NLUUG Autumn Conference
“Mobility”

&

Embedded Linux Conference Europe

http://www.nluug.nl/
http://www.embeddedLinuxconference.com/

November 6 2008
Embedded Linux Conference Europe
NLUUG Autumn Conference “Mobility”

November 7 2008
Embedded Linux Conference Europe

Contents

Talks ELC Europe November 6 2008

Keynote ELC Europe November 7 2008

Talks ELC Europe November 7 2008

General information

Introductie

Mobiele apparatuur heeft de laatste 15 jaar het leven van veel mensen en organisaties radicaal veranderd. Het heeft gezorgd voor een andere manier van leven, voor kansen en problemen, grote technische uitdagingen en mogelijkheden. Met het krachtiger en goedkoper worden van apparatuur schuiven mobiele apparaten steeds meer op in de richting waar nu vaak nog 'normale' computers gebruikt worden. Het is de verwachting dat over niet zo heel veel tijd er geen onderscheid meer is. Hierdoor ontstaat de noodzaak voor nieuwe vormen van beheer en beveiliging van infrastructuur met mobiele apparaten, maar ook voor een andere manier van applicatieontwikkeling om te zorgen dat een apparaat zo lang mogelijk en zo fijn mogelijk gebruikt kan worden.

Toevallig (of juist niet) zijn deze apparaten ook één van de grootste toepassingsgebieden voor Linux. Naast mobility gerelateerde onderwerpen komen dus ook de laatste technologie trends en ontwikkelingen van embedded Linux aan bod.

Op deze conferentie hopen NLUUG en CELF u een goed beeld te geven van wat er nu al kan, waar de valkuilen zitten en vooral ook wat we op korte termijn kunnen gaan verwachten.

We wensen u een plezierige en vooral ook een leerzame conferentie toe.
Armijn Hemel, programmacommissie NLUUG & ELC Europe.

Introduction

In the last 15 years mobile devices have radically altered the way companies and people live and work. This has led to a different way of life, brought chances and new possibilities as well as humongous technological challenges.
In daily life mobile devices have become more powerful and cheaper, and they are moving into areas where until recently a 'normal' computer would be used.
It is expected that in due time there will very little difference between the two. Mobile devices demand new ways of administration and securing infrastructure, but also ask for new techniques in writing applications, to make sure that they can be used for a long time in a productive way.

Coincidentally (or maybe not) these devices are also one of the biggest emerging markets for the Linux operating system. This conference is not just talk about mobility, but also a look at the latest technology trends and developments of embedded Linux.

At this conference NLUUG and CELF hope to give you a good view of what is possible right now, where the pitfalls are and especially what we can expect in the near future.

We wish you a pleasant and useful conference.
Armijn Hemel, programme committee NLUUG & ELC Europe.

Joint Keynote NLUUG & ELC Europe November 6 2008

How chip makers should (not) support free software

Harald Welte
HMW-consulting

Silicon manufacturers, or rather design houses play a key aspect in how well their products are supported in Free Software oparating systems such as Linux.
In the early Linux days - more than a decade ago - it was normal to have completely public technical reference manuals for the silicon, enabling Linux community developers to write drivers for the chips.

After chip design houses start to realize there is an economically significant Linux market, they try to use their existing workflow, processes and development model for proprietary operating systems and try to apply this to Linux. The result are in many cases binary-only drivers for certain kernel versions and/or distributions or unmaintained, non-portable, coding style incompliant open source drivers for outdated kernel versions. Those kind of drivers are bound to create dissatisfaction within the Free Software developer community, among the Free Software users. Furthermore, they also result in inefficient use of R&D resources both inside and outside the chip vendor.

Many silicon design houses still don't understand the Free Software and particularly Linux development model at all. This results in suboptimal support of their hardware products. In the end, customers are likely to buy from a different vendor.

So what can chip design houses do to ensure excellent support of their products in the Free Software world?

Biography

Harald Welte is a freelancer, consultant, enthusiast, freedom fighter and hacker who is working with Free Software (and particularly the Linux kernel) since 1995. His first major code contribution to the kernel was within the netfilter/iptables packet filter.

He has started a number of other Free Software and Free Hardware projects, mainly related to RFID such as librfid, OpenMRTD, OpenBeacon, OpenPCD, OpenPICC.

During 2006 and 2007 Harald became the co-founder of OpenMoko, where he served as Lead System Architect for the worlds first 100% Open Free Software based mobile phone.

Aside from his technical contributions, Harald has been pioneering the legal enforcement of the GNU GPL license as part of his gpl-violations.org project.
More than 150 inappropriate use of GPL licensed code by commercial companies have been resolved as part of this effort, both in court and out of court.

He has received the 2007 "FSF Award for the Advancement of Free Software" and the "2008 Google/O'Reilly Open Source award: Defender of Rights".

Harald is currently working as "Open Source Liaison" for the Taiwanese CPU, chipset and peripheral design house VIA, helping them to understand how to attain the best possible Free Software support for their components.

He continues to operate his consulting business hmw-consulting.

Talks NLUUG
November 6 2008

WAN optimization: Pain XOR gain

Ralf van Dooren
Snow BV

High latency, low bandwidth, slecht ontworpen protocollen (bv CIFS); allemaal factoren die werken op afstand er niet eenvoudiger op maken.

Tegenwoordig kun je WAN versnellers kopen, die pretenderen je WAN verbindingen beter te benutten; mobiele varianten heb je ook al.
Deze presentatie geeft een overzicht van de technieken en (on)mogelijkheden, zowel closed source als open source. Het is primair vendor onafhankelijk en focust vooral op de techniek.

Biography

Sinds 2001 actief met Unix & Networking; laatste jaren als technisch projectleider grote wereldwijde datacenter projecten ontworpen en gebouwd.

Linux connection manager

Marcel Holtmann
Intel

The new Connection Manager for Linux is an attempt to create a generic infrastructure for creating networking connections. The main goal is to make the new solution ready for embedded systems. The whole design is modeled to be slim and flexible. This is achieved via a fully plugin and policy based architecture. Connection Manager is the perfect solution for embedded system like phones and tablets that are running Linux and where Network Manager would be too big and complex.

The plugin based architecture provides the most flexible way of integrating it into existing solution. Support for HAL, PolicyKit and other standard desktop components has been abstracted into a generic framework and are optional. It is possible to replace them with vendor specific plugins to deal with certain special embedded devices. All the hardware access is done via technology specific plugins. This allows a quick adaption of new technologies without changing the entire framework.

The initial release has been made public as part of Moblin.org and includes support for Ethernet, WiFi and Bluetooth. Future releases will add support for Ultra-Wideband, GSM/UMTS and WiMAX.

Biography

Marcel Holtmann works for the Open Source Technology Center at Intel. He maintains the Bluetooth subsystem for Linux, the OpenOBEX library and is the author of Connection Manager.

The IP packet size not as trivial as it sounds

Frans van Leuven
Atos Origin

The number of problems related the size of IP Packets seem to still increase year by year. Most of the time this leads to conditions where some applications won't work over the network. They increasingly create also more obscure problems where:

- It works sometimes but regular outages are observed for unknown reasons;
- There are severe performance issues with some specific applications/users;
- Network equipment and/or servers show high processor utilisation;
- Performance is (sometimes) spongy;
- FW's and IPS security provisions seem to cause problems for some applications.

Common causes for all these problems are being explained during this session. Technical Terms/Accronyms used during this session are: Segmentation, Multi-Pathing, MTU (Maximum Transmission Unit), Jumbo Frames, Encryption, Tunnels. Of course also ways to diagnose and circumvent packet size related problems will be provided. This includes a view on how this looks like using IPv6.

Biography

Frans has more than 30 years of experience in the field of data communication on both national and global level working with various companies.
The last 10 years Frans has been active within the Managed Operations division of Atos Origin in the field of Security and Communications services. During a long period he headed the Network Architecture Group.
At the moment Frans is employed as Innovation Architect mainly working on the future service offerings which Atos Origin plans to deliver to their customers.

NLUUG

Socket aware change of IP address (SACIP) Short

Samo Pogacnik
Iskratel company

This paper presents one possibility to preserve established network connections of unmodified applications, when an IP network address of an endpoint device changes. This functionality might enable the mobility of network users in a way, where a mobile user could cross borders of statically configured IP (sub)network areas just by accepting new IP address available from the entered IP network. At the same time established network connections would not be interrupted and no need for the network infrastructure routing reconfiguration on behalf of the mobile user's changed location, would be necessary.
The basic idea of SACIP is to separate IP addresses written into IP packet headers from IP addresses used to create a network socket and to maintain a link between them. On IP address change extended socket parameters are being updated by new IP address values as well as remote hosts are being notified about the change. A special notification protocol is necessary for this purpose and which mostly defines the security aspect of the solution.

The presentation includes a brief description of the primitive implementation of SACIP functionality for the Linux kernel and its possible enhancements and use cases.

Biography

Working for the Iskratel company (telecomunication equipment manufacturer) after finished electrotechnical studies. Having 7 years of experience in customer technical support (telecoms). Afterwards working in system software research and development department. Learning Linux since 1994 as a permanent hobby, while trying to understand different aspects of Linux OS and its community. Besides that, i am constantly learning how to be a father in my family and we all consider ourselves big fans of almost all kinds of music.

NLUUG

Computing without breaking a sweat

Rick van Rein
GroenGemak

My laptop always seems to be hot and sweaty from doing things, even if I don't ask it to do anything. This is a senseless waste of energy, and it is largely due to design choices that stem from an era when energy was in abundant supply.
Mobile devices and the end of cheap fossil fuel are two reasons why we should change, and conserve energy.

This lecture dives into the lowest levels of computing, and explains which energy-efficiency improvements are currently being worked on, and how we should change our style of hardware and software design. We sketch the architecture of future computers, starting at the level of the hardware and working our way up to kernel and applications.
Will Unix be flexible enough to follow this radical redesign?

Keywords:

- § low-energy computing
- § non-volatile memory
- § solid-state devices
- § bistable memory
- § bistable displays
- § interrupt-driven computing
- § asynchronous electronics
- § data-flow architecture
- § clocktick interrupts
- § power budgeting

Biography

GroenGemak is a company that is looking for sustainable solutions that do not limit our quality of life. Being started by a computer scientist, the main focal area of GroenGemak is sustainable technology, with an emphasis on computing.

Dr.ir. Rick van Rein has been operating OpenFortress for 7 years, but felt an increasing "personal itch" to help develop his area of computer science into more sustainable technology. GroenGemak recently arose from that wish.
A background in computer science and electrical engineering (including chip technology) turn out to be useful in realising that.

1-2-3 PAY! Secure and simple system of mobile payment

Matjaz Rozman
Halcom d.d.

The solution uses public and private key technology saved on SIM smart cards (WPKI), and basic mobile telephone functions. Halcom's certifying agency, Halcom-CA is the first certificate agency in the region to have fully mastered the technology for saving public and private keys on SIM smart cards.

Using WPKI technology and high quality software and the tried and tested Halcom business network and reliable technical connections with financial institutions, the Hal M-Payments solutions offers the following major advantages for users:
security: digital signature (WPKI)
easy-to-use: communication via SMS text message also suitable for high-value payments: payment settled directly with user's bank account operates on all normal mobile telephones
low investment for partners (mobile operators, banks, and goods and service providers): no major changes in information systems, relatively simple interface required.
Given the high security standards and ease of use, the Hal M-Payments solution is particularly suitable for the following e-services:

- § secure e-payment for goods and services (including high-value payments)
- § internet shopping
- § share trading
- § e-banking
- § public administration
- § e-services
- § gambling and other services...

Biography

I'm working in Halcom as Sales manager New Services, responsible for M-payment and secure M-identification.

NLUUG

Implementing UMTS support on openSUSE 11.0

Stefan Seyfried
SUSE Linux Products GmbH

UMTS/3g networks are a hot topic.
This talk focuses on the implementation that was done for openSUSE 11.0, from both a users and the developers view.

Topics:
§ UMTSmon;
§ NetworkManager.

I will also talk about the ongoing development after 11.0 and on Linux distributions in general.

Biography

2000 - joined SuSE as a Systems Administrator.
2003 - left SUSE for almost a year as a consultant for a small software company in Chemnitz.
2004 - rejoined SUSE in the QA and the Mobile Devices department.
Today I am working in the Mobile Devices team, which is part of the desktop department, working on suspend/resume issues, bluetooth and UMTS/3G. I maintain numerous software packages for SUSE.
In my spare time I am hacking on the tuxbox.org project for satellite TV set-top-boxes, of course running Linux.

NLUUG

Suspend modes and power management on Linux

Stefan Seyfried
SUSE Linux Products GmbH

The presentation will give an overview about the current state of suspend and power management on Linux, mainly focused on notebook hardware.

Topics:
§ device power management;
§ different sleep states;
§ implementation issues;
§ ideas for the future.

Biography

2000 - joined SuSE as a Systems Administrator.
2003 - left SUSE for almost a year as a consultant for a small software company in Chemnitz.
2004 - rejoined SUSE in the QA and the Mobile Devices department.
Today I am working in the Mobile Devices team, which is part of the desktop department, working on suspend/resume issues, bluetooth and UMTS/3G. I maintain numerous software packages for SUSE.
In my spare time I am hacking on the tuxbox.org project for satellite TV set-top-boxes, of course running Linux.

Network Management in KDE 4.1 Beyond The Desktop

Will Stephenson
KDE e.V.

The popularity of KDE on laptops and increasingly on smaller mobile devices demands that applications are able to react to mobility and dynamic network environments. We present the Solid-Network framework developed to support KDE applications under these conditions.

The varied software stack which KDE applications run on demands a flexible system. We show the abstractions used to make KDE integrate well whether on an OpenSolaris workstation, a variety of Linux distributions, or a Windows laptop. A brief overview of the widely used NetworkManager system is given.

The system is used in two ways. Networked applications need to be aware of connectivity changes. Infrastructure supporting this is provided to application developers and made as simple as possible to encourage adoption.
Control applications responsible for configuration and status feedback must be usable but allow complex configuration. We summarize the discussions that informed the design.

Finally we describe the requirements placed on the system by administrators, who require central configurability as well as secure storage of network authentication credentials.

Biography

Will Stephenson is a long time KDE e.V. developer. He is part of the KDE team at Novell, with a responsibility for network and PIM applications on the desktop. His development interests lie taking the data and functions these provide and making them available all over the desktop, outside the bounds of traditional mail and IM clients.

Wireless ad-hoc mobile networks

Edwin Tromp
Cisco systems

Deze sessie beschrijft de mogelijkheid om netwerken ad-hoc en mobiel te kunnen vormen en hierop informatie te kunnen delen met peers in het (mobiele) netwerk en daarbuiten.
Door gebruik te maken van diverse beschikbare radio technologien en roaming mogelijkheden is het mogelijk om in het mobiele domein en in de backoffice verbinding met elkaar te hebben. MANET, MANEMO, AUTOCONF zijn hier belangrijke protocollen.
Een van de essentiele onderdelen hiervan is de mogelijkheid om een radio netwerk te laten communiceren met het IP netwerk om kwaliteit van het netwerk te kunnen gebruiken voor routerings beslissingen. Hierdoor is het mogelijk dat een radio netwerk dat in kwaliteit degradeerd te omzeilen en andere radio netwerken te gebruiken die wel beschikbaar zijn. Cisco heeft dit ontwikkeld en gestandariseerd in RFC4938 en onlangs bekend en beschikbaar gemaakt. Nu is het mogelijk dat radio fabrikanten deze techniek oon kunnen toepassen in hun terminals en modems.
Doelgroep voor deze sessie is:

- Defensie;
- Openbare orde en veiligheid;
- Openbaar vervoer;
- Transport.

Biography

15 jaar werkachtig in netwerk industrie waarvan de laatste 8 jaar gespecialieerd in deployed en mobiele netwerken.
Cisco CCIE (3233) sinds 1998.
Ervaring in de service provider markt en sinds 8 jaar gespecialiseerd in de defensie en public safety markt.
Heden werkzaam in Cisco's Public Sector EUROPA team, gespecialiseerd in Defensie en Public Safety.

Talks ELC Europe
November 6 2008

Rich GUI without pain

Gustavo Sverzut Barbieri
ProFUSION

This talk will present the Enlightenment Foundation Libraries (EFL) and Guarana, their technical overview and how they make it very easy to create rich graphical user interfaces (GUI) for your embedded system, cutting development time and providing more eye-candy at the same time.
EFL was already demonstrated on last year's ELC Europe-2007 at the talk "Fancy and Fast GUIs on Embedded Devices", but since then it evolved and got faster and now supports DirectFB and SDL. It also got more users, with the release of Canola media center for Nokia internet tablets and OpenMoko using it on their cellphone.

Guarana is a layer on top of EFL with focus on embedded devices. It is being developed to help with the development of Digital TV Set-Top Boxes. This layer, that will be released as free software soon, provides an extremely simple but powerful widget set, a Model-View-Controller (MVC) framework, an easy to use and extensible plugin system and lots of helpers for such systems.

Biography

Gustavo Sverzut Barbieri works with graphics and multimedia systems since 2002, was one of the architects of Canola project, one of developers of core Enlightenment Foundation Libraries (EFL) and now leads ProFUSION team working on Guarana framework.

Digital television with Linux - architecture and opportunities

Bas Engel
Philips

In 2007 Philips Consumer Lifestyle migrated a large part of the digital television range to Linux based systems. Recently, Philips went to the market with digital television sets that are based on the Space architecture that was discussed at the '07 CELF conference. With Space, it is relatively easy to enable anybody to join a community of developers to create innovative applications that run on standard Space enabled platforms. This concept is called OpenSpace. OpenSpace leverages the basics of the Space architecture, however it also takes us to the next step in system performance and security (IP protection, fault tolerance, execution stability, etc).
OpenSpace is an effort to understand these issues and define the required changes to the Space system to allow people to prototype, leverage, and optimize the Space system.

The presentation will explain the basics of the Space architecture, some of the challenges that were faced productizing a multi application architecture by addressing boot time, IPC performance, execution stability, multi window management, and graphics. Finally we will discuss the consequences of OpenSpace.

Biography

Bas Engel has over 8 years of experience in the consumer electronics domain. He has been working on consumer device architecture and Linux application for Philips Research, Philips Semiconductors (now known as NXP), and Philips Consumer Electronics. Today Bas is the Chief Software Architect for Business Unit TV within Philips Consumer Lifestyle. His responsibilities range from short term product introductions and mid to long term system innovations where Linux plays a key role.

Kernel summit report

Thomas Gleixner
linutronix

The annual Kernel Summit is an invitation only conference for the most active Linux kernel developers. The Kernel Summit focuses on future technological challenges and development process related topics. The report gives an overview over the 2008 Kernel Summit topics in general. Detailed information will be provided about the topics which affect embedded developers and the status of the realtime preemption patch.

Biography

Thomas Gleixner started as a (embedded) Linux user who tried to figure out why his box did not work anymore after a kernel upgrade. Today he is on the receiving end of bug reports for NAND FLASH, core timers and the unified x86 architecture aside of his efforts to mainline the remaining bits of the realtime preemption patch.

A quart into a pint pot: porting uCLinux to small micros

Peter Griffin
MPC Data

A case study presentation on porting uCLinux kernel and uClibc C library to a previously unsupported 16 bit processor architecture with limited tools and debugging support. The processor is based on a National Semiconductor CR16C+ core and targets VoIP applications on domestic DECT and WiFi handsets with very low-power requirements.
Although this was a very challenging project, it was very successful and the chip is expected to be manufactured in high volumes.

The first part will summarise the differences between uCLinux and Linux and focus on the architecture specific areas of the uCLinux kernel and uClibc C library, describing the process of porting uCLinux to a new architecture.

The second part will focus in detail on the problems and war stories encountered throughout the project, how they were debugged and also the implementation of eXecute In Place and other optimizations to overcome the tight memory constraints of the device.

Biography

Peter Griffin graduated with a 1st class honours degree in Computing for Real Time Systems B.Sc. from the University of the West of England in Bristol. He won best technical computing project 2007 from the university for his project on EJTAG debugging on the MIPS architecture and now works as an embedded Linux software engineer in the Embedded Linux Group at MPC Data. He has worked on several Linux powered consumer electronic devices including the Node Explorer – a location aware portable multimedia player (currently used at London Zoo), the Zilog Zatara (ZA9L) ASSP which targets security and POS applications and most recently the uCLinux kernel and tools port to the SiTel SC14450 baseband processor.

Taking Linux power management to production quality

Eugeny S. Mints
Embedded Alley Solutions

Today the Linux kernel provides a number of building blocks for power management support enabling a solid base for developing power management solutions for wide range of mobile devices. However, power management support which comes with the Linux kernel sources or even with an embedded Linux distribution requires enormous amount of efforts to be turned into a full power management solution for a product.

This presentation will discuss challenges one faces implementing full power management solution for Linux based mobile devices such as cell phones, MIDs and others. The talk will provide an overview of existing power management building blocks and dive into the design details and considerations necessary to create a complete power management implementation for today's mobile devices including kernel, driver and user space components.

The presentation will be of interest for developers implementing power management solution for a product.

Biography

Eugeny S. Mints, Systems Architect at Embedded Alley Solutions graduated in St. Petersburg State University in 2002, he was developing first for RTOSes such as RTEMS and VxWorks. 2.5 years was working for MontaVista Russia on Linux for different platforms and architectures, mainly Linux-powering consumer electronic devices. Power management has been main area of interest for Eugeny for last 2 years.

A corner-to-corner approach for cost-effective implementation of consumer electronics human machine interfaces

Denis Mishin
Synesis Vision

It may require above 50% of the project human resources to implement a professional-looking, reliable consumer electronics human machine interface. The key to success in HMI is by employing simple yet reliable and extendable design patterns and an approach with specific focus on ensuring the code could be easily maintained during years of product lifetime.

We would like to share with CE Linux community our approach for human machine interface creation with focus on Embedded Linux environment, based on our experience creating a number of products for digital television, addressing following areas:

- Choosing right Linux graphical backend on embedded system: RAM and performance aspects, supporting high resolution displays, hardware acceleration.
- Application of finite state machine approach for human machine interface creation under Linux. How it can be combined with object-oriented approach. How FSM approach pays off in project maintenance phase.
- On-target user-level test automation. Approach to make test automation independent from HMI changes, and how it can go in parallel with development. Developing functional automation tests in Python.

Biography

Denis Mishin is co-founder and product manager of Synesis Vision specializing in machine vision and multimedia electronics. Before Synesis, Denis served as Director of Engineering for Flextronics Software Systems Ukraine responsible for a wide range of products development - from mobile handsets to network infrastructure.

Update on filesystems for flash storage

Michael Opdenacker
Free Electrons

With the LogFS and UBIFS filesystems getting mature enough for real products, embedded Linux system developers now have multiple choices for their flash storage devices. How to choose between JFFS2, YAFFS2, LogFS and UBIFS?

To help our customers and the community make the right decision, we measured how these filesystems compare in terms of mount time, access time, read and write speed, as well as CPU usage in several corner cases and with different flash chip sizes. Besides sharing lessons learned from our experiments, the presentation will also introduce you to each filesystem and its implementation. We will also give advice for flash based block storage (such as Compact Flash and Solid State disks), to reduce the number of writes and avoid damaging flash blocks.

Then, surrender your JFFS2 partitions. Resistance is volatile ;-)

Biography

Michael Opdenacker is the founder of Free Electrons, a company supporting individuals and organizations creating embedded systems based on Free Software. Michael is best known for all the training materials he shared with the Free Software Community under a free documentation license (see http://free-electrons.com/training/). This represents more than 1500 pages of presentation slides, from kernel driver development, to real-time and embedded system development. Michael is a citizen of the Earth, with a French soul, a Belgian heart and a Finnish kernel.

Choosing free software graphical libraries for embedded devices

Thomas Petazzoni
Free Electrons

As often with Free Software, many alternatives are available to developers of embedded systems with a graphical interface. It can take a significant amount of time to find the graphical library that best meets your product's requirements.

Using an ARM-based development board, we compared the most popular solutions in terms of drawing performance, code size, features, availability of add-on solutions, ease of implementation, maintainability, and licensing constraints. We also compared their suitability for a few typical use cases.

The goal of this presentation is to spare you a few precious weeks of research. But don't tell your boss, and spend these weeks working on cool community projects instead...
Though they were intensively stimulated, no penguins were harmed during these tests.

Biography

After having spent a significant part of his free time at university on hacking small operating systems, Thomas Petazzoni worked during three years as a kernel developer in a French company developing storage virtualization software for computer clusters. He now works for Free Electrons, a free-software-friendly company offering kernel and embedded Linux development services, consulting and training, while enjoying the nice weather and food of the South of France and advocating free software on his spare time.

Embedded magic, or how people suddenly find out that they are collaborating (some thoughts parsed through the brain of an anthropologist)

Gregers Petersen
Copenhagen Business School

Collaboration, that people do things in common, is somehow a strange thing. It is something taking place "between" individuals or groups of people. The "between" is something which comes about through recognizing differences - that the other exists. But, how does it actually emerge when it can seem impossible to understand or respect the position of the other?
This talk is intended to unfold how collaboration emerge between such discrete entities as free software projects and commercial companies. How a reality of interaction, transactions and exchange based on reciprocity is created. It would seem that the clash of values and traditions is to be incomprehensible and unsolvable. On the one hand you have a quest for free flow of information and on the other a world of sorcerers, with their hidden secrets.
The key to this puzzle is an anthropologist piping experiences from embedded Linux system development through the classic anthropological topic of magic. Oddly enough things reconfigure themselves, if magical actions are introduced into the equations - free software can be said to carry the intentions of its maker(s) with it, and hereby influence the acts and behaviour of the user, which is the essence of magic. All this eventually leads to the point that people of very different kinds suddenly realize that they are collaborating and exchanging.

Biography

Gregers Petersen is an anthropologist who presently researches the intersections between free software and commercial use. His work is in particular focused on an understanding of ownership and property, and their enactment. Gregers Petersen is also OpenWrt.org developer, with a prime interest in layer 8 and how best to break stuff. He is currently employed by the Copenhagen Business School, as well as being affiliated with the University of Aberdeen, and lives in Copenhagen with his family.

Managing NAND longevity in a product

Matthew Porter
Embedded Alley Solutions

This presentation will explore the topic of managing NAND flash life expectancy in a product based on embedded Linux. The talk will start with an overview of NAND technologies and the life expectancy of these parts. Following this, the various Linux technologies for support of NAND will be described.

The presentation then explores new support for measuring wear to NAND blocks and quantifying ECC errors as they occur in a system. A process is described through which an I/O model of a product may be created and the integrity of the NAND flash is monitored via a simulation of the product lifecycle.

The talk continues with a description of how to use the acquired data to design a filesystem hierarchy to meet the product life requirements. In closing, the presentation describes an actual product and how this process is applied from start to finish.

Biography

Matt Porter started contributing to Linux as an early Debian GNU/Linux developer. As an early adopter of embedded Linux, Matt has developed and maintained support for embedded PowerPC systems in the mainline kernel. He was the first member of the Linux kernel team at Motorola Computer Group and later joined MontaVista Software as the founding member of the Arizona engineering center. Matt joined with other embedded Linux veterans to found Embedded Alley and now works in many areas of kernel and userspace to provide solutions for embedded Linux products.

Using "Dot Clock" displays in embedded Linux devices

Vitaly Wool
Embedded Alley Solutions

Today, most SoC's use frame buffer type LCD controllers. Framebuffer controllers "buffer" the image with internal RAM. They can remember for themselves what value any given pixel is supposed to have and don't need constant refreshing. Framebuffer LCD controllers are very stable and well known however are quite expensive compared to a "dot clock" type LCD controller. Dot clock controllers scan the display in a similar manner as CRT controllers and therefore do not require the internal built-in memory.

These controllers require the CPU to constantly feed them with data for the display. As the requirements for display size strengthen, it's becoming more and more expensive to use framebuffer based displays, so dot clock display usage is quite attractive for low cost solutions. However, this approach brings in some important problems, both hardware and software, which need to be addressed.

This talk will cover the trade-offs between the dot clock and framebuffer LCD controller types and main hardware design points that need to be taken into account when planning to employ dot clock displays. The talk will also address in detail the peculiarities of the driver design and implementation for dot clock displays.

Biography

Vitaly Wool, Senior Consultant at Embedded Alley Solutions, graduated in St. Petersburg State Univ. in 2002 as a Computer Science specialist, worked with such real-time OSes as VxWorks and RTEMS building networking equipment solutions. Moved to Moscow, Russia, in 2003 where he started to work mostly on Linux with different platforms and architectures, for different companies. Interested in consumer electronic optimizations for Linux, ARM Linux development, flash technologies and image processing.

Solar hot water geekery: making infinitely versatile home heating controllers with free software and open hardware

Wookey
Aleph One Ltd.

Solar hot water systems in particular, and home control in general, provide excellent opportunities for fun geeking. Conventional control is done with various boxes, each of which is very stupid. Everything is proprietary and mostly incompatible with other manufacturers. Wookey decided that a better solution was one smart controller using open technologies, which could do cool stuff like on-line energy logging.

He will explain enough about plumbing that the rest of the talk makes sense, then cover the practicalities of the necessary mix of IO: (I2C, 1-wire, digital IO, switching, displays), Software (logging, control scripting PID control, user feedback) and Hardware (Balloonboard). When he's finished you should have enough knowledge to go away and put together your own hyper-versatile controller (and solar system), and an appreciation of the potential of this technology, as well as what work is still needed to make it accessible beyond the world of embedded Linux engineers.

Biography

Wookey has been a professional Linux geek since 2000, working with ARM hardware, initially on desktops and then on embedded things at Aleph One Ltd. Since 2002 he has been involved with Open Hardware production, first the LART, and then the Balloon, currently employed by Toby Churchill Ltd and iEndian. He is a Debian and Emdebian developer, and is currently getting excited about the intersection of renewable energy and Free Software.

Keynote ELC Europe
November 7 2008

Embedded maintainers: Community and Embedded Linux

David Woodhouse
Intel

The idea of an embedded maintainer was tossed up by Andrew Morton at ELC 2008, and only a few weeks later David Woodhouse and Paul Gortmaker volunteered as official embedded maintainers.

This presentation will introduce and discuss the new community rôle of 'embedded maintainer', present David's ideas and seek other opinions on what the job is actually supposed to mean.
The community at large needs to be more coherent - it's not just about big companies playing nicely with us, but also about building a community around embedded Linux in a way that we haven't really done so far. Even the individual projects aren't working together as well as they should. The 'embedded maintainer' rôle isn't like other maintainers in the kernel - we don't own a certain section of the code and just act as gatekeeper and arbiter of taste for it. It's more about bringing people together and getting them to collaborate better.

Biography

David is one of the two first official 'embedded maintainers' that Linux has. David got involved in Linux while at University.
His first encounter with solid state storage was a summer vacation job on networking over power line, using Linux boxes for routing. It was part of the basis of what later became the MTD [Memory Technology Device] subsystem.
Later David ended up working for Red Hat's engineering services division, doing board ports, drivers and other work. That's when JFFS2 was written, as part of a customer contract.
After some 8 years at Red Hat, this year David joined the Intel Open Source Technology Center, a job that he can combine with his volunteered rôle as 'embedded maintainer'. Community interaction will continue to be part of his day job.

Talks ELC Europe
November 7 2008

Using a JTAG for Linux driver debugging

Mike Anderson
The PTR Group

This presentation will focus on the use and techniques for debugging Linux kernel modules via a JTAG interface.

The presentation will outline the connection strategy, compilation requirements, and debugging strategies for use in low-level driver debug. The presentation will cover from the initial module load through driver exit and clean- up. There will be a live ARM-based target and JTAG unit used for the presentation. Mike Anderson is a founder and Chief Scientist of The PTR Group.

Biography

Mike's background encompasses over 30 years of computer experience ranging from supercomputers to embedded 8-bit microprocessors. With over 20 years focusing in the RTOS marketplace using VxWorks, pSOS, and RTX-32, among others, Mike brings a unique perspective to the embedded Linux arena. His Linux experience encompasses many years using and deploying commercial and open source Linux distros from companies like MontaVista, Wind River Systems and the Denx ELDK as well as building distros from scratch for ARM/OMAP/XScale, PPC and MIPS.

Tools and techniques for reducing bootup time

Tim Bird
Sony

Particularly for Consumer Electronics products, bootup time of the system continues to be an important factor in user satisfaction with a product. In this presentation, Tim will review technologies and techniques for reducing bootup time in an embedded device. This will include bootup instrumentation features, such as printk-times, KFT, and bootchart.

Also Tim will describe individual areas where the kernel and user space bootup time can be improved. Some of the techniques to be discussed are: preset lpj, deferred module loading, reduction of probing delays, refactoring user-space init code, and pre-linking of applications. These techniques are used today in many Sony products

Biography

Tim Bird is a Senior Software Engineer for Sony Corporation of America, in their Silicon Valley Software Group. Tim helps customize the Linux kernel for use in Sony products. Also, Tim represents Sony in the CE Linux Forum. He is Chair of the CELF Architecture Group, where he directs initiatives designed to improve Linux for use in embedded products. He served as the first chair of CELF's Bootup Time technical working group. Tim was formerly CTO of Lineo, one of the first embedded Linux vendors, and has been working with Linux for over 15 years.

Device Tree's in Linux

Vitaly Bordug
MontaVista Software

This presentation explains the origin of the device tree and what it can do for embedded Linux developers. The value of using Open Firmware to boot used to be disputable, but now the concept is used even in the popular firmware, u-boot. Use of the device tree concept can combine several kernels, root filesystems, and other files, selecting the appropriate items for a target board. The presentation will discuss why the initial approach to the use of the device tree to pass board information in u-boot was insufficient, different opinions about where the binary blob should reside, basic device tree and board set-up code examples from PowerPC, and the new multi-image format for u-boot based on the device tree

Biography

As principal software engineer at MontaVista Software Vitaly is team lead and architect for kernel development. He has worked in the Linux kernel community for more than five years, contributing to device drivers and arch-specific packages. Vitaly focuses primarily on the PowerPC family of processors, and is the maintainer of the PowerQUICC processor family (8xx).

Handhelds Mojo - Building and running Ubuntu distributions on ARM

Andrew Christian
Nokia

The objective of the Handhelds Mojo project is to make available complete desktop Linux distributions for ARM devices. Using the same source packages on desktop and embedded devices enables rapid prototyping and development, avoids version skew, and provides a steady source of security patches and bug fixes.

The Mojo project has released a series of distributions including "Frisky" (based on Ubuntu 7.04 Feisty), "Grumpy" (based on Ubuntu 7.10 Gutsy), and "Hasty" (based on Ubuntu 8.04 Hardy).
Compilation targets include ARMv5 EL, ARMv5 EL + VFP, and ARMv6 EL VFP.

This presentation will discuss the trials and tribulations of building the 17,000+ binary packages for each variation of each distribution, and then describe how the Mojo distributions have been used in a variety of hardware devices.

http://mojo.handhelds.org

Biography

Andrew has been working with embedded Linux since the early days of the Handhelds project where he spent many months writing device drivers and kernel modules for the Compaq iPaq handhelds. Before that he spent many years doing product design, robotics, and human interface research starting with a Ph.D. in engineering from MIT and continuing with DEC, Compaq, and HP. He currently runs the open-source research group at Nokia's Cambridge Research Laboratory.

The strategic implementation of free software in business

Shane Martin Coughlan
FSF Europe

Free Software is a key paradigm in ICT and most organisations are either adopting or considering the adoption of solutions based on this approach. As with proprietary software, the successful implementation of Free Software requires an understanding of the best policy and processes applicable to its context.

Shane will discuss how FSFE's legal project and its European Legal Network have engaged with this issue by producing generic market knowledge for supply and purchasing contracts, work flow documents and deployment methodology.

This knowledge is immediately relevant to the adoption and management of Free Software code. It also has relevancy in optimisation to help ensure organisations engaging with Free Software obtain a good return on their investment.

Biography

Shane is the coordinator of FSFE's Freedom Task Force legal project. He has given numerous talks on Free Software issues and delivered training courses throughout Europe as part of his role at the foundation. He also manages a network of legal and technical experts covering seventeen European countries and with contacts worldwide. Shane was previously involved in lock-in analysis, open standards and ICT security as a consultant. He studied at the University of Wolverhampton in the West Midlands and read for his MA at the University of Birmingham. His research during his MA was focused on security, and he produced a thesis on cybernetic warfare.

Avoiding web application flaws in embedded devices

Jake Edge
LWN

Security flaws in embedded devices have been rather visible of late, with several devices exposing serious vulnerabilities in their administrative web interface. For example, the BT Home Hub had a whole laundry list of flaws that would allow attackers to take control of it. Many of the same kinds of exploits used against more mainstream web applications are applicable to the embedded world:

- cross-site scripting
- cross-site request forgery
- default administrative passwords and others.

The talk will be targeted at developers of administrative web interfaces for embedded Linux devices. It will provide examples of vulnerabilities, explain how they work and how to avoid them. The audience will leave with a thorough understanding of web application security issues, especially as they pertain to embedded administrative interfaces. The emphasis will be on writing the application code to avoid these kinds of problems.

Biography

Jake Edge has been a software engineer for various companies over the last 20 years, specializing in Linux development. He has worked on various projects, for everything ranging from embedded systems to server daemons. Some of the embedded projects used Linux, others used various roll-your-own operating systems, on hardware such as phone interfaces, storage controllers, and printers. After writing articles for LWN.net for several years, Jake joined LWN full-time in June 2007 as an Editor. He is in charge of the Security page for each weekly edition as well as writing articles on other topics of interest to the Linux and free software communities. He lives in western Colorado (USA) with his wife and two loony dogs.

Abusing UPnP

Armijn Hemel
Loohuis Consulting

Universal Plug and Play is the dominant technology for easily discovering and using services on a network. It started as a Microsoft Windows only technology, but it has been quickly embraced by vendors around the world and is being used increasingly in a lot of devices. Universal Plug and Play functionality can be found on more and more consumer electronics devices, with different roles.

Broadband routers with UPnP functionality are very widespread and more and more networked media devices depend on UPnP (part of DLNA). For Wi-Fi Protected Setup one of the required configuration methods is through UPnP. This talk will show how I've been trying to exploit devices using UPnP, while working within the specifications of the protocol.

I will highlight potential pitfalls and hopefully give some ideas about how to keep me out of your UPnP-enabled devices.

Biography

Armijn Hemel is CTO at Loohuis Consulting, a small ADD-driven company in Utrecht, the Netherlands. He read computer science at Utrecht University, where he obtained a MSc degree with a thesis about NixOS, a Linux distribution based around the revolutionary Nix package management system.

Armijn is serving on the board of NLUUG and chair of the NLUUG fall conference 2008. In his spare time he hunts GPL violations as part of the gpl-violations.org project. In his spare spare time he thinks it's funny to shoot holes in devices and applications using UPnP, which he documents on his UPnP hacking website (http://www.upnp-hacks.org/).

BlueZ 4.0

Marcel Holtmann
Intel

The Bluetooth subsystem for Linux has come a long way and has been improved with support for various new features from the Bluetooth specifications in the past two years. Products like the Nokia Internet Tablets or the Android platform have clearly shown that BlueZ is stable and ready for usage in mainstream products.

With the 4.x series a massive cleanup work has been started and all lessons learned from previous releases have been taken into account to create a better, more powerful and smaller API. The new API will allow an easier integration of Bluetooth technology and seamless support advanced technologies like Simple Pairing to increase the user experience.

The 4.x series makes use of a plugin based architecture to keep the core daemon small. Plugin for audio devices, inputs like keyboards and mice, networking and serial services are part of the default distribution.

Besides the main Bluetooth daemon (bluetoothd) another daemon to handle all OBEX related profiles (obexd) has been developed. With bluetoothd and obexd together it is possible to create a feature rich Bluetooth experience that integrates perfectly with all other Linux subsystems.

Biography

Marcel Holtmann works for the Open Source Technology Center at Intel. He maintains the Bluetooth subsystem for Linux, the OpenOBEX library and is the author of Connection Manager.

pjsip: open source compact SIP and media stack

Perry Ismangil and Benny Prijono
Teluu

Introducing pjsip project and challenges in cross-platform embedded development. As a case study, the use of embedded Linux for a hardphone will also be discussed.

Biography

Perry Ismangil

Perry Ismangil is co-founder and Managing Partner of Teluu. He previously co-founded the first open source company in Indonesia, and has been involved in the software development business for the last 10 years. For full profile see http://www.linkedin.com/in/ismangil.

Benny Prijono

Benny Prijono is Founder and Chief Scientist of Teluu. Previously, he was involved in setting up a telco service provider in London, and has been programming on Linux platform since 1995. He has been continuously developing pjsip since 2005. For full profile see: http://www.linkedin.com/in/bennyprijono

Power management on an ARM11 platform

Mischa Jonker
NXP Semiconductors

At NXP an ARM11-based test chip has been developed to study several power management approaches on real silicon. CPUidle, which is initially designed for use on laptops, has also been ported and it turns out to be a suitable way to select the different ARM power modes. The implementation of the various ARM core shutdown modes involved doing tricks with page tables and the MMU. Besides these implementation details, the presentation will also address how much energy can be saved by these measures, together with an assessment of performance impact and what to do about it. Finally, there will be some suggestions on how to adapt your drivers and applications to benefit most of this type of power management.

Biography

Mischa started at NXP as a graduation student, back in 2005. After researching and benchmarking several power management techniques for 7 months, he joined Philips TASS. His first assignment was at his old graduation spot, at OS Knowledge Center, NXP, and he's still sitting there. When there is any spare time left, this is spent on researching dynamic power management even further, but most of the time he is loaded with supplier management, porting and supporting Linux kernels on various NXP SoC's and various other OS-technology related consultancy/support tasks.

Deferred IO and E-paper displays

Jaya Kumar
Independent Consultant

E-Paper displays are becoming increasingly common in consumer electronics, especially in the E-Book Reader market. E-Paper displays present a unique challenge to embedded Linux because of their varied latency and non-memory mappable custom controller interfaces.

This presentation will share the details of the deferred IO framework that was recently merged in to the Linux kernel. It will demonstrate and cover the efforts and experiences of using Xfbdev with deferred IO on a Gumstix PXA255 (Xscale) embedded device with a Metronome EPD controller interfaced to a Vizplex E-Ink E-Paper Display.

Biography

Jaya Kumar has been working with embedded devices for 10 years. He is the author of the deferred IO framework, the E-Ink display controller drivers, and various other drivers in the Linux kernel. He has a deep interest in E-Paper technology and also the use of free and open source technologies in developing countries.

Portability and optimization of GNU / open source applications with ARM embedded Linux

Vasileios Laganakos
ARM

This presentation gives a description of the challenges developers face when compiling existing applications like DirectFB, Mesa3D and Mozilla Firefox, initially developed for desktop environment, to ARM Embedded Linux platforms. This talk will describe the options available in terms of development environment (i.e. classic cross-compilation, Scratchbox, native etc.) as well as what developers should take into account when targeting multiple platforms and enable the use multiple tool-chains like GCC or ARM RealView tools, whether optimizing for specific architectural features or code density.

The experience of working with projects like DirectFB, Mesa3D and Mozilla Firefox will be used to describe some of GCC extensions which have been commonly used in some projects, as well as options to adapt code to target multimedia instructions on different versions of ARM processors (SIMD on ARMv6 or Neon on ARMv7). Tools can have a significant impact on the quality and the performance of the resulting code which programmers should be aware of to improve performance, portability and maintenance of their project across multiple architectures and development environments.

Biography

Vassilis is a renegade Physicist, where during his studies he got involved with Unix/Linux and was/is thrilled to be involved with the Open Source community. He has 6 years experience in administrating and working with Linux and Unix platforms in networked environments. He got his MSc in Advanced Computer Science from The University of Manchester (UK), where he focused in High Performance Computing and Micro-Kernel operation and principles. His main role at ARM includes porting & benchmarking tools/applications with ARM/Linux environments, investigating the use of Open Source as well as ARM development tools with Linux and embedded platforms.

An overview of the Squashfs filesystem

Phillip Lougher
Independent Consultant

This presentation will give an overview of Squashfs, currently the most compressed read-only filesystem for Linux. It is used in many embedded systems as the rootfs, and it is the filesystem used for almost all current Linux LiveCDs.

The presentation will give the original reasons for writing the filesystem, and it will detail some of the design decisions followed in the filesystem that has made it so successful. It will also describe the filesystem layout changes that have been made in the last five years and the reasons for the changes.
Lastly it will discuss the most recent 4.0 layout changes, and the experiences obtained in trying to get the filesystem mainlined.

Biography

Phillip started off in academia, receiving a PhD in video filesystem design from Lancaster University in 1993. He subsequently carried out post-doctoral research at Lancaster and Cambridge Universities in the areas of video filesystems and multimedia operating systems. Since leaving academia Phillip has worked as a Linux kernel engineer mainly in the embedded industry (STBs, mobile phones), porting the Linux kernel to unsupported PowerPC variants, and writing numerous Linux device drivers. Phillip also recently served as a kernel maintainer for the Ubuntu distribution.

Building embedded userlands

Nedeljko Miljevic and Klaas van Gend
MontaVista Software

Most embedded Linux systems not only contain a kernel, but also contain applications - running in user space. Apart from the application-specific binaries, most embedded systems also have a shell, a system logger and other generic apps. Over the years, many mechanisms have been designed to cross-compile and build these apps, including plain scripts, rpm, dpkg, buildroot, scratchbox, bitbake and others. This talk will address the community efforts, what the various commercial embedded Linux vendors have done and will compare different approaches, illustrate their advantages and drawbacks and try to show how to meet your deadlines in the least painful way.

Biography

Ned Miljevic

Since 1981, Ned has been involved in embedded systems development on different microprocessor and microcontroller architectures. He started working with Unix in late 1980s and with Linux in early 1990s and has competences in architecture, design and implementation of embedded as well as complex server systems. During his career he worked for different companies in telecommunication and telematics business and currently at MontaVista as Solution Architect his role is to help the customers in their implementations of embedded Linux. He lives in Freising, Germany with his wife and twin sons.

Klaas van Gend

Since 1999, Klaas has been professionally engaged with Linux software development for various companies including Philips and Siemens. In his current job as Senior Systems & Solutions Architect at MontaVista, he visits a lot of customers across the USA and helps them with their strategy to apply Linux in embedded systems. Klaas has been a speaker at various conferences on the topics of Real Time Linux and UMTS - the latter because he is lead developer of a 3G mobile communications software package for Linux called umtsmon. Klaas also writes as a free-lance author for several magazines. Until the summer of 2009, he lives in San Leandro, California with his wife Ellen.

Open integration layer - DirectFB 2.0

Denis Oliver Kropp
The DirectFB Company

Within the past few years DirectFB 1.x became fairly standard in the TV market and other domains, while it has been adopted by major software vendors and hardware manufacturers. One of the key aspects is the clean design of its driver interfaces and modules for seamless integration into various software architectures or hardware platforms. Another important factor is the ability to build the core as a single process library with pure function calls down to the hardware, but also as a multi process solution without client/server overhead, allowing direct function calls down to the hardware as far as possible. This nature allows the integration of various applications, libraries, frameworks or systems including UI toolkits or virtual machines within one environment with efficient resource usage.
The roadmap of DirectFB 2.0 is focusing on those aspects to strengthen its position as an Open Integration Layer that brings independent hardware and software vendors together in one architecture, providing full interoperability and efficient implementations of Khronos' and other APIs to meet latest industry standards for graphical user interfaces on mobile devices, car and home entertainment systems, or any other consumer electronics with low to high end graphics and media processing capabilities.

Biography

Denis Oliver Kropp, 27, is the chief architect of DirectFB and specialized himself in the area of system software engineering with a focus on user interfaces and video/graphics acceleration, having experience in these areas and Linux in general for more than ten years. After more than four years of employment incl. DirectFB development and MHP implementation, followed by almost four years of contracting work around DirectFB, he's starting his own company together with his wife and a couple of initial employees to fulfill the increasing amount contracting requests and to support the evolution of DirectFB beyond the requests of customers and very limited "free time" (as in free beer).

Using the appropriate wear leveling to extend product lifespan

Bill Roman
Datalight

To ensure that your product design decisions will meet the requirement of the intended product life, you must have a solid awareness of the many flash wear leveling methods.

In this session you will learn how the technology actually works, what the difference is between static and dynamic wear-leveling, and how to identify the factors that impact wear leveling effectiveness. We will also discuss the impact of wear leveling on performance and how best to minimize potential downside risks.

Flash has a rated lifetime, measured in terms of the number of times a given block can be erased. Wear leveling is a mechanism for ensuring that some flash blocks do not wear out before others, resulting in premature device failure. A number of flash trends are conspiring to reduce part life and consequently device life, including; dropping erase cycle ratings, increasing bit error rates, and lower data retention ratings.
Learn about the latest choices available to manage these issues, and which wear leveling algorithms will work best for your application.

Biography

Bill Roman has been a Software Architect at Datalight for over six years where he has gained experience with a wide range of flash memory technologies through his work on their FlashFX Pro flash management software. Most recently he has been responsible for the port of FlashFX Pro and the Reliance file system to Linux.
Prior to Datalight, Bill worked with operating system internals at Digital Equipment Corporation, as well as embedded systems in the test, communications, medical, and industrial control industries. He has a Masters of Engineering degree from Cornell University, and is one of the few people in the world with experience in the programming language 8-BOL.

Adventures in real-time performance tuning, part 2

Frank Rowand
Sony

The real-time for Linux patchset does not guarantee adequate real-time behavior for all target platforms. When using real-time Linux on a new platform you should expect to have to tune the kernel and drivers to provide performance that matches your specific requirements.

Part 1, presented at ELC 2008, provided an example of the trials and tribulations of the tuning journey for a MIPS target board.

Part 2 will provide additional examples of methods to debug and tune latency. An additional target for this installment is an SMP ARM board, leading to a new set of challenges.

Biography

Frank has hacked on many kernels, both real-time and not, including Linux, HP-RT, HP-UX, NeXTstep, and MPE. His computing experiences are varied; some areas of technology that he has been known to touch include embedded, real-time, machine dependent kernel, networking, drivers, and performance. He is currently employed by Sony Corporation of America.

Building bridges - coherence, a DLNA/UPnP framework

Frank Scholz
Independent Consultant

UPnP is the standard when it comes to interoperability in the digital world - especially the UPnP A/V and DLNA specifications for digital media devices like MediaServers and MediaRenderers/-Players.
Coherence is a framework that provides by itself several of these MediaServers and MediaRenderers. Coherence differs in being not "only" a library that provides calls to the various methods needed to interact with the UPnP protocol stack. It can be used that way, but its real intention is to act as a bridge between any application that deals with digital data and the DLNA/UPnP world - embedded within the application or standalone as a daemon. It provides a very high level interface an application can utilise to expose for instance its data as a MediaServer. Or expose its playback capabilities as a MediaRenderer.

The presentation will focus on some of the new features of Coherence, highlighting:

1. the integration with the DVB-Daemon, providing the first Open Source implementation of an UPnP A/V ScheduledRecording service.
2. a gateway to KNX and ZigBee devices, exposing them via the UPnP Lightning Contols services.

Biography

Frank Scholz (44) - lead developer of Coherence, lives with his wife and four kids in Germany and works as a consultant and software developer. When his family grants him the time, he brings to perfection his Linux home-server integration with his home-automation and home-entertainment systems.

NAND chip driver optimizaton and tuning

Vitaly Wool
Embedded Alley Solutions

In the past two years, the capacity of NAND flash chips has dramatically increased. A 8 GB NAND flash is now of no surprise, and both Samsung and Dell are now producing laptops with 32 GB NAND flash as the main storage device. And in 2007 A-DATA showcased SSD hard disk drives based on Flash technology in capacities up to 128 GB. Keep in mind that flash memory does not have the mechanical limitations and latencies of traditional hard drives, so flash-based disks are preferable in terms of noise, power consumption, and reliability, and are now not much behind in terms of speed and capacity.

Given the capacity increase and the significance of NAND flash in the embedded market now, it's crucial to have the software capable of using the benefits of the modern chips and controllers. This talk will cover these benefits and how the drivers should be written to make use of them, along with the other tips on NAND chip driver optimization and tuning, including programming DMA-capable controllers and hardware ECC calculation, also focusing on the challenges that different NAND page sizes bring to programming hardware ECC-capable controllers.

Biography

Vitaly Wool, Senior Consultant at Embedded Alley Solutions, graduated in St. Petersburg State Univ. in 2002 as a Computer Science specialist, worked with such real-time OSes as VxWorks and RTEMS building networking equipment solutions. Moved to Moscow, Russia, in 2003 where he started to work mostly on Linux with different platforms and architectures, for different companies. Interested in consumer electronic optimizations for Linux, ARM Linux development, flash technologies and image processing.

General information

NLUUG

The NLUUG is the association of (professional) Open Source and Open Standards users in the Netherlands. Since the late seventies, the NLUUG has brought together the community of systems administrators, programmers, researchers and IP network professionals. The primary goal of the NLUUG is to extend the application of, and knowledge about, open systems and UNIX.

The NLUUG Programme committee consists of

Armijn Hemel	armijn@loohuis-consulting.nl
Klaas van Gend	klaas.van.gend@mvista.com
Paolo Costa	costa@cs.vu.nl
Gerben Blom	gerben.blom@pts.nl
Robert Kochheim	robert@kochheim.org
Floris Steenbrink	fsteenbr@cisco.com
E-mail	pc-nj2008@nluug.nl

NLUUG board:

Walter Belgers	Madison Gurkha
René Pluis	Cisco Systems
Klaas van Gend	MontaVista Software
Armijn Hemel	Loohuis Consulting
Melanie Rieback	Vrije Universiteit
Adriaan de Groot	Radboud Universiteit Nijmegen
Mark Overmeer	MARKOV Solutions
E-mail	bestuur@nluug.nl

Conference organisation: Congres- en organisatiebureau Interactie bv
http://www.interactie.org
info@interactie.org

Consumer Electronics Linux Forum

The Embedded Linux Conference (ELC) is the premier vendor-neutral technical conference for companies and developers using Linux in embedded products. The main sponsor of ELC is the CE Linux Forum (CELF). Each year two conferences are organized. In Spring, ELC - CELF's main international event - is organized in the USA. In Autumn, ELC Europe is held targeting a European audience.

CE Linux Forum is an international open source software development community established in 2003. It is a forum of like-minded software engineers dedicated to the development and enhancement of Linux-based embedded devices through the irreplaceable resource of shared knowledge. These engineers bring their ideas and finest skills to such missions as decreasing system size, startup/shutdown time, and power consumption; improving compatibility to various CPU architectures, and developing middleware.

The ELC Europe Programme committee consists of

Klaas van Gend	MontaVista Software
Ruud Derwig	NXP Semiconductors
Tim Bird	Sony

Programme committee:	elce-08@tree.ceLinuxforum.org

ELC Conference:	http://www.embeddedlinuxconference.com/
CE Linux Forum:	http://www.celinuxforum.org/

Conference organisation:	Congres- en organisatiebureau Interactie bv http://www.interactie.org info@interactie.org

Location

The NLUUG and ELC Europe conferences are held at:

Hotel en Congrescentrum De Reehorst
Bennekomseweg 24
6717 LM Ede (Gld)
The Netherlands
Phone: +31 318 750 300

De Reehorst is conveniently located at walking distance (about 10 minutes) from train station Ede-Wageningen.

Arriving from Amsterdam Schiphol Airport

If you arrive at Amsterdam Schiphol Airport, do not take a taxi to the hotel, this will cost you approximately 200 euros! Instead, buy a train ticket to “Ede-Wageningen”. The costs for a single fare is € 13.30 in second class or € 22.60 in first class. From Amsterdam Schiphol Airport, take the train to “Utrecht Centraal Station” and take the train to “Ede–Wageningen”, usually departing from Utrecht on platform 14. When you arrive at Ede-Wageningen follow the sign Hotel De Reehorst.

Arriving from Rotterdam Airport

If you arrive at Rotterdam Airport, take the bus to Rotterdam Centraal Station (every 10 minutes), take the train to Utrecht Centraal Station and change to catch the train heading in the direction of "Ede-Wageningen".

ICE high speed train

If you arrive with the ICE high speed train from Germany, change at Arnhem station to catch the train heading in the direction of "Ede-Wageningen".

More information on the Dutch railway system is available on their website: http://www.ns.nl/en/

Registration for the conference will be open at De Reehorst on Wednesday night from 6PM until 9PM. During registration, you will receive your badge, a conference bag with the schedule, the proceedings and some goodies.

Thursday November 6, registration opens at 8:30.
Friday November 7, registration opens at 8:30.

Hotels

Especially for our international guests, we have reserved blocks of hotel rooms in De Reehorst and Hotel WICC in Wageningen.

The conference fee does not include the hotel.

Hotel en Congrescentrum De Reehorst
Bennekomseweg 24
6717 LM Ede (Gld)
The Netherlands
Phone: +31 318 750 300
http://www.reehorst.nl/
hotel@reehorst.nl

Hotel WICC
Lawickse Allee 9
6701 AN Wageningen
+31 317 490 133
http://www.wicc.nl/
hotel@wicc.nl

De Reehorst	single room	€ 97.50
	double room	€ 132.50
Hotel WICC	single room	€ 75.00
	double room	€ 98.50

Breakfast is included with the hotel reservation.

Unfortunately de Reehorst has no website in English. However, making reservations in English (or other common European languages) should not be an issue. In case you need further assistance, please contact Interactie.

We will arrange transportation info to and from the WICC hotel to De Reehorst on both days. During your check-in at the hotel you should receive information on this.

Registration

Please register in advance. This is the only way we can guarantee there will be a badge, a T-shirt and a conference bag for you and enough food and drinks.

Because essentially there are two conferences held together, the entrance fees vary depending on your membership status and the number of days you plan to attend.

NLUUG

Members of the NLUUG or sister associations (incl. GUUG, UKUUG and USENIX) pay € 135 euro for the first day. If they also want to attend the second day of ELC Europe, they pay € 100 more. Student members of the NLUUG pay 26 euro per day.
Non NLUUG-members *who only want to attend the first day* pay the customary NLUUG non-member fee of € 290 euro. It is usually cheaper to register as an NLUUG member first. See the NLUUG website at http://www.nluug.nl/ for more information about how to become a member of NLUUG and other benefits for NLUUG members.

All registrations through the NLUUG website will have access to both the NLUUG and the ELC Europe sessions on November 6.

ELC Europe

Commercial participants pay € 320 euro, hobbyists pay € 80 euro for attending the 2 days of ELC Europe.
All registrations through the ELC Europe website will have access to both the NLUUG and the ELC Europe sessions.

For registration for ELC Europe, please visit:
http://www.embeddedlinuxconference.com/

	Thursday November 6		Friday November 7
	incl. 19% VAT	excl. VAT	
NLUUG:			
Members	€ 135.00	€ 113.45	+ € 100.00 (€ 84.03 excl VAT)
Non-members	€ 290.00	€ 243.70	+ € 100.00 (€ 84.03 excl VAT)
Students	€ 26.00	n/a	€ 26.00
ELC Europe:			
Commercial	€ 320.00	€ 268.91	Included in price
Hobbyist	€ 80.00	n/a	
Dinner (see Social Event)	€ 15.00		

All participants have to pay the VAT, including all employees of European companies. Your accounting department will know how to get the VAT refunded.

Students will have to prove their status by bringing a valid student ID card and showing it at the registration desk.

Please indicate qualification for the ELC Europe hobbyist tariff during your registration.

Payment

In the Netherlands, it is very customary to wire money in advance or use debit cards to pay at the conference. We do also accept cash payments at the registration desk.
Especially for our overseas guests, this year we will also accept credit cards.

Your registration is only considered complete if:
1. We have confirmed your registration by letter or e-mail and
2. We received your payment before October 31st 2008
   (non-Dutch attendees need not pay in advance).

Advance payments can be wired to Postbank account 2353318 for "NLUUG". Please indicate the invoice number from your confirmation.

For non-Dutch attendees:

IBAN:	NL77 PSTB 0002 3533 18
BIC/SWIFT:	PSTBNL21

If you have not received any confirmation within 7 days of your registration, please contact the NLUUG office:

buro@nluug.nl
phone: +31 318 694416

If your payment has not been made before October 31 2008, you will have to pay at the registration desk. You can use PIN (Maestro), VISA and Master Card credit cards or pay cash.

For dutch participants only:
Voor Nederlandse deelnemers die niet kunnen aantonen dat ze betaald hebben, bestaat de mogelijkheid om een machtiging tot automatische incasso te tekenen. Indien we twee weken later nog geen betaling hebben ontvangen, wordt deze geincasseerd.

The first 50 ELC Europe registrations and the first 50 (paid) NLUUG registrations will also receive a free Early Bird gift!

Exposition / Sponsorship

On November 6 there will be an exhibition. If your company would like to participate in this exposition, or otherwise would like to sponsor the conference, please contact Interactie:

Organisatie- en congresbureau Interactie bv
Stationsweg 73C
6711 PL Ede (The Netherlands)
http://www.interactie.org
info@interactie.org
Telephone: +31 (0)318 694416
Fax: +31 (0)318 694417

Social Event – Dinner at Burgers' Zoo

On Thursday November 6 there will be a social event, including dinner, at various locations in Burgers' Zoo in Arnhem.

The costs for the social event are € 15.

We have arranged buses to take you to Burgers' Zoo and back to the hotels. The buses will depart at 18:00 (6:00 PM) in front of De Reehorst.

Registration for the social event is open to both NLUUG and ELC Europe participants. Spouses are also welcome – at an additional € 15 of course.

See http://www.burgerszoo.nl/ for more information on the Zoo.

Cancellation policy

Cancellations must be submitted in writing to Interactie bv before October 26 2008. A € 35,- administration fee will be charged. No cancellation requests will be accepted after October 26 2008.