

Chris MacGregor

Principal Software Engineer

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Expertise

- Robust, maintainable, extensible, reusable, scalable, high-performance, high-quality, documented software
- C/C++/Asm in embedded and real-time systems large and small, ranging from Linux on client/server networked systems using 64-bit ARM multi-core CPUs to an RTOS (or no OS) on 8-bit microcontrollers with 16k RAM
- Architecture, design, and implementation of solid, stable systems, from requirements & research to production
- In-depth low-level optimization to maximize performance of embedded computing systems for e.g. real-time image compression & processing, utilizing experience from many years of work on compiler back ends
- High performance image processing on embedded (CPU- & memory-constrained) and desktop platforms
- Kernels, device drivers, compilers, simulators, development tools
- Libraries; C/C++ API design, implementation, and documentation; runtime environments; firmware
- Technical leadership and mentoring while also working directly on design and code
- Learn existing codebases quickly
- Long history of successful work either independently or as part of a remote and/or local team, large or small

Experience

- GOOGLE** (Seattle, WA) 2013 – present (2020)
- Researched and developed high-fidelity software emulation of 16550A UART for Google Compute Engine (cloud).
 - Proposed and led successful project to provide ssh-based interactive serial console access to Google Compute Engine VMs: <https://cloud.google.com/compute/docs/instances/interacting-with-serial-console> & wrote much of the code.
 - Led deep research into heap allocation behavior.
 - Various other projects subject to NDA.
- WALLINGFORD IMAGING SYSTEMS** (Seattle, WA): 2010 – 2013
- Designed & implemented software to control and monitor video capture systems and process captured video (including sophisticated custom image processing), optimized for maximum performance and flexibility.
 - Designed & implemented embedded video capture systems (based on OMAP 3 and similar) operating at up to 14 fps in full 5 megapixel resolution.
 - Fixed and enhanced kernel mode image sensor drivers and platform drivers in Linux kernels from 2.6.3x to 3.x.
- CYBERMATO CONSULTING** (Seattle, WA): 2003 – present (2020)
- Designed & implemented numerous significant new features and enhancements for an open source video editing program to adapt it to video analysis of real-world biological behaviors.
 - Designed & implemented Linux interfaces to assorted equipment including: a velocimeter (3D water current measurement device), a stepper motor controller, and a direct interface to stepper motors and sensors.
 - Ported a Windows-based embedded system to Linux, introducing portability layer, refactoring/restructuring.
 - Revamped and optimized legacy web-based front end and data-entry interface to scientific database.
 - Built multi-platform (Windows, Mac OS X, Linux) offline data-entry application for scientific database.
- ORFLO TECHNOLOGIES** (Hailey, ID - Remote): 2011 – 2013
- Repaired and enhanced multi-platform (Windows, Mac OS X) application for device control and data analysis.
 - Led software architecture, design, prototyping, and implementation for new products in development.
- AMAZON.COM** (Seattle, WA): 2008 – 2012
- Designed and implemented device-side system software for Kindle (e.g., book-downloading infrastructure).
 - Advanced product development work on unannounced products.

DIGEO (Kirkland, WA): 2005 – 2008

- Created fully-automated system to build cross-compilers and complete custom Linux distro from scratch for ARM, MIPS, PPC, & x86.
- Designed & implemented OpenGL subset, including scaling+rotating+flipping blits using C++ templates.
- Modified Linux device drivers to improve performance and implement missing features.

TIGERWAVE NETWORKS (Seattle, WA):

2003 – 2007

- As co-owner & CTO of web & email hosting company, handled all engineering, administration, sales, tech support.
- Built customer-facing web-based control panel; automated configuration file generation and management; managed all servers & networking equipment; did all software installation & configuration, system administration, security, etc.

SONY ELECTRONICS (Mountlake Terrace, WA):

2001 – 2005

- Designed, implemented, tested, documented, and deployed several large new software components for advanced research projects and prototypes, using C++ in a Linux-based embedded environment.
- Client/server-structured configuration info subsystem; infinitely multi-zoned flexible debug/trace output management system; SIP-based VoIP+video communication management system; LCD monitor firmware rewrite for new product.
- Designed, implemented, tested, documented, and deployed fully automated system for testing various aspects of TV functionality, such as compliance with V-Chip requirements (EIA-608B).

BSQUARE CORP. (Bellevue, WA):

1994 – 2001

- Compiler back end implementation for TriCore (as technical lead), ARMv4 & Thumb (assistant technical lead)
- Designed creative solution to maintain backward source-level compatibility despite incompatible calling convention.
- Designed and implemented ARM disassembler and peephole optimizer.
- Implemented Hitachi SH-3 code generation, low-level optimization, & bit assembly using Microsoft front end & linker
- Designed, implemented, tested, and deployed an assembler for the SH-3, compatible with Hitachi's assembler.
- Interfaced with various customers, primarily Infineon, ARM, Hitachi, and Microsoft.
- Initiated, maintained, and broadened an effective and cooperative relationship with the engineers at Microsoft maintaining tools being ported. Delicately handled some difficult personalities. Most of the interaction was via email.
- Enhanced C runtime in numerous ways; debugged and fixed various WinCE kernel bugs.
- Proposed & implemented several initiatives improving development environment, including many new tools.
- Wrote a sophisticated set of customizable, extensible build scripts for the development tools (in Perl 5).

GTE NETWORK MANAGEMENT OPERATIONS (Bothell, WA):

(Contract) 1993 – 1994

- Designed, implemented, tested, and documented powerful new CM tool using Perl 4, RCS, and Sybase (SQL database).

STRATUS COMPUTER, INC. (Marlboro, MA):

1987 – 1993

- Developed and maintained toolset to automate source control/configuration/build/test management, still used in 2013+.
- Developed and maintained powerful make front end (in Perl) and makefile framework, still in use in 2013+.
- Significantly enhanced & ported GNU assembler (gas) for PA-RISC on proprietary OS.
- Co-developed and maintained a tcsh-like shell for proprietary OS.
- Developed large C library (still in use) to: provide or emulate standard Unix system calls and runtime functionality missing from proprietary OS; provide ANSI & POSIX compliance; ease porting of standard tools and other software.
- Designed, implemented, and tested an i80860 instruction-level simulator, using GDB as a front end.
- Maintained and enhanced an MC88100 simulator used for all in-house MC88100 software development.
- Designed, implemented, and exhaustively tested high-performance MC88100 assembly language runtime routines: variable-alignment data moves and compares, varying-length string operations, PL/I data type conversions, etc.

Education

BS in Computer Science (with Distinction), Worcester Polytechnic Institute (MA), 1990