

KEN GRIMES

Backend Developer

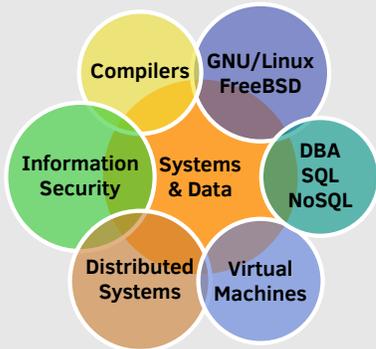
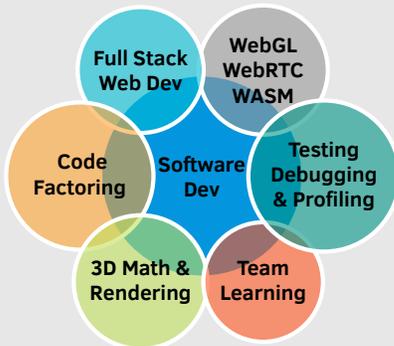
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Skills



Technology

Proficient —————> *Skilled*

JavaScript ES6 ES7 • HTML5 • CSS3

WebAssembly • WebGL • Forth

SQL • MariaDB • NginX • Git

Quaternions • Linear Algebra • TeX

C • gcc • gdb • Emacs • Shell

Postgres • Lua • Reverse Engineering

Tarantool • React • Ansible

Rust • C++ • PHP • Unreal • GLSL

Experience

Jun 2018 - Present **Server Administrator - Volunteer** PVNN, Los Angeles

- Maintain, refactor WordPress server and front-end
- Debugging, optimization of web performance and SEO

Feb 2017 - Present **Server Administrator** Ancient Arts, Irvine

- Maintain server and databases, CentOS, Nginx, MySQL, PHP
- Developed a secure backend for remote website editing using Lua, Hugo, NoSQL. Frontend in HTML5/CSS3/ES6.
- Expanded web presence for Ancient Arts brand

Mar 2015 - Dec 2017 **Co-founder, Manager & Developer** Mhrtec LLC, Irvine

- Founded company with 13 members, managed and lead research & development for 2 years.
- Trained developers, designed software and specifications implemented with C and Javascript using WebRTC over HTTPS.
- Developed Bison-directed LR parser and compiler to package A/V assets into binary form for use in WebGL rendering engine.
- Devised routing protocols, network security schemes, database architecture, and scaling model.
- Managed version control software (git), servers, and backups.

Sep 2009 - Mar 2015 **Independent App Developer, Tutor** UT, Austin

- UNIX command-line tutoring
- Programming lessons
- Gigs: Web applications, server administration

Sep 2002 - Mar 2007 **Network Technician - Contract** OneSource, Dell, et al

- Travel-based work across the US
- Updated legacy networks, installed telcom lines, networking equipment, and trained on-site staff
- Advised hardware purchases, network architectures

Education

2012 - 2015 **Mathematics, Computer Science** ACM Member, Tutor UT, Austin

2011 **Intro to AI/Stochastic Systems (MOOC)** Thrun, Norvig Udacity

2010 - 2012 **Philosophy, Computer Science** ACM Member Texas Tech University

2009 - 2010 **Biology, Anatomy** Eastern New Mexico University

Projects

watForth [Demo][Source]
The watForth virtual machine is a Forth implementation and research project written in WebAssembly Text featuring unique traits like a real-time execution environment, asynchronous coroutines, and data channels.

KIAK - Kiak Isn't A Kernel [Source]
A JavaScript unikernel providing networking, crypto, authentication, and accounting on a Plan9-styled file system in a browser.

STON and HENGE [Source][Documentation]
STatic Object Notation (STON) is the structured language for the Asset Package Compiler (APC), which generates A/V binary data for the Hackable ENginE (HENGE).

Professional Details

How I Do My Computing

My goal in computing is to understand the essence of computation itself, to develop skills that are not only platform agnostic, but future-proof and applicable to all walks of life. Computers are thus a tool of self-improvement for me.

“The hard part of programming is the same regardless of the language.” -Richard Stallman

My Systems

PC/Laptops – x86 GNU GuixSD, Arch-Linux, and Debian based systems for personal use

Raspberry Pi – RaspbianOS DNS Sink using Pi-Hole, local network gateway

Linode Cluster – Remote administration, web hosting

I use a Samsung S7 with a bluetooth keyboard as an ultra-portable development platform, and I’m interested in head-mounted displays for this purpose. I am also planning a migration from x86-based machines to a stable RISC architecture eventually (POWER, RISC-V, Mill, etc).

Software I Use

Interaction – Emacs, exwm, Zile, ssh, POSIX Shell

Emacs is my preferred mail client, shell, window manager, debugger, and IDE. I don’t use many graphical applications, but when I do use them I run them inside of an Emacs buffer using the exwm package. I can use just about any IDE, but why limit myself with editors that can’t be edited?

Operating Systems – GNU/Linux, FreeBSD, Mac OS X, Windows

Mobile OS – Android, iOS

I have expertise administering the GNU/Linux system with excellent knowledge of the common tools. Familiar with the Android SDK/Dalvik, mostly user-level knowledge of iOS.

Databases – Tarantool, MariaDB, PostgreSQL

Automation – Ansible, Kubernetes

VersionCtl – Git, Subversion, Perforce

I’m experienced with RDB administration including indexing/optimization and procedures. I am currently evaluating and learning Kubernetes and Tarantool. Tarantool is an exciting NoSQL architecture providing storage redundancy, an in-memory database, a Lua execution environment, and a SQL translation layer. It can replace the entire data stack (Redis, Postgres, Cassandra/et al) with a single tool.

App Servers – Node.js, Python, Ruby, PHP

Web Hosting – NginX, Apache, Letsencrypt

Browsers – EWW, Firefox, Chrome

Media – VLC, GIMP, Nextcloud

Social – Mastodon, Diaspora, Matrix

Most of my application server experience is with Node.js, but I’m not coupled to any particular tool. I’ve basically abandoned Apache in favor of NginX at this point, but I retain good knowledge of both. Nextcloud is my device-synced repository of contacts, files, e-mail, and calendar data.

Compilers – gcc, llvm, rustc, emscripten, luajit, pypy, bison, ragel

Debuggers – gdb, valgrind, chrome tools, mozilla tools

Build – Make, cargo, rollup.js, npm, pip, pear, luarocks

Libraries – SDL2, xxHash, stb, OpenGL ES, libsodium, wolfssl, GMP, BLAS, GPG, zlib, curl

I have advanced knowledge of the entire C toolchain, including transpiling to web targets. I tend to manage my own build systems and tests, which I trigger on main repository receive events.

Programming Languages

Script – JavaScript ES6/ES7, HTML5, CSS3, PHP, Bash, sed, AWK, \LaTeX

High – C, C++, WASM, Lua, Rust, Scheme, Python

Low – Forth, x86, amd64 (MMX, SSE)

Haskell, Erlang, Ruby and Elixir are all on my list of languages to learn. I have mastery in C and JavaScript, and a strong understanding of most other common languages.

Network & Security

Protocols – DHCP, DNS, HTTP, TLS/SSL, SSH, TCP, UDP, ARP, RARP, IPv4, IPv6, IPsec, Diffie-Hellman, ActivityPub, SSB, Gopher

Crypto – X.509, Web of Trust, RSA, ed25519, SHA2, chacha

AppSec – Authentication, Authorization, Session Management, Input Validation

I understand the principles of application security and can spot security flaws during implementation. I also understand many of the protocols in the TCP/IP stack, as well as a few federation protocols like ActivityPub.

Graphics and Physics Simulation

Engines – Unreal UDK/UE4, Bullet, Chipmunk

Render – GLSL, WebGL, Materials

Math – Quaternions, Linear Algebra, Vectors

Owing both to my hobbyist game modding and 3D graphics studies in school, I have a pretty well developed handle on advanced 3D simulation and rendering techniques, and basic understanding of AI and Audio concerns in these environments.

Recommendations

“As the lead technical director, Ken’s impressive ability to break down complex concepts into their fundamental aspects was the key to solving what were seemingly intractable problems. More importantly, he was able to articulate his process and discoveries so that all around him were able to learn and benefit. Ken’s technical proficiency, combined with his mentoring nature, provided a crucial source of value for the company. Working with Ken has been a highlight of my career and I would be thrilled to do so again.”

Jordan Lavatai - CTO at Naked Apps (formerly “PhD Labs”), Irvine

Personal Details

Life & Philosophy

"If the human race develops an electronic nervous system, outside the bodies of individual people, thus giving us all one mind and one global body, this is almost precisely what has happened in the organization of cells which compose our own bodies. We have already done it. [...] If all this ends with the human race leaving no more trace of itself in the universe than a system of electronic patterns, why should that trouble us? For that is exactly what we are now!" -Alan Watts

Culture & Leisure

Sports – Kuk Sool Kwan, eSports
Creative – Writing, Pixel Art, Cooking, Coffee Roasting
Diet – Plant-based Whole Foods, "Flexitarian"
Art – Theater, Drag Shows, Live Music
Games – Modding, Strategy, Community Management, Chess, Tabletop Games

Maintaining mental and physical health are very important to me. Martial arts, leisure activity, meditation and diet are crucial to this. I enjoy modding games and I've founded and run multiple gaming communities, some reaching over 1,000 members. I've also volunteered my time to community coordination efforts with various MMO game companies.

Reading & Studies

Math – Altmann, Fourier Transformations, Vector Calculus, Quaternions, Tensors, Linear Algebra
Science – Game Theory, Quantum Theory, Physics
Computers – IEEE/ACM Transactions journals, Cambridge Combinatorics Probability and Computing, Implementation Manuals, Alan Kay, Don Knuth, Chuck Moore

My History

I have a colorful past. I started out life in a tiny agrarian community situated at the intersection of the Rust Belt and the Bible Belt, born to the daughter of a farming family and the son of a police chief. My early interests in math and technology were often seen as a rejection of traditional local values.

Early On

2003 University of Missouri, Columbia
2002 Moberly Area Community College, MO
2000 College of the Albemarle, NC
2000 Landscaping and Painting
1999 - 2002 Steel Erection (Construction)
1998 - 1999 Textbook Warehousing

By the late 90s, my family's economic situation forced me to withdraw from high school and start working full-time, despite advanced placement studies, scholarship offers from Duke, and academic honors. I spent almost 2 years working at the MBS Textbook warehouse in Columbia, MO. It was heartbreaking to lose my escape hatch from the Midwest, but I credit the easy access to textbooks at MBS, like Meyers's "RPG IV Programming on the AS/400", to influencing my early interest in programming languages, although I'd been tinkering with computers and electronics since childhood. I later took a job in construction and began travelling between Missouri and Texas, erecting buildings for pay. I

Philosophy – Taoism, Zen Buddhism, Joseph Campbell, Alan Watts, Martin Heidegger, Carl Jung, Classics

Language – Russian, French

I try to spend at least 8 hours per week studying these areas of interest. Much of my inspiration and knowledge comes from my independent research, so maintaining a library is important. My language skills in Russian and French are both pre-conversational, but improving. I have formally studied some of the Greek Classics, including Zeno, Pythagoras, Plato's unwritten doctrines, Socrates, and Carneades.

Influences

Tim Cain – Interplay/Troika/Obsidian - Game development, engine architecture
Richard Stallman – MIT/FSF - Software ethics, virtual machines
Donald Knuth – Stanford/Art of Programming - Theory, algorithms, literate programming
Chuck Moore – Forth - Code factoring, simple design, elimination of technical debt
Edwin Brady – St. Andrews - State Machines, Idris, Functional programming

As a software developer, I am regularly introduced to theories and pragmas that leave a lasting impression on me. With the sheer volume of great ideas already in print, much of the difficulty in innovation lies in reading and research, not experimentation.

also operated a landscaping and painting company during the off-season. I traveled to North Carolina briefly, taking classes at a local college focusing on A+ and CCNA certification preparation. In 2002, I followed this up with FORTRAN and COBOL programming classes back in Missouri. I eventually found work at the University of Missouri, Columbia, working in the IT department. I gained enough exposure to networking technology to turn this into a viable travel-work option, and also received a GED one afternoon when I happened to walk by the facility where the testing took place and struck up a conversation with the supervisor. This led me to start taking contract work consisting of 6-8 month assignments across the country, mostly at hospitals.

Traveller

2007 - 2009 Real Estate Agent
2002 - 2007 Network Technician

I wound up in New Mexico when my primary contract provider (OneSource) shut down. Soon after, I moved a few miles south to Roswell, NM based entirely on the humor of its association with aliens. The town was utterly devoid of technology, so to try something different I acquired a license and began practicing real estate at Century 21. I spent a year or so collecting myself and planning my next move, bewildered by the local culture and its similarities to the tiny communities I had grown up around. I took this time to develop a few total-conversion game mods with the Unreal Engine, and after many years of "playing around" with software and run-

ning my own servers and projects, I decided it was time to make a serious, concerted effort to develop these skills to their maximum. It had, after all, remained the most constant fascination and fixture in my life for many years.

Academics

- 2012 - 2015 University of Texas, Austin
- 2010 - 2015 Website/Apps Development, Tutoring
- 2010 - 2012 Texas Tech University, Lubbock TX
- 2010 - 2012 Intro to AI/Stochastic Systems, Udacity
- 2009 - 2010 Pharmacy Technician
- 2008 - 2009 Eastern New Mexico University

I set my sights on UT, Austin, the nearest university with a respectable computer science department. Texas Tech, in Lubbock TX, offered in-state tuition for qualified students at Eastern New Mexico University, so I enrolled with plans to use it as a bridge to UT. The only computing classes at this school focused on Microsoft products and BASIC programming, so I opted instead for a more varied education and studied Anatomy and Biology, acquiring a Pharmacy Technician certificate before transferring. At Texas Tech, I was able to enroll in the BA Mathematics program owing to a high score on the entrance exam and placement in Calculus II for my first semester. I was lucky to have two very inspiring professors while at Texas Tech in Dr. Bo Yang (Calculus), and Dr. Michael Gelfond (AI, Probabilites) who both left a lasting impression on me. I later switched majors to Computer Science for a year, but remained focused on Mathematics due to the Java-oriented CS department at the school. Soon, though, I transferred to UT Austin and gain exposure to a more demanding program.

At UT I had a wonderful opportunity to study compilers, artificial intelligence, hardware architecture, advanced mathematics, operating systems, and algorithms. It swallowed my life whole, and I focused as much energy as possible on my studies. I used an early (pre-Red Hat) version of Ansible to help automate my contracted web admin work and began tutoring students as well. My knowledge of computing expanded radically during these years, and I spent the summer months deeply engrossed in independent studies of John Nash's work in Game Theory and combinatorics. I was also lucky enough to get involved with the first-ever MOOC (Intro to AI with Thrun and Norvig).

Later That Day...

2015 - 2017 Mihartec

I was approached by a friend with an offer to get involved with a software startup in late 2014. The company's goal to create an efficient in-browser engine hit home on many fronts for me, and it didn't take much arm-twisting before I was enamored with the concept. I became deeply involved in the planning process, and even drafted our operating agreement. A few months later, I would leave my BS program at UT to found the company, and relocate to Irvine, CA. It was tough to walk away from two nearly finished degrees, but my academic career will never truly be over. Mihartec was a one-of-a-kind opportunity to research, design, study, and implement fun and interesting technology. I was also able to hire on one of my former tutoring students, Jordan Lavatai, 8 months later. It was an ideal environment for continued learning, where I could explore and teach philosophies on design and construction, and our productivity grew at a fantastic rate.

Two years into our four-year development cycle, we received unexpected news that our chief financial partner's situation had changed and further funding seemed improbable. After much deliberation with partners, we decided to hedge our bets by slowly winding down development as we waited for updates. Jordan took a temporary contract job at PhDLabs in Irvine, and I continued to work on the software. After a few months with funding unsolved, the need for us to scuttle our project became clear. So I began necessary filings to defunct Mihartec, notified our partners, and archived our code.

Going Forth

2018 watForth, ActivityPub

Recently, I've taken time to apply what was learned at Mihartec and study mesh networks, federation, domain specific languages, and Forth. I began a research project called watForth, which is a real-time implementation of a Forth virtual machine in WebAssembly Text. It provides a live coding environment for the creation of domain specific web languages, and produces ultra-compact and maintainable code. I've also begun development on an ActivityPub compliant content publishing application built on top of Tarantool focusing on minimal interaction. This year, with the aid of that application, I hope to begin publishing articles about my various research and computing projects.