# Samuel Gabrielsson

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## Experience

2022 – 2023 **Digital Radio Algorithms Developer**, *Saitama AB*, Stockholm, Sweden.

- ***Consultant at Ericsson AB - Hardware Department***
  Predevelopment of firmware for algorithm control and functions in Micro Controllers (also called Device Processors (DP) in Ericsson terms). With the help of DPs, Power Amplifiers can be made efficient by reducing the distortion created in their non-linear regions.
  - Write in Matlab and C, Digital Pre-Distortion (DPD) software to increase the efficiency of Power Amplifiers.
  - Use Xilinix SDK or Vitis IDE to implement and debug the FPGA and software load on the target.

2018 – 2022 **Senior Research Software Engineer**, *Saitama AB*, Stockholm, Sweden.

- ***Consultant at Ericsson AB - Systems and Technology (R&D)***
  Platform research and development of 5G and 6G testbeds to field trial prototypes. Responsible for the upper layer BaseBand applications to run on a real-time OS by minimizing CPU jitter and NIC latency.
  - Write UDP server and enable hardware timestamping on NIC to measure packet Round Trip Time (RTT).
  - Write AF_XDP high performance packet processing client with zero-copy to run on Mellanox CX-6 and Intel XL710 that support XDP.
  - Implement zero-touch automation using Ansible on Ericsson proprietary hardware and commercial off-the-shelf (COTS) hardware like SuperMicro, Dell PowerEdge machines that has BMC/IPMI/iDRAC and Mellanox SN4700 400GbE switches with Cumulus. The automation conducts a full deployment of OS on multiple nodes in parallel and configures BIOS, LDAP, PTP, auto installs unattended Linux or Cumulus OS and sets up real-time OS properties with low CPU jitter and low NIC latency.

2016–2018 **Senior Software Architect and Design**, *Realtime Embedded AB*, Stockholm, Sweden.

- ***Consultant at NorthStar***
  Development of NorthStar Advanced Connected Energy (ACE) gateway smart battery system.
  - Implement external alarm handling for the battery system. Ensure that the software can trigger and control relays through the GPIO pins in the gateway when correct signaling through IPC messages are received.
  - Implement functional tests and libraries/packages using the 9pm test framework.
- ***Consultant at Vanderbilt (former Bewator)***
  Development of Linux Kernel drivers for access control system called Omnis. The hardware used was called E100 which is developed on site and is similar to AT91SAM9x5-EK.
  - Write GPIO test application to control relays.
  - Write Atmel AT91 ADC test application to read voltage raw values.
  - Write Linux kernel and device tree patch to enable USB-B gadget and Ethernet over USB.
  - Write Linux kernel driver and application for 74VHC595 8-bit shift register with output latches in order to control via sysfs LEDs, input ports and RS485 card readers.
  - Write Linux kernel driver and test application for Magstripe (Clock/Data) and Wiegand (Data/Data) card readers.
  - Write a firmware upgrade/flash script to automatically update the system using the SD/MMC card during bootup.
  - Modify and patch the bootloader from Atmel called at91bootstrap in order to fix bugs and enable bootup of SD/MMC or NAND flash.

2011–2016 **Team Leader/Software Developer**, *Ericsson AB*, Stockholm, Sweden.

Employed at Ericsson in Kista as a Software Developer and Team Leader. I developed drivers for the radio hardware units used in the Radio Base Station 6000 series. In order to first boot and bring up the radio hardware, the different drivers for the many components on the board needs to be working and configured correctly. This is done by either creating the drivers from scratch using the components data sheet and the boards circuit diagram or simply by adapting and reusing existing drivers. In most cases we emulate the hardware first and then write the drivers, before the physical boards arrive from the factory, to save time and money.

- Development of radio software drivers for the Radio SW platforms and Radio Hardware emulation. Board bringup and integration of hardware products like Antenna Integrated Radio unit (AIR), Micro Radios, Next Generation Radios and the 5G Program. Other side tasks include splitting parts of the Radio SW code into modules, introducing Git, Gerrit, Jenkins, BitBake and Autotools.
- Short term assignment (3 months) at the hardware department in Ottawa as a software integrator for Platform 5.2 AIR 32 products.
- Act as a technical Scrum/Kanban Master to lead and coach a Cross-Functional Driver team of 10 people. Conduct daily scrum meetings, sprint retrospective meetings, keep statistics of flow, eliminate waste and help Product Owner.

2008–2011 **Software Developer**, *SAAB Combitech*, Stockholm, Sweden.

My first consultant job started at SAAB Combitech for Ericsson AB Linux Center in Älvsjö and Telefonplan. There, I developed a test framework in Perl which is used to run automated test cases. The test cases was written in Tcl/Expect but the framework can also execute test cases in Perl or Bash and also support NetConf. The test framework became a separate product and was used to test different Linux embedded operating systems by many Ericsson products at the department. I continued in the same department but as a designer where I began to develop Linux kernel patches and pushed upstream to Linus Torvalds.

- Develop drivers and Linux kernel patches for the Ericsson Linux distribution called ENUX, which is used to run a Virtual Machine to emulate APZ classic run time environment for PLEX based programs such as AXE.
- Designer and tester for other Ericsson platform products such as CPBS, GSDI and IS running on GEP board hardware.
- Framework developer for automated test cases.
- Develop automated test cases for Ericsson products Linux Open-source Telecom Cluster (LOTC) and SLES Virtual Platform (SVP) based on Xen.
- Open Multimedia Platform (OMP) customer forum support.
- Handle and solve trouble reports for all the products.

2006–2007 **Research Assistant**, *University of Toronto*, Toronto, Canada.

I worked as a research assistant for professor J. Christopher Beck at the Department of Mechanical and Industrial Engineering. My stay there was funded by a scholarship from the University of Toronto (UofT) and Toronto Intelligent Decision Engineering Laboratory (TIDEL). During my research, I became extremely interested in operations research, optimization and solving NP-hard combinatorial problems with the help of distributed algorithms. Together with another PhD student, we published a paper[1] and the whole experience abroad gave me new friends for life, deepened my analytical thinking and broaden my knowledge in research and software development.

- Research in artificial intelligence and planning. Published paper: "Modelling Security Protocol Synthesis with AI Planning", UofT TIDEL, ON, Canada.
- Research in optimization, parallel and distributed algorithms and communications protocol. Published paper: "Solving Combinatorial Problems with Parallel Cooperative Solvers", Ninth International Workshop on Distributed Constraint Reasoning, Brown University Providence, Rhode Island, USA.
- MPI Cluster Computing, installation and configuration.

## Education

2001–2006 **M.Sc. Computer Science & Engineering**, *Luleå University of Technology*, Luleå, Sweden.
Specialized in Applied Mathematics

### Master thesis

title *A Parallel Tabu Search Algorithm for the Quadratic Assignment Problem*

supervisors Professor J. Christopher Beck - University of Toronto & Professor Inge Söderkvist - Luleå University of Technology

description Find optimal solutions for a quadratic assignment problem using the tabu search algorithm on a cluster.

1995–1998 **Natural Science Programme**, *Västergård High School*, Södertälje, Sweden.

## Skills

- basic knowledge
- intermediate knowledge with some project experience
- extensive project experience
- deepened expert knowledge
- expert / specialist

| | Level | Skill | Years | Comment |
|---|---|---|---|---|
| Programming Languages: | ■■■■■ | Ansible | 3 | *I use Ansible, Jinja2, YAML and Redfish for zero-touch automation.* |
| | ■■■□□ | Assembler | 1 | *Mips32 course at university.* |
| | ■■■■■ | Bash | 23 | *Used in most of my work projects and at home to quickly write scripts with minimum dependencies. Also used together with Sed, Awk and Regular Expressions.* |
| | ■■■■■ | C/C++ | 20 | *I have used C/C++ in most of the big Linux embedded projects, Linux applications, kernel modules and patches.* |
| | ■■□□□ | CSS | 2 | *Used to develop my personal homepage a long time ago.* |
| | ■■■■□ | Haskell | 2 | *I learned recursive programming at university.* |
| | ■■■□□ | HTML | 2 | *Used to develop my personal homepage a long time ago.* |
| | ■■■■□ | Java | 5 | *From different courses at university and throughout work.* |
| | ■■■■■ | LaTeX | 10 | *I've used LaTeX in everything from thesis report, research papers, my company annual reports to this CV.* |
| | ■■■■□ | Lisp/Scheme | 3 | *Did the SICP course at University and to configure my Emacs editor.* |
| | ■■■■□ | Maple | 3 | *Used in mathematics courses at the university.* |
| | ■■■■□ | Matlab | 5 | *Used in mathematics courses at the university and while working at Ericsson research.* |
| | ■■■■□ | Pascal | 4 | *Self-taught Turbo Pascal as a child.* |
| | ■■■■■ | Perl | 7 | *Wrote a test framework at Ericsson Linux DC that executed Perl and Expect test cases.* |
| | ■■■□□ | PHP | 2 | *Used to develop my personal homepage a long time ago.* |
| | ■■■■■ | Python | 15 | *I wrote a test framework and corresponding test cases. Python has also been used for misc scripting in bigger projects throughout the years.* |
| | ■■■■□ | Ruby | 2 | *Used to write test cases at Radio SW. Very nice and friendly scripting language with a lot of handy predefined functions.* |
| | ■■■■■ | Tcl/Expect | 13 | *I sometimes use Expect for automation and test cases in different projects.* |
| Tools: | ■■■□□ | Buildroot | 3 | *Used to build embedded Linux OS.* |
| | ■■■■□ | Docker | 3 | *Used when isolating applications at Ericsson Testbed.* |
| | ■■■□□ | ClearCase | 3 | *Version control system used at Ericsson but replaced by Git.* |
| | ■■■■■ | Gerrit | 10 | *Code reviewing tool used in most of my projects together with Git and Jenkins.* |

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| | ■■■■■ | Git | 13 | *Simply the best version control system out there.* |
| | ■■■■■ | Jenkins | 10 | *Combined with Gerrit and Git, you get the best tool for continuous integration.* |
| | ■■■□□ | SVN | 1 | *Version control system that I used when working at Vanderbilt.* |
| | ■■■■■ | Vim | 20 | *My main editor used for coding and editing.* |
| | ■■■■■ | Yocto/BitBake/Poky | 3 | *Used to build embedded Linux OS.* |
| OS: | ■■■■■ | Linux | 23 | *Started with RedHat, Slackware, Linux From Scratch and settled for Ubuntu.* |
| | ■■■□□ | OSE | 5 | *The main OS in the old Ericsson Radio product.* |
| | ■■■■□ | Solaris | 5 | *Primary OS at the university.* |
| | ■■■■■ | Windows/MS-DOS | 25 | *Dual booting Windows only when playing PC games at rare occasions.* |
| Methods | ■■■■■ | Kanban/Scrum | 5 | *Team leader for Radio Software Board team.* |

## Languages

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|---|---|---|
| Swedish | Native speaker | *Born and raised in Sweden* |
| English | Fluent | *Thanks to early training since primary school* |
| Aramaic | Fluent | *Ancient christian language spoken by my parents* |
| German | Fair | *Learned in school* |

## References

Will be supplied on request.

## Publications


[1] Lei Duan, Samuel Gabrielsson, and J. Christopher Beck. Solving combinatorial problems with parallel cooperative solvers, 2007.

[2] Samuel Gabrielsson and J. Christopher Beck. Modelling security protocol synthesis with ai planning, 2006.