

QGIS Plugins

Creating custom spatial functions
within the QGIS application
framework using Python



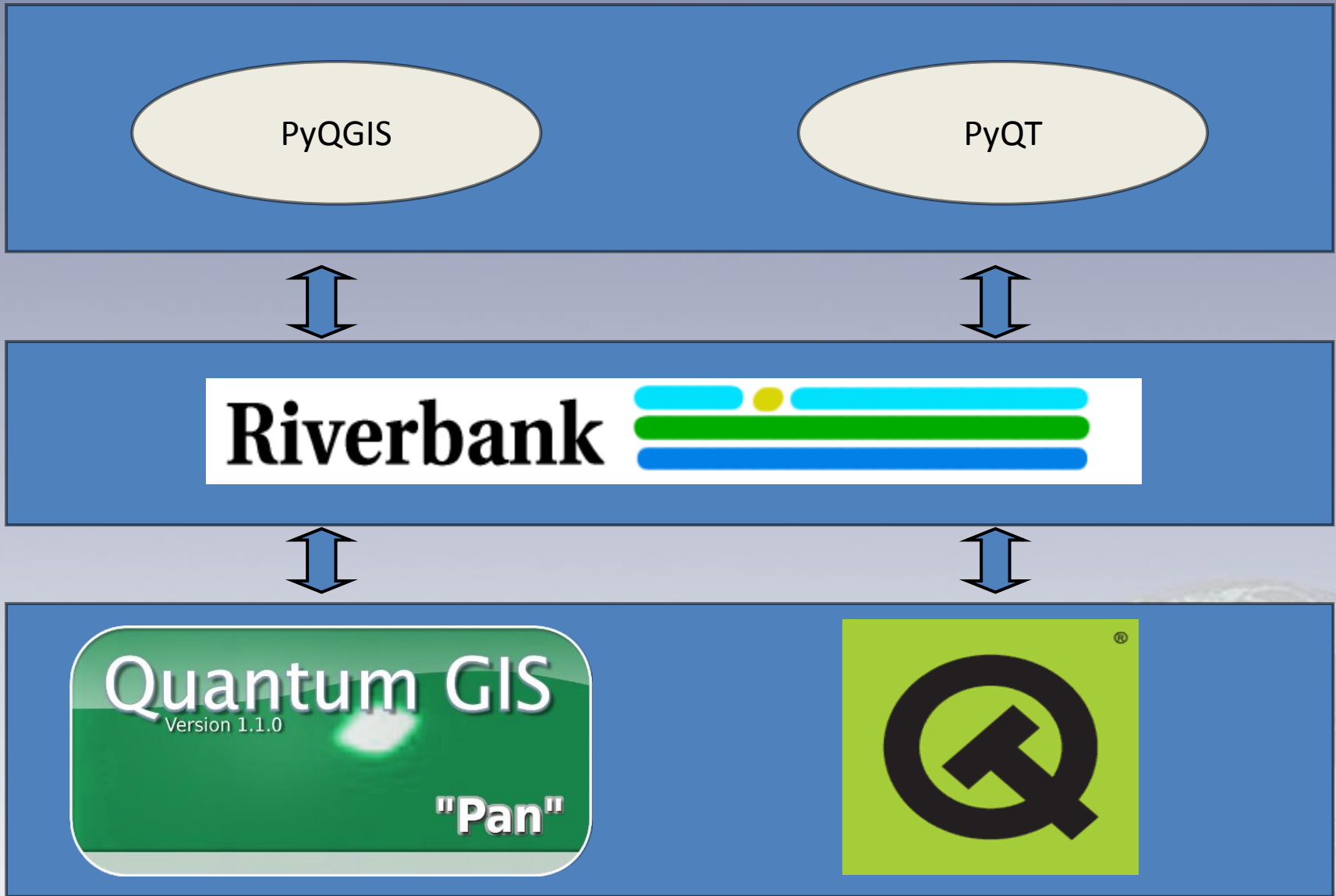
Plugin?

- Extends the functionality of QGIS
- Written in C++ or Python
- QGIS provides access to UI and Core
 - Models the QT structure
 - QGIS widgets are just QT widgets
- PyQt is cool... almost fun!



Why Open Source?

Cost
Freedom
Community
Get Good Karma
Opportunity to innovate
Very Fast Development Cycle
Very Low Barrier To Dev Community Entry



Why QT and PyQt?

- QT is Open Source and well supported (Nokia)
- QT is cross platform with support for multiple compilers (msvc, ming)
- QGIS was developed on top of QT
- PyQt is a reference implementation of Python bindings to C++ applications using SIP
- QGIS has been extended to provide PyQGIS



```
# PyQt4 includes for python bindings to QT
```

```
from PyQt4.QtCore import *
```

```
from PyQt4.QtGui import *
```

```
# QGIS bindings for mapping functions
```

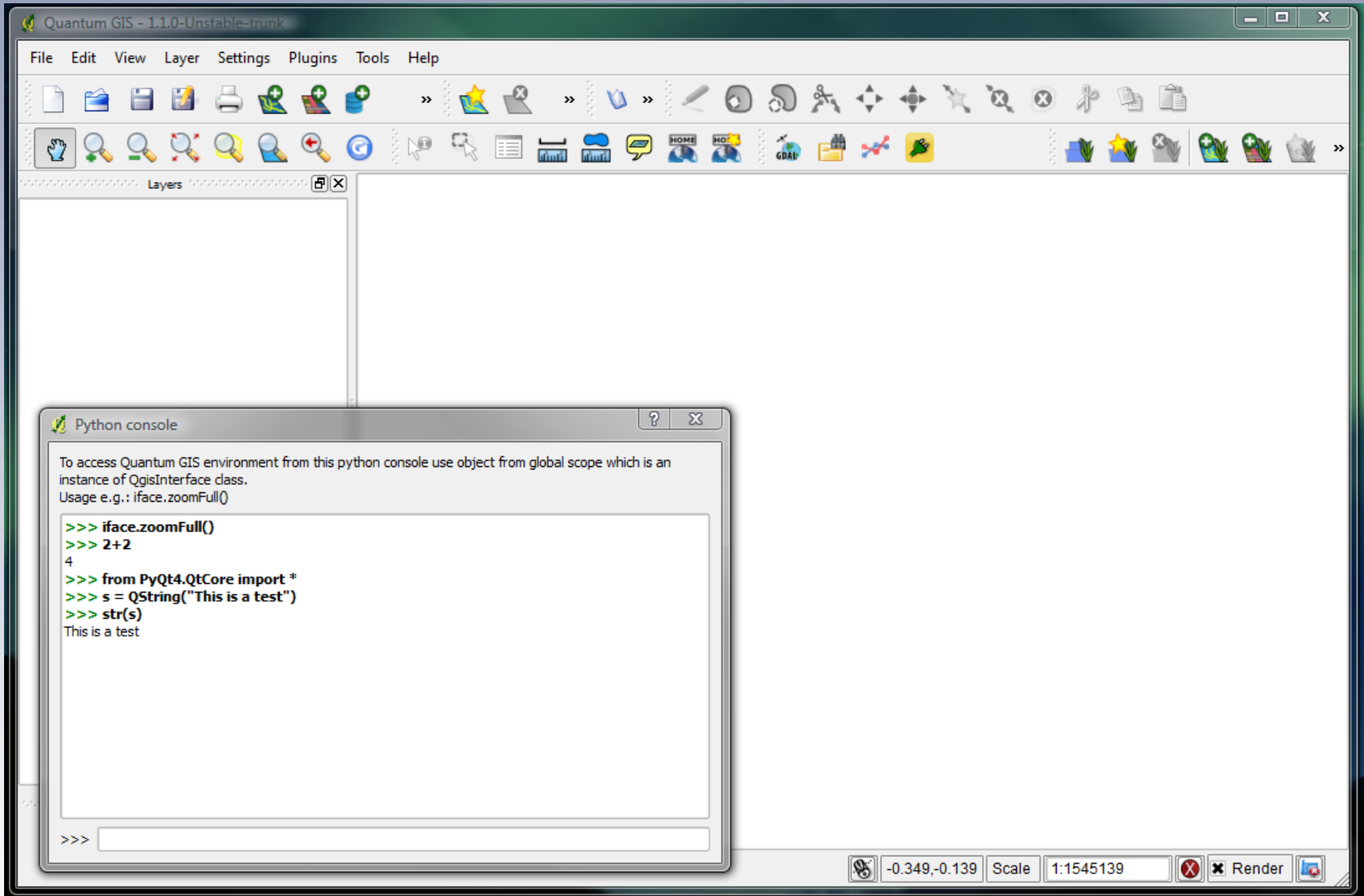
```
from qgis.core import *
```

```
from qgis.gui import *
```

That wasn't so hard...



Python Inside QGIS...



Installing Plugins

QGIS Python Plugin Installer

Plugins Repositories Options

Filter: all repositories any status

Status	Name	Version	Description	Author	Repository
upgradeable	Raster File Info Plugin	0.2 -> 0.3	Get the raster file info for a loaded layer	Aaron Racicot	Aaron
upgradeable	Plugin Installer	0.9.9 -> 1.0	Downloads and installs QGIS python plugins	Borys Jurgiel	QGIS Official Repository
not installed	HomeRange_plugin	2.0.1	Home range estimation with R. Requires Python 2.5, Rpy, R>= 2.7.1, R packages rgdal and adehabitat, a...	Anne Ghisla under Google Summer of Code	Faunalia Repository
not installed	Arpat	0.3.1	Survey identification. Licenced under GNU GPL v2.	Martin Dobias for Faunalia and ARPAT-SIRA (h...	Faunalia Repository
not installed	Point sampling tool	0.2.1	Collects polygon attributes and raster values from multiple layers at specified sampling points	Borys Jurgiel	bwj
not installed	Zoom to Point	1.0	Zooms the map canvas to a coordinate you specify. You can specify the zoom level as well to control th...	Gary Sherman	QGIS Official Repository
not installed	Html Image Map	0.3.7	Generates a html image map (image+html) from a given polygon/point layer. 0.3.7 version for Qgis 1.0...	Richard Duivenvoorde	QGIS Contributed Repository
not installed	OpenStreetMap	0.2.1	OSM integration - proof of concept	Martin Dobias	Faunalia Repository
not installed	RandomHR (AniMove)	0.1.2	Randomization of home ranges within a study area.	Borys Jurgiel for Faunalia and University of Flo...	Faunalia Repository
not installed	Value Tool	0.2	Display the values of the raster layers at the current mouse position. Values are printed in a table or plott...	Ghislain Picard	QGIS Contributed Repository
not installed	Postgis Tools	0.1	Plugin to store PostgreSQL's queries and transform them into a plugin with GUI using a xml file.	Mauricio de Paulo	QGIS Contributed Repository
not installed	Find By Attribute	0.3	Search for features by their attributes. Supported logical operations are: equal - less than - more than - l...	Anita Graser	QGIS Contributed Repository
not installed	RGB Composition	0.4	Adds a "Add RGB Composition" to the layers menu. Works using gdal-python and VRT files.	Mauricio de Paulo	QGIS Contributed Repository
not installed	manageR for QGIS 1.x	0.6.5	Provides R statistical functionality within QGIS. Requires rpy2 and R >= 2.8.0	cfarmer	ftools
not installed	qgsAffine	0.4	Apply an Affine Transformation to vector features.	Mauricio de Paulo	QGIS Contributed Repository
not installed	Symbology-NG	0.1.6	New generation symbology.	Martin Dobias	martin
not installed	GHydraulic	2.0.0	Calculate economic pipe diameters for water supply networks	Steffen Macke	QGIS Contributed Repository
not installed	fTools for QGIS 1.x	0.5.9	Tools for vector data analysis and management.	cfarmer	ftools
not installed	PostGIS manager	0.4.9	Simple manager for a PostGIS database.	Martin Dobias	martin
not installed	Profile Tool	0.2	Plots terrain profiles	Borys Jurgiel	QGIS Contributed Repository
not installed	OpenStreetMap Loader	0.2	Plugin for loading, downloading and uploading OSM data. REQUIRES OSM PROVIDER!	Lukas Berka	martin
not installed	Linear referencing plugin	0.5.4	Calculate dinamic segmentation for PostGIS layers	Martin Dobias for Faunalia and TEACZ	Faunalia Repository
not installed	Metaedit	0.1.1	Editor to read and write XML Metadata	Alex Mandel	QGIS Contributed Repository
not installed	Table Manager	0.1.7	Manages attribute table structure	Borys Jurgiel	bwj
not installed	Geoprocessing	0.52	The plugin provides the basic vector Geoprocessing functions: Buffer, Convex Hull, Dissolve, Difference,...	Horst Düster	QGIS Contributed Repository
not installed	MapSheetAutoGeoRef	1.04	Map Sheet Mass Georeferencing Automation for QGIS. Requires gdal-bin on unix and FWTools on Win pl...	Janis Jatnieks	QGIS Contributed Repository
not installed	Scattergram	0.2.1	Plot the scattergram of two raster layers. Requires Qwt5.	Ghislain Picard	QGIS Contributed Repository
not installed	Postgis Query Editor	1.2	The plugin offers a SQL query editor, performs the edited spatial PostGIS queries and visualises the quer...	Horst Düster	QGIS Contributed Repository
not installed	Numerical Vertex Edit	0.1.1	Allows to edit a vertex in a numeric way by clicking on it. It asks to give the new coordinates in a dialog.	Cedric Moeri	QGIS Contributed Repository
installed	Threading Demo Plugin	0.2	Show off running something in a thread from the plugin	Aaron Racicot	Aaron
installed	fTools	0.5.9	Tools for vector data analysis and management	Carson J. Q. Farmer	only locally available
installed	MapServer Export	0.1	Export a saved QGIS project file to a MapServer map file	Gary E. Sherman	only locally available

The plugins will be installed to ~/./qgis/python/plugins

Repo's

Aaron Racicot's Public Qgis Plugins - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://qgisplugins.z-pulley.com/

Aaron's Public Qgis Plugins

Mirror Map : 0.0.2
A plugin to allow for simple side-by-side viewing of layers
Download: [mirrormap.zip](#)
Author: Aaron Racicot
Experimental: true

Reference Map : 0.0.4
A reference map plugin to view webmaps in qgis for reference.
Download: [refmap.zip](#)
Author: Aaron Racicot
Experimental: true

Threading demo : 0.2
Simple demo to show a plugin operating in a separate thread from the main w
Download: [threading_demo.zip](#)
Author: Aaron Racicot
Experimental: true

QGISRest : 0.2
This is a QGIS plugin based on the "Rest Client" by crshmidt to interact with R
spatial servers like featureserver. REQUIRES simplejson python module to run
Download: [qgisrest.zip](#)
Author: Aaron Racicot
Experimental: true

Raster File Info : 0.3
Simple demo plugin to let a user click and find out the file paths of all the ras
the click intersects
Download: [rasterinfo.zip](#)
Author: Aaron Racicot
Experimental: true

Done

pyqgis.org - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://pyqgis.org/

Most Visited Getting Started Latest Headlines Firebug Lite

pyqgis.org

Contribute
Have a plugin to contribute?
Upload it to the user-contributed repository.

Plugin Builder
Use the [Plugin Builder](#) to generate a starter PyQGIS Plugin

Quantum GIS Python Plugins

QGIS 1.x Official Python Plugins

View [user-contributed](#) plugins.

Download:
[Plugin Installer](#)
[Zoom to Point](#)

Plugin Installer : 1.0
The recent Python Plugin Installer
Download: [plugin_installer.zip](#)
Author: Borys Jurgiel
Version: 1.0
Minimum QGIS Version: 1.0
Home page: <http://www.bwj.aster.net.pl/qgis/>

Zoom to Point : 1.0
Zooms the map canvas to a coordinate you specify. You can specify the zoom level as well to control the view extent.
Download: [zoom_to_point.zip](#)
Author: Gary Sherman
Version: 1.0
Minimum QGIS Version: 1.0
Home page:

Done

Repo's... just some XML

```
Source of http://qgisplugins.z-pulley.com/ - Mozilla Firefox
File Edit View Help
<?xml version = '1.0' encoding = 'ISO-8859-1'?>
<?xml-stylesheet type="text/xsl" href="http://qgisplugins.z-pulley.com/media/plugins_public.xsl" ?>

<plugins>

<pyqgis_plugin version="0.0.2" name="Mirror Map" >
  <description>A plugin to allow for simple side-by-side viewing of layers</description>
  <homepage>http://trac.reprojected.com/qgisplugins/</homepage>
  <file_name>mirrormap.zip</file_name>
  <author_name>Aaron Racicot</author_name>
  <download_url>http://www.reprojected.com/qgis_dev/plugins/mirrormap/0_0_2/mirrormap.zip/</download_url>
  <qgis_minimum_version>1.0.0</qgis_minimum_version>
  <experimental>true</experimental>
</pyqgis_plugin>

<pyqgis_plugin version="0.0.4" name="Reference Map" >
  <description>A reference map plugin to view webmaps in qgis for reference.</description>
  <homepage>http://trac.reprojected.com/qgisplugins/</homepage>
  <file_name>refmap.zip</file_name>
  <author_name>Aaron Racicot</author_name>
  <download_url>http://www.reprojected.com/qgis_dev/plugins/refmap/0_0_4/refmap.zip/</download_url>
  <qgis_minimum_version>1.0.0</qgis_minimum_version>
  <experimental>true</experimental>
</pyqgis_plugin>

<pyqgis_plugin version="0.2" name="Threading_demo" >
  <description>Simple demo to show a plugin operating in a separate thread from the main window.
</description>
  <homepage>http://trac.reprojected.com/qgisplugins/</homepage>
  <file_name>threading_demo.zip</file_name>
  <author_name>Aaron Racicot</author_name>
  <download_url>http://www.reprojected.com/qgis_dev/plugins/threading_demo
/0_2/threading_demo.zip/</download_url>
  <qgis_minimum_version>1.0.0</qgis_minimum_version>
  <experimental>true</experimental>
</pyqgis_plugin>

<pyqgis_plugin version="0.2" name="QGISRest" >
  <description>This is a QGIS plugin based on the &quot;Rest Client&quot; by crshmidt to interact with REST
based spatial servers like featureserver.  REQUIRES simplejson python module to run.</description>
  <homepage>http://trac.reprojected.com/qgisplugins/</homepage>
  <file_name>qgisrest.zip</file_name>
  <author_name>Aaron Racicot</author_name>
  <download_url>http://www.reprojected.com/qgis_dev/plugins/qgisrest/0_2/qgisrest.zip/</download_url>
  <qgis_minimum_version>1.0.0</qgis_minimum_version>
  <experimental>true</experimental>
</pyqgis_plugin>

<pyqgis_plugin version="0.3" name="Raster File Info" >
  <description>Simple demo plugin to let a user click and find out the file paths of all the rasters that
the click intersects</description>
  <homepage>http://trac.reprojected.com/qgisplugins/</homepage>
  <file_name>rasterinfo.zip</file_name>
  <author_name>Aaron Racicot</author_name>
  <download_url>http://www.reprojected.com/qgis_dev/plugins/rasterinfo/0_3/rasterinfo.zip/</download_url>
  <qgis_minimum_version>1.0.0</qgis_minimum_version>
  <experimental>true</experimental>
</pyqgis_plugin>

</plugins>
```

Plugin Building

- Create from scratch... don't recommend
- Copy existing... great place to start
- Plugin Builder... ah, that's to easy



Plugin Builder

The screenshot shows a web browser window with the URL http://pyqgis.org/builder/plugin_builder.py. The page title is "PyQGIS Plugin Builder". Below the title, there is a paragraph explaining that the form will build a minimal plugin for QGIS 1.0. The main section is titled "Create your plugin (All fields are mandatory)". It contains several input fields: "Class name (use CamelCase)" with "WaURISA", "Short descriptive title" with "WaURISA TestApp", "Description" with "General app for capturing file name of layers", "Version number" with "0.1", "Minimum required QGIS version" with "1.0", "Text for the menu item" with "WaURISA", "Author/Company name" with "Z-Pulley Inc", and "Email address" with "aaronr@z-pulley.com". A "Build It!" button is located below the email field. To the right of the form, there is an "Example" section with a grey background, showing "ZoomToPoint" as an example plugin that zooms to a point on the map. At the bottom of the form, there is a footnote: "1Your email address is used in the generated code and not retained for".

http://pyqgis.org/builder/plugin_builder.py

The screenshot shows a web browser window with the URL http://pyqgis.org/builder/create_plugin.py. The page title is "Plugin Builder Results - WaURISA". Below the title, there is a horizontal line, followed by the text "This is a test version of the Plugin Builder". Another horizontal line follows. Below that, it says "Generation complete for WaURISA. You can download it [here](#)". The section "What Next?" is followed by a list of five steps: 1. Unzip the plugin into your QGIS plugin directory and test it. 2. Modify it by editing the implementation file WaURISA.py. 3. Create your own custom icon, replacing default icon.png. 4. Modify your user interface by opening WaURISA.ui in Qt Designer (don't forget to compile it with pyuic4 after changing it). 5. Use the Makefile to compile your Ui and resource files if you make changes to them (requires gmake). At the bottom of the page, there is a link to http://pyqgis.org/built_plugins/waurisa.zip.

Where do they live?

`%working_dir%\.qgis\python\plugins`

SECRET: That is where the plugin installer puts them!



Designer

- Let's you add GUI elements via graphical interface
- Focuses on Widgets and Layouts
- Generates UI files
 - Natively consumed in QT
 - Must be compiled in PyQt
- <http://www.riverbankcomputing.co.uk/software/pyqt/download>
- OSGEO4W does not contain designer... download separately



Lets build one...

- Run through the Plugin Builder
- Unzip into .qgis\python\plugins
- Test
- Open .ui file in Designer and modify
- Compile .ui -> .py
- Hook into a SIGNAL from the UI in plugin



```
QtCore.QObject.connect(iface.mapCanvas,  
QtCore.SIGNAL("xyCoordinates(QgsPoint&)"),  
self.updateCoords)
```

```
Def updateCoords(self,p):
```

```
    capture = QtCore.QString(str(p.x()) + " , " +  
    str(p.y()))
```

```
    self.lineEdit.setText(capture)
```



Cool List

- fTools
- ManagerR
- PostGIS Manager
- WaURISA Test Plugin 😊



References

PyQGIS

Bindings - <http://wiki.qgis.org/qgiswiki/PythonBindings>

API - <http://doc.qgis.org/head/classes.html>

QT API - <http://doc.trolltech.com/4.5/index.html>

PyQT Docs - <http://www.riverbankcomputing.co.uk/static/Docs/PyQt4/pyqt4ref.html>

SIP Docs - <http://www.riverbankcomputing.co.uk/static/Docs/sip4/sipref.html>

Official Plugin Repo - <http://pyqgis.org/>

Plugin Builder - http://pyqgis.org/builder/plugin_builder.py



Help

- #qgis on freenode IRC
- <http://www.qgis.org/community/mailling-lists.html>
- <http://www.qgis.org/index.php>
- <http://blog.qgis.org/>
- <http://forum.qgis.org/>
- <https://trac.osgeo.org/qgis/>



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