Microkernels and You:
Long path of the small project

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Ksys labs
Structure

- Introduction: About Us
- First Case: Trusted Screen
- Practical View on L4Re, Fiasco.OC and Genode
- Our Contribution
- Summer Systems School’12
- 2013
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About Us

• Small R&D enterprise
• Information Security
• Network and mobile devices
• Russian Market
About me

• I’m 27
• Graduate Moscow Engineering Physics Institute in 2010
• Around 8 years experience in embedded development
• Wide range of projects and companies – from Montavista to startups
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First Case: Trusted Screen

• Was started in April of 2011
• See what you real sign
• Electronic signature for banking
First Case: Trusted Screen

- Platform – TI OMAP3
- First platform – DEVKIT 8k with screen
- First Linux based example – 1st day
First Case: Trusted Screen

• Idea: let we use uKernel

• Projects:
  – Fiasco.OC, L4Re * dde kit, dope, l4linux
  – L4::ka * there was no omap support
  – XEN * there was no arm support
  – QNX, OKL4 – closed sources
Trusted Screen:

Fiasco.OC

Ned
Sigma0
Moe

IO
FS+NAND
Crypt

L4Linux
SIGN
GUI
FB-DRV

I2C
TWL
musb
USB-GADGET
TCP
Web
CGI application

L4Linux
SIGN-DRV

SIGN
First Case: Trusted Screen

• Vanilla L4Linux does not support any board specific drivers

arch/arm/mach-omap/board-<..>.c:
  ads7846_init
  smsc911x
display
dss_data,
nand,
mmc
Gpio
i2c
regulator
<..>

arch/l4/kernel/arch-arm/setup.c
First Case: Trusted Screen

- L4Linux + L4Re + Mag (Dope) (August of 2011)
First Case: Trusted Screen

- L4Linux + L4Re + Qt (September of 2011)
First Case: Trusted Screen

- L4Linux + L4Re + Disko GUI (November of 2011)
First Case: Trusted Screen

• Summary:
  – 8 person-month
  – Mag/Dope, Qt, DISKO
  – Two times we made OTG support from scratch
First Case: Trusted Screen

- Stopped in December of 2011
- Hardware prototype was outsourced and made with a lot of bugs
First Case: Trusted Screen

- Qt + Genode on OMAP3
First Case: Trusted Screen

- OMAP4 -> IMX6 with Genode
Practical View on L4Re, FOC and Genode

• Fiasco.OC/L4Re:
  – Rare and silent Releases
  – Uncertain future, there is no public roadmap
  – SMP, DMA, L2 cache
  – Publications–sources gap

• Genode:
  – Public Github
  – Low performance lwIP
  – Slow FB
  – Pandaboard support
Practical View on L4Re, FOC and Genode

• We use:
  – L4Re for OMAP3
  – Genode for OMAP4
  – Switch from L4Re to Genode on x86
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Our Contribution

• L4Reap – L4Re (additional) applications
  – L4Linux for OMAP3
  – L4Re applications:
    • freetype2
    • libsigc++
    • libwhefs
    • libxml2
    • openssl
    • Disko GUI

Source: http://ksyslabs.org

Source: http://etc.usf.edu/clipart/53300/53327/53327_reaping.htm
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Summer Systems School’12

• 7 lectures from TUD and Genode plus 3 own.
• Theory and practice
• Very important material for new developers and students
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- Summer Systems School’13
- Hardened Fiasco.OC
- Fiasco.OC for PowerPC
Thanks

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