

Ioan-Alexandru Lazar

Embedded Systems Developer
Bucharest, Romania

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Work Experience

- **Independent Contractor** Remote/Bucharest, Romania
Systems Engineer June 2019 - Present
 - Consulting and engineering services provider, with a focus on operating systems development, reliability engineering and security.
 - **Technologies:** Linux (kernel space and userspace), OpenBSD, FreeBSD, Nanos. GUI development using Wayland, Qt, GTK 3. C, C++, Python, Go, ASM on x86_64, ARM, RISC-V
 - References available upon request.
- **Lenovo, Datacenter Group** Bucharest, Romania
Embedded Systems Developer December 2016 - June 2019
 - Developed/maintained Linux device drivers, distributed monitoring and diagnosis tools for high-performance networking/telecom equipment.
 - Developed/maintained components of a HAL/middleware for high-speed packet switching applications..
 - Maintained and co-authored architecture and system design documentation.
 - Interviewed and mentored new employees and interns.
 - Coordinated development efforts with OEM/ODM partners, offered assistance during hardware design and debugging.
 - **Results:** Authored critical components of two major products, developed with minimal investment by a small team with little supervision, completely new in Lenovo's portfolio, with the potential to expand presence into new markets. Co-authored several patent and internal enhancement proposals. Successfully mentored interns and junior programmers.
 - **Technology:** Linux (kernel space and userspace), C and C++ for firmware development, on PPC- and x86-based platforms; Python, TCL, Ixia for automated testing.
- **Mentor Graphics Corp.** Bucharest, Romania
Senior Software Developer April 2016 - December 2016
 - Developed a variety of Linux/Yocto-, Android- and Neutrino-based, turnkey solutions for the IoT, high-performance networking, security and automotive markets.
 - Focused primarily (but not solely) on Linux kernel programming, especially device driver development and integration.
 - **Platforms:** ARM-family MCUs (i.MX6, i.MX8, TDA2x, OMAP5), PowerPC (MPC5xxx), primarily programmed in C and ASM, with bash, Perl and Python for glue layers.
- **FHC, Inc.** Bucharest, Romania/Bowdoin ME, USA
Lead Developer July 2014 - April 2016
 - Coordinated the development (software and hardware) of a high-precision, high-reliability microelectrode positioning system for use in neurosurgical procedures.
 - Involved in the design of a high-throughput multi-purpose recording and stimulation device for use in neurosurgical procedures.
 - Developed a portable SDK and driver API to be used in several future devices, with a RTC-based scheduler and soft/hard real-time guarantees.

- **Platforms:** SHARC-family DSPs programmed in C and C++ on the device side; Verilog on Xilinx KC-7, Spartan-VI and Spartan-III family FPGAs; C++ and C#, using Boost, Qt, Windows Forms, WPF and MS SQL on the PC side.
- **Results:** Successfully delivered a replacement for one of the company's most successful (but aging) products. The new design resolved the manufacturing problems of the old version (based on outdated, often EoL, non-RoHS compliant components), while reducing manufacturing costs by almost 60% and virtually eliminating complex servicing procedures.

- **Bitdefender SRL**

Bucharest, Romania

- *Senior Software Engineer*

October 2013 - July 2014

- Developed various security-focused components for embedded devices, including embedded Linux kernel drivers, a low-latency URL and domain blacklist/whitelist manager and system configuration tools. More details available selectively due to confidentiality agreements.
- Architected and designed several security-focused embedded systems, from concept to schematic, layout and prototype.
- **Platforms:** Networking SoCs based on MIPS cores, Atmega and ATtiny-family MCUs, various multimedia-enabled ARM SoCs. Software-wise, I developed Linux userspace tools, mainly using C and Python with shell-scripted glue layers, drivers for the Linux kernel as well as bare-metal applications for Atmega and ATtiny-family MCUs, using C and Assembly.

- **CloudBit SRL**

Bucharest, Romania

- *Embedded Systems Developer*

July 2011 - October 2013

- Developed and maintained several drivers for various types of sensors (temperature, radiation intensity etc.) for a RTOS developed in-house.
- Developed and maintained comprehensive electrical energy metering and battery monitoring solutions for consumer electronic devices.
- Participated in the development of a highly scalable, protocol-agnostic system for home and building automation, with special features for electrical energy consumption management.
- Participated in the process of hardware design and prototype verification for several embedded applications, including networking devices.
- **Results:** I was part of a team that developed and maintained a segment-leading energy metering solution, used in two lines of products sold internationally, with a measurement uncertainty of less than 1% and using a minimal range of components, reaching mass-production level prices.
- **Platforms:** In-house developed RTOS, embedded Linux systems (Angstrom, OpenWRT), Mac OS X/macOS, Windows. Userspace tools include C++/Qt, Objective-C and Java, as well as POSIX C. Products were developed on several hardware platforms, including MSP430-family, ATmega-family and ARM MCUs, PowerPC, MIPS and ARM CPUs, using various communication protocols, both wired (I2C, RS232, SPI, Ethernet) and wireless (Z-Wave, ZigBee, WiFi).

- **Politehnica University, Bucharest** Numerical Modeling Lab, Dept. of Electrical Engineering

- *Research Assistant*

October 2009 - July 2011

- Developed and implemented new methods for simulating passive devices and structures in high-frequency integrated circuits.
- Disseminated results in various national and international conferences; published several articles in reputable international journals.
- **Results:** Co-developed a new method for extraction of equivalent circuits for passive devices in high-frequency integrated circuits, co-authoring three papers in reputable journals (IPSE, Springer's Series on Mathematics in Industry and IEEE Transactions on Magnetics). I implemented a high-performance MOR tool that decreased extraction time by up to fourty

times, allowing the first steps for industrial adoption of a well-founded, but previously unfeasible academic development.

- **Platforms:** Linux, FreeBSD. Userspace tools included various numerical computing packages, OpenMP, MPI, ZeroMQ, Scipy and Numpy, running on a massively-parallel Beowulf cluster.

- **Self-Employed**

Bucharest, Romania

Freelance Developer

November 2006 - May 2012

- Developed various embedded, mobile and web-based tools for networking, energy management and financial services.
- **Results:** Developed an order placement and tracking, invoice and billing system with a mobile and a web-based interface for a plastic bags manufacturer. The system was used in production to track commands and bill several hundred clients, at production levels of several thousands of units per day. I also co-developed an unrelated mobile-based short-range optical communication system.
- **Platforms:** Linux, OpenBSD, iOS and various web-based platforms. Userspace tools included POSIX C, C++, Python, Objective-C and PHP, along with Gtk, Qt, Boost, CocoaTouch, web2py and CodeIgniter.

- **PC Magazine Romania**

Bucharest, Romania

IT Journalist

November 2002 - January 2009

- Authored more than 60 articles on topics that included software development, Linux system administration and network security.
- I have constantly kept in touch with the readers of my articles, answering to suggestions or requests for additional information and assessing the impact of my material. My series on network security was the first comprehensive material of this kind in the Romanian IT press.

Education

- **Politehnica University**

Bucharest, Romania

B.Sc. Electrical Engineering - Instrumentation Engineering

2007 - 2011

- Graduated top of my class.

Skills

- **Software Development**

- **Systems Development:** Hands-on experience developing Linux and OpenBSD drivers and kernel components, with focus on networking and telecom devices, instrumentation systems and security. I have a good track-record of operating systems development experience, and have written software for a wide range of systems, including Linux, FreeBSD, OpenBSD, macOS, Mac OS classic and BeOS .
- **Programming Languages and Technologies:** I have more than 7 years of experience using C, C++ and Python, and considerable hands-on experience with Objective-C, Java, Common Lisp and assembly language for various platforms (detailed below). I am highly familiar with the principles of object-oriented and functional programming.
- **Mission-Critical Applications:** I am familiar with secure and/or safe coding practices, including standards such as MISRA C, industry-specific standards such as IEC 60601, and various formal verification tools.

- **APIs:** Some of the tools I have used extensively include the Qt application framework, Gtk and Tk for GUI development, various *nix utility libraries (ncurses, readline etc.), distributed, parallel programming and message-passing frameworks like ZeroMQ, OpenMP, MPI and Unix sockets, and web frameworks like web2py and CodeIgniter.
- **Hardware Platforms:** I have extensive experience in developing software specific to MSP430 and ARM-family MCUs, as well as systems programming experience on MIPS and ARM. I am reasonably familiar with the x86_64, PowerPC and Z80 families (including various derivatives) and with PIC MCUs.
- Electrical and Electronic Engineering
 - **Microelectronics:** as a former researcher in the field of EDA tools for microelectronics, I am highly familiar with the concepts and process of silicon-level design, including hands-on experience with analog and mixed-signal IC structures.
 - **Instrumentation engineering:** having received formal training as an Instrumentation Engineer, I am highly familiar with a wide variety of measurement equipment and techniques, as well as with the functional principles and the design of advanced sensors and transducers.
 - **Power electronics:** I am fairly familiar with the main concepts of power electronics and electrical drives, including exploitation, maintenance and design guidelines.
- Others
 - **Physics and Mathematics:** As a former researcher in the field of computational electromagnetism, I am familiar with the physical and mathematical concepts of electromagnetism, waves and Physics in general, and I have hands-on experience developing mathematical models and implementing simulation software. I am also fairly familiar with major concepts and basic experimental techniques in astronomy and solid-state physics .
 - **Signal Processing:** I have a strong background in signal processing, including advanced topics such as audio synthesis and compression, image processing and stochastic signals processing .

Publications

- Ciuprina, G. ; Ioan, D. ; Lazar, I.A. ; Dita, C.B. , **Vector Fitting Based Adaptive Frequency Sampling for Compact Model Extraction on HPC Systems**, IEEE Transactions of Magnetics, Vol. 48, 2012
- Ioan, D, Ciuprina, G, Lazar, I.A., **Substrate Modelling Based on Hierarchical Sparse Circuits**, Springer Series on Mathematics in Industry Vol. 16, 2012
- Lazar, I. A.; Ciuprina G.; Ioan, D. , **Effective extraction of accurate reduced order models for HF-ICs using multi-CPU architectures**, IPSE Vol, 20, 2012