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

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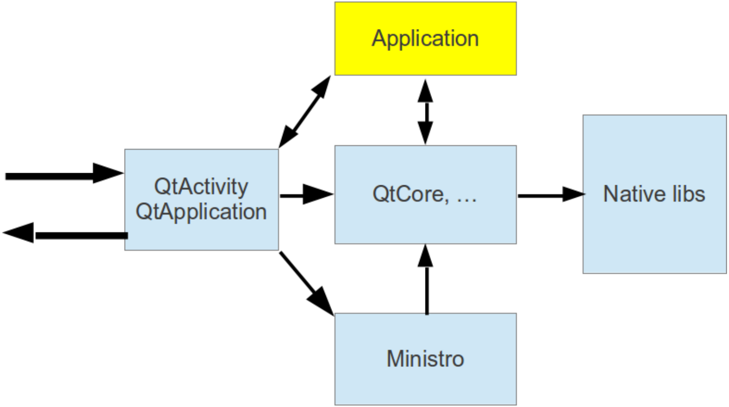
Architecture

- QtActivity and QtApplication generated by Necessitas
- Ministro provide Qt libraries



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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:

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

Android:

```
cellWidth: (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:

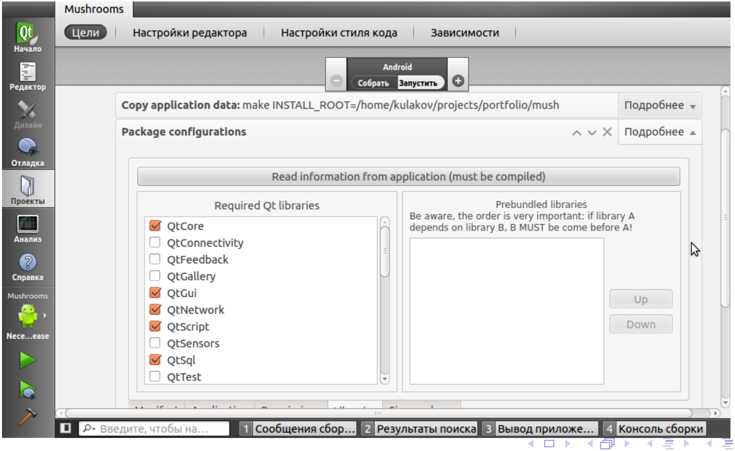
```
android {
    images_deploy.files=qml/images/*.jpg
    images_deploy.path=/assets/qml/images
    INSTALLS += images_deploy
}
```

main.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



Mushrooms

Цели | Настройки редактора | Настройки стиля кода | Зависимости

Android
Собрать | Запустить

Copy application data: make INSTALL_ROOT=/home/kulakov/projects/portfolio/mush — Подробнее

Package configurations — Подробнее

Read information from application (must be compiled)

Required Qt libraries

- ☑ QtCore
- ☐ QtConnectivity
- ☐ QtFeedback
- ☐ QtGallery
- ☑ QtGui
- ☑ QtNetwork
- ☑ QtScript
- ☐ QtSensors
- ☑ QtSql
- ☐ QtTest

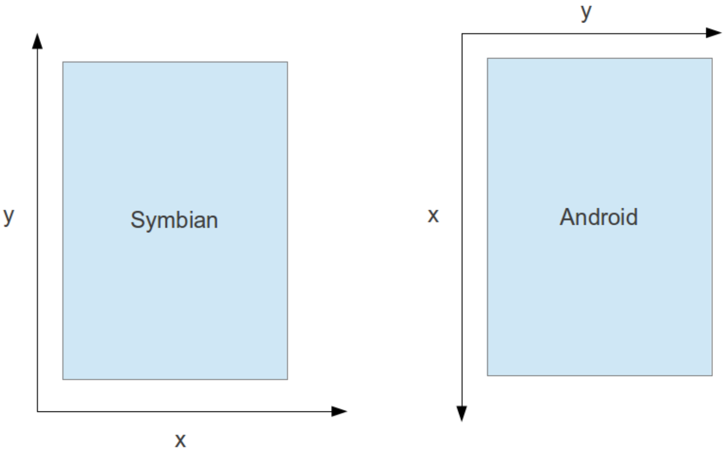
Prebundled libraries
Be aware, the order is very important: if library A depends on library B, B MUST be come before A!

Applications ported to Android platform

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

Accelerometer usage

- Android and Symbian has different directions



Control statements

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

Symbian:

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

Android (AndroidManifest.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()

Statistics

- All applications are published in Google Play

Application	Nokia Store	Google Play
Loader	13015	481 (74)
Shariks	10089	63 (8)
Liquid	12750	36 (3)
Mushrooms	28027	15637 (5253)

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)