Qt to create OSM-based apps

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Outline

• What is Qt
• Qt5, Qt/QML, QtQuick
• QtLocation
  • Mapping
    • OSM plugin
    • MapboxGL plugin
  • Other functions
• Live demo
What is Qt?

- "Cross-platform application framework and widget toolkit"¹
  - "for creating classic and embedded graphical user interfaces, and applications that run on various software and hardware platforms with little or no change in the underlying codebase, while still being a native application with native capabilities and speed."¹

- Applications are native AND cross platform
  - Desktop, mobile and embedded

- C++, Javascript, QML: mix and match

- Ships with modules for (almost) everything

- Comes with an awesome IDE

¹ Wikipedia
QML, Qt5, QtQuick2

• "QML (Qt Modeling Language) is a user interface markup language"¹
  • "It is a declarative language (similar to CSS and JSON) for designing user interface-centric applications. Inline JavaScript code handles imperative aspects. It is associated with Qt Quick, the UI creation kit originally developed by Nokia within the Qt framework."¹

• Introduced with Qt 4

• Mature and optimized in Qt5
  • V4 Engine, JIT, qtquickcompiler,

• Comes w. QtQuick2, Quick Controls, ++
  • HW-accelerated scene graph, QQC2

• Qt5 is a lot more

¹ Wikipedia
Qt5 at a glance: the complete picture
20+ years of Qt

Qt History

1991
Qt conceived by Hauard Nord and Eink Chambe-Eng on a park bench in Tronheim, Norway.

1996
- Customer #1 - European Space Agency
- Qt 1.0 - full X11 support for free software development
- KDE project established with Qt as its underlying library

1998
KDE Free Qt Foundation - guarantees Qt availability for free software development

2000
- New Qt windowing system - QtEmbedded (a.k.a. QWS & Qtopia Core)
- Both Qt/X11 & QtEmbedded under GPL + commercial licenses
- GPL v2 with Qt 2.2

2005
Qt 4.0 - Total makeover with full re-architecture under commercial & GPL 2.0 (or later) for all platforms, even Windows (Famous Qt 4 dance video)

2008
Nokia acquires Trolltech - "Qt Software at Nokia"

2009
Qt Creator launched and Qt 4.5 brought LGPL v2.1

2001
Qt 3.0 - "multiple database environments, multiple languages, multiple monitors" with Mac OS X support and a new Qt Designer GUI builder

2006
- Trolltech IPO on Oslo Stock Exchange
- Greenphone developer smartphone
- Qtopia in millions of devices worldwide from Sharp to Motorola
Qt Location

• Organized in 2 submodules: **Positioning** and **Location**

**Positioning**
• C++ and QML api to retrieve the current position
• On Linux, WinRT, Android, MacOS, iOS and serial NMEA

**Location**
• C++ and QML api for geocoding, routing, and PoI search and manipulation
• QML API for mapping
  • Display maps
  • Add (interactive) content
    • Programmatically
    • From a model
Mapping

- Built-in raster engine
  - Smooth zoom
  - Supports hi-dpi tiles
  - Mip-mapping and anisotropic filtering
  - Supports caching
  - Supports offline datasets

- Extensible via 3rd-party mapping engines
  - Ships with a mapbox-gl-native based plugin
  - DynamicParameter to tune such plugins
Mapping: map items

- Geometric and MapQuickItem
- Rotate and tilt with the map
  - drawn on top of the map
- QQuickItems
  - interactive with MouseArea
- Stacked using z property
- Map Objects to go native
- MapItemView, MapObjectView
  - populate maps from models
The OpenStreetMap plugin

- Repo of open-access OSM-based geoservices
  - raster maps, geocoding, routing, POIs

- Maps from open-access tile providers
  - can change or terminate at any time
  - configurable

- Routing using OSRM
  - defaults to OSRM demo server
    - not production-quality, probably soon gone
  - configurable to run on own server

- Geocoding and Places via Nominatim
  - defaults to OSM nominatim server
  - again, configurable
The MapboxGL plugin

- A mapping-only plugin based on mapbox-gl-native
  - Supports own styles
  - Supports offline tiles

- Draws map items natively
  - except for MapQuickItem

- Supports a number of DynamicParameters
  - mostly to manipulate the style at runtime
Geocoding

- Forward and reverse geocode
  - from coordinate
  - from string
  - from structured addresses
Routing

- Supports multiple waypoints
- Returns multiple results
  - with directions (Maneuvers)

Head northeast on Piazza dell’Unità Italiana
Turn right to stay on Piazza dell’Unità Italiana
Turn left onto Piazza Madonna degli Aldobrandi
Turn right to stay on Piazza Madonna degli Aldobrandi
Turn right onto Via dei Conti (71 m)
Keep left onto Via Ferdinando Zannetti (9)
Turn left onto Via dei Cerretani (52 m)
You have arrived at your destination, on the...
Places of interest

- API to search places
  - by free text
  - by category

- and info about them
  - editorials
  - reviews
  - images

- integrated with QtContacts
  - again, some day
Conclusion

- Complete module for mapping and navigation
- Effective for consuming OSM data
  - map data, POI data, geocoding, routing
- Mix and match providers and geoservices
- Actively developed and supported
- Fits most scenarios
  - embedded, desktop, mobile
Thanks for your attention!

For more information: doc.qt.io/qt5
For bugreports, feature requests and suggestions: bugreports.qt.io
Also on IRC: #qt-mobility on irc.freenode.net