

# 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](#)

## 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 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 cmake3 cmake
```

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/git git /usr/bin/git 10 \
--slave /usr/local/git-receive-pack git-receive-pack /usr/bin/git-receive-pack \
```

```
--slave /usr/local/git-shell git-shell /usr/bin/git-shell \  
--slave /usr/local/git-upload-archive git-upload-archive /usr/bin/git-  
upload-archive \  
--slave /usr/local/git-upload-pack git-upload-pack /usr/bin/git-upload-pack \  
--family git  
  
sudo alternatives --install /usr/local/bin/git git /usr/local/git/bin/git 20 \  
\  
--slave /usr/local/git-cvsserver git-cvsserver /usr/local/git/bin/git-  
cvsserver \  
--slave /usr/local/git-receive-pack git-receive-pack /usr/local/git/bin/git-  
receive-pack \  
--slave /usr/local/git-shell git-shell /usr/local/git/bin/git-shell \  
--slave /usr/local/git-upload-archive git-upload-archive  
/usr/local/git/bin/git-upload-archive \  
--slave /usr/local/git-upload-pack git-upload-pack /usr/local/git/bin/git-  
upload-pack \  
--slave /usr/local/gitk gitk /usr/local/git/bin/gitk \  
--family git
```

Test cmake version:

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

So \*if we need\* to switch to cmake version 2 in the future, 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, otherwise 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.
```

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

Fine... **Tesseract** is a an *OCR engine* that OpenALPR needs.

**A) The Short path:** we can install the default, old tesseract from our distro repos:

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

Or we can go...

**B) The Long path:** install the Latest Tesseract, 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 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  
$ 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 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**

```
$ 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

```
$ 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
```

Everything ok?

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 is available

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
```

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