

Richard Bennett

E-mail: richard@bennett.com

Phone: (408) xxx-xxxx

Web site: <http://bennett.com>

Home: Livermore, California

Objective

Broadband network architect and policy consultant

Summary

- ◆ Entrepreneur, inventor, network engineer, and writer.
- ◆ Responsible for several of the most important networking standards in use today, including Ethernet over UTP, Wi-Fi, UWB, and bandwidth management protocols.
- ◆ Consultant to major Internet stakeholders in business and government.
- ◆ Author of provocative opinion columns on networking, international conference speaker, and expert witness in network policy and intellectual property issues.
- ◆ Named one of the most influential people in the network neutrality debate by Sidecut Reports.

Employment Experience

Information Technology and Innovation Foundation, Washington, DC. June 2009-Present, Research Fellow.

- ◆ Advise government policy makers on broadband network deployment and regulation, the National Broadband Plan, and pro-innovation technology policy.
- ◆ Frequently give talks and engage in panel discussions on network technology and regulation at industry gatherings and policy conferences.
- ◆ Write studies, white papers, and reports relevant to the innovation debate.
- ◆ Publish opinion columns in major daily news outlets.

Actiontec Electronics, Sunnyvale, CA, 2007-2009, Principal Engineer.

Responsible for system architecture, planning, and implementation of added-value networking components of a broadband home router product line sold to Verizon and Qwest.

- ◆ Designed portable system architecture for config manager, CLI, GUI, and TR069.
- ◆ Implemented Wi-Fi features (WMM, WPS, Home Hotspot, and 802.11n.)
- ◆ Upgraded company's test and measurement system.
- ◆ Developed RFP responses and helped close deals.

Trapeze Networks, Pleasanton, CA, 2005-2007, Principal Engineer.

Developed architecture and code for an advanced WLAN switch in a fast-paced startup operating

in the enterprise networking space. These features included:

- ◆ Bandwidth management system for QoS, rate-limiting, and aggregation.
- ◆ Improved support for IETF protocols such as UDP/RTP, IP, ARP, and DHCP.
- ◆ Software support for new access points for 802.11n, 802.11e, and outdoor mesh.
- ◆ Local switching architecture
- ◆ Mesh networking enhancements for wireless bridge and backhaul.

Also developed intellectual property around packet scheduling for QoS and collaborated with OEM customer Nortel's research team.

Sharp Labs of America, Camas, WA, 2003-2005, Sr. Consultant.

Designed Distributed Reservation Protocol system for Wi-Media Alliance UWB network. Contributed to IEEE 802.11e and 802.11n in the areas of block ACK, preamble structure, and frame aggregation and filed patents. Represented company on MBOA MAC task force, WiMedia Architecture Task Group, Streaming Media Task Group, and IEEE 802.15.3a standards committee. Developed easy install procedure for wireless home networks and contributed to Wi-Fi Easy Setup Task Force.

Airgo Networks, Palo Alto, 2001-2002. Technical Leader.

Advised on chipset architecture, Access Point design and wireless network simulation for 802.11abgn chipset. Designed, specified, and developed a verification and diagnostics test bench including Python- and C++ DVTs, a SWIG wrapper, a diagnostic DLL, an NDIS driver, VERA conversions, and an ARM agent for Windows, MV-Linux, and FreeDOS.

Cisco Systems, San Jose, 2000-2001. Consultant.

Under very tight deadlines, successfully delivered diagnostics for the two highest-priority projects for the 7500 router, an Intel-based Gigabit Ethernet adapter and a Triple STM-1 SONET adapter with Power PC. Diagnostics ran under the Cisco IOS. Co-designed an on-line diagnostic for IOS, created a library for sharing code between IOS and IDS, developed tools for running SSH sessions from AT&T cable-hosted site into Cisco, and revised device/bus mapping architecture.

3Com Corporation, Santa Clara, 1995-2000, 2001. Consultant.

Wrote drivers and diagnostics for Ethernet adapters from 10BaseT to 1000BaseX (some with embedded ARM processors) for Windows, DOS, OS/2 and NT, both as standard products and OEM specials for HP and Dell (1996-2000.) Also developed auto-install programs used by @Home and others for simple network setup.

EIT, Palo Alto, CA, 1994-1995 Sr. Member Technical Staff

Developed real-time Web collaboration tools under a grant from DARPA. Designed a protocol similar to the Open Settlement Protocol (ETSI TS 101 321) providing for route selection and billing for real-time web sessions, developed a custom version of IP multicast for the MBONE, and wrote Java programs integrating collaboration tools.

Photonics Corporation, San Jose, 1991-94. Consultant.

In conjunction with business partner IBM, designed a preliminary version of the IEEE 802.11 MAC protocol, providing bandwidth reservation, label-based inter-access point routing, hidden

node protection, data transfer, multiple access priorities, segmentation, and error recovery for an infrared WLAN. Implemented this protocol in an NDIS 2 driver for DOS/Windows and developed a simulation tool

Fremont Communications, Fremont, 1990-1991. Vice-President of Engineering.

Managed a group of four engineers responsible for all user interface and protocol elements of an award-winning, low-cost PC-based fax modem, in a start-up environment.

Memorex-Telex, Milpitas, 1986-90. Director, Technical Marketing.

Managed a group of five system engineers who designed, provisioned, and installed networks for company's customers, including NICs, Novell file and print server, and typically a 3270 gateway for mainframe access. Co-founded the Open Token Foundation, a trade group of LAN vendors that created the testing lab now used by the Wi-Fi Alliance.

Excelan Inc., San Jose, 1985-1986. Lead Software Engineer.

Designed and developed OSI file transfer, access, and management protocol (FTAM) for turnkey Ethernet/TCP company. Represented company at OSI Implementors' Workshop and contributed to design of multi-protocol framework for future development of TCP/IP and OSI protocols. Provided input on the RFC 1001 and 1002, NETBIOS over TCP/IP.

Tandem Computers, Austin, TX, 1983-1985. Lead Software Engineer.

Developed SNA/LAN gateway, supported sales organization in closing LAN deals, and represented company on LAN standards committees. Wrote DOS device drivers in Intel assembly language and developed an SMB/NETBIOS file server client. Served as Vice-Chair and Editor of 802.3 1Base5 Task Group, developing design of the first Ethernet over Unshielded Twisted Pair (UTP) standard.

Texas Instruments, Austin, TX, 1977-1983. Software Engineer/Project Lead

Designed the device I/O subsystem for a proprietary network OS. Designed and implemented the first application for company's Token Ring chipset, a tunneling terminal server for legacy equipment. Developed a minicomputer-based 3270 emulator and related SNA/LAN gateway for use by PCs over a LAN.

Education

Post-graduate work, University of Texas, Computer Science, Logic, and EE, 1977-78.
BA, University of Texas, 1975.

Industry Groups

- ◆ Contributor, IETF Homegate, Ledbat and ALTO task groups (2008-present.)
- ◆ Contributor, Wi-Fi Alliance Easy Setup Task Force (2004) producing Wi-Fi Protected Setup standard.
- ◆ Team Lead, WiMedia Alliance (2003-4). Contributed wireless multimedia architecture for consumer electronics over IETF, IEEE 802.15.3a, and Ultra-Wide Band (UWB).
- ◆ Contributor, IEEE 802.15.3a and MBOA MAC Protocol task group (2003-4.) Contributed critiques and enhancements to the standards body developing MAC and

PHY protocols for Ultra-Wide Band communication and improvements to the vendor group.

- ◆ Secretary and Founder, Open Token Foundation (1989). Organized group of Token Ring vendors into trade group.
- ◆ Participant, OSI Workshop (1985-86). Wrote interoperability subset specification for protocol suites with multiple options, and demonstrated feasibility of open protocols
- ◆ Vice-Chair and Editor, IEEE 802.3 1Base5 task force (1984-86). Wrote first Twisted-Pair Ethernet Standard, the proof-of-concept for 10BaseT.

Publications

Google's Political Head-fake, San Francisco Chronicle, July 9, 2008 (reprinted in Washington Times July 12). Op-Ed on Google's expansion.

The Circus is Coming, San Jose Mercury News, April 17, 2008. Op-Ed on FCC hearing.

Everyone's a winner in the Comcast - BitTorrent detente, The Register, March 31, 2008, plus eight other recent articles in same publication.

WiMedia MAC Convergence Architecture, WiMedia Alliance 2004, listed co-author.

Ethernet History: Nikkei Network, February 2003 (interviewed on development of twisted-pair standard)

New Challenges in Corporate Connectivity: Dataquest, 1990 (with Glenn Schiller.)

Token Ring's First Decade: The Open Token, September-November 1989.

Supplements to IEEE CSMA/CD 802.3 Standard: IEEE, 1989, listed co-author.

Citations

Quoted in Comcast, Verizon and AT&T FCC filings on broadband management docket 07-52.

Issued Patents

System Clock Synchronization in an Ad Hoc and Infrastructure Wireless Networks, 2/1/2004 (with Kowalski and Kandala). Method of reducing packet jitter. United States Patent 7,239,626.

Systems and methods for implementing an acknowledgment mechanism for transmission of a real-time data stream, 12/5/2003 (with Hlasny). Method of reducing packet jitter on TCP. United States Patent 7,394,813.

Patents Pending

Method and System for Aggregating Frames in Quality of Service Enabled Wireless Network (with Gast), 12/20/2006. Method of building 802.11n aggregates at the MSDU and MPDU level. Application #20080159319.

Decentralized Bandwidth Reservation Mechanism for Wireless Networks, 2/3/2004. Method of ensuring QoS without central controller. Application #20050169221. Method and System for

Detecting Pending Transmissions in a Wireless Data Network, 2/3/2004. Method of ensuring QoS without central controller. Application #20050169231.

(Others as well.)

Other Patent Activity

Communication medium access control protocol for wireless communication, 11/15/1993 (Credited to Chen et. al.) US PTO 5,502,724. Allocates network time. (note: Photonics employees Tom Kurata and Stan Fickes developed this patent with my collaboration.)

State Description and Retry Strategy for Aggregated 802.11n Frames, 8/11/2004 (with Kowalski and Kandala). Prepared for USPTO filing. This is the method used for A-MPDU in 802.11n.

Recent Public Appearances

U. S. House of Representatives Subcommittee on Communications, Technology, and the Internet hearing on network privacy, April 23, 2009, witness.

Congressional Internet Caucus Advisory Committee “State of the Mobile Net” conference, April 23, 2009, policies enabling wireless innovation panelist.

eComm 2009, San Francisco, CA, March 5, 2009, Spectrum 2.0 panelist.

Messaging Anti-Abuse Working Group, San Francisco, CA, February 19, 2009, Net Neutrality panelist.

Institute for Policy Innovation events on European network regulation, Brussels and London, October 14-15, 2008. Internet Regulation panelist.

Innovation '08, MAP Network Management event, Santa Clara, CA, June 25, 2008, panelist.

Supernova 2008, San Francisco, CA, June 18, 2008. Broadband future panel.

Information Technology and Innovation Foundation Forum on Network Management, Washington, DC, March 12, 2008. Principal speaker.

Federal Communications Commission public en banc hearing on broadband network management practices, Cambridge, MA, February 25, 2008. Technical experts panel.

Toll Roads Symposium on Network Neutrality, University of San Francisco Law School, January 26, 2008. Social Control and Autonomy Panel.

Professional Memberships

IEEE, IEEE Standards Association, ACM, ISOC.