

Kurt Guntheroth
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Staff Software Engineer

A career technologist with 30+ years of commercial software design experience covering many full product life-cycles. Special expertise in C++ development, network protocols, optimization, new product concept formation, requirements analysis, software development methodologies. I am a scientist, a craftsman, and a mentor.

Knowledge Keywords

Software Development Experience: Windows, UNIX/Linux, embedded, database, cross-platform and multi-target development. Event-driven, real-time, parallel, multi-threaded, multi-processor.

Languages: C++ (20+ years). C (10+ years), Java, Javascript, Perl, Python, shell scrips.

Databases: Sybase & Microsoft SQL, SAS. Markup Languages: HTML5, XML, JSON.

Development Methodologies: Scrum, Agile, traditional, ISO-9000, Test Driven Development, CRC cards, UML.

Networking: sockets, WireShark dissectors, ZeroMQ library, RTP and forward error correction, TCP, UDP and multicasting, ICMP raw packets, SNMP, ASN1, H.323, IEEE 488.

Knowledge Domains: Win32, MFC, TAPI, COM, ODBC, boost, video processing, telecom, security, ssl programming, VoIP, functional test (2 U.S. patents), compilers, PLD programming, IEEE-1149 & 1352.

Technology Development Experience: industry standards committees, defect tracking systems, software metrics. Trained in “innovation management” methods; affinity analysis, idea generation, facilitating, Pareto and Ishikawa analysis, Quality Function Deployment (QFD), Total Quality Management (TQM).

Education and Training

Master of Business Administration, Seattle University, Seattle WA: Program partially completed. Topics included marketing, statistics, operations analysis

Master of Science in Computer Science, University of Washington, Seattle WA:
Thesis topic was an object-oriented, distributed programming language largely anticipating Java.
Special topics included languages, distributed systems, artificial intelligence, networks.

Bachelor of Science in Computer Science, University of Washington, Seattle WA:
Topics included compilers, operating systems, algorithms, and statistics. Minor in Mathematics.

Continuing Education: Quality Function Deployment, Total Quality Management, Innovation Management, Universal Modeling Language, Software Design Patterns, CASE and Design Methodologies, Advanced Windows, C++, Software Test Methodologies, System Engineering, Cadence Management Seminar, Experience-based Interviewing, ISO 9000 Internal Auditor training, C++ Template Metaprogramming, Algorithm Design, Java, Android Development, Video and Audio Processing.

Employment History

Developer, 2014-2015, iStreamPlanet, Redmond WA

Developed video pipeline code in C++/Win32. Implemented an MPEG-2 Transport Stream RTP sender and RTP receiver with Forward Error Correction based on redundant data per SMTPE 2022-1. Developed GPU-accelerated video processing pipeline code using Intel Media Library.

Independent Consultant, 2009-2014 (5 years)

The Great Recession was hard on senior people who were standing up when the music stopped. I took a number of brief 1099 and W2 positions for several clients. Here are some highlights.

- C++/Win32 development for Google's Chrome browser under contract to Microsoft. Added experimental CSS styles to Chrome, developed JavaScript/HTML5 test cases, worked with Google's ninja build system designed for the very large Chromium code base.
- C++/Win32 development for Pokki; a program launcher, app store, and advertising network for Windows that also provided a Javascript programming environment. Improved Pokki's visual appearance under non-default screen settings. Measured performance and improved execution times by a factor of 4x. Worked with Windows Assessment Toolkit to ensure compliance with OEM Windows certification standards.
- Designed, implemented, and documented a proprietary wire protocol for a networked LED lighting product on contract to Micron Technologies of Boise; coded a Wireshark sniffer plugin in C for the protocol, developed a lighting network controller in C++/Win32/SDK that encapsulated the proprietary protocol over an asynchronous RS232 link, and also included a full network and lighting device emulator.
- Programmed complex core network and database server components in C++/Linux for a distributed database with a novel spatial indexing scheme; mentored teammates in C++, optimized naïve C++ code, improving data ingestion rate 60%, developed and documented error handling system.
- Complex network and server programming in C++ on Windows and Linux for a radio-over-IP product; developed Wireshark dissector plugin in C for two proprietary network protocols, documented the protocols, made point-fixes to undocumented legacy code. Worked with RTP protocol with NAK/Resend-based Forward Error Correction.
- Wrote content for a wiki on multi-threaded development; created sample applications for Intel's Atom Developers Program; developed test fixture control software in C/VxWidgets.

During down time, taught myself Java and Android programming, and developed an efficient fixed-point math template for C++.

Staff Software Engineer, 2008-2009 (6 months), Attachmate Corp., Seattle WA

Developed features for a cross-platform security product based on openSSH and openSSL in C and C++ on Windows plus 20 UNIX and Linux variants on a variety of hardware. Analyzed security protocols for potential weakness and recommended fixes. Laid off with my whole team when company suffered an unexpected 30% revenue shortfall going into the Great Recession.

Staff Software Engineer, 1999-2008 (9 years), Aubeta Networks, Seattle WA

Developed server components of a distributed business management system and Computer-Telephony-Integration (CTI) system in C++ on Windows. Took servers from prototype to highly-available production code. Developed a network monitor for Aubeta's customer WAN. Brought professional software development methods, defect tracking, documentation, and release management to AuBeta's software team.

- Integrated knowledge from several sources to produce a stack traceback on Windows structured exceptions to facilitate rapid debugging of infrequently recurring bugs.
- Improved mean time-to-failure of server suite from 2 hours to >1000 hours through debugging, refactoring, and high-availability coding techniques.
- Scaled server apps over 1-2 orders of magnitude growth in transaction rate.

Staff Software Engineer, 1992-1999 (7 years), Data I/O Corp., Redmond WA

Chief architect and lead on a 30 man-year software project with 10 developers. Estimated manpower, schedules, development costs, and project budgets. Hired staff, did performance reviews. Specified software development tools. Maintained team focus on objectives. Mentored team members in C++, OO design methods. Developed Win32 and embedded C++ code for two projects, and maintained C code for another. Did user needs analysis and design for four projects.

- Represented Data I/O on IEEE 1532 (Boundary Scan Device Programming) and EIA/JEDEC JESD-71 (STAPL) industry standards committees.
- Developed schedule using consensus work estimates de-rated for estimated availability. Original schedule estimated code complete within two per cent.
- Performed R&D for next-generation products. Developed product concepts. Made first contact with customers to establish user needs. Used rapid development techniques to meet harsh calendar schedule.
- Helped establish software development process standards for successful ISO-9001 certification. ISO 9000 internal auditor.

Senior Software Engineer, 1981-1992 (11 years) Fluke Corp., Everett WA

Progressive responsibility as software designer and lead. Developed soft real-time code in C over many full product life cycles.

- Designed a programming language for functional test, an object oriented editor, and an instrument control program similar to HP VEE or National Instruments LabWindows.
- Member of a tiger team that developed a \$20M (annual revenue) business opportunity. Received special innovation management training for this project. Fluke's successful LAN tester and indoor air quality meter products were outgrowths of this work.
- Developed and patented innovative methods for testing semiconductor RAM and ROM devices. RAM test is 3x faster than competing algorithms and has better coverage.
- Represented Fluke on SCPI instrument control standard committee. SCPI officer 2 years.
- *Personally* talked the U.S. Army out of a destructive change to MIL-T-28800 COTS procurement standard. Built consensus among industry players to oppose this change.
- Revised and automated a build system, reducing build time from 7 days of human attention to one day. Revised build system again a year later to reduce build time to require less than one hour of human attention.
- Led a team to perform causal analysis of over 600 bugs from a large development project.

Patents and Publications

Optimized C++, O'Reilly, Fall 2015

<http://www.guntheroth.com>, personal web page, 2005-present

Kurt Guntheroth's Old Hands Blog, <http://oldhandsblog.blogspot.com>, 2011-present

Fixed-Point Types for C++, in *C/C++ User's Journal*, 5/2005

Custom Exception Types for C++, in *C/C++ User's Journal*, 2/2005

Attacking the Causes of Software Defects, in *Fluke Technical Review*, 10(2), Autumn 1992

Tester-Assisted Built In Test, in *Proceedings of Autotestcon*, 1989

An Inexpensive Robot Prober, in *Proceedings of ATE&I East*, 1988

TL/1: A Language for Testing and Troubleshooting, in *Proceedings of ATE&I West*, 1988

Rapid Prototyping Languages Considered Harmful, *Fluke Technical Review* 7(1), Spring 1986

Method of and Apparatus for Diagnosing Faults in Read-Only Memory Systems and the Like, U.S. Patent 4,876,684, issued 10/24/1989

Method of and System for Fast Functional Testing of Random Access Memories, Jacobson et. al., U.S. Patent 4,715,034, issued 12/22/1987