

Python, Qt4, QGIS & InaSAFE



By Tim Sutton

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`git clone git@github.com:timlinux/python-qt4-qgis-inasafe-talk.git`

Talk outline

4 topics

- * PyQt4
- * QGIS
- * InaSAFE
- * Lessons we have learned / Python essentials

What is Qt?

- * Set of C++ libraries (with Python bindings)
- * Gui, File I/O, 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/>

PyQt4 Hello World

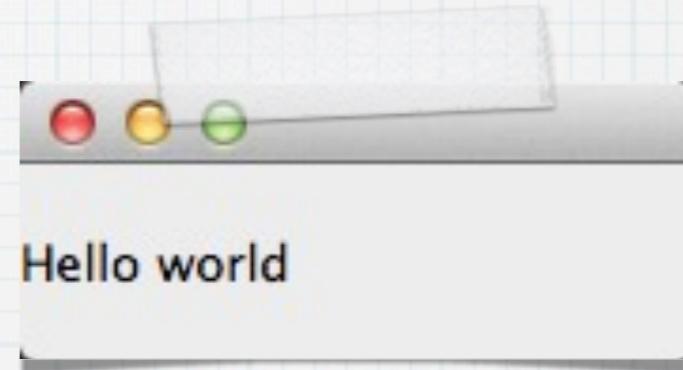
```
# coding=utf-8
"""
Example Qt4 Application
"""

__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_())
```



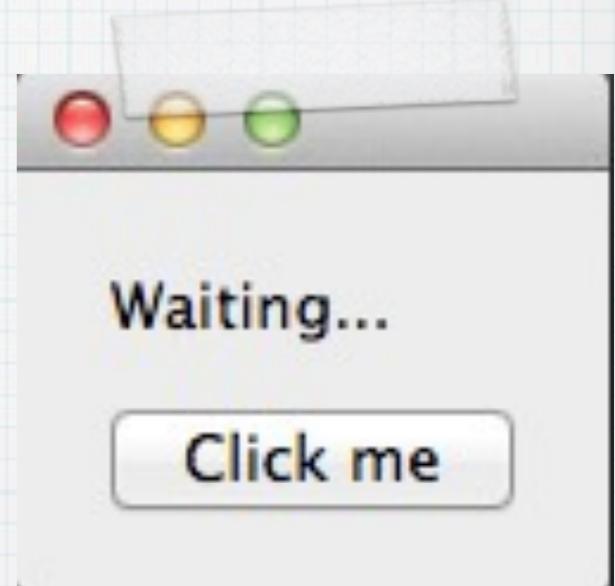
PyQt4 Application

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

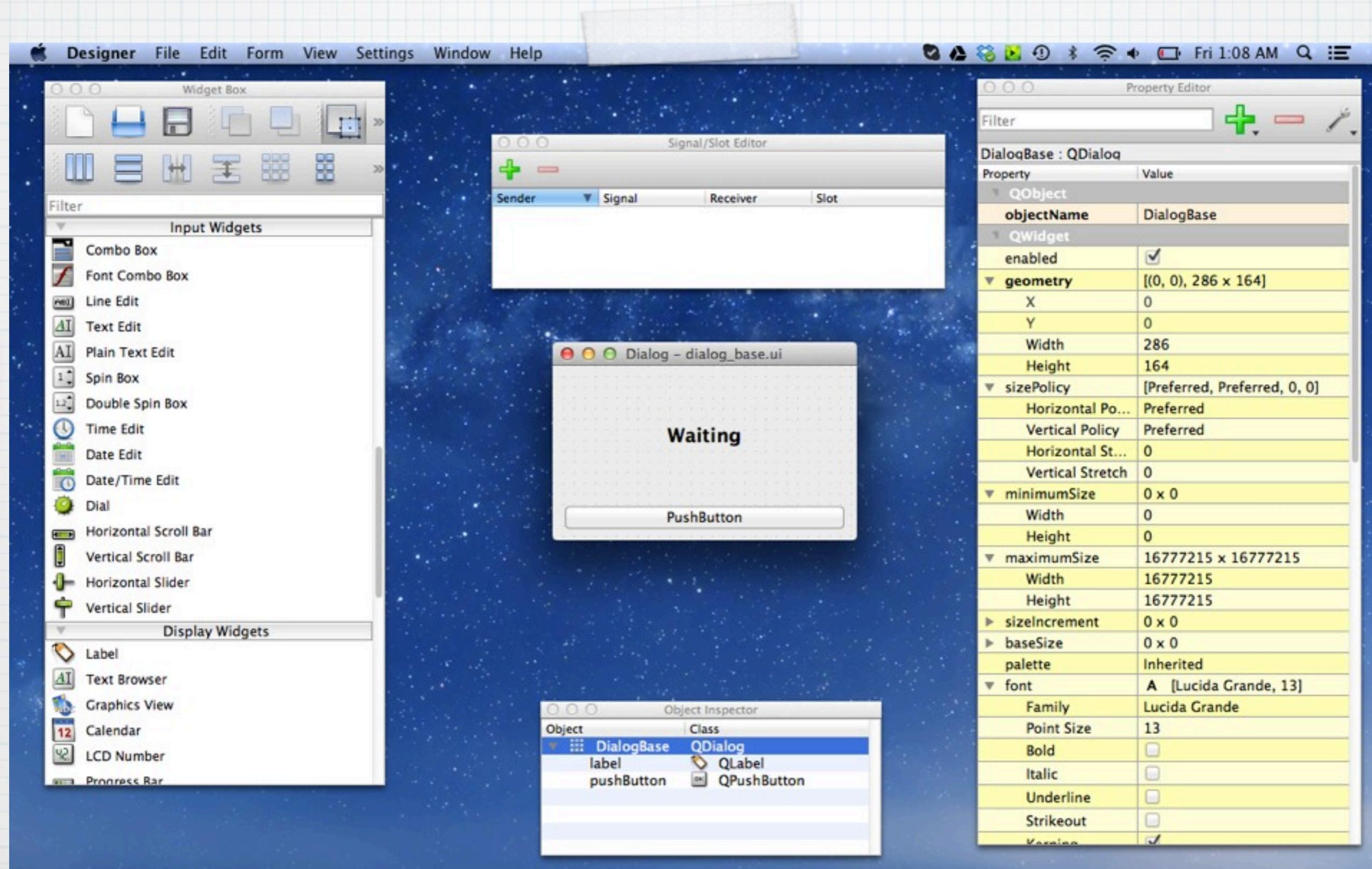
class HelloApp(Qt.QApplication):
    def __init__(self, args):
        Qt.QApplication.__init__(self, args)
        self.layout = QtGui.QVBoxLayout(self.widget)
        self.widget = QtGui.QWidget(None)
        self.button = QtGui.QPushButton("Click me", self.widget)
        self.label = QtGui.QLabel('Waiting...', self.widget)
        self.widget.setLayout(self.layout)
        self.layout.addWidget(self.label)
        self.layout.addWidget(self.button)
        # Call our slot (callback) whenever 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
```

Convert user interface (ui) file to python

PyQt4 Application

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

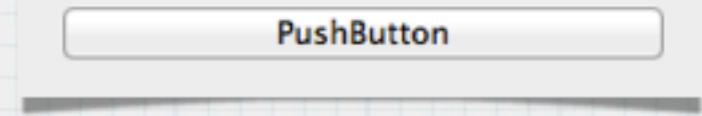
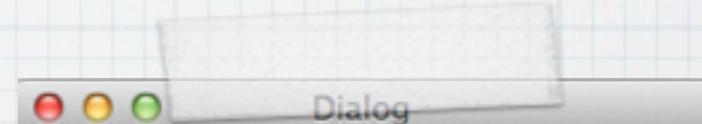
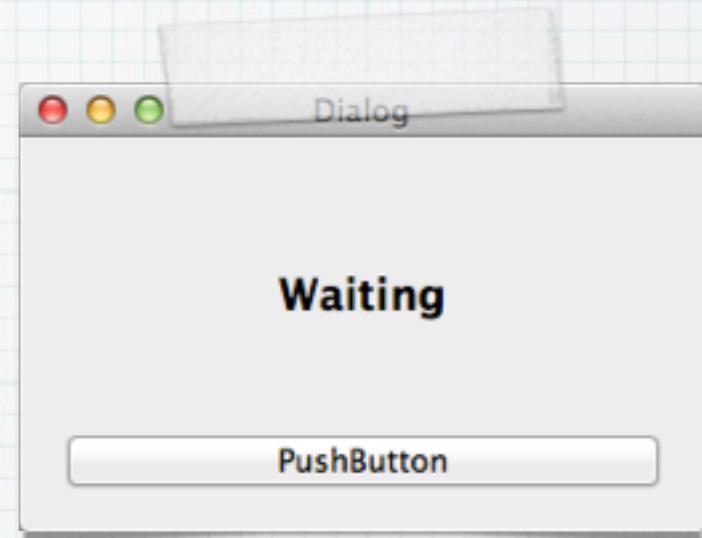
import sys
from PyQt4 import Qt, QtGui
from dialog_base import Ui_DialogBase

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!')

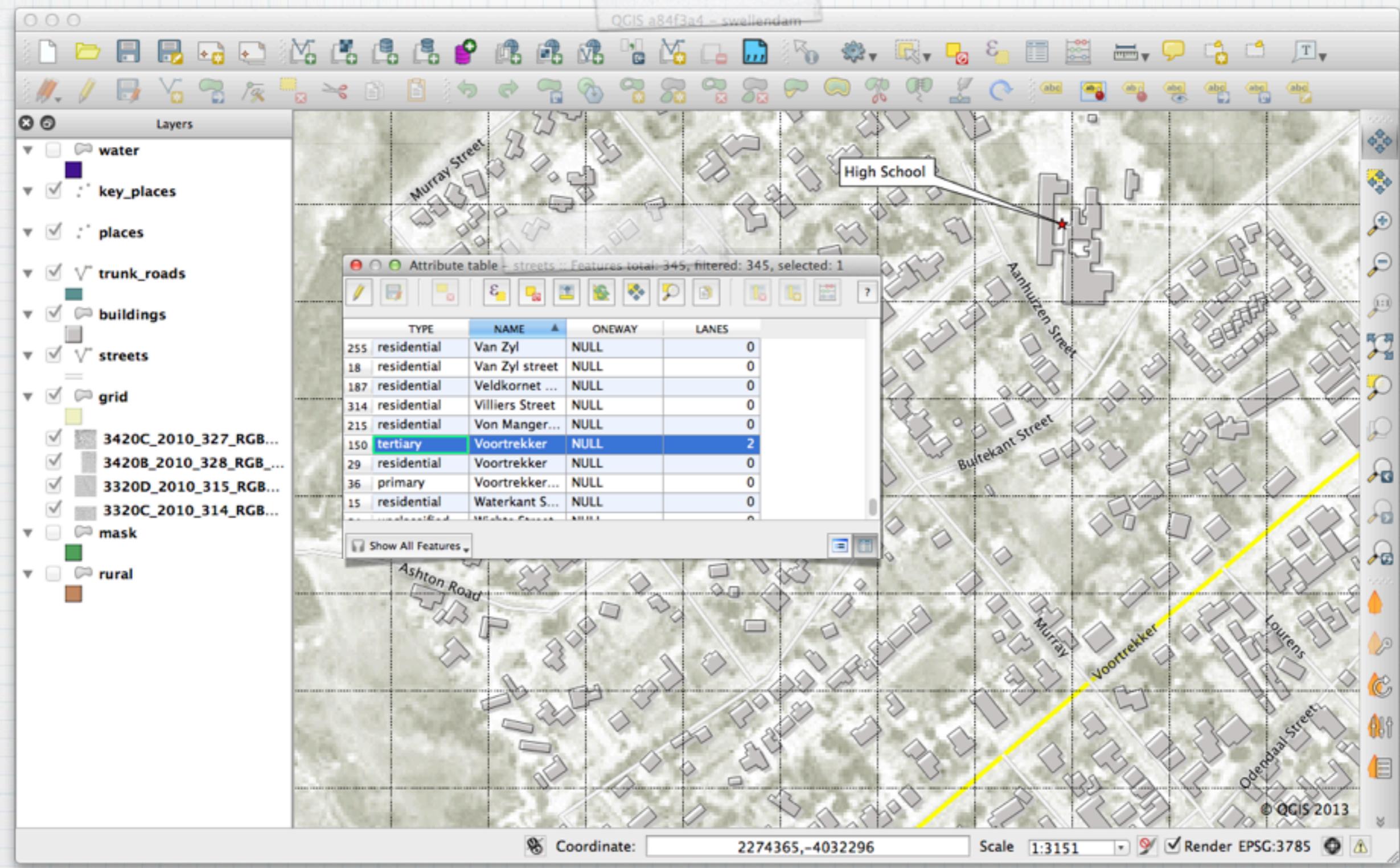
if __name__ == "__main__":
    app = Qt.QApplication(sys.argv)
    dialog = Dialog()
    app.exec_()
```



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 Quick Tour

QGIS ‘Under the hood’

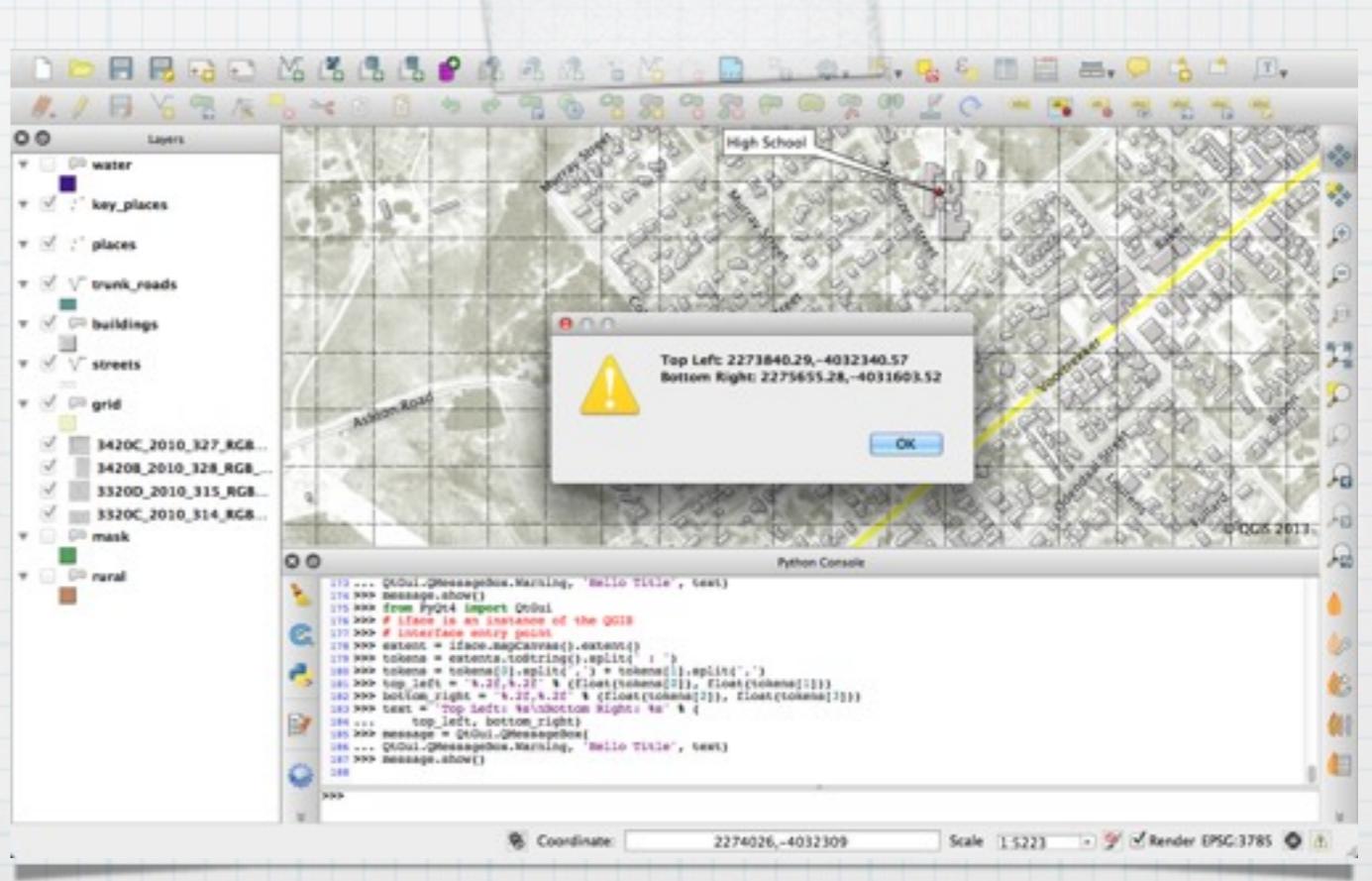
- * Built with Qt4, PyQt4
- * QGIS-CORE - non-graphical libraries for working with GeoSpatial
- * QGIS-GUI - re-usable GUI dependent elements (widgets, dialogs etc.)
- * QGIS Application - the desktop application
- * Python bindings for pythonistas!

```

# 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 = extent.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 Hello World

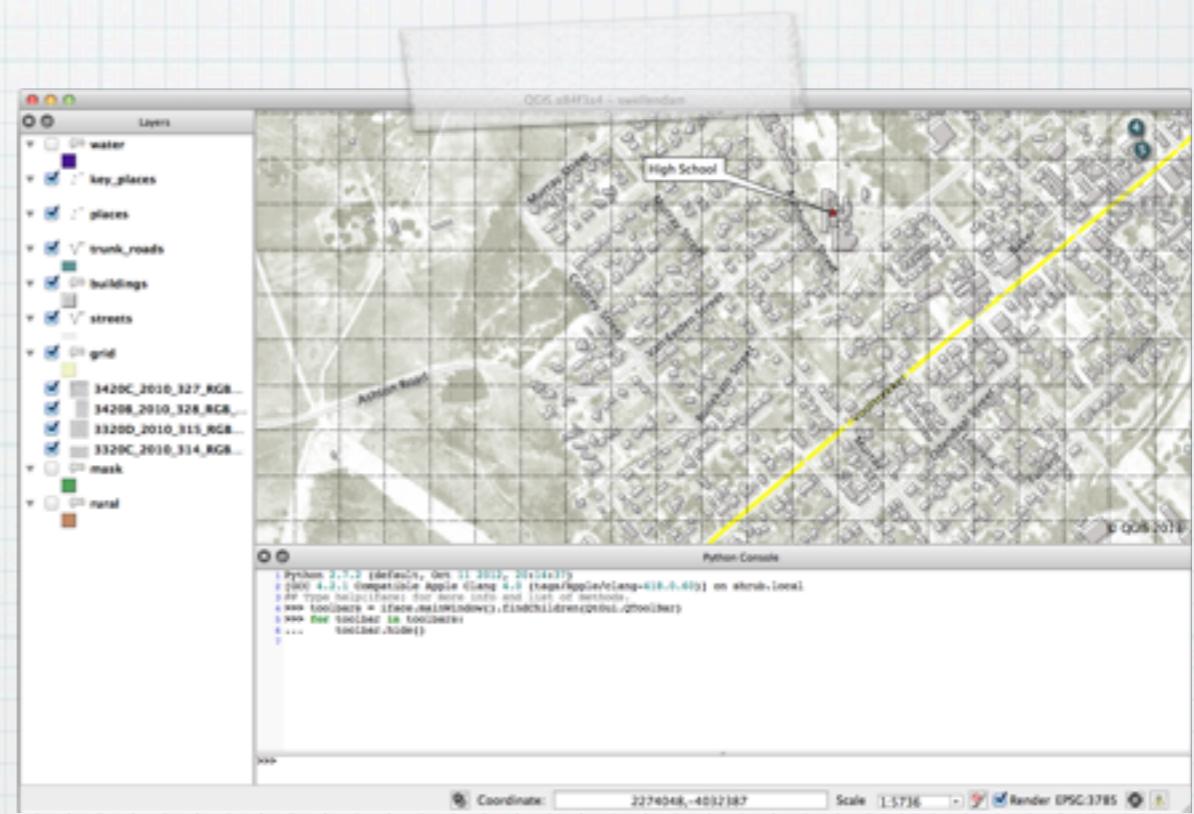
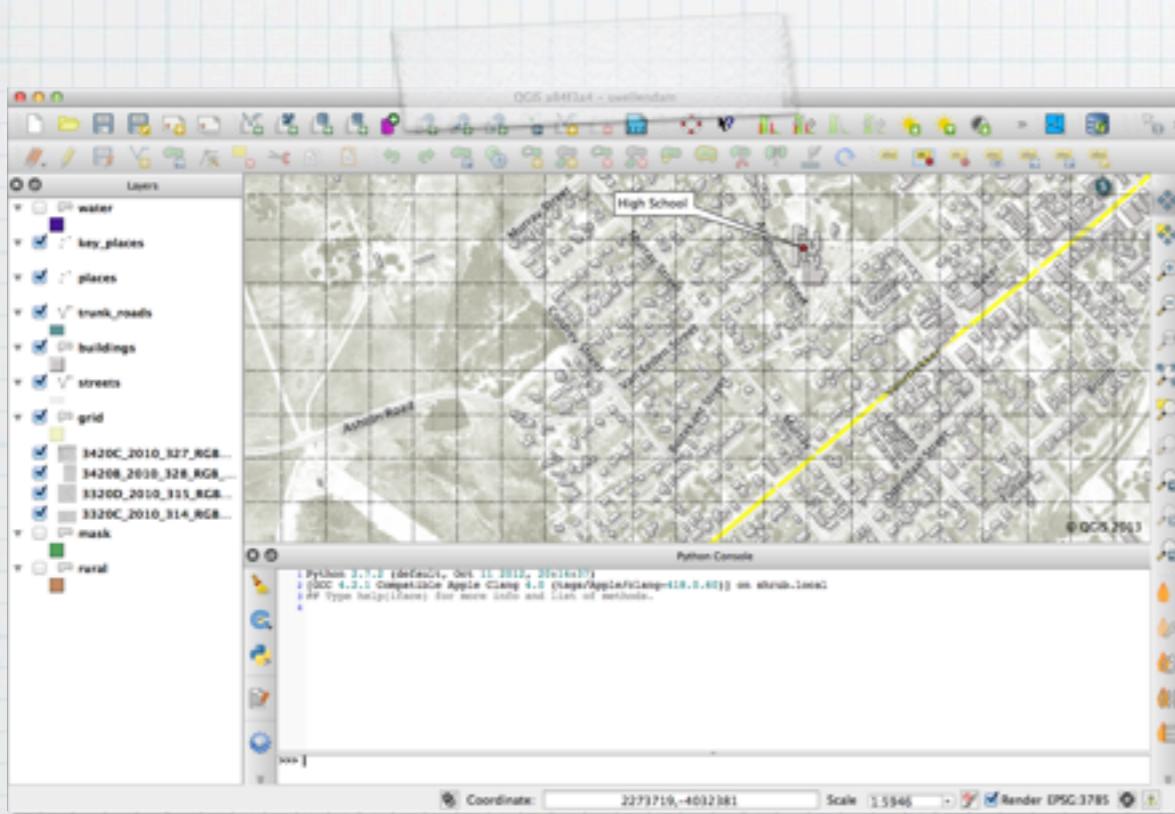


QGIS API - What you can do...

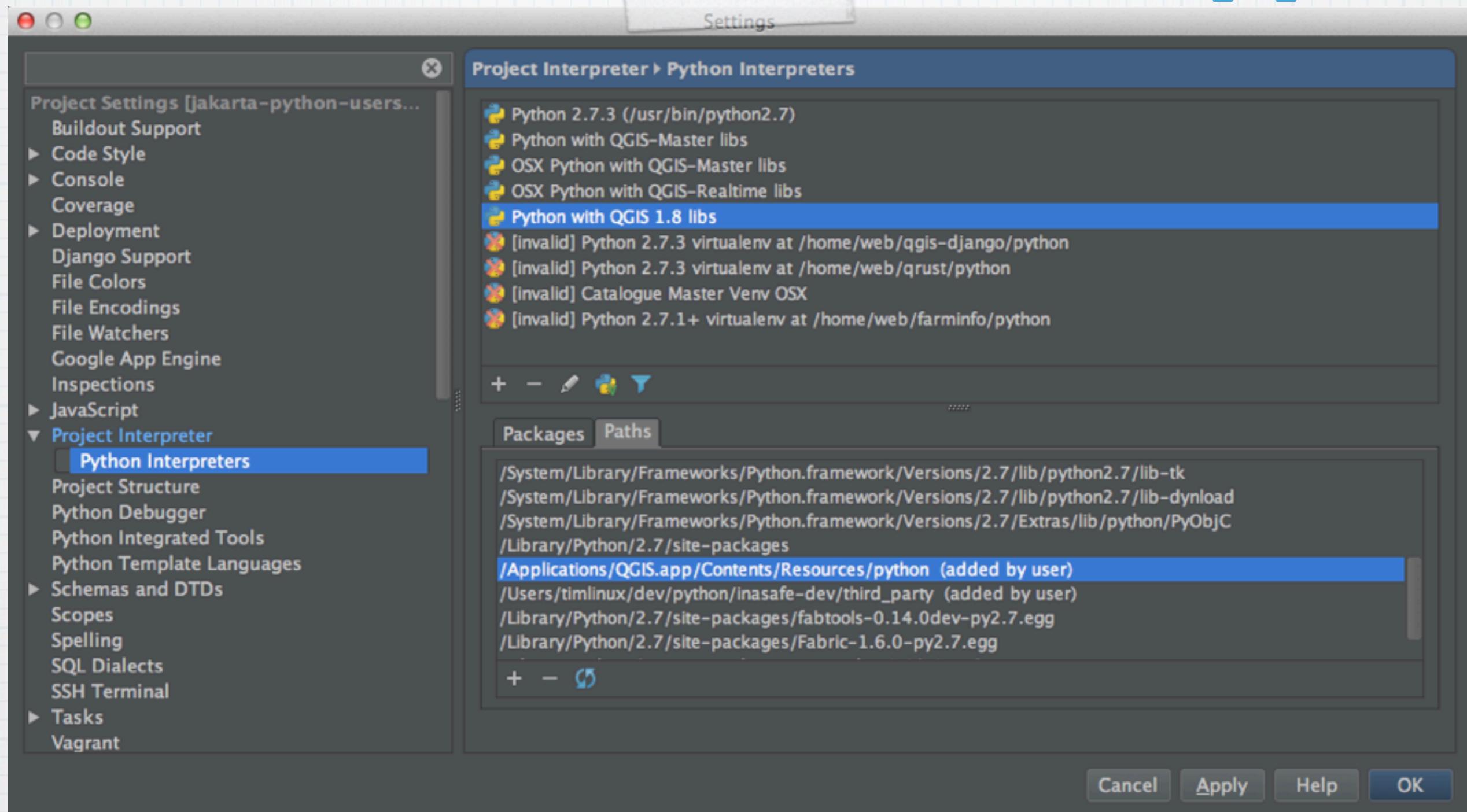
- * Change at runtime almost any part of the application
- * Create standalone GUI or server-side applications
- * Create plugins that extend the functionality of QGIS

Change almost any part of the app at runtime!

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



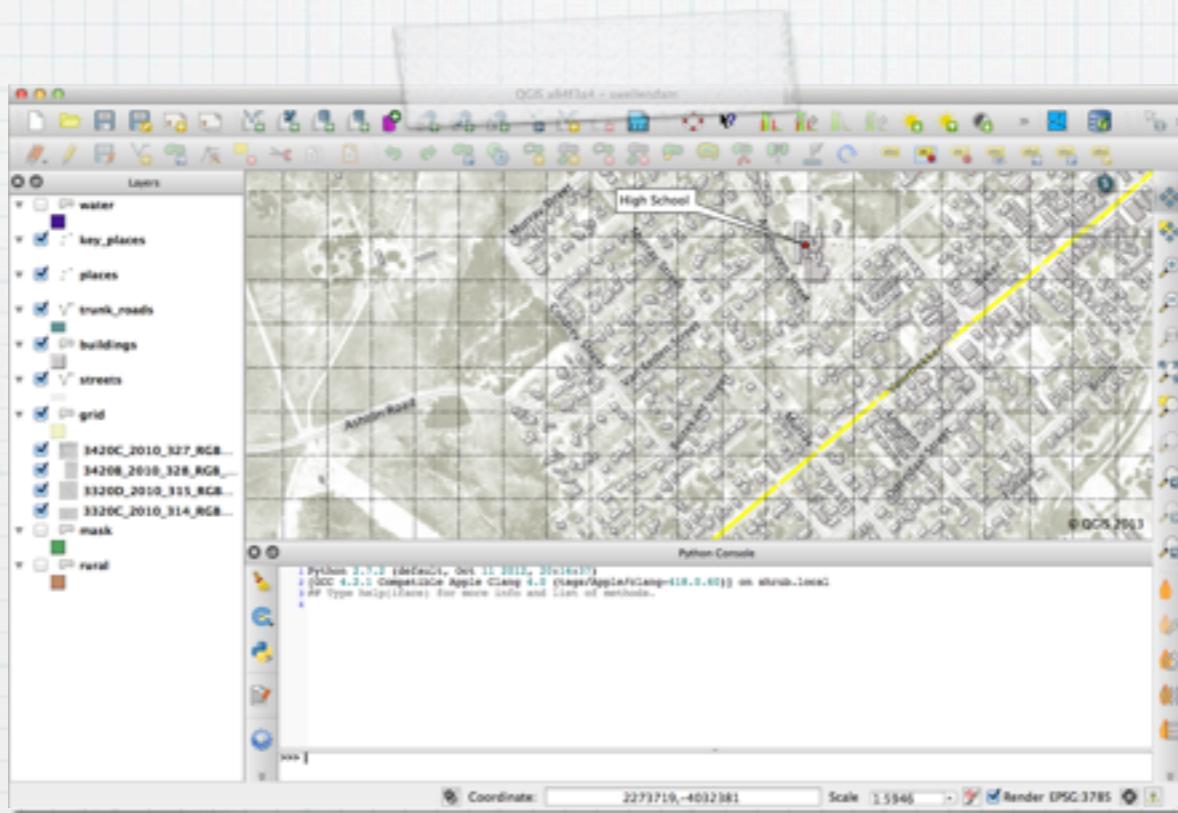
Create standalone apps



Ensure that QGIS python directory is in your PYTHONPATH!

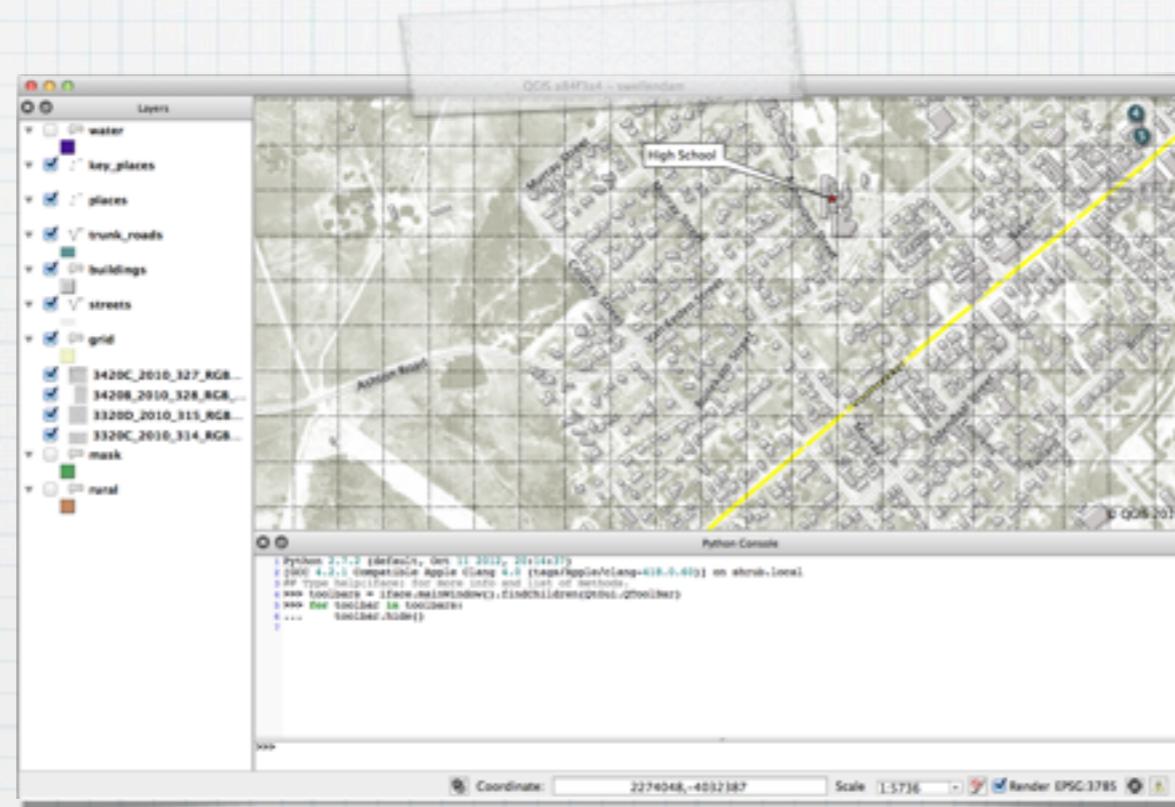
Create standalone apps

Example of standalone app here....



Create server side apps

Example of loading a layer and taking a screenie here...



What is InaSAFE?



BNPB



THE WORLD BANK

- * A disaster contingency planning tool
- * Partnership between BNPB, AusAID, WorldBank
- * Completely Free and Open Source Software
- * A library and a plugin for QGIS
- * Written in Python (numpy, PyQt4)

<http://inasafe.org>

What is InaSAFE?

- * BlackDuck 'Rookie of the Year 2012' Winner
- * <http://www.blackducksoftware.com/open-source-rookies>



<http://inasafe.org>

Hello World in InaSAFE

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

ReStructured Text & Autodoc

Distributed Version Control

GIT

Conclusion

If you are a python programmer looking to do
geospatial analysis and build GIS enabled
applications, you are in luck!



B N P B



THE WORLD BANK

Thanks

My work on InaSAFE is supported by AUSAID and BNBP through the Australia-Indonesia Facility for Disaster Reduction.

The World Bank's GFDRR has also funded parts of InaSAFE and the addition of new features to QGIS that make our work possible.

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