

Configure time-zone

```
sudo dpkg-reconfigure tzdata
```

Ros Prerequisites

```
sudo update-locale LANG=C LANGUAGE=C LC_ALL=C LC_MESSAGES=POSIX sudo sh -c  
'echo "deb http://packages.ros.org/ros/ubuntu xenial main" > /etc/apt/sources.list.d/ros-  
latest.list' wget https://raw.githubusercontent.com/ros/rosdistro/master/ros.key -O - |  
sudo apt-key add - sudo apt-get update
```

Ros installation (Kinetic for ubuntu 16.04)

```
sudo apt-get -y install ros-kinetic-ros-base --allow-unauthenticated
```

Python Dependencies

```
sudo apt-get -y install python-rosdep python-dev python-pip python-rosinstall python-  
wstool --allow-unauthenticated
```

sudo c_rehash /etc/ssl/certs #TX1 has problems with the imaging of its certificates. If this step is not followed rosdep init will fail

```
sudo rosdep init rosdep update echo "source /opt/ros/kinetic/setup.bash" >> ~/.bashrc  
source ~/.bashrc
```

Ros packages

```
sudo apt-get -y install ros-kinetic-rosserial-arduino --allow-unauthenticated sudo apt-get -y  
install ros-kinetic-rosserial --allow-unauthenticated sudo apt-get -y install ros-kinetic-  
eigen-conversions --allow-unauthenticated sudo apt-get -y install ros-kinetic-tf2-geometry-  
msgs --allow-unauthenticated sudo apt-get -y install ros-kinetic-angles --allow-  
unauthenticated sudo apt-get -y install ros-kinetic-web-video-server --allow-  
unauthenticated sudo apt-get -y install ros-kinetic-rosbridge-suite --allow-unauthenticated  
sudo apt-get -y install ros-kinetic-rospy-tutorials --allow-unauthenticated sudo apt-get -y  
install ros-kinetic-joy --allow-unauthenticated sudo apt-get -y install ros-kinetic-teleop-  
twist-joy --allow-unauthenticated sudo apt-get -y install ros-kinetic-roslint --allow-  
unauthenticated sudo apt-get -y install ros-kinetic-controller-manager --allow-  
unauthenticated sudo apt-get -y install ros-kinetic-camera-calibration-parsers --allow-  
unauthenticated sudo apt-get -y install ros-kinetic-xacro --allow-unauthenticated sudo apt-  
get -y install ros-kinetic-robot-state-publisher --allow-unauthenticated sudo apt-get -y  
install ros-kinetic-diff-drive-controller --allow-unauthenticated sudo apt-get -y install ros-
```

```
kinetic-ros-control --allow-unauthenticated sudo apt-get -y install ros-kinetic-dynamic-reconfigure --allow-unauthenticated sudo apt-get -y install ros-kinetic-fake-localization --allow-unauthenticated sudo apt-get -y install ros-kinetic-joint-state-controller --allow-unauthenticated
```

USB_CAM package is not integrated in ROS Kinetic repository, you need to install it from source

```
cd ~/catkin_ws/src git clone https://github.com/bosch-ros-pkg/usb_cam.git cd ..
```

Configure Catkin Workspace

```
source /opt/ros/kinetic/setup.bash cd ~/catkin_ws/src catkin_init_workspace
```

Install Ros Opencv bindings from source (If the vision_opencv package fails compilation, please download it and move to your catkin workspace and catkin_make)

```
cd ~/catkin_ws wstool init src src/rosjet/TX1_rosjet.rosinstall wstool merge -t src src/rosjet/TX1_rosjet.rosinstall wstool update -t src
```

Install Caffe

```
sudo add-apt-repository universe sudo apt-get update -y /bin/echo -e "[1;32mLoading Caffe Dependencies.[0m" sudo apt-get install cmake -y # General Dependencies sudo apt-get install libprotobuf-dev libleveldb-dev libsnpappy-dev libhdf5-serial-dev protobuf-compiler -y sudo apt-get install --no-install-recommends libboost-all-dev -y # BLAS sudo apt-get install libatlas-base-dev -y # Remaining Dependencies sudo apt-get install libgflags-dev libgoogle-glog-dev liblmdb-dev -y sudo apt-get install python-dev python-numpy -y
```

```
sudo usermod -a -G video $USER /bin/echo -e "[1;32mCloning Caffe into the home directory[0m" # Place caffe in the home directory cd $HOME # Git clone Caffe git clone https://github.com/BVLC/caffe.git cd caffe cp Makefile.config.example Makefile.config # Regen the makefile; On 16.04, aarch64 has issues with a static cuda runtime cmake -DCUDA_USE_STATIC_CUDA_RUNTIME=OFF # Include the hdf5 directory for the includes; 16.04 has issues for some reason echo "INCLUDE_DIRS += /usr/include/hdf5/serial/" >> Makefile.config /bin/echo -e "[1;32mCompiling Caffe[0m" make -j4 all
```

Run the tests to make sure everything works - This takes a really long time, so comment it if you want to run it later.

```
/bin/echo -e "[1;32mRunning Caffe Tests[0m" make -j4 runtest
```

System Optimizations

```
gsettings set org.gnome.settings-daemon.plugins.power button-power shutdown gsettings  
set org.gnome.desktop.screensaver lock-enabled false sudo apt-get -y install compizconfig-  
settings-manager gsettings set org.gnome.desktop.interface enable-animations false  
gsettings set com.canonical.Unity.Lenses remote-content-search none echo -e  
'[SeatDefaults]-user=ubuntu' > login_file; sudo mv login_file /etc/lightdm/lightdm.conf  
gsettings set org.gnome.Vino enabled true gsettings set org.gnome.Vino disable-  
background true gsettings set org.gnome.Vino prompt-enabled false gsettings set  
org.gnome.Vino require-encryption false
```

```
echo "alias sr='source ~/catkin_ws/devel/setup.bash'" >> ~/.bashrc
```

```
cd ~/catkin_ws catkin_make && source devel/setup.sh
```

Before starting with ROS, you might want to remove OpenCV4Tegra if you had flashed that from JetPack, and install OpenCV 3.1 instead as there are some configurations issues that needs to be resolved for using OpenCV4Tegra with ROS Kinetic. (Note: OpenCV4Tegra is designed in such a way that it utilizes the power of the Nvidia GPU. OpenCV 3.1 only uses CPU.)

Comment out all the lines from below if you want to continue with OpenCV4Tegra.

Uninstalling OpenCV4Tegra

```
sudo apt-get purge libopencv4tegra-dev libopencv4tegra sudo apt-get purge  
libopencv4tegra-repo sudo apt-get update
```

OpenCV 3.1 Installation

```
sudo apt-get install build-essential sudo apt-get install cmake git libgtk2.0-dev pkg-config  
libavcodec-dev libavformat-dev libswscale-dev sudo apt-get install libgstreamer1.0-dev
```

```
libgstreamer-plugins-base1.0-dev sudo apt-get install python2.7-dev sudo apt-get install  
python-dev python-numpy libtbb2 libtbb-dev libjpeg-dev libpng-dev libtiff-dev libjasper-  
dev libdc1394-22-dev sudo apt-get install libgtkglext1 libgtkglext1-dev sudo apt-get install  
qtbase5-dev sudo apt-get install libv4l-dev v4l-utils qv4l2 v4l2ucp git clone  
https://github.com/opencv/opencv.git curl -L  
https://github.com/opencv/opencv/archive/3.2.0.zip -o opencv-3.2.0.zip unzip opencv-  
3.2.0.zip cd opencv-3.2.0 mkdir release cd release cmake -D WITH_CUDA=ON -D  
CUDA_ARCH_BIN="5.3" -D CUDA_ARCH_PTX="" -D WITH_OPENGL=ON -D  
WITH_LIBV4L=ON -D CMAKE_BUILD_TYPE=RELEASE -D  
CMAKE_INSTALL_PREFIX=/usr/local .. make -j4 sudo make install
```