Olivier Mehani

French and Australian citizenships

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Australia
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Technical skills

Languages Python, C (GNU, ANSI), shell (Bash, POSIX), sed, PHP, Go, HTML/CSS/JavaScript, R, Ruby (incl. Rails), Java, C++
LISP, Prolog, assembly (68k, x86)

Development tools Version control (Git, Subversion, CVS), GNU toolchain (autotools, GCC, GDB, Gprof), cross-compilation, GNU make, clang, Android, Pebble, misc. tools (strace/ktrace+kdump, Valgrind, ElectricFence/DUMA)

Software engineering Test-driven development, continuous integration / deployment / delivery and automation (Github Actions, Jenkins, Travis), Agile methods (Scrum, Kanban), UML

Operating Systems UNIX; mainly (GNU/)Linux (Debian and derivatives, ArchLinux, Slackware, RedHat and derivatives) and BSDs (Open, Free)

Networks IPv4/v6, 802.11, standard network protocol stack (TCP/IP, DNS, DHCP, HTTP, etc.) and routing (Quagga)

Tools DevOp: Docker, Amazon Web Services, Google Cloud Platform, SaltStack, Vagrant, Ansible; Web: Nginx, Apache; Virtualisation: VirtualBox, QEMU, OpenStack

Data representation and management SQL (MySQL, SQLite, PostgreSQL), XML/XSL, Hadoop

Artificial Intelligence Neural networks, genetic algorithms, agent-based systems

Professional experience

Since 2024
≥1 year

Staff Software Engineer — Mozilla / remote office, Hobart, Tas
Engineering Workflow, Firefox

In the Engineering Workflow team, I look after the source control systems and workflow tools. Firefox Engineers use them daily to review and land code for the web browser, as well as other ancillary tools.

In this role, I have participated to the migration from the Mercurial version control system to Git. I took ownership of a system to synchronise code between the repositories. I took it from a functional prototype to a production- and operations-ready service which processes thousands of commits a week.

Technologies: Python, Git, Docker, Mercurial, Google Cloud Platform

2016–2024
8 years, 4 months

Learnosity, Sydney, NSW / remote office, Hobart, Tas

Learnosity is a B2B SaaS EdTech company. They build and operate Web APIs (Javascript/JSON) to support online assessments, from content authoring to reporting and data analytics. The platform delivers more than 2Bn questions monthly to users worldwide.

Staff Software Engineer (2020–2024; 4 years, 2 months)

I transitioned to the Platform team. There, I developed and re-engineered core components of the Learnosity infrastructure with a focus on ease of maintenance, scale and security. I also continued to maintain internal development tools.

My key focus was on

- development and deployment platforms (Python, Docker, SaltStack, Github Actions)
- backend and infrastructure services (Linux, Amazon Web Services, PHP)
- security and compliance (member of the CERT team, participation to the ISO-27001 certification effort, running red team exercises)

In this role, I have

- led a project to review and improve our release processes, which resulted in more automation and halving the need for staff member involvement
- been part of a two-person team who rebuilt an escrow environment from scratch, moving it from VMs to containers, and reducing the effort to build it from multiple weeks to a couple of days
- actively contributed to the platform team's effort to increase and simplify CI/CD processes, based on more regular build systems and containerised deployment, which holds the promises of increasing the release cadence from three-weekly to daily
- supported the hiring, on-boarding and training of two new remote SRE teams, in two timezones

My activity also continuously involved

- general code and processes improvement (refactoring, new implementations and test patterns)
- knowledge transfer (code review, documentation, seminars, mentoring)
- performance testing
- security reviews
- production support and on-call rotation

In addition to this, I was actively re-discovering, documenting and supporting parts of the codebases for which institutional knowledge had been previously lost.

Senior Software Engineer (2016–2020; 4 years, 2 months)

In the Analytics scrum team, I developped and maintained backend systems code and internal development tools.

My responsibilities included

- HTTP APIs for reporting and data access (PHP, MySQL, PostgreSQL)
- backoffice services (SQS, Kinesis, Elasticsearch)
- analytics services (Go, Redshift)
- development platform (Linux, Python)

In this role, I have led or majorly contributed to efforts allowing us to scale our infrastructure and databases. Those include

- tracking down and fixing application bottlenecks, allowing to increase the supported load of an event-passing system by two orders of magnitude
- the iterative refactoring of ETL processes and data-warehouse schematas that quadrupled the data ingestion throughput

Technologies: Linux, Git, Docker, Amazon Web Services, Python, PHP, SaltStack, MySQL, PostgreSQL, Go, Vagrant, HTML/JavaScript, Elasticsearch,

2015
4 months

Sessional lecturer — School of Electrical and Information Engineering, University of Sydney, NSW

Course: Data Communications and the Internet (ELEC3506/9506)

Awarded a Faculty Teaching Commendation based on the outcome of the student satisfaction Survey

Technologies: TCP, IPv4, IPv6, 802.11, HTTP, DNS, DHCP, routing, QoS

2011–2016
4 years, 8 months

Researcher — NICTA (National ICT Australia), Sydney, NSW

Security and Privacy I was one of the principal investigators on the Anonalytix project, in collaboration, amongst others, with a large telecommunications operator. The aim was to develop database de-identification methods that provide strong guarantees on the impossibility of re-identification while preserving as much utility as possible for downstream analytics. Ultimately, this would allow to perform big data analytics while ensuring compliance with privacy laws and regulations.

My focus was on porting those algorithms to a Spark/Hadoop environment, and build a SaaS platform. I led the engineering effort towards this goal, building the platform, improving or porting existing code, and creating the continuous delivery pipeline.

Prior to this, I collaborated on security-testing a framework for privacy-leak protection on Android (TaintDroid), and identified several flaws through which it could be bypassed. I also worked on a project aiming to identify common security flaws of IoT devices, and provide a network-managed protection solution.

Technologies: R, Java, Spark, Hadoop, C, Jenkins, Travis, Vagrant, Docker, Ansible, PostgreSQL, Android

Platforms for Experimental Measurement I was (2011–2015) the maintainer of the OML instrumentation and reporting library, of which I have greatly improved the code quality as well as related delivery processes. This tool is widely adopted for testbed-based experimental research, and I was directly involved with the GIMI (NSF) and Fed4FIRE (EC FP7) projects using this library. It is also a fundamental part of the IREEL e-learning platform, which has been used by various universities (USyd, UWS and UNSW) to teach network courses.

Technologies: C, UNIX, autotools, GDB, Git, Valgrind, ArchLinux, Debian, RedHat, Python, Ruby, SQLite, PostgreSQL, OpenStack

Performance of Network Protocols I also followed up with the research on the optimisation of the quality of experience (QoE) of multi-homed mobile devices that I started during my doctoral studies. Parts of this work was been done in collaboration and integrated within the SAIL EC FP7 project.

I have continued to work on transport protocols, particularly on long-delay links, and less than best-effort algorithms. This led me to a focus on active queue management (AQM) as a way to address issues caused by over-sized buffer in routers (BufferBloat), as well as multipath protocols.

I also explored the feasibility of layer-4 packet switching and multipath scheduling in SDN.

Technologies: C, Linux, IPv4, TCP, Android, Python, ns-2, TCL

Finally, in this position, I have supervised two Master students, several student projects (both graduate and undergraduate), and have informally co-supervised two late-stage Doctoral students. I have also published more than 30 research papers in peer-reviewed venues.

2008–2011
3 years, 8 months

PhD research — Network Research Group, NICTA (National ICT Australia), Sydney, NSW / Imara project-team, Inria, Rocquencourt, France

My PhD aimed to solve communications issues raising from highly mobile environments. Typical use-cases, from vehicular networks to hand-held devices, are exposed to an ever-changing set of wireless connectivity options to use, with no clear choice, or combination thereof. This led me to propose a loosely-coupled cross-layer architecture aiming to control the MAC/PHY, network and transport layer protocols in a way which would improve application quality metrics by specifically matching application requirements and networks' characteristics.

As part of this work, I gained a thorough understanding of the state of the art of the networking stack, particularly at the network and transport layers, as well as knowledge and participation to current research efforts to improve or replace this paradigm.

I also got very familiar with experimental research in general, and the problems of reproducible experiments in network and telecommunications. This led me to specifically study problems of accurate and precise measurement of phenomena in networked systems, and allowed me to provide a solid backbone observation mechanism of my cross-layer architecture.

My thesis resulted in the publication of 9 research papers, as well as various pieces of software (*ns*-2 modules, software instrumentation, patches).

Technologies: C, Linux, IPv6, IPv4, TCP, 802.11, HTTP, Python, ns-2, TCL

2006–2008
1 year, 8 months

Imara project-team, Inria, Rocquencourt, France

Expert engineer (2006–2008; 1 year, 4 months)
Network mobility/IPv6

While communication was abstracted away from my MSc thesis problem (see below), the obvious future step of implementing the algorithm in a real system led me to take on a further engineering role within the IMARA team. This role led me to take charge of the technical coordination of the experimental platforms for the Com2REACT EC FP7 project. The position involved the following responsibilities.

- Maintenance of an embedded vehicular router Linux system
- Design and maintenance of a vehicular *ad hoc* network (VANET)
- Design and implementation of an IPv6 mobility testbed

I also designed and built a wiki-based knowledge management system for the LaRA joint-research unit, allowing to match hardware platforms and people's skills across three research labs. This solution also allowed for a much better coordination and record-keeping of work being done and domain knowledge being acquired or created.

Technologies: IPv6, IPv4, 802.11, DNS, DHCP, Apache, GNU/Linux, OpenBSD, Quagga, PHP

MSc intern (2006; 6 months)

My Master's thesis focused on determining collision-free schedules for a fleet of automated vehicles to safely pass a crossroads. This work included the design of a new spatio-temporal reservation algorithm, its implementation in an *ad hoc* simulator, and an evaluation of it efficacy. This resulted in the publication of a paper describing the algorithm and its evaluation and its presentation at an international conference.

Technologies: Python

2004–2005
6 months

Free software developer — Linbox/Free ALter Soft, Montreuil, France

During this internship, I worked on porting Free software to proprietary Unices. Beyond pure software porting, this work also involved automating the patching and building of subsequent upstream releases, and their packaging into a relocatable distribution for installation on the target system without the need for root permissions.

Technologies: C, UNIX, autotools, GDB, PHP, MySQL, HTML, TCL

2003
3 months

Systems and network administrator — Caisse d'Épargne PACR, Aix-en-Provence, France

For this internship, I have been in charge of the development of an automated application update processus for mobile laptops. I also took part in daily administration tasks in a fleet of more than 200 local and remote machines.

Technologies: C, CVS

2000
5 months

Computer workshop animator — Darnétal city council, Darnétal, France

While at high school, I took charge of the animation of a computer workshop aimed at local primary school children. I introduced a group of 10–15 children to the use of computers, covering basic aspect of office suites and tools. I also took them a bit beyond simple uses, and discussed computer programming.

Education

2011

PhD in Computer Science — Centre for Robotics, Mines ParisTech, Paris, France / School of Electrical Engineering and Telecommunications, University of New South Wales, Sydney, NSW
Thesis title: Contributions to Mechanisms for Adaptive Use of Mobile Network Resources

2007

MSc in Complex Adaptive Systems — Chalmers Tekniska Högskola, Gothenburg, Sweden
Thesis title: Mesoscopic Management of a Fleet of Cybercars at a Crossroads

2007

MSc in Computer Science — UTC (Université de Technologie de Compiègne), Compiègne, France
Major: Systems and Networks

2003

Engineering Technologist Degree in Electrical Engineering and Computing — EEIC IUT (Electrical Engineering and Industrial Computing Institute), University of Aix–Marseille III, St. Jérôme, France
Major: Local Industrial Networks (ranked first)

Other Involvements and Projects

Since 2001
≥25 years

Involvement with the Free software community

Various contributions to several projects such as gpsd, Gajim and multiple Unix distributions, and other personal projects.

- Contributions on GitHub: https://github.com/shtrom

Technologies: Python, C, Bash, Git, GNU/Linux, OpenBSD, Java, Ruby, Subversion, CVS

Since 2007
≥18 years

Self-hosted server management

I am hosting most of the Internet services I use on various local and cloud servers.
Technologies: Bash, Docker, SaltStack, Git, Amazon Web Services, Nginx, DNS, GNU/Linux, IPv6, IPv4, OpenBSD, Apache, Subversion

Since 2023
≥2 years

Co-maintainer of Mediagoblin

Mediagoblin is a free software decentralised media publishing platform.
Technologies: Python, Git, Linux, Docker, Nginx

2013

Volunteer scientist — SMiS (Scientists and Mathematicians in Schools), CSIRO (Commonwealth Scientific and Industrial Research Organisation)
Regular introductory workshops on scientific concepts for school-aged children

2003–2004
8 months

Development of an autonomous drone — UTC (Université de Technologie de Compiègne), Compiègne, France
During this university project, I participated to the conception and realisation of the embedded hardware and software of the flying agent, based on Rabbit 3000 microcontroller running uC/OS-II real-time OS.
Technologies: C

2002–2004
1 year, 7 months

Network administration — EEIC IUT (Electrical Engineering and Industrial Computing Institute), University of Aix–Marseille III, St. Jérôme, France

Installation and administration of a small network composed of 6 GNU/Linux stations and one server (DNS, DHCP, NIS, CUPS).
Technologies: GNU/Linux, IPv4, DNS, DHCP

2002–2003
8 months

Conception of an autonomous robot — EEIC IUT (Electrical Engineering and Industrial Computing Institute), University of Aix–Marseille III, St. Jérôme, France
This university project/contest aimed to develop and build an autonomous robot, controlled by a PIC16F877, able to follow a track and give way to others.
Technologies: C, uClinux

Languages

French native speaker
English fluent (IELTS: 8.5/9, TOEFL: 263/300, TOEIC: 920/990, 15+ years in Australia)
Spanish practical level

Miscellaneous activities

- Member of the G6/TFF French IPv6 taskforce
- Australian Amateur Radio License (advanced, call sign VK7SHM)
- DIY beer brewing and cheese making
- Role-playing games (both tabletop and live-action)
- Bass guitar