

# ALEJANDRO E. GONZALEZ-ARAYA

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Software engineer with five years of experience in Cloud Computing Infrastructure and Hypervisors, three years experience with Container Engines and Orchestration technologies. Focused on performance characterization, resource provisioning and scaling of Cloud Infrastructure. With eight years of professional experience with Java and more than ten years of experience with Linux as well as experience in Internet-of-things architecture, Edge Computing and Big Data; I strive to improve performance and system efficiency.

## PROFESSIONAL EXPERIENCE

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### Research Assistant – University of Puerto Rico – Mayaguez, PR

Jan 2018 – Jun 2021

- Designed and developed a container orchestration platform for cloud and edge environments that uses container live migration to improve performance of running CPU-intensive workloads by up to 15%.
  - Tested different live migration techniques and developed an optimized parallelized sequence that supports network connected containers and container file system transfer with minimal downtime.
  - Developed a customizable and lightweight multithreaded software to monitor the performance of live-migrating containers and scales to support hundreds of containers (see publications).
  - Analyzed performance and workload characterization data using machine learning, to develop container placement policies that improve, in real-time, the performance of running database-intensive workloads by up to 45%.
  - Developed infrastructure automation scripts to deploy, customize and manage the experimental setup on a cloud computing cluster for OpenStack.
- Linux kernel configuration, building and setup to enable container live migration on edge and mobile ARM64 devices.
- Designed and deployed on multiple bare-metal servers, a cloud computing infrastructure cluster to test software defined networks using VMware ESXi and VMware-NSX-T.
  - Designed the network topology, performed packet tracking, network troubleshooting and performance analysis.

### Intern, Digital Combat Systems – Department of Navy (NAVSEA) – Dahlgren, VA

May 2019 – Aug 2019

- Designed and developed automation software for the deployment of realtime performance monitoring tools for distributed virtualized tactical systems.
- Developed technical documentation for the installation and configuration of the developed software as well as provided training to the Virtual Test Environment (VTE) Lab team on how to operate said software.

### Software Developer Analyst – Netwave Equipment Corp. – San Juan, PR

Feb 2017 – Jul 2017

- Gathered project requirements and designed application modules and databases. (MSSQL, ASP.NET, Oracle DB)
- Analyzed and improved the performance of existing database queries and stored procedures.

### Software Developer – Nustream Communications Inc. – San Juan, PR

Jun 2013 – Aug 2016

- Developed new modules and databases to support new health insurance regulations. (Java, MySQL, Bash, Linux)
- Improved the performance of existing processes by optimizing the use of data structures.

## PUBLICATIONS

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- A. Gonzalez, E. Arzuaga, “HerdMonitor: Monitoring Live Migrating Containers in Cloud Environments” 2020 IEEE International Conference on Big Data (Big Data), 2020

## EDUCATION

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### MS in Computer Engineering – University of Puerto Rico, Mayaguez

Aug 2017 – Jun 2021

- **Master Thesis:** *Distributed Resource Provisioning for Containers Using Machine Learning and Live Migration.*

### BS in Computer Engineering – University of Puerto Rico, Mayaguez

Aug 2013 – Jan 2017

- **Cloud Computing Infrastructure:** Design, development, and characterization of a SaaS cloud model (JavaEE, OpenStack).
- **Capstone:** Designed and developed network and backend for *DynoCloud: IoT Pet Habitat monitoring and control system.*
  - First Chance at Commercialization Award - Texas Instruments Innovation Challenge 2016.

## LEADERSHIP EXPERIENCE

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- **Teaching Assistant** – University of Puerto Rico, Mayaguez: Aug 2017 – Dec 2019
  - Operating Systems course (4 terms): Lectured and developed new laboratory assignments on Concurrency, Synchronization, Kernel Scheduling, Kernel Memory Management, Linux Kernel Modules and Drivers.
  - Advanced Programming course (1 term)
- **Research Lead** – University of Puerto Rico, Mayaguez: Jun 2019 – July 2019
  - Lead a group of undergraduate research students on software defined networks and cloud computing infrastructure.
- **Project Manager** – Capstone: Software team and lead programmer for Internet-of-things software systems.
- **Technology Lead** – EnterPRize, Justas Empresariales Universitarias, I-Corps Puerto Rico – PR, Jan 2015 – May 2016
  - Design and development of an embedded (TI CC3200) IoT automated parking payment system for a local startup.
  - Project won First Place Award (Technology) at Justas Empresariales Universitarias (2015).

## SKILLS

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**Expertise:** Java/JavaEE · Python · C Embedded Programming · Bash Scripting · RHEL/Debian Linux · Docker, Compose, Podman.

**Frameworks and tools:** JAX-RS · Jackson · Jupyter · XGBoost · Pandas · NodeJS · Git · JDB · Valgrind · MQTT · NoSQL · Go.