

Nathan Vander Wilt

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Freelance software developer *2012-present*

Caretaker in the design, architecture, and implementation of web/native/embedded software. Most recent focus includes "THE WEB" (esp. React, node.js) and also some Apple platforms — willing and able to **dive deep into nearly anything** with little advance notice.

An extensive list of projects and sampling of the technologies/skills involved may be found at the end of this document. I am also active on GitHub and StackOverflow.

Activities and interests

My office is the cabin of an 30' wooden boat, currently convalescing in my backyard. I read a lot and enjoy writing as well. My wife and I are active in our local church. I enjoy doing projects in the garage and/or electronics workbench with our three sons. We dabble in gardening (with chickens, rabbits, fish and even snails and crickets), play a variety of musical instruments, do balloon aerial photography, go boating and camping and occasionally travel.

Prior positions

Room to Think - Treasurer *2012-2014*

Board member on the Tri-Cities' first coworking space, organized as a not-for-profit WA corp. Maintained books and accounts payable/receivable, guided future direction of community.

&yet - Senior Developer, Interim CTO *2010-2012*

Led web/iPhone team for major client in the location tracking and telemetry industry. Researched and developed libraries in support of realtime single-page web apps.

Calf Trail Software - Co-founder *2008-2010*

Designed, developed and personally supported several independent Mac shareware products. Authored company website and blog. Guided graphic design and iPhone development.

NOAA/NWS, Orion Network Solutions - Subcontractor *2006-2007*

Automated map generation for visualization of updating and static hydrology datasets. Implemented geometry and labeling algorithms in support of basemap generation.

Dordt College Technical Support Services - Workstudy *2003-2006*

Facilitated sound, lighting and projection for twice-weekly chapels. Recorded concerts in auditorium. Operated live video cameras. Stage managed and set up special events.

Inspiration Hills Summer Camp - Videographer/Worship Leader *2004-2005*

Filmed and produced videos on weekly deadlines. Coordinated chapels and led singing. Maintained facility's computer systems.

Speaking opportunities

Full Stack Tri-Cities (Richland, WA) — Deep Dive on Building Alexa Skills, explaining the system and showing some example skill development

MakerLand 2016 (Seal Rock, OR) — "Workshop: All About Radio", an introduction to RF communication fundamentals and Software Defined Radio

CascadiaJS 2013 (Vancouver, BC) — Building apps with D3.js

"D3 is well-known as an SVG visualization library, but can provide a powerful platform for building entire DOM-aware frontend applications."

video: https://www.youtube.com/watch?v=hhSIX_r7GZA

Apache CouchDB Conf (Vancouver, BC) — Personal Web Apps

"CouchDB is great at keeping track of all sorts of personal data — everything from notes and contacts, to sharing a live stream of photos from a balloon 250 feet above a construction site. I'll demo of some of the more interesting apps I've been building for my 'personal cloud' and talk about the CouchDB features which make them easy. We'll also explore what CouchDB doesn't do and how to get those things done anyway."

video: https://www.youtube.com/watch?v=4QttTEbQ_1I

slides: http://n.exts.ch/2014/02/couchconf_slides

State of the Map US 2012 (Portland, OR) — Building the Other Tab: Satellite Maps for Your App

"Take a behind-the-scenes look at how we made Argyle Tiles, a tile service hosting a remix-friendly global satellite/aerial map layer. Get an overview of what it takes, learn which datasets and tools we use, and explore how you could build something like it on your own."

CouchConf 2012 (Portland, Seattle) — Scaling geodata with MapReduce

"While Couchbase's support for spatial indexing is a powerful feature, certain geodata patterns fit well within the MapReduce paradigm. We'll look at some example views that stretch the potential of a single-dimensional index (and leverage its scalability) for geographic datasets. [Also including:] reasons to use a spatial index for non-geographic data."

slides: http://n.exts.ch/2014/02/couchconf_slides

TriConf 2011 (Richland, WA) — Shipping tips: Habits, Strategies, Tactics (and Reasons) for shipping software.

Institutional and continuing education

Bachelor's Degree - General Metaphysics

Dordt College, Sioux Center, Iowa (May 2006) — graduated a year early

"Amateur Extra" radio license (AF7TB) — passed all three exams at one sitting in 2015

"GROL" Commercial Operator radio license (PG00060621) — obtained in late 2018

"Quantum Mechanics for Everyone" (course certificate) — passed EdX course in early 2019

Compendium of client projects

2019 NOTE: all dates approximate, some projects spanned multiple years

Inquirium, an educational software consultancy

redesigning Project READI's "SenseMaking" app for in-classroom reading/notetaking/analysis

÷ efficient **refactoring** of an old **D3.js** codebase towards combined **preact/D3.js** usage, implementing mockups as **LESS/CSS**, maintaining **node.js** and **CouchDB** backends

Krekeltronics, a product design studio

research and preliminary prototyping for a Windows wrapper around a PWA with additional native network discovery needs

÷ **node.js**, **WinRT** APIs, **Capacitor** framework and **Electron** runtime, **dns-sd** library evaluation

Inquirium

worked out an interactively-animated landing page for a new UChicago Impact product

÷ converting complex **SVG** resources to data-driven **React** components, handling complex layout via **DOM Events** and **CSS**, advanced **LESS mix-in** design, browser compatibility

2018

Inquirium

implemented a new app design for an upcoming data exploration tool related to UChicago Impact's 5Essentials product

÷ **code reuse** and **architecture** evolution of **React.js/redux/reselect** frontend, more **SVG** data visualizations and **event-driven animation**, more **Django** and **Python** data processing, **LESS/CSS** maintenance

Pacific Northwest National Laboratory, a Department of Energy research facility

contract development of a new Mac app meeting diverse IT department objectives

÷ low-level **macOS development** in **Swift**, including with **XPC** and **app sandboxing**, web **API integration**, **shell scripting**, tooling for **smart card** infrastructure, technical **project management**

Krekeltronics

integrated an in-house audio framework and a client-provided DSP library into a new iOS app, various other technical assistance on team projects

÷ **Swift**, digital **audio processing**, maintaining someone else's **Objective-C** codebase, integrating **C/C++** build processes in **Xcode**, troubleshooting **CoreAudio** integration

Client projects, continued...

2017

Inquirium

webapp lead for redesign of UChicago Impact's "5Essentials" survey analytics tool

÷ **React.js/redux/reselect** frontend using **ES2015** syntax, **interactive SVG** data visualizations, **Django** views, **Python** data processing

AstroHQ, the company behind the Astropad tablet software for iPad

low-level R&D into the macOS graphics system

÷ **x86-64 disassembly**, **DTrace**, **kernel driver development**

Pacific Northwest National Laboratory

staff augmentation for IT user experience improvements

÷ **Linux/Apache/PHP** deployment, **shell scripting**, **macOS app development**/debugging in **Swift**, macOS internals and **AppleEvent scripting** interfaces, enterprise wireless **network configuration**, **documentation** and **source control** assistance)

2016

Flex Rental Solutions, providing inventory management for the A/V industry

helped finish an in-progress iPad/iPhone app release after its original developer left

÷ **debugging**, **Objective-C**, **iOS** development, working with **other people's code**

TiLite, makers of custom-fit titanium wheelchairs

worked through &yet with a small team on a tight deadline to develop a cutting-edge iPad app and server API, including physical prototyping

÷ **user experience**, **R&D**, **OpenCV**, **Swift/C++** integration, **JavaScriptCore**, **teamwork**

AstroHQ

helped integrate my macOS multitouch library under license into their iOS and Mac apps including some updates and improvements

÷ **macOS HID internals**, **Objective-C**

Client projects, continued...

2015

Filament, developers of secure wireless network devices

helped test IoT hardware prototypes via custom firmwares developed, provided feedback/troubleshooting/documentation on an early Telehash implementation

÷ **embedded ARM** development, **electronics** rework, **protocol development**, **RF** testing, **documentation**

Inquirium

frontend developer for UChicago's "To&Through" data browsing tool from initial implementation and through a significant later revision

÷ **architecture**, **custom Django** middleware, develop **Django** template addons for **SVG** generation, **jQuery/Bootstrap/LESS** frontend, **refactoring**

2014

Viking Digital, manufacturer of electronic "modchips" for gamers

built an API for storing/sharing data from an online editor tool, built system for integrating website to physical controllers via a cross-platform app, extended MCU bootloader to support encrypted updates to help protect client IP

÷ **node.js**, **CouchDB**, **Electron** precursor native app, **binary data formats**, **USB driver** and **embedded PIC** development, **cryptography**

Couchbase, mission-critical data platform provider

helped tie together a "CouchTalk" P2P/syncing demo application ahead of a marketing event

÷ early **React.js**, early **Couchbase Lite** and **Sync Gateway**, deployed on **Android** and **iOS**

Technical Machine, creators of the Tessel JavaScript IoT platform

helped port NRF24 wireless transceiver to Tessel platform, implemented SD Card and FAT32 filesystem driver from scratch, implemented JS-conformant Unicode behavior for Lua transpiler system, helped build system for remote code deployment and workaround wireless network chip issues

÷ **node.js** hardware drivers, **embedded ARM** development, **Unicode**, **networking protocols**

Client projects, continued...

2012–2013

Argyle Tiles, personal startup

began processing aerial imagery and built a service to host unified "slippy map" tiles from multiple data sources, promotion and market research

÷ **node.js**, **image processing**, **GDAL**, cartographic **projections**, **public datasets**, **Amazon Web Services**, **marketing** and **intern mentorship**

Meograph, a four-dimensional storytelling startup

assisted with some web map expertise, re-architected multi-faceted media player for more stable playback, worked around Google Earth and YouTube player integration issues

÷ **CoffeeScript**, **collaboration**, **integration**

Inquirium

primary developer and design contributions to several iterations of Project READI's "SenseMaking" app for reading/notetaking

÷ **CouchDB** and **node.js** backend, **D3.js** frontend, **low-level DOM** manipulation in support of student highlighting, many **CSS** tricks and **mobile web** multitouch compatibility

Recon Dynamics, wireless asset management corporation

some continued support of the mapping platform I had helped develop via an employer

÷ configuring **VirtualBox**, **GDAL**, **customer service**. Earlier: **Django**, **OpenLayers**, **multitouch**, **Tropo/Twilio** integration

2010

Tracking startup in Yakima

helped a local entrepreneur explore feasibility of a cellular-based GPS fleet tracking service, using/debugging their procured off-the-shelf hardware and prototyping simple web app

÷ Online **mapping**, easily-hosted **PHP** backend, **GPS** technology, **SMS** gateways and cellular fee structures, **troubleshooting**

Personal/open source project highlights

fermata

A lightweight and clean library to build URLs, make HTTP requests, and parse the results.

✦ **node.js**/browser, low-level **HTTP** protocol, **REST** concepts, **API design**, advanced **JavaScript** features

PeerPouch

An experimental plugin for peer-to-peer syncing of PouchDB databases between browsers.

✦ early **PouchDB**, **CouchDB** replication, using **WebRTC** data channels, RPC handling

ShutterStem

A long-term personal project, creating a self-hosted photo management "app platform".

✦ **UI design**, advanced **JavaScript/browser** techniques, Python and other supporting utilities, handling **EXIF** data, **digital asset management**, **GPS data** management, and much more

js-cnc

Work-in-progress UI and backend for web based operation of a (grbl-based) CNC system.

✦ processes raw **G-code** via a **custom parser**, **computational geometry** for display/transformation, control over **USB serial** protocol, current backend via **node.js streams** although also researching **ChromeOS** deployment

Metakaolin

Proof-of-concept "modeless" UI to draw shapes on a map, saved in a self-hosted database.

✦ **UI design**, **web mapping**, computational **geometry** and basic **graph theory**, **multitouch** event processing, **cross-browser** implementation, **GeoJSON**, **CouchDB**

fatfs / sdcard / struct-fu

Pure-JS implementations of the FAT filesystem and signal-level driver for the SD Card interface. Also designed a standalone library for clean handling of the binary data structures involved.

✦ **filesystems**, **hardware** integration, **buffer** manipulation, **API design**

node-nrf

Pure-JS implementation of a nRF24L01+ wireless transceiver driver, exposing a high-level interface on top of the low-level low-level command/interrupt handling which I implemented.

✦ low-level **chipset protocols**, **node.js streams**, **hardware troubleshooting**

Other contributions

During the course of my work, I proactively file issues and submit patches to "upstream" libraries as appropriate. On occasion I've taken over responsibility from the original authors.

✦ patches contributed to: D3.js, preact, node-hid, node-cookie-signature, browserify, django-pipeline-browserify, tessel-runtime, pouchdb, WebKit, and others