Curtis Jones
r é s u m é

Atlanta, GA
M: 770-999-0575 x1
curtis.jones@gmail.com
curtisjones.us/resume
github.com/senojsitruc
linkedin.com/in/senojsitruc

Introduction

I've worked on a lot of projects. Years ago, a recruiter advised me that my resume had too many pages. I shrunk the font. I'm skeptical he found that as amusing as I did, but I'm loath to delete old details. My LinkedIn profile (linkedin.com/in/senojsitruc) includes my middle-school paper route for the San Jose Mercury News. This history tells a story.

The story you'll find here as you filter through the buzzwords is of one who, to his core, revels in engineering challenges, is more than a little opinionated, loves simple solutions to complex problems, eschews office politics, can delegate, manage, encourage and mentor, and who would rather be playing with his kids right now than typing a resume introduction. Also, I'm truly terrible at marketing.

Most recently, working on Streamie (streamie.co) has given me the opportunity to delve into audio/video streaming, transcoding, recording, sharing, cloud services and backend engineering. I've specifically worked with H.264 (AVC), H.265 (HEVC), AAC, G.711a/mu, PCM (in various forms), while implementing services using MPEG-DASH, RTSP, WebRTC and others, using AVFoundation, AudioToolbox, VideoToolbox, FFmpeg and other toolkits and frameworks.

Outside of engineering, I've been responsible for management of marketing, sales and other individuals; contract negotiations with service providers and physical infrastructure projects; vendor relations.

I've been honing my craft for twenty-five years and I look forward to applying my experience and enthusiasm to my next opportunity. Let's talk about how I can help you.

Highlights

Streamie Security: iOS & tvOS apps, infrastructure, backend APIs for IP camera streaming; **Chick-fil-A**: re-wrote drivers for their credit card reader to speed up your drive-through time; **Apple**: macOS retail store support app; **Bloomberg LP**: infrastructure optimizations for processing financial data, exchange feeds and more for; **The Wall Street Journal**: their first iPhone app; **Kmart**: VT-220-based inventory management iOS app; **The Atlanta Journal-Constitution** and **Cox Interactive:** web & print publishing system; **Differential Solutions, Inc.**: structural stress analysis library; **Avienda**: distributed communication framework; **Dorey Publishing**: commercial real estate data management and research system; **GlowWorm FW**: macOS socket-filtering kernel extension; **Nexidia**: two phonetic-based macOS search apps for FinalCut Pro; **MUSEaic Labs**: Sonos-integrated iPad app; **FIT Radio**: streaming radio app with custom HLS audio streaming core; **Experience LLC**: from-scratch ITF barcode scanner.

Experience

MEPS (Dec '23 - Dec '24) I was recruited as the CTO for this small technology company based on my experience with Streamie (streamie.co) which provided key technology and capabilities for government contracts they had won, and others they were pursuing. My responsibilities included software engineering, logistics and purchasing work related to various contracts, pursuing new contracts, developing team engineering skills, setting company technology standards, office security standards and occasionally setting up a Mac for a new hire or diagnosing wifi performance issues. I established relationships with new vendors, solicited quotes and provided technical assistance with proposals. I also worked with corporate legal counsel related personnel issues, interviewed candidates and made hiring decisions.

Streamie Security (Jan '21 - Present) streamie.co | On the frontend, designed & developed an **iOS** and **tvOS** app for IP camera streaming, recording, monitoring and sharing, including a custom RTSP streaming client, MPEG-DASH ingest support for YouTube, and integration with WebRTC for Google Nest streaming; managed beta testers and worked with customers on support issues. • On the backend, evaluated databases, servers and fiber providers, installed and supported infrastructure (servers, storage, network switches, power management), managed external services (CloudFlare (D1, R2, Tunnels, Proxy, Workers, Load Balancer), Azure (Storage Blobs), Twilio, Checkly, Backblaze) and internal services (BedrockDB, HAProxy, Nginx, Proxmox VE, Gitea), developed the app's API server (in Swift), knowledge base, database schema and information security processes. • Interviewed, hired and managed additional resources for engineering & marketing. • Evaluated market conditions and competitors. • Cheerfully hired others to develop and execute a marketing strategy.

Chick-fil-A (Jan '16 - Dec '20) chick-fil-a.com | Initially started on an as-needed basis, consulting for **iOS** related issues, including software design and debugging, eventually expanding to include implementing bug fixes and resolving performance issues — for point-of-sale, **Apple Watch** / **watchOS** and other enterprise applications; • performed extensive design, development and debugging work on the CFA One app, including features used by millions of people; • implemented drivers for BlueTooth integration (via ExternalAccessory) with the Verifone E-355 credit card reader thereby resolving issues that occurred during heavy drive-through periods when an area was crowded with BlueTooth accessories; • implemented an API for use with the Epson TM-T88V thermal receipt printer and cash drawer via the manufacturer's drivers.

Greenlight (Feb '18 - Sep '18) greenlightcard.com | Led the development of the **iOS** Greenlight v2.0 effort. Reduced technical debt, implemented new interfaces, improved crash rate, improved analytics reporting, improved APIs, simplified UI styling, cleaned up old code, provided guidance on iOS interface design standards, applied best practices and software design patterns.

Quasar Blu (Aug '16 - Apr '17) Part of a small but highly talented group of engineers. We worked on a social networking app that relied heavily on video recording, editing, playback and sharing (**AVFoundation**). Strong use of design patterns.

Apple (Apr '15 - Oct '17) apple.com | Lead the engineering of an internal **macOS / Cocoa** retail store app based on an existing iOS app and shared data model. Worked daily with a part-local, part-offshore team. Mentored other engineers on topics related to **Swift**, **Objective-C** and **Cocoa**; • taught an in-office class on constraints & autolayout; • performed **code reviews** for nearly all UI-related changes, with an eye towards improving overall code quality and instilling a sense of individual code ownership. Implemented numerous custom controls; • heavily customized many standard controls; • architected and implemented the app's window and tab management system. Performed further customization throughout the app to support keyboard and **VoiceOver** accessibility. Debugged numerous issues including custom first responder behavior and UI performance (such as table view scrolling performance). Implemented several advanced text layout features.

FIT Radio (Mar '13 - Dec '20) fitradio.com | Inherited a codebase of an **iOS streaming radio** app from another development group and hit the ground running by resolving numerous crashing issues, playback stalling issues, and general instability. • Replaced the **AVAudioPlayer**-based v1 streaming mechanism with a custom-built **HLS streamer** built on **CoreAudio**; added support for headphone controls, lock screen metadata and background streaming. • Performed significant refactoring, resolved 100's of long-standing issues, implemented a caching mechanism to improve playback stability in poor network conditions, • added run-tracking with **CoreMotion** and **CoreLocation**, • improved in-app purchasing, • integrated analytics, • and consulted with the client to provide direction throughout development.

Kenzie Lane Innovations / MUSEaic Labs (Jul '12 - Jan '15) museaic.com | Developed several native **iOS** apps targeted for the **iPhone** using **Core Animation**, **Core Audio, Core Location**, audio queues (play, record, offline render, transcode), **Speex**, Google Voice transcribe, iSpeech transcribe, **Spotify** (libSpotify, CocoaLibSpotify), **Rdio**, iZotope (FunFX, CoreFX, TrashFX), Parse.com and the **Facebook** SDK; • responsibilities also included the implementation of heavily customized interfaces based on design comps in Adobe Photoshop. • Implemented backend **macOS / Cocoa** app as "middleware" between iOS and 3rd party data services

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including The Echo Nest, MusicMatch and SenticNet. • Reverse engineered the **Sonos** protocol and integrated support for discovering and interacting with Sonos hardware in an iPad app. • Developed prototype iOS app with **Swift** and **Objective-C** incorporating a unique, cutting-edge UI design including integration with **Parse**, **Instagram**, **Spotify**, **Camera** and **iCloud Photo Library**; • app required non-trivial use of custom gestures, autolayout constraints, UIEvent tracking and performance optimizations through content caching. • Consulted, performed code reviews, debugging and provided guidance on an iOS app relying on **CoreBluetooth** which was experiencing background connectivity issues.

Bridge2 Solutions (Sep '14 - Oct '14) bridge2solutions.com | **iOS** prototype app design and development with **Swift** and **Objective-C** using autolayout constraints, incorporating designs from a 3rd party design firm working for the end-client.

Insightpool (Jul '14 - Oct '14) insightpool.com | **iOS** prototype app design and development with **Swift** and **Objective-C** using autolayout constraints.

Experience LLC (Jan '14 - Mar '14) expapp.com | Designed, developed and integrated a custom **ITF barcode** scanning algorithm and implementation into this event ticket-upgrade app. Suitable ITF barcode scanner support was not available from any third party libraries at the time.

REACH Health, Inc. (Nov '13 - Feb '14) reachhealth.com | Provided consultation and development expertise regarding **macOS** application development, including **Xcode**, **Cocoa** UI design and **Chromium Embedded Framework** (CEF) integration.

Razorfish (Sep '13 - Oct '13) razorfish.com | Worked with the in-house engineering team to bring a large-scale **iOS** retail project to market. Implemented interfaces based on screen comps from the design team, coordinated development with the server engineering team, researched and implemented optimizations and bug fixes.

Gree (Jan '13 - May '13) gree.co.jp | iOS game design and development. Updated existing app and framework code with up-to-date language and API features; • performed foundational work for a new iOS game based on the Android counterpart; • researched and resolved long-standing bugs and other issues.

AdvancEd (Nov '12 - Feb '13) advanc-ed.org | Instructed in-house Java developers on **iOS** programming starting with the basics of **Objective-C**. Provided guidance to management regarding design, usability, backwards compatibility, deployment, etc. as they approached their first iOS app. Provided guidance to the design team regarding deliverables. Developed (along with their in-house team) the company's first iOS app - including integration with their existing backend and implementation of screen comps.

Motive (Oct '11 - Jul '12) Developed an **iOS** app targeted for **iPad** with **PhoneGap** integration that uses both proprietary **XML-over-HTTP** and **SOAP** for backend service communication. • Developed a **Node.js C++** add-on that extends native **UPnP** functionality back to **JavaScript** on iOS.

Sears Holdings (Jul '11 - Mar '12) Developed an **iOS** app for inventory management to replace the aging, proprietary handheld units at **Kmart** stores. App includes: a custom **VT-220 emulator** with support for proprietary escape sequences for sounds and for configuring and controlling an **IPC Linea-Pro barcode scanner**, • telnet connection negotiation, • **AudioUnits** for tone-based feedback, shared battery charging between the sled and iOS device, • **ZBar** as an alternative means for barcode scanning • custom controls and toolbars for efficient data entry • wireless LAN monitoring to prevent unintentional disconnects • and various internal tools for streamlining operations.

Moxie Interactive (Aug '10 - Nov '10) Developed a service (accessible via **Apache**) for **Coca-Cola** running on **macOS** that mixed and resampled **AIFF** output from Apple's **SpeechSynthesis** framework with background music using **LAME** (for mp3 encoding) and **Core Audio** (for aiff decoding). See: crammerkeeper.com

Nexidia (Mar '10 - Jun '11) nexidia.com | Lead the development of "Get" (getphonetic.com), a **Cocoa** / **macOS** application integrating Nexidia's **Workbench** phonetic search technology with **Final Cut Pro**. • Rapidly designed and developed a functional prototype for the **NAB** 2010 conference. Implemented bug fixes and changes during the course of the NAB demo. • Further developed the prototype into the v1 release which included the use of **XMEML** via **AppleEvents** for Final Cut Pro integration, • **Grand Central Dispatch** (GCD) for multi-threaded search, • **SQLite3** for data backing, • and **DiskArbitration**, **FSEvents**, **Spotlight**, **LaunchServices**, **IOPowerSource**, **QuickTime**, **QTKit** and **OpenSSL** for various other features. • Completed another contract for a 2nd macOS product which remains under wraps.

JamCloud (Jul '08 - Mar '10) 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.

The Wall Street Journal (Jul '08 - Feb '09) wsj.com | 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.

Lime Wire LLC (Nov '07 - Jun '08) limewire.com | 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 **macOS** 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 macOS • 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) bloomberg.com | 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.

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Life Style Reflection (Mar '07 - Apr '07) Designed and developed a **Perl** and **PostgreSQL** based backend for **Linux**, including • an administration interface, • **Pay-Pal** 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 **macOS** 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 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 **macOS 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 macOS.

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 operations 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) ajc.com | 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) suntrust.com | 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.

Projects

CameraMan - curtisjones.us/cameraman | An app for **macOS**, **iOS** and **tvOS**, it is a light-weight app for streaming audio and video (via **RTSP** / **Live555**), monitoring and recording from IP network cameras. Using **libAVFormat**'s (from the **FFmpeg** project) ability to perform format writing, CameraMan can record streams without decoding or transcoding, simply writing the encoded audio and video frames to disk, which consumes minimal resources. Recording is further optimized by in-memory buffers that periodically flush to disk. The tvOS app relies on the **VideoToolbox** framework for decoding, resulting in the **Apple TV 4K** being able to easily handle up to sixteen simultaneous 1080p streams.

libEmailz - github.com/senojsitruc/libEmailz | Fast and memory efficient GCD-based SMTP server library.

Orbit - An **Arduino** and **iPad** program, it controlled two servos (one mounted onto the other for pan/tilt support) used to direct an antenna to track orbiting satellites, above the horizon, based on telemetry provided by the accompanying iPad app which communicated with the Arduino via **UDP** over **Wifi**. I referenced *Fundamentals of Astrophysics and Applications, 3rd Ed* for many of the calculations. Berkeley's *libAstro* library did most of the "heavy lifting" (atmospheric perturbations, etc.). The

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curtis.jones@gmail.com
curtisjones.us/resume
github.com/senojsitruc
linkedin.com/in/senojsitruc

iPad app integrated with **space-track.org web service** to find up-to-date satellite orbital parameters (Keplerian elements); it also displayed a world map depicting the current location of each saved satellite along with its distance, relative velocity, doppler shift (for frequency adjustments) and its orbital prediction.

MovieMaker - curtisjones.us/moviemaker | Designed and developed a macOS app for creating time-lapse movies using Apple's **AVFoundation** framework. Supports drag-and-drop for importing **PNG**, **JPEG**, **GIF** and **TIFF**; • an editor allows for per-frame adjustments, in/out points and custom segments; • settings include dimensions, frame rate, bitrate, regex-based filename date parsing and overlay content; • extracts and overlays **GPS** data from images; • encodes movies as **H.264**, **MJPEG**, **PRO RES 442** and **PRO RES 4444**; • exports movies as **M4V**, **MP4** and **MOV**; • supports sharing movies via **AirDrop**, Messages, email, **Dropbox**, **You-Tube**, **Vimeo**, **Twitter**, **LinkedIn** and **Facebook**; • incorporates analytics using **Parse**.

Static - curtisjones.us/status | github.com/senojsitruc/Static | A scalable, multi-threaded discrete time **signal analysis** program written in **C** with a **Posix** core and **Objective-C / macOS / Cocoa** gui. 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-0.1** based **FTDI** driver and the **libusb-1.0** based **LibFTDI** 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 **Accelerate.framework**, **fftw3** and **ooura** fourier support.

BigMath - curtisjones.us/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.

Locator - curtisjones.us/locator | A solution to my need to publish my location and status during mountain climbing trips, the process starts when a message is sent from a **Spot Messenger** via satellite resulting in a location update email which is picked up by the **Perl** script (using **IMAP**) and logged to a **Postgres + PostGIS** database. Next, the several most recent location updates are selected from the database including labels indicating the closest known point to each and exported as **XML**, **SFTP**'ed to the web server where the **XSL** renders the data (including an embedded **Google Map**) for the web browser. Additionally, status updates are exported to **Blogger** and **Facebook**.

iCast - curtisjones.us/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 multi-threaded **C** based iCast server uses **pthreads** and **gzip** stream compression via **zlib**.

AIMSpy - curtisjones.us/aimspy | A **macOS** / **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.

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 serial **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.

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 Java/Swing proof-of-concept application were draggable to simulate a real-world environment. • Demonstrated application and presented results, algorithms and protocols to client.

XGroove - curtisjones.us/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 (very old stuff) - 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, Interests, et al

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

Mountaineering - **2006**: Mauna Loa **2008**: Ice climbing in Adirondack Park • Mt. McKinley via the West Buttress • Half Dome via the cables • Grand Canyon "Death March" **2009**: Ice climbing in Adirondack Park • Mt. McKinley via the West Buttress • Mt. Rainier via Liberty Ridge • Grand Canyon "Death March" **2010**: Cotopaxi • Cayambe • Mt. Shuksan via Fisher Chimneys • Mt. Baker via the North Ridge • Half Dome via the cables **2011**: Ice climbing in New Hampshire; Ouray, CO • Mt. McKinley via the West Buttress **2012:** Ice climbing in Adirondack Park; New Hampshire; Ouray, CO • Mt. McKinley via the West Buttress.

Treasurer - Hope Presbyterian Church, 2004 - 2007; Christ Covenant Presbyterian Church, 2013 - 2024.

Deacon - Christ Covenant Presbyterian Church, 2018 - 2024