



# Rahim Khoja

SYSTEMS ENGINEER / SOFTWARE ENGINEER

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## Profile

A mildly eccentric, but mostly fantastic computer systems engineer with a passion for economics and cutting-edge technologies. With extensive experience in Linux administration, cloud computing, and HPC clusters, I excel at designing, implementing, and optimizing complex systems. Proficient in Python and Bash, I've successfully led projects including the development of an advanced algorithmic trading platform and an SMS AI Assistant, driving operational excellence and innovation across diverse computing environments.

## Employment History

### Founder & Senior Developer, Improbability Labs Inc., North Vancouver

August 2022

Improbability Labs Inc. is dedicated to cutting edge technologies like high-performance computing (HPC) infrastructure and AI (Artificial Intelligence) to develop innovative solutions across various domains. Our flagship project, 'Trader', exemplifies this mission through its advanced algorithmic trading and portfolio management capabilities, setting new standards in the financial markets.

- Designed and developed 'Trader', an advanced algorithmic trading platform for cryptocurrency and stock markets using Python, Slurm HPC, and MySQL Cluster.
- Architected scalable infrastructure with Proxmox/KVM and Linux, implementing Flask APIs for system integration.
- Engineered data analysis tools using libraries like Pandas and TA-Lib, incorporating AI with OpenAI's GPT models for predictive analytics.
- Developed SMS AI Assistant, integrating OpenAI and GroqCloud for intelligent conversation capabilities, with Stripe for payments and Twilio for communication.
- Utilized technologies including Ubuntu, Arch Linux, Docker, NGINX, Grafana, and various financial APIs to create robust, scalable solutions.
- Managed projects including Trader, Quant, and SMS AI Assistant, showcasing expertise in HPC, AI, and algorithmic problem-solving.

### Systems Administrator II, HPC, The University of British Columbia, Vancouver

August 2021 — August 2022

In the HPC team, I was part of a team that developed two major implementations of JupyterHub, tailored to enhance the educational and research capabilities at UBC. These platforms are designed to support a wide range of academic activities, accessible to all current students, faculty, and staff across both campuses.

- Collaborated with the HPC team to develop two Kubernetes JupyterHub implementations (Jupyter Open and Jupyter Course) for university-wide computational access managed via a CI/CD pipeline.

- Contributed to engineering custom JupyterLab/Jupyter Notebook containers using Docker Stacks on AWS EKS.
- Assisted in implementing high-availability web server with Shibboleth authentication for Jupyter Open.
- Helped develop Jupyter Course, including LTI authentication via Canvas, and created a POC API using Python/Flask.
- Participated in enhancing Terraform deployment for EKS cluster and GitHub Actions Pipelines for project automation.
- Worked with technologies including Linux, Docker, AWS services, MySQL, Bash, Python, Kubernetes, and HPC tools.

Key projects: JupyterLab Images, Python Flask API, Terraform Deployment

### **Systems Administrator, 3vGeomatics, Vancouver**

April 2020 — April 2021

Served as a member of the systems administration team, focusing on enhancing and securing high-performance computing environments. Contributed to critical infrastructure updates, implemented comprehensive logging solutions, and developed proof-of-concept systems to improve operational efficiency and data management.

- Developed and tested CentOS 7.9 update, reworking in-house repositories and creating robust partitions meeting OpenSCAP standards.
- Designed and implemented Graylog and Rsyslog logging system for comprehensive log collection across diverse platforms.
- Audited NAS storage systems, providing GAP analysis reports and solutions for identified issues.
- Created POC for Rancher Kubernetes Environment (RKE) with Quobyte integration and example deployment scripts.
- Built various POC and testing machines, including oVirt Hypervisor Cluster and VMware ESXi server.
- Managed storage technologies (OpenZFS, FreeNAS, Quobyte) and networking infrastructure (Fortinet, Mellanox, Bind DNS).
- Supported HPC technologies including Son of Grid Engine (SGE) and NVIDIA drivers/CUDA.

### **Systems Engineer & Developer , Triforce Media , North Vancouver**

December 2016 — March 2021

Served as a versatile Systems Engineer and Developer, contributing to both infrastructure and client-facing solutions for an SEO and website development company. Specialized in e-commerce platform maintenance, payment system integration, and infrastructure optimization, driving significant improvements in website performance and functionality.

- Developed POSconnect Interac Online Payment plugins for WordPress, WooCommerce, and Magento 1.9x.
- Migrated websites to AWS EC2 instances running CentOS 7 with Plesk, enhancing performance.
- Compiled iOS and Android applications using Ionic, Apache Cordova, Node.js, Xcode, and Android Studio.
- Advised on data housing, compliance, and IT architecture for international projects.
- Established data center infrastructure using VMware ESXi, Fortinet 60E, and HP Gen7 & Gen8 Servers.
- Configured and maintained server environments including CentOS 7, Ubuntu, Ansible, and Plesk.

- Optimized WordPress sites, significantly improving Google PageSpeed Insights rankings.
- Tested and integrated open source marketplace solutions like Sharetribe.

### **Linux Systems Engineer, Carbon 60 / Gossamer Threads, Vancouver**

November 2018 — February 2020

Served as a key Linux Systems Engineer, focusing on high-availability and scalable virtualization solutions across multiple data centers. Led critical projects in virtualization, migration, and automation, significantly enhancing system performance and operational efficiency.

- Spearheaded migration of 700 legacy Xen virtual machines to oVirt and VMware across four data centers in three countries, maintaining 90% uptime.
- Developed automated VMware Cluster Deployment tool using Ansible, PowerCLI, and Bash, deploying over 25 standardized clusters.
- Designed pfSense configuration generator and deployment script for standardized Virtual Appliance creation.
- Created custom oVirt Cloud-Init deployment script for Gentoo VMs and developed multiple VM templates.
- Contributed to Graylog rollout across data centers, implementing TLS Syslog configurations and updating over 400 Gentoo VMs.
- Automated deployment of standardized Gentoo and CentOS 7 VMs, internal DNS, IP management, and network configuration.
- Engineered oVirt cluster with over 40 hosts, developing management scripts for rapid provisioning.
- Modified Python oVirt Guest Agent to enhance Gentoo compatibility.

### **Systems Analyst II, The University of British Columbia, Vancouver**

July 2017 — April 2018

Served as a key Systems Analyst, responsible for comprehensive analysis, development, and migration of IT systems across the university's infrastructure. Participated in multiple projects to enhance operational efficiency, security, and system integration within various departments.

- Analyzed and reported on over 40 UBC IT systems, web applications, services, and infrastructure components.
- Developed POC Academic Calendar system supporting 10+ complex web applications using Apache, ColdFusion, PHP, and MySQL.
- Migrated 6 Linux servers to RedHat 7.4 within UBC's EDUcloud environment, including various web and database servers.
- Centralized databases from multiple Linux servers into a recommended MySQL 5.7 server setup.
- Created FIPPA-compliant POC WordPress site for UBC Extended Learning, enabling student assignment submissions.
- Implemented POC Graylog Logging Server for Mechanical Engineering department, uncovering significant security insights.
- Initiated implementation of Kibana, Elasticsearch, Logstash, and Filebeat to integrate with UBC's central logging service.
- Developed POC for connecting RedHat/CentOS via SSSD to UBC's Active Directory using POSIX values .

### **Further employment history and references available upon request.**

June 1999 — December 2016

## Education

### Computer Programming Courses, Athabasca Univerity, Remote

2016 — 2017

### About Half of a Computer Science Undergrad, Simon Fraser University, Burnaby

2010 — 2012

### High School Diploma, Vancouver School Board, Vancouver

2007 — 2009

Graduated with a 90% average.

## Links

[LinkedIn](#) [Rahim's GitHub](#) [Stack Overflow](#) [Improbability Labs GitHub](#) [SMS AI Assistant](#)

## Skills

Linux (CentOS/Redhat/Ubuntu/Debian/etc)



Python (Flask/Pandas/NumPy/Twilio/etc)



Databases

(MySQL/SQLite/ElasticSearch/MongoDB)



HPC (Slurm/SGE)



Cloud Technologies (AWS/Azure/GCP)



Virtualization (VMware/KVM/Xen)



Financial Analysis / Economics



Containers (Docker/Kubernetes)



Monitoring/Logging ( ELK/GrayLog/Grafana)



Orchestration (Ansible/Puppet)



Bash Scripting



Git (GitHub / GitLab / BitBucket)



SQL



AI Providers (OpenAI/Groq/HuggingFace)



Web Applications (Apache/NGINX/Tomcat)



Storage (AWS EFS & EBS/ZFS/DFS)



Cryptocurrency

(Daemons/Pool/Farms/API's)



CI/CD (GitHub Actions)



Networking (TCP/UDP/DNS/VPN/Routing)



Terraform



## Projects

### The Quant

2024

"The Quant" is an AI-driven stock analysis tool designed to empower traders by predicting potential trading opportunities. Hosted on a Vultr Ubuntu VM, it fetches OHLCV data, applies technical indicators, and processes this data through AI to provide actionable insights. The tool recommends optimal trading strategies, including Buy at Market, Limit Sell orders, and Trailing Stop Losses for risk management, making it ideal for data-driven decision-making in stock trading.

**Project URL:** <https://quant.improbability.io/>

**Git Repo:** <https://github.com/ImprobabilityLabs/quant>

## **Atomik Controller Project**

2016 — 2017

As a personal project turned product, the Atomik Controller was developed to control over 100,000 wireless RGB bulbs, aiding in attracting investors for Mi-Light Wireless Bulbs certification. Built on a Raspberry Pi with an Nrf24l01+ transceiver and written in C++11, Node.js, PHP, MySQL, JQuery, and Bash, the project utilized Debian Linux, Cron, Nginx, and Systemd. The controller featured a Node.js JSON API for third-party integration, a smartphone server emulator secured with Mac address filtering, and a web GUI for comprehensive management of light bulbs, RF remotes, smartphone remotes, network settings, and scheduled tasks.

**Project URL:** <https://hackaday.io/project/12748-the-atomik-controller>

**Git Repo:** [https://github.com/rahimkhoja/Atomik\\_Controller](https://github.com/rahimkhoja/Atomik_Controller)

## **Improbability Labs - Trader - Algorithmic Trading Platform**

2021 — 2024

"Trader" is an advanced cryptocurrency trading platform developed by Improbability Labs Inc. It features the Technical Analysis Trade Processor (TA-Bot), which uses customizable algorithms and technical indicators to optimize trading strategies. The platform includes automated portfolio management, extensive back-testing, and live trading functionalities. Developed using Slurm HPC, Proxmox/KVM, and Linux for robust infrastructure, the project leveraged Python with libraries like Pandas, TA-Lib, and Numpy for data analysis, and integrated AI with OpenAI's GPT models for predictive analytics. The system is enhanced with Flask APIs and Grafana for monitoring, providing a scalable and efficient trading environment.

**Project URL:** <https://improbability.io/trader.html>

## **SMS AI Assistant**

2024

The SMS AI Assistant is a subscription service designed to boost productivity by performing Google lookups via SMS for users in Canada and the USA. Developed in just 5 weeks, the platform leverages Flask, MySQL, NGINX, and CertBOT for backend infrastructure, and integrates with OpenAI and GroqCloud for intelligent conversational capabilities. The service includes payment processing through Stripe and communication via Twilio and SendGrid, all deployed on Ubuntu 23 hosted on Vultr. A web interface allows users to manage assistant settings, including personality options and chat history, ensuring a personalized and seamless user experience.

**Project URL:** <https://sms.improbability.io/>

**Git Repo:** [https://github.com/ImprobabilityLabs/sms\\_ai\\_assistant/](https://github.com/ImprobabilityLabs/sms_ai_assistant/)

## **Dynamic DNS Server**

2016

The Dynamic DNS Server is a web application and API that enables users to manage virtual DNS hosts, compatible with most DDNS clients by emulating the dyndns2 protocol. Developed to gain proficiency with Tomcat, Bind, and CentOS 7, the project involved configuring and deploying Bind 9.1x with DLZ support, setting up MySQL 5.7 in master-slave mode, and deploying Tomcat 9 on CentOS 7. A CRUD-based web application was created for DNS management, alongside a REST API secured with a JDBC realm for authentication. The system utilized Slave DNS servers for production, with additional configurations including systemd service files, bash scripts, and cron jobs.

**URL:** [https://github.com/rahimkhoja/DDNS\\_Server](https://github.com/rahimkhoja/DDNS_Server)