# Thomas Zimmerman

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# Professional Portfolio

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## Personal Summary

My name is Thomas Zimmerman and I am an engineer.  Linux is my means, scripting is my prose, and homelabbing is my craft. I am a maker, poet, and technophile. Careers with which I would see myself flourishing include DevOps, Site Reliability Engineering, IT Operations, Cloud Architecture, System and Virtualization Administration, and Linux/Unix Consultation.

I look at learning new technologies as a challenge, and I am the defier. I have an uncanny ability to rapidly learn on my own, a dedication to self-education, and a fondness for FOSS. I have been a technology enthusiast since I was a child and I have been using Linux daily since I was 15. I am an individual that believes in using the best tool to get the job done and I live to solve complex problems. Above all else, I am a person who enjoys team-oriented environments where I am often challenged to learn and implement new technologies.

In my free time I enjoy raising saltwater fish and corals, gardening, reading science fiction, and cultivating my homelab. I have an always-on ESXi 6.5 based home server with which I maintain dozens of virtual machines and containers. Much of my time is spent working on my website, www.tjzimmerman.com, learning cool new software, and practicing my systems administration.

## Career Objective

I've had a fascination with computers since childhood. As I've grown this passion into a career I've explored Software Engineering, Systems Administration, and Operations Engineering. I've always been prone to automating my workflows and compulsively monitoring my home network infrastructure so, as the DevOps methodology became more popular over the past few years, I found that this was the direction in which I wanted to take my career.

Ideally, I would like to work in a fast-paced and team-oriented atmosphere for an organization with a predominantly Linux-based infrastructure. Causes I particularly care about include marine life, the aerospace industry, and STEM education so an organization in one of those industries would be ideal. Open offices that encourage agile development and collaboration stimulate me to do my best work.

I'm currently located in Michigan, however, I've wanted to live in Seattle for most of my life and I am finding myself more and more drawn to the startup atmosphere of the West Coast lately. I would be open to relocating to another part of the United States for the right opportunity and I welcome the idea of frequent traveling with excitement. While working at Blue Medora I spent a lot of time with the Sales Architects creating use cases for demonstration environments of our software. This exposure allowed me to see a unique perspective into their careers and the idea of consultation and traveling to customer sites has been something I've often considered since.

## Contact Information

I prefer communication by email, however I can be reached by phone as well. Additionally, my online presence can be found on many websites.


| | |
|---|---|
| ***Phone*** | (989) 317-7325 |
| ***Email*** | TJ@TJZimmerman.com |
| ***Website*** | https://TJZimmerman.com |
| ***GitHub*** | https://GitHub.com/Zimmertr |
| ***LinkedIn*** | https://www.LinkedIn.com/in/ZimmermanThomas/ |

# Professional Recommendations

**Craig Lee -** Chief Systems Architect
*Blue Medora*
*(231) 343-1740*
*February 22, 2017*

"TJ demonstrated an excellent comprehension of virtualization infrastructure skills in his work at Blue Medora. He was instrumental in our demo environment project which involved complex Linux system administration."

**Dylan Myers -** Systems Engineer
*Blue Medora*
*(616) 323-6158*
*February 22, 2017*

"TJ is a very knowledgeable and detailed engineer. His depth of Linux knowledge, and his acumen in that has allowed him to accomplish a number of difficult and complicated tasks on his own. He has a great capacity for research, and is very capable of teaching himself many things in a reasonable amount of time"

**Wesley Creager -** Systems Analyst
*Blue Medora*
*(616) 322-2125*
*February 10, 2017*

"Thomas is a very hard working and intelligent individual. From the beginning of his time at Blue Medora he raised the bar for the expectations of an intern, and continues to excel now as a full time employee. His drive to continually learn new skills has always been an asset, and I am sure will serve him well throughout his career"

**Dan Lindeman –** Software Engineer
*Blue Medora*
*(586) 630-2175*
*February 23, 2017*

"Thomas is an excellent colleague with a vast array of skills. When I found myself on projects with him I knew for certain that every task would not only be completed, but that Thomas was thinking above-and-beyond simply what was required of the team. His pragmatism, focus, and kindness shows in every aspect of his work. I would work with Thomas again in a heartbeat."

**Audra Gamble -** Editor in Chief
*Grand Valley Lanthorn*
*(734) 612-0198*
*February 6, 2017*

"TJ was my web manager at the Grand Valley Lanthorn, and he added a great deal to our team. He was always a joy to have in the office, and is very personable. He also made sure to carefully explain the tech of what we needed to our very non-tech oriented staff in a way that was easy to understand and follow. Throughout his time with the Grand Valley Lanthorn, it was clear that TJ was strongly invested in our company's product and cared a great deal about its success."

# Work Experience

### Engineering Operations Engineer
Blue Medora Labs
*Grand Rapids, Michigan*
*Oct 2016 – Mar 2017 // 6 Months*

I originally started at Blue Medora as an intern. I was hired full time as an Operations Engineer when their new subsidiary, Blue Medora Labs, was created. Since Blue Medora was so heavily partnered with other companies, they received a lot of contract work which tied up the capacity of the engineers and slowed down development on our core projects. Blue Medora Labs was created to handle this contract work and to make the company more appealing for acquisition.

I was responsible for the majority of the operations that our department encountered. The largest project that I worked on involved designing and developing a container-based infrastructure using Rancher, Docker, and ESXi/vCenter to maintain an array of RancherOS hosts with a cumulative active container count of 25-50 and multiple users.

A contract I worked on involved developing software to parse the logs created by over 25 different enterprise technologies. I was responsible for obtaining, installing, configuration, and containerization of each application as well as exercising and writing scripts to put load on them to generate dynamic and interesting log content. This project covered technologies that ranged from the Apache Big Data suite of applications (Hadoop, Cassandra, Spark, Hive, Kafka, and Zookeeper) to other common enterprise applications such as Oracle Management Cloud and Enterprise Manager, NGINX, Microsoft DNS, .NET Framework, and VMware ESXi.

During the early phases of this project I was also responsible for development. I reverse engineered an example product provided to us from the requisite company to understand in detail how it functioned as well as how it would be interpreted by the parent software. Additionally, I collaborated with a developer from Blue Medora proper to automate much of the design and deployment of future products under this contract with Ruby and Rake tasks. As the project continued and we hired more engineers, I was responsible for training them how to develop these products as well as how the product actually functioned.

Working alongside software engineers, management, and the IT team, I prevented bottlenecks by streamlining processes and resolving potential roadblocks before they were fully realized. I led meetings to demonstrate progress on projects to senior management as well as participated in other Agile-focused meetings where development progress was demonstrated to requisite companies.

In addition to the above, I also worked with other members of the team not associated with these projects for technologies including VMware vRealize Operations Manager, VMware vRealize Automation, VMware vRealize Orchestrator, and Oracle Enterprise Manager for installation, configuration, training, and support-related tasks.

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### Engineering Operations Intern
Blue Medora Labs
*Grand Rapids, Michigan*
*Mar 2016 – Oct 2016 // 8 Months*

As an intern at Blue Medora, I worked on their DevOps team which was responsible for all virtual server and DNS administration within the organization. I worked with a datacenter containing over 1000VMs, several physical sites, and a multitude of hosts. Blue Medora is a company that specializes in developing software plugins to extend the functionality of popular IT infrastructure monitoring solutions such as VMware vROps, Oracle Enterprise Manager, and New Relic. My principle role in this organization was to deploy, configure, and exercise a large variety of databases, enterprise applications, and hardware for a team of over 50 software engineers.

In addition, I also frequently collaborated with the Chief Systems Architect and several Sales Architects to design customer-focused use cases that I used to build empathy-driven demonstration environments to sell our software. I predominantly worked with VMware vRealize Operations Manager and our products to accomplish this. These demo environments exploited a hidden feature in vROps that allowed data to be retrieved from the database and played back to the system as if it were being collected live. The value provided by this feature combined with these environments contributed to the success of several record-breaking financial quarters. Additionally, it allowed us to disable much of the stress testing and load generation on our targets which greatly reduced the overall consumed resources in our infrastructure. Working with the Vice President of Engineering, I automated much of this procedure and greatly reduced the time required to develop future demonstration environments as well as allowed data to be reused between demonstration environments.

### Data Communications Lab Administrator

Grand Valley State University
*Allendale, Michigan*
*Sep 2014 – Sep 2016 // 2 Years, 1 Month*

While studying at Grand Valley State University, I worked as the System Administration of the Data Communications Lab. The Data Communications Lab was used to teach classes involving advanced networking, programming, and computer security. I was responsible for maintaining over 30 student workstations, multiple server racks full of Cisco switches and routers, and a swath of other enterprise networking equipment.

While working there, I also planned and performed a site-wide upgrade from BackTrack Linux to Kali Linux as well as generated a solution to image these machines semi-annually with CloneZilla and PXE boot to greatly reduce the amount of time required for semi-annual maintenance windows.

Additionally, I managed all network configuration, management, and installation on both the physical and software side for three racks of Cisco routers and as well as designed and implemented an infrastructure of six Cisco APs, four WLAN Controllers, and a PoE switch to integrate new hardware into the curriculum of the networking classes.

Lastly I was responsible for troubleshooting and providing support for the multitude of issues computer labs often encountered including networking, software, and hardware issues as well as preparing the lab for lessons taught by several different faculty members.

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### Website Manager

Grand Valley Lanthorn
*Allendale, Michigan*
*May 2013 – May 2016 // 3 Years, 1 Month*

As the Website Manager for the Grand Valley Lanthorn, I updated and maintained our website as our newspaper released bi-weekly issues. I utilized Gryphon, a CMS designed by Michigan State University to manage the content as well as other software commonly involved in media including Adobe Photoshop, Acrobat, and NewsEdit. Other focal points of my position included using Google Analytics to increase overall website traffic, pagehits and search engine optimization.

While working at the Lanthorn, I also oversaw a large iterative website overhaul and the migration of the entire underlying content management system. I worked directly with several other members of the newspaper as well as the developers of Gryphon at Michigan State to mitigate downtime and to ease the workflow transitions for the journalists and editors.

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### Repair Technician / Sales Engineer

Huizar Machines Computer Repair
*Rose City, Michigan*
*Jun 2010 – Jan 2011 // 8 Months*

Working for Huizar Machines was my first exposure to computers from the business perspective. While employed, I was responsible for troubleshooting and repairing customer workstations for a variety of issues that spanned both hardware and software. I frequently replaced desktop hardware, performed software upgrades and operating system installations, removed malware, and organized a large hardware inventory.

While working at Huizar Machines, I also performed several onsite calls where I was involved in projects including overhauling an entire hotel's networking infrastructure as well as executing software upgrades, maintenance, and troubleshooting for an office environment and a library. When I did not attend calls with my boss, I was responsible for all customer-facing interactions. This required me to receive customer information and computers as well as perform the initial diagnosis and root cause analyses on their devices.

In order to automate a lot of procedures, I also wrote several scripts to troubleshoot basic networking and hardware issues that we occasionally encountered.

# Education

### Bachelor of Science (B.S.), Computer Science / Information Systems

Grand Valley State University
*Allendale, Michigan*
*Sep 2011 – Dec 2016 // 5 Years, 3 Months*

I started studying at Grand Valley State University with Computer Science declared as my major. For the first two and a half years I studied software engineering until I discovered systems administration and changed my major to Information Systems. Throughout the course of my education I also studied General Business and I completed my Bachelor of Science and received my degree in December, 2016.

While at Grand Valley, I principally worked with JAVA, C++, Visual Basic, and C# to learn programming methodologies, data structures, algorithms, and the other components of software engineering. Other topics I covered included using ASM to learn about computer organization, processor architecture, machine language, and the interaction of hardware as well as designing a Oracle database by creating a logical model and eventually implementing it.

Grand Valley also gave me an exposure to enterprise networking by teaching the entire OSI model using hands-on design projects. Another core focus of my education included advanced mathematics including Boolean algebra, logical proofs, statistics, calculus and trigonometry. Additionally, my core degree included classes in Project Management including Systems Analysis and Design and Management of Information Systems.

Grand Valley is a liberal arts college so, in combination with the above core education, I also learned about a variety of topics from biology and geography to communication, religion, and philosophy.

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### High School Diploma

Ogemaw Heights High School
*West Branch, Michigan*
*Sep 2007 – Jun 2011 // 3 Years, 10 Months*

Much of my education at Ogemaw Heights was what you would expect any student my age in America to have experienced. However, my school allowed a variety of free electives. I used this opportunity to study computers and software engineering when possible. During high school I took courses where I learned how to program in VB6 and PHP as well as how to develop websites in HTML and create video games using Game Maker.

I was a member of the Youth Advisory Counsel, Business Professionals of America, and Chess Club in High School as well as played center and defensive end on our school's football team, the Falcons. In 2009 was the Vice President of Business Professionals of America and I competed in PC Servicing & Troubleshooting where I placed 2nd at the regional level and 3rd in the state of Michigan.

# Personal Projects

## Personal GitHub

I am a proponent of open source software and most of the code that I have written in my life can be found on my public GitHub account. There are over 35 repositories that include my personal website, Dockerfiles, Chef Cookbooks, tools and scripts that I have written for both personal and professional use, programming projects I completed for my degree, my dotfiles for my workstation and dev environment, and my ongoing work with learning embedded programming in C with my Arduino.

## VMware ESXi 6.5 Homelab

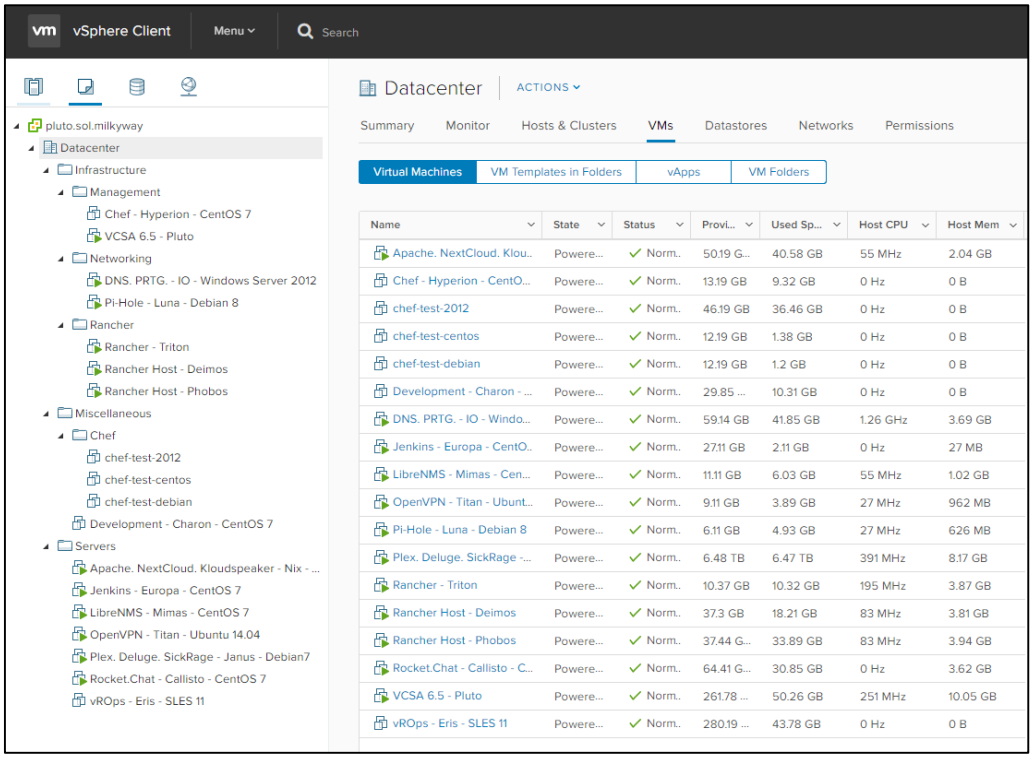
Perhaps the largest project I have been involved in and likely my favorite has been my extensive homelab. Over the past few years I've explored systems administration at home by hosting webservers and other applications until I finally took the plunge and setup a personal virtualization server. The underlying hypervisor is VMware ESXi 6.5 and the hardware is a 2008 Mac Pro with dual Intel Xeons, 64GB of memory, and expansive flash storage. I actively maintain dozens of virtual machines and Docker containers that I use to run software like the vSphere appliance, Plex Media Server, Rancher, and Chef for both educational and learning purposes.

Most of my servers are Linux based however I use Windows Server 2012 R2 for DNS and DHCP. I have flashed OpenWRT to my NetGear router which I use in bridge mode with my AT&T modem as my router and firewall. Also on my network I have a managed Gigabit switch from which I have QoS configured to give network priority to my wireless devices and workstation over my virtual servers and I have configured a separate vLAN that I use as a DMZ so as not to expose me entire LAN to the internet.

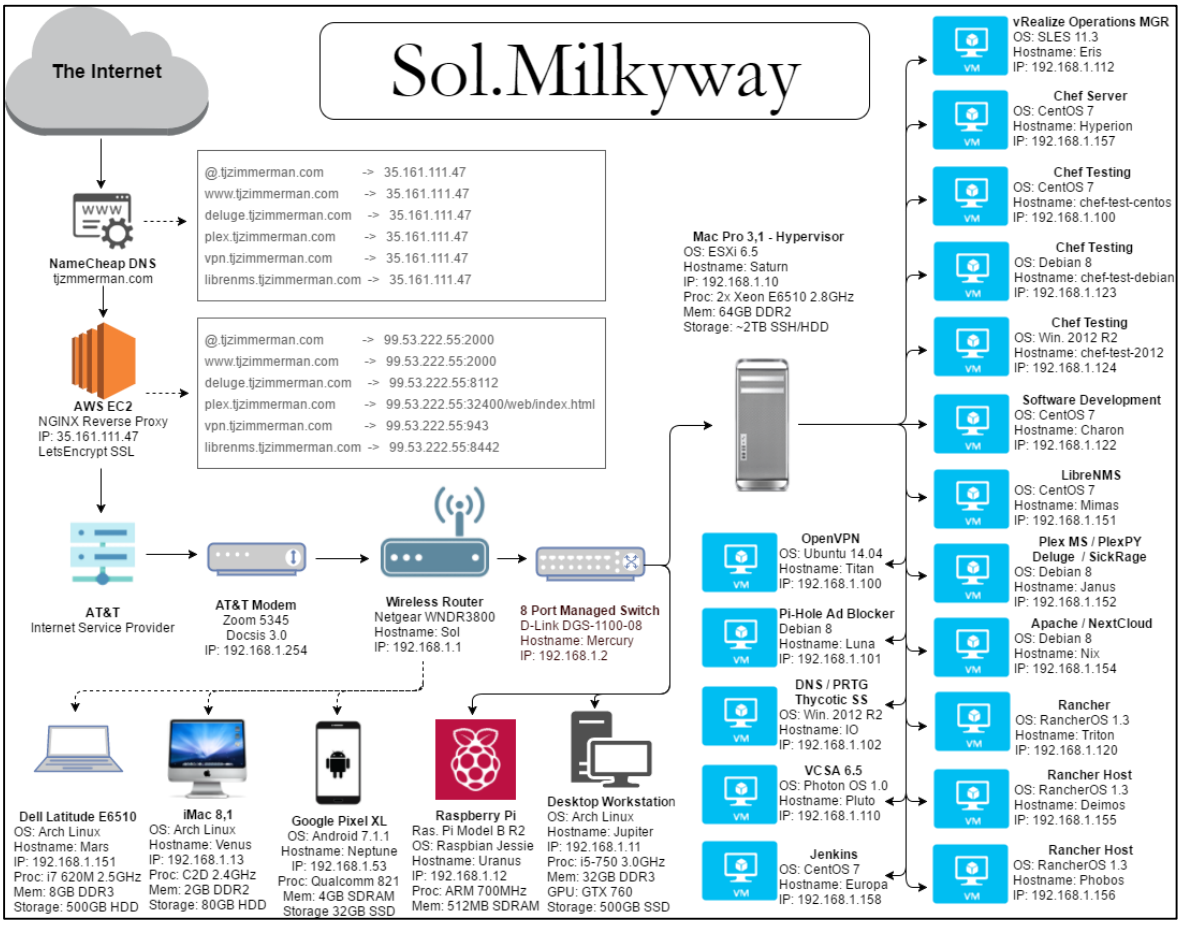
Devices on my network follow several standards that I have defined. I use a theme organized around our solar system for names and have organized my static IP Address suffixes based on their intended purposes. Below you will find a few tables showing my methods as well as a screenshot of my vSphere client and my existing virtual machines. On the following page, you can see tow diagrams that show both my entire home network as well as my existing IPAM solution. In the future I intend to switch to either GestioIP or phpIPAM instead of using a spreadsheet with formulas for my lab organization.

| Host Naming | |
|---|---|
| **Type** | **Body** |
| Router | Stars |
| Physical Devices | Planets |
| Virtual Machines | Moons |
| Virtual Appliances | Dwarf Planets |

| IP Addressing | |
|---|---|
| **Type** | **Suffix** |
| Networking Devices | 001-009 |
| LAN Devices | 010-049 |
| Wireless Devices | 050-099 |
| Networking VMs | 100-109 |
| VMware Appliances | 110-119 |
| Miscellaneous VMs | 120-149 |
| Server VMs | 150-199 |
| DHCP Pool | 200-255 |



## Network Diagram




## IP Address Management

| Physical Devices | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Device** | **Function** | **Operating System** | **Processor(s)** | **Memory (GB)** | **Storage (GB)** | **Graphics** | **Hostname** | **IP Address** |
| Netgear WNDR3800 | Router | OpenWRT 15.05 | AR7161 R2 680MHz | 128MB SDRAM 333MHz | 8MB | N/A | sol | 192.168.1.1 |
| D-Link DGS-1100-08 | Switch | 1.10.033 | N/A | N/A | 2MB | N/A | mercury | 192.168.1.2 |
| Mac Pro 3,1 | Server | ESXi 6 | 2x Xeon E5462 2.8GHz | 64GB DDR2 667MHz | 7523.25GB | Radeon HD 2600 XT | saturn | 192.168.1.10 |
| PC | Workstation | Arch Linux / Windows 10 | i5 750 2.8GHz | 32GB DDR3 1333MHz | 1200GB | Nvidia GTX 760 | jupiter | 192.168.1.11 |
| Ras. Pi Model B Rev. 2.0 | | Raspbian Jessie | ARM1176JZF-S 700MHz | 512MB SDRAM 800MHz | 8GB | Broadcom VIdeoCore IV | | |
| iMac 8,1 | | | Intel Core2Duo E8135 2.4GHz | 2GB DDR2 800MHz | 80GB | Radeon HD 2400 Xt | venus | |
| MacBook Pro 12,1 | Laptop | OS X 10.10.5 Yosemite | i5 5250U 1.6GHz | 8GB DDR3 1600MHz | 128GB | Intel Iris 6100 | earth | 192.168.1.50 |
| Dell Latitude E6510 | Laptop | Arch Linux | i7 620M 2.55GHz | 8GB DDR3 1333MHz | 500GB | Nvidia NVS3100M | mars | 192.168.1.51 |
| Google Pixel XL | Smart Phone | Android Nougat 7.1.1 | Qualcomm Snapdragon 821 | 4GB SDRAM 1600MHz | 32GB | Adreno 530 | neptune | 192.168.1.53 |

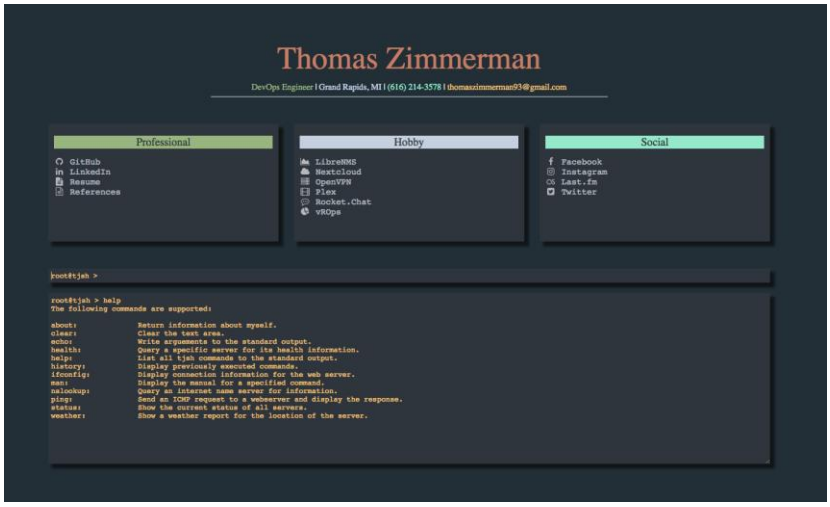
| Virtual Machines | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Function** | **Host** | **Operating System** | **vCPU(s)** | **Memory (GB)** | **Storage (GB)** | **Datastore** | **Hostname** | **IP Address** |
| OpenVPN Server<br>Netdata | saturn | Ubuntu 14.04 | 1 | 1 | 8 | DS2 | titan | 192.168.1.100 |
| Pi-Hole Ad Blocker<br>Netdata | saturn | Debian 8 | 1 | 1 | 5 | DS2 | luna | 192.168.1.101 |
| Windows DNS Server<br>Thycotic Secret Server<br>PRTG | saturn | Windows Server 2012 R2 | 1 | 4 | 40 | SSD | io | 192.168.1.102 |
| VMware VCSA 6.5 | saturn | Photon OS 1.0 | 2 | 10 | 115 | SSD | pluto | 192.168.1.110 |
| VMware vROps | saturn | SLES 11 | 1 | 6 | 275 | DS1 | eris | 192.168.1.112 |
| Rancher | saturn | RancherOS | 1 | 1 | 5 | SSD | triton | 192.168.1.120 |
| Chef Testing - CentOS | saturn | CentOS 7 | 1 | 2 | 10 | DS2 | chef-test-centos | 192.168.1.121 |
| Software Development | saturn | CentOS 7 | 1 | 4 | 20 | DS2 | charon | 192.168.1.122 |
| Chef Testing - Debian | saturn | Debian 8 | 1 | 2 | 10 | DS1 | chef-test-debian | 192.168.1.123 |
| Chef Testing - Windows | saturn | Windows Server 2012 R2 | 2 | 4 | 40 | DS1 | chef-test-2012 | 192.168.1.124 |
| LibreNMS<br>Netdata | saturn | CentOS 7 | 1 | 1 | 10 | DS1 | mimas | 192.168.1.151 |
| Plex Media Server<br>PlexPy<br>Deluge Server<br>SickRage<br>Netdata | saturn | Debian 8 | 3 | 8 | 104 | SSD | janus | 192.168.1.152 |
| Rocket.Chat | saturn | CentOS 7 | 1 | 4 | 50 | SSD | callisto | 192.168.1.153 |
| Apache Web Server<br>NextCloud<br>Netdata | saturn | Debian 8 | 1 | 2 | 20 | DS2 | nix | 192.168.1.154 |
| Rancher Host | saturn | Fedora 25 | 1 | 4 | 30 | SSD | deimos | 192.168.1.155 |
| Rancher Host | saturn | Fedora 25 | 1 | 4 | 30 | SSD | phobos | 192.168.1.156 |
| Chef | saturn | CentOS 7 | 1 | 3 | 10 | DS1 | hyperion | 192.168.1.157 |
| Jenkins | saturn | CentOS 7 | 1 | 2 | 25 | SSD | europa | 192.168.1.158 |
| **Total Virtual Machines: 17** | | | **Provisioned Memory: 61/64 GB** | | | **Provisioned Storage<br>SSD: 324/447GB<br>DS1: 70/298GB<br>DS2: 298/931GB** | | |

## Personal Website

When I first started learning about server administration I began with a website running on an Apache webserver.

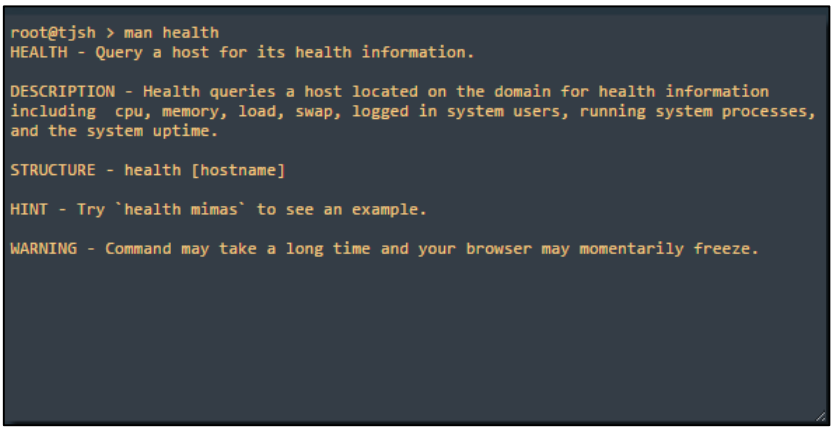
Since then my website has gone through several phases of development and, most recently, I've designed a terminal emulator in Javascript that can be found embedded on it.

Many of the commands have been written in an attempt to mimic a common UNIX shell. However, I have also introduced some custom commands that support functionality such as querying my internal servers for health metrics. For a full list of commands, see the following table.




| CMD | Short Description |
|---|---|
| About | Return information about myself. |
| Clear | Clear the text area |
| Echo | Write arguments to STDOUT |
| Health | Query a specific server for its health |
| Help | List all tjsh commands to STDOUT |
| History | Display previously executed commands |
| Ifconfig | Display server network information |
| Man | Display the manual page for a command |
| Nslookup | Query an internet name server for info |
| Ping | Send an ICMP request to a server |
| Status | Show the up/down status of all servers |
| Weather | Show a weather report for the server |

*Each command has had a manpage written for it and can easily be summoned by the terminal. For example, the command health.*




Functionally, the website utilizes an event handler that listens for an enter keypress, your browser's local storage to remember your personal terminal history, and an array object of supported commands and their descriptions.

When input is sent to the terminal, it is stored as a string which is then compared against the contents of the command array. If a match is found, the terminal executes the command with whatever arguments are provided. If an error is made in typing the command or giving a parameter, the terminal will show an appropriate error response for the user.

Commands that interact directly with internal servers do so by chainloading CGI scripts which function as bash scripts that execute on remote servers. These files can be found in the cgi-bin folder in the repository. There is a different script for each command that requires one. All CGI scripts are written using BASH.

After a command is executed in the shell, the terminal enters its cleanup phase. This is used to scroll the output box to the end of the output of the command in case it takes up more space than the terminal has. An empty line is added after the command is ran, and the shell prompt area is cleared of the previous command.

The website can be accessed live at www.TJZimmerman.com and all of the source code can be found on my GitHub profile at Github.com/Zimmertr/Personal-Website-With-JS-Terminal-Emulator.

## Workstation and Development Environments

Every developer has their preferred working environment. Over the years I've moved operating systems, IDEs, editors, desktop environments, shells, and window managers countless times. In recent times I have gravitated towards Arch Linux because I really enjoy the Pacman package manager.

Pacman allows you to gain access to a large repository of packages with build scripts called the Arch User Repository so you don't have to mess around with adding repository sources and PPAs like what is required for Yum and Apt-Get. Additionally, Arch Linux has a crowd sourced documentation wiki called the Arch Wiki which is quite honestly the single greatest repository of Linux information on the internet. Much of the information found there cross talks with other distributions as well. All of my configuration files and information about my personal configuration can be found on my GitHub Profile.

I've found that I work All of my dotfiles can be found on my GitHub profile. And you can see an example of what my configuration may look like below:

| App | Repository |
|---|---|
| i3wm | https://github.com/zimmertr/i3wm-Configuration |
| ZSH | https://github.com/zimmertr/zsh-Configuration |
| Conky | https://github.com/zimmertr/Conky-Configuration |