

Sam Roberts

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Software developer with 20+ years of experience in distributed micro-services, network protocols, cryptographic formats, with multiple languages and operating systems.

Multi-language: C; C++; Node.js; Lua; Python; Ruby; Go.

Open source: Node.js TSC member; conference speaker; author or contributor to many open-source projects.

Unix & network programming: event-driven I/O; sockets, IPC, and packet injection; Linux/QNX4 system APIs

Network protocols and formats: TCP/UDP/IP, Mail protocols (POP3/SMTP/MIME), HTTP1.1, ASN.1/BER/DER, vCard, iCalendar, BEEP.

Cryptographic protocols and formats: CMS, S/MIME, SSL/TLS/WTLS, X.509/PKIX, PKCS #1/5/7/8/11/12, smart cards and hardware accelerators, cryptographic APIs, RSA, Diffie-Hellman, and Elliptic Curve crypto-systems.

Experience

2018/10-now: Senior Software Developer, IBM Canada (Runtimes) (remote)

Contribute to Node.js project in C++ and JavaScript, primarily to crypto, security, LTS, and IBM platform support. Contribute to IBM and open source projects for production Node.js deployment to Docker, Kubernetes, and IBM cloud. JavaScript, C++, occasional Go.

- **Contributor** to Node.js since 2013.
- Member of Node.js Technical Steering Committee (**TSC**).
- Add TLS1.3 support to Node.js' OpenSSL bindings (**nodejs/node#26209** and previous).
- Coordinate Node.js security releases (**nodejs.org/en/blog/vulnerability/**).
- Develop IBM reference architecture for Node.js development: recommend best practice for Node.js containerization, Prometheus, Kabanero and Appsody stacks. POC of using Kubernetes operator for Node.js specific functions.

2016/10-2017/09: Senior Software Developer, IBM Canada (Runtimes) (remote)

Contribute to Node.js project and IBM's Node.js APM (**appmetrics**). JavaScript, C++, C.

- Integrate Strongloop capabilities into appmetrics, replace **strong-agent** with appmetrics in **strong-pm.io**.
- Help setup Node.js' **Security Working Group**.
- **Back Pressure, or, Don't Accept Work Before You're Ready**, Node.js Interactive, Oct 2017/Nodeconf.eu, Nov 2017.
- **Node's Event Loop from the Inside Out**, Node.js Interactive, Austin TX, Dec 2016

2015/11-2016/09: Senior Software Developer, IBM Canada (APIConnect) (remote)

Lead team of 3 IBM developers to integrate Strongloop runtime technology into IBM APIConnect's service orchestration layers using **strong-supervisor**. JavaScript.

- **Node.js API Pitfalls: Can You Spot Them?**, Node.js Interactive, Portland WA, Dec 2015

2013/04-2015/10: StrongOps Team Lead, Strongloop (remote)

Lead team of 4 responsible for deployment, management, and monitoring for Node.js services (**strong-pm.io**) until Strongloop acquisition by IBM. Micro-services in JavaScript, APM in JavaScript and C++.

- Participate developing the **strong-agent** APM and metrics collector.
- Develop process and cluster management for single machines (strong-pm.io), and distributed service orchestration (unreleased after acquisition).
- Contribute to Node.js core, primarily to Unix process handling.

2007/05-2013/03: Senior Architect and Development Lead, Wurldtech (Vancouver, BC)

Lead a team of 8 developers developing a network protocol exploit generation Linux appliance. Python/Twisted, Lua, and C.

- Implement Scrum, and ship product within first year of development.
- Rewrite the network protocol and penetration framework from Java to Lua.
- Implement many network and industrial protocols in C and Lua (modbus, ZibBee, etc.)
- Write a protocol interceptor in C, along with a Lua rule engine for a Linux/VxWorks intrusion prevention system (IPS).

2005/11-2007/06: Senior Software Architect, Bycast (Vancouver, BC)

Implement microservice components of StorageGrid, a large image distributed data store. C++, some Ruby, and Lua.

- Implement an XML RPC API for the Grid, and rewrite its HTTP/1.1 server for standards conformance and security, both in C++.
- Implement grid communication protocols in Ruby, for QA team to automate tests.
- Write Lua bindings in C for Grid APIs and implement tape archive components in Lua.

2000/10-2005/10: Senior Software Developer, Certicom (Mississauga, ON)

Develop C language cryptographic toolkits on servers and mobile devices. C, some Ruby and Perl.

- Extend WTLS protocol toolkit, troubleshoot vendor interoperability problems.
- Propose and implement Crypto-C API extensions to support 3rd party and hardware-based crypto.
- Design PKI-C toolkit, and implement BER/DER, key formats, X.509 certificate encode/decode/validation, CMS, and PFX. Multiple legacy products were able to replace bespoke PKI implementations with one common library.
- Implement cryptographic key store architecture and plugins using LDAP, file-based PKCS#12, CAC smartcards, Cryptoki (PKCS#11) smartcards, and WinCE servers. Integrate key stores into PKI-C.
- Implement test automation to expose protocol and memory usage errors in existing C toolkits, and fix them.
- Wrote a Ruby documentation generator for PKI-C (adopted by other toolkits).

1998/10-2000/10: Software Developer, Cogent Real-Time Systems (Mississauga, ON)

Develop industrial distributed systems in C and Cogent's LISP-dialect, using a microservice architecture (service discovery, hierarchical key-value store, message queueing, time-series data, etc.). C, some Gamma (a LISP variant).

- Port microservice SDK product to Linux, after writing Linux kernel emulation of QNX4 messaging.

1995-1998/10: Development Lead, International Submarine Engineering (Port Coquitlam, BC)

Responsible for ACE, an event-based kernel and configuration language for robotics. Port to QNX4 on my own initiative, which became the RTOS of choice for subsequent projects. Implement sensor device serial protocols. C++.

Education

B.A.Sc., Engineering-Physics, Computer Science Option; University of British Columbia (1996)

Open source

Node.js	• commits to Node.js core • authored or maintained many Strongloop packages, such as modern-syslog (~9K downloads/week), strong-supervisor (~1.7K downloads/week),
C+Lua	• luasocket , forked , integrated multiple CVS and Mercurial forks into github, brought collaborators together, and passed project back to original author • C/Lua bindings: pcap-lua , netfilter-lua , termios-lua , bcrc-lua
Ruby	• vCard and iCalendar support (vpim), > 1million downloads • ZeroConf DNS service discovery (net-mdns)
C	• libnet , adopted a widely used packet crafting and injection library • GNU mailutils , commits to email address decoding, file locking, SMTP
Go	• git-walk , recursive, parallel command execution in Ruby, Node.js, and Go • operator-nodejs , operator that triggers Node.js diagnostic reports • wtfutil secret store , use docker-credential-helpers to store API keys and other secrets • whereami , example app to explore Go programming and channels