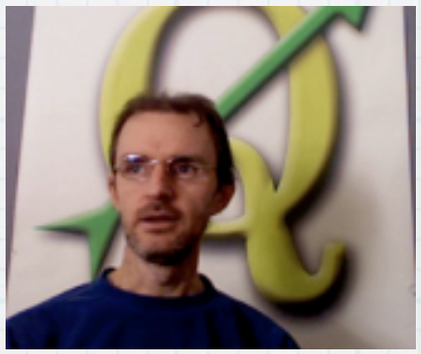
Python, Qt4, QGIS & InaSAFE



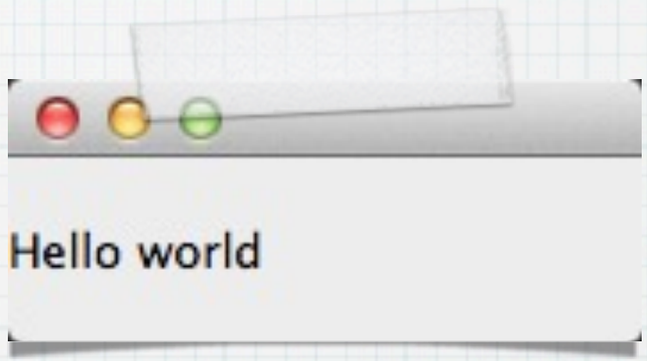
By Tim Sutton

What is Qt?

* Set of C++ libraries (with Python bindings)
* Gui, File IO, Networking, Web, Xml, etc.
* Cross-platform
* Android, Linux, Windows, OSX, BBerry
* Basis for KDE, BB 10, QGIS, Google Earth...
* FOSS at http://qt.digia.com/

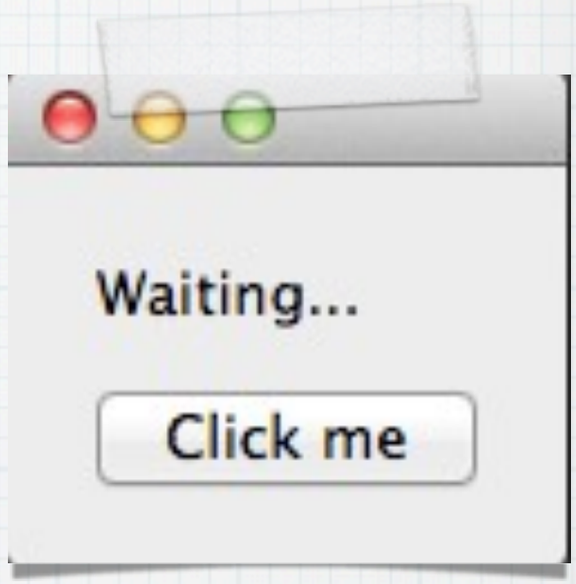
Qt4 Hello World

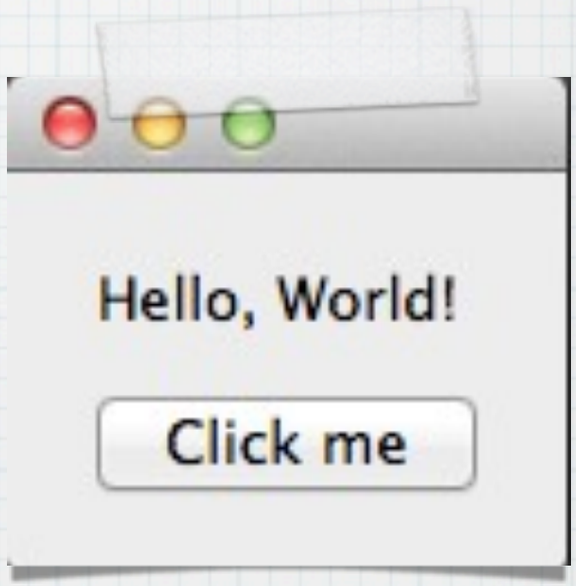
```
    # coding=utf-8
"""
Example Qt4 Application
"""

__author__ = 'tim@linfiniti.com'
__revision__   = '$Format:%H$'
__date__ = '27/05/2013'
__copyright__ = 'Copyright 2012, Tim Sutton'

import sys

from PyQt4 import Qt, QtGui

if __name__ == '__main__':
    app = Qt.QApplication(sys.argv)
    label = QtGui.QLabel('Hello world')
    label.show()
    sys.exit(app.exec_())
```



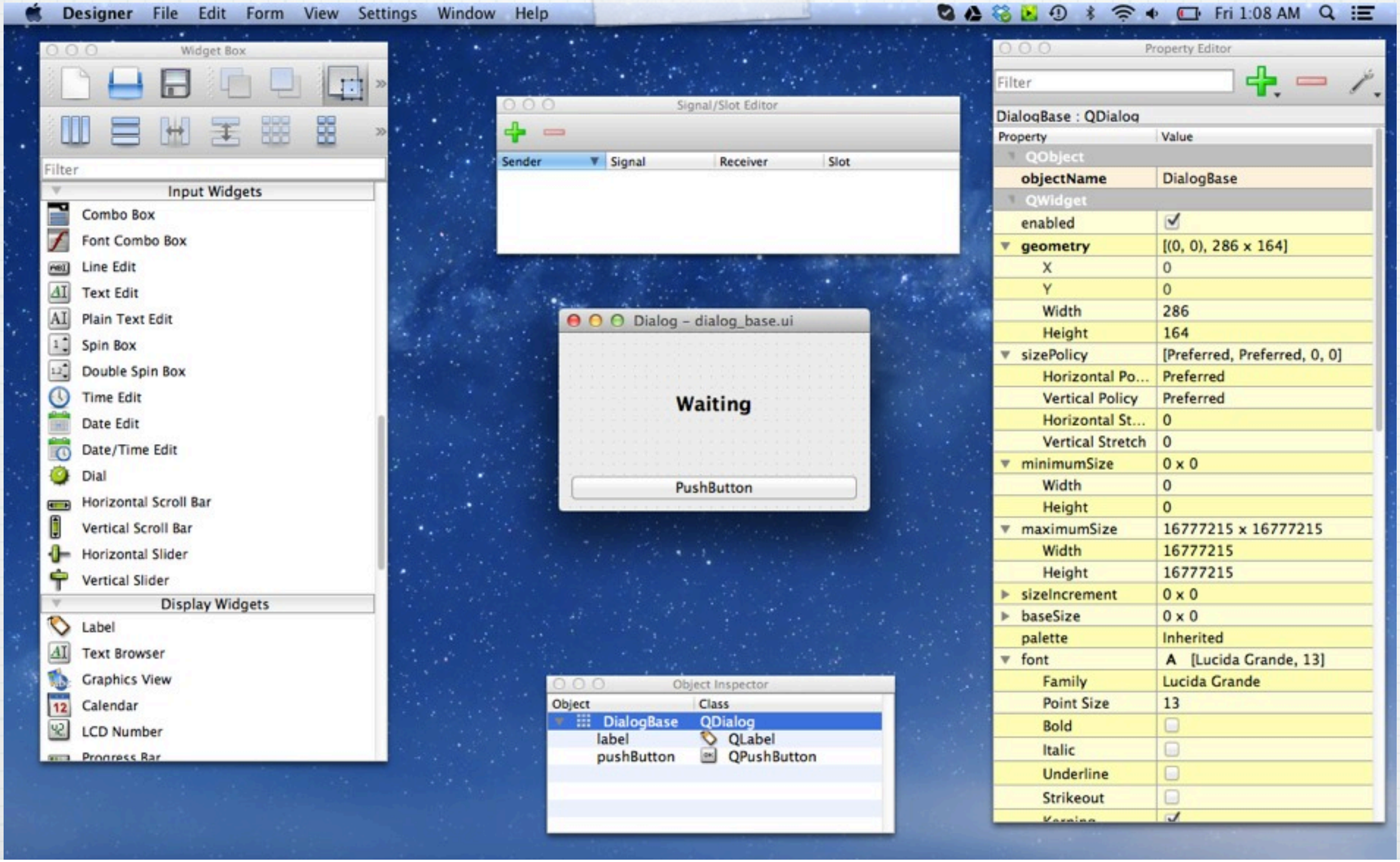
Qt4 Application Class

```
   #!/usr/bin/env python
# coding=utf-8
"""Example Qt4 Application"""
import sys
from PyQt4 import Qt, QtGui


class HelloApp(Qt.QApplication):

    def __init__(self, args):
        Qt.QApplication.__init__(self, args)
        self.layout = QtGui.QVBoxLayout(self.widget)
        self.widget = QtGui.QWidget(None)
        self.button = QtGui.QPushButton("Click me", self.widget)
        self.label = QtGui.QLabel('Waiting...', self.widget)
        self.widget.setLayout(self.layout)
        self.layout.addWidget(self.label)
        self.layout.addWidget(self.button)
        # Call our slot (callback) when ever the button is pressed.
        self.connect(self.button, Qt.SIGNAL("clicked()"), self.slot)
        self.widget.show()

    def slot(self):
        self.label.setText('Hello, World!')

if __name__ == "__main__":
    app = HelloApp(sys.argv)
    app.exec_()
```





Qt4 Designer 1



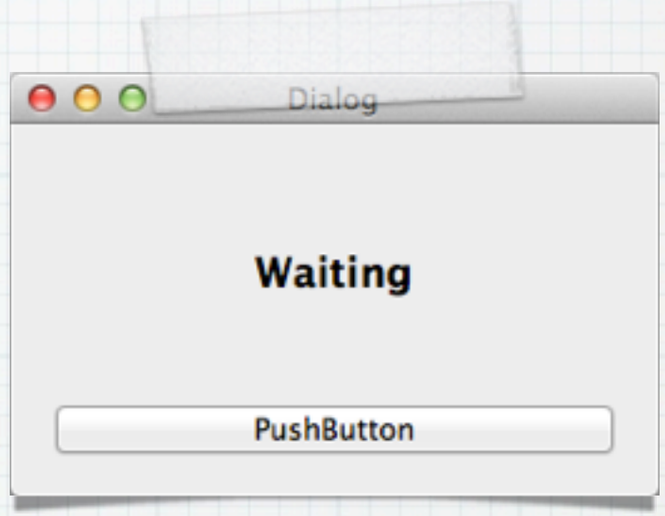
Qt4 Designer 2

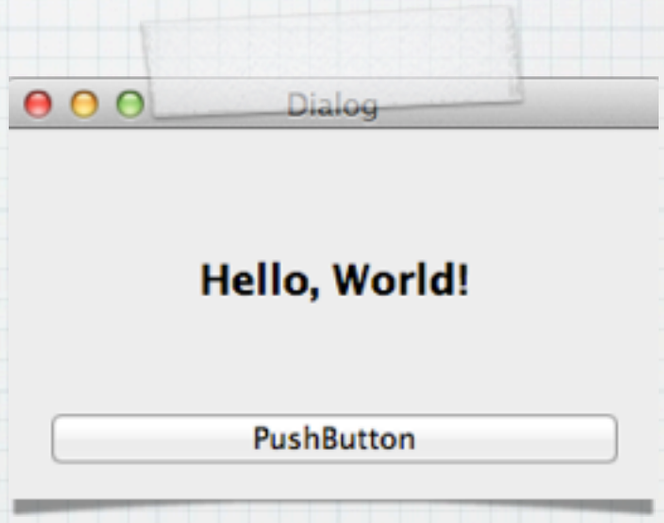
```
$ pyuic4 -o dialog_base.py dialog_base.ui
$ ls
dialog_base.py dialog_base.ui
```

Covert user interface (ui) file to python

Qt4 Application Class

```
   #!/usr/bin/env python
# coding=utf-8
"""Example Qt4 Application"""

import sys
from PyQt4 import Qt, QtGui
from dialog_base import Ui_DialogBase


class Dialog(QtGui.QWidget, Ui_DialogBase):
    def __init__(self):
        QtGui.QWidget.__init__(self)
        self.setupUi(self)
        self.show()

    def on_pushButton_clicked(self):
        """Wow - an autoconnected slot!"""
        self.label.setText('Hello, World!')

if __name__ == "__main__":
    app = Qt.QApplication(sys.argv)
    dialog = Dialog()
    app.exec_()
```

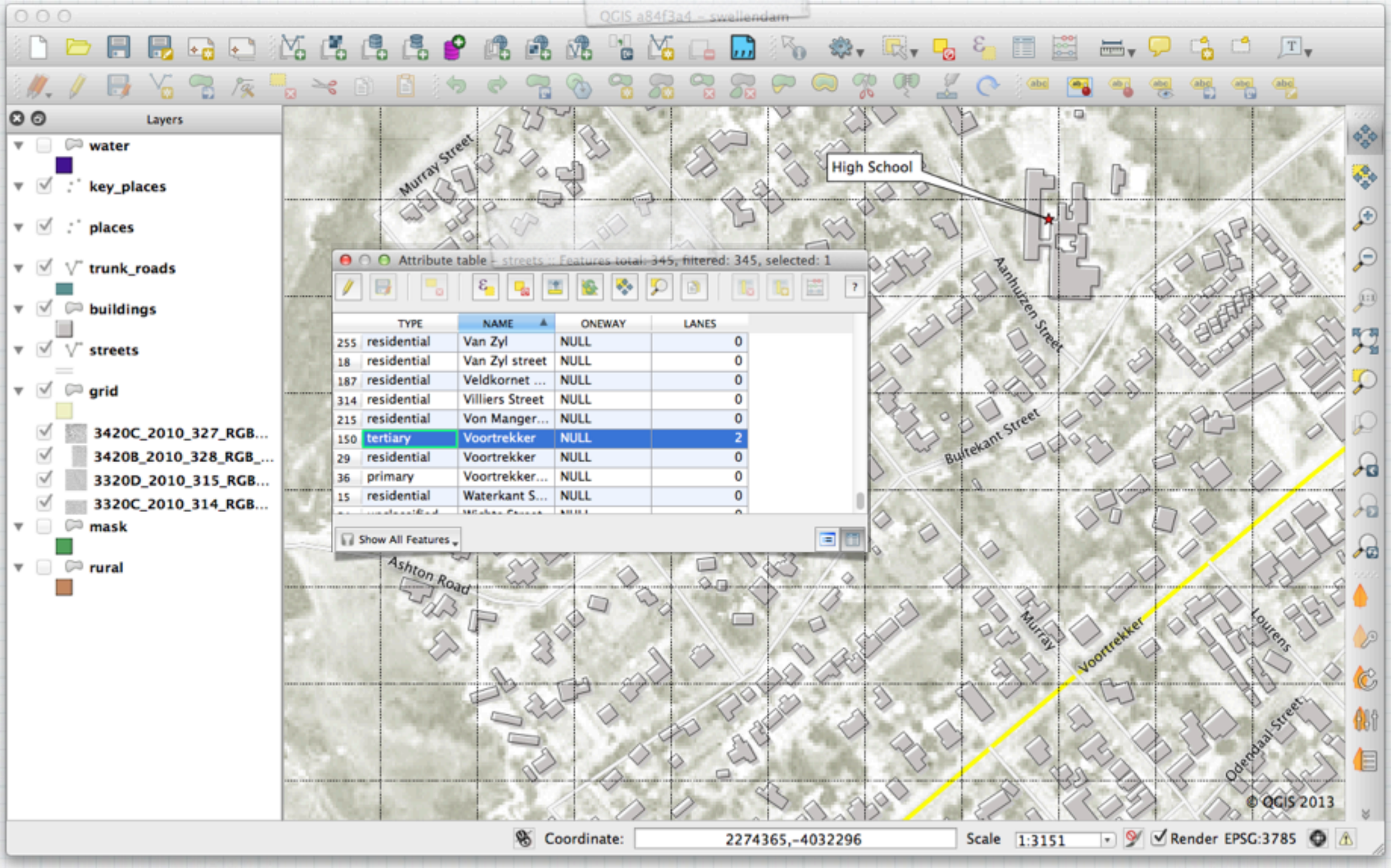




What is QGIS?

* A free and open Geographical Information System
* Allows you to open, create, visualise and analyse geospatial data
* Completely Free and Open Source Software
* 11 Years old, under very active development

QGIS Screenshot

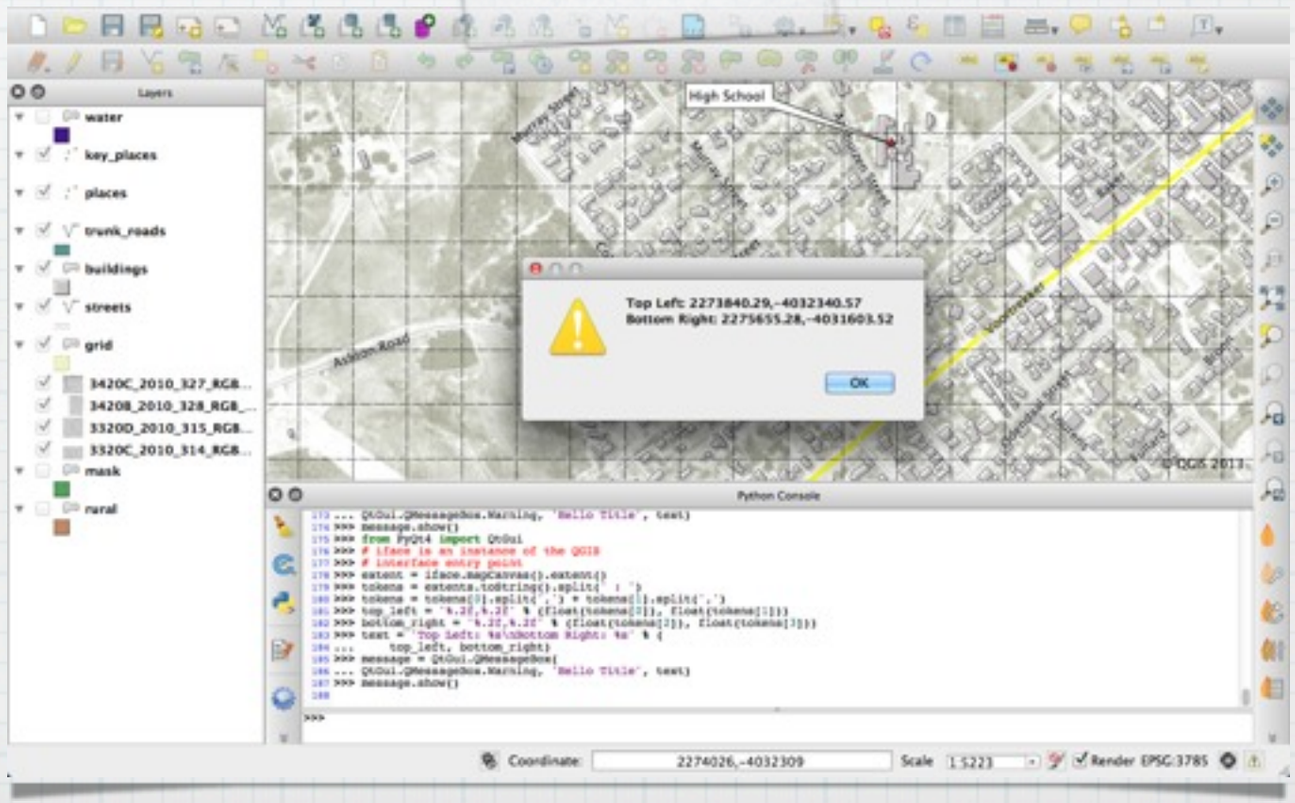


QGIS 'Under the hood'

* Built with Qt4, PyQt4
* QGIS-CORE - non-graphical libraries for working with GeoSpatial
* QGIS-GUI - re-usable GUI dependent elements (widgets, dialogs etc.)
* QGIS Application - the desktop application
* Python bindings for pythonistas!

QGIS Hello World

```
    #
# Note: This example created using QGIS master / 1.9
#
from PyQt4 import QtGui
# iface is an instance of the QGIS
# interface entry point
extent = iface.mapCanvas().extent()
tokens = extents.toString().split(' : ')
tokens = tokens[0].split(',') + tokens[1].split(',')
top_left = '%.2f,%.2f' % (float(tokens[0]),
float(tokens[1]))
bottom_right = '%.2f,%.2f' % (float(tokens[2]),
float(tokens[3]))
text = 'Top Left: %s\nBottom Right: %s' % (
    top_left, bottom_right)
message = QtGui.QMessageBox(
    QtGui.QMessageBox.Warning, 'Hello Title', text)
message.show()
```

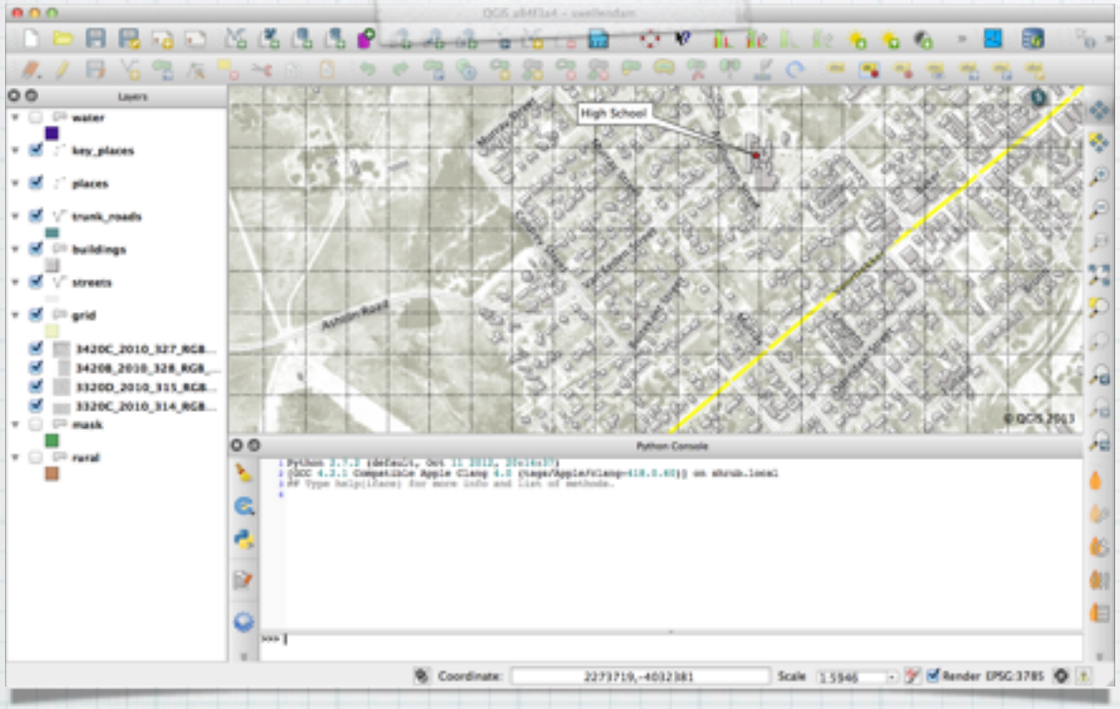


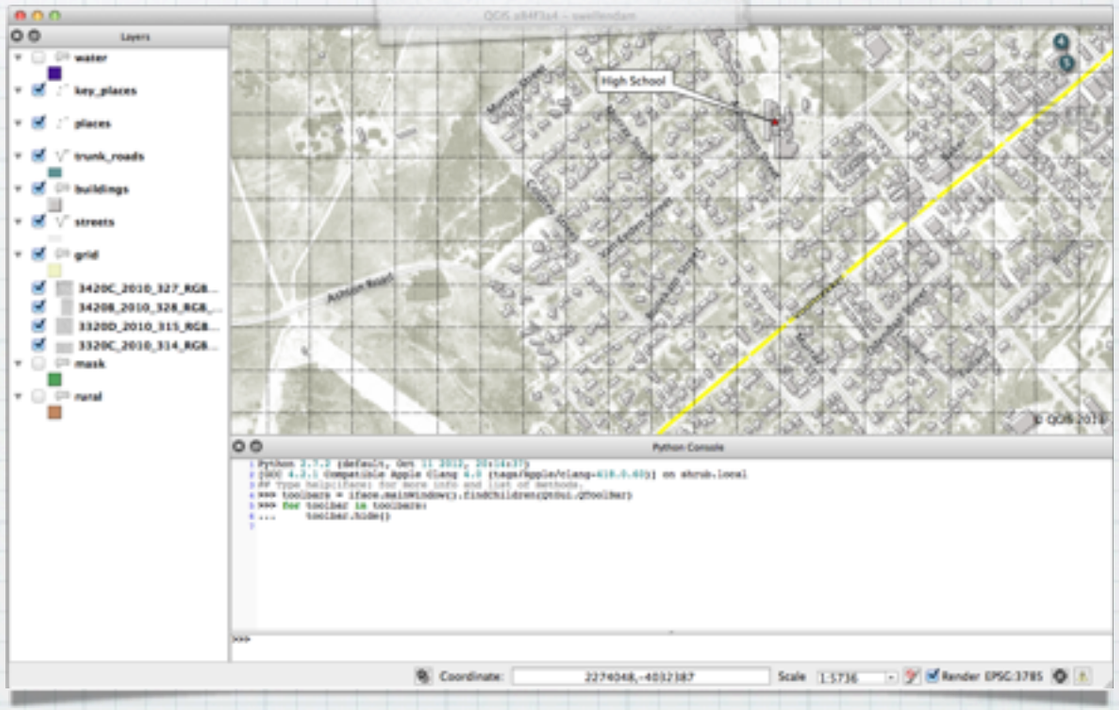
QGIS API - What you can do...

* Change at runtime almost any part of the application
* Create standalone GUI or server-side applications
* Create plugins that extend the functionality of QGIS

Change almost any part of the app at runtime!

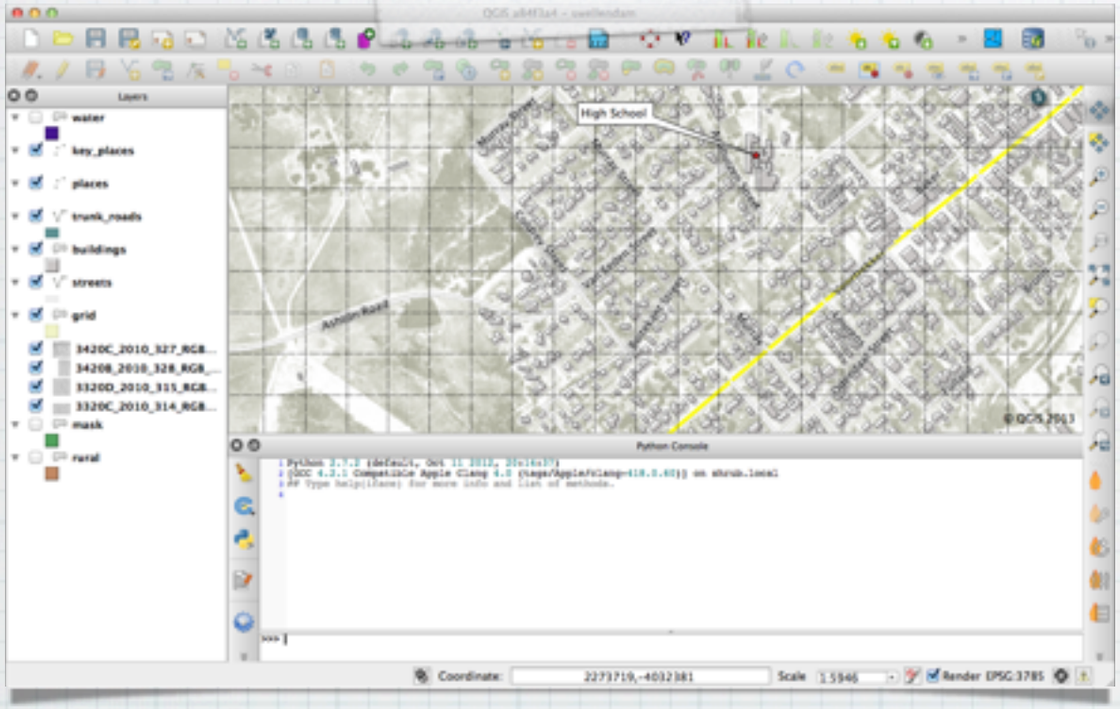
```
    toolbars =
    iface.mainWindow().findChildren(QtGui.QToolBar)
for toolbar in toolbars:
    toolbar.hide()
```

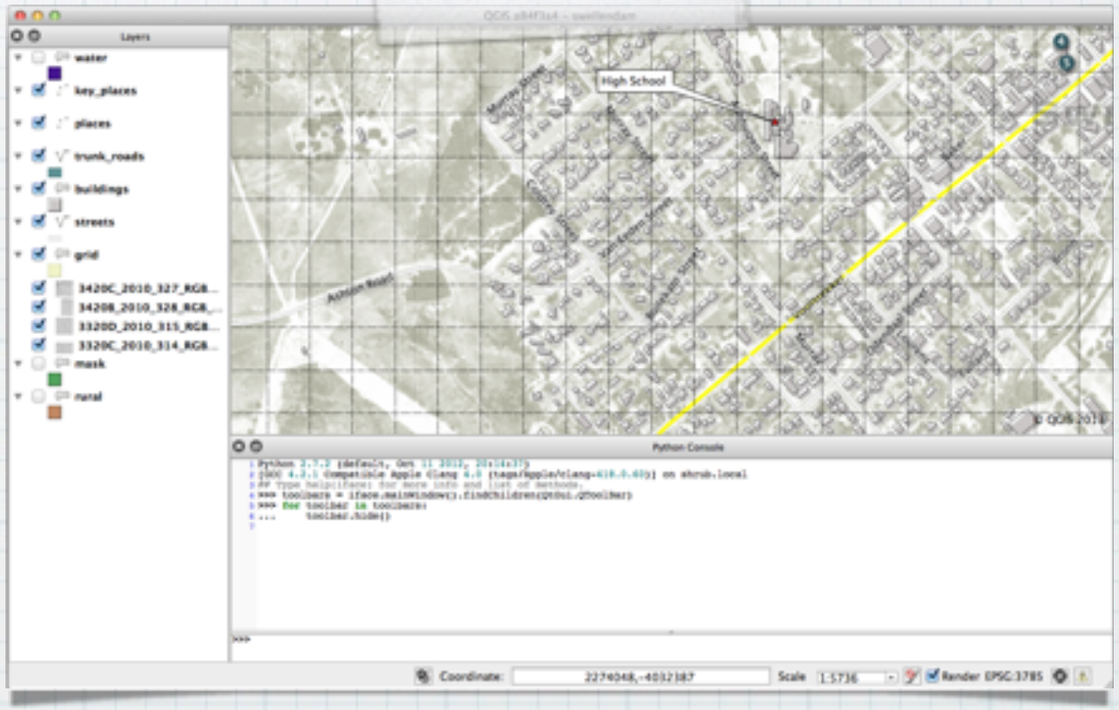




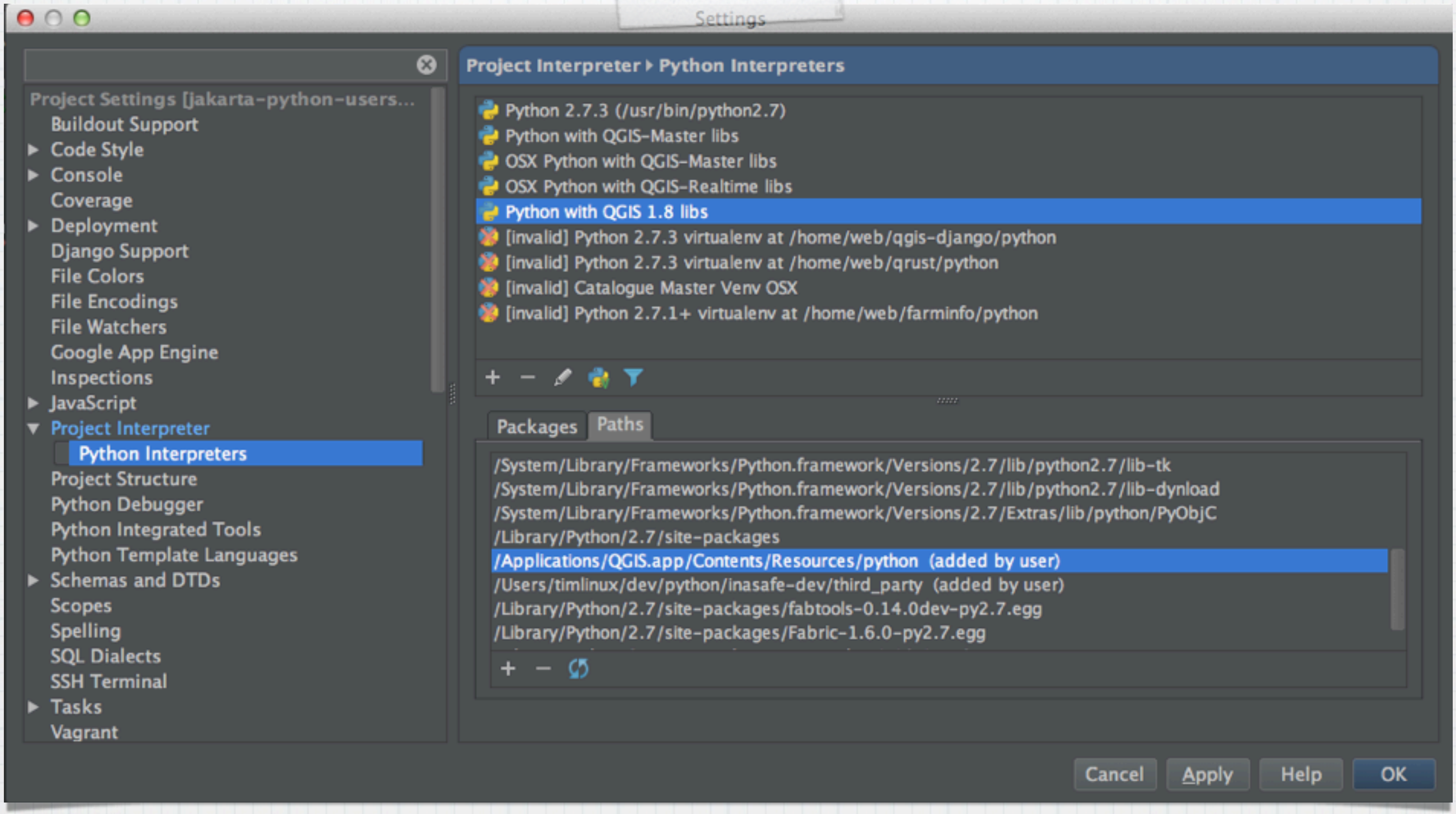
Create standalone apps

```
    toolbars =
    iface.mainWindow().findChildren(QtGui.QToolBar)
for toolbar in toolbars:
    toolbar.hide()
```





QGIS Hello World 2



Ensure that QGIS python directory is in your PYTHONPATH!

What is InaSAFE?

What is PyQt4?

Hello World in PyQt4

QGIS Quick Tour

Hello World in QGIS

Hello World in InaSAFE

Accessing the Dock in QGIS

```
from safe_qgis.dock import Dock
from safe.messaging.message import Message
m = Message('Hello World')
i = qgis.utils.iface
d = i.mainWindow().findChild(Dock)
d.hide()
d.show()
d.showStaticMessage(m)
d.showDynamicMessage(m)
wv = d.wvResults
wv.page().mainFrame().evaluateJavaScript('alert("Hello");')
wv.page().mainFrame().evaluateJavaScript('$("#1").goTo();')
```

Essentials for a busy Python Developer

PyCharm

pylint

pep8

Unit testing

A coding standard

'It doesn't matter what your coding standard is, as long as you have one!'

Continuous Integration

Sphinx

ReSTructred Text & Autodoc

Distributed Version Control

GIT