David Benoit B.Sc., M.Math

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Professional software consultant, systems designer and C++ developer with 14 years of industry experience specializing in highly robust, scalable, available, and configurable software for Linux and Solaris.

Computing

Languages:	**C++**/C, Awk/Gawk, Lex/Yacc, Tk/Tcl, SGML, HTML, XML, XSLT, JavaScript, SQL, LISP, FORTRAN, ProLog, Smalltalk, Maple, x86 Assembly, Perl, Visual Basic, Java, Unix Shell scripting.
Libraries & Environments:	**Boost**, **STL**, SigC++, AJAX, GDK/GTK+, Gnome, X, IPv4, IPv6, JRun, .NET, CSS, Winsock2.
Operating Systems:	**Linux**, **Solaris**, SunOS, RIM OS, Windows 7/Vista/2k8/XP/NT/2k/98/95/CE, IRIX, AIX, VAX/VMS, DOS, Macintosh.
Software:	**emacs, PostgreSQL**, MySQL, vi, SVN, CVS, RCS, Source Depot, SQL Server, Maple, HP OpenView, SNMP, Libre/Open Office, Microsoft Office/Project/Visio, Lotus Suite, WordPerfect Suite, XRunner, dBase, Internet & Communications Software, etc.
Hardware:	RIM 950/957/Blackberry, NMS (various models), Palm Devices, DAP Handhelds, Compaq iPaq, Microcomputers, Workstations, Peripherals, Serial Controllers, internetworking infrastructure.
Protocols:	**TCP**, **UDP**, **SIP**, **RTP**, **HTTP**, **SMDI**, **FIX**, **PostgreSQL**, **MySQL**, TDS, SNMP, H.323, H.225, Q.850, Q.931 and other proprietary and internal protocols.

Work Experience

Jan 2006 – Present: **Chief Technical Officer, Software Engineer & Co-Founder at Starscale**
Halifax, Nova Scotia

- Real-time merchant payment system supporting credit-card (with and without 3-D Secure), localized payment cards and PayPal with built-in foreign exchange capabilities providing “like-for-like” settlement of currencies. Direct integration with Global Collect and Optimal Payments for payment processing and Royal Bank of Scotland (RBS MP) for foreign exchange settlement. Database support for reconciliation, and secure access for merchant XML requests via a symmetric SSL server.
- Design and development of hierarchical binary protocol for use in transmitting and storing arbitrary tree structured messages. Development of associated C++ classes for easy use.
- Development of an asynchronous socket library in C++ for use on multiple CPU architectures and operating systems complete with replaceable components at each level for testing and verification.
- Asynchronous C++ library for direct access to MySQL dataservers using protocol version 10.
- Database schema and stored procedure implementation for online account registration, confirmation, and subsequent lifecycle management.
- MIME multipart message decoder designed to allow seamless streaming of received messages directly to end consumers or storage with no buffering.
- Monitoring software in C++ to ensure that all necessary software for deployed services are running and available.
- Creation of an posix-based C++ operating system abstraction layer to allow higher level applications to be written without specific knowledge of the operating system yet maintain performance.
- Cross-platform C++ runtime environment and framework to allow for easy creation of services that conform to a flexible and standardized operational environment.
- XSL automatic generation of C++ environment to test stored procedure interfaces.

Oct 2009 – Present: **President & CEO at Pedestrian Crossing**
Montréal, Québec

- FIX to Filter feed handler for fixed income assets for Morgan Stanley written in C++ and Boost ASIO.
- Investigation and prototyping of Bloomberg MPF protocol handler for Morgan Stanley writing in C++ and Boost ASIO.
- Enterprise-scale system performance monitoring software for Morgan Stanley written in C++ and Boost ASIO.
- Enhancements and modifications to Zabbix monitoring software (client, server, database, and protocol level) providing integration to the Morgan Stanley cross-platform build system.
- UDP based multi-link aggregation, packet re-ordering, loss recovery and jitter correction for live broadcast quality HD video (H.264) streaming over 3G links written in C++ and Boost ASIO.
- Parsing of PDF records for analysis and data visualization of chronological performance records.
- jQuery extension to allow for user preference ordinal ranking input for multi-criteria decision making analysis.

Jan 2010 – Apr 2011: **Software Engineer IV at Tekelec / Blueslice**
Montréal, Québec

- VRRP and HSRP automated link failure detection and fast link switchover in for HA installations.
- Automatic provisioning of PCRF profiles in response to PUR DIAMETER requests.
- C++ SQL parser implemented with Boost Spirit with complete decomposition of complex queries to support automatic rewriting of queries during schema upgrades.
- Development of a C++ framework to support generic RESTful web service backend systems.
- Design and development of a cache management system to support fragmented database storage in C++.

- Design and development of a high-performance generic template based in-memory object cache in C++.
- Performance analysis, system optimization and build system optimization.

Jan 2008 – Mar 2009: **Software Development Engineer II at Microsoft**
Redmond, Washington

- Automatic and transparent session re-establishment with minimal packet resends after unexpected connection loss.
- Consolidation of TDS C++ data type definitions throughout the SQL Server engine to allow for easier maintenance and creation.
- Specification of C extensions to the ODBC specification to allow for completely asynchronous usage.
- Extensions to the C# SQL Server installation system to allow for on-the-fly application of patches to packages during installation.

Dec 2003 – Dec 2007: **Principal Software Engineer at AOL / InfoInteractive**
Bedford, Nova Scotia

- Host Media Processing Engine (SIP and RTP) written in C++ supporting full audio playback and recording control, DTMF interrupts and media hairpinning for transfers. This application, supporting a large number of concurrent sessions, allowed AOL Voice Services to deprecate a large and expensive hardware and TDM telephony based solution with a flexible scalable architecture requiring only stock Linux machines and IP connectivity.
- Realtime C++ RTP Transcoder which converts live media streams between Speex, iLBC, GSM and PCMU codecs to allow narrowband clients to connect to and use AOL Voice Services with minimal loss of voice quality.
- Server-hosted C++ SIP conference server with hardware (NMS) audio mixing control.
- C++ SIP rewrite server used to apply static rules for call routing, filtering, and load balancing.
- C++ SIP stack designed for high capacity call processing and routing systems. Personally tested this completely asynchronous modular and extensible stack the industry integration and test event (SIPit20).
- C++ RTP stack designed to support numerous automated services as well as live person-to-person calling.
- C++ Media streaming system for real-time voicemail screening in the AIM client.
- C++ Web activated and controlled calling with full real-time asynchronous call control via AJAX.
- Co-design of a per-minute incremental billing system for AOL Voice Services products.
- C++ Phone Locale system for storing and retrieving locale information based on E.164 phone number prefixes.
- Extensions to CVS to allow for integration with an in-house bug tracking system.

Dec 2002 – May 2007: **Vice President & Chief Technical Officer at Invio Bioinformatics**
Halifax, Nova Scotia

- Prototype software for indexing genetic sequences using compact trees in C++.

Mar 2002 – Feb 2003: **Senior Software Developer at J.J. MacKay Canada**
Halifax, Nova Scotia

- Real-time data acquisition and terminal programming application in C++ on WinCE.
- Established best-practices for software design, construction and Linux system administration.

Nov 1998 – Mar 2002: **Senior Software Engineer at AOL / InfoInteractive**
Bedford, Nova Scotia

- MWI (Message Waiting Indication) Gateway for large scale generic routing of voicemail indication to a specific communication method. SMDI and ISVM Gateways including all flow control and low level communication in C++.
- Real-time multicasting system for call notification in C++.
- H.225 gatekeeper in C++.
- TCP “coupler” application to bridge network connections in arbitrary directions in C++.
- Large-scale, high-performance server to provide presence management for UDP-based clients. This server also integrates with several event connections to provide the clients with real-time notification of each type of event and acts as a gateway for dispositions from the clients in C++.
- Large-scale user profile management system in C++.
- Unix/Linux-based core implementation for the Internet Call Manager application in C++.
- Design of InfoInteractive's loss tolerant encrypted UDP communications protocol for client session state management (akin to today's DTLS) in C++.
- Real-time call disposition client for the RIM 950/957/Blackberry devices and the Mobitex and DataTAC networks
- Design and Development of a C++ Object-Oriented socket library for use in real-time systems on Unix/Linux.
- Design, development and testing of the Key-Value-Pair-Protocol (KVPP) which provides a means of designing efficient, flexible, portable, and easy to use messaging between network-based applications.
- Ticket Tracking System (TTS) designed to track problems, and change requests in C++.

Miscellaneous: **Nortel / Bell Northern Research, Dalhousie University, SHL Systemhouse & others**

- GUI-based event manager to monitor and test SNMP based network management software in C++.

- Feature testing for SNMP device management software in C++.
- Test suite automation software in C++.
- On-line faculty information database for the Department of Mathematics, Statistics and Computing Science at Dalhousie University.
- Installation and setup of Public Access Terminals for the Chebucto Community Net.
- On-line course evaluation system for the Department of Mathematics, Statistics and Computing Science at Dalhousie University.
- Implementation and administration of the undergraduate Dalhousie University MSCS Web server.
- On-line campus tour of Dalhousie University.
- Custom software development for Chebucto Community Net Public Access Terminals in C.
- Library Management System developed for SHL Systemhouse written in VB.
- Hardware/Software inventory management procedures developed for use at SHL Systemhouse written in VB.
- Data security and encryption methods for online payment written in Java.
- Micro-kernel multitasking real-time Operating System for the i486 processor written in C.
- ATM Congestion control algorithm simulator written in C.

Academia

May 2004 – Aug 2004:	**Lecturer: Object-Oriented Programming in C++** Faculty of Computer Science, Dalhousie University, Halifax, Nova Scotia
Jan 2004 – Apr 2004:	**Lecturer: Computer Science for Health Professionals** Faculty of Computer Science, Dalhousie University, Halifax, Nova Scotia
May 2002 – Aug 2002:	**Lecturer: Object-Oriented Programming in C++** Faculty of Computer Science, Dalhousie University, Halifax, Nova Scotia
Jan 2002 – Apr 2002:	**Lecturer: Cryptography and Network Security** Department of Math and Computing Science, St. Mary's University, Halifax, Nova Scotia
Sept 1997 – Nov 1998:	**Teaching Assistant / Research Assistant** Department of Computer Science, University of Waterloo, Waterloo, Ontario
Sept 1995 – May 1997:	**Tutorial Leader / Marker** Department of Mathematics, Statistics and Computing Science, Dalhousie University Halifax, Nova Scotia
Sept 1994 – May 1996:	**Program Assistant / Teaching Assistant** University Computing and Information Services, Dalhousie University Halifax, Nova Scotia

Education

Masters:	M.Math, Computer Science, June 1999, University of Waterloo, Waterloo, Ontario.
Undergraduate:	B.Sc. Honours, Computing Science, May 1997, Dalhousie University, Halifax, Nova Scotia.

Publications

- David Benoit, Erik D. Demaine, J. Ian Munro, Rajeev Raman, Venkatesh Raman and S. Srinivas Rao, "Representing Trees of Higher Degree", Algorithmica, Vol. 43, Number 4, December 2005.
- David Benoit, Erik D. Demaine, J. Ian Munro and Venkatesh Raman, "Representing Trees of Higher Degree", Proceedings of the 6th International Workshop on Algorithms and Data Structures (WADS '99), Vancouver, Canada, August 1999.
- David Benoit, Compact Tree Representations, Masters Thesis, University of Waterloo, Waterloo, Ontario, November 1998.

Awards

- US Patent #7,110,748 B2: Telephone Call Manager.
- Deans List, Dalhousie University, 1997.
- Second Place standing in the 1995 APICS Programming Competition.
- Gold Medal and Certificate of Distinction in the Euclid Mathematics Contest, 1993.
- Third Place standing and Certificate of Merit in the Nova Scotia/Prince Edward Island Secondary School Physics Examination, 1993.
- Leon Doof Music Scholarship for excellence and outstanding achievement in Music, 1993.

Hobbies & Interests

General Aviation, Book Binding, Travel, Ultimate, Cycling, Skating, Skiing, Raquetball, Swimming, Classical Music, Clarinet, Viola, Piano, Photography, Art, Woodworking, Home Renovations, Computer Graphics, Animation, Electronics.

References

Available upon request.