Practice of Porting Qt applications to Android platform

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Motivation

- Many platforms — many users
- Application fast development
- Cross-platform frameworks
- Middle and low-level integration with platform
- Native style for user interface
Necessitas and Ministro

- Necessitas — community project
- Provide an easy way to develop Qt apps on Android platform
- Supports QML and QWidget based UIs
- Necessitas uses Android NDK
- Current status: beta release
- Ministro is a system wide libraries installer/provider for Android
- More information at http://necessitas.kde.org
**Architecture**

- QtActivity and QtApplication generated by Necessitas
- Ministro provide Qt libraries
Porting user interface

- Variety devices and screen sizes
- Portrait and landscape screens
- Extensible user interface for small, normal, large and extra large screens
- Add restrictions on the supported generalized screen sizes

Symbian:

```javascript
cellWidth: (parent.width / parent.height > 1.5) ? 213 : 120;
```

Android:

```javascript
getCellWidth: (parent.width / parent.height > 1.5) ? 213 : (parent.width > 400 ? 120 : Math.ceil(parent.width / 3));
```
Using objects and data

- Package contains only libraries and meta data
- Use Resources to package objects and files
- Use "Assets" to add files to package

Mashrooms.pro:

```cpp
android {
    images_deploy.files=qml/images/*.*.jpg
    images_deploy.path=/assets/qml/images
    INSTALLS += images_deploy
}
```

main.cpp:

```cpp
#ifndef Q_OS_ANDROID
view.rootContext()->setContextProperty("applicationPath", "file:////" + QApplication::applicationDirPath() + "/");
#endif
```
Project environment

- Application name
- 3 icons (small, medium and large)
- List of used Qt libraries
Applications ported to Android platform

- Action game “Shariks”
- Based “box2d” technology “Loader”
- Accelerometer based drawing program “Liquid”
- Reference application “Mushrooms” with Qt components
- Applications published in Nokia store for Symbian and Harmattan
Accelerometer usage

- Android and Symbian have different directions

![Diagram showing different accelerometer orientations for Android and Symbian](image-url)
Control statements

- Some control statements in Qt code don’t work in Android
- Manual set configuration of application in file “AndroidManifest”

Symbian:

```cpp
viewer.setOrientation(QmlApplicationViewer::ScreenOrientationLockLandscape);
```

Android (AndroidManifest.xml):

```xml
android:screenOrientation="landscape"
```
Splash screen

- Application starts in “window” mode (with top panel)
- At start Qt components gets wrong screen size
- After load Qt gets correct screen size but QML not
- How to get correct screen size:
  - Connect to signal QDesktopWidget::workAreaResized()
  - Send to QML new screen size from QDesktopWidget::screenGeometry()
All applications are published in Google Play

<table>
<thead>
<tr>
<th>Application</th>
<th>Nokia Store</th>
<th>Google Play</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loader</td>
<td>13015</td>
<td>481 (74)</td>
</tr>
<tr>
<td>Shariks</td>
<td>10089</td>
<td>63 (8)</td>
</tr>
<tr>
<td>Liquid</td>
<td>12750</td>
<td>36 (3)</td>
</tr>
<tr>
<td>Mushrooms</td>
<td>28027</td>
<td>15637 (5253)</td>
</tr>
</tbody>
</table>
Results

- All applications tested in various Android devices (Android 2.2-4.0)
- Application may not work in device (font problems, black screens, etc.)
- Qt applications may be used in Android devices
- The main problem is a integration Qt framework into Android platform
- Many users complain about the large size of Qt libraries and Ministro application
- Qt errors are not detected by platform (application was closed)