Maximiliano **Osorio**

Software Engineer

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Work Experience

Research Programmer - Software Developer Consultant
Los Angeles, USA

Information Sciences Institute — *Jan. 2019 - Oct 2020 / Apr 2021 - Present*

- Developed APIs, pipelines, and workflows for integrating data from various sources using Python, FastAPI, Express, and PostgreSQL, cutting the model and data ingestion time from weeks to one day.
- Built a Model Catalog to enable interoperability between models, data, and existing resources using web semantic technologies, allowing MINT to find and run relevant data, models, or chains of models based on user-selected indicators (e.g., crop production).
- Created Helm charts for deploying services in Kubernetes clusters, including Information Science Institute, San Diego Supercomputer Center, and Texas Advanced Computing Center, reducing installation time to 10 minutes and providing clear documentation.
- Designed, integrated, and maintained CI/CD pipelines using GitHub Actions, enabling developers to efficiently test and deploy changes.
- Deployed and managed authentication services using Keycloak, enabling login from different agencies via OIDC.
- Implemented the provenance extension to DISK, improving data tracking and documentation, which helps neuroscientists better understand experiment results.

Software Developer Consultant
Austin, TX

The University of Texas at Austin — *Mar 2021 - Present*

- Propose, design, and implement software solutions for Planet Texas 2050, an eight-year initiative aimed at enhancing community resilience. Collaborate with experts from diverse fields including architecture, city planning, public health, geology, and engineering, to develop integrated and innovative solutions.
- Refactored metadata APIs to enhance performance and maintainability using LoopBack 4, TypeScript, OpenAPI, and PostgreSQL, providing clear API specifications to agencies and detecting inconsistencies between the metadata schema and the API.
- Integrated a new execution system for running simulations from MINT, allowing to use 5,800 nodes with approximately 175,000 CPU cores and optional NVIDIA A100 GPUs.
- Designed and built a web application using FastAPI and React, enabling users to run simulations on High Performance Computing (HPC) clusters without needing SSH access.

Part-time Teacher
Valparaíso, Chile

Computer Science Department — *Jul 2016 - Dec 2018*

- Proposed and teach a course on Software Deployment on Linux, covering tools such as Docker, AWS, GitHub Actions and Nginx. This course equips students with practical skills for deploying applications.
- Taught an Operating Systems course, guiding students through core concepts with practical exercises in a Linux environment and related DevOps tools.

Systems Engineer
Santiago, Chile

Linets — *Jan. 2014 - Mar. 2016*

- Managed system administration for 400 servers, achieving improved performance and reliability through effective troubleshooting, configuration, database administration, and optimization.
- Led the deployment of the first OpenStack environment in Chile, supporting Beebop, the country's first public cloud.
- Automated the OpenStack deployment process using Docker Containers and Ansible playbooks, streamlining operations and reducing deployment time from hours to minutes.
- Implemented Ceph-based shared storage for the public cloud, enhancing data performance, reliability, and scalability, which improved storage efficiency by 40%.

Systems Administrator
Valparaíso, Chile

Computer Science Department — *Aug. 2011 - Oct. 2014*

- Administered internal servers, ensuring the availability of services for students and faculty.

Education

M.Sc. in Computer Engineering

Valparaíso, Chile

Universidad Técnica Federico Santa María

Mar. 2017 - Dec 2018

- Thesis: Towards reproducibility of computational environments for Scientific Experiments using Container-based virtualization.

Computer Science Engineering

Valparaíso, Chile

Universidad Técnica Federico Santa María

Mar. 2010 - Jan. 2016

- Undergraduate project: Evaluation of Kubernetes (v1.0.6), an orchestration system for Docker Containers.

Skills

Programming Languages

Python, JavaScript, TypeScript, Java, Bash

- Proficient in developing applications, automating tasks, and analyzing data with these languages.

Backend Development

Loopback & Express (Node.js), FastAPI, SpringBoot, PostgreSQL, and testing(Jest, Mocha and JUnit)

- Capable of developing robust server-side applications and managing databases effectively.

Frontend Development

React, GraphQL, Figma

- Experienced in building web applications.

DevOps Tools

Docker, Kubernetes, GitHub Actions, Ansible, Helm

- Experienced in containerization, orchestration, continuous integration, and deployment.

Cloud Platforms

AWS

- Experience in deploying and managing applications on AWS.

Semantic Web

RDF, OWL, Neo4j Graph Database, SPARQL

- Experience in developing and querying semantic web applications.

Projects

MINT Project

Los Angeles, USA

Developer

Jan 2019 - Present

- MINT assists an analyst to easily use sophisticated simulation models and data in order to explore the role of weather and climate in water on food availability in select regions of the world.
- MINT has been applied by The Defense Advanced Research Projects Agency (DARPA) to the assessment of food insecurity in Ethiopia, where 1.2 million simulations were run to allow experts to simulate food production.
- MINT has been adopted by the Planet Texas 2050 project, which aims to design solutions that will make our Texas communities stronger, more resilient, and better prepared for current and future challenges
- MINT has been used by Supercomputer Center at the University of California, San Dieg to simulate the impact of wildfires in California.

OBA

Co-creator

May 2019 - Present

- OBA reads ontologies (OWL) and generates an OpenAPI Specification (OAS). Using this definition, OBA creates a REST API server automatically.
- Nominated for the Best Paper Resources Award at the 2020 International Semantic Web Conference (ISWC).