

# Qtopia Minimum VoIP Device Profile

Trolltech

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# 1 Summary

This device profile(min\_voip) aims to create the minimum footprint for VoIP devices with smaller memory specification. The primary target device has 16MB flash and 16MB RAM.

Most of the applications that do not have high priority for a VoIP device have been excluded from the build to reduce the footprint.

The profile is to assist integrators with their own sip stack hence Qtopia's sip stack is excluded from the build.

The profile is applied to Qtopia 4.1.7 and Qtopia 4.2.3 on Greenphone and the results are summarized.

## 2 Introduction to Device Profile

Qtopia Phone Edition comes with a rich set of features and capabilities to address the savvy user's needs. However, every mobile phone project has a different set of requirements and the target device has a different set of capabilities compared to another.

Even though Qtopia build system is designed to facilitate the different configuration options and provide flexibility as much as possible, it is still cumbersome if you have to patch the source code for each project which also leads to the difficulty in maintaining the source code.

Qtopia device profiles provide a solution to this situation by having a single directory that contains all the configuration information for a target device.

A device profile contains information to configure Qtopia Phone Edition, scripts for the environment set up, tool-chain info and source code for the device specific projects.

The device profile is consist of the following components.

	Description	Greenphone dependency
bin/	Scripts for toolchain set up	Medium
include/	Greenphone hardware driver headers	High
mkspecs/	qmake configurations for cross compilation	Medium
src/	Greenphone specific projects	High
config.pri	Defines for conditional compilation	High
configure	Device configuration options	Medium
custom.h, custom.cpp	Greenphone specific code	High
defaultbuttons.conf	Keypad button mapping information	High
environment^	Script to set up appropriate cross compiler environment	High
Hardware.conf	Power Management configuration options	Low
project.pri	List of excluded projects from the package	Low
Storage.conf	Greenphone storage configuration options	High
server/	Greenphone specific Server Task* implementations	High

Components with high Greenphone dependency are more likely to be changed to meet the new device's specifications.

^ environment script must be changed to point to your own tool-chain.

\* Server Task requires Qtopia 4.2.1 or higher.

Server Task is a more extensible mechanism to control what and how the Qtopia server process starts. Some of the server tasks are device specific and implementation for those resides in server/ directory within the device profile. Examples are SystemSuspend and PowerManagerTask.

### 3 Applying the Device Profile

Download Qtopia Phone Edition source package and unpack to your source directory.

```
mkdir -p /devel/greenphone-sdk-source/package
cd /devel/greenphone-sdk-source/package
tar -xzf /home/user/path_to_files/qtopia-phone-commercial-src-4.2.2.tar.gz
cd qtopia-phone-4.2.2
```

Create build directory.

```
mkdir -p ~/build/qtopia/4.2.2
```

Export environment variables.

```
export QTOPIA_DEPOT_PATH=/devel/greenphone-sdk-source/package/qtopia-phone-4.2.2
export QPEDIR=~/build/qtopia/4.2.2
```

Copy unpack min\_voip device profile source package

```
cd $QTOPIA_DEPOT_PATH/devices
tar -xzf /home/user/path_to_files/4.2-min_voip.tar.gz
```

Configure, make and make install for **quicklaunch build**

```
cd $QPEDIR
$QTOPIA_DEPOT_PATH/configure -device min_voip
make
make install
```

Or, Configure make and make install for **singleexec build**

```
cd $QPEDIR
$QTOPIA_DEPOT_PATH/configure -device min_voip -singleexec
make
make install
```

## 4 Configure Options for Qtopia 4.1.7 / Qt 4.1.12

The file min\_voip/configure contains the following:

```
-xplatform min_voip -arch arm -no-qvfb
-displaysize 320x240
-edition phone
-no-modem
-voip
-no-helix
-no-drm
-no-sxe
-prefix /opt/Qtopia
-no-bluetooth
-no-infrared
-iconsizes 14
-fontsizes "160 120 240"
-fontstyles 50
-fontfamilies "helvetica"
-languages "en_US"
-extra-qtopiacore-config "-no-freetype"
-extra-qtopiacore-config "-qt-libjpeg"
-extra-qtopiacore-config "-qt-libmng"
-extra-qtopiacore-config "-qt-libpng"
-extra-qtopiacore-config "-qt-zlib"
-extra-qtopiacore-config "-no-accessibility"
-release
(-singleexec)
```

The file min\_voip/projects.pri excludes the following components:

Group	Project
application	calculator camera datebook helpbrowser mediaplayer mediarecorder photoedit qtmall simapp sysinfo textedit today todo

Group	Project
<b>libraries</b>	handwriting qtopiamail qtopiamedia qtopiasmil
<b>3rdparty</b>	libraries/amr libraries/dissipate2 plugins/codecs/libamr plugins/inputmethods/pkim plugins/obex plugins/obex/openobex
<b>plug-ins</b>	applets/irreceiver codecs/wavrecord
<b>settings</b>	appearance beaming calibrate callforwarding handwriting phonenetworks phonesettings security sipsettings words worldtime
<b>games</b>	fifteen minesweep qasteroids snake
<b>themes</b>	brushedmetal fantasy gel portal
<b>tools</b>	sipagent dualdisplaybasic

## ***Resulting Compressed Image Sizes***

These figures may slightly differ between each build depending on Qtopia version.

### **Singleexec Build**

qtopia.cramfs : 8.5 MB

qtopia\_default.tgz : 222KB

### **Quicklaunch Build**

qtopia.cramfs : 9.5 MB

qtopia\_default.tgz : 222KB



## 5 Configure Options for Qtopia 4.2 / Qt 4.2

The file `min_voip/configure` contains the following:

```
-xplatform min_voip -arch arm -no-qvfb
-displaysize 320x240
-edition phone
-no-modem
-voip
-no-helix
-no-drm
-no-sxe
-prefix /opt/Qtopia
-no-bluetooth
-no-infrared
-iconsize 22
-font "dejavu:160:50"
-languages "en_US"
-extra-qtopiacore-config "-no-freetype"
-extra-qtopiacore-config "-qt-libjpeg"
-extra-qtopiacore-config "-qt-libmng"
-extra-qtopiacore-config "-qt-libpng"
-extra-qtopiacore-config "-qt-zlib"
-extra-qtopiacore-config "-no-accessibility"
-release
-silent
-no-samples
(-singleexec)
```

The file `min_voip/projects.pri` excludes the following components:

Group	Project
application	calculator camera datebook helpbrowser mediaplayer mediarecorder photoedit qtmall simapp sysinfo textedit today todo

Group	Project
<b>libraries</b>	handwriting qtopiamail qtopiamedia qtopiaprinting qtopiasmil
<b>3rdparty</b>	libraries/amr libraries/dissipate2 plugins/codecs/libamr plugins/inputmethods/pkim plugins/obex plugins/obex/openobex
<b>plug-ins</b>	applets/irreceiver codecs/wavrecord content/exif content/id3 inputmethods/dockedkeyboard inputmethods/keyboard
<b>settings</b>	appearance beaming calibrate callforwarding handwriting packagemanager phonenetworks phonesettings security serverwidgets sipsettings words worldtime
<b>games</b>	fifteen minesweep qasteroids snake
<b>themes</b>	brushedmetal crisp fantasy gel portal smart
<b>tools</b>	drmfilehandler printserver sipagent vsexplorer

## ***Resulting Compressed Image Sizes***

These figures may slightly differ between each build depending on Qtopia version.

### **Singleexec Build**

qtopia.cramfs : 8.7MB

### **Quicklaunch Build**

qtopia.cramfs : 12MB

## 6 Creating Compressed Image

### *Qtopia 4.1*

```
$QTOPIA_DEPOT_PATH/scripts/greenphone-make-cramfs.sh \  
$QPEDIR/image/opt/Qtopia/ \  
$QPEDIR/
```

### *Qtopia 4.2*

```
$QTOPIA_DEPOT_PATH/scripts/greenphone-make-cramfs.sh \  
$QPEDIR/image/ \  
$QPEDIR/
```

## 7 Including Extra Projects

Extra projects can be included by commenting out project exclusion lines from

```
$QTOPIA_DEPOT_PATH/devices/min_voip/projects.pri
```

To include calculator project, for example,

```
PROJECTS-=applications/calculator
```

```
-> #PROJECTS-=applications/calculator
```

**WARNING:** Some project may have dependencies to already excluded library. In that case libraries need to be included as well. To see the dependency refer to the project's .pro file in the source directory.

## 8 Creating Image for X11 and QVfb

To create an image that can run with QVfb on X11 host environment, configure the system like this.

```
$QTOPIA_DEPOT_PATH/configure -device min_voip -xplatform linux-generic-g++ \  
-arch i386 -qvfb
```

```
make
```

```
make install
```

To run Qtopia:

```
mkdir -p /opt/Qtopia
```

```
cp -a $QPEDIR/image/* /opt/Qtopia
```

```
$QPEDIR/script/runqtopia
```

## 9 Integrating SIP stack with Qtopia

### *Building Blocks*

#### **Qtopia Services Framework**

Qtopia Application Services allow an application to consume functionalities of other applications. This is a mechanism that can be used to initiate VoIP service.

For example, VoIP handler needs to publish it's service so that Qtopia Telephony Framework can consume it.

#### **Unix Domain Socket**

For 4.1, Unix domain socket is used to facilitate the communications between Qtopia Phone Server and VoIP handler.

For 4.2, it is recommended to inherit Qtopia Telephony classes and re-implement its virtual functions.

#### **Qtopia Phone API**

Client applications can use Qtopia Phone API that translates telephony requests to VoIP commands. API also contains class for network registration, call management and so on.

## 10 Test Hardware Specification

### ***Greenphone Specification***

- Touch-screen and keypad UI
- QVGA® LCD color screen
- Marvell® PXA270 312 MHz application processor
- 64MB RAM & 128MB Flash
- Mini-SD™ card slot
- Broadcom® BCM2121 GSM/GPRS baseband processor
- Tri-band (GSM 900/1800/1900) support
- Bluetooth® equipped
- Mini-USB port
- 1.3 megapixel camera

## 11 References

### ***Qtopia 4.1***

Device Configuration Profiles

<http://doc.trolltech.com/qtopia4.1/buildsystem-user-guide.html#device-configuration-profiles>

Hardware Configuration

<http://doc.trolltech.com/qtopia4.1/syscust-hardware.html>

Tutorial : Implementing a Device Plug-in

<http://doc.trolltech.com/qtopia4.1/tut-deviceexample.html>

Qtopia VoIP Integration

<http://doc.trolltech.com/qtopia4.1/voip-integration.html>

Services

<http://doc.trolltech.com/qtopia4.1/services.html>

### ***Qtopia 4.2***

Device Configuration Profiles

<http://doc.trolltech.com/qtopia4.2/buildsystem-user-guide.html#device-configuration-profiles>

Hardware Configuration

<http://doc.trolltech.com/qtopia4.2/syscust-hardware.html>

Tutorial : Implementing a Device Plug-in

<http://doc.trolltech.com/qtopia4.2/tut-deviceexample.html>

Server Tasks

<http://doc.trolltech.com/qtopia4.2/qtopiaserverapplication.html>

Qtopia VoIP Integration

<http://doc.trolltech.com/qtopia4.2/voip-integration.html>

Services

<http://doc.trolltech.com/qtopia4.2/services.html>

### ***Greenphone***

<http://www.trolltech.com/products/qtopia/greenphone/>