Bart De Schuymer

PERSONAL DETAILS

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Date of birth: 19/05/1978
Place of birth: Gent (Belgium)
Citizenship: Belgian
Driver's license: B
Education: Ph.D., M.Sc.
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PROFILE

Devoted freelance software developer with a long-lasting love for programming, algorithm and architecture design.

PROFESSIONAL PROFILE

- Analytical thinker, problem solver, mathematical mind
- Good documentation, presentation and teaching skills
- Functions well in a team or independently
- Languages: English – fluent; Dutch – fluent; French – good
- In-depth ict knowledge

TECHNICAL SKILLS AND KNOWLEDGE

Languages:

- C: 10+ years
- C++ (including C++11 and Boost): 5+ years
- Go: 2 years
- Python: 3 years
- Matlab: 4 years
- Vhdl: 1 year

Knowledge:

- Linux (kernel and userspace)
- Digital signal processing
- Network technology and security: concepts and implementation
- Operating system internals
- Multithreaded programming

Technical experience:

- 6+ years of experience in embedded development with a strong affinity with development on Linux: both userspace and kernel development
- Open source development toolchain: Unix shell scripting, make, gcc, gdb/ddd, valgrind, gprof, lcov, cvs/svn/git, uncrustify
- Development platforms: 32-bit and 64-bit pc, dsp, microcontroller, fpga, embedded platforms

- Development tools: Eclipse CDT, Visual Studio, PyDev, PyCharm, user-mode Linux, Wireshark
- Experience with: MySQL, Redis, Apache Kafka, Docker, Kubernetes, Jenkins, Grafana, gtest, flatbuffers, Java, JavaScript, assembly, Ruby, JSON, JSON Schema, XML, LATEX, Django, UML, snmp, Unicode, html/css
- Linux kernel development: ±4000 loc in the official kernel; author of the *ebtables* firewall tool; custom kernel networking modifications
- Code maintenance, refactoring, optimization and debugging.
- Automated unit and system testing.

PROFESSIONAL EXPERIENCE

02/2016 – present

Software Engineer — Be-Mobile, Gent, Belgium

- Development in C++11 and Go on the core real-time routing platform (road traffic management, tolling).
- Port existing C++ application from Windows to Linux. Integrate Apache Kafka and Redis.
- Introduce unit testing and system tests.
- Port C++ application to Go and implement new applications in Go.
- Design, test and implement algorithmic improvements on traffic jam detection.
- Guidance of thesis student and interns. Share knowledge and expertise with coworkers.

09/2014 – 01/2016

Software Engineer — Siemens, Brussel, Belgium

- Software development in C and Python as a member of the team developing the EBP system: a real-time computer system that is being used to control and manage the Belgian railway signalling infrastructure from a central place.
- Design, test and implementation of 2 drivers that handle the reception of signalisations and transmission of commands to the railway interlocking system. This program was successfully installed and is operational 24/7 on Infrabel's railway infrastructure. Assisted Infrabel on site during the first three installations (by night).
- Key role in the design and implementation of the automation of tests for the legacy software. Automate testing of individual programs by implementing a tool that allows simulation and verification of communication between the program under test and other components of the system. Emulate the signalization hardware in the field, enabling e.g. to make the EBP system see a (simulated) driving train. This enables high-level automated tests that simulate very closely a real installation in production.
- Study and implement new safety-critical functional specifications from Infrabel and provide valid improvements.

01/2014 – 08/2014

Software Engineer — Amplidata, Lochristi, Belgium

- Member of the C++ development team that is responsible for the implementation of Amplidata's cloud storage system's Internet-facing interfaces, which includes the Amazon S3 API. Key person in delivering the required features on time, well-tested and according to the specs.
- Implementation of parts of the http 1.1 and Amazon S3 specification (REST API) with a strong focus on details.
- Development of multi-threaded, asynchronous, thread-safe design in C++11, using Boost libraries such as asio, ptime, shared_from_this, regex, interprocess.
- Custom system test framework written in Python. Unit testing using Google Test (gtest).

01/2013 – 12/2013

Device Software Engineer — Newtec, Sint-Niklaas, Belgium

- Member of the Professional Equipment department, developing professional satellite communication ground equipment using Linux-based embedded platforms (PowerPC and Intel). Development in C++11, test automation based on Ruby.
- Designed (in collaboration) and implemented a networking mechanism that creates a virtual LAN network allowing Newtec devices to communicate with each other locally and over the satellite link with minimal administration setup. The mechanism uses standard Linux tools such as iptables and iproute2.
- Debugging of networking issues in kernel space. Experience with zero-copy mechanisms between userland and kernel (based on ring buffers) such as pf_ring, af_packet mmap and custom solutions.
- Integration of packet encapsulation mechanisms into the existing products.

05/2010 – 12/2012

Software Engineer — Technicolor, Edegem, Belgium

- Participate in an international team to develop the next generation core middleware software framework to be deployed in the digital home network. A member of the team that develops the communication bus between components installed on the middleware. Embedded platforms: Linux MIPS (gateway), Linux Intel Atom (set-top box).
- Integration, testing of and submitting bug reports for third-party software.
- Provide outside access to the communication bus by using JSON bindings on top of WebSockets.
- Technical subjects: DDS (Data Distribution Service), marshalling/serialization, access control, security, distributed networking, automatic code generation, automatic test framework, thread-safe library design.

11/2005 – 03/2010

Senior Development Engineer — Televic, Izegem, Belgium

- Design and implementation of signal processing algorithms on pc and embedded platforms (dsp (Analog Devices Sharc), microcontroller (Analog Devices Blackfin) and fpga (Xilinx)).
- This includes adaptive feedback cancellation algorithms, the Bluetooth subband codec, infra-red apcm codec, packet loss concealment, speeding up/down of speech while preserving pitch, microphone array steering.
- Cover the complete design and implementation process of industrial grade software: from experimentation on pc (e.g. in Matlab) to real-time implementation in C/C++ (including assembly optimization) or vhdl.
- Coordination of and participation in several research projects in cooperation with academic and industrial partners. Experience as project lead of a successfully finished multimillion research project.

12/2001 – 10/2005

Ph.D. Student — Ghent University, Gent, Belgium

- Taught exercises for various courses (software design and mathematics) to university students.
- Conducted research in order to obtain a Ph. D. in Mathematics, in the field of probability and game theory. My public defense took place on June 3rd, 2005.
- Authored multiple articles in international journals.
- Gave lectures at international gatherings.
- My Ph. D. thesis and papers are available at www.artinalgorithms.be .

8/2001 – 11/2001

Software Engineer — Alcatel Bell, Antwerpen, Belgium

- Implementation of a layer between the network processor and the higher-level software for an IP core router.
- Detected and corrected numerous bugs (C++) and wrote dozens of test cases (Tcl).

EDUCATION

- Ph.D., Mathematics, June 3rd 2005. Dissertation: “Comparing Random Variables from a Game-Theoretic Perspective”
- M.A., Computer Science, Ghent University, major: Information and Communication Technology, 2001. Dissertation: “Firewalls: netfilter”
- Additional courseware and professional development:
  - “VHDL for FPGA design”, Doulos
  - “Project Management for team Members”, Threon
  - “Communicatievaardigheden voor professionals”, Kluwer Opleidingen
  - “Vergaderen: snel en resultaatgericht”, High Performance People N.V.
  - Secure Application Development, 2011 (secappdev)
- Books: Effective C++ (S. Meyers), The C++ Programming Language (B. Stroustrup), Programming with POSIX Threads (D. Butenhof), The Little Book of Semaphores (A. Downey), Linkers and Loaders (J. Levine), TCP/IP Illustrated (W. Stevens), Unix Systems for Modern Architectures (C. Schimmel), Internetworking with TCP/IP (D. Comer), …
- Online lectures: MIT – Introduction to Algorithms