

## Mikhail Vorozhtsov

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## Summary

- Ten years of solving problems with strongly, statically typed functional languages (Haskell, Scala).
- Strong skills in formal language translation, covering both DSL design and industrial compilers internals.
- Broad experience in software development, from bare-metal programming to type-level computations and back again.

## Work experience

### 2017-present Senior Software Engineer at **OneFactor** (Moscow, Russia)

ML-based services for the banking and advertising industries. A member of data delivery team.

- Developing and supporting an internal service for de-identification and cross-DC data transfers (Scala, Hadoop, Spark, ZooKeeper, Kafka, Akka, MongoDB).

### 2013-2016 Senior Software Engineer at **Yaliny** (Moscow, Russia)

Startup that aimed to prototype, develop and launch a telecommunication system built around a LEO satellite constellation.

- Designed and specified the network stack (non-IP based) used throughout the system for voice calls, user data transmission, and maintenance traffic.
- Designed and implemented an EDSL (Haskell) for describing behaviour of network nodes (as a special kind of automata). The purpose of the DSL was to provide high level definitions that could be verified and tested (via interpretation) and used to automatically generate documentation and low level (C, HDL) implementations.
- Developed toolchains for two generations of soft-processors with non-conventional (no register file in the usual sense) proprietary architectures. The toolchains consisted of algebraic assemblers (Haskell, custom monadic parser combinators [library](#)), linkers (ports of GNU *gold*), and LLVM backends.
- Developed telecommunication system simulator client (Scala, Netty, SWT, LWJGL, GLSL).
- Prototyped mobile telephony application (Scala, Android).

### 2011-2013 Freelancer

Designed and developed a software system for providing VPN services, including

- Access server software (Haskell, OpenSSL, OpenVPN), on top of a custom asynchronous I/O library (an early prototype of the library in Scala is available [here](#)) that relied on STM. Among other things, a caching DNS server (using [network-dns](#)), NAT-PMP server (using [network-natpmp](#)), and a Linux kernel [module](#) for traffic shaping were implemented.
- Client software (C++, Qt, WinAPI, WinDDK). Patched the TAP-Windows driver vs broadcast/multicast traffic filtering.
- System control and configuration software (Scala, JavaFX, Netty, X.509, JCA/JCE).
- Site backend (Scala, Lift, Akka, Netty, Spring, Hibernate, PostgreSQL).

### 2010-2011 Senior Software Engineer at **Studio DVA** (Omsk, Russia)

Social network game development.

- Introduced Scala to the company.
- Designed and developed game backend (Scala, Netty, MongoDB, Redis, REST) on top of a HTTP routing [library](#) and MongoDB query [DSL](#).
- Implemented a Scalac [plugin](#) for easier annotation placement.

## **2008-2010 Software Engineer at Zeon Group** (Omsk, Russia)

Solutions for network traffic accounting and control.

- Created a minimalistic application server for Java applications (Scala, Jetty, JPS, PostgreSQL, C), which ran on top of a custom Linux distribution, integrating closely with system components such as *udev*, *mdadm*, and *iptables*.
- Implemented *iptables* module for traffic accounting.

## **Additional Experience**

- A humble GHC contributor (the [LambdaCase](#) extension, several Template Haskell improvements [1](#), [2](#), [3](#), [4](#), [5](#)).
- Worked on a [microkernel](#) for the x86\_64 architecture in 2007-2008.

## **Education**

### **2001-2006 Omsk State University** (Omsk, Russia)

M.S. in Applied Mathematics and Computer Science