

# We need a "Linux company": Here is one

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April 22, 2008, Hannover Fair



# „Open Source“: Impact on Paradigms (1)

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#1: You need a different operating system for different systems

- Embedded systems
- Desktop computers
- File servers
- Main frames
- Supercomputers



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# „Open Source“: Impact on Paradigms (1)

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#1: You need a different operating system for different systems

- Embedded systems
- Desktop computers
- File servers
- Main frames
- Supercomputers

**Incorrect!**

*Linux works on all of them.*



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## „Open Source“: Impact on Paradigms (2)

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#2: You cannot retrofit an existing general-purpose operating to become real-time compliant!

Instead, you need a dedicated real-time operating system that was developed specifically for this purpose.



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## „Open Source“: Impact on Paradigms (2)

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#2: You cannot retrofit an existing general-purpose operating to become real-time compliant!

Instead, you need a dedicated real-time operating system that was developed specifically for this purpose.

**Incorrect!** *Linux was equipped with real-time capabilities about 10 years after it was originally published*



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# Kernel Configuration

.config - Linux Kernel v2.6.24.2-rt2 Configuration

## Preemption Mode

Use the arrow keys to navigate this window or press the hotkey of the item you wish to select followed by the <SPACE BAR>. Press <?> for additional information about this option.

- No Forced Preemption (Server)
- Voluntary Kernel Preemption (Desktop)
- Preemptible Kernel (Low-Latency Desktop)
- Complete Preemption (Real-Time)

<Select>

< Help >



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# „Open Source“: Problem

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**Project Manager:** "We need to get someone to develop a Linux driver for our new machine controller. Here's a purchase order for the work."

**Purchase Department:** "Okay. Let me check the purchase order to make sure it follows our standard procedure: NDA to be executed, source going into company's safe ... "

**Project Manager:** "Nope, we're going with Open Source - source gets published to the Internet."

**Purchase Department:** "What? We're paying for the development but the source code goes out to the Internet? If everybody can use the source code, why are we the only ones paying for this? No way this can fly!"

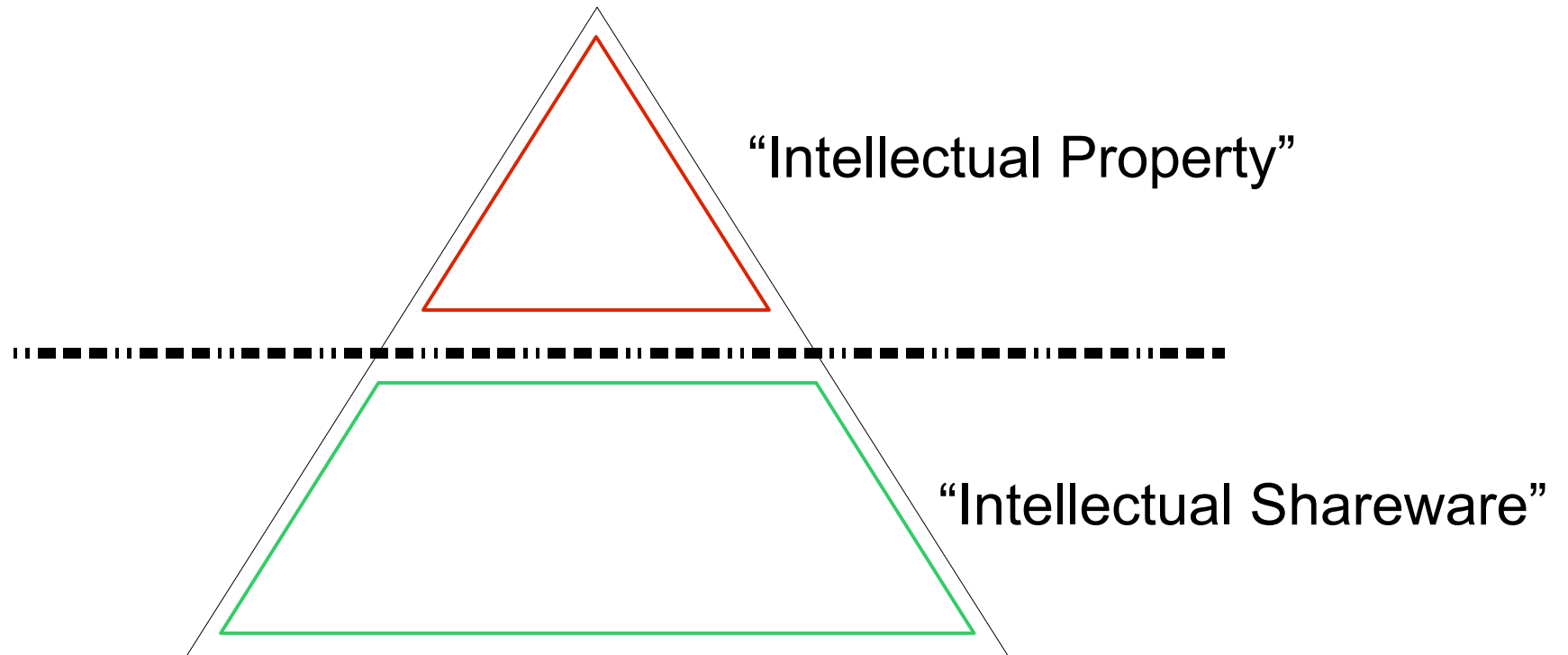


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# „Open Source“: Property vs. Shareware

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# „Open Source“: Solution

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„Purchase community“ for Open Source software



Limited, Corporation, Foundation, Federation, Cooperative?



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# „Open Source“ has a model in history

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Robert Owen  
(1771 - 1858)



Friedrich Wilhelm  
Raiffeisen (1818 - 1888)



Richard M. Stallman  
(\*1953)

*"What is impossible for the individual, many can do."*



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# Preamble of the OSADL by-laws

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*The automation industry and its suppliers are profiting greatly from open-source operating systems such as Linux since they guarantee long production cycles, rapid troubleshooting and the independence of individual software manufacturers. However, this branch requires specific expansions of the operating system such as real-time capability, the compatibility with these expansions must be certifiable, and standardized software interfaces must be available. The development of these requirements is the goal of the Open Source Automation Development Lab (OSADL)."*

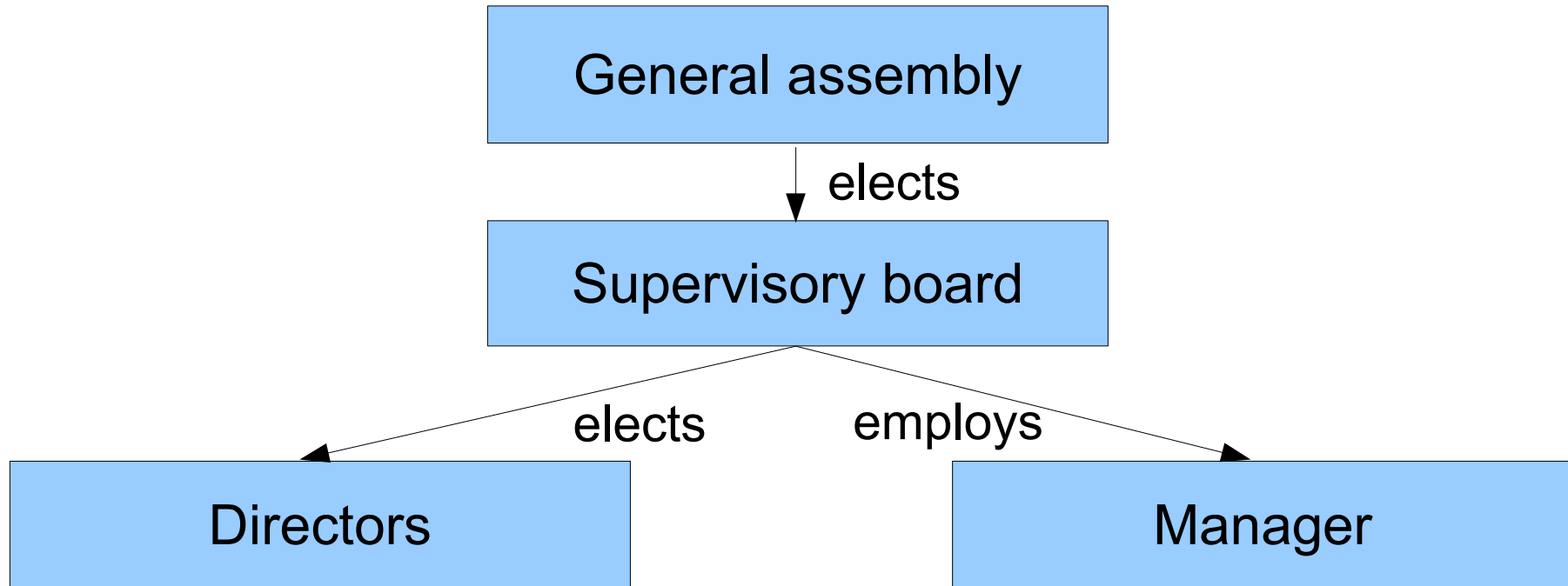


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# Organs of the cooperative

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# Membership Levels

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**Bronze Member**

8,000.00 euros/year

**Silver Member**

16,000.00 euros/year

**Gold Member**

24,000.00 euros/year



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# Regular OSADL Members

## Gold



## Silber



## Bronze



- Machine and engineering companies
- Manufacturers of automation hardware
- Manufacturers of automation software
- Open Source software service providers



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# Academic Members

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Lanzhou University, Lanzhou, P.R. China,  
School of Information Science and Engineering,  
Distributed & Embedded System Lab,  
Lanzhou, P.R. China



University of Stuttgart,  
Institute of Control Engineering of Machine  
Tools and Manufacturing Units (ISW),  
Stuttgart, Germany



Reconfigurable Embedded Digital Systems,  
School of Business and Engineering in  
Canton of Vaud (REDS),  
Yverdon, Switzerland



RWTH Aachen, Laboratory of Machine Tools  
and Production Engineering,  
Chair of Machine Tools,  
Aachen, Germany



UNIVERSITÄT HOHENHEIM  
International Management and Innovation



University of Hohenheim,  
Research Unit International Management  
and Innovation,  
Stuttgart, Germany



Katholieke Universiteit Leuven, Department of  
Mechanical Engineering, Division of Production  
Engineering, Machine Design and Automation,  
Leuven, Belgium



HOCHSCHULE  
MERSEBURG (FH)  
University of Applied Sciences

Hochschule Merseburg (FH)  
University of Applied Sciences,  
Chair of Mechatronic Systems  
Merseburg, Germany



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# Projects

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- Realtime capability of the mainline Linux kernel (RT Preempt)
- “Safety Critical Linux” - Certification of the Linux kernel
- Migration and portability issues
  - Xenomai skins (e.g. for VxWorks) for RT Preempt
  - Porting the RTDM API to RT Preempt
  - OS-9 file system for Linux
- Upstream submission of existing Linux drivers
- Definition of minimal requirements of Board Support Packages
- Compatibility of kvm (Kernel Virtual Machine) with RT Preempt
- Linux Ethercat Master
- Coldfire (68knommu) support for RT Preempt



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