL mesa-libGL-devel boost boost-
thread boost-devel libv4l-devel
```

```
$ mkdir ~/src/opencv_build; cd ~/src/opencv_build
```

```
$ git clone https://github.com/opencv/opencv.git
$ git clone https://github.com/opencv/opencv_contrib.git
```

```
$ cd ~/src/opencv_build/opencv && mkdir build; cd build

$ cmake3 -D CMAKE_BUILD_TYPE=RELEASE -D CMAKE_INSTALL_PREFIX=/usr/local -D
INSTALL_C_EXAMPLES=ON -D INSTALL_PYTHON_EXAMPLES=ON -D
OPENCV_GENERATE_PKGCONFIG=ON -D
OPENCV_EXTRA_MODULES_PATH=~/src/opencv_build/opencv_contrib/modules -D
BUILD_EXAMPLES=ON ..
```

This is going to take some minutes (nproc here is to inject number of CPUs available):

```
$ make -j$(nproc)
```

Everything ok? Then

```
$ sudo make install
```

```
$ sudo ln -s /usr/local/lib64/pkgconfig/opencv4.pc /usr/share/pkgconfig/
$ sudo ldconfig
```

Check the OpenCV version available now:

```
$ pkg-config --modversion opencv4
4.5.3
```

Step 4. More dependencies

Let's try again to configure OpenALPR

TLDR; `sudo yum install curl curl-devel log4cplus-devel`

```
$ cd ~/src/openalpr/src/build
```

```
$ cmake -DCMAKE_INSTALL_PREFIX:PATH=/usr/local -
DCMAKE_INSTALL_SYSCONFDIR:PATH=/etc ..
[...]
ERROR:   Could NOT find CURL (missing: CURL_LIBRARY CURL_INCLUDE_DIR)
```

Great... let's install curl-devel

```
$ sudo yum install curl curl-devel
```

Trying again...

```
$ cmake -DCMAKE_INSTALL_PREFIX:PATH=/usr/local -
DCMAKE_INSTALL_SYSCONFDIR:PATH=/etc ..
[...]
ERROR: Required library log4cplus NOT FOUND.
```

Fine, let's install log4cplus-devel

```
$ sudo yum install log4cplus-devel
```

Should be OK now!

```
$ cmake -DCMAKE_INSTALL_PREFIX:PATH=/usr/local -
DCMAKE_INSTALL_SYSCONFDIR:PATH=/etc ..
[...]
-- Build files have been written to: .../src/openalpr/src/build
```

Step 5. Dependencies resolved, let's try to make

Let's finally compile this thing.

TLDR;
`cmake…, make, sudo make install`

```
$ cd ~/src/openalpr/src/build
$ cmake -DCMAKE_CXX_FLAGS="-std=c++11" -
DCMAKE_INSTALL_PREFIX:PATH=/usr/local -
DCMAKE_INSTALL_SYSCONFDIR:PATH=/etc ..
$ make
$ sudo make install
```

The `alpr` command should be available now

Long version:

```
$ cd ~/src/openalpr/src/build
```

Let's try make:

```
$ make
[...] error: #error "OpenCV 4.x+ requires enabled C++11 support"
[...]
make[2]: *** [video/CMakeFiles/video.dir/videobuffer.cpp.o] Error 1
```

It's complaining about enabling `C++11 support` which we can fix using `-DCMAKE_CXX_FLAGS="-std=c++11"` at cmake call (took me a bit of research to fix):

Cleanup first:

```
$ make clean
```

Redo the cmake call:

```
$ cmake -DCMAKE_CXX_FLAGS="-std=c++11" -
DCMAKE_INSTALL_PREFIX:PATH=/usr/local -DCMAKE_INSTALL_SYSCONFDIR:PATH=/etc
..
```

Try again make and it should go well now:

```
$ make
```

```
$ sudo make install
```

Evertyhing ok?

Finally, alpr command available, but it works?

Let's try if the `alpr` command is finally available:

```
$ alpr
alpr: error while loading shared libraries: libopenalpr.so.2: cannot open
shared object file: No such file or directory
```

Sweet... Another clusterf*ck I had to research a bit.

Create a new file named `/etc/ld.so.conf.d/usrlocal.conf` and put these lines:

```
/usr/local/lib
/usr/local/lib64
```

```
$ sudo ldconfig -v
```

Let's try again:

```
$ alpr --version
alpr  version: 2.3.0
```

Woohoo! alpr command actually works

Get an image of a vehicle plate, say `plate.jpg`.

```
$ alpr --help
```

Try an image (by default “us” country is used).

```
$ alpr plate.jpg
```

You can try “eu” as country and limit guess at 2 top matches:

```
$ alpr -c eu -n 2 plate.jpg
plate0: 2 results
  - 2008ZGZ    confidence: 94.4568
  - 20Q8ZGZ    confidence: 87.0557
```

~~DISCUSSION|Comentarios~~

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