# Harrison Grant Totty

DEVOPS ENGINEER · SOFTWARE PROGRAMMER

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## Summary

Current lead DevOps Engineer and systems architect for the Web Systems group at Wolfram Research. Highly experienced at implementing custom infrastructure solutions within bare-metal/on-premise environments. Thrives in seeking solutions within domains not yet encompassed by popular technologies or industry standards.

## Education

**Tallahassee Community College**                                              *Tallahassee, FL*

ASSOCIATE OF SCIENCE                                                          *Jan 2015 - Jan 2016*

- Graduated honors with 4.0 GPA.

**University of West Florida**                                                  *Pensacola, FL*

PHYSICS                                                                       *Aug 2011 - Jul 2014*

## Skills

| | |
|---:|:---|
| **CI/CD** | Jenkins Pipelines (Declarative & Scripted Syntax) |
| **Cluster Orchestration** | Helm, Bare-Metal Kubernetes (k8s & k3s) |
| **Configuration Management** | Ansible, Puppet, Salt |
| **Container Runtimes & Virtualization** | containerd, Docker |
| **Data Languages** | INI, JSON, TOML, XML, YAML |
| **Data Science** | Jupyter Lab/Notebooks, Mathematica, matplotlib, plotly, sympy |
| **GNU/Linux Distributions** | Arch Linux, Debian (Ubuntu), Gentoo, RHEL (CentOS), Void Linux |
| **High Availability** | HAProxy, keepalived |
| **Markup Languages** | LaTeX, Markdown, Org |
| **Networking Fundamentals** | ARP, CIDR, Mikrotik RouterOS, Ubiquity Unify Controller, VLAN |
| **Programming Languages** | C/C++, C# .NET, Emacs Lisp, groovy, Perl, Python, Rust, Shell Languages, Wolfram (Mathematica) |
| **Project Management** | GitHub Issues/Projects, GitLab Issues, JIRA |
| **Repository Hosting** | Bitbucket, GitHub, GitLab |
| **Secrets Management** | Hashicorp Vault |
| **Templating Languages** | Cheetah, Embedded Ruby, Jinja, Liquid |
| **Text Editors** | GitHub Atom, GNU Emacs, nano, vi/vim, Visual Studio Code |
| **Version Control Systems** | cvs, git |
| **Web Servers** | NGINX, Apache Tomcat |

## Work Experience

**Wolfram Research, Inc.**                                                     *Champaign, IL*

DEVOPS ENGINEER                                                              *Apr 2018 - Present*

- Streamlined disaster recovery of Wolfram Cloud user data with end-to-end encrypted backups via ⌀ backuputil.
- Provisioned bare-metal Kubernetes environments for Wolfram|Alpha utilizing Kubespray, Helm, Rook-Ceph, and Velero.
- Incorporated Hashicorp Vault for secrets management of Kubernetes CI/CD pipelines.
- Implemented infrastructure as code (IaC) standards for on-premises environments by leveraging ⌀ Puppet and ⌀ Cobbler.

WEB SYSTEMS ADMINISTRATOR                                                    *Dec 2016 - Apr 2018*

- Developed a ⌀ templating engine for Apache HTTP Server configurations.
- Provisioned and maintained on-premises environments for Wolfram Cloud.
- Collaborated custom log data analysis and reports for Wolfram Cloud in Python and Mathematica.
- Designed Salt configurations for managing internal infrastructure.
- Developed backend code for the Wolfram Cloud Platform in Java.

### Web Systems Intern
*Sep 2016 - Dec 2016*
- Implemented new Wolfram kernel features in C/C++.
- Developed a containerized RPM build environment hosted in Apache Marathon/Mesos.

## Wolfram Research, Inc.
*Boston, MA*
### Wolfram Summer School Student
*Jun 2016 - Jul 2016*
- Invited to Bentley University for three weeks to conduct research on various machine learning analogues.
- Participated in Wikipedia article authoring meetup at MIT.
- Completed final project on feed-forward neural networks using Boolean networks.

## Tallahassee Community College
*Tallahassee, FL*
### Mathematics and Technology Tutor
*May 2016 - Aug 2016*
- Provided tutoring and support to students in various mathematics and technology topics.

## Radio Shack
*Pensacola, FL*
### Sales Associate
*Jul 2013 - Mar 2015*
- Provided customer service and support for a variety of mobile devices, DIY components, and more.

## University of West Florida
*Pensacola, FL*
### Student SSE System Administrator
*Jan 2014 - Aug 2014*
- Provided general systems administration for the faculty of the School of Science and Engineering.

### ResNet Technician
*Feb 2012 - Aug 2013*
- Supported the technical needs of dorm students.

# Projects

### Web Systems Infrastructure Rearchitecture
*Wolfram Research, Inc.*
A project to modernize all on-premesis user-facing infrastructure
*Mar 2020 -*
- Leveraged Cobbler for systems provisioning and Puppet for configuration management.
- Targeted CentOS 8.2 (up from CentOS 6.8 and 5.5) for new machines, while still integrating with older environments.
- Implemented infrastructure-as-code standards.
- Developed more than ○ 20 Puppet modules, each with a high degree of parameterization.

### ○ prov
*Wolfram Research, Inc.*
A Python script to modify Cobbler item specifications in a Terraform-like declarative way
*Mar 2020 - May 2020*
- Leverages Cobbler's XMLRPC API to synchronize YAML-based item specifications.
- Shows Terraform-like client-server differences prior or during application.
- Supports backwards-compatibility with Cobbler servers older than version 3.
- Synchronizes data items (such as profiles and systems) as well as files (such as snippets).

### ⸕ Personal Finance Analytics Platform
*Personal Project*
A Python library for categorizing and analyzing bank transactions
*Mar 2020 -*
- Categorizes transactions based on a home-made library of regular expressions.
- Leverages sklearn to perform predictive regression on financial trends.
- Provides a wrapper around plotly for graphical analysis.

### ○ grav
*Personal Project*
A gravitational n-body simulation program written in Rust
*Nov 2019 - Dec 2019*
- Leverages an entity-component-systems (ECS) simulation backend.
- Simulation data post-processed via Jupyter notebook.
- Custom 3D vector and physical laws implementation.

### ○ CV & Resume
*Personal Project*
(This Document)
*May 2019 -*
- Built from Jinja2-templated LaTeX documents via "tmpl".
- Raw data present in YAML format.

### ○ tmpl
*Personal Project*
A general-purpose templating system
*May 2019 - Jun 2019*
- A general-purpose Jinja2/YAML templating system based on "mkconf" and "mkdot".
- Utilized in the generation of this CV/Resume.
- Supports runtime-loaded Python extensions to the templating system.
- Capable of handling raw Jinja2 content piped directly to STDIN.

## ⊙ backuputil

*Wolfram Research, Inc.*

A PYTHON WRAPPER SCRIPT AROUND THE BORG BACKUP UTILITY.

*Jan 2019 - Apr 2020*

- Extends and generalizes the functionality of Borg.
- Allows multiple "back-up tasks" to be specified in a single configuration file.
- Used to back-up large volumes of data internally at Wolfram Research.
- Supports sending email reports on script completion or detection of issues.

## ⊙ Remote Execution Framework

*Personal Project*

AN EASY REMOTE COMMAND EXECUTION UTILITY

*Nov 2018 - Apr 2019*

- Written in Python3 as a lightweight alternative to frameworks such as Fabric and Ansible.
- Automatically formats output depending on whether a TTY is present.
- Capable of running both arbitrary commands and defined tasks.
- Includes interactive console mode.

## ⊙ mkdot

*Personal Project*

THE HANDY DOTFILE TEMPLATING SYSTEM

*Oct 2018 - Dec 2018*

- Based on "mkconf" project, but specialized for the generation of dotfiles.

## ⊙ mkconf

*Wolfram Research, Inc.*

AN APACHE WEB SERVER CONFIGURATION TEMPLATING ENGINE

*Aug 2018 - Sep 2018*

- Generates Apache Web Server configurations from Jinja2 templates and YAML configuration files.
- Replaced older in-house utility written in Perl.
- Validates directives after generating configuration files.
- Capable of backing-up previous configurations and reverting changes.

## ⊙ Simplex Universe

*Personal Project*

AN ABSTRACT N-DIMENSIONAL N-BODY SIMULATION PROGRAM WRITTEN IN C# .NET

*Aug 2013 - Dec 2014*

- Custom CPU-based 3D rendering engine and graphical library.
- Dynamic C# scripting support
- Abstraction over spacial dimensionality and physical laws.
- Implemented Newtonian gravitational, classical electrostatic, and classical electrodynamic laws.
- Real-time simulation parameter tweaking and simulation object property inspection.
- Support for toroidal, infinite, and perfectly elastic/inelastic boundary conditions.