Aleksei Ignatov

Embedded software engineer

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Work experience

10.2017–11.2018 **Embedded software engineer**, *Unikie Oy*, `https://www.unikie.com/`.
Participated in the project of the networked digital microscope based on NVidia Tegra SoC. Development and maintainance of the custom firmware build system and tools. Design and implementation of the OTA firmware update subsystem and other system components and features, including security aspects such as verified boot process. U-Boot and Linux kernel development. Participation in the design verification. Development and maintainance of tools and infrastructure for continuous integration (Jenkins), automated testing and cloud software deployment (Ansible). Development of tools to be used in the device mass production process (factory flashing and testing procedures, tracking database).

04.2016 **Embedded software developer (single project job)**, *Russian Engineer, LLC*, `http://rengineer.ru/`.
Development of the Arduino firmware for the prototype of selective laser sintering based 3D-printer (deeply reworked MarlinKimbra firmware)

07.2015–05.2016,12.2016–05.2017 **Embedded Linux developer (part-time job)**, *Contactless Devices, LLC*, `http://contactless.ru/`.
Wide range of embedded Linux related tasks: from kernel drivers, BSP and peripheral interfaces (C, C++, Go), to web UI (AngularJS), mostly system software, including hardware add-on modules management subsystem. Target device is household and industrial automation controller, based on i.MX23, i.MX28 and i.MX6UL SoCs.

06.2015 **Linux kernel developer (single project job)**, *CrystalD*.
Linux kernel drivers forward-porting to recent kernel version. Target device based on i.MX6Q SoC

05.2015–06.2015 **Embedded software engineer (single project job)**, *IncrediTECHs*, `http://www.increditechs.com/`.
Self-service kiosk software development from scratch (Raspberry Pi, Go language)

09.2014–01.2015 **System software engineer (part-time job)**, *Virt2real*, `http://virt2real.ru/`.
Linux kernel features development and bugfixing for TI DM365 based video streaming and remote control platform.

08.2014–05.2015 **Embedded software engineer (remote job)**, *JSC NPK Rotek*, `http://rotek.ru/`.
Bringup of new hardware for running existing application software (inluding development of drivers for board peripherals, implementing custom bootloader features, improving reliability and robustness of the overall system, and performing various kinds of testing). Development of firmware for STM32-based climate control and monitoring device, integrating support of this device into embedded application running on Linux-based device.

10.2013–07.2014 **Leading software engineer**, *Samsung R&D Institute Russia*, `http://www.research.samsung.ru/`.
Linux kernel development. Development of an QEMU-based ARM system emulator and solving other virtualization tasks, involving running hypervisor on ARM Cortex-A15 hardware. Participate in the development of a fair scheduler for heterogenous multi-processor system (ARM big.LITTLE technology). Solving a wide range of kernel-related problems, such as performance optimization, bug fixing and automated testing of kernel features.

11.2012–10.2013 **Embedded software engineer**, *JSC NPK Rotek*, `http://rotek.ru/`.
Development of U-Boot, Linux kernel drivers and BSP for industrial automation, monitoring and smart home controllers with ARM9 CPU. Development of firmware for STM32 MCUs, acting as peripherial and cryptographic coprocessor on controller board and as main processor in I/O extension modules. Development of application software parts for monitoring controllers. Writing scripts for production hardware testing and firmware uploading. Stress and reliability testing. Assisting customers' software engineers in using our preinstalled BSP, bugfixing

01.2012–07.2012 **Software engineer**, *Mobix Chip Ltd*.
Design and implementation of MAC-level protocols of SUN 802.15.4g (RF) and PRIME (PLC) standard for communication ASIC

05.2010–10.2011 **Embedded systems developer**, *SMP-Service Ltd*.
Development of mobile robot navigation system, based on inertial sensors (accelerometer, gyroscope), magnetometer, odometer and GPS. Implementation of data acquisition and math processing firmware for Freescale Coldfire MCUs. Development of BSP for MQX RTOS.

10.2009–06.2010 **Junior system administrator**, *National Research University of Electronic Technology*.
Administration of Linux servers (about 10 units) running on VmWare ESXi virtualization platform. Have configured e-mail and web services, installed centralized backup system (bacula)

Education

2008–2010 **National Research University of Electronic Technology**, *Moscow, Russia*, Department of Computer Science and Telecommunications, Data Processing and Computer Software Design chair.
unfinished high education

2006–2008 **Karavaevo Municipal Secondary School**, Department of informatics.
vocational technical education

Skills and knowledge

Programming

Languages C, C++14x, Unix shell (bash), Go, Perl - skilled; Matlab, Python, Scheme, ECMAScript - intermediate; Haskell, Rust - want to know better

Development tools GNU toolchain (gcc, ld, make, gdb); clang/LLVM; GIT and SVN version control systems; various issue trackers, code review and continuous integration tools

Linux OS

Usage experience 14 years; preferred distros - Gentoo, Debian

Programming	Development of applications, utilities and daemons. Development and debugging of kernel modules and BSP, porting to the embedded system. Research in area of process scheduling, virtualization and memory management
Bootloaders	U-Boot: configuration, adding custom features, adapting for board; other domain-specific bootloaders as needed (RedBoot, at91bootstrap, etc)
Distribution building	Buildroot and Yocto frameworks: writing new packages, customizing for certain purposes; custom build systems

Hardware

Architectures	Various ARM7TDMI, ARM Cortex-M0/M3/M4 and m68k-like microcontrollers; ARM9 (by Atmel, Freescale and TI), ARM Cortex-A9 (Freescale i.MX6), ARM Cortex-A7/A15MPCore (by Samsung) processors, ARM Cortex A57 (NVidia Tegra TX2); basic knowledge of x86 architecture
Peripherials	Sensors with analog and digital interface, PWM, ADC, DAC, image capture sensors; MMC and NAND storage
Buses and networks	Ethernet, USB, RS-232, RS-485, SPI, I2C, 1-Wire
Debug tools	JTAG, SWD, BDM, LEDs, oscilloscope

Electronics

Development	Digital electronics schematics and PCB layout (hobbyist level)
Devices assembly and adjustment	Practical skills in hardware debugging and usage of oscilloscope and other lab equipment

Other competences

Operating systems	FreeRTOS, ChibiOS RT, MQX RTOS, TNKernel RTOS; Plan9
Digital signal processing	Fourier transform, Kalman filters, convolution filters, etc
Standards	POSIX, ANSI C, C99 - pratical usage in coding; MISRA C guidelines
Networks	Deep understanding of OSI networking stack model; TCP/IP and 802.15 protocol families; plenty of application-level protocols
Cryptography	Applied cryptography usage; basic understanding of hash & encryption algorithms and protocols
Blockchain	Deep understanding of the technology; supported infrastructure for altcoins mining and distributed Bitcoin analytics service
Algorithms	Classic algorithms and data structures. Have experience of competitive programming (ACM ICPC) in school and university.

Other

- Languages: English - good, Russian - native, learning Finnish
- Driver license: yes, B category