

Cullum Smith

SYSTEMS ENGINEER · TRADING TECHNOLOGIES · FREEBSD/LINUX

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Summary

Currently a Site Reliability Engineer for Thesys Technologies, a financial technology company specializing in low-latency high-frequency trading platforms. 5+ years of development and operations experience. Strong skills in C, C++, and Perl programming and system administration with FreeBSD and Linux. Intermediate experience in Python and Ruby, as well as networking and infrastructure management. Highly motivated engineer that can manage client relationships while solving low-level systems issues in fast-paced environments.

Work Experience

Thesys CAT LLC

SITE RELIABILITY ENGINEER

Charleston, SC

Jan 2018 - present

- Designed infrastructure, networking, and operations strategies for the implementation of the SEC's Consolidated Audit Trail.
- Led infrastructure rollout and configuration management effort using Ansible for hundreds of bare metal and cloud servers.
- Implemented internal authentication system for both application services and Unix accounts using Kerberos/GSSAPI.
- Built petabyte-scale object storage solution using FreeBSD and ZFS.
- Created automated build and packaging pipeline for in-house repositories using FreeBSD, Git, and Poudriere.
- Recent role transition, more details forthcoming.

Thesys Technologies

DEVOPS ENGINEER

Charleston, SC

Feb 2016 - Dec 2017

- Head of development and operations for hardware trading platform. Implemented market access software in C for Tiler's TILE64 architecture, supporting over \$1 billion per day of order volume.
- Doubled the accuracy of distributed C-based client risk checks while maintaining $\leq 2.5\mu\text{s}$ order latency.
- Responsible for development and operations of C++-based software trading platform as part of trading technologies DevOps team.
- Maintained client-facing C++ trading APIs and market data feeds.
- Coordinated network connectivity and colocation with clients and stock exchanges in the USA and Canada.
- Eliminated manual, error-prone administration tasks by creating Perl-based command-line tool for managing hosts and trading sessions.
- Assessed and resolved real-time trading and connectivity issues in a high-stress HFT environment while managing relationships with customers.

SPARC

SOFTWARE ENGINEER

Charleston, SC

Apr 2015 - Feb 2016

- Developed benefit management software for the Department of Veterans Affairs using Java, Spring Framework, and AngularJS.
- Led a special performance "tiger team" which identified and mitigated application throughput bottlenecks.
- Achieved a >10x speedup by refactoring application-layer JPA logic into stored procedures at the database layer.
- Created and maintained CentOS VM images running Oracle Database to replace existing nonperformant Windows VMs used by developers.

Clemson University

GRADUATE RESEARCH ASSISTANT

Clemson, SC

2013 - 2015

- Designed and implemented a middleware system for watershed-scale sensor networks using Java and Node.JS.
- Maintained a middleware backend which served over 50 live ecological sensor deployment sites across South Carolina.
- Independently developed a metadata management system for sensor network hardware, which was presented at IEEE and ACM conferences.
- Created front-end visualization and management tools for sensor networks using AngularJS.
- Led seminars and coordinated software development with graduates, undergraduates, professors, and full-time engineers.

Education

Clemson University

M.S. IN COMPUTER SCIENCE

Clemson, SC

2013 - 2015

- GPA 3.70. Pioneered new data analytics and management tools for wireless sensor networks in Clemson's Dependable Systems Research Group.
- Relevant Coursework: Linux Kernel Programming, Embedded Network Systems, Algorithm Analysis

Clemson University

B.S. IN COMPUTER SCIENCE

Clemson, SC

2009 - 2013

- GPA 3.82. Graduated *magna cum laude* as an undergraduate researcher in the Calhoun Honors College.

Publications

Harnessing the Flow of Ecological Data Across Networks, Middleware, and Applications

Reston, VA

PROCEEDINGS OF THE 2016 IEEE 3RD WORLD FORUM ON INTERNET OF THINGS

2016

- Jiannan Zhai, Chuck Cook, G. Cullum Smith, Vamsi Gondi, Jason O. Hallstrom, Christopher Post, Gene W. Eidson

Managing Metadata in Heterogeneous Sensor Networks

Kennesaw, GA

PROCEEDINGS OF THE 2014 ACM SOUTHEAST REGIONAL CONFERENCE

2014

- G. Cullum Smith, Jason O. Hallstrom, Sam Esswein, Gene W. Eidson, Chris Post

Projects

Mail Server Hosting Guide

c0ffee.net

PERSONAL PROJECT

2017

- Designed, deployed, and documented the configuration of a modern, secure personal email server based on FreeBSD and open-source software (Postfix, Dovecot, Rspamd, OpenLDAP).
- Supports opportunistic TLS, IMAP access, spam filtering with statistical training, full-text mailbox search, and custom filters.
- Maintain custom FreeBSD ports for a Dovecot patchset and associated Perl daemon which enable Apple push notifications for new mail on iOS.

Linux Graphics Card Driver

Clemson University

KERNEL PROGRAMMING COURSE (DR. ROBERT GEIST)

2015

- Implemented a thread-safe, DMA-compatible device driver in C for Linux 3.19, targeting a virtual AMD graphics card.
- Driver supports framebuffer drawing operations via both memory-mapped FIFO queues and DMA.

Intelligent River

Clemson University

GRADUATE RESEARCH PROJECT

2013 - 2015

- Designed and developed middleware applications using Java, Node.JS, AngularJS, and MongoDB for the Intelligent River project—an NSF-funded wireless ecological sensor network with multiple live deployments in the Savannah River Basin.
- Created a metadata management system for highly heterogeneous sensing hardware to facilitate semantic web analysis of raw sensor data, featured in multiple conference proceedings.

Wireless Spanning Tree Protocol

Clemson University

EMBEDDED NETWORK SYSTEMS COURSE (DR. JASON HALLSTROM)

2013

- Designed and implemented a spanning tree network protocol in C for the TelosB wireless mote platform based on TinyOS.
- Each node routed onboard sensor readings to a parent gateway via a wireless spanning tree network.
- From an initial disconnected state, the protocol allows each node to form a multi-hop path to the root of the tree. Routing algorithm is resilient to cycles in the network graph and node death.