Alex Ionita

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EDUCATION

University of Waterloo, Waterloo, ON
Doctor of Philosophy, Computer Science — Sep. 2022 - Present
Advised by Samer Al-Kiswany, in the Waterloo Advanced Systems Lab (WASL)

University of Waterloo, Waterloo, ON
Master of Mathematics, Computer Science — Sep. 2019 - Apr. 2022
Thesis: A Two-Tier Storage Interface for Low-Latency Kubernetes Deployments
Studied the throughput and latency of application deployment using Kubernetes. I identified bottlenecks related to collection of reporting metrics for usability. A change in the architecture improved the throughput by nearly 2x while also improving latency characteristics.

Concordia University, Montréal, QC
Bachelor of Engineering, Computer Engineering — Sep. 2009 - Apr. 2014

RESEARCH INTEREST

My research focuses on designing systems for cloud and edge infrastructure that provide applications greater performance or more suitable abstractions. My Master's thesis work centered around application orchestration performance for edge systems, in the context of end-user mobility. My current research explores changes to serverless technology, at the orchestration and virtualization layers. My engineering work experience informs the shape of offered abstractions and APIs.

ENGINEERING EXPERIENCE

Kaloom (Startup, Datacenter Networking) — Aug. 2017 - Aug. 2019
Software Designer

- Designed and developed control plane to orchestrate top-of-rack programmable switches offering SDN/VNF features; design work performed for first version of the product.
- Control plane responsible for handling switch lifecycle, and remediate connectivity changes due to switch failure.
- Developed new service to maintain cluster state as a dependency graph; this new design maximized number of concurrent state changes throughout the cluster, providing significant speedups over previous service.
- Designed APIs for the cluster inter-service notification system, metrics collection and configuration service.
- Integrated distributed tracing (Jaeger) to enable system observability, for both performance and errors.
- Developed end-to-end testing framework; allowed developers to write end-to-end testing scenarios using high-level abstractions, increasing the overall number of tests created. Catalog of tests ran continuously on dedicated cluster of switches, surfacing issues before release.

JDA Software — Mar. 2017 - Aug. 2017
Software Developer R&D

- Explored ways to enhance a commercial semi-humanoid robot (Pepper) designed for general interaction and conversation with humans.
- Researched usage of a lightweight pub/sub protocol as a near real-time method for robot control; this would add a simplified interface through a widely available protocol, replacing its native RPC methods.

- Worked on extending Pepper's SDK by integrating Google Cloud ML models alongside Pepper's integrated simpler models, significantly augmenting its vision, NLP and sentiment analysis capabilities.

Société Générale (Corporate & Investment Banking) Nov. 2016 - Mar. 2017
Software Developer

- Developed an application that aggregates market and financial data to aid traders in making investment decisions.
- Prototyped UI visualizations (replacing tabular data) to better convey specific metrics and statistical outcomes, allowing traders to draw conclusions faster.
- Took initiative to improve team-wide testing practices, introducing integration and contract testing.

Morgan Stanley Jul. 2015 - Nov. 2016
Infrastructure Engineering, Consultant

- Worked with team responsible for the deployment of a large application monitoring and analysis platform used by developers throughout the organization.
- Developed an infrastructure and platform watchdog service to detect failures before users experience them and find their root cause; watchdog improved service stability by finding cascading issues early and drastically increased mean-time-to-recovery.
- Developed deployment orchestration tool for the application monitoring platform; replaced manual error-prone processes of updating the deployments.
- Created self-service tool for platform clients to generate configuration files; tool reduced adoption friction and misconfigurations.

TEACHING EXPERIENCE AS TEACHING ASSISTANT

(F=Fall, W=Winter, S=Spring)

University of Waterloo:
CS 456 - Computer Networks. S20, F20, S21.
CS 492 - Social Implications of Computing. W20, W21, W22.
CS 234 - Data Types and Structures. F22.
CS 245 - Logic and Computation. F19.

ADDITIONAL PROJECTS

Mars Rover Competition Prototype May 2013 - Apr. 2014
Electronics & Software Team Lead

- Multidisciplinary rover prototype
- Coded bandwidth-sensitive video streaming module between the camera on the rover and the command station.
- Coded network benchmark tool to validate communication subsystem performance.
- Designed and realized rover's electronic communication subsystem necessary for rover teleoperation.
- Developed PID motor controller on an embedded system.

Cube Satellite Jan. 2010 - Apr. 2013
Software & Communications Team Lead

- Awarded first place out of 10 competing Canadian universities.
- Designed custom low-bandwidth communication protocol, with lower overhead than the traditional TCP stack, that provided reliable wireless communication over an AX.25 link.
- Developed software library allowing interoperation with Helium 100 transceiver firmware, necessary to ensure nanosatellite communication.

- Coded hardware-interfacing Linux libraries for the nanosatellite's main embedded computer system, enabling it to process payload telemetry data.

COMPUTER SKILLS

Technology: Go, Python, C#, JavaScript, C++, SQL, Shell Scripting.
Tools: Git, Numpy, Pandas.
Languages: English, French, Romanian.