# Matt Ervin

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Accomplished Software Engineer and Architect with proven project and personnel management skills and a mastery of the SDLC from inception/design, through development and testing, to deployment/ship/support and maintenance. Extensive experience with C++, STL, Boost, C, OOAD, TMP, UML, and design patterns targeting Windows, Linux, Android, iOS, and proprietary embedded devices. Extremely strong Windows and Linux development and administration skills. Proven ability to collaborate with both local and remote multilingual teams around the world and to deliver high quality maintainable products on time and on budget. Trained as an Electronics Engineer; firmware and 'on the metal' programming of various firmware applications are well within area of expertise.

*Additional details available online by following the links in the footer.*

## KEY AREAS OF EXPERTISE

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| C++, C, STL, Boost, TMP, Bash, UML | Qt, MFC, COM, Win32 API, Posix (Linux) API |
| C#, Objective-C, iOS, Java, Android, x86 Assembly | Visual Studio, Android Studio, Eclipse, QtCreator |
| Multi-threading, Real-time systems, Concurrency | Event driven hierarchical state machines |
| Refactoring, Design Patterns, TDD, Unit tests | Project planning, estimation and management |
| Windows Desktop / Embedded / Drivers | Linux Desktop / Embedded / Kernel / Drivers |
| Embedded Firmware, Device Drivers, BIOS, BSP | Android (Embedded / App), iOS |
| Object oriented analysis and design (OOAD), UML | Structured / procedural development |
| "Big picture" software architecture / infrastructure | Documentation, Requirements, Specifications |

- *Exceptional communication, documentation, and conflict resolution skills*
- *Principled, fastidious and ambitious (very driven) with extremely strong work ethic*

## OUTSTANDING ACCOMPLISHMENTS

*Rescued several over budget, over due, and out of control projects. Most notably:*

- Brought flagship product(s) back from death and restored health of entire company after nearly all of the development staff ruined two separate, but related, code bases (and CVS repositories) and then left the company to start a competing venture. This was an extremely serious situation that was resolved successfully with all contractual obligations fulfilled and customers satisfied. (See: Fleetwood Gaming)
- Rescued gaming machine from eminent failure to pass regulations and be certified for sale. Carefully analyzed software and made strategic [controlled impact] modifications to correct errors and added additional missing functionality. (See: imp software LLC – Bingo slot machine supporting five game themes).
- Rescued production test equipment from failing to be delivered and prevented loss of sales. (See: VLC)

*Developed many large scale and complex projects from scratch. Most notably:*

- Developed a new cutting edge gaming machine from from scratch. Functioned as both hands on individual contributor and software development team/department manager. (See: U1 Gaming)

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➤ Developed a real-time distributed IGT-SAS communication system for the GnSYS casino management system: .NET components and apps implemented in C# with a real-time sub-system implemented in C++ that communicates with embedded devices containing at least three real-time PIC processors.  (See: bluberi, GATE+)

➤ Developed UDP over WiFi based real-time communication sub-system supporting flight controls, live video streaming, and snapshot/video download for iOS and ARM Linux SoC. (See: imp software LLC)

➤ Developed many stand alone professional GUI and CLI applications from scratch (including installers and documentation – everything), e.g. several multithreaded real-time system simulators, for various gaming devices, that support concurrent communication with thousands of devices using proprietary protocols (see: VLC); several poker, keno, spinning reel, and bingo games; Discrete event simulation software (see: ProModel Corporation), assemblers/compilers (see: Hybrid Microsystems Inc. and Ameritech Library Services).

## PROFESSIONAL EXPERIENCE

| Software Engineer and Owner | Bozeman, Montana |
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| imp software LLC (a small consulting firm) | *November 2007 - Present (5+ years)* |

◆ Communication sub-system for RC quad-copter including flight controls, telemetry, image/video download, and live streaming video.  Utilized Mavlink and Boost asio.  Targeted iOS (flight control app) and embedded Linux (quad-copter). `[c++ obj-c mavlink udp stl boost asio sockets linux embedded ios]`

◆ Bingo slot machine supporting five game themes, two hardware platforms, dual screens, and all the complexity mandated by state gaming regulations. (http://tailormadegaming.com/games/bingo/Bingo-Shock/BingoShock.html). `[c++ stl boost ui ux opengl windows embedded thermal-printer note-acceptor]`

◆ "Subway Bingo" iOS (iPod, iPhone) game for "Insanely Ridiculous". (built to spec; http://itunes.apple.com/us/app/subway-bingo/id400208513). `[obj-c ios ui ux]`

◆ Real-time SAS I/O in native code on Android for FriendlyARM (tiny/mini-210; S5PV210 ARM Cortex-A8 SOC) platform, which included enhancements to Samsung serial I/O [Linux kernel] device driver and JNI code for Android applications. `[c c++ java jni linux driver android embedded]`

◆ Real-time firmware for proprietary embedded device with four processors (from scratch), which made heavy use of $I^2C$, RS-232, RS-422, and bit I/O.  Included development of several proprietary P2P and shared bus packet based serial protocols. `[c c++ pic i²c serial protocol rs232 rs422 rs485 smartcard igt-sas]`

◆ C, C++, and C#/.NET server side software components to facilitate communication between real-time embedded firmware devices and Windows based PC servers. `[c++ stl c# win32 service com serial rs232 rs422 rs485]`

◆ EGM interface board software/firmware for Reel TV. Built on PPC/Linux; plays advertisements on EGM touch screen displays during idle time by monitoring machine state via the IGT SAS protocol and myriad machine peripherals. `[c c++ linux serial rs232 igt-sas]`

| Software Architect and Manager | Bozeman, Montana |
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| Fleetwood Gaming | *July 2010 – May 2013 (2.8 years)* |

◆ Rescued legacy technology and implemented several new keno and spinning reel games (all on Linux). `[c++ c ui ux bash linux driver embedded serial rs232 protocol bsp board-bring-up refactoring]`

◆ Created root and chain of trust for system validation (includes system BIOS and PnP Option BIOS on x86; all on Linux). `[c++ c assembly bash pci-pnp-option-bios linux wine win32 sha1]`

◆ Implemented deployment solution for gaming machine (this is essentially a sophisticated Linux installer that builds installation media, including BIOS images, from source and ensures that all builds

always match and are exactly reproducible. `[bash linux rpm cpio initrd busybox wine xxd sha1]`

◆ Implemented GAT protocol within gaming machine and a Qt based host application used for testing. `[c++ stl qt ui ux serial rs232 protocol linux]`

◆ Provide guidance, training, and support for technical staff to ensure efficient operations and effective and practical development practices. `[leadership management project-management]`

◆ Implemented IT infrastructure including Subversion, Jira, and Confluence servers, automated backup, etc. Workstations include Linux (Fedora & Ubuntu), Windows XP & 7, and OS X. `[svn jira confluence postgresql linux windows osx]`

◆ Set up and managed remote office. Corporate HQ is in Billings, MT (two hours away). `[management]`

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| **Software Engineer/Consultant** | Bozeman, Montana |
| bluberi | ***January 2008 – June 2010 (2.5 yrs)*** |

◆ Exclusively retained by Bluberi Gaming, Canada to develop real-time serial and network communications infrastructure for Casino back-office/floor device integration for GnSYS casino management system which Bluberi purchased from GATE+, S.A. and imp software. `[c++ stl c# .net ui ux pinvoke win32 service com serial rs232 rs422 rs485 protocol igt-sas svn international]`

◆ Implemented RTE and AFT IGT-SAS communication protocols. `[igt-sas]`

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| **Software Architect and Manager** | Bozeman, Montana |
| U1 Gaming | ***June 2002 – November 2007 (5.5 years)*** |

◆ Developed a bleeding edge electronic gaming machine designed to serve the legalized (and highly regulated) gaming markets of Montana and Nevada states. This machine is currently released in the Montana market where it has been extremely successful and continues to grow in popularity. This is a robust high reliability machine that is designed to be always on and power loss fault tolerant. It plays poker and keno, sports a 24" cinema style true color video display, touch screen, surround sound, conforms to both hard and soft real-time constraints, and includes myriad atypical features for a device of its type. `[c++ x86-assembly stl boost win32 mfc dundas ui ux com serial rs232 igt-sas flash action-script pci-pnp-option-bios md5 sha1 visual-studio incredibuild windows embedded driver service line-printer note-acceptor chain-of-trust orm-persistence bat-script svn poker keno uml agile]`

◆ Software Architect: Provided hands on technical leadership and designed and implemented nearly all core software technology for the company's flagship product - a new cutting edge electronic gaming machine. `[c++ x86-assembly stl boost win32 mfc dundas ui ux com serial rs232 igt-sas flash action-script pci-pnp-option-bios md5 sha1 visual-studio incredibuild windows embedded driver service line-printer note-acceptor chain-of-trust orm-persistence bat-script svn poker keno uml agile]`

◆ Software Manager: Hired, managed, and mentored both junior and senior software engineers. Coordinated interaction between software development and other departments (hardware design, game design, Q.C.). Reported progress and status to Engineering Department Manager. `[management]`

◆ Information Technology: Setup and managed LAN, Windows 2000 servers (active directory, DHCP, DNS, etc), and Linux servers (subversion, samba, ssh, etc) for the first three years during company startup. `[information-technology windows-server linux svn samba ssh management]`

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| **Independent Contractor** | Bozeman, Montana |
| GATE+ | ***August 2004 – February 2007 (2.5 yrs)*** |

◆ Gathered functional requirements and created the specification for the IGT-SAS communication solution for the GnSYS casino management system, which included: the network topology, embedded hardware and firmware, server-side communication software, and .NET framework API for IGT-SAS communication. `[agile project-management uml]`

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◆ Developed the Real-time IGT-SAS communication solution for the GnSYS casino management system (the flagship product of GATE+) , which is currently supporting European and South American legalized gaming markets.  In short, it is a .NET based framework implemented in C# (with a real-time sub-system implemented in C++) whose primary purpose is to provide high-level .NET application developers with an intuitive, easy to use, and reliable method of communicating with thousands of electronic gaming machines in a casino resort . `[c++ stl c c# .net pinvoke win32 service com serial rs232 rs422 rs485 embedded pic i²c firmware protocol peripherals igt-sas svn international]`

◆ Interfaced with multinational/multilingual teams and provided system integration, technical support, and on-site deployment support in multiple locations throughout France and South America.  `[agile project-management management uml international offshore multi-lingual]`

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| **Software Engineer III** | Bozeman, Montana |
| VLC (A division of Anchor Gaming) | ***June 1999 – July 2002  (3 yrs)*** |

◆ Developed a PC based "Front End Processor" (FEP) simulator, which is used for the development, testing, and maintenance of Video Lottery accounting and control systems.  `[c++ win32 mfc ui ux serial rs232 rs422 rs485 protocol des md5 project-management uml]`

◆ Developed a PC based "Gaming Machine" (GM) simulator, which is used for the development, testing, and maintenance of Video Lottery accounting and control systems.  `[c++ win32 mfc ui ux serial rs232 rs422 rs485 protocol des md5 project-management uml]`

◆ Eliminated the jeopardy that was identified with regard to having production test equipment ready for delivery to the customer by developing a single threaded operating system for firmware integrity testing using Motorola 68360 assembler, C, and C++ compilers.  Two letters of commendation can be viewed on-line at http://www.antaean.com/resume/vlc_prod_test_equip_commendations.html.  `[c++ c tdd peripherals bsp board-bring-up firmware project-management]`

◆ Developed a multi-threaded 68360 based operating system, including POSIX thread API, C++ infrastructure, and Java (FastJ) support to be used for dedicated secure gaming, i.e. gambling/casino machines.  `[c++ c posix java bsp board-bring-up firmware]`

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| **Sr. Software Engineer** | Provo, Utah |
| iMALL Inc. | ***May 1998 – May 1999  (1 yr)*** |

◆ Developed shopping cart and payment services using Inprise VisiBroker CORBA and Sun Workshop C++ on Solaris.  `[c++ corba solaris tcp]`

◆ Developed core development components including collections, intelligent pointers, observer pattern, observable native types, SMTP, telnet, and object oriented threading using Sun Workshop C++ on Solaris.  `[c++ tcp design-patterns framework solaris]`

◆ Developed e-mail auto-responder CGI using Sun Workshop C++ on Solaris.  `[c++ solaris]`

◆ Developed a syslog message demultiplexer service using Sun Workshop C++ on Solaris.  This service scanned all messages sent to syslog and redirected them to the appropriate log based on message content.  `[c++ solaris service]`

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| **Sr. Software Engineer** | Provo, Utah |
| ProModel Corporation | ***May 1996 – May 1998  (2 yrs)*** |

◆ Developed core development components including collections, intelligent pointers, observer pattern, observable native types, and object oriented threading using Visual C++ on Windows 95/NT 4.0.  `[c++ win32 design-patterns framework]`

◆ Developed a discrete simulation engine task scheduler using Visual C++ on Windows 95/NT 4.0.  `[c++ design-patterns framework simulation]`

◆ Developed a discrete simulation engine virtual machine (and simple compiler), including instruction set and theory of operation, using Visual C++ on Windows 95/NT 4.0.  This is similar to the Java Virtual Machine. `[c++ design-patterns framework simulation virtual-machine vm compiler assembler]`

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◆ Developed a discrete simulation engine virtual machine debugger using Visual C++ and MFC on Windows 95/NT 4.0.  This is similar to the Visual C++ debugger.  **[c++ win32 mfc ui ux]**

◆ Developed two language grammars.  An assembly language and a high level language, both used for the definition of discrete event simulation logic.  **[cfg grammar compiler]**

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| **Software Engineer** | Provo, Utah |
| Ameritech Library Services | ***October 1994 - May 1996  (1.6 yrs)*** |

◆ Continued development of "Good Reads", a Windows 3.1 application developed using Borland C++, OWL, and the POET object database, which allows a library patron to search for materials based on some combination of title, ISBN, genre, author, subject, etc.  **[c++ win16 owl ui ux poet]**

◆ Developed a natural language parser using Borland C++ and OWL for Windows 3.1.  This application converts magazine articles into MARC Twain database records.  **[c++ win16 grammar compiler]**

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| **Software/Embedded System Engineer** | Murray, Utah |
| Hybrid Microsystems Inc. | ***January 1993 - July  1994  (1.5 yrs)*** |

◆ Developed thermal film processing embedded system software using C, 6811 assembly, EPROM emulator, logic analyzer, and proprietary 68HC11 based embedded system.  **[c assembly 6811 micro-controller firmware logic-analyzer oscilloscope electronics automation]**

◆ Developed film transport/management embedded system software using C, 6811 assembly, 6805 assembly, EPROM emulator, logic analyzer, and 68HC11/68HC05 based embedded system.  **[c assembly 6805 6811 micro-controller firmware logic-analyzer oscilloscope electronics automation]**

◆ Developed several lenscard-machine embedded subsystems using 6805 assembly language and associated hardware tools.

◆ Developed lenscard-machine supervisor software using Borland C++, Turbo Vision, and a DMPI extender on Microsoft DOS.  **[c++ DOS dpmi turbo-vision ui ux automation]**

◆ Developed a macro assembler for both the 6805 and 6811 microcontrollers using Borland C++ for Windows 3.1.  **[c++ win16 cfg grammar assembler compiler 6805 6811 micro-controller]**

## EDUCATION

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| Utah Valley State College | Electronics Engineering |

## MISCELLANEOUS

➔ **On-line Resume** available at: http://www.antaean.com/resume/resume.html

➔ **Linked In** profile at http://www.linkedin.com/in/mattervin

➔ **On-line Portfolio** available at: http://www.antaean.com/resume/portfolio.html

➔ **Indeed** available at: https://my.indeed.com/me/matt_ervin