



Embedded Linux Servers

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Contents

- What is Embedded Linux
- Selecting hardware and distribution
- Key development areas
- Developer communities & problems & getting help
- More information



Embedded Linux

- There's no single thing called Embedded Linux, but in general we are talking about a situation where Linux is used in one or more of the below conditions:
 - limited resources on target device (computing, memory, storage, power consumption)
 - hardware differs from a standard PC (non-x86 processors, no floating point processor, ...)
 - customised and minimised operating system, applications and/or distribution
 - limited or non-existing user interface, less traditional input/output modalities
 - real-time requirements
 - low maintenance effort and robustness ("install and forget")

=> One size does not fit all!



Some examples at VTT



Component selection criteria (non-comprehensive list)

- Environmental requirements
 - Physical size, conditions (outdoor/indoor, toleration for vibrations, knocks, temperature, moisture), available/required power, attachment method
- Hardware requirements
 - Processor architecture & capabilities, memory, storage, I/O methods, networking, required connectors
- Software requirements
 - Openness, available distribution(s), required software, licensing issues, life cycle of the product, maintenance path

5



Selecting a distribution

- Choices
 - Homebrew by hardware manufacturer
 - Montavista, Wind River (commercial)
 - OpenWRT
 - uClinux
- Quite often you don't have a choice, at least without hacking...
- Differences to desktop/server distributions
 - Often monolithic, no extensive software repositories
 - Many lack proper tools for maintenance (software upgrades etc.)

6



Current key development areas ^(*)

- Bootup time
- System size
- File systems
- Tracing
- Security
- Power management
- Realtime
- Middleware

^(*) Tim R. Bird, Embedded Linux BOF, Ottawa Linux Symposium, July 2008 – see elinux.org for more information

7



Developer communities & problems & getting help

- Communities for software which is mostly used on non-embedded platforms may not have experience and tools for embedded
- Embedded market is very heterogeneous so communities for rare or very old platforms may be small or missing

=> Getting help is more difficult, you need to be more active

- The development pace is much more slow in the embedded world
- Tools are often very bare and sometimes less tested
 - Compiler errors etc. (ICE)
- Lack of interaction with the up-/mainstream?
 - Kernel embedded guys aims at fixing some of that

8



More information

- linuxdevices.com (Embedded Linux News)
- lwn.net (Linux Weekly News)
- uclinux.org (Linux for microcontrollers)
- openwrt.org (Linux for more capable devices)

