

The Moblin.org Open Source Project

<http://www.moblin.org>

Derek S. Speed, Open Source Technology Center, Intel Corporation

Introduction

A new category of devices is emerging in the market that delivers the ability to access the rich content available on the Internet, but without the complexity often associated with PCs. These devices come in a variety of form factors, from Mobile Internet Devices (MIDs) to portable media players (PMPs) to Personal Navigation Devices (PNDs) to digital set top boxes (STB) and netbooks.

The Moblin.org project was launched by Intel in July 2007 with the goal of driving the new technologies required to enable this new class of devices. The initial focus of the Moblin.org project is on enabling the MID software ecosystem, but will expand over time to include additional product categories.

This paper will describe the motivation behind the Moblin project, its goals and objectives, key projects and technologies, and how to get involved.

The Moblin Vision

In 2006, as Intel was launching its first generation of Ultra Mobile PCs, device manufacturers voiced their desire for additional operating system choices that met the following high level requirements:

- Available from a number of vendors
- Low cost, as these devices are sold at consumer price points
- Delivers a rich Internet and multimedia experience to end-users
- Customizable to allow deployment on a variety of devices and manufacturer specific branding
- Excellent support for wireless networking technologies (WiFi, Bluetooth, GPS, 3G, WiMax)
- Tuned for low power consumption, long battery life and efficient use of system resources such as memory and storage
- System software and built-in applications that were consumer friendly, intuitive and easy to use
- Leverages the x86 software ecosystem in terms of software availability and developer mindshare
- Enables compelling new usage models and user interface paradigms

From these requirements, it was clear that a Linux*-based operating system was a good starting point - in fact, several successful mobile and consumer electronics products had been created using Linux as the core operating system. However, there was no concerted effort in the open source community to proactively drive the new technologies required for this category of devices.

And so, the idea behind the Moblin.org project was born. The purpose of the Moblin.org project is to:

- Drive the new technologies required to fill the gaps in using Linux for MIDs and other consumer oriented devices
- Jumpstart the software ecosystem required to support these new devices.

What Are The Key Problems That Moblin Is Trying To Solve?

Because the first generation of MIDs were based on standard mobile PC hardware, it was easy for the Intel engineering team to bring up a desktop/notebook PC Linux distribution on a MID platform to do some early experimenting to help define the scope of the Moblin project. After doing this, a few issues quickly became apparent:

- The standard Linux desktop user interfaces (UI), such as GNOME and KDE, are better suited for experienced computer users than novices. The fact that Linux was running “under the hood” needed to be transparent to end-users.
- Application GUIs written for a standard PC Linux distribution did not work well on a MID whose primary input method is a touch screen and whose primary output method is a landscape orientation screen that is much shorter than it is wide (800x480 is typical). On-screen buttons were too big or located in the wrong place on the screen. In many cases, you couldn’t even see the buttons because they were drawn off-screen.
- The memory and disk footprint was too large. A typical desktop Linux distribution might be several gigabytes in size and use 512 MB or more memory. Because they are cost sensitive, MIDs typically have 512 MB memory or less and their on-board flash memory storage is typically around 4-8 GB. If too much storage was used, there would be no room left for user content and run-time performance would be sluggish.
- Power efficiency was sub-optimal, mostly due to lack of attention to this important metric as opposed to any fundamental issue with Linux.
- Software development for Linux is typically self-hosted, meaning that the software is edited, compiled, tested and debugged on the same system. Because MIDs use less powerful processors that are optimized for low power, they are not as well suited to software development tasks as more powerful multi-core notebook or desktop workstations.

This early prototyping helped identify the key projects required on Moblin.org – a “MID appropriate” application framework, consumer friendly applications and user interface, power optimization, platform configuration tools, and development environment.

At the same time, the Moblin team recognized that embedded Linux operating systems had a number of advantages:

- The operating system is highly modular and allows the platform developer fine-grained control over which components are installed on the target platform. The downside is that platform developers need to have a detailed understanding of which of the hundreds of software packages are required to enable the end-user usage models they have in mind.
- Because embedded OSes “grew up” on platforms with significant constraints in terms of processing power, memory, and storage, they are typically highly optimized.
- The software development model for embedded Linux is a host/target model – most development (code editing, compilation, builds) is done on the host, then the resulting OS image is downloaded to the target and is debugged remotely from the host PC.

The Intel Moblin team felt that it was possible to achieve the benefits of both desktop and embedded Linux distributions.

One of the first problems the team tackled was how to make it easy for a platform developer to configure a target Linux OS image without having to understand, at a detailed level, which software packages need to be