Curtis Jones

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Introduction

Accomplished systems architect and project lead, specializing in **scalability**, **security**, **network programming** and **client / server design**. Successfully designed and deployed a network security application for **Mac OS X**, a web & print publishing system for **The Atlanta Journal-Constitution** and **Cox Interactive**, a stress analysis library for **Differential Solutions, Inc**., a distributed communication framework for **Avienda**, a commercial real estate data management and research system for the **Dorey Publishing Company**, infrastructure optimizations related to processing financial data, exchange feeds and more for **Bloomberg LP**, an **iPhone** application for **The Wall Street Journal** and a custom network protocol, server and database for **JamCloud**.

Objectives

My work is an extension of who I am, and I am meticulous in the design and execution of every project of which I am a part. I seek work that is challenging and as a consequence, rewarding.

I am interested in full-time and consulting (corp-to-corp) work for challenging, non-trivial projects in a developer-friendly environment that fosters creativity, productivity and pride in one's work. I have experience as a project and team lead. I can work well as part of a team or independently and I expect to have to solve problems and research solutions without imposing on others.

Experience

Succeeded as the lead designer and developer on projects developed with **Java**, **Objective-C**, **Perl**, **JavaScript**, **C**, **C++**, **AppleScript, XML** / **XSLT** / **DTD**s, **Bash**, and **Make,** targeted for **Mac OS X**, **Linux**, **FreeBSD** and **Solaris** using **Cocoa**, **Perl/Tk**, **Gtk**, **Glib**, **Swing**, **AWT**, **Qt** and "raw" **X11** / **Xlib**. • Worked with products from **MapInfo**, **Software Construction Company (SCC)**, **Digital Technology (DTI)**, **Macromedia**, **Apple** and **AutoDesk**. • Worked with databases from **PostgreSQL Group**, **Sybase**, **MySQL AB**, **Oracle, SQLite** and **Microsoft** (using **DBI**, **JDBC**). • Developed projects using **Xcode**, **JBuilder**, **Eclipse** and **VI**. • Experienced with source revisioning using **Subversion**, **CVS**, **ClearCase, Git** and **SourceSafe**. • Accomplished in **object oriented design**, **relational database design**, **newspaper publishing systems**, **mobile applications**, **unix administration** and **network protocol design & implementation**.

The Wall Street Journal (Jul '08 - Feb '09) Lead the development of The Wall Street Journal's first **iPhone** application based on Apple's **iPhone SDK**. Worked with a small team to assess requirements for this project, demonstrated various interface features of the iPhone SDK to managers and designers with example applications and interface mockups. • Implemented custom RSS feed parser using the push API in **libxml2**, • added support for saving stories locally and performing real-time, full-text searches of saved content using **SQLite**, • devised a challenge-response based authentication mechanism (based on **OpenSSL**) for (mostly) restricting backend access to our iPhone application, • worked with our in-house J2EE developer to create services for improving our application performance, • assessed the competition to ensure that our application was technologically superior.

JamCloud (Jul '08 - Present) Lead the development of the core backend infrastructure, including database schema design, development of the **NIO** based scalable, multi-threaded **Java** server (including implementations of **AMF** and **RTMP**). The server design focused around consuming minimal resources per socket and that of not allowing slow sockets to monopolize threads. • Subsequently designed and developed a replacement **C** based server with an emphasis on efficiency by minimizing dynamic memory allocation. • Created a prototype client implementation for the purpose of verifying server functionality, locating memory leaks and simulating load. • Proposed, designed and implemented an efficient and suitable binary protocol for client/server communication. • Worked with the **PostgreSQL** DBA to design a suitable database. • Assisted in the development of **stored procedures** using **PL/pgSQL**, which provided a clean, consistent interface for the C server and minimized the complexity of the **SQL** found in the server code.

Lime Wire LLC (Nov '07 - Jun '08) Member of the development team for the **LimeWire** distributed **p2p** file sharing application. Worked with internal project management tools such as **JIRA** (ticket tracking), **FishEye** (revision management) and **Crucible** (code reviews). Specific responsibilities include network programming, extending the file sharing protocol to improve features and performance, and improving platform native integration for **Mac OS X** through the **JNI**. • Removed all 32-bit dependencies (i.e., **Carbon**, libObjcJava); ported many features to **Cocoa**; updated all libraries with 32/64-bit versions; and finally got LimeWire working under **Java SE6** on Mac OS X • Added Growl support. • Streamlined the installation process. • Significantly reduced the size of the installer by modifying the build system and installer scripts to use **pack200**. • Performed the initial design and coding for the core-as-a-service initiative which will allow for platform native GUIs that communicate with the Core using XML-over-HTTP with **Restlet** on the Core side. Primarily worked with **Java**, **C** and **Objective-C**.

Bloomberg LP (Mar '07 - Nov '07) Member of the team that designs, implements and supports the infrastructure of the **financial data** systems at Bloomberg. • Analyzed performance issues with heavily used libraries using **collect** and **analyzer** on **Solaris**. Implemented a replacement function in one such library that provided a 31x speed improvement and which doubled the performance of several applications which depended upon it. • Performed initial design research for a replacement for the primary data processing application, which is presently the foremost bottleneck, with a goal of 10x improvement in overall throughput. • Worked with the **Reuters SDK** to implement parsers for new exchange feeds. • Designed, implemented, tested and deployed a Power-related exchange parser in **C** for **Solaris** based on the **OMX** platform. Researched and selected third-party libraries (**curl**, **libxml2**, **OpenSSL**) to expedite development. Coordinated the efforts of teams in New York, London and Portugal. Diagnosed and assisted in correcting feed network connectivity issues over the Internet and leased lines. • Daily assisted other in-house developers with the use of internal tools, libraries and systems.

Life Style Reflection (Mar '07 - Present) Designed and developed a **Perl** and **PostgreSQL** based backend for **Linux**, including • an administration interface, • **PayPal** integration, • a purchase and payment verification system, • incorporation of business rules and • a **templating system** for easy customization of website look and feel. • Created design documents, including a **database schema**, based on "loose" specifications received verbally. • Installed and deployed final product, including database setup, on client's web server. • Completed project to the satisfaction of the client, before the deadline and under budget. In Jan '09, produced and published an **iPhone** application for client which provides some of the client's content plus self-analysis quizzes in an easy-to-navigate and visually appealing interface.

GlowWorm FW (Sep '06 - Mar '07) Developed a **Mac OS X** kernel extension which uses **kauth** and **tcp4**, **udp4** and **ip4** filters to monitor and control the creation of incoming and outgoing sockets and the transfer of data across those sockets. • Implemented a rule evaluation system in the kernel extension

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Experience (cont)

based on socket and process information, • an **ElGamal** signature and **SHA2-512** based registration key system with a web frontend, **Perl**, **C** and **Postgres** backend with the ability to receive and verify **PayPal** payments automatically, • an arbitrary precision arithmetic library (see 'Example Code', below), in **C**, supporting addition, subtraction, multiplication, division, mod, mod-pow, mod-inv, gcd, pow, cmp, rand and various bit operations, • a transaction oriented, asynchronous messaging protocol with an **Objective-C** based **Framework** implementation for sending commands to the kernel extension and receiving event notifications, • a plugin-based **Mac OS X Cocoa** application for controlling the system and **plugins** for viewing and editing the firewall rules, authorizing connection and data events and viewing system network activity. • GlowWorm FW provides a level of network security and process control not otherwise available on Mac OS X.

Differential Solutions, Inc. (Feb '04 – Dec '05) Developed a **C++** library which performs load stress analysis based on the **AISI** specs for **Cold Formed Steel** (with **GTStrudl** output serving as library input). • Designed suitable object model based on limited specifications. • Performed rigorous optimization and result verification on non-trivial data sets. • The library serves as a key component of their **AutoCAD** based product. • Subsequently completed second contract extending the library's functionality, implementing additional optimizations and extending the object model based on updated specifications.

Dorey Publishing Company (Feb '04 - Jun '08) Lead the design and development of a web based commercial real estate data management system with five people in my group. • Designed and developed a **Cocoa** based application for managing and monitoring the server and assisting with debugging. • Responsibilities included server hardware setup, • all server-side coding (**Java**), • database administration (compilation, installation, configuration, performance tuning, schema design and conversion, indexing, query optimization, etc.), • network protocol design, • security (intrusion detection, IP based restrictions, security alerts, server statistics, etc.), • scalability, • logging, • relationship based access management system (business rules), • flexible user permissions system, • spatial search capabilities, • XML feed for third parties, etc. • Assisted front-end developers, using **ActionScript 2.0** / **Flash MX 2004**. • Set up, configured and maintained **Linux**, **Apache**, **BigFaceless** (for PDF report rendering), **Subversion** and **WebSVN** (for source versioning), **Mantis** (for bug tracking), **MapInfo MapXtreme** (for mapping), and later worked with **FlashMaps Geospatial** (for **SOAP** based **Geocoding** and map rendering). Authored ~200 page book (using **LaTeX**) documenting system design, functionality and administration. • Implemented another data management system frontend based on **AJAX**.

The Atlanta Journal-Constitution (May '01 – Aug '04) Worked closely with the lead DBA of the **Publishing Technologies** department in writing tools to import 250+ gigabytes (2.25 billion rows) of **2000 Census Data** into **Sybase** (on **Solaris**) for News Research. Assisted users in writing non-trivial SQL queries. • Developed data migration tools for DTI **DT 4** to **DT 5** and **SCC** system conversion, including an application to pull DT 4 data (images, stories, etc.) from **Sybase**, perform character set conversions, image manipulation (resizing, rotation, format conversion, etc.) via **ImageMagick / JMagick** and push into the **SCC** archive system. • Developed a **Java / Swing** application for non-SQL savvy users to create complex **SQL** queries. • Developed **Java** based **GIS** prototype mapping application. • Designed and deployed various solutions to automate tasks throughout the department. • Coordinated efforts with numerous departments for over a year while developing **The Big-A List** event publishing system - a Java-based transactional backend running on **Linux**. • Developed a language for describing published events incorporating all of the nuances of the newspaper's style guidelines. • Developed an algorithm for transforming a list of event dates into a concise English representation of those dates following the newspaper's style guidelines, and thereby automating what was previously a labor-intensive manual process. • Provided user support and maintenance for publishing system hardware and software. • Publishing system continues to perform smoothly, maintenance free, after nearly three years. • Assisted and mentored other developers.

Avienda / Silverpop (Jan '00 – Jan '01) Developer and technical lead. • Coordinated the efforts of eight other developers. • Worked with **VA Linux** to design a scalable server solution for our network. • Designed and implemented a **Perl, C++** and **MySQL** based fault-tolerant, distributed communication framework which included **advanced data caching**, **self-replicating file system**, **bandwidth optimizations** and **encryption**. • Designed and supported the database schema. • Worked closely with senior management, and quickly adapted design specifications to meet constantly changing market conditions. • Worked through the night to meet deadlines such as spur-of-the-moment investor demos and other presentations. • Worked with the admins to coordinate the distribution of new builds to the many hundreds of servers in dozens of POPs throughout the world. • Using third party libraries, added server-side support for a multi-protocol (AIM, ICQ, Yahoo, MSN, IRC) chat transport system supporting encrypted communication, offline-messaging, and integration with the mail system.

Auto Auction Services Corp (Jul '99 - Jan '00) Designed and developed an **Oracle** / **Solaris** based automobile auction system, largely in **Perl**, for this **Cox** subsidiary. System included features for inventory management, auction tracking, customer access and provided facilities for third party importing/exporting of data. • Inherited initial code base with very limited documentation. Analyzed code, produced documentation and started making modifications.

SunTrust Bank (Jul '99 - Jul '99) Contracted to debug a critical problem in a **Perl** based web system for customer application processing. Due to the nature of bank security, the debugging had to be done with pen and paper (and a print-out of the suspect code). • Completed three month contract in one day.

BannerFusion (Jan '99 - Jul '99) Designed and developed a **Perl**-based **CGI** banner advertising management and tracking system. BannerFusion was suitable for the management of advertising for a single web site, or as a service to other web sites with the ability to take a certain percentage of the ad impressions as payment (ie, LinkExchange). A simple web-based interface provided access to manage banners, customize the rotation weight of a banner and view impression and click-through statistics. BannerFusion continues to see limited use as of 2007.

AIMSpy - A **Mac OS X** / **Cocoa** application that has as its purpose to "listen" on a user-selected **ethernet** interface, using a **raw socket**, for any and all packets, and analyze, parse and display in an orderly fashion all packets related to **AIM** chats. • Chat transcripts are grouped by the local participant's IP address and then the remote participant's screen name. • Modularized parser support with an abstract interface.

BigMath - An arbitrary precision arithmetic library, written in **C**, based on **Knuth's** algorithms (see *The Art of Computer Programming*, vol. 2, 3rd ed). This library formed the basis for the cryptographic registration system in **GlowWorm FW**. Supported operations include add, sub, mul, div, mod, modpow, modinv, pow, gcd, factorial (lazy), n-th root, radix conversion, scientific notation, string-to-bignum and equality comparisons.

iCast - A reverse engineering effort of Apple's iTunes **TCP/IP** based **Digital Audio Access Protocol** (DAAP) and **Rendezvous** (Bonjour) protocols. • Implemented an **MPEG** audio frame parser for determining audio length, sample rate, frame count, bit rate, etc., • and an **ID3 v2.2** tag parser. • The multithreaded **C** based iCast server uses **pthreads** and **gzip** stream compression via **zlib**.

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Experience (cont)

Llama - A framework for rapidly designing and deploying light-weight web applications and other transaction oriented protocols. • Includes highly scalable threading model, • **JDBC** based **connection pooling** system, • **HTTP** and **SMTP** implementations, • **XML** based database schema system for object-oriented **SQL** query generation, • and an abstract interface for defining database specific nuances with implementations for **MySQL**, **Oracle**, **PostgreSQL**, **Sybase** and **SQL Server**. • Based several substantial projects on this framework and licensed it to third parties.

Mapster - Initially a personal project that was subsequently adopted by my then employer who desired a proof-of-concept for future projects. • Mapster includes utilities for downloading, parsing and importing the "raw" line-segment mapping data (such as the **Tiger/Line Census Data**) into a **MySQL** database. • Additional utilities ran optimizations on the line-segment data to greatly improve query performance. • Supported the drawing of roads, county lines, state borders, bodies of water and hundreds of other boundary types and landmarks, all in real-time. • Added support for tracking and displaying multiple, simultaneous input sources, such as a directly attached **GPS** device or a network-based feed, including on-screen telemetry data. • Implemented a canvas-based drawing method that used buffered 4-byte **ABGR** images, drawing each layer to a separate image, which images were then alpha-blended together, creating the final map.

Pandora - Designed and implemented a network protocol and **Java** based **framework** for secure, anonymous and reliable communication across a completely **distributed**, **fault-tolerant** and **self-optimizing TCP/IP** based virtual network. • Pandora allows one to create a virtual network akin to a traditional VPN but without centralized structure and with guaranteed anonymity. • It was also necessary to implement the **Blowfish** (for encrypted communication) and **Diffie-Hellman** (for key exchange) algorithms, which was done so by referencing various online and printed resources.

Static - A scalable, multi-threaded discrete time **signal analysis** program written in **C** with a **Posix** core and **Objective-C / OS X / Cocoa** gui. Presently in the early stages of development, Static supports abstractions over drivers, devices and protocols, • output methods such as planar and history graphs • and the **RF Space SDR-IQ** (via the **libusb** based **FTDI** driver) for input. Signal data is manipulated via per-output processing chains. Future development will include various demodulators (am, fm, ssb, etc.), signal recording and playback, additional input methods and other graphs. • The performance-oriented design includes pre-allocated objects with reference counting, • atomic data structures, • read- and write-buffered data streams, • a device-event dispatching system, • and **fftw3** and **ooura** fourier support. Screenshots and additional details available at: http://curtisjones.us/static

Triangulate - A proof-of-concept application. The concept is one related to being able to establish one's exact location with only a receiver, using the transmission of known "beacons". This involved the design of a communication protocol for the beacons to establish their relative positions to each other and for the receiver to determine its location using trigonometry. • Objects within the proof-of-concept application were draggable to simulate a real-world environment. • Demonstrated application and presented results, algorithms and protocols to client.

XGroove - An **X11** based network application (written for **POSIX** systems in **C**) for controlling multiple computers with a single keyboard and mouse. • XGroove also supports a copy-and-paste clipboard mechanism which follows the mouse (i.e., copy on one machine, paste on another).

Additionally - Implemented the client and server sides of the **HTTP**, **DNS** & **ICMP**, **SMTP**, **POP3** and various other protocols. • The **DNS** resolver was implemented using the **Java Native Interface** (JNI) which allowed for **ICMP** packets to be sent/received via a **raw socket**. The library included functions for dropping root privileges after the socket was created. The DNS resolver itself implements its own **result caching**, which caching expires results based on their respective TTLs, • can automatically perform **recursive resolves** for MX lookups and other **CNAME** based DNS answers. • The **HTTP** server implements keep-alive connections, • **gzip** stream compression and • **CGI** input types **GET**, **POST** and **multipart/form-data** POSTs. Input parsing includes timeouts and strict buffer size limits to prevent malicious clients from hanging or flooding the server. • The **SMTP** client's overall design and threading model allow it to sort and prioritize emails in a manner which maximizes its ability to deliver email quickly and efficiently. • The **XML** server module uses **dom4j** for xml parsing, which interface is chiefly used by the corresponding **Flash** client. The protocol supports binary file transfers within the XML stream through an OOB-style extension.

Certifications

Technician Class - Received a perfect score on the FCC Amateur Radio Technician Class Element 2 exam on Jan 28, 2008 (KC2SUS).

Interests

Mountaineering - I enjoy various outdoor activities, mountaineering in particular. I've climbed Pikes Peak (Colorado) via Barr Trail, Mauna Loa (Hawaii), Mt. Rainier (Washington) via Liberty Ridge, Mt. McKinley (Alaska; May-2008 (guided), May-2009 (solo)) via the West Buttress, Cotopaxi and Cayambe (Ecuador), and many small peaks in the North Georgia mountains. • Successfully accomplished a "Death March" in the Grand Canyon (2008, 2009). • I've also done two seasons of ice climbing in Adirondack Park.

Example Code

BigMath - Arbitrary precision arithmetic library. Released under the **BSD License**. http://curtisjones.us/bigmath

Locator - An end-to-end location tracking project for use with the FindMeSpot personal locator. http://curtisjones.us/locator (http://whereiscurtis.com)

Summary

While my experience is broad, my passion lies in distributed systems, network programming and security, operating systems (network kernel extensions) and nearly any communication related technology I can get ahold of. • I am primarily interested in contract (corp-to-corp) opportunities. Please contact me if you are interested in discussing such an opportunity. • Please find the latest version of my resume at **http://curtisjones.us/resume**. I do not have a Word version of my resume. • References available upon request.