

Viewpoint Engineering

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David B. Tuttle, Principal Engineer

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Detailed Curriculum Vitae -

Positions, Projects, Publications, Presentations, Documents

Abstract Algebra and Computers - Summer 1965

National Science Foundation, Secondary Science Training Program

Stevens Institute of Technology, Hoboken NJ

- Abstract Algebra of groups, sets, vectors, topology
- FORTRAN II programming, IBM 1620 machine language & Autocoder assembly

Clerk Level 3 - Summer 1966

Research Department, Tunnels and Bridges Division

Port Authority of New York and New Jersey

Commerce Building, 111 Eighth Ave, Manhattan NYC

- Holland Tunnel traffic incident data collating & numerical analysis
- FORTRAN IV interactive programming on IBM Research M44/44X time-sharing system
- Traffic density and ventilation studies in Lincoln Tunnel

Undergraduate Student - Fall 1966 - Winter 1968

Massachusetts Institute of Technology, Cambridge MA

- Course 6.47: Introduction to FORTRAN for Engineers - Jerome Salzter
- Course 6.544/18.16J: Heuristic Programming & Artificial Intelligence - Marvin Minsky & Seymour Papert

User Support Consultant (part time) - Spring 1967

Computation Center, Massachusetts Institute of Technology (MIT CC), Cambridge MA

- MIT Compatible Time Sharing System (CTSS) on modified IBM 7094
- Unit record operations on IBM 1401, 026/027 keypunch, 1403 printer, etc.
- System/360 Programming in FORTRAN IV, PL/1 and System/360 Assembly
- Enhanced CTSS '21' Blackjack game in Michigan Algorithm Decoder (MAD)
- Fortran SLIP library (list processing) updated to S/360 Fortran IV

System Programmer - Summer 1967

MIT Computation Center, Cambridge MA

- OS/360-PCP Sysgen and installation on System/360 Model 65
- OS/360 Installation and extensive customization of Attached Support Processor (ASP) with System/360 Model 40 channel-attached to System/360 Model 65
- OS/360 I/O device programming, Job Control Language and utility programming
- 'Spacewar' video game experience on IBM 2250 Model 1 vector graphics display

User Support Consultant (part time) - Fall 1967 - Spring 1968

MIT Computation Center, Cambridge MA

- SHARE Software Librarian for MITCC
- System Installation and Utility programming on IBM System/360 model 20
- Assembly-language rewrite of Fortran three-space coordinate transformation functions, supporting molecular structure analysis of stereoisomers

Supplemental Employee (part time) - Fall 1968

Computer Graphics Group, Cambridge Scientific Center

Data Processing Division, International Business Machines Corp.

545 Technology Square, Cambridge MA

- Interactive programming in S/360 Assembly & PL/1, using Cambridge Monitor System in a virtual machine under Control Program-67 (CP-67/CMS)
- OS/360 Sysgen, installation and operation in a CP-67 virtual machine
- Magnetic tape access and data retrieval using OS/360 in a virtual machine

Associate Programmer - January 1969 - 1970

Computer Graphics Group, IBM Cambridge Scientific Center

545 Technology Square, Cambridge MA

- ONLINE/OS interactive interface for OS/360-PCP in a CP-67 virtual machine
- PL/1 programming support for Sketchpad III graphical element database
- Data communication protocol design and driver development for IBM 1130 graphical display client & PL/1 database server under ONLINE/OS and CP-67

- Introduction to ONLINE/OS

E. C. Hendricks, C. I. Johnson, R. D. Seawright, D. B. Tuttle;
IBM Cambridge Scientific Center Report 320-2036, March 1969.

- ONLINE/OS User's Guide

E. C. Hendricks, C. I. Johnson, R. D. Seawright, D. B. Tuttle;
IBM Cambridge Scientific Center Report 320-2037, March 1969.

- Notes on Design Objectives and Implementation under OS/360 of a General Purpose Binary Synchronous Telecommunications Package for Multi-Programmed Applications in OS/360

E. C. Hendricks, D. B. Tuttle;

IBM Cambridge Scientific Center Report 320-2047, August 1969.

- BSCCA: An Interrupt Service Subroutine for Binary Synchronous Operation of the IBM 1130 Synchronous Communications Adapter

D. B. Tuttle;

IBM Cambridge Scientific Center Report ZZ20-2096, October 1969.

Senior Associate Programmer - 1970 - August 1971

Computer Graphics Group, IBM Cambridge Scientific Center

Advanced OS Development Group, IBM Cambridge Scientific Center

- Advanced text editor design and development for CP-67/CMS and ONLINE/OS
- Data communication protocols designed for reliable machine to machine data exchange
- CP-67 extensions for virtual System/360-67 multiprocessor support
- Context Editors, Part II: A Non-System-Specific Context Directed Editor
D. B. Tuttle;
IBM Cambridge Scientific Center Report 320-2048, March 1970.
- HOTLINE: A Binary Synchronous Access Method
E. C. Hendricks and D. B Tuttle;
IBM Technical Disclosure Bulletin WA8-70-0091, September 1970.

Senior Associate Programmer - August 1971 - 1972

CP-67/CMS Development Group, IBM Industry Marketing & Development

545 Technology Square, Cambridge MA

- Alpha Test design documentation for New Context Editor (NED)
- CP I-System support for IBM 3330 drives and IBM 2305 fixed-head DASD
- Virtual machine device control, I/O virtualization, virtual memory virtualization
- Source update & build utility design and implementation in CMS
- Prototype support for System/370 Program Event Recording and VM microcode assist



Virtual Machine Facility/370 - August 1972 Blue Letter

Control Program (CP) & Conversational Monitor System (CMS)

System/370 Advanced Function - announced August 1972, shipped November 1972.

Staff Programmer - 1973 - 1976

VM/370 Control Program Development, Advanced Systems Development

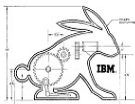
IBM New England Programming Center, System Development Division (SDD)

24 New England Executive Park, Burlington MA

- VM/370-CP support for virtual channel-to-channel adapter (CTCA), 1973
- VM/370-CP support for IBM 3704 and 3705 Programmable Communications Control Units

- VM/370 delegate, IBM Systems Network Architecture (SNA) Architectural Maintenance Board (AMB), 1973-1976
- System Architect, VM/370 Control Program, 1974-1975
- IBM Project Management training program, Poughkeepsie NY
- Technical reviewer, IBM SNA Formats and Protocols Reference Manual v1.0, 1976

INSIDE THE NCP



VM/370 Support for the 3704/3705 Programmable Communication Control Units
SHARE User Group presentation, August 1974.

Principal Software Engineer - 1976 - 1978

Distributed Systems Group, ML5-5

Digital Equipment Corporation, Maynard MA

- RSX-11M support for IBM SDLC communications and IBM 3790 SNA protocols
- DECnet Stage II design task force, 1977
- DECnet Review Group (DRG) member, 1977-1978
- Project leader for all IBM interface products, 1977-78
- Preliminary Design Specification for the Network Resource Control Protocol and the Node Resource Manager
David B. Tuttle; Digital Equipment Corp. Report DBT-77-002-02S, April 1977.
- RSX-11M/3790 Protocol Emulator
Digital Equipment Corp. product documentation, 1978.

Manager, DMEP Software - 1978 - 1979

Cambridge Telecommunications Corp. (CTX)

5 Old Concord Road, Burlington MA

- First-level manager for a group of 5 to 8 software engineers
- DataNetwork Modified Emulation Program (DMEP) on-site customer support and development
- Citinet™, Telenet™, Tymnet™, Datapac™ packet network terminal support for IBM 3704/3705 Communication controllers
- DataNetwork Modified Emulator Program (DMEP) for the IBM 3704/3705
Cambridge Telecommunications Inc. product documentation, 1979.

Manager, Front-End Software - 1979 - 1980

GTE Telenet Communications Corp. (acquired CTX in Fall 1979)

20 Blanchard Road, Burlington MA

- X.25 and terminal protocol support for IBM 3704/3705 Communication Control Units

- Technical liaison with Bell Canada Datapac, Tymnet, Memorex and IBM
- Promoted from line management to senior technical staff

Senior Scientist, PAD Development - 1981 - 1984

GTE Telenet Communications Corp., Burlington MA

- 3270DSP protocol for remote operation over X.25 of IBM 3270 display terminal clusters
- X.25 network planning and support for GTE Data Services, GT Northwest, Hawaii Tel
- 3270 Display System Protocol, 3270DSP
Approved and issued August 1981 by GTE Telenet, Tymnet, and Datapac.
Second edition updates issued July 1983.

Chief Scientist, PAD Architecture - 1984 - 1985

GTE Telenet Communications Corp., Burlington MA

- HPAD protocol for remote operation over X.25 of IBM SDLC and CCITT HDLC devices
- Consulting within GTE on burst switching experiments and ISDN development
- GTE Corporation Engineering Symposium, 1984
- HPAD, An HDLC Packet Assembler/Disassembler Protocol for X.25 Networks
Issued jointly by GTE Telenet and IBM Corp., 1984.

Senior Technical Consultant, Communications - 1985 - 1986

Software Systems Engineering, Prime Computer Inc.

500 Old Connecticut Path, Framingham MA

- Open Systems Interconnection Service Definition Abstracts
Prime Engineering Technical Report PE-T-1328, June 1986.
- Reference Listing of ISO and CCITT Data Communications Standards
Prime Engineering Technical Report PE-T-1358, October 1986.

 [DoD Internet Architecture \(TCP/IP and Friends\)](#)

 [Open Systems \(OSI\) Protocols](#)

 [PRIMOS™ Data Communications, 1985 - 1989](#)

Principal Technical Consultant, OS and Data Comms - 1986 - 1989

Technical Consulting Group, Prime Computer Inc.

500 Old Connecticut Path, Framingham MA

- Strategy Forum delegate, Corporation for Open Systems (COS)
- Strategy Forum Nominating Committee, Corporation for Open Systems
- Strategy Forum Architecture Committee, Corporation for Open Systems

- Open Systems Network Management Forum (OSI/NM)
- UNIX International Communications Special Interest Group (SIG)
- X/Open XNET Working Group
- Prime Computer internal Patent Review Committee
- The EMACSMail System, Version 86.01 Users Guide
Prime Engineering Technical Report PE-T-1333, October 1986.
- The EMACSMail System, Version 86.12 Users Guide
Prime Engineering Technical Report PE-T-1333 Rev. 1, March 1987.

VM and the VM Community: Past, Present, and Future

Melinda Varian, Office of Computing and Information Technology

Princeton University, August 1989 and later revisions, for the SHARE VM Project.

 [VM and the VM Community: Past, Present, and Future](#) - April 1991

 [VM and the VM Community: Past, Present, and Future](#) - August 1997

Senior Research Engineer - 1990 - 1991

Product Operations, Ungermann-Bass Inc. (subsidiary of Tandem Computers)

5 Corporate Drive, Andover MA

- Local Area Network infrastructure and interface equipment
- Broadband, Baseband, twisted-pair and Token Ring LAN hubs and bridges
- Enterprising Networks - Communication Networks Perspectives for the 1990s
PowerPoint presentation; Ungermann-Bass Advanced Engineering, February 1990.
- The "I-Net" Intelligent Network - Preliminary Concepts & Possibilities
PowerPoint presentation; Ungermann-Bass Advanced Engineering, April 1990.
- Notes on X.25 Capability for Net/One and Access/One
System Architecture File report; Ungermann-Bass Advanced Engineering, June 1990.
- Access/One Requirements, Assumptions, Conclusions, Alternatives
PowerPoint presentation; Ungermann-Bass Advanced Engineering, February 1991.
- Token Ring Support PDT Review
PowerPoint presentation; Ungermann-Bass Inc., February 1991.

Chief Engineer - 1991 - 1993

Product Operations, Ungermann-Bass Inc., Andover MA

- Chairman, Product Delivery Division Technical Review Board (TRB)
- Project Engineer, Peregrine FibreChannel Gateway (joint project with Emulex Inc. and Siemens Control Systems)
- Project Engineer, Bandstand (Access/Open) managed network services platform

- Preliminary System Description – Bandstand Medley
Ungermann-Bass Inc. internal document, July 1991.
- Preliminary Functional Specification – Bandstand Management
Ungermann-Bass Inc. internal document, September 1991.
- Bandstand Management – Demo Version
Ungermann-Bass Inc. internal document, October 1991.
- A View to the Future
PowerPoint presentation; Ungermann-Bass Inc., November 1991.
- Technical Review Board Purposes and Procedures
PowerPoint presentation; Ungermann-Bass Inc., January 1992.
- Bandstand Project, aka Access/Open
PowerPoint presentation; Ungermann-Bass Inc., January 1992.
- Peregrine Fibre Channel Gateway Proposal
PowerPoint presentation to TRB; Ungermann-Bass Inc., May 1992.
- Peregrine Gateway System Description
Ungermann-Bass Inc. internal document, September 1992.
- Network Computers
PowerPoint presentation; Ungermann-Bass Inc., January 1993.
- Engineering Notes – Access/One and Access/Open
Ungermann-Bass Inc. internal document, March 1993.
- Virtual Network Architecture (VNA) – Architectural Framework
PowerPoint presentation; Ungermann-Bass Inc., May 1993.
- Virtual Network Architecture (VNA) – Physical Layer Features
PowerPoint presentation; Ungermann-Bass Inc., July 1993.

Consulting Engineer – 1993 - 1995

Augment Systems Inc.

19 Crosby Drive, Bedford MA

- High-performance device interfaces for digital color editing and prepress operations
- Fibre Channel adapter design for Sun Microsystems SBus, for Interphase Corp.
- Fibre Channel technology training course prepared & presented to Quantum Corp.
- Business plan development and presentations for refinancing/reorganization
- Technology evaluation and negotiation to acquire Radius Inc. **Skylab** project
- Negotiation with Apple Computer for license to develop MacOS compatible multiprocessor platform
- Fibre Channel FC-PH Device Driver for the AL303 / Model 4626 SBus FC Adapter
Software Design Specification, Augment Systems and Interphase Corp., February 1994.
- Augment Systems Report on Fibre Channel
PowerPoint presentation prepared for Network Systems Corp., March 1994.

- Introduction to Fibre Channel, ANSI X3.230
PowerPoint presentation developed for Quantum Corp. training class, April 1994.
- Fibre Channel Protocol for SCSI (FCP), dpANS X3.993
PowerPoint presentation developed for Quantum Corp. training class, April 1994.

Chief Technology Officer - 1995 - 1997

Augment Systems Inc.

2 Robbins Road, Westford MA

- Product redesign when Apple Computer denied MacOS license for Radius Rocket blades in Skylab
- Conceptual design of **Firebird** file server with 125 MByte/sec FC-AL interfaces
- Foreign filesystem protocol design exploiting FCP frames over FC-AL
- RAID management interface design, MacOS **Finder** interface design, debug/trace tools
- Conceptual and physical design of PCI bus bridge card for Rocket Private Bus (Motorola MC68040)
- AFX drivers for Emulex LightPulse 6000 FC-AL adapter: Rocket/MC68040, PowerPC Macintosh, Intel WindowsNT
- Augment **AFX-210, AFX-410** series - FibreChannel Storage Area Networking system for PowerMacintosh and WindowsNT professional color editing & printing

- Centric Systems : Business Opportunity - Fall 1994
- Centric SK/6 Super Server : Preliminary Datasheet - September 1994
- Centric Systems : Business Proposal - October 1994
- Centric Systems : Executive Overview - January 1995

 [Firebird Data Warehouse Architecture](#), February 1996

 [Firebird SuperServer for MacOS](#), February 1996

 [Augment Systems AFX 410 SuperServer](#), September 1997

Consulting Engineer, Software Project Leader - 1997 - 1999

VideoServer Connections Inc. (division of VideoServer Inc.)

4 Mount Royal Avenue, Marlborough MA

- Developer's kit driver software for BRICK™ ISDN interface modules
- Prototype design & software implementation for Teletex TeleEye®-384 video conferencing endpoint terminal

- Functional Specification, PCI BRICK™ Carrier Card
Dave Tuttle & Tom Daly; VideoServer Connections Inc., March 1998.
- DVC9-ISDN Reference Design Kit Adaptation for BRI Brick™ Support

Project Proposal for 8x8 Inc.; VideoServer Connections Inc., August 1998.

- System Design Specification, DVC9-Brick™ Reference Design Kit
VideoServer Connections Inc., January 1999.

Chief Engineer - 1999 - 2000

NorthStar Internetworking (a Teradyne company)

200 Fifth Avenue, Waltham MA

- NetFlare™ Internet Diagnostic Unit (IDU), two patent applications
- CompactPCI platform with RedHat Linux 6.1 on Intel x86, PCMCIA boot
- Ariel RS6000 T1/E1 24/32-channel line cards with 56 Kb/s modems
- NetFlare™ Product Family
PowerPoint presentation; NorthStar Internetworking, October 1999.
- Brainstorm 99/12
PowerPoint presentation; NorthStar Internetworking, December 1999.
- PC Configuration Fault Analysis
Peter H. Schmidt, David B. Tuttle, Davis Foulger et al.;
Patent applications filed in U.S. and Europe; Teradyne Inc., April 2000
U.S. Patent 7,127,506 granted October 2006.
- Network Transaction Stress Amplifier
David B. Tuttle
Patent applications filed in U.S. and Europe; Teradyne Inc., May 2000.



[Teradyne & Stargus exploit NetFlare™ and CableEdge™ systems - 2002](#)

Project Engineer, Fat City - 2000

Hammer Technologies (a Teradyne company)

205 Lowell Street, Wilmington MA

- PacketSphere™ 2.5 Gb/s network analyzer and network behavior simulator
- Compact PCI platform with VxWorks on Motorola PowerPC processor
- Custom CPCI line cards using C-Port C-5 network processors



[Hammer PacketSphere™ platform](#)



[Network Emulator for Hammer PacketSphere XG™](#)

Operating System Software Engineer - 2000 - 2003

Vividon Inc. (originally Exotec Inc.)

142 North Road, Sudbury MA

- Design & implement 'fsck' utility for CFFS+ clustering Fast File System for ExOS
- Redesign XOK ExoKernel memory mapping and restructure ExOS for 4GB address space

- Redesign and implement ExOS CFFS+ disk block allocation for 256-512 GB disk partitions
- ExoKernel architecture-specific support for Dell rack-mount servers
- Kernel driver porting for Tigon2 & Intel GbE, Q-Logic SCSI, etc.
- Multi-thread asynch file I/O design & implementation on RedHat Linux 8.x
- Design & implement Cisco WCCPv2 daemon on Linux for multi-protocol web cache & proxy

Principal Engineer - 2003

StarBak Communications Inc. (merged with Vividon in Jan. 2003)

One University Park, 29 Sawyer Road, Waltham MA

- Design & implement Microsoft Windows Media Player v9 playlist interpreter for Linux

Principal Engineer - 2003 - 2004

Katana Technology Inc. (later Virtual Iron Software Inc.)

43 Nagog Park, Acton MA

- Supervise porting and testing of TopSpin InfiniBand drivers to FreeBSD x86 kernel
- Design & implement non-blocking InfiniBand interconnect for FreeBSD embedded kernel
- Design & implement FreeBSD kernel support for IPMI and related facilities
- Implement InfiniBand RDMA & atomic services over 100Mb/s Ethernet for development

Principal Engineer - 1994 - Present

Viewpoint Engineering (sole proprietorship)

Heather Drive, Reading MA

- Occasional work as independent contractor and/or consultant, between full-time positions

Principal Software Engineer, Contractor - 2004

Crossbeam Systems Inc.

200 Baker Avenue, Concord MA

- Experimental software partitioning supporting multiple uniprocessor Linux kernels on an Intel SMP platform
- Condensed [MP-Split] Project Statement - September 2004
- MP-Split Multiple Linux Support for Intel SMP, COS-based Prototype for C30i - March 2005
- MP-Split Multiple Linux Support for Intel SMP, XOS Implementation for APMs - July 2005

Principal Software Engineer - 2005 - 2010

Crossbeam Systems Inc.

80 Central Street, Boxborough MA

- Source control organization, build support and build integration for Octeon™ Linux
- Kernel platform drivers for Octeon™ packet accelerator engines, with user-space interfaces

- Octeon™ 64-bit port of EZchip NP-2 support libraries (EZdriver)
 - EZdriver board support package and host driver implementation for NP-8600
 - "FrankenBoard" bring-up with Octeon evaluation board acting as control host for EZchip EZsystem2 evaluation platform
 - SDK and Linux kernel update for supporting Cavium Octeon Plus™ in 2nd-generation NP6 modules
 - Assisted in x86_64 support for APM and conversion of CPM system base to x86_64 Linux
 - Technology exploration of IPMI, SSI, HP and IBM blade servers, platform management, etc.
 - Technology and market exploration of requirements for IPv6 networking
 - Source control and build support for new NPM module (3rd generation NP6, new EZchip)
 - Crash data capture and crash reporting update for new APM modules, Linux x86 and x86_64
 - Major cleanup of complicated, hierarchical 'make' procedures for XOS (4 Linux builds for the Cavium Octeon, 18 Linux x86 builds for APMs, Linux x86_64 build with KVM & QEMU virtualization, then Linux x86_64 build for the CPM that packages all of the results)
 - Source import, source control organization and build support for KVM, QEMU, 'libvirt', Red Hat EL v5.4 kernel for x86_64
 - Preferred virtual machine memory management for Red Hat EL v5.4 with KVM and QEMU
- Octeon™ Linux Extensions for NPM-4 and CSM - November 2005
 - Platform Software for NPM-4 - December 2005
 - NextGen Build Tree for XOS Development - August 2006
 - Octeon™ Initialization for NPM-8600, XOS Release 8.0 - Fall 2007
 - IDT 88K8483 SPI Usage on the NPM8600 - January 2008
 - Linux Modifications for NPM-8600 - February 2008
 - IPv6 for X-Series - Introduction & Overview - June 2008, PowerPoint

Principal Engineer, Contractor - Summer 2011

SafeNet Inc.

100 Conifer Hill Drive, Danvers MA

- Implemented physical intrusion alarm and event processing in Tileria Tile-64 Linux.
- Extended inter-processor PCI interfaces to pass event notifications and state data.
- Developed named semaphore interfaces for multi-thread cross-process communications.
- Unit test and documentation for alarm interface; passed full QA test suite.

Principal Engineer - 2011 - 2012

Symmetric Computing Inc.

Venture Development Center, University of Massachusetts

100 Morrissey Boulevard, Boston MA

- OpenSuSE Linux development and release engineering for 'Departmental Supercomputer'

products based on Distributed Symmetric Multiprocessor (DSMP™) technology.

- Kernel x86_64 support for direct-connect InfiniBand with RDMA paging for a fixed cluster of two or three nodes. Quad-socket platform for AMD Opteron™ G34 processors, with up to 64 cores and very large physical memory (256 GB-1.0 TB) per node.

Principal Platform Engineer - 2012

VideoIQ Inc.

213 Burlington Road, Bedford MA

- Embedded Linux development supporting TI8168 (ARM9) and DSP-based video surveillance and security products with Real-Time Threat Detection technology and network deployment.
- Platform development for standalone and multi-unit Rialto video bridge with integrated real-time analytics and zero-bandwidth audio/video storage.
- System and internal network design of multi-unit chassis with embedded Marvell GbE switch and Cogent NAS controller with local SATA disks.

Principal Engineer, Contractor - 2013 - 2014

Affirmed Networks Inc.

35 Nagog Park, Acton MA

- Embedded Linux development for AN3000 Mobile Content Cloud (MCC) clusters.
- Purpose-built ATCA and VM-based non-stop, scalable systems for mobile subscriber and content gateway services.
- C++ and Python system configuration updates for management interfaces with 802.1q VLAN.
- Complex C++ support for MPLS control plane with multiple network namespaces.
- Linux 3.2.x 64-bit kernel support for MPLS IPv4 and IPv6, based on SourceForge prototype.

Principal Engineer, Contractor - 2015

VideoIQ Product Group, Avigilon Inc.

900 Middlesex Turnpike, Billerica MA

- Yocto Linux embedded development for Atomic ES-HD High Definition Edge Storage server.
- Embedded Linux support for Rialto and R-Series video encoders and analytic platforms.

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 [TW3 Nostalgia](#)

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