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Experience

- Mar 2014 – **Consultant, MSB Associates, Belmont, CA & Brooklyn, NY**
- Present Working on Secured Systems, High-Performance Computing, Networking, and IoT projects for various companies including:
- DARPA CPM: Compartmentalization for Security, SRI and University of Cambridge
 - Secured in-home Android TV display (First customer ship Fall 2023).
 - DARPA TWISTED (secure portable storage) with UC Santa Cruz.
 - Secured manufacturing in China; anti-counterfeiting across China, HK, US.
 - DARPA MTSS Project using CHERI architecture.
 - Secure video conferencing system (FCS 2021).
 - DARPA ECATS Project: secure hardware/software systems with Cambridge, ARM, others.
 - Secured Bluetooth-enabled personal medical device.
 - Designed Precision Time Protocol Deployment for the European Extremely Large Telescope (ELT).
 - Applied PTP-1588 to autonomous robotics.
 - DARPA CADETS: Distributed Tracing for Security.
 - Audited/extended protocol stacks for enterprise storage vendor.
 - Designed/deployed PTP grand-masters in Financial Markets.
 - Analyzed/remediated TCP/IP/IPSec and packet forwarding performance.
 - Designed purpose-built high-performance packet switch.
- Jan 2008 – **Kernel Programmer, Hudson River Trading, New York, NY**
- Jan 2014 Extended and maintained FreeBSD for trading/research systems:
- Maintained and enhanced PTPd (IEEE-1588) with Ethernet driver support.
 - Developed low-latency kernel bypass in 10GbE NIC driver.
 - Built multicast latency benchmarking tools.
 - Diagnosed/fixed HPC storage performance (Isilon clusters).
 - Created innovative machine clock drift measurement technique.
 - Extended hwpmc and PAPI support for Intel CPUs.
 - Built in-house trading network test lab.
 - Debugged complex networking issues.
- Aug 2004 – **Senior Paranoid Yahoo, Yahoo Inc., Tokyo, Japan & Sunnyvale, CA**
- Dec 2007 Member of the Paranoids Security Group:
- Created and taught "Paranoid University" (10+ hrs of security/fail-safe programming).
 - Delivered training worldwide across Yahoo development centers.
 - Performed secure code and system reviews.
 - Developed tools for code spelunking and static security analysis.
 - Worked on open source conformance tools: Packet Construction Set, Packet Debugger.
- May 2002 – **Senior Software Engineer, Nominum Inc., Redwood City, CA**
- Aug 2004
- Developed high-performance DHCP server for large-scale deployments.
 - Implemented low-level packet handling.
 - Integrated Python scripting for server customization.

- Jul 1999 – **Senior Member of Technical Staff**, *Wind River Systems*, Alameda, CA
- Nov 2001
 - Member of Network Architecture Council.
 - Designed/implemented BSD-derived TCP/IP stack supporting virtual routed networks.
 - Enhanced routing sockets with new message types.
 - Supported VxWorks networking team.
 - Performed technical due diligence on networking acquisitions.
- Mar 1999 – **Senior Software Engineer**, *Siara Systems Inc.*, Mountain View, CA
- Jun 1999
 - Designed TCP/IP hot failover.
 - Investigated VPN stack in virtual routed environments.
 - Assessed SONET router support requirements.
- Jan 1998 – **Manager, Core Network Technologies**, *Wind River Systems*, Alameda, CA
- Feb 1999
 - Managed 7 engineers (TCP/IP, SNMP, perf. analysis).
 - Released SENS 1.1 update.
 - Hired/reviewed team members; handled evaluations.
 - Evaluated external acquisitions.
- Dec 1995 – **Network Software Engineer**, *Wind River Systems*, Alameda, CA
- Jan 1998
 - Created Enhanced Network Device (END) specification.
 - Developed END interface to VxWorks TCP/IP.
 - Built END test protocol.
 - Ported routed(1), added RIPv2 support.

Education

- 2029 **PhD (in progress)**, *Yale University*, New Haven, CT
- 1990 **Bachelor of Science in Computer Science**, *Northeastern University*, Boston, MA

Publications

- 2020 *The Collected Kode Vicious*, Pearson.
- 2014 *The Design and Implementation of the FreeBSD Operating System 2nd Ed* co-author with McKusick and Watson, Addison-Wesley.
- 2004 *The Design and Implementation of the FreeBSD Operating System* co-author with McKusick, Addison-Wesley.
- 2004-Present *Kode Vicious*, Monthly Column in ACM Queue.
- June 2015 *Measure Twice, Code Once*, FreeBSD Journal Vol. 2 No. 3.
- March 2014 *Hardware Monitoring Performance Counters*, FreeBSD Journal Vol. 1 No. 2.
- May 2009 *Whither Sockets*, ACM Queue, May 2009.
- 2009 *Understanding and Tuning SCHED_ULE*, BSDCan 2009.
- 2007 *Security, Safety, and the Deployment of IPv6*, ACM SIGCOMM IPv6 Workshop, 2007.
- 2007 *Securing IPv6 on FreeBSD*, BSDCan.
- Sept. 2003 *Code Spelunking*, ACM Queue.
- April 2003 *Programming Without a Net*, ACM Queue.
- April 2003 *SoC: Software, Hardware, Nightmare, Bliss*, ACM Queue.

- 1997 *Evolving BSD 4.4 Network Interface*, Communication Design Engineering Conference, 1997.
- 1997 *No-Copy TCP/IP for Embedded Applications*, Communication Design Engineering Conference. 1997.
- 1995 *User Configurable Networking in VxWorks*, VxWorks Users Group.
- 1994 *Issues in Continuous Media Systems*, Pegasus Report 94-1.
- 1993 *Current Efforts in Client/Server Audio*, The X Resource, Fall.
- Sept 1993 *BUENA: A protocol for Digital Audio*, Pegasus Comm. Work Pkg.

--- Presentations and Teaching

- 2023 Guest expert on security on *The Entree* (produced by CNN)
- 2016 Keynote: The coming decades of BSD, EuroBSDCon
- 2016 Through the Wire: Measurement and Improvement of a software-based IPSec implementation, Part II, BSDCan
- 2016 Through the Wire: Measurement and Improvement of a software-based IPSec implementation, AsiaBSDCon
- 2016 (D)Tracing FreeBSD for DevOps and Developers, Tutorial at EuroBSDCon
- 2016 A Look Inside FreeBSD with DTrace, Tutorial at BSDCan
- 2016 (D)Tracing FreeBSD for DevOps and Developers, Tutorial at AsiaBSDCon
- 2015 Measure Twice, Code Once: Network Performance Analysis for FreeBSD, Part II, BSDCan
- 2015 Cambridge L41: Teaching Advanced Operating Systems with FreeBSD, BSDCan
- 2015 Measure Twice, Code Once: Network Performance Analysis for FreeBSD, AsiaBSD-Con
- 2015 A Look Inside FreeBSD with DTrace, Tutorial at AsiaBSDCon
- 2015 Computers, Clocks and Network Time: Everything you never wanted to know about time, FOSDEM
- 2014 Systems, Science, and FreeBSD, Microsoft Research, Cambridge
- 2012 Networking from the Bottom Up: Packet Processing Frameworks; FUSE and FreeBSD, AsiaBSDCon
- 2011 Synchronizing Systems on a LAN: An Introduction to PTPd; Networking from the Bottom Up: Routing, BSDCan
- 2010 Networking from the Bottom Up: IPv6, BSDCan
- 2009 Networking from the Bottom Up: Device Drivers, BSDCan
- 2009 Thinking about Thinking in Code, Keynote at BSDCan
- 2008 Multicast Performance in FreeBSD, EuroBSDCon
- 2008 Performance Analysis with HWPMC, Tutorial at EuroBSDCon
- 2006 Becoming Paranoid, Cambridge Security Seminar, Cambridge University, UK
- 2006 Paranoid University Asia Tour (8 cities: Mumbai, Bangalore, Sydney, Singapore, Taipei, Seoul, Beijing, Hong Kong)

- 2005 Paranoid University Europe Tour (5 cities: London, Paris, Grenoble, Munich, Hamburg)
- 2005 Paranoid University Asia Tour (7 cities: Bangalore, Sydney, Singapore, Taipei, Seoul, Beijing, Hong Kong)
- 2004 Paranoid University, Yahoo Asia Developers Conference, Fall
- 2003 Deploying and Debugging DHCP, Tutorial at LISA
- 2003 Deploying and Debugging DHCP, Tutorial at APRICOT
- 2002 Socket Programming, Tutorial at Usenix

Professional Activities

Co-Chair ACM Presidential Task Force on Globalization (2023–2025)
ACM Queue Advisory Board (2004–present)
Editor-in-Chief, FreeBSD Journal (2014–2019)
ACM Practitioner Board (2014–2016).
FreeBSD Core Team (2006–2010, 2014–2016, 2020–2022)
FreeBSD Committer 2004–Present
Usenix (since 1990)
ACM (since 1993)
IEEE (since 2001)

Languages

C, Python, Go, Rust, various Assemblers, and others.

Systems

Unix (all flavors), Embedded Systems, TCP/IP Internals.