Sergey Shchekoldin

Russian (location: Abu Dhabi Emirate)

shchekoldin@gmail.com +971529828342, +79200170979

linkedin.com/in/sergey-shchekoldin-b7536b85

Summary

Software and Hardware Developer with the following skills and experience:
- C/C++ (more than 16 years), standards: C++/11/14/17 (strong OOD & OOP skills)
- FPGA (Xilinx/Intel/Altera) - SystemVerilog (> 7 years)
- Microcontrollers: STM32, MSP430, AVR (> 10 years)
- High-frequency PCB + schematics using Altium Designer (> 5 years): >10 layers, 10 GHz
- Hardware Protocols: I2C, SPI, UART, Ethernet 1-10g, PCIe, USB
- Frameworks: STL, BOOST, DPDK, CUDA, REST, SQL, PCRE, OpenSSL, OpenCV, OpenCL
- Database (ODB): MySQL, Oracle, NoSQL, Redis
- Debugging & Profiler: gdb, valgrind, strace, operf/opcontrol

I developed solutions for:
- Digital Signal Processors (DSP) for Radio Frequency Systems (RFS)
- Deep Packet Inspection (DPI) for Lawful Interception Systems
- Data Leak Prevention (DLP) for Threat Intelligence Systems
- Big Data solutions for high-load databases and storage/recording network traffic payloads (> 1Tbit/s)
- Hardware devices for voice interception: E1 (copper), STM 1-64 (optical), SS7 (Ethernet frames)
- Anti-NAT - specific network cards and software to compare traffic before and after NAT
- Specialized hardware network devices for routing, aggregation, and balancing traffic
- Anti DoS/DDoS solutions

Extensive experience in developing high-load applications and optimizing code for various architectures:
- x86-64
- AMD EPYC
- ARM
- Loongson (LoongArch64 with 4 NUMA)
- Tilera (64 + Pro)
- Cavium (Octeon)
- NVIDIA CUDA (sm50-sm90)
- FPGA (Xilinx/Intel/Altera)
- Russian CPUs Elbrus (E8C) and Baykal T1000

Parse and communication with network protocols:
- ethernet, rdma, ptp, ipv4/ipv6, mpls, vlan, pppoe, gre, arp, tcp/udp/sctp
- bgp, igrp, ospf, netFlow, radius, snmp
- http1-2.0, https/ssl/tls, dns, ftp, smtp, pop3, imap, mime
- sip, h323, ss7, sigtran, mtp, abis, ranap, megaco, mgcp, skinny, rtp
- icq, irc, msn, jabber, xmpp, mra, yahoo, bitTorrent
- xml, json/bson, asn1 (ber+per), zeroMQ, protoBuf

Own projects: http://vsyn.ru/

Experience

Senior Software Engineer

UAE (Abu Dhabi Emirate)

Feb 2023 - Present (1 year 4 months)

• I implemented high-speed data reception and processing for RFS, achieving a speed of 80 Gbit/s for x86/64 (+AVX512).

• The current processing algorithms have been optimized 40 times, primarily through the migration from x86/64 to GPU-Nvidia CUDA.

• I successfully reduced the prime cost of the system and significantly decreased the overall energy consumption of the system.

Team Lead (software and hardware developer)

Norsi-Trans (Russia)

Sep 2011 - Feb 2023 (11 years 6 months)

Development for the Telecommunication industry:

• Developed Yakhont-SHD - proprietary Big-Data database, establishing relationships between statistics/indexed network flows (TCP/UDP) and corresponding raw-packet traffic (PCAP) or voice payload (RTP/E1/STM)

• Possess experience in building storage with a recording speed exceeding 1 Tbit/s, accommodating statistics/indexed data for 3 years and raw-packets for more than 6 months

• I implemented "Shproto," a program that generates C++ code to parse protocols based on simple rules. It addressed parsing protocol challenges and served as the foundation for the company's DPI/DLP products:

sourceforge.net/projects/shproto

• Implemented a search for similar images/photos and objects in them (via OpenCV) with GPU-Nvidia CUDA optimization

• Developed a system for detecting the most important words and phrases (factorial analysis) in text or messages (similar to Yandex MyStem)

These hardware devices have been entirely designed by me, and some of them have been produced in series of more than 1000 units (based on FPGA, STM32 + FreeRTOS, PCIe/USB drivers):

• Anti-NAT - a specific network card and software for comparing traffic before and after NAT (>120m flows/sec)

• E1-48 - interception (identifying E1 period, parsing HDB3, transferring it to host for future analysis)

• STM1-64 - interception (finding STM period, translating STM-4-16-64 to STM1, parsing STM1 to VC4, and transferring it to x86/64)

• TAP-1G - for SS7 interception (protected inline connection in the Ethernet channel to send a copy of traffic)

• NC-light - (12 ports x10 Gbit/s) for routing, balancing, and aggregating network traffic

Also, I worked in a department focusing on active traffic interaction:

• SOPSA (https://sopsa.ru/) - Anti-DDoS solution (based on NetFlow+BGP+SNMP protocols), analogous to Arbor Networks

• KROZ - DPI/DLP solution

• NanoSwitch-64/128 ports - hardware network device (based on FPGA-Xilinx) for routing, aggregation, and balancing traffic

System architect programmer

MFI Soft (Russia)

Aug 2007 - Sep 2011 (4 years 2 months)

I progressed from a developer to a system architect at one of the largest companies in Russia in the telecommunications industry. Participated in the following projects:

• Anti-DDoS solution: https://www.anti-malware.ru/reviews/DDoS_attack_prevention_Perimetr

• Presentation server (remote presentation from a mobile phone, iPad, notebook, etc., without software on it, from a web browser): www.nicemeeting.com (functionality was integrated into some projectors)

• Analysis of the executable Skype.exe file to decrypt the transmitted traffic: https://xakep.ru/2007/06/08/38543/

I was awarded diplomas as the best employee of 2009 and 2010 in the MFI-SOFT company.

Education

Higher School of Economics

Master's degree, Information Technology

2011 - 2013

HSE is one of the top universities in Russia and the leader in Eastern Europe and Eurasia in economics and social sciences

State University of Nizhni Novgorod named after N.I. Lobachevsky (UNN)

Bachelor of Economics, Business economics for managers

2005 - 2010

Lobachevsky University - Lobachevsky State University of Nizhni Novgorod

State University of Nizhni Novgorod named after N.I. Lobachevsky (UNN)

Bachelor of Science in Information Technology, Programmer (Information Technology)

2004 - 2009

Lobachevsky University - Lobachevsky State University of Nizhni Novgorod

Skills

C++ • Field-Programmable Gate Arrays (FPGA) • Verilog • Printed Circuit Board (PCB) Design • Big Data • CUDA • Program Development • Deep Packet Inspection • Performance Improvement • Embedded Systems