17:30 17:30

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 (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
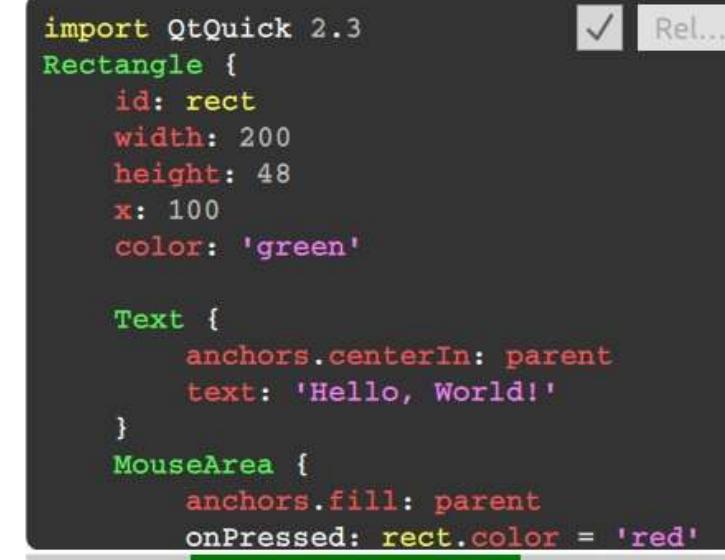
```
import QtQuick 2.3                    ✓  Rel...
Rectangle {
    id: rect
    width: 200
    height: 48
    x: 100
    color: 'green'

    Text {
        anchors.centerIn: parent
        text: 'Hello, World!'
    }
    MouseArea {
        anchors.fill: parent
        onPressed: rect.color = 'red'
```

Hello, World!

[1] Wikipedia

Qt5 at a glance: the complete picture

20+ years of Qt

Qt History

1995
Troll Tech 1st public release on 20 May,
Qt 0.90 for X11/Linux
» Commercial & open source (FreeQt license)

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

2000
» New Qt windowing system - Qt/Embedded - (a.k.a. QWS & Qtopia Core)
» Both Qt/X11 & Qt/Embedded 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"

1991
Qt conceived by Haavard Nord and Eirik Chambe-Eng on a park bench in Trondheim, Norway.

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

1999
**Qt 2.0** - Qt/X11 open source with QPL
(Q Public License)

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 Motorol

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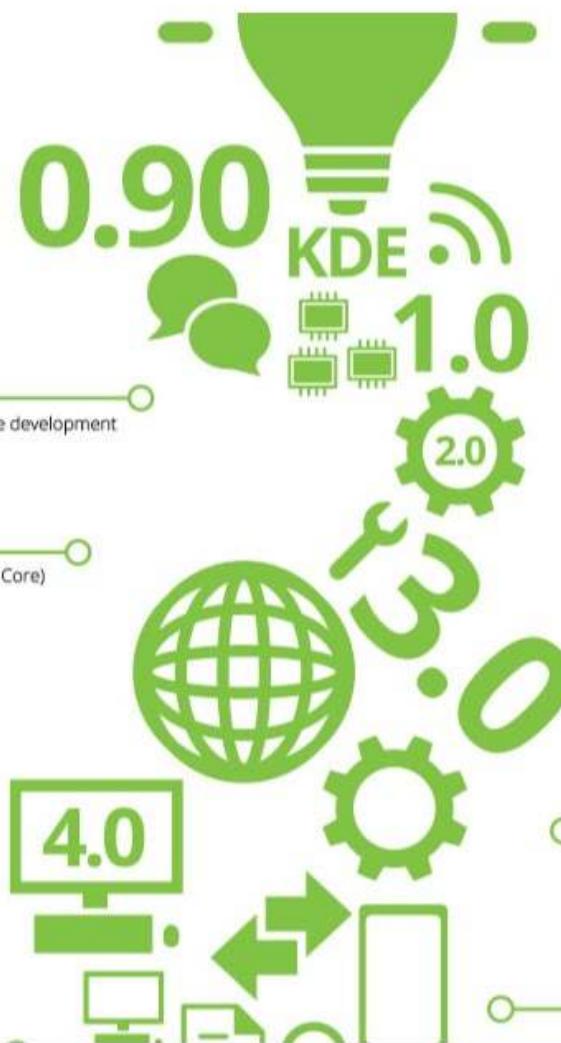
Qt Location

- 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

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State of the Map 2018
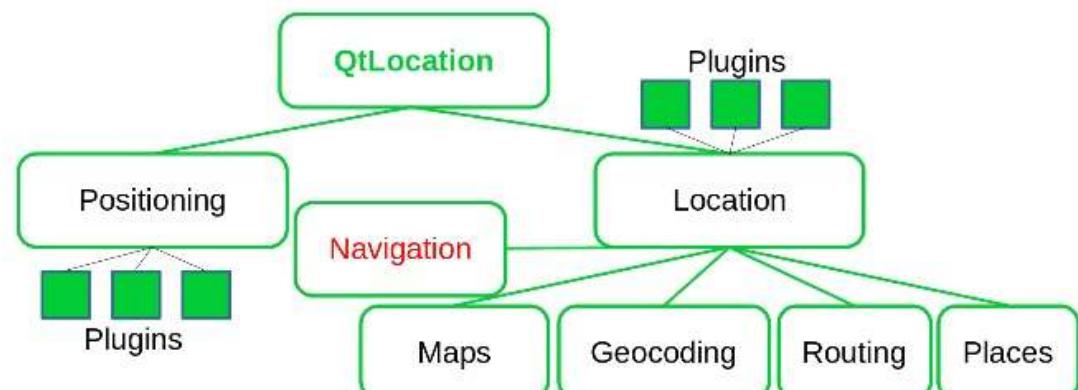
Mapping

- 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

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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 nominamtim 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 Italia
Turn right to stay on Piazza dell'Unità Itali
Turn left onto Piazza Madonna degli Aldo
Turn right to stay on Piazza Madonna degl
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 th
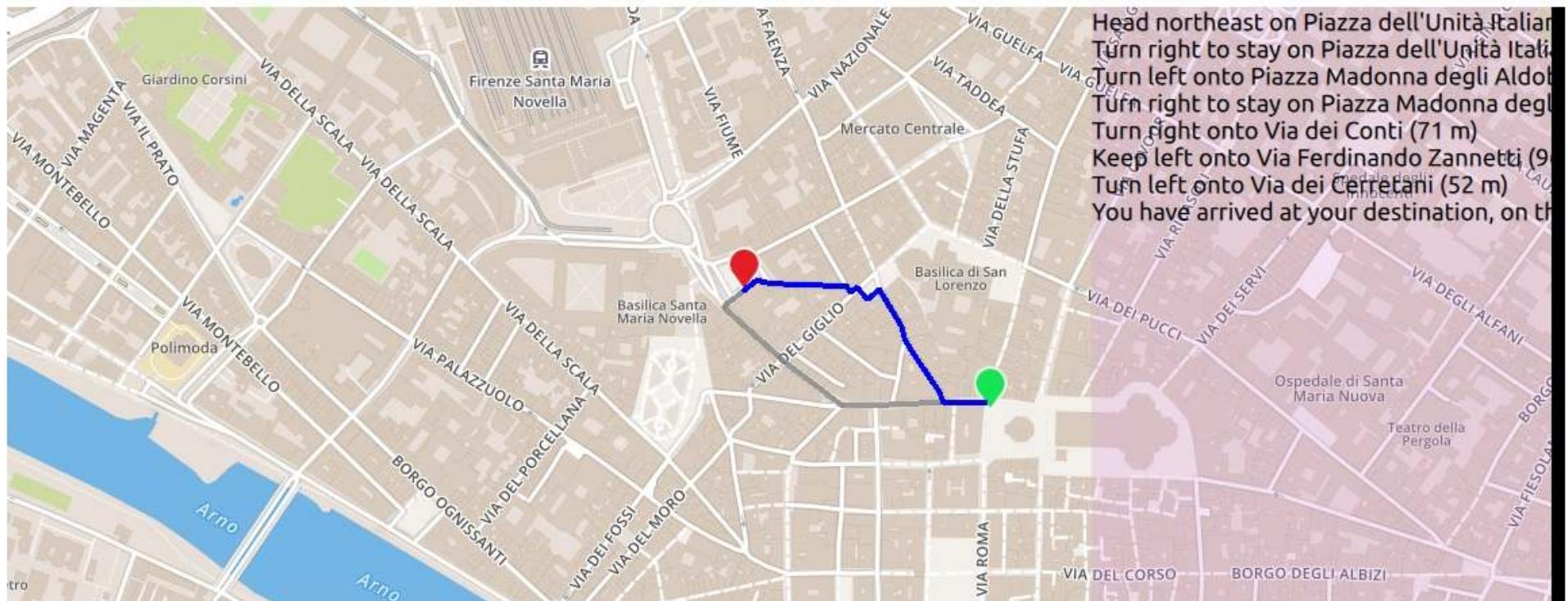
Places of interest

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

- and info about them
  - editorials
  - reviews
  - images

- integrated with QtContacts
  - again, some day

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✓   Rel...

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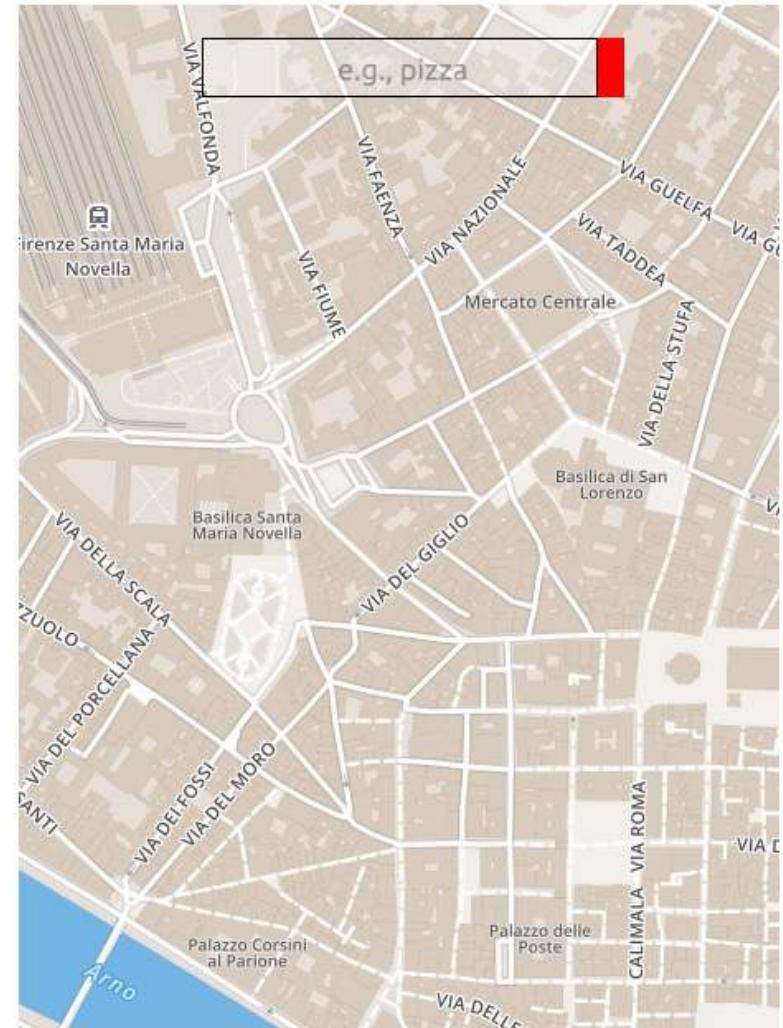
Conclusion

- 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**

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