Personal

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Summary

My name is Michael Verhulst, I am an experienced Python Developer and Consultant. I am very energetic, flexible, hard working, skilled and based in Austin, TX. I have worked on multiple successful Python and Linux developments projects. I have worked with clients of many different sizes from a diverse range of fields. I love new and interesting challenges. Along with my real world development experience, I have a strong background in mathematics, astrophysics, and aerospace and I like to use my skills in these areas in projects that I work on.

SKILLS

Computer Science/ Programming:

Full-stack Development, Python Development, Python Optimization, Linux Application Development, Database Development and Administration, Server Administration, Algorithms, Computational Complexity Theory, Data Compression, Encryption, Information Theory and Data Security.

Physical Science/Mathematics:

Astrophysics, Cosmology, Spacecraft Propulsion, Condensed Matter Physics, Quantum Mechanics, Nanotechnology, Relativity, Cell Biology, Number Theory. Blackhole mechanics, Quantum Information Theory.

Miscellaneous:

Networking, Finance, Economics Patent Law, Securities Law, Aerospace and Aviation, Rock Climbing, Car repair/maintenance.

Computer Hardware:

- I have assembled a small 16 node “cluster” and created a proof-of-concept

load balancer for it in python.
- I have performed remote PC/Mac maintenance via TeamViewer and LogMeIn.
- I have personally assembled, repaired, and/or upgraded hundreds of computers. Mostly Dells among other vendors, and some DIY customs builds in many configurations.
- I built a dedicated server for kvm, VMware, ESX, ESXi, VSphere, and compiled Xen for a round of experiments to configure a hypervisor with VT-d based PCI passthrough.
- I built a dedicated GPU server for high performance vector machine processing of MRI data with Nvidia CUDA.
- I built a dedicated buildbot server for continuous integration and automated testing of software projects that require VT-x and VT-d instructions in the cpu.
- I have done some hobbyist experimentation with Raspberry Pi including:
    - Specialize SD card formatting for os reinstall.
    - Performance testing of computational tasks run in Wolfram Language (Mathematica)
    - Ran a demonstration web service (written in Python) on the device.
- I ran a 10 computer dell homelab. Used for:
    - VMware (vCenter, Horizon, NSX Advanced Load Balancer (Avi), Tanzu), Citrix, VDI, Dask, SaltStack, Windows server 2016/2019, GPU based machine learning - Nvidia Quadro K5200 8GB GDDR5/Quadro RTX 400, Wolfram Research enterprise private cloud, Dell Wyse PCoIP, Redhat Openshift, Redhat RHEL workstation, HP Teradici, HP iLO experiments, Dell PowerEdge RAID Controller (PERC) experiments, Dell Remote Access Controller (iDRAC) 7 experiments, TrueNAS, Keyshot cluster rendering.
- I have installed network infrastructure and equipment for clients. This includes:
    - installing wireless Internet systems, configuring routers, running cabling, cable management, setting up multiple monitor workstations, building racks and rack-mountable servers, converting tower servers into rack-mountable servers, upgrading servers, installing servers into cabinets with or without rails, configuring multi-boot systems, installing printers, settings up networks.
- I am familiar with (and have made apps for) many Apple products. These

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products include:

iPhone 5s, iPhone 4s, iPod 4, iPad mini, iPad Air, MacBook, Mac mini.

System Administration / DevOps:

Admin/DevOps tool I have worked with:

- SSH, Coreutils, OpenVPN, OpenSSL, EC2, S3, Cloudfront, Route53, VirtualBox, Vagrant, SaltStack, Chef, Fabric, Libcloud, OpenStack, nmap, Wireshark / Ethereal, Bind9, Gearman, Supervisor, Terraform, lxc, Docker, Namecheap, Godaddy, Dev-mode Chrome book.

Cloud providers and data centers I have worked with:

- AWS, Azure, CGP, DigitalOcean, Rackspace, OnRamp, m5hosting.

DevOps highlights:

- I have experimentally run OpenStack on Dell R220 servers, in a handful of different configurations.
- I have created hundreds of virtual machines on a variety of providers, locally and in the cloud.
- A have worked with a AWS based vm cluster with over one hundred virtual machines all running at the same time all managed by SaltStack.

Programming Languages:

HTML/CSS	18 years
JavaScript	15 years
Python	15 years
jQuery	8 years
C/C++	5 years
Fortran	3 years
SQL	3 years
Ruby	2 years
Wolfram Language (Mathematica)	2 year
Objective-C	1 year
Swift	<1 year
Go	<1 year

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WORK EXPERIENCE

- Python Consultant at Terminal Labs ---------- 2007 – present
  I have led the implementation of some advanced technologies, worked with a range of clients, lead development projects, designed and installed server/networking gear, worked with marketing firms, interacted with UI/UX designers/design firms, given a few public presentations (some in front of 100-200 people), Developed projects from scratch, inherited projects midway through development, used modern DevOps tools to manage infrastructure, spent a large amount of time researching emerging technologies, and written a lot of code.

- Temporary Web Design Consultant ---------- August 2007 – November 2007
  As a freelance web design consultant I designed and implemented some aesthetic and code changes to a high traffic area of the medical school's website. This project was entirely front-end development. After mocking-up the design in Photoshop, I created a new static webpage by hand-coding the relevant source-code in HTML/CSS/JS.

- Counselor at the U.S. Space & Rocket Center ---------- January 2006 – May 2006
  I taught several hundred children (and a few adults) from around the world a little bit about the exciting history of manned space flight and the history of the US space program. My duties included: academic tutoring, teaching classes on space science/aerospace engineering, keeping the team energized and on schedule, running some fairly complex flight simulator software, lifeguarding, leading teams of 8-12 campers though numerous engineering/design competitions, giving advice about how best to prepare for a career in aerospace and or science, helping campers complete challenging physical obstacle courses.

- Rock Climbing Instructor and Lakeside Lifeguard at BSA Summer Camp - Summer 2005
  I taught around 200-300 people, on a 75’ climbing tower, basic/intermediate rock climbing techniques, equipment usage and safety procedures. When I was not on the climbing tower, I was a

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lifeguard/swimming instructor and astronomy/spaceflight merit badge teacher. I covered Apollo, New Horizons, and Mars Exploration Rover among other topics. As my first job, it was not as technical as my professional work experience or university studies, yet, leading and challenging so many people to do something that they had never done before was a very valuable learning experience.

PROFESSIONAL PROJECTS

PYTHON CONSULTATION PROJECT

Projekt202 ---------- July 2019 – September 2019

Projekt202 is a consulting firm with an international presence that specializes in software development, marketing, and business strategy analysis. I helped one of their clients maintain a Python Django based commercial recommendation engine.

Technologies used:

AWS, Python, Django, Node.js, Docker, Docker-compose, Postgres, Keen.io, 1Password, CircleCI, Ansible, Webpack, React.js.

My involvement included:

- Helped audit an inherited code-base and created a set of recommendations for how to proceed with adapting the code.
- Debugged an issue on prod that was preventing us from deploying new code.
- Created an early draft algorithm to calculate a weighted score of manufacture generated metadata in order to create a recommendation engine for the end user.

PYTHON CONSULTATION PROJECT

Adlightning ---------- May 2019 - June 2019

AdlIghtning needed a custom on-line advertisement scanning tool. I built a system that scanned a set of user defined ads on a schedule. The system could identify ads, label them, extract images, and generate statics and metadata on the ads.

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Technologies used:

Ubuntu, VirtualBox, Vagrant, Git, Bash, Python, Pyenv, Supervisor, Docker, Chromedriver, Flask, Click, JSON-RPC, Selenium, Black, Flake8, Pillow.

My involvement included:

- Built an automatic Selenium based ad scanning system.
- Worked with a scheduler system to plan the order of event execution for the system as a whole.

CONSULTATION PROJECT

Kickdrum ---------- April 2019 – May 2019

Kickdrum provides technical assessments to firms seeking to acquire companies. Assessments can also involve mergers, in which case the technical viability of leveraging the technology of multiple companies is considered. I provided technical consultation to the client to inform their assessments.

PYTHON CONSULTATION PROJECT

Projekt202 ---------- August 2018 – February 2019

Projekt202 is a consulting firm with an international presence that specializes in software development, marketing, and business strategy analysis. My partner Chris and I took over one of their client's projects as Sr. Software Architects with a 6-week deadline. We worked to create a project scope that would have the potential to meet business requirements given a tight schedule and be consistent with previous design choices.

Technologies used:

AWS Lambdas, AWS ECS, AWS Aurora w/ Postgres, AWS Cognito, Overall some 50+ AWS services, Docker, Flask, SQLAlchemy, Alembic, Elasticsearch, Flask-Marshmallow, Flask-Restful, O365, Moto.

My involvement included:

- Client had a need to port existing infrastructure to AWS. Large pieces of legacy code were replaced with salvageable elements preserved when prudent.

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- A frontend interface redesign was taking place. The effort had to be coordinated with the backend development of an ETL system that also would provide the API for the frontend.
- A system of AWS Lambdas was implemented to process ETL data into a proprietary JSON schema, and further support the ingestion of that JSON data into a Postgres database using an SQLAlchemy ORM backed schema via a RESTful API hosted by a flask server.
- Did design work for the backend development and DevOps support of the system described above.
- Did work to facilitate designing of sprints.
- Although my role was as a Software Architect, due to the tight timelines involved, I also contributed to backend development.
- Designed and built out elements of AWS Cognito middleware to be used for user authentication.
- Created terraform codebase to automate the creation of AWS resources
- Managed O365 federated login to allow identity based GitFlow workflow to push code to different environments
- Designed a AWS Step Functions system using Lambda to handle bulk ingestion of ETL jobs.
- Setup URL routing scheme for load balancers

PYTHON CONSULTATION PROJECT

Agrarian Labs ---------- May 2018 - July 2018

Agrarian Labs Had built their cloud based product offering on Docker Cloud, when Docker Cloud shut down Agrarian Labs needed to perform an emergency rebuild on AWS based Kubernetes in less then 6 weeks.

Technologies used:

AWS, AWS CLI, kops, Kubernetes, Prometheus, Kubernetes Dashboard, Ubuntu, Vagrant, Virtualbox, Rambo, Make, Python, Go, NSQ, VPN, Conda, Helm, Docker, Docker Hub, Zookeeper, Skipper, Websockets, Nginx, Redis, Datadog, OpenVPN, CircleCI, Glances, Apple OSX.

My involvement included:

- Taught the team how to use Kubernetes

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- Planned the entire migration from Docker Cloud to Kubernetes
- Created a small workstation based deployment of Kubernetes
- Deployed Prometheus into are freshly instantiated Kubernetes
- Setup OpenVPN

PYTHON CONSULTATION PROJECT
Client (name withheld) ---------- May 2018

Client, a partner consulting firm that needed a quick turnaround for a small project for one of their clients. I supported Chris Smith while he created a Webex Teams bot in less than 7 days.

Technologies used:
Node.js, Express.js, npm, Pug, Postgres, Ngrok, Heroku

My involvement included:
- Created a few different light demo projects on Heroku
- Stamped out some Node.js, Express.js, npm boilerplate code

PYTHON CONSULTATION PROJECT
Quansight ---------- March 2018

Quansight, a partner consulting firm asked us to help them build an automated system that would spin up a kubernetes cluster on GCP and then install Jupyterhub via Helm. All from a one a button deployment.

Technologies used:
GCP, Kubernetes, Prometheus, Kubernetes Dashboard, Ubuntu, CentOS, Vagrant, Virtualbox, SaltStack, Rambo, Inflation, Python, Conda, Docker, Node.js, Express.js, Google Cloud SDK (gcloud cli), LastPass CLI, Helm, Semantic-UI, JupyterHub, Jupyter Notebook.

My involvement included:
- Created SaltStack states to automate the instantiation of the GCP Kubernetes cluster.
- Cycled the system about 15 times in order to verify functionality
- Pulled credential codes from the LastPass CLI

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PYTHON CONSULTATION PROJECT

Curiosity.com ---------- January 2018 - February 2018

Curiosity.com, Needed to re-work ad placements and look and feel of their online popular science platform and curated content

Technologies used:

AWS, Python, Ubuntu, Javascript.

My involvement included:

- implemented and integrated a few ad platform SDKs into the client's codebase.
- Worked with the graphic design team to create new page layouts.
- Implemented changes the HTML5 codebase to create new page layouts.
- Audited client's dev environment and created a set of recommendations for streamlining.
- Did some backend work in Python.
- Tuned Nginx in order to setup local routing for dev workstation.

PYTHON CONSULTATION PROJECT

Cox Media Group - Platform ---------- February 2016 – April 2016

Cox Media Group, a department within Atlanta-based Cox Enterprises - Cox Media Group. The department's operations include maintaining infrastructure and platform technologies needed to run the organization's complex content management system.

Technologies used:

Python, jQuery, Apple OS X, HTML5/CSS3/JS, Git, Hg, Virtualenv, Vagrant, Node.js, Adobe Creative Cloud, Office, Less, Open Graph Protocol, Django.

My involvement included:

- Worked with HTML5/CSS3/Less//JS to make several small improvements to the look and feel of customer facing web pages.
- Worked with the 3-party tool Livefyre in order to modify how their service presented shared links on social networking sites.
- Debugged our organization's implementation of janrain, a 3-party customer

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profile-management tool.
- Worked with Apple OS X, iPhone 5s, iPhone 4s, iPad Air, mobile chrome, and safari in order to debug and fix an intermittent problem that only appeared on mobile devices.
- Worked with the 3-party tool Janrain while debugging and fixing a race condition where certain JS files were not being loaded in the customer's web browser in the correct order.
- Worked with the Open Graph Protocol in order to debug and fix an issue with how shared videos were playing on Facebook's wall.
- Provided general code maintenance and refactoring.
- Worked with VirtualBox and Vagrant to set up multiple VM guests for testing/development and other various uses.
- Studied the 3-party online video platform Brightcove, in order to debug a ticket, we needed to gain a better understanding of how Brightcove served video data.
- Modified Django templates.
- Modified backend Python files containing Django template tags.
- Updated a Python unit test.
- Fixed bugs.

PYTHON CONSULTATION PROJECT
Cox Media Group - Radio ---------- August 2015 – December 2015

Cox Media Group - Radio, a department within Atlanta-based Cox Enterprises - Cox Media Group. The department's operations include maintaining 86 radio stations.

Technologies used:

Python, CentOS, jQuery, Linux Mint, Apple OS X, HTML5/CSS3/JS, Git, Hg, Virtualenv, Vagrant, Bootstrap, Node.js, Adobe Creative Cloud, Office, Jade Templates, SCSS, Less, Glyphicons, Flask, Dropbox, SQLite, Jinja2 Templates, Nginx, Grunt, MongoDB, File Compression, Flot, AJAX, SQLAlchemy.

My involvement included:
- Converted PNG file, Office file, and/or PDF file based web page design mock-ups files into fully functional interactive Node.js based web pages and UI features.

- Provided general code maintenance and refactoring.
- Worked with HTML5/CSS3/Less/SCSS/JS to make many small improvements to the look and feel of customer facing web pages.
- Worked with VirtualBox and Vagrant to set up multiple VM guests for testing/development and other various uses.
- Fixed bugs.
- Created new Jade templates which were rendered into new webpages.
- Refactored HTML5/CSS3/JS code in order to be more cross browser compatible and responsive to work well on small screens.
- Prototyped a Python Flask based web portal designed for streamlining the workflow of an internal reporting auditing process.
- Utilised the python module Django-htmlmin to to compress the HTML generated by Flask for the web portal.
- Worked with the Python module Flask-security to implement: user authorization, form validation, and cross-site request forgery protection. For the web portal.
- Worked with Flot/HTML/JS to add and modify live data-driven charts that were rendered in the client-side browser. The data for these charts was generated in the backend and passed to the browser via AJAX and JSON.
- Worked with MongoDB/SQLAlchemy/SQLite to create a backend datastore that worked well with Python and Flask and supported storing user data for the web portal.
- Utilised Python decorators in order to streamline the configuration of which pages rendered by Flask (in the web portal) could be accessed by standard users and which pages could only be accessed by admin users.
- Converted existing static HTML5/CSS3/JS based web pages into HTML5/CSS3/SCSS/JS Jinja2 Template based pages rendered via Node.js.
- Studied, Audited and began automating an internal process that had previously been done manually once each month.
- Wrote documentation in order to help formalize the exact steps that needed to be carried out by any staffer who was assigned the task of completing the monthly internal reporting auditing process.
- Completed the monthly internal reporting auditing process. For a few months in late 2015.
- Worked with colleagues to specify how to best utilize Bootstrap in order to allow our internal project to responsively reflow at 5 breakpoints at 5 device/screen sizes.

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PYTHON CONSULTATION PROJECT

Cox Media Group ---------- June 2014 – August 2015

Cox Media Group, a subsidiary of Atlanta-based Cox Enterprises, is an integrated broadcasting, publishing and digital media company. The company's operations include 15 broadcast television stations and one local cable channel, 86 radio stations, four metro newspapers, more than a dozen non-daily publications and more than 100 digital services. At this time, the company operated one of the largest production deployments of Django in the world.

Technologies used:

Python, Django, Django-South, jQuery, Ubuntu, HTML5/CSS3/JS, Git, Virtualenv, Vagrant, Adobe Analytics, New Relic, Brightcove, Qualtrics, Outbrain, AngularJS, Lazythumbs, Less, Grunt, JIRA, Review Board, BeautifulSoup, CoffeeScript.

My involvement included:

- Converted PNG and/or PDF web page design mock-ups files into fully functional interactive HTML5/CSS3/Less/JS based web pages and UI features.
- Provided general code maintenance and refactoring.
- Created new Django HTML templates which were rendered into new customer facing web pages viewed by millions of users across the country.
- Helping successfully achieve launch goals of JP2 in the Fall of 2014.
- Worked with CMG's automatic ad serving systems to rearrange how and where certain ads were included in customer facing web pages.
- Worked with HTML5/CSS3/Less/JS to make many small improvements to the look and feel of customer facing web pages.
- Reworked how image thumbnails are generated via Django and Lazythumbs.
- Audited the CMG's usage of browser cookies in order to decrease the amount of data that customer's browsers needed to download in order to render a page. Outlined a set of recommendations for CMG to edit and in some cases remove unneeded cookies.
- Worked with Brightcove and Qualtrics to reduce the size of the cookies that they included in web pages served by CMG.
- Worked with VirtualBox and Vagrant to set up multiple VM guests for

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testing/development and other various uses.
- Worked with Adobe Analytics tools to add statistics gathering instrumentation to CMG's online assets.
- Worked with the Python library BeautifulSoup
- Worked with tools from Outbrain to better associate CMG's online content with related content elsewhere on the internet.
- Modified which site URLs are rendered by Django's sitemap generating system in order to create better organized sitemap.xml files.
- Fixed many bugs. These fixes ranged from small visual problems to complex backend issues.
- Wrote documentation for internal code and systems as well as additional documentation and usage summaries for third party products.
- CMG needed to gain a better understanding of their customer's browser resource utilization and in-browser performance statistics. So I worked with New Relic's services to build out custom JS instrumentation for inclusion in their webpages. I worked with New Relic, Application Performance Monitor (APM), Browser, Insights, and New Relic Query Language (NRQL).

PYTHON CONSULTATION PROJECT
Modavanti ---------- March 2013 – June 2014

Modavanti is a New York based E-commerce company that sells sustainable fashion from around the world. They bring an element of environmental and social awareness to the runway. In 2018 Modavanti was acquired by DoneGood.

Technologies used:

Python, Django, Django-South, jQuery, Rackspace, elasticsearch, Ubuntu, Chef, HTML5/CSS3/JS, Git, Mercurial, Virtualenv, Gearman.

My involvement included:
- Modavanti had their own internal graphic designer who created mock-ups and designed the UI for the website. I worked with him to provide technical recommendations as to the development schedule/feasibility of proposed features.
- Converted Adobe Photoshop/Illustrator design mock-ups into fully functional

interactive HTML5/CSS3/JS based web pages and UI features.
- Reworked how product images are downloaded from the Rackspace CDN.
- Worked with Elasticsearch to enhance how customers search for products.
- Refactored Javascript classes that handled the behavior of the infinite-scroll shop page.
- Worked with Rackspace's API to their CDN in order to batch upload image files.
- Worked with Chef, Ruby and some recipe files to spin up some background Gearman worker tasks (which in turn ran on a rackspace VM) for logging user click activity into the database.
- Worked with the Python Gearman client to create some worker scripts that were deployed to the background worker server.
- Revised the project documentation to better describe how to perform a full-stack restart/cloud infrastructure transfer.
- Research the Kissmetrics analytics system and it's API in order to learn how best to integrate its features into the core project.
- Studied Chef and Salt in consideration of switching to Salt.
- Worked with VirtualBox to set up multiple VM guests for testing/development and other various uses.
- Supported Modavanti's cloud infrastructure both the production VMs and the staging VM.
- Maintained the Supervisord configuration that controlled the Gearman background worker processes.
- Modavanti needed to gain a better understanding of their customer's click-through paths, so I used Django-South to modify the database schema in order to store click event data. I also customized the Django Admin portal so that it would display the data.

PYTHON CONSULTATION PROJECT
mobiusmed.com ---------- June 2013 – December 2013

Mobius Medical Systems offers innovative software for modern radiation oncology. Specifically, they offer products that help Medical Physicists analyze radiation treatment plans for accuracy. Intensity modulated radiation therapy allows for radiation to more selectively target cancer cells. However, plan error tends to increase with modulation. To fully leverage modulation, plan error must be controlled as much as possible. In 2018 Mobius was

acquired by Varian Medical Systems.

Technologies used:

Python, CouchDB, PyCUDA, NumPy, Flask, Genshi, Foundation, jQuery, Ctypes, Coffee-Script, couchdb-python, HTML5/CSS3/JS, Selenium, PhantomJS, Git, Virtualenv.

My involvement included:

- Worked with CouchDB to create new MapReduce views to distill data.
- The Mobius Med wanted to be able to access Nvidia GPU cards from a virtual machine. So I set up VMware, ESX, ESXi, VSphere, and Xen for a round of experiments to try and configure VT-d based PCI pass-through.
- Ported an algorithm originally written in NumPy to C, to be called in Python via ctypes to aid in hitting performance benchmarks.
- Added in product features, by working with Python Flask views, Genshi templates and HTML5/CSS3/JS. Also used GIMP and Adobe Photoshop to edit some web site artwork/images.
- Worked with PhantomJS to reconfigure the DPI resolution of exported PDF files.
- Worked with the Nvidia CUDA compiler on Linux Ubuntu and PyCUDA.
- Made many aesthetic and UI interactivity changes to the project code.
- Worked with WebGL and the scientific visualization toolkit XTK.
- Worked with Selenium to create a Python module that could be used to run UI tests against the HTML5 interface.
- Refactored some aspects of how data is stored and retrieved to/from CouchDB.
- Moved/created python functions that forked off as child processes to run in the background.
- Created a forked process monitoring module that gathers performance statistics (including memory usage, cpu-time, wall-time) of each child process and stores this data into CouchDB.
- Created some HTML email and interfaced with the Python module smtplib to send them.
- Developed a UI feature that displayed complex data, distilled from multiple sources, in a simple tooltip table. Used both Foundation 2.0 and jQueryUI, ultimately choosing jQueryUI.
- Wrote unit tests, using the unittest Python module and Selenium

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PYTHON CONSULTATION PROJECT
agyield.com ---------- January 2012 – March 2013

Agyield.com offers a very useful tool for risk management for farmers that allows them to understand the costs and risks related to their crops in order to keep track of and project profit scenarios.

Technologies used:

Python, Django, Less, AWS, MySQL, jQuery, Ubuntu, HTML5/CSS3/JS, Mercurial.

My involvement included:

- Worked with the CEO and CTO of the company that offers the agyield.com service to understand and revise the development roadmap.
- Performed a broad ranging review of the Agyield's technical operations.
- Worked with AWS to help maintain the Agyield's production servers.
- Studied commodities trading and crop insurance.
- Worked with ReportLab and wkhtmltopdf to programmatically create PDF files.
- Worked with the Agyield's ETL systems that regularly downloaded and processed data purchased from a third party.
- Implemented many aesthetic and code changes in HTML5/CSS3/JS.
- Refactor HTML5/CSS3/JS code in order to be more cross browser compatible and work well on a small screen.
- Modified how and when emails were pragmatically sent.
- Optimized/Refactored crop insurance calculation functions in Python.

PRO BONO PROJECT
Space Development Matrix ---------- 2019 - Present

Earth Light Foundation is in the process of creating an information archiving and exploration tool. Designed from the ground up to be a tool to help people explore the many interrelated technologies involved in human space flight and space settlement. Similar to a wiki, the systems will allow community edits and will present data and information in a hierarchical and interactive way. I was involved in this project at an early stage.

Technologies used:

Python (3.6+ from anaconda), sphinx, requests, flask, flask-login, flask-security, flask-sqlalchemy, wkhtmltopdf, Js (jquery, node.js), AWS, IBM Cloud, VirtualBox, Vagrant, Linux (ubuntu), Bash, DNS, Git (GitLab), SaltStack, Nginx, Postgresql, Mongodb, Wolfram Research Mathematica, KeyShot.

My involvement included:

- Created proof of concept boilerplate code
- Evangelism
- Meeting planning
- Graphic design
- DevOps
- Python Development
- Integrated a html5 in-browser 3d object rotator

PRO BONO PROJECT

Disaster Recovery for client ---------- February 2013

Client was a small company that had unrecoverably lost it's source code, and only had a single copy on their production server running their webapp. They didn't know how to access this copy safely, or if it was a complete repository or just a single checkout of the code. I worked with the client to understand the nature of the problem and estimate its severity. I participated in the creation and execution of a plan of action that would fix the issue, I also helped to explain to the client what had been done in order to remedy the situation.

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SIDE PROJECTS

OPEN SOURCE PROJECT

Epython ---------- 2019 - Present

Epython is A typed subset of Python to provide a standard way to extend any Python runtime with new types and builtin functions.

The work is open source and can be found here:
https://openteams.com/projects/epython

Technologies used:

Python, PyPy, Cpython, Brython, SaltStack, Ubuntu, Vagrant, VirtualBox, Slack

My involvement included:

- Involved early on with brainstorming and organizing
- Created early proof of concept boilerplate code
- Evangelism

OPEN SOURCE PROJECT

Microsoft Azure and Windows Servers ---------- 2018 - Present

Azure is offering an interesting collection of services. I have been using them for experimental projects.

Technologies used:

Python, SaltStack, Windows Server 2012/2016/2019, Azure, DevOps, Boards, Repos, Pipelines, Functions, Virtual Machines, Office 365, Active Directory, Hyper-V Server, SQL Server, Windows Pro Enterprise, Visual Studio Code, Account Management.

My involvement included:

- Ran python 3.6 on Azure Functions
- Setup DevOps Pipeline
- Helped teach Azure systems to my apprentice
- Administered a few O365 + Azure accounts for partners/clients

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OPEN SOURCE PROJECT
terminallabs.com ---------- 2011 - Present

terminallabs.com is our own company website. Through it we have taken the opportunity to use several technologies. Though we have a fairly simple website, the body of work that supports our website continually evolves. As much as our time allows, we habitually use this to experiment with new technologies and methodologies, while striving to maintain ease of maintainability. Currently, our website is using Lektor as a CMS, Framework, and Static Site Generator.

The work is open source and can be found here:
https://bitbucket.org/terminal_labs/tl-lektor

Technologies used:

Python, Django, Mezzanine, Flask, Lektor, AWS (EC2, S3, Cloudfront, Route53), DigitalOcean, Vagrant, Salt Stack, Jira, Bitbucket, Git, Mercurial, Postgres, Debian, Buildbot, Jinja, Less, jQuery, Locust, Selenium.

My involvement included:

- Iteratively developing the frontend codebase working with HTML5/JS/LessCSS and Django or Jinja templates
- Iteratively developing the Python server backend with Django / Mezzanine / Flask. This included creating models changes, views, and modifying the CMS for altering content in admin.
- Using Lektor as a web-framework and static site generator and hosting this static site over AWS S3 & Cloudfront with SSL.
- Maintaining multiple code repositories in Mercurial and Git.
- Creating a repository that heavily uses Vagrant and Salt Stack to create and manage both development and production environments on either AWS or DigitalOcean. With a simple `vagrant up` with a couple optional arguments you can spin up local or cloud-based dev instances or cloud-based production instances.
- Used locust with selenium to do load testing against our deployment.

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OPEN SOURCE PROJECT

Inflation ---------- 2017 - Present

Inflation is a tool that allows you to simply orchestrate and provision a cluster. It is built on top of **Rambo** (listed below). With Inflation you can with a couple commands you can create a variable number of virtual machines. This cluster can either be local on a powerful enough computer or created with cloud based virtual machines such as Digital Ocean Droplets or AWS EC2 instances. The cluster is easily configured to have subsets of VMs created and provisioned differently for specialized purposes, so subsets may have varying hardware and configured with different software, all networked together for powerful parallel computing. We cycled the full cluster over 20 times, sometimes we configured the cluster to be small at 6 nodes, sometimes we spun it up with 64 nodes. We can set the cluster size by changing one int in the config file. We have gotten hdfs volumes up to about 5 TB with about 375 GB of distributed ram. This cluster ran on DigitalOcean.

The work is open source and can be found here:
https://github.com/terminal-labs/inflation

Technologies used:

Python 2 & 3, Bash, DigitalOcean, AWS EC2, Vagrant, Rambo, VirtualBox, LXC, SaltStack, Hadoop, HDFS, Ambari, Spark, Dask, Pandas, Jupyter, Distributed, Ubuntu/Cent/RHEL/Debian/Fedora, Yarn, Terraform, Packer, CircleCI.

My involvement included:

- Configured inflation to install Hadoop with Hortonworks Ambari.
- Configured inflation to install Hadoop HDFS.
- Wrote Jupyter notebooks that ran on a Hadoop Edge Node to distribute data storage and computation, using Anaconda Dask and Distributed, Pandas, and Hadoop HDFS.
- Used Jupyter's Magic to use HDFS to import data and in situ configuration of Edge Nodes.
- Imported ~100 GB of data from a Digital Ocean Volume onto HDFS and processed it with Python.
- Cycled clusters repeatedly.
- Created a 64 node Hadoop cluster, and a 120 node general cluster.
- Built an automation layer around Packer to build several customized Vagrant boxes. This work can be found at https://github.com/terminal-labs/vagrant-boxes. The boxes can be found at

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https://app.vagrantup.com/terminal-labs
- Automated setting of FQDNs, hostnames, and SSH keys.
- Create a minimal Flask server to allow an API for guest machines / minions to communicate with the host / master Salt Server.

OPEN SOURCE PROJECT

Rambo ---------- 2015 - Present

Rambo is a tool that allows you to simply provision new virtual machines on any provider and have them be nearly identical. To accomplish this Rambo makes heavy use of Vagrant and it's various plugins for different providers. As a design philosophy, we really want to have development environments that are as similar as possible to production environments. This streamlines development, catches bugs, and helps smooth production releases. So to achieve this, we wanted to automate the provisioning of these environments. For this we used SaltStack. Among other things, SaltStack is great for provisioning machines. With it, we can provision a local or remote instance pretty easily.

The work is open source and can be found here:
https://github.com/terminal-labs/rambo

Technologies used:

Python, Bash, Ruby, AWS EC2 and S3, DigitalOcean, Vagrant, VirtualBox, Packer, LXC, SaltStack, Jira, Bitbucket, Git, Mercurial, Postgres, Debian, Buildbot, Bitbucket Pipelines, Apple OS X, CircleCI.

My involvement included:
- Setup a buildbot server for continuous integration and automated testing of Rambo which requires VT-x and VT-d.
- Created virtual machines on AWS EC2, DigitalOcean, VirtualBox, & LXC
- Worked with numerous Vagrant plugins each from different developers and organizations with different design philosophies.
- Worked with complex SSH key vendor and authentication systems.
- Maintaining multiple code repositories in Mercurial and Git.
- Smoothed out many inconsistencies between several different cloud providers.

- Created SaltStack configurations with over 50 salt states and custom grains.
- Wrote some custom Vagrant code in Ruby.
- Integrated this project into a cluster with over one hundred virtual machines all running at the same time all managed by SaltStack.
- Worked with LXC on Ubuntu 16.04 and Debian 8 in order to add LXC as a supported provider.
- Worked with Bitbucket Pipelines.
- Created custom VirtualBox and LXC images for use with Rambo.
- Worked with Docker in order to incorporate it as a supported provider.
- Wrote a simple deployment and initiation script in Bash.
- Used Packer to create a few dozen VirtualBox images, in several flavors. Both Debian based and Ubuntu based.
- Publicly hosted VirtualBox images on AWS S3
- Wrote documentation and tested against its instructions.

PYTHON DEMONSTRATION PROJECT

PiCloud/iPhone pi distribution statistics app ---------- April 2013 – March 2013

This nice iOS app is a simple demonstration of calling the PiCloud cluster via an iPhone app. From the app, the user can search for an inputted string in several billion digits of the decimal expansion of Pi. In 2013 PiCloud was acquired by Dropbox.

Technologies used:

Ubuntu Server, Apache Cordova, PiCloud, Flot, Apple OS X, Xcode, Python Tornado, Nginx, HTML5/CSS3/JS, jQuery, Mercurial.

My involvement included:

- Used Adobe Photoshop/Illustrator and GIMP to design mock-ups of the app.
- Converted Adobe Photoshop/Illustrator design mock-ups into fully functional interactive HTML5/CSS/JS and UI features.
- Developed a functional backend server in Python Tornado for receiving/processing AJAX data send from the iPhone app.
- Studied and worked with PiCloud and their API in order to become proficient with their environment.
- Developed an iOS app in Xcode using PhoneGap (aka Cordova) and HTML5/CSS3/JS

- Created a simple HTML5 based iPhone/PhoneGap “mockup viewer” in order to ease and accelerate development. Configured a Nginx server to support the “mockup viewer”.
- Assembled some open source JavaScript modules into a small utility library that abstracts the underlying JavaScript methods into a more “python-esq” syntax, in order to increase readability.
- Studied multiple JavaScript plotting libraries and ultimately chose Flot, and integrated it into the PhoneGap App.
- For this project we needed to test on physical iOS devices, so I used multiple developer tools from the Apple ecosystem (iOS provisioning portal, app signing, physical device deployment)

EDUCATION

- 2008
  Bachelor’s Degree (with Honors), Liberal and Integrative Studies Emphasizing Commercial Spaceflight and Astrophysics, University of Illinois at Springfield.
- 2005
  Studied Mechanical/Aerospace Engineering, at the University of Alabama in Huntsville (Honors Program).
- Associate's in Science Degree, Lincoln Land Community College (Honors Program).

PATENTS ISSUED

- High Specific Impulse Superfluid and Nanotube Propulsion Device, System and Propulsion Method.
  - Patent 8,991,150. 31 Mar. 2015.
- Web Insulation System, Valve for a Web Insulation System, and a Storage Container Using the Web Insulation System.
  - Patent 8,991,636. 31 Mar. 2015.
- Apparatus and Method for Anonymously Presenting Targeted Advertisements and Desirable Media Content in Association with a Virtual Currency.
  - Patent 9,001,979. 7 Apr. 2015.
- Web insulation system, valve for a web insulation system, and a storage container using the web insulation system (continuation).
  - Patent 9,279,540. 8 Mar. 2016.

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AWARDS AND ACCOMPLISHMENTS

- Member of the American Institute of Aeronautics and Astronautics (AIAA) Nuclear & Future Flight Propulsion Technical Committee (NFFPTC).
- Earned the Congressional Award. I received the Bronze, Silver, and Gold Medals.
- Received the Boy Scouts of America (BSA) Ranger Award, Gold Award, Silver Award, and Bronze Award.
- Completed the BSA's Lifeguard Training program and the BSA's Climbing Instructor training program.
- Studied in the University of Alabama in Huntsville's Honors Program.
- Volunteered at the University of Alabama in Huntsville's Propulsion Research Center.
- Received first place at the 2008 Science Research Symposium held at the University of Illinois at Springfield for "Implementation of a Multi-Platform General Purpose Distributed Computation Grid.
- I hold a Professional Association of Diving Instructors (PADI) Open Water scuba diving certification.

VOLUNTEER AND SOCIAL

I have taught beginner to intermediate students aspects of a diverse range of topics, including:

Python development, linux, database systems, virtual machine usage, AWS EC2/DigitalOcean/Azure usage, c/c++, algebra, wolfram language, astrophysics, cosmology, relativity, raspberry pi usage, black hole mechanics, finance, economics, computer science, environmental science, space science, spacecraft propulsion, thermal dynamics, quantum computation.

ORGANIZATIONS

- National Space Society
- Earthlight Foundation
- American Institute of Aeronautics and Astronautics
- Association for Computing Machinery
- Experimental Aircraft Association
- American Physical Society

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PROGRAMS & TOOLS THAT I HAVE EXPERIENCE WITH

Software Programs:

- Adobe Creative Cloud Suite
  - Photoshop
  - Illustrator
  - InDesign
  - Premiere
  - XD
- Wolfram Research Suite
  - Mathematica
  - Enterprise Private Cloud
  - WolframOne
  - WolframCloud
  - WolframAlpha
  - WolframEngine
- Unity Game Engine
- Mathcad
- Maple
- Gimp
- Inkscape

CAD, Modeling and Rendering:

- Moment of Inspiration
- Rhino3d
- SolidEdge
- KeyShot
- Corelcad
- Bricscad
- AutoDesk Product Design & Manufacturing Collection
  - AutoCAD
  - Inventor
  - Fusion 360
  - 3ds Max
  - Vault
- Adobe 3d Collection
  - Substance Painter

Python Frameworks, Platforms and Modules:

- Lektor
- Locust
- Anaconda
- BeautifulSoup
- Ctypes
- Dask
- Django
- Django-CMS
- Django-htmlmin
- FastAPI
- Falcon
- Flask
- Flask-security
- Lazythumbs
- TensorFlow
- PyTorch
- Jupyter
- NumPy
- Moto
- PiCloud
- PIL
- PyInstaller
- PyQt
- PySide
- Python Mezzanine
- Python Pyramid
- Python Tornado
- SQLAlchemy

Operating Systems:

- Apple OSX
- CentOS
- RHEL
- Damn Small Linux
- Debian
- Fedora
- FreeBSD
- iOS
- Linux Mint
- Slackware
- Sun Solaris 9

Web Apps:

- Bitbucket
- GitHub
- GitLab
- Backlog
- JIRA
- Dropbox
- O365
- Onedrive
- Google Docs
- Google Drive
- Google Hangouts
- Pivotal Tracker
- Redmine
- Review Board
- VersionOne
- Zoom
- Skype
- WhatsApp
- Slack
- Shift

Frameworks:

- AngularJS
- Backbone
- Bootstrap
- Semantic-UI
- Ember
- InK
- jQuery
- PhoneGap (aka Cordova)
- Qt
- Node.js
- React.js
- Express.js

Cloud Providers And Data Centers:

- Amazon Web Services
- Azure
- GCP
- IBM Cloud

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    - Substance Stager
- Blendigo
    - Indigo Renderer
    - Blender

Additive Manufacturing:
- Onshape
- SolidWorks
- Ultimaker Cura

Legacy Software Programs:
- SpaceClaim
- Anark Studio

Misc Tools and Libraries:
- 7-Zip
- Ansible
- Clonezilla
- Docker
- Docker-compose
- Flot
- Gearman
- Genshi templates
- Django templates
- Git
- GParted
- Grunt
- Jade templates
- Jinja templates
- KVM virtualization
- Lastpass
- 1Password
- TeamViewer
- LogMeIn
- Less
- Mercurial
- OpenVPN
- PhantomJS
- Rsync
- SaltStack
- Selenium
- SpinRite
- Apt/Yum/Snap
- Ubuntu
- Xubuntu
- ESXi
- Windows
- Amazon Linux

Platforms and Analytics:
- Adobe Analytics
- Adobe DTM
- Brightcove
- Kissmetrics
- Keen
- New Relic
- Omniture
- Kubernetes
- OpenStack
- OpenShift
- Outbrain
- Qualtrics

Virtual Desktop Infrastructure:
- Vmware
- Vmware with nvidia quadro via PCI passthrough
- Vmware Horizon
- Physical to virtual conversion
- Citrix and Citrix Hypervisor
- Windows Server 2016
- Active Directory
- Hyper-V Server
- SQL server
- Dell Wyse thin clients
- AWS Workspaces
- Teradici PCoIP Connection Manager for Amazon WorkSpaces
- Teradici PCoIP Cloud Access for GPU workloads
- NVIDIA Quadro Virtual Data Center Workstation
- Rackspace
- DigitalOcean
- OnRamp
- M5hosting
- Heroku
- Netlify

Amazon Web Services:
- S3
- EC2
- IAM
- ECR
- EKS
- ECS
- RDS
- VPC
- SQS
- CLI Tools
- Route 53
- CloudFront
- DynamoDB
- CloudFormation
- Certificate Manager
- Workspaces
- Lambda
- API Gateway
- Cognito
- CodeBuild
- CodeDeploy
- CodePipeline
- Step Functions
- SageMaker

Database Systems:
- CouchDB
- Elasticsearch
- Memcached
- MongoDB
- MySQL
- PostgreSQL
- SQLite

Servers:
- Nginx

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- SSH
- Subversion
- Syncthing
- TrueCrypt
- UnixUtils
- Vagrant
- VirtualBox
- Packer
- Virtualenv
- VMWare Workstation
- Webpack
- Xen
- LXC
- Buildbot
- Terraform

(Quadro vDWS) running on VMware vSphere and Horizon View

- LAMP
- Lighttpd

IOT and Machine Learning:

- Nvidia Jetson Nano
- Raspberry pi
- Apple iPad
- IOT Linux USB camera
- NOOBS
- Rufus, BalenaEtcher and SD card partitioning
- Fanless GPU CUDA based ML - GeForce GT 1030 SC 2GB GDDR5 Passive
- Fanless Intel server
- Ubiquiti PoE
- Ubiquiti airCube
- Ubiquiti EdgeRouter

Compilers:

- Dev C++
- F95
- g95
- GCC
- Shed Skin
- Tiny C Compiler
- XCode
- Go
- Cython

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- Brython
- PyPy

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