

NAME: Stephen D. Williams
sdw@lig.net 703.371.9362, PO Box 40, Mt. View, CA 94042-0040,
AIM: sdw Yahoo: sdwlignet Google: stephendwilliams

POSITION: Senior Technical Director - Practice Scientist / Engineer

NOTABLE INNOVATIONS: Created curses-based web-like scrolling forms w/ scripting in a Postscript-like language – circa 1988.
Created Internet / X.500 / workstation email gateway with fuzzy directory matching – 1990.
Architected and helped implement satellite delivery of Usenet - 1992.
Founded a dialup ISP – 1992.
Setup firewall and first public bank web server for Bank of America – 1994.
Created web publishing system with image and text conversion – 1995.
Wrote and scaled first versions of Buddylist at AOL - 1995.
Solved communication abuse attribution problem at AOL with digital notary – 1996.
Created IM-based multi-person video chat system at AOL, including rate based protocol and digital notary – 1996.
Architected and lead implementation of a rule-engine based web application for insurance quoting – 1998.
Founded startup Insta.com to provide chat-based web support – 1999.
Independently invented CAPTCHA – 1999 (1 year before it was patented).
Relative to binary XML encoding design, invented: hybrid byte aligned format (HBAF), restricted character sets with escapes, chunked tree continuation token, XML Meta Structure (XMS), “Elastic memory” - 2004-2007.
Pending Efficient RDF Interchange format proposal – 2008.
Pending patent application on automotive capability – 2007/8.

EDUCATION: Stanford University Computer Science Artificial Intelligence Certificate Program 2008-present
Cray X1 and XT3 Series System Administration
HPTi Effective Writing for Business and Proposals
American University Masters Degree program 2005-2007
Netscape Application Server 1998
HPTi Business Development, Proposal Writing, Project Management
Certified Information Systems Security Professional (CISSP) (2003)
NSA INFOSEC Assessment Methodology (2003)
NSA / General Dynamics Taclane/Fastlane KG training (2002)
Self taught primarily.

SUMMARY: **Stephen Williams** is a technical and business IT professional with 25 years of IT experience. He joined HPTi in the Fall of 2001 as a Senior Technical Director. Mr. Williams is an deeply knowledgeable in numerous technology areas including:

- scalable transaction and communication systems,
- secure distributed processing,
- rule engines and probabilistic reasoning,
- presence and messaging,
- Linux and other Unixen,
- Java/C/C++,
- digital communications, and
- MPEG4.

Projects he participated in include:

- Cray Supercomputer security and administration,

- temporal graph analysis,
- large DoD program assessment,
- XML-related research,
- video technology,
- messaging and presence systems,
- PKI encryption,
- security,
- biometrics,
- Internet hosting and development,
- virtualization administration,
- insurance and stock quoting systems,
- embedded machine control,
- accounting systems,
- image processing,
- networking design and implementation,
- patent interpretation,
- auction systems, and
- customer relationship management.

Technologies and methodologies commonly employed also include Java, J2EE, JMS, XML, SQL, graphic arts, UML, and Agile methods. He has also been a subject matter expert in patent litigation.

Key areas of activity have included: many XML related methods and extensions to standards and paradigms, biometric research and presentation to the Nevada Gaming Commission, creation of satellite-based communication software, cryptographically secure digital notary and secure transaction systems, architecting advanced information grid systems, creating expert systems and rule engines, and designing federated communications technologies and architectures.

Corporate activities have included interviewing, college recruiting trips, building and running a technical mailing list, career and technical discussion and counseling, event photography, numerous proposal efforts and contributions, participation in management training and events, maintaining moral, and contributions of technical research and knowledge on a number of important subjects.

Mr. Williams is a member of IEEE, ACM, PMI, CISSP, W3C, a lifetime member of AAI, and has participated in standards bodies work such as IETF and W3C working groups. Mr. Williams is a CISSP and holds a Top Secret/SCI clearance, a Position of Public Trust clearance for Treasury, and other clearances available upon appropriate request.

EXPERIENCE HISTORY:

From 10/01 to Present

HPTi, Senior Technical Director / Practice Scientist/Engineer

Participated in project architecture, customer consulting, development management, business development, proposal writing as a principle investigator creating new technology, researcher, technology evaluator, technical interviewer, infrastructure consultant, and assessment consulting.

Supercomputer Security and Administration – 2007-2008

Provided network, security, and system engineering and architecture services in support of an Army supercomputing center initially consisting of a Cray X1E, a Cray XT3, and a set of Linux and Solaris support

servers. Programmed Cisco 6509 and 3550 from scratch, implemented trunked VLANs between Cisco / Linux / Juniper Netscreen firewalls, firewall configuration, Kerberos 5 authenticated SSH connectivity, email servers, and other support options. Interfaced with NASA site security and networking personnel, DREN firewall and network services, and worked with a team of junior and senior administrators to quickly implement system and participate in DoD network and system security reviews as an independent DoD research site.

Temporal analysis, RDF, SPARQL, and Graph Analysis – 2006-2007

Researched, architected, and began implementation of graph query and analysis capability that includes temporal versioning and time series processing. Made use of Java-based RDF / RQL / SPARQL processing engine used in a service function. Designed extensions to directly support temporal processing. Participated in W3C Semantic Web working and interest groups to gain knowledge, best practices, and access to creators and implementors of semantic web and RDF technologies.

Semantic Web and Visualization Development – 2005-2006

Participated in development of semantic / RDF database client and visualization components. Interfaced with I2 Analyst Desktop application. Installed and configured Tomcat, Sesame, Subversion, and other related tools. Evaluated potential technology and methods for possible introduction to project.

W3C Efficient XML Interchange Working Group – 2004-2007

Key participant in the Efficient XML Interchange working group, and follow-on to the XML Binary Characterization working group. Proposed the esXML format as a binary XML standard, participated as a measurements document editor, and participated in teleconference and face to face meetings. Submitted esXML partial implementation as a candidate. Participated as an editor and chief source of new ideas for EXI specification.

Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics - 2006

Played multiple roles in large DoD program assessment. Activities included participating as part of the OSD team for investigation, analysis, reporting, and briefing both programs teams and DoD executives. This assessment work included rapid program understanding, wide-ranging technology investigation, and generating program and technical recommendations.

Scalable Awareness Framework (SAF) for intelligence – 2003-2006

Conceived, researched, architected, and sold the concept of a processing and meta-data framework that is designed to manage large data flows, data sets, and knowledge synthesis goals over a large distributed processing environment. This system combines advanced control methods with universal meta-data tagging, handling of any data format, plug-in interfaces for the creation or incorporation of data mining, synthesis, conversion, gisting, translation, or other tools. Providing continuous temporal tracking, advanced knowledge management, and generalized link tracking, the system acts as a framework in support of the use of new and existing knowledge synthesis tools. Driven by analyst controlled goals, classifications, method development, and probability and assurance classification, the system also maintains policy boundaries between multiple agencies. Managed developer as part of development

phase of project.

Department of Justice CIO PKI/Security Consulting – 2002-2005

As initial lead for the PKI Task and subject matter expert for both PKI and security areas, provided in-depth investigation, analysis, architecture, planning, and recommendations for the creation of a public key infrastructure and improved security architecture. This included widespread interviews of DOJ component technical representatives, presentations to the DOJ CIO, and numerous documents, plans, and position papers. Key components of the DOJ included DEA, FBI, INS, JMD, and US Attorneys. Produced a key PKI Enabling and Secure Application Development handbook with comprehensive coverage of all aspects of architecture, design, and implementation. Contributed directly to requirements documents, evaluation criteria, Project Management Office planning, and educating department personnel.

Health and Human Services Office of Regulatory Affairs – 2002

Performed final IV&V for PKI Certification Authority policies, architecture, and procedures.

Treasury FMS Secure Payment System – 2001-2002

Mr. Williams was the Senior Architect and Project Manager on Secure Payment System project at Financial Management Service, US Treasury, assisting in the management of twelve team members. The Secure Payment System will be used for highly secure entry and approval of all Federal non-military payments. Over two million payments are processed every year, including summary schedules for large bulk payments. These payments are submitted from worldwide locations using modern Internet technology and communications such as Java, HTTPS/SSL3, XML, Entrust / PKI / SmartCards, JMS/MQ, HP Virtual Vault, and DB2 SQL servers. As senior architect working on the SPS project, Mr. Williams refined the initial architecture, investigated and chose dependant technologies, conceptualized and designed several key security architectural features, directed the development team, and interfaced with client and external teams. Specific technology design areas included the overall security architecture, secure database architecture, signed XML documents, XML business object intermediary layer, validation rule engine, message oriented processing, GUI isolation layer and look and feel, 508 (accessibility) considerations, modern design and development methodology, and audit design. In addition to closely assisting the project manager with project management tasks, interviewed, mentored, and coordinated the development team to efficiently plan and develop while reducing risk with prototype tasks. Chaired or participated in presentations to client management, teams, and external teams such as NIST, GAO, the Security Architecture Review Panel of experts, and HPTi personnel. During the design of this system, numerous innovative design elements were created that greatly enhance security, verifiability, and auditability while reducing development and maintenance costs.

From 7/99 to 1/01

Insta.com, President and Chief Scientist

Founded startup based on fusion of presence, instant messaging, dynamic web pages, and customer service. Participated in IETF Instant Messaging and Presence Protocol (IMPP) standards committee. Managed a team of six, wrote contracts, and negotiated financial and shareholder arrangements.

From 1/92 to 8/01

Concinnous Consulting, Inc.

Founded and ran Concinnous Consulting, managing several consultants during different periods.

- From 7/01 to 8/01** **Interactive Gaming Institute of Nevada, Chief Technical Advisor.**
Researched and presented a presentation to the Nevada Gaming Commission on the subject of reasonable assurance of age, ID, and location using existing and emerging technologies including biometrics and Internet trace methods.
- From 11/00 to 3/01** **Jabber.com, Chief Technical Officer.**
As a member of both the Technical Advisory Board and executive management, provided strategic vision, planning, and help with market positioning. Also provided detailed technical training and assistance with scalability, enhanced features, interoperability, and a roadmap for extending Jabber's open IM/Presence system into a platform for general P2P and other transactional, message oriented applications. Directly addressed the expansion of XML usage toward efficient inter-application communication.
- From 7/97 to 12/00** **Netword LLC, Chief Technical Officer.**
Managed technical support and development team of 5 people. Provided technical direction and consulting. Performed and directed emergency and ongoing maintenance, architecting. Performed a complete analysis and redesign of system using open standards (LDAP, SQL, DNS, CORBA, JAVA) and assisted in marketing, positioning, and potential-partner communications.
- From 3/99 to 10/99** **ReverseAuction.com, Chief Technical Officer.**
Architected systems, infrastructure, hired, managed technical staff, developed email and other systems. Build hardware and software for application servers and network management.
- From 4/95 to 4/98** **America Online, Inc., Senior Consultant.**
Designed and implemented Buddy List server (versions 1.x). Implemented custom terminal emulator for Stratus access. Conceived, designed, prototyped, and developed Instant Images, a video conferencing system. Participated heavily in the design of new products with marketing, UI, and development. Researched VRML and other topics.
- From 2/95 to 4/95** **Chemical Bank, Senior Consultant.**
World Wide Web server, software, auto-administration system development and consulting. Consulted on selection and usage of external firewall, external web server, and secure data transfers. Built very easy to use web page authoring system.
- From 11/94 to 2/95** **Bank of America, Senior Consultant.**
Integration, testing, augmentation, and automation of Dec SEAL firewall and WWW servers (External and Internal). Integrated PC, Mac, and Unix Internet access software and wrote installation procedures and scripts. Also developed graphic conversion and production techniques.
- From 2/92 to 8/94** **Lexis-Nexis, Senior Consultant.**
Worked on OOA/OOD/OOP of document management, processing, and retrieval on a large network of Suns and IBM Mainframes.
- From 6/89 to 1/92** **GE Aircraft Engines, Senior Consultant.**

Worked on workstation self-management tools for network of greater than 1000 workstations (Apollo and HP). Ported GNU gcc, g++(c++), Emacs, tools, etc. to both platforms. Ported Kerberos (MIT authentication, chosen by OSF) to SysVR3. Wrote an expert system shell library in C++ for a distributed process monitoring diagnostic and automation tool. Supported an extensible object and inference engine design with forward and backward chaining.

From 9/88 to 7/89

NCR Retail, Senior Consultant.

Organized, participated in design of Communication Management Platform for remote management of Unix systems from a central Unix platform.

From 11/87 to 8/88

Computer Sciences Corp., Member Technical Staff.

A member of the Independent Research and Development team applying Artificial Intelligence to military Logistics. Designing and implementing expert systems with PC to mainframe interaction.

From 5/86 to 11/87

NCR Corp., Staff Consultant.

Participated in the program design, programming, testing, and implementation of NCR Flex benefits worksheet program. Utilized Progress (4GL) to perform transformations on sequential and structured data files for the NCR Order System.

From 8/85 to 5/86

Maxsoft, President.

Creation and sale of custom/vertical software in C for both MS-DOS and Unix (using own NCR Tower 32).

From 2/84 to 8/85

GE Lighting Business Group, Programmer/Analyst.

Worked mainly on advanced computer controls projects: helped design, specify, and write software to control a rotary indexing machine driven by 5 Intel single board computers and an IBM PC User Interface computer.

From 9/82 to 2/84

Maumee Valley Computer Center, Programmer/Analyst.

Evaluated, ordered, and stocked software and microcomputer hardware. Taught computer literacy and BASIC programming. Freelance, utility, and recreational programming: screw machine statistical package, payroll system, point of sale system, encryption program.

HARDWARE EXPERIENCE:

Processors: Cray X1E vector, National Semiconductor 6502, 8080, Zilog z80, Intel 8088, 8086, 80286, 80386, 486, Pentium, Pentium II, Pentium III, Pentium IV, Motorola 68000, 68020, DEC Alpha, Sparc, UltraSparc, StrongARM, PowerPC, RISC 6000, PA RISC, MIPS, VAX 785, VAX 850, MicroVAX II, Perkin Elmer Mini, IBM MVS 360/370, Dragonball, Stratus.

Systems: Atari 400, 800, 1200xl, ST, ATR 8000, Commodore 64/VIC, PET, Radio Shack Pocket Computer I/II, Epson Desktop, Epson PC, Heath CP/M, Columbia PC, Kaypro luggable, Compaq luggable, NEC 6801 CP/M/Basic, NCR DMV, NCR Tower, NCR Tower32, Prism server, ATT 7300, DEC DecStation, CompuPro/Godbout MP/M 8/16 4-user, DEC Decstation, Apollo workstations, HP workstations, HP servers G50, SGI servers, SGI Webforce Indy, Sparc 1, Sparc Classic, Sparc 5, Sparc 10, UltraSparc 20, Sparc 450, Sparc 250, IBM AIX servers, IBM PC, IBM PC/XT, IBM PCjr, IBM AT, IBM Thinkbook 450, IBM 360/370, Perkin-Elmer Mini, DEC VAX 785, DEC VAX 850, DEC MicoVAX I/II, Mass 80, Radio

Shack Model 1, 3, 5, Pocket Computer I/II, Sharp Zaurus, Handspring Treo, Crystal PC servers, Ampttron motherboard/book pc various, VPR Matrix PC, various HP/Compaq/Dell/whitebox PCs and servers, Stratus servers, Prime servers, Tandem Mainframe servers, TI/994a, Cray X1E & XT3.

Telecommunications equipment: US Robotics modems 300, 1200, 2400, 9600, 33.6K, Telebit 19.2 UUCP modem, Racal Vadec 1200, Hayes various, various ISDN network/POTS adaptors, PBX systems, Zyxel 14.4 voice modem.

Network equipment: Develcon Port Switcher, Livingston Portmaster, Arcnet, Thicknet, thicknet vampire taps, thinnet/10-base-2, 10-base-5, 100-base-5, various hubs, switches, managed switches, Cisco routers, Linux routers, DEC Seal firewall, Linux Firewalls, PIX firewalls, Raptor firewall, various Ethernet cards, D-Link/Linksys 802.11b/a cards, access points, CDPD card, RIM Blackberry, PCS Vision Handspring Treo, Ricochet original, network scanners, HP network print servers, OSI ISO X.400/X.500 servers and networking, Novell servers, Windows Servers, Intel BitBus, satellite dish/receiver/modem.

Peripherals: Various scanners, various mice, keyboards, audio, hubs, Epson MX80, FX80, FX100, HP/NEC/QMS/Lexmark/Epson/Other impact ink/plastic, laser, led, dye sublimation, film transfer, wax, line printers, various cameras, video capture, GPS, robotics, joysticks, digitizing pads, MFM, RLL, IDE, SCSI 1/2/3/SCA/LVD, IDE Raid, embedded hardware: Opto22, Compumotor stepper boards, pseudo-gray code shaft encoders, proximity switches, H/O2 torches, spinning collets, LED touch screens, resistive touch screens, Atari pen-plotter, HP pen plotter, virtual headset, pneumatic actuators, key card readers, PKI smart cards, light pens and guns, virtual gloves, bar code readers, scale.

Other: A wide variety of professional Nikon cameras and lenses, including D2X, photographic strobes and lights, Motherboard repair, system building and assembly, carbon fiber composite construction, wax molding, plastic molding, dual-trace oscilloscopes, frequency counters, logic probe, logic analyzer, optical comparators, digital photography, digital videography, logic probes, light meters, television repair.

SOFTWARE EXPERIENCE:

Operating systems: Various proprietary, CP/M, MP/M, DOS 1/2/2.12/3.22/4/5/6, DRDOS (original, new), IBM Topview 1, Quarterdeck, Windows 3.0/3.1/95/98/2000/XP, MacOS, VMS, WANG, IBM MVS/TSO, SunOS/Solaris various, HPUX 3-11, SGI Irix various, AIX various, NCR Unix various, ATT Unix Version 7, Unix System 5.2/5.4/various, DEC Ultrix, Prism Unix, Mass 80 Unix, BSD various, Interactive Unix all versions, SCO Unix various, Microport 286 Unix, Prime Unix, Everex Unix 5.4, Linux .9-2.4.20/2.5+, embedded and custom OS, Tandem.

Databases: Oracle, Sybase, Progress 4GL, MS SQL Server, MySQL, Postgres, PostgreSQL, DB2, Dbase 2/3/4, Clipper, BerkelyDB, DBM/NDBM/GDBM, Tandem, Various ISAM, Access, Delphi, Objectstore, Objectivity.

Programming languages: C++/C (Unix, Lattice, Glockenspiel, GNU, Sun, Microsoft, many others), Small C (Dr. Dobbs, Deep Blue C), Action, Java, Perl, Pascal, Atari Basic, Microsoft Basic (various), Common Lisp, Franz

Lisp, Emacs Lisp, M1/S1, TCL, Forth, Prolog, SQL, Python, Postscript, Javascript, Powerbuilder, SDW (created), assembly: z80/8080, 8086, 6502, 68K.

Office automation packages: Wordstar, Epson Office, Wang, WordPerfect, OpenOffice/StarOffice, KOffice, Lotus 1/2/3, Visicalc, Corel Ventura, Pagemaker, Framemaker, MS Word/Excel, Borland/Corel Quattro Pro, Latex, Nroff.

CASE Tools: System Architect (early), Together Control Center, Rational Rose, XML Spy, various others.

Design / Graphic tools: Corel Draw 5/6/7/8/9/10, Lightwave 3D 5-7, Adobe Photoshop/Illustrator, MS Visio, Xfig, Harvard Graphics, VideoWave 5, VRML, Dreamweaver/Fireworks, Flash, 3D Builder, PBMPPlus, Imagemagick, various others.

Network software: cern-httpd, apache, Netscape server, AOL Server, IIS, Roxen Challenger, HP Virtual Vault, Mosaic (all versions), Netscape .9 on, Internet Explorer, AOL browser (all versions), AOL clients DOS and v. 2 on, ssh/openssh all versions, netpipe, nmap, bind (all versions), satan, samba, ircd, sshd, telnet, ftp, tftp, Amanda, iptables, ipchains, cvs, uucp, innd, sendmail, postfix, imapd, popd, qmail, dce rpc, ldap, cobra, x.25 / x.25 gateways, tcp/ip, SNA, Decnet, Jabber, talkd, rsync, Realserver/player/custom plugins, Mpeg4, rtsp, finger, whois, ntp, lpd, syslogd, SOAP, xml-rpc, plug-gw, DEC Seal firewall, kerberos, Hesiod, Zephyr, ncftp.

Development software: Emacs (GNU, Epsilon, CCA, Unipress, Mark of the Unicorn), uEmacs, gdb, Microsoft Visual Dev, Eclipse, Sun Forte, diff/patch, lex/flex/yacc/bison, QT, scs/rcs/cvs, Neuron Data Elements Advisor, M1/S1, Netscape Application Server, Saber/Centerline Software, Great Circle, gc, STL, JGL, Purify, in circuit emulator.

Speaking Engagements and Selected Publications:

1. Williams, *Serialization Considered Harmful: An Alternate Approach to Data Representation And Movement In Real-World Applications*, Master's Thesis at American University, 2008.
2. Williams, *The EsXML Data Format*, published and presented to the W3C Efficient XML Working Group, 2006.
3. Williams, Chris Powell, et al, *DOJ IT Security Architecture*, presented to the Department of Justice, 2004.
4. Williams, *Public Key Infrastructure Enabling – Secure Application Development*, presented to the Department of Justice, 2003.
5. Williams, *FDA ORA PKI IV&V, presented to FDA ORA, 2004.*
6. Williams, *Efficiency Structured XML, presented at Mitre/DoD Binary XML Workshop, Hampton, Virginia, 2005.*
7. Williams, *Efficiency Structured XML*, presented at W3C Binary Interchange Workshop, Santa Clara, California, Oct. 2003.
8. Williams, *Efficiency Structured XML – A Standard Binary Infoset and API*, presented at Extreme Markup Languages, Montreal, Canada, Aug. 2003.
9. Williams, *Internet Communication Technology Futures*, presented at Interactive Gaming Expo & Conference, Las Vegas, 2001.
10. Williams, *Biometrics, Security, and Location Verification*, presented to Nevada Gaming Commission & Control Board, Las Vegas, July 2001.
11. Williams, *The future of Instant Messaging*, presented at Pulver PIM, Boston,

2001.

12. Williams et al, *Instant Messaging and Presence Protocol*, presented at Internet Engineering Task Force #46, DC, 1999.
13. Williams, *Internet Services Experience*, presented at Internet Implementation Practices Conference, Chicago, 1999.
14. Williams, *The Emergence of Internet Communities*, presented at Rural Datification Conference, Chicago, 1992.

SECURITY CLEARANCE:

Top Secret+, details upon request.
Top Secret, issued 11/13/2002 by DISCO.
Position of Public Trust (Q), issued 11/2001 by Treasury.