Thomas Grothe
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Full-stack software engineer with a wide variety of skills

Highlights

- Languages: C#, Java, C++, C, Javascript, PHP, python, typescript, bash, dart, html, css
- Tools/Platforms: Git, Kubernetes, Docker, Podman, Ansible, GDB, JDB, sed, awk, GNU/Linux/Unix,
- Frameworks/Libraries: Laravel, nodejs, Express, React, Redux, Vue, Flask, Android, Flutter, sequelize, Boost
- Other: Postgresql, Mysql, Apache, nginx, REST APIs, AMQP, WebSockets,

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Experience

Software Engineer – General Dynamics Mission Systems (Dec 2020 – June 2024; March 2025 - present)

- Working on Tactical Control Systems, a suite of software that ingests data from submarine sensors and communications to provide an operational picture. This includes target motion analysis, situational awareness, and command decision tools. (C++, Java, bash, python, Linux)
- Design, develop, and test software features and bug fixes
- Reverse engineer code, using debugging tools such as GDB and tcpdump
- Deep understanding of design patterns implemented in a large codebase
- Worked hands on with a real-time fault-tolerant distributed system, being cognizant of coordination/communication between processes running concurrently on a cluster of machines
- Use kubernetes to orchestrate podman containers across server cluster
- Deeply understand the compilation, installation, and deployment process of a complex distributed system
- Made a tool to streamline patching containers for development and testing purposes, and presented demo for it
- Participated in transitioning old monolithic codebase to microservices
- Experience with React+Redux web development (Typescript, Javascript) and integrating with build pipeline
- Familiarity with message-based/event-based architectures using Qpid or RabbitMQ (AMQP)
- Familiarization and experience with DevOps pipeline practices
- Maintained good documentation on system functionality
- Daily scrum meetings. Code review. Quarterly PI planning meetings. Translating product requirements to sprint ticket work. (Agile)
- Held educational sessions to teach other developers and produce instructions for certain development processes

Software Engineer – Progeny Systems (Jan 2020 – Oct 2020)

- Worked on Digital Data Collection System, enabling submarine operators to record and review data from various sensors (Java, C, C++, bash, python)
- Distributed and multi-threaded software system
- First exposure to more nuanced git usage such as rebasing and cherry-picking
- Team meetings three times a week to plan work and collaborate on system design
- Rigorous testing and verification of software in a SCIF
- Created a simulated environment using Docker for sandbox testing on development machines
- Handling communications between several Linux processes

Sabbatical (June 2022 – Sept 2022; June 2024 – March 2025)

- 3D game development with Godot and Unity engines (C#), collaborating with a small team, code review
- Managing some services on my homeserver (nginx, python, javascript, postgres, linux, btrfs, PHP, nodejs)
- Read book: *Site Reliability Engineering: How Google Runs Production Systems*
- Useful scripts and tools for linux system administration
- Laravel code generation for REST APIs (database migrations, ORM, routes, forms)
- Started learning Vulkan and WebGPU
- Taking a course on general-purpose GPU programming from CalTech (CS179)
- Certificates from Deeplearning.ai (Neural Networks & Deep Learning; Supervised Machine Learning: Regression and Classification; Advanced Learning Algorithms)
- Helped a friend make an e-commerce website for his business (Laravel PHP, Javascript)

Software Developer (Internship) – Iowa Dept of Transportation (Nov 2017 – May 2019)

- Allow victims of human trafficking to easily and anonymously report their location on a map, by address, or by location of their device, via a web application (Javascript, ArcGIS, CSS, HTML)
- Automate user management tasks on an ArcGIS system using Python
- Enable appropriate parties to propose a road closure via web application (Javascript, ArcGIS, CSS, HTML)

- Automatically populate relevant fields, such as maintenance garage, county, route id, and reference post, upon user adding a new geometry in our geospatial system via Oracle SQL trigger using REST calls and other GIS-related database functions
- Find every best detour for every bridge in the state and compile them into a database, with length and geospatial representation, using the NetworkX library for Python

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Education

Bachelor of Computer Science – Iowa State University, Ames, IA
May 2019 - GPA 3.23

- Evolution Simulator group project (Software Development Practices). Used C++ with SFML
- Webmaster for the Engineers for a Sustainable World club (PHP+Laravel, html, css, javascript, linux)

Other Projects

- Personal Home Server (2012 – present) (Linux, Debian, Opensuse, Javascript, Laravel, Docker, systemd, bash)
- Android App: FrogPond (2019, Flutter)
- Android App: SnapSaver (2014, Java), Random Reminders (2017, Java)
- See github