

# Intallation of LOFAR in Red Hat Enterprise 5.8

This is the description of the installation of LOFAR on the cluster of the [IAA](#) in [Granada](#). It bundles an old version of Red Hat Enterprise Linux that does not contain many of the new libraries required by LOFAR.

Description of the system:

- Operating system: Red Hat Enterprise Linux Server release 5.8 (Tikanga)
- PBS queue system: [TORQUE](#)
- Libraries available: HDF5 and old versions of boost and fftw3.

After some tests we determined that we needed to install, at least, the following software and libraries:

- scons
- WCS
- lapack
- atlas
- fftw3
- Python
  - numpy
- Boost
- LOFAR related:
  - casacore
  - pyrap
  - casarest
  - LOFAR (Loflm)

## Installation steps

The software was installed in the home of the user `jsm` (`/home/users/dae/jsm`). You should change the scripts accordingly.

Previous steps:

```
## Create the installation directory
mkdir -p /home/users/dae/jsm/local/src
cd /home/users/dae/jsm/local/src
```

Download and copy the data:

```
# scons
wget http://prdownloads.sourceforge.net/scons/scons-2.3.0.tar.gz
# WCS
wget ftp://ftp.atnf.csiro.au/pub/software/wcslib/wcslib.tar.bz2
# lapack
```

```
wget http://www.netlib.org/lapack/lapack-3.4.2.tgz
# atlas
wget http://prdownloads.sourceforge.net/math-atlas/Developer%20%28unstable%29/3.11.11/atlas3.11.11.tar.bz2
# FFTW3
wget http://www.fftw.org/fftw-3.3.3.tar.gz
# Boost
wget
http://prdownloads.sourceforge.net/boost/boost/1.54.0/boost_1_54_0.tar.gz
# LOFAR related software
# casacore
#svn co http://casacore.googlecode.com/svn/tags/casacore-1.5.0
cp -r /home/users/dae/jsm/local-v0/src/casacore-1.5.0 .
rm -rf casacore-1.5.0/build
# pyrap
#svn co http://pyrap.googlecode.com/svn/tags/pyrap-1.1.0
cp -r /home/users/dae/jsm/local-v0/src/pyrap-1.1.0 .
# casarest
#svn co https://svn.astron.nl/casarest/trunk/casarest/
cp -r /home/users/dae/jsm/local-v0/src/casarest .
rm -rf casarest/build
```

We had already got a copy of the LOFAR software with SVN in /home/users/dae/jsm/LOFAR:

```
# LOFAR
cp -r /home/users/dae/jsm/LOFAR .
```

We used the following paths:

```
# PATH
export
PATH=/home/users/dae/jsm/local/bin:/home/users/dae/jsm/python/bin:/usr/local/casapy-stable-42.0.25430-001-64b:/usr/local/iraf/bin:/usr/local/mpich-install/bin:/usr/local/bin:/bin:/usr/bin
# LD_LIBRARY_PATH
export
LD_LIBRARY_PATH=/home/users/dae/jsm/local/lib:/home/users/dae/jsm/local/atlas/lib:/home/users/dae/jsm/python/lib:/usr/local/hdf5-1.8.11-linux-x86_64-shared/lib:/usr/local/mpich-install/lib:/usr/local/lib
```

Install Python and their important libraries:

```
# Compile
mkdir -p /home/users/dae/jsm/python/src
cd /home/users/dae/jsm/python/src
# Download Python **** CHANGE
# Extract Python **** CHANGE
cd Python-2.7.5
./configure --prefix=/home/users/dae/jsm/python --enable-shared
make
```

**make install**

```
# Install zeromq (used by IPython parallel)
cd /home/users/dae/jsm/python/src
wget http://download.zeromq.org/zeromq-3.2.4.tar.gz
tar xzf zeromq-3.2.4.tar.gz
cd zeromq-3.2.4
./configure --prefix=/home/users/dae/jsm/local
make
make install

# Install easy install and pip
cd /home/users/dae/jsm/python/src
wget https://bitbucket.org/pypa/setuptools/raw/bootstrap/ez_setup.py
python ez_setup.py
wget https://raw.githubusercontent.com/pypa/pip/master/contrib/get-pip.py
# rm -r /tmp/pip-build-jsm/pip
python get-pip.py

# Install packages
pip install virtualenv
pip install numpy
pip install h5py
pip install scipy
pip install matplotlib
pip install pandas
pip install pyfits
pip install pywcs
pip install astropy
pip install cython

# Install pyzmq
cd /home/users/dae/jsm/python/src
wget https://pypi.python.org/packages/source/p/pyzmq/pyzmq-13.0.2.tar.gz --no-check-certificate
tar xzf pyzmq-13.0.2.tar.gz
cd pyzmq-13.0.2
python setup.py configure --zmq=/home/users/dae/jsm/local/
python setup.py install

# Install IPython
cd /home/users/dae/jsm/python/src
pip install ipython[all]
```

From now on we need to enter an interactive PBS job to avoid our jobs to be killed after certain amount of time (the maximum allowed lenght for a job without using PBS is 10 minutes). The nodes do not have direct access to the Internet (that is why they were previously downloaded):

```
### Enter interactive qsub session
qsub -I -X -N LOFAR_soft
```

```
## Update the PATH and the LD_LIBRARY_PATH
# PATH
export
PATH=/home/users/dae/jsm/local/bin:/home/users/dae/jsm/python/bin:/usr/local
/hdf5-1.8.11-linux-x86_64-shared/bin:/usr/local/casapy-
stable-42.0.25430-001-64b:/usr/local/iraf/bin:/usr/local/mpich-
install/bin:/usr/local/bin:/bin:/usr/bin
# LD_LIBRARY_PATH
export
LD_LIBRARY_PATH=/home/users/dae/jsm/local/lib:/home/users/dae/jsm/local/atlas
/lib:/home/users/dae/jsm/python/lib:/usr/local/hdf5-1.8.11-linux-x86_64-
shared/lib:/usr/local/mpich-install/lib:/usr/local/lib
```

Compile the libraries and tools:

```
## scon
cd /home/users/dae/jsm/local/src
tar xfz scon-2.3.0.tar.gz
cd scon-2.3.0
python setup.py install --prefix=/home/users/dae/jsm/local
```

```
## ATLAS + LAPACK + BLAS
cd /home/users/dae/jsm/local/src
tar xfj atlas3.11.11.tar.bz2
mkdir -p ATLAS/build
cd ATLAS/build
../configure -b 64 -D c -DPentiumCPS=2932 --shared \
--prefix=/home/users/dae/jsm/local/atlas \
--with-netlib-lapack-
tarfile=/home/users/dae/jsm/local/src/lapack-3.4.2.tgz
make build
make check
make ptcheck
make time
make install
ln -s /home/users/dae/jsm/local/atlas/lib/libcblas.a \
/home/users/dae/jsm/local/atlas/lib/libblas.a
```

```
## WCS
cd /home/users/dae/jsm/local/src
tar xfj wcslib.tar.bz2
cd wcslib-4.19
./configure --prefix=/home/users/dae/jsm/local/
make
make install
```

```
## FFTW3
```

```

cd /home/users/dae/jsm/local/src
tar xfz fftw-3.3.3.tar.gz
cd fftw-3.3.3
./configure --enable-threads --enable-shared \
  --prefix=/home/users/dae/jsm/local/
make
make install
make clean
./configure --enable-threads --enable-shared --enable-float \
  --prefix=/home/users/dae/jsm/local/
make
make install

## Boost
cd /home/users/dae/jsm/local/src
tar xfz boost_1_54_0.tar.gz
cd boost_1_54_0
./bootstrap.sh --prefix=/home/users/dae/jsm/local \
  --with-python=/home/users/dae/jsm/python/bin/python
./b2
./b2 install

```

#### Compile casacore

```

## casacore
cd /home/users/dae/jsm/local/src
cd casacore-1.5.0
mkdir build; cd build
cmake .. -DWCSSLIB_LIBRARY=/home/users/dae/jsm/local/lib/libwcs.so \
  -DWCSSLIB_INCLUDE_DIR=/home/users/dae/jsm/local/include/ \
  -DCMAKE_INSTALL_PREFIX=/home/users/dae/jsm/local/casacore \
  -DUSE_HDF5=ON -DUSE_FFTW3=ON \
  -DHDF5_ROOT_DIR=/usr/local/hdf5-1.8.11-linux-x86_64-shared \
  -DLAPACK_LIBRARIES=/home/users/dae/jsm/local/atlas/lib/liblapack.a
\
-
DBLAS_LIBRARIES=/home/users/dae/jsm/local/atlas/lib/libf77blas.a\;/home/user
s/dae/jsm/local/atlas/lib/libcblas.a\;/home/users/dae/jsm/local/atlas/lib/li
batlas.a \
  -DBLA_VENDOR=ATLAS \
  -DFFTW3_LIBRARY=/home/users/dae/jsm/local/lib/libfftw3.so \
-
DFFTW3_THREADS_LIBRARY=/home/users/dae/jsm/local/lib/libfftw3_threads.so \
  -DFFTW3F_LIBRARY=/home/users/dae/jsm/local/lib/libfftw3f.so \
-
DFFTW3F_THREADS_LIBRARY=/home/users/dae/jsm/local/lib/libfftw3f_threads.so \
  -DFFTW3_INCLUDE=/home/users/dae/jsm/local/include/ \
  -DCMAKE_Fortran_COMPILER:FILEPATH=/usr/bin/gfortran
make

```

## make install

Install pyrap (scons needed):

```
## pyrap
cd /home/users/dae/jsm/local/src
cd pyrap-1.1.0
## PATCH pyrap *****
python batchbuild.py --boost-root=/home/users/dae/jsm/local \
--casacore-root=/home/users/dae/jsm/local/casacore \
--enable-hdf5 --hdf5-root=/usr/local/hdf5-1.8.11-linux-x86_64-shared \
--lapack-root=/home/users/dae/jsm/local/atlas \
--wcs-root=/home/users/dae/jsm/local \
--prefix=/home/users/dae/jsm/local
```

Install casarest

```
## casarest
cd /home/users/dae/jsm/local/src
cd casarest
mkdir build; cd build
cmake .. -DBOOST_ROOT=/home/users/dae/jsm/local \
-DLAPACK_LIBRARIES=/home/users/dae/jsm/local/atlas/lib/liblapack.a
\
-DLAPACK_INCLUDE=/home/users/dae/jsm/local/atlas/include/ \
-
DBLAS_LIBRARIES=/home/users/dae/jsm/local/atlas/lib/libf77blas.a;/home/user
s/dae/jsm/local/atlas/lib/libcblas.a;/home/users/dae/jsm/local/atlas/lib/li
batlas.a \
-DDBLAS_INCLUDE=/home/users/dae/jsm/local/atlas/include/ \
-DWCSLIB_LIBRARY=/home/users/dae/jsm/local/lib/libwcs.so \
-DWCSLIB_INCLUDE_DIR=/home/users/dae/jsm/local/include/ \
-DCASACORE_ROOT_DIR=/home/users/dae/jsm/local/casacore \
-DCMAKE_INSTALL_PREFIX=/home/users/dae/jsm/local/casarest \
-DHDF5_ROOT_DIR=/usr/local/hdf5-1.8.11-linux-x86_64-shared \
-
DLIB_EXTRA_SYNTHESIS=/home/users/dae/jsm/local/atlas/lib/libcblas.a;/home/u
sers/dae/jsm/local/atlas/lib/libatlas.a \
-DBUILD_ALL=1
make
make install
```

Install LOFAR:

```
cd /home/users/dae/jsm/local/src
#cp -r ~/LOFAR .
cd LOFAR
### PATCH LOFAR *****
mkdir -p build/gnu_opt; cd build/gnu_opt
mkdir /home/users/dae/jsm/local/LofIm
```

```

cmake ../.. -DBUILD_SHARED_LIBS=ON \
  -DCMAKE_INSTALL_PREFIX=/home/users/dae/jsm/local/LofIm \
  -DUSE_LOG4CPLUS=OFF \
  -DBOOST_ROOT=/home/users/dae/jsm/local \
  -DHDF5_ROOT_DIR=/usr/local/hdf5-1.8.11-linux-x86_64-shared \
  -DWCSSLIB_LIBRARY=/home/users/dae/jsm/local/lib/libwcs.so \
  -DWCSSLIB_INCLUDE_DIR=/home/users/dae/jsm/local/include/ \
  -
DLAPACK_LIBRARIES=/home/users/dae/jsm/local/atlas/lib/libf77blas.a\;/home/us
ers/dae/jsm/local/atlas/lib/libcblas.a\;/home/users/dae/jsm/local/atlas/lib/
libatlas.a\;/home/users/dae/jsm/local/atlas/lib/liblapack.a \
  -
DBLAS_LIBRARIES=/home/users/dae/jsm/local/atlas/lib/libf77blas.a\;/home/user
s/dae/jsm/local/atlas/lib/libcblas.a\;/home/users/dae/jsm/local/atlas/lib/li
batlas.a\;/home/users/dae/jsm/local/atlas/lib/liblapack.a \
  -DFFTW3_LIBRARY=/home/users/dae/jsm/local/lib/libfftw3.so \
  -DFFTW3_THREADS_LIBRARY=/home/users/dae/jsm/local/lib/libfftw3_threads.so \
  -
  -DFFTW3F_LIBRARY=/home/users/dae/jsm/local/lib/libfftw3f.so \
  -
DFFTW3F_THREADS_LIBRARY=/home/users/dae/jsm/local/lib/libfftw3f_threads.so \
  -DFFTW3_INCLUDE=/home/users/dae/jsm/local/include/ \
  -DCASACORE_ROOT_DIR=/home/users/dae/jsm/local/casacore \
  -
DCASA_CASA_LIBRARY=/home/users/dae/jsm/local/casacore/lib/libcasa_casa.so\;/
home/users/dae/jsm/local/atlas/lib/libf77blas.a\;/home/users/dae/jsm/local/a
tlas/lib/libcblas.a\;/home/users/dae/jsm/local/atlas/lib/libatlas.a\;/home/u
sers/dae/jsm/local/atlas/lib/liblapack.a \
  -DUSE_OPENMP=ON \
  -DBUILD_PACKAGES=Offline\;LofarFT\;StaticMetaData\;SPW_Combine \
  -DCASAREST_ROOT_DIR=/home/users/dae/jsm/local/casarest/ \
  -DPYTHON_LIBRARY=/home/users/dae/jsm/python/lib/libpython2.7.so \
  -DPYTHON_EXECUTABLE:FILEPATH=/home/users/dae/jsm/python/bin/python \
  -DPYTHON_INCLUDE_DIR:PATH=/home/users/dae/jsm/python/include \
  -DPYRAP_INCLUDE_DIR=/home/users/dae/jsm/local/include/pyrap \
  -DPYRAP_LIBRARY=/home/users/dae/jsm/local/lib/libpyrap.so \
  -DCMAKE_Fortran_COMPILER:FILEPATH=/usr/bin/gfortran \
  -DF2PY_FCOMPILER=gnu95 2>&1 | tee log.txt
make
make install

```

Finish the installation ():

- Configure .bashrc
- Configure .casarc

## Patches needed

pyrap and LOFAR need to be patched to allow them to compile in this old system.

## Problems

From:

<https://www.astron.nl/lofarwiki/> - **LOFAR Wiki**

Permanent link:

[https://www.astron.nl/lofarwiki/doku.php?id=public:install\\_lofar\\_redhat5.8&rev=1381398945](https://www.astron.nl/lofarwiki/doku.php?id=public:install_lofar_redhat5.8&rev=1381398945)

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