

Mobile Broadband Configuration Assistant for  
NetworkManager

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Project Plan  
Kesäkoodi 2008

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## Terms and Abbreviations

**Bluetooth** an industrial specification for wireless personal area networks that provides a way to connect and exchange information between devices over a secure, globally unlicensed short-range radio frequency.  
[ <http://www.bluetooth.com> ]

**GNOME** GNU Object Model Environment – easy to understand desktop for your GNU/Linux or UNIX computer.  
[ <http://www.gnome.org> ]

**GNU** GNU's Not Unix – The GNU Project was launched in 1984 to develop a complete Unix-like operating system which is free software. GNU's kernel wasn't finished, so GNU is used with the kernel Linux. The combination of GNU and Linux is the GNU/Linux operating system, now used by millions.  
[ <http://www.gnu.org> ]

**Kesäkoodi** Summer Code Finland – a yearly project organized by the Finnish Linux and Open Source Initiative, which aims to support Finnish participation in significant open source projects and to strengthen the open source competencies that companies need.  
[ <http://www.coss.fi/kesakoodi> ]

**Linux** a Unix-like operating system kernel, started in 1991 by Linus Torvalds. The combination of Linux and GNU operating system is called GNU/Linux.  
[ <http://www.kernel.org> ]

**NetworkManager** a software utility aimed at simplifying the use of computer networks on Linux and other Unix-like operating systems.  
[ <http://www.gnome.org/projects/NetworkManager> ]

**PPP** Point-to-Point Protocol. Also, Paul's PPP Package, an open source package which implements the Point-to-Point Protocol on Linux and Solaris systems.  
[ <http://ppp.samba.org> ]

**Red Hat** one of the larger and more recognized companies dedicated to free software / open source, and a distributor of Red Hat Enterprise Linux.  
[ <http://www.redhat.com> ]

**Ubuntu Linux** a Linux distribution that aims to provide an up-to-date yet stable operating system for the average user, and features a strong focus on usability, regular releases, and ease of installation. Ubuntu is sponsored by Canonical Ltd.  
[ <http://www.ubuntu.com> ]

**USB** Universal Serial Bus – a serial bus standard to interface devices.  
[ <http://www.usb.org> ]

**XML** Extensible Markup Language — simple, very flexible text format derived from SGML (ISO 8879).  
[ <http://www.w3.org/XML> ]

# 1 Abstract

This document contains the project plan for Mobile Broadband Configuration Assistant for NetworkManager – a project for Kesäkoodi 2008. Development will be executed during the period of 3 months starting on May 26<sup>th</sup> and ending on August 22<sup>nd</sup>. See Appendix B for a detailed development schedule.

# 2 Motivation

Having an Internet access has become almost a basic commodity these days. In the past few years mobile service providers have started to offer mobile broadband solutions for their customers. Mobile broadband offers a fast and easy way to connect to the Internet anytime anywhere. Through tie-in sales the customers also have inexpensive mobile broadband capable phones at their disposal.

Although the service providers target their marketing mainly on laptop users, it is equally possible for desktop users to benefit from a mobile broadband connection. Combined with fixed monthly fees, instead of charging per megabytes transferred, and having a wide network coverage mobile broadband can be a viable option compared to common land line broadband solutions – especially in locations lacking a land line.

## 2.1 Problem

Although it is very easy, fast and inexpensive to get a mobile broadband subscription, it is very difficult to configure a mobile broadband connection for GNU/Linux based systems. There are no easy to use tools for creating the needed connection settings and thus the user must create nontrivial configuration files by hand! What makes the situation even worse is that the service providers often have support documentation only for Microsoft Windows operating systems and thus it can be very difficult even for an experienced user - let alone for a novice - to find the needed information.

## 2.2 Solution

An assistant software must be developed to trivialize configuration of mobile broadband connections. This tool should work out of the box with minimal or without any knowledge of technical details required from the user. Mandatory configuration files would be created based on simple information provided by the user, such as the country and the name of the service provider – information that everyone owning a mobile phone should be able to provide.

## 3 Goals for this Project

The project aims to address the current problematics in configuring mobile broadband connections under GNU/Linux by developing an assistant software for GNOME desktop environment. Because of the tight schedule of Kesäkoodi and the lack of certain hardware some requirements and features must be left out of the scope of this project. However it will be taken into account that these missing features can be added some time later.

The assistant will be integrated with NetworkManager to provide the user the most convenient mobile broadband experience under GNOME desktop. *Dan William* - who is employed by Red Hat and who is the main developer of NetworkManager - has promised to mentor the project.

The development will be done on Ubuntu 8.04, but there is no intention to limit the software only to Ubuntu. During the development only commonly used external components and libraries will be used and thus the program should run on any GNU/Linux distribution, given that all the required external dependencies have been satisfied.

### 3.1 Requirements

The program<sup>1</sup> must to be easy to use. The user must not be bothered by unnecessary technical questions. The program must be translatable to different languages. The program must support multiple configurations and multiple devices.<sup>2</sup> The program must look and feel like a native GNOME software.

The program must support following communication methods between a mobile phone and users computer:

- Bluetooth
- USB
- Serial (DE-9)

Some phones also support infrared, but because no infrared adapter is available support for infrared is not in the scope of this project.

Following information given by user must be enough to create a configuration:

- communication method
- which device to communicate with
- name of the service provider

### 3.2 Licensing

All code will be licensed under the GNU General Public Licence<sup>3</sup> version 3 whenever possible. Some small portions of the code, helper programs and other

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<sup>1</sup> in the context of this document *program* means the assistant - not NetworkManager

<sup>2</sup> e.g. John Doe has two phones - one for work, the other for private use - and he wants to switch between them with his laptop.

<sup>3</sup> <http://www.fsf.org/licensing/licenses/gpl.html>

content may be licensed as Public Domain or under some other license approved by Open Source Initiative<sup>4</sup>.

## 4 Deliverables

Section describes deliverables that will be produced during the project. The deliverables address the requirements. Appendix C also contains a simple list as a summary of the items.

### 4.1 Assistant Program

The assistant<sup>5</sup> will be created to divide the configuration process into simple steps and to hide the unnecessary complex technical details from the user. In every step the user has a choice to go backwards to change previous selections. The assistant will guide user through every step and eventually will toss new configuration settings to NetworkManager. Editing and removing of configurations is left out of the scope of this project.

First step is to select a communication method between the computer and the mobile phone. When the user has selected the method the assistant will move to the next step which is selecting the device or location what to use for the connection.

If user has selected Bluetooth as the communication method, a list of names of available Bluetooth devices is presented. The user selects the device that will be used to connect to the Internet. The user has a possibility to refresh the list. The user also has a possibility to directly specify a Bluetooth Hardware Address for devices that do not inform about their presence. The program internally identifies the Bluetooth devices by hardware address.

If the user has selected a serial cable as the communication method, a list of available serial ports is presented. The user selects the serial port where the mobile phone is plugged in. There is also a possibility to enter a custom path for the serial port. The program internally identifies the device by a serial port and thus the device has to be plugged to the same port every time.

If the user has selected an USB cable as the communication method, a list of names of available USB devices is shown. The user selects the device that will be used to connect to the Internet. Only devices that have a standard USB serial interface will be shown. Any proprietary USB interface will not be supported because of the lack of hardware, interface documentation and development time. The program internally identifies the USB devices by a Hardware Abstraction Layer Unique Device Identifier (*HAL UDI*).

After selecting the device the next step is to specify the service provider. The user must first select a country because service providers have different settings for different countries. The Service provider is selected from a drop down list. The service provider information is read from *Service Provider Database*. There will be a possibility in the future to enter a custom settings if the needed service provider information is not available, but this functionality is left out of the scope of this project.

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<sup>4</sup> <http://www.opensource.org>

<sup>5</sup> on Microsoft platforms called "wizard"

The final step gives the user a summary of the selected options and the user gives a unique name for the configuration to be created. The name helps the user to identify the specific configuration when multiple configurations are available.

The program will be implemented as a *GtkAssistant* and the user interface will be designed with *Glade UI Designer* to have a consistent look and feel with other GNOME software. D-Bus will be used to communicate with different services when possible. Libxml will be used to process the Service Provider Database. The Bluetooth device support will be implemented using Bluez libraries. The serial and USB device support will be implemented using HAL.

#### 4.1.1 Integration With nm-applet

When the assistant is ready and tested it will be integrated with nm-applet<sup>6</sup>. Details of this task will be decided later between the applicant and the mentor.

#### 4.1.2 Source Code

Main programming language used to develop the program will be C. Other languages may be used for different kind of helper programs if necessary.

#### 4.1.3 USB Modems And PCMCIA Cards

The support for dedicated mobile broadband USB modems and PCMCIA cards is left out of the scope of this project because of the lack of hardware.

### 4.2 Service Provider Database

A database containing service provider specific settings will be created. The database will be stored on a single file containing a XML presentation<sup>7</sup> of the data for easy editing and human readability. The settings to be stored in the database will be gathered through networkmanager-list<sup>8</sup>. A web-form is also an option.

A Document Type Definition (*DTD*) XML schema format specification will be provided to easily validate the correctness of the database file.

### 4.3 Documentation

User documentation covering compilation, installation and basic usage will be provided. The documentation will be written in English in plain text.

### 4.4 Translations

The program will be developed in English and a translation for Finnish will be provided as a proof that the project fulfills the translation requirement.

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<sup>6</sup> the applet displaying an icon in GNOME's desktop panel and that is providing an user interface for controlling NetworkManager

<sup>7</sup> see Appendix E for an example.

<sup>8</sup> <http://mail.gnome.org/mailman/listinfo/networkmanager-list>

## 4.5 Packaging

An installation package for Ubuntu 8.04 will be created containing the program, the translation and the database. The package can be installed using Ubuntu's package manager. But if the project is not in a usable state because NetworkManager is still missing crucial features at the end of the project, the installation package will be left out from the Deliverables.

## 5 NetworkManager

Although NetworkManager is introducing support for PPP connections the support is far from complete. Part of the project is to improve and develop NetworkManager, but no promises can be made at this time about whether or not NetworkManager and the assistant combined together can provide a complete and working solution at the end of this project.

But even if the functionality of NetworkManager is insufficient, the assistant will be a valuable part that is ready for use as soon as the missing functionality is later developed. Particular actions will be decided between the applicant and the mentor when the time is right.

## 6 Applicant

### 6.1 Brief Introduction

My name is Antti-Hermann Kaijanmäki and I am a student at Tampere University of Technology. I have worked mainly with C and C++ and I have familiarized myself with Linux-kernel development, Gtk+, PHP, Python, Qt and many other technologies. Unfortunately I do not have any greatly visible contributions to Free Software but here are some projects that I have worked on that can be found using Google:

FinFlect: <a href="http://finflect.sourceforge.net">http://finflect.sourceforge.net</a>
Nokia 770: <a href="http://www.mail-archive.com/maemo-developers@maemo.org/msg00762.html">http://www.mail-archive.com/maemo-developers@maemo.org/msg00762.html</a>
Ubuntu Translations: <a href="https://translations.launchpad.net/~kaijanmaki">https://translations.launchpad.net/~kaijanmaki</a>

A Curriculum Vitae should be found attached alongside this document. If not, or for any other inquiry, feel free to contact <antti@kaijanmaki.net>. My CV also contains some information about proprietary projects that I have worked on before.

### 6.2 Mobile Broadband Configuration Assistant

I have planned this Mobile Broadband Configuration Assistant for over two years now. Unfortunately things like military service and becoming a father got into the way of making it a reality. I even had a working prototype six months ago, but an unfortunate typing error destroyed all what I had accomplished so far. Hopefully now I have a change to finally create a new and better version of the software that most probably will benefit many people.

# APPENDIX

## A Risk Management

A table of risks involded:

<b>Risk</b>	<b>Description</b>	<b>Probability</b>	<b>Severity</b>
General1	Severe illness or injury of the applicant or a family member.	Medium	High
General2	The development schedule is too tight.	Medium	Medium
General3	Massive backup failure.	Low	High
General4	Barack Obama loses the elections.	Low	Medium
General5	Communication problems between the applicant and the mentor.	Low	Low
Assistant1	The toolset has bugs or is missing features.	Medium	Medium
Assistant2	Integration with NetworkManager fails.	Low	High
Database1	Inability to determinate what information needs to be stored.	Low	High
Database2	Inability to produce the DTD or the parser.	Low	High
Documentation1	The documentation is incomplete or too technical to be useful.	Medium	Low
Translation1	The translation is misleading or too technical.	Low	Low

## B Development Schedule

The project will be executed during the period of 3 months starting on May 26<sup>th</sup> and ending on August 22<sup>nd</sup>.

The development schedule for the project:

wk22	project kickoff set up the development environment
wk23	design the UI
wk24	specify the XML schema format for the service provider information develop the parser for the service provider information integrate the XML parser to the UI
wk25	implement the UI navigation implement the general UI functions implement the serial page
wk26	implement the USB page implement the Bluetooth page
wk27	testing localization time for unfinished tasks
wk28	usability testing
wk29	reacting on usability testing feedback
wk30 wk31 wk32 wk33	time for unfinished tasks integration with nm-applet implement NetworkManager's missing features
wk34	writing the documentation packaging project ending

## C Deliverables

A list of different deliverables:

1. Assistant
  - (a) source code
  - (b) integration with nm-applet
2. Service Provider Database
  - (a) XML schema format specification
  - (b) database
3. Documentation
  - (a) compilation
  - (b) installation
  - (c) basic usage
4. Translations
  - (a) English
  - (b) Finnish
5. Installation package
  - (a) for Ubuntu 8.04

See section 4 for the detailed description of each item.

## D Resources

A lists of resources available for development and testing:

### D.1 Software

Operating System	Ubuntu 8.04 (Hardy Heron)
Development Tools	Anjuta IDE Glade UI Designer GNU gettext libxml, HAL, BlueZ..

### D.2 Hardware

#### D.2.1 Mobile Phones

Model	BT	IR	USB	Serial
Ericsson R600s	-	-	-	x
Nokia 6021	x	x	x	-
Nokia 6151	x	x	x	-
Nokia 6630	x	-	x	-
Nokia 6280	x	x	x	-
Nokia 9300i	x	x	x	-
Nokia N70	x	-	x	-

BT = Bluetooth, IR = infrared

#### D.2.2 Cables & Adapters

Type	Availability
Bluetooth Adapter	available
Infrared Adapter	not available
Serial Cable	available
USB Cable	available

### D.3 Other

Service Subscriptions	Saunalahti <i>Saunapaketti3G</i> Saunalahti <i>Paketti Plus</i> Elisa <i>Puhepaketti 250</i>
Voluntary Helping Hands	1 tester 1 proof reader (non-tech) 2 usability testers

## E Service Provider XML

An example how information about service provider specific settings could be presented in XML:

```
<serviceproviders>
  <country code="fin">
    <provider>
      <name>Elisa</name>
      <apn>internet</apn>
    </provider>

    <provider>
      <name>Saunalahti</name>
      <apn>internet.saunalahti</apn>
    </provider>

    <provider>
      <name>Sonera</name>
      <apn>internet</apn>
      <dns>192.89.123.230</dns>
      <dns>192.89.123.231</dns>
    </provider>
  </country>

  <country code="gbr">
    <provider>
      <name>Orange</name>
      <apn>orangeinternet</apn>
      <dns>158.43.192.1</dns>
      <dns>158.43.128.1</dns>
    </provider>

    <provider>
      <name>Orange (PAYG)</name>
      <apn>payginternet</apn>
      <dns>158.43.192.1</dns>
      <dns>158.43.128.1</dns>
    </provider>
  </country>
</serviceproviders>
```