PyQt for Autodesk Maya 2017 64bit

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Building SIP, and PyQt for Maya 2017

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 2017 uses Qt5.6.1 which is binary compatible with the latest version of PyQt – 5.7 / SIP - 4.18.1

Note that it’s important to use the Maya modified version of the Qt source code. A copy of the customized Qt 5.6.1 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 2017, 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-5.6.1, 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 2017 now ships without the devkit, include and mkspecs folders. You can get the Maya 2017 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- 4.18.1' and 'PyQt5\_gpl-5.7'. Unzip them in one folder, then you should get something like this:

**Mac**

*/Users/cyrille/Documents/\_Maya2017Scripts/sip-4.18.1*

*/Users/cyrille/Documents/\_Maya2017Scripts/PyQt5\_gpl-5.7*

*'/Users/cyrille/Documents/\_Maya2017Scripts' 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-5.6.1-include.tar.gz into /devkit/include/Qt

The qt.conf file uses MAYA\_LOCATION and DEVKIT\_LOCATION to locate the expected header/library files. Therefore, users must set both environment variables before building the PyQt5.

DEVKIT\_LOCATION should point to the directory where the devkit include, mkspecs, cmake directories are located.

Edit …/bin/qt.conf like this:

[Paths]

Prefix=

Libraries=$(MAYA\_LOCATION)/MacOS

Binaries=$(DEVKIT\_LOCATION)/devkit/bin

Headers=$(DEVKIT\_LOCATION)/include/Qt

ArchData=$(DEVKIT\_LOCATION)

Data=$(DEVKIT\_LOCATION)

HostData=$(DEVKIT\_LOCATION)

HostBinaries=$(DEVKIT\_LOCATION)/devkit/bin

HostLibraries=$(MAYA\_LOCATION)/MacOS

Untar the qt-5.6.1-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 = 5.6.1

QT\_MAJOR\_VERSION = 5

QT\_MINOR\_VERSION = 6

QT\_PATCH\_VERSION = 1

#namespaces

QT\_LIBINFIX =

QT\_NAMESPACE =

QT\_NAMESPACE\_MAC\_CRC =

**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-4.18.1

export MAYA\_LOCATION=/Applications/Autodesk/maya2017

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/maya2017

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

export QMAKESPEC=$QTDIR/mkspecs/macx-clang

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-5.6.1-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-5.6.1- include.tar.gz in $INCDIR\_QT !"

exit

fi

# qt.conf - /Applications/Autodesk/maya2017/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 Designer DesignerComponents Gui Help Multimedia Network OpenGL Script ScriptTools Sql Svg WebKit Xml XmlPatterns

do

if [ ! -f $QTDIR/MacOS/libQt5${mod}.dylib ];

then

echo "You need to copy a fake Qt$mod dylib - cp $QTDIR/MacOS/Qt5$mod

$QTDIR/MacOS/libQt5${mod}.dylib !"

#cp $QTDIR/MacOS/Qt5$mod $QTDIR/MacOS/libQt5${mod}.dylib

exit

fi

done

export DYLD\_LIBRARY\_PATH=$QTDIR/MacOS

export DYLD\_FRAMEWORK\_PATH=$QTDIR/Frameworks

export SIPDIR=$MAYAPYQTBUILD/sip-4.18.1

export PYQTDIR=$MAYAPYQTBUILD/PyQt5\_gpl-5.7

export SIP\_EXE=$QTDIR/Frameworks/Python.framework/Versions/2.7/bin/sip

export SIP\_INCLUDE=$QTDIR/Frameworks/Python.framework/Versions/2.7/include/python2.7

cd $PYQTDIR

export PATH=$QTDIR/bin:$PATH

$QTDIR/bin/mayapy ./configure.py LIBDIR\_QT=$LIBDIR\_QT INCDIR\_QT=$INCDIR\_QT MOC=$QTDIR/bin/moc --sip=$SIP\_EXE --sip-incdir=$SIP\_INCLUDE -w --no-designer-plugin

make -j 8

sudo make install

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

**Linux**

*/home/cyrille/Documents/\_Maya2017Scripts/sip-4.18.1*

*/home/cyrille/Documents/\_Maya2017Scripts/PyQt5\_gpl-5.7*

*'/home/cyrille/Documents/\_Maya2017Scripts' 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).

The qt.conf file uses MAYA\_LOCATION and DEVKIT\_LOCATION to locate the expected header/library files. Therefore, users must set both environment variables before building the PyQt5.

DEVKIT\_LOCATION should point to the directory where the devkit include, mkspecs, cmake directories are located.

Edit your qt.conf file (/usr/autodesk/maya2017/bin) like below

[Paths]

Prefix=

Libraries=$(MAYA\_LOCATION)/lib

Binaries=$(MAYA\_LOCATION)/bin

Headers=$(DEVKIT\_LOCATION)/include/Qt

ArchData=$(DEVKIT\_LOCATION)

Data=$(DEVKIT\_LOCATION)

HostData=$(DEVKIT\_LOCATION)

HostBinaries=$(MAYA\_LOCATION)/bin

#### Untar the /include/qt-5.6.1-include.tar.gz into /include/Qt

#### Untar the /mkspecs/qt-5.6.1-mkspecs.tar.gz into /mkspecs

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

sudo chmod aog+x /usr/autodesk/maya2017/bin/moc

sudo chmod aog+x /usr/autodesk/maya2017/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-4.18.1

export MAYA\_LOCATION=/usr/autodesk/maya2017

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/maya2017

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-5.6.1-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-5.6.1-

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

exit

fi

# qt.conf - /usr/autodesk/maya2017/bin

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

then

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

exit

fi

test=`grep 'Headers=$(DEVKIT\_LOCATION)/include/Qt' $QTDIR/bin/qt.conf`

if [ -z "$test" ];

then

echo "You need to edit $QTDIR/bin/qt.conf to use 'Headers=$(DEVKIT\_LOCATION)/include/Qt'"

error=1

fi

export SIPDIR=$MAYAPYQTBUILD/sip-4.18.1

export PYQTDIR=$MAYAPYQTBUILD/PyQt5\_gpl-5.7

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\\_Maya2017 Scripts\sip-4.18.1*

*D:\\_\_sdkext\\_Maya2017 Scripts\PyQt5\_gpl-5.7*

*'D:\\_\_sdkext\\_Maya2017 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\Maya2017\bin) like below

[Paths]

Prefix=$(MAYA\_LOCATION)

Libraries=lib

Binaries=bin

Headers=include/Qt

Data=.

Plugins=qt-plugins

Translations=qt-translations

Qml2Imports=qml

#### Unzip the /include/qt-5.6.1-include.tar.gz into /include/Qt Unzip the /mkspecs/qt-5.6.1-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-4.18.1

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\Maya2017

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

@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\Maya2017

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%

set QMAKESPEC=%QTDIR%\mkspecs\%\_QMAKESPEC\_%

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

echo "You need to uncompress %MAYA\_LOCATION%\mkspecs\qt-5.6.1-mkspecs.tar.gz !"

goto end

)

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

echo "You need to uncompress %MAYA\_LOCATION%\include\qt-5.6.1-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

)

findstr /L /C:"-lqtmain -lshell32" "%QTDIR%\mkspecs\common\msvc-desktop.conf" >nul 2>&1

if ERRORLEVEL 1 (

echo "You need to edit %QTDIR%\mkspecs\common\msvc-desktop.conf to use 'QMAKE\_LIBS\_QT\_ENTRY = -lqtmain -lshell32'"

goto end

)

if not exist "%MAYA\_LOCATION%\include\Qt\qtnfc.disabled" (

echo "You need to rename %MAYA\_LOCATION%\include\Qt\qtnfc to %MAYA\_LOCATION\include\Qt\qtnfc.disabled"

goto end

)

set SIPDIR=v:\sip-4.18.1

set PYQTDIR=v:\PyQt5\_gpl-5.7

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%

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

"%MAYA\_LOCATION%\bin\mayapy" configure.py --spec %QMAKESPEC% LIBDIR\_QT="%QTDIR%\lib" INCDIR\_QT="%QTDIR%\include\Qt" MOC="%QTDIR%\bin\moc.exe" --sip="%QTDIR%\Python\sip.exe" --sip-incdir="%QTDIR%\Python\include" -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 PyQt5.QtWidgets import (QWidget, QToolTip, QPushButton)

from PyQt5.QtGui import QFont

class Example(QWidget):

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

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

self.initUI()

def initUI(self):

QToolTip.setFont(QFont('SansSerif', 10))

self.setToolTip('This is a <b>QWidget</b> widget')

btn = QPushButton('Button', self)

btn.setToolTip('This is a <b>QPushButton</b> widget')

btn.resize(btn.sizeHint())

btn.move(50, 50)

self.setGeometry(300, 300, 300, 200)

self.setWindowTitle('Tooltips')

self.show()

ex = Example()

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