



Linux @ Industry

Open Source Perspectives





Software @ Siemens

- 60% of **SIEMENS** business is based on software
- Recent study shows, that inside our products there are 25 different operating systems used
 - 18 are produced by third-parties
 - others are home-grown
- The cost of own operating systems development plus runtime fees are rather significant

Unification of this core software component will help to reduce expenses, by lowering at least royalties and support expenses





Embedded Software

- Computational power of modern embedded systems is constantly increasing
- Microcontroller units are embedded in more and more consumer and industrial products



- Proprietary solutions are not scalable enough to cover all areas of Siemens business
- Home-grown operating systems are limited in functionality and too expensive to maintain

...so there is Linux.





Linux History

- Started as a free-time project by Linus Torvalds, released to public at 1991
- Linux version 0.95 is capable of running the X Window System on March, 1992
- First Linux distributions created in 1992, Slackware in 1993 (still maintained)
- Version 1.2 of March 1995 added support for Alpha, Sparc and Mips
- ...
- Now a full featured and free server, desktop and embedded platform

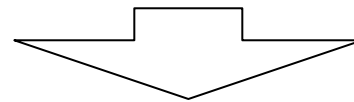
- Initially used by enthusiasts and mostly in academic environment
- GNU/Linux now found its way into non-profit organizations, corporate and small businesses, as well as embedded products





Linux Today

- Has very reliable and scalable architecture
- Linux uses open standards
- Target platform for an extended amount of applications
- Supported by a wide range of hardware



Major organizations start using Linux as a desktop environment



Linux became a natural choice when building server platforms



Software &
Engineering



Embedded Linux

How does typical embedded Linux system look like?



In contrast to many other alternatives, such as proprietary real-time kernels, Linux allows to build system for almost any application.

- Resource Requirements
 - It can be used for a tiny control module with 50MHz CPU and small footprint of memory (2 MBs)
 - Or extremely complicated networked system, with SMP and GHz CPU frequencies, RAID array and gigabytes of RAM
- Application Area
 - You can find it in a PC-like device with screen and keyboard
 - Or in autonomous industrial system with only blinking LEDs





Get Into It!

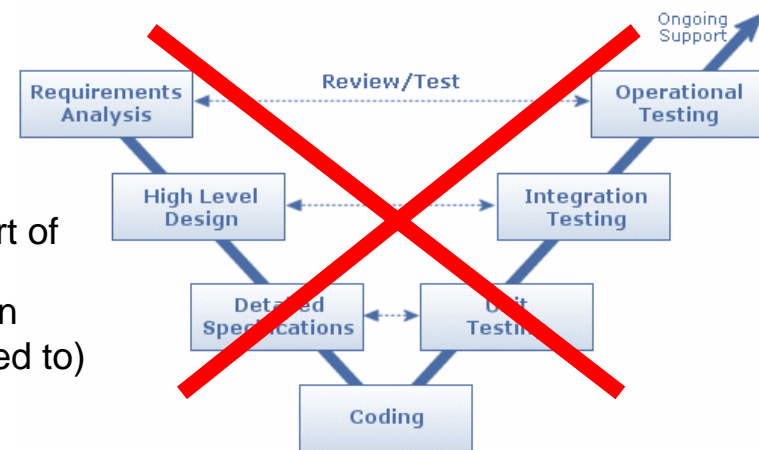
- Software in a Free World
 - Development Process
 - Reasons of Success
- When Corporate meets Open Source
 - Development Process
 - Tools & Techniques
 - Human Factor





OSS Development HOWTO

- Project Leader (Author, Maintainer)
 - Defines directions of software evolution (architecture & design)
 - Responsible for core software functionality
 - Accept/review/integrate patches
- Developers
 - Usually work on some particular part of software
 - May also suggest changes to design
 - Submit patches (and apply, if allowed to)
- Users (AKA Testers)
 - Submit bug reports
 - Create patches





Best Practices

- From my experience, three most effective practices of software engineering are:
 - To have one person who define software features and design
 - And that is the case for most successful open source projects!
 - Perform source code inspections
 - Satisfied in by the fact of code openness and multiple developers
 - Use prototype-based development
 - There are no formal “official” lifecycle restrictions on design changes
- Most of Open Source projects actively use:
 - Source control
 - Bug tracking system
 - Collaboration tools (IRC channels, mailing lists)





Why Open Source is Good?

In his classic book, Brooks says:

- “Surgery team organization is the best way to keep project integrity”
 - that is exactly how Open Source projects are organized!
- “Programming satisfies every human being creativity need”
 - and open Source software is created only for creativity reason
- “Best software engineers are 10 times more effective”
 - from psychology we know, that higher intellectual qualities assume higher needs for creativity
- “Plan to throw out a first version”
 - most of Open Source projects are constantly redesigned, while commercial projects tend to afraid of redesign due to tight deadlines and resource limitations
- “Conceptual integrity is the most important factor of project success”
 - Open Source development is not lead by customer requests, but mostly by program author will





When Corporate meets Open Source...





Introducing Linux

- Problem: **Unix is new for most people!**
 - Majority of software developers in our days do not use Linux or any other Unix'es
 - Developer work places are not Linux-based
- Consequence: **It is not easy to start...**
 - Developers startup time us huge, and their work style is not optimal
 - Linux-based development environment is difficult to setup and maintain, because new system administration skills are necessary





In Siemens

- Solution: The **SIEMENS** Way
 - Company wide Embedded Linux Initiative
 - Establish Competence Center Embedded Linux
- What we do?
 - Trainings
 - Consulting
 - Prototyping & Development
 - Evaluation & Benchmarking





Usual Problems

- Answer the questions:
 - How can we develop for Linux on non-Linux based computers?
 - What is the version of software we shall use?
 - Which JTAG/BDM debug interface we can use?
 - How well this processor is supported by the kernel?
- Help:
 - To setup development environment and servers
 - Perform prototyping and educate developers
 - To resolve tools, kernel or application specific issues





Conclusion

- Linux operation system
 - Reduces time-to-market
 - Extend quality and functionality of provided solutions
 - Constant support of community helps to keep development up-to-date with modern technology
- Common OSS components
 - Reduce number of errors
 - Achieve better compatibility between various products
 - Simplify future updates





No Comments





References

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Thank you!

