PyQt for Autodesk Maya 2016 64bit

#### Written by Cyrille Fauvel – Autodesk Developer Network (April 2013)

#### Updated by Vijaya Prakash – Autodesk Developer Network (May 2015)

Building SIP, and PyQt for Maya 2016

PyQt [[http://www.riverbankcomputing.co.uk](http://www.riverbankcomputing.co.uk/)] is a python binding to the Qt library. Because Maya uses Qt internally, you can use the PyQt modules in Maya python scripts to create custom UI. PyQt does not have the same licensing as Maya, Qt, or Python. Please consult the PyQt website for information about licensing for PyQt.

Download PyQt: <http://www.riverbankcomputing.com/software/pyqt/download>

Download SIP: <http://www.riverbankcomputing.com/software/sip/download>

The following are instructions for building a copy of the PyQt modules that have been known to work with Maya.

Maya 2016 uses Qt4.8.6 which is binary compatible with the latest version of PyQt - 4.11.3 / SIP - 4.16.7 (at time of writing, May 2015).

Note that it’s important to use the Maya modified version of the Qt source code. A copy of the customized Qt 4.8.6 source is available from Autodesk's Open Source web-site (<http://www.autodesk.com/lgplsource>) and includes text files describing how to configure, build and install Qt for each platform supported by Maya.

However, be aware that with Maya 2016, there is no more need to build PySide as it is coming by default in Maya, nor you have to rebuild Qt itself as the main Qt tools to build PyQt are now included in the Maya distributions (I.e. qmake, moc, …)

libxml, openSSL, OpenAL, python2.7, qt-4.8.6, and tbb are also coming by default in the Maya include and lib folders, so unless you have a very specific need, you would not need to rebuild any of those libraries like before. Note as well that there is a 'MAYA\_LOCATION/support/opensource' folder now which contains some of the community source.

**Important:** Maya 2016 now ships without the devkit, include and mkspecs folders. You can get the Maya 2016 devkit from the Autodesk Apps Exchange Store here for [Windows](https://apps.exchange.autodesk.com/MAYA/en/Detail/Index?id=appstore.exchange.autodesk.com:autodeskmaya2016developerkit_windows64:en), [OSX](https://apps.exchange.autodesk.com/MAYA/en/Detail/Index?id=appstore.exchange.autodesk.com:autodeskmaya2016developerkit_macos:en), and [Linux](https://apps.exchange.autodesk.com/MAYA/en/Detail/Index?id=appstore.exchange.autodesk.com%3aautodeskmaya2016developerkit_linux%3aen). Download the devkit and unzip the files into your Maya root folder. Make sure to read the instructions to install the devkit, include and mkspecs folders properly on your system.

The scripts used in this document are now also posted on [Github](https://github.com/cyrillef/Maya-PyQt-Scripts).

Download SIP and PyQt source from ['http://www.riverbankcomputing.co.uk'](http://www.riverbankcomputing.co.uk/) - here I downloaded 'sip- 4.16.7' and 'PyQt-win-gpl-4.11.3'. Unzip them in one folder, then you should get something like this:

**Mac**

*/Users/cyrille/Documents/\_Maya2016Scripts/sip-4.16.7*

*/Users/cyrille/Documents/\_Maya2016Scripts/PyQt-mac-gpl-4.11.3*

*'/Users/cyrille/Documents/\_Maya2016Scripts' being my local folder. Now the instructions, and bash scripts to build that SIP and PyQt.*

Follow the instructions from the API docs to setup your environment (Developer Resources > API Guide

> Setting up your build environment > Mac OS X environment, in the Maya Documentation) Untar the /devkit/include/qt-4.8.6-include.tar.gz into /devkit/include/Qt

Copy /Resources/qt.conf into /bin/qt.conf and edit it like this:

[Paths]

Prefix=

Libraries=../MacOS

Binaries=../bin

Headers=../../../devkit/include/Qt

Data=..

Plugins=../qt-plugins

Translations=../qt-translations

Untar the qt-4.8.6-mkspecs.tar.gz into $MAYA\_LOCATION/Maya.app/Contents/bin/mkspecs.

Make sure the qconfig.pri looks like this:

**qconfig.pri**

#### #configuration

CONFIG += release def\_files\_disabled exceptions no\_mocdepend stl x86\_64 qt #qt\_framework

QT\_ARCH = macosx

QT\_EDITION = OpenSource

QT\_CONFIG += minimal-config small-config medium-config large- config full-config no-pkg-config dwarf2 phonon phonon-backend accessibility opengl reduce\_exports ipv6 getaddrinfo ipv6ifname getifaddrs png no-freetype system-zlib nis cups iconv openssl corewlan concurrent xmlpatterns multimedia audio-backend svg script scripttools declarative release x86\_64 qt #qt\_framework

#versioning QT\_VERSION = 4.8.6

QT\_MAJOR\_VERSION = 4

QT\_MINOR\_VERSION = 8

QT\_PATCH\_VERSION = 6

#namespaces

QT\_LIBINFIX =

QT\_NAMESPACE =

QT\_NAMESPACE\_MAC\_CRC =

You also need to create copy of the Qt lib files as fake .dylib files from the /MacOS directory. The script below will give you the commands to do that.

**Build & Install SIP**

#!/usr/bin/env bash

MAYAPYQTBUILD="`dirname \"$0\"`" # Relative

export MAYAPYQTBUILD="`( cd \"$MAYAPYQTBUILD\" && pwd )`" # Absolutized and

normalized

cd $MAYAPYQTBUILD

export SIPDIR=$MAYAPYQTBUILD/sip-4.16.7

export MAYA\_LOCATION=/Applications/Autodesk/maya2016

cd $SIPDIR

$MAYA\_LOCATION/Maya.app/Contents/bin/mayapy ./configure.py --arch=x86\_64

make

sudo make install

### Build & Install PyQt

#!/usr/bin/env bash

MAYAPYQTBUILD="`dirname \"$0\"`" # Relative

export MAYAPYQTBUILD="`( cd \"$MAYAPYQTBUILD\" && pwd )`" # Absolutized and

normalized

cd $MAYAPYQTBUILD

export MAYA\_LOCATION=/Applications/Autodesk/maya2016

export QTDIR=$MAYA\_LOCATION/Maya.app/Contents

export QMAKESPEC=$QTDIR/mkspecs/macx-g++

export INCDIR\_QT=$MAYA\_LOCATION/devkit/include/Qt

export LIBDIR\_QT=$QTDIR/MacOS

if [ ! -f $QMAKESPEC/qmake.conf ];

then

echo "You need to install qt-4.8.6-mkspecs.tar.gz in $QTDIR/mkspecs

!"

exit

fi

if [ ! -f $INCDIR\_QT/QtCore/qdir.h ];

then

echo "You need to uncompress $MAYA\_LOCATION/devkit/include/qt-4.8.6- include.tar.gz in $INCDIR\_QT !"

exit

fi

# qt.conf - /Applications/Autodesk/maya2016/Maya.app/Contents/Resources

if [ ! -f $QTDIR/bin/qt.conf ];

then

echo "You need to copy $QTDIR/Resources/qt.conf in $QTDIR/bin !"

exit

fi

test=`grep "Data=../.." $QTDIR/bin/qt.conf`

if [ ! -z "$test" ];

then

echo "You need to edit $QTDIR/bin/qt.conf to use 'Data=..'"

exit

fi

test=`grep "Headers=../../include" $QTDIR/bin/qt.conf`

if [ ! -z "$test" ];

then

echo "You need to edit $QTDIR/bin/qt.conf to use 'Headers=../../../devkit/include/Qt'"

exit

fi

test=`grep "Libraries=../lib" $QTDIR/bin/qt.conf`

if [ ! -z "$test" ];

then

echo "You need to edit $QTDIR/bin/qt.conf to use 'Libraries=../MacOS'"

exit

fi

test=`grep "Plugins = qt-plugins" $QTDIR/bin/qt.conf`

if [ ! -z "$test" ];

then

echo "You need to edit $QTDIR/bin/qt.conf to use 'Plugins=../qt-

plugins'"

exit

fi

test=`grep "Translations = qt-translations" $QTDIR/bin/qt.conf`

if [ ! -z "$test" ];

then

echo "You need to edit $QTDIR/bin/qt.conf to use 'Translations=../qt-

translations'"

exit

fi

for mod in Core Declarative Designer DesignerComponents Gui Help Multimedia Network OpenGL Script ScriptTools Sql Svg WebKit Xml XmlPatterns

do

if [ ! -f $QTDIR/MacOS/libQt${mod}.dylib ];

then

echo "You need to copy a fake Qt$mod dylib - cp $QTDIR/MacOS/Qt$mod

$QTDIR/MacOS/libQt${mod}.dylib !"

#cp $QTDIR/MacOS/Qt$mod $QTDIR/MacOS/libQt${mod}.dylib

exit

fi

done

if [ ! -f $QTDIR/MacOS/libphonon.dylib ];

then

echo "You need to copy a fake phonon dylib - cp $QTDIR/MacOS/phonon

$QTDIR/MacOS/libphonon.dylib !"

#cp $QTDIR/MacOS/phonon $QTDIR/MacOS/libphonon.dylib

exit

fi

export DYLD\_LIBRARY\_PATH=$QTDIR/MacOS

export DYLD\_FRAMEWORK\_PATH=$QTDIR/Frameworks

export SIPDIR=$MAYAPYQTBUILD/sip-4.16.7

export PYQTDIR=$MAYAPYQTBUILD/PyQt-mac-gpl-4.11.3

cd $PYQTDIR

export PATH=$QTDIR/bin:$PATH

$QTDIR/bin/mayapy ./configure.py –use-arch x86\_64 LIBDIR\_QT=$LIBDIR\_QT

INCDIR\_QT=$INCDIR\_QT MOC=$QTDIR/bin/moc -w --no-designer-plugin -g

make -j 8

sudo make install

#### You're done! go to the testing paragraph at the end of the article.

**Note:** In Maya 2016, PyQT will fail to execute because of a hidden phonon symbol. There is a QTBUG reference at <https://bugreports.qt.io/browse/QTBUG-37209> which would support the change in compiler we did for Maya (i.e. there is a Qt source change suggested for the CLANG build to export symbols). Visit the blog ‘[Around the corner](http://around-the-corner.typepad.com/adn/2015/05/building-sip-and-pyqt-for-maya-2016.html)’ or download Maya 2016 Service Pack 1 to obtain the fix.

**Linux**

*/home/cyrille/Documents/\_Maya2016Scripts/sip-4.16.7*

*/home/cyrille/Documents/\_Maya2016Scripts/PyQt-mac-gpl-4.11.3*

*'/home/cyrille/Documents/\_Maya2016Scripts' being my local folder. Now the instructions, and bash scripts to build SIP and PyQt.*

Follow the instructions from the API docs to setup your environment (Developer Resources > API Guide

> Setting up your build environment > Linux environments (64 bit), in the Maya Documentation).

Edit your qt.conf file (/usr/autodesk/maya2016/bin) like below

[Paths]

Prefix=

Libraries=../lib

Binaries=../bin

Headers=../include/Qt

Data=../

Plugins=../qt-plugins

Translations=../qt-translations

#### Untar the /include/qt-4.8.6-include.tar.gz into /include/Qt

#### Untar the /mkspecs/qt-4.8.6-mkspecs.tar.gz into /mkspecs

#### Make qmake, moc executables from the Maya bin directory

sudo chmod aog+x /usr/autodesk/maya2016/bin/moc

sudo chmod aog+x /usr/autodesk/maya2016/bin/qmake

### Build & Install SIP

#!/usr/bin/env bash

MAYAPYQTBUILD="`dirname \"$0\"`" # Relative

export MAYAPYQTBUILD="`( cd \"$MAYAPYQTBUILD\" && pwd )`" # Absolutized and normalized

cd $MAYAPYQTBUILD

export SIPDIR=$MAYAPYQTBUILD/sip-4.16.7

export MAYA\_LOCATION=/usr/autodesk/maya2016

cd $SIPDIR

$MAYA\_LOCATION/bin/mayapy ./configure.py

make

sudo make install

### Build & Install PyQt

#!/usr/bin/env bash

MAYAPYQTBUILD="`dirname \"$0\"`" # Relative

export MAYAPYQTBUILD="`( cd \"$MAYAPYQTBUILD\" && pwd )`" # Absolutized and normalized

cd $MAYAPYQTBUILD

export MAYA\_LOCATION=/usr/autodesk/maya2016

export QTDIR=$MAYA\_LOCATION

export QMAKESPEC=$QTDIR/mkspecs/linux-g++-64

export INCDIR\_QT=$MAYA\_LOCATION/include/Qt

export LIBDIR\_QT=$QTDIR/lib

if [ ! -f $QMAKESPEC/qmake.conf ];

then

echo "You need to install qt-4.8.6-mkspecs.tar.gz in $QTDIR/mkspecs !"

exit

fi

if [ ! -f $INCDIR\_QT/QtCore/qdir.h ];

then

echo "You need to uncompress $MAYA\_LOCATION/include/qt-4.8.6-

include.tar.gz in $INCDIR\_QT !"

exit

fi

# qt.conf - /Applications/Autodesk/maya2016/Maya.app/Contents/Resources

if [ ! -f $QTDIR/bin/qt.conf ];

then

echo "You need to copy $QTDIR/Resources/qt.conf in $QTDIR/bin !"

exit

fi

test=`grep "Headers=../include/Qt" $QTDIR/bin/qt.conf`

if [ -z "$test" ];

then

echo "You need to edit $QTDIR/bin/qt.conf to use

'Headers=../include/Qt'"

exit

fi

export SIPDIR=$MAYAPYQTBUILD/sip-4.16.7

export PYQTDIR=$MAYAPYQTBUILD/PyQt-x11-gpl-4.11.3

cd $PYQTDIR

export PATH=$QTDIR/bin:$PATH

$QTDIR/bin/mayapy ./configure.py LIBDIR\_QT=$LIBDIR\_QT

INCDIR\_QT=$INCDIR\_QT MOC=$QTDIR/bin/moc -w --no-designer-plugin -g

make -j 8

sudo make install

#### You're done! go to the testing paragraph at the end of the article.

**Windows**

*D:\\_\_sdkext\\_Maya2016 Scripts\sip-4.16.7*

*D:\\_\_sdkext\\_Maya2016 Scripts\PyQt-win-gpl-4.11.3*

*'D:\\_\_sdkext\\_Maya2016 Scripts' being my local folder. Now the instructions and scripts to build SIP and PyQt.*

Follow the instructions from the API docs to setup your environment (Developer Resources > API Guide

> Setting up your build environment > Windows environment (64‐bit), in the Maya Documentation)

Edit your qt.conf file (C:\Program Files\Autodesk\Maya2016\bin) like below

[Paths]

Prefix=

Libraries=../lib

Binaries=../bin

Headers=../include/Qt

Data=../

Plugins=../qt-plugins

Translations=../qt-translations

#### Unzip the /include/qt-4.8.6-include.tar.gz into /include/Qt Unzip the /mkspecs/qt-4.8.6-mkspecs.tar.gz into /mkspecs

**Build & Install SIP**

@echo off

set MAYAPYQTBUILD=%~dp0

set MAYAPYQTBUILD=%MAYAPYQTBUILD:~0,-1%

if exist v:\nul subst v: /d

subst v: "%MAYAPYQTBUILD%"

set SIPDIR=v:\sip-4.16.7

set MSVC\_DIR=C:\Program Files (x86)\Microsoft Visual Studio 11.0

if ["%LIBPATH%"]==[""] call "%MSVC\_DIR%\VC\vcvarsall" amd64

set MAYA\_LOCATION=C:\Program Files\Autodesk\Maya2016

set INCLUDE=%INCLUDE%;%MAYA\_LOCATION%\include\python2.7

set LIB=%LIB%;%MAYA\_LOCATION%\lib

pushd %SIPDIR%

"%MAYA\_LOCATION%\bin\mayapy" configure.py

nmake

nmake install

popd

### Build & Install PyQt

Note that the pyQT generated makefile are using the make macro <? while building 'pylupdate'. Unfortunately, it will hang forever on Windows, and will complain about an undefined macro <? ... This macro means to use the first build dependency file as argument, but nmake does not seems to like it. The script below will bypass the makefile rule, so it should work just fine.

@echo off

set MAYAPYQTBUILD=%~dp0

set MAYAPYQTBUILD=%MAYAPYQTBUILD:~0,-1%

if exist v:\nul subst v: /d subst v: "%MAYAPYQTBUILD%"

v:

set MAYA\_LOCATION=C:\Program Files\Autodesk\Maya2016

if exist m:\nul subst m: /d

subst m: "%MAYA\_LOCATION%"

set MAYA\_LOCATION=m:

set QTDIR=%MAYA\_LOCATION%

set MSVC\_VERSION=2012

set QMAKESPEC=%QTDIR%\mkspecs\win32-msvc%MSVC\_VERSION%

set \_QMAKESPEC\_=win32-msvc%MSVC\_VERSION%

if not exist "%QMAKESPEC%\qmake.conf" (

echo "You need to uncompress %MAYA\_LOCATION%\mkspecs\qt-4.8.6- mkspecs.tar.gz !"

goto end

)

if not exist "%MAYA\_LOCATION%\include\Qt\QtCore\qdir.h" (

echo "You need to uncompress %MAYA\_LOCATION%\include\qt-4.8.6-

include.tar.gz in %MAYA\_LOCATION%\include\Qt !"

goto end

)

findstr /L /C:"Headers=../include/Qt" "%MAYA\_LOCATION%\bin\qt.conf" >nul 2>&1

if ERRORLEVEL 1 (

echo "You need to edit %MAYA\_LOCATION%\bin\qt.conf to use 'Headers=../include/Qt'"

goto end

)

set SIPDIR=v:\sip-4.16.7

set PYQTDIR=v:\PyQt-win-gpl-4.11.3

set MSVC\_DIR=C:\Program Files (x86)\Microsoft Visual Studio 11.0

if ["%LIBPATH%"]==[""] call "%MSVC\_DIR%\VC\vcvarsall" amd64

set INCLUDE=%INCLUDE%;%MAYA\_LOCATION%\include\python2.7

set LIB=%LIB%;%MAYA\_LOCATION%\lib

pushd %PYQTDIR%

pushd pylupdate

del moc\_translator.cpp 2> nul

del moc\_translator.obj 2> nul

%QTDIR%\bin\moc.exe -o moc\_translator.cpp translator.h

popd

set PATH=%QTDIR%\bin;%PATH%

"%MAYA\_LOCATION%\bin\mayapy" configure.py -p %QMAKESPEC% LIBDIR\_QT="%QTDIR%\lib" INCDIR\_QT="%QTDIR%\include\Qt" MOC="%QTDIR%\bin\moc.exe" -w –-no-designer-plugin

nmake

nmake install

popd

:end

#### You're done! go to the testing paragraph at the end of the article.

Testing

Copy and paste this example in the Maya Script Editor (in a Python tab), and execute the code:

import sys

from PyQt4 import QtGui

class Example(QtGui.QWidget):

def \_\_init\_\_ (self):

super(Example, self).\_\_init\_\_ ()

self.initUI()

def initUI(self):

self.btn = QtGui.QPushButton('Dialog', self)

self.btn.move(20, 20)

self.btn.clicked.connect(self.showDialog)

self.le = QtGui.QLineEdit(self)

self.le.move(130, 22)

self.setGeometry(300, 300, 290, 150)

self.setWindowTitle('Input dialog')

self.show()

def showDialog(self):

text, ok = QtGui.QInputDialog.getText(self, 'Input Dialog',

'Enter your name:')

if ok:

self.le.setText(str(text))

ex = Example()

#### If you see the dialog is showing, you are all set.