Matteo **Bertrone**

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"Everyone thinks of changing the world, but no one thinks of changing himself" - Leo Tolstoy

Summary

I'm research assistant at Department of control and computer engineering of Polytechnic of Turin, Italy, where I developed Polycube, an open source framework to provide fast, in-kernel, virtualized network functions. I love to code, but I also love to share ideas and feedback with my team, not only technical ones.

I'm working on network programmability, SDN and could computing, eXpress Data Path (XDP) and eBPF. I deal with distributed programming, APIs design, concurrency, and performance optimization. I spent some time visiting and collaborating with tech companies in Silicon Valley, as part of my research work.

Work Experience

Polytechnic of Turin — *Turin, Italy*

Research Fellow & Software Engineer — *Jan. 2017 - PRESENT*

- Core developer of Polycube: I am part of design and development process of the framework from the very beginning.
- Implemented virtual network services (bridge, router, nat, loadbalancer), without kernel modifications requirements.
- Managed to create a clone of iptables firewall, exploiting efficient algorithms and XDP optimizations, leading up to 10x performance gain.
- Developed a networking provider for OpenStack (iovisor-ovn). Increased visibility by publishing it under iovisor community.

Huawei Technologies — *Santa Clara, CA, U.S.A.*

Intern — *May. 2018 - Jun. 2018*

- Development of Polycube framework and services, as collaboration with Polytechnic of Turin.

Nebbiolo Technologies, INC. (Start-up company) — *Milpitas, CA, U.S.A.*

Consultant — *Feb. 2017 - May. 2017*

- Design and deploy of a lightweight bridging networking solution, as a substitute of Linux bridge.

PLUMgrid INC. (Acquired by VMware) — *Santa Clara, CA, U.S.A.*

Intern — *Sep. 2016 - Jan. 2017*

- Developed networking modules, that can be interconnected to provide networking for OpenStack.
- Overcome eBPF language limitations, and achieved an efficient solution without modifying Linux kernel.

EiSWORLD — *Turin, Italy*

Software Developer — *Mar. 2014 - May. 2014*

- Developed a network analysis and diagnostic tool for Fiat Chrysler Automobiles, used to debug and detect issues on dealers network.

Projects & Open Source

PolyCube — *github.com/polycube-network*

Polycube is an open source framework to build virtual network functions with XDP and eBPF — *Jan. 2017 - PRESENT*

- I'm core developer of Polycube, major contribution to design and implement the framework.
- Implemented an abstraction layer to easily deploy services (e.g. bridges, routers), configure them, create virtual topologies, and connect them to Dockers, namespaces, VMs, NICs. Developed a rich set of services, e.g. bridge, router, load balancer, nat, DDoS mitigator.
- Designed and developed a bpf-based clone of iptables, using Polycube framework. Presented at Netdev 0x12 (Montreal, Canada - July 2018)

Iovisor-OVN — *github.com/iovisor/iovisor-ovn*

Iovisor-ovn provides an efficient data plane replacement for OpenStack networking. — *Sep. 2016 - Jan. 2017*

- Developed and designed as part of my master thesis, and during the internship in PLUMgrid.
- Presented at Open vSwitch 2016 Fall Conference (San Jose, CA, U.S.A.)

Skills

Programming C/C++, eBPF, Go, C#, JAVA, LaTeX
Tools Linux, Git
Languages Italian, English

Education

Polytechnic of Turin — *Turin, Italy*

Master's Degree, Computer Engineering, 110/110 — *2014 - 2016*

Polytechnic of Turin — *Turin, Italy*

BSC Degree, Computer Engineering, 110/110 — *2011 - 2014*