Sergey Mikhanov

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Work

03/2013–01/2015 **Chief Technical Officer, Fountain Digital Labs**, London

The role comprised both developing critical parts of the company's codebase in **Python** and **Objective-C** and managing the development team — at its largest six developers across three countries, at times working to very tight deadlines. I developed and led the execution of the following products, each a key component of the company's long-term technological strategy:

- **Python**-powered video processing backend based on **ffmpeg** and running on **AWS**. This part of our infrastructure ingests video from an RTMP source and produces an adaptive-quality HLS stream. The entire backend was developed from scratch and uses its own scaling logic for transcoding large amounts of incoming video while using the resources of the AWS efficiently (we used **boto** for working with AWS and **ZeroMQ** for IPC). The entire transcoding cluster could be rolled out with one click using **Puppet** and includes tools for self-monitoring (using **statsd** and **Graphite**);
- Web-based administration console for management of the video backend is a classic webapp with **Python/Bottle/uWSGI** backend and **YUI**-based frontend. It includes features for managing and monitoring all aspects of our system like AWS configuration or user roles. It also provides basic workflow support for the video assets in the system. Console includes remote video camera controlling capabilities using RS-232 over TCP/IP (using a **Tornado** server and Moxa appliance);
- "Virry" iPad app that consumes the video and presents it to the user. The app was developed using the **FRP** approach (a technique that I introduced to our team and maintained), that greatly reduces the amount of "spaghetti code" so common for the UI layer. Some of the base components of the iOS **AVFoundation** were extended for this app to provide a smoother viewing experience for the user.

Technologies and software used: Python, Bottle, boto, ffmpeg, Objective-C, Cocoa Touch, iOS, Puppet, JavaScript, YUI.

03/2012–03/2013 **Senior Developer (FX), Barclays Investment Bank**, London

Designed and developed an internal synthetic market provider as well as connectivity module for Tradition's ParFX, both highly-available **Java** applications:

- Both run on BATS, Barclays proprietary FX trading platform, with a generic **FIX** connectivity to multiple FX exchanges;
- Combine spot and future market data from different exchanges to provide internal spot liquidity for trading desk.

Technologies and software used: Java, FIX protocol

05/2011–03/2012 **Founder, Scalar** (http://scalarapp.com), London

Built the app Scalar in **Objective-C** from scratch. Scalar aims to rethink how calculations are carried out on mobile devices and to offer an alternative to unnecessarily complex spreadsheets. I was responsible for all aspects of the app:

- Product conception, design, management, development and integration with **external APIs** (Evernote, Google Analytics);
- Ported to Objective-C and extended (trigonometric functions support and bug fixes) the arbitrary precision arithmetic library, **mpi**;
- Created iOS controls to support custom fonts on early versions of iOS, while making sure that glyph rendering showed adequate performance even on the early devices;
- Implemented a number of UI elements with custom drawing routines and integrated these with the rest of the UI.

Technologies and software used: Objective-C with and without ARC, Cocoa Touch, iOS

11/2010–04/2011 **Senior Developer (Equities), Nomura International**, London

As a member of Exchange Connectivity team was responsible for developing the Swiss Stock Exchange (SWX) connectivity component. Key component features:

- Utilizes low-level data serialization and exchange techniques (shared memory over **JNI**, binary mapping of **Java arrays to C structures**, etc) for interacting with the SWX API;
- Used as a part of internally developed trading platform and maps state machine of the **FIX** protocol to SWX proprietary protocol;
- Employs **multithreading** and **memory management** facilities of the trading platform for achieving required latency figures.

Technologies and software used: Java, FIX protocol, SWX proprietary APIs

06/2006–11/2010 **Senior Developer, Kapsch CarrierCom**, Vienna

Designed and developed Java framework for telecom applications, a suite of services based on it, and a web front-end for service management. Key framework features:

- Exposes plain **Java** components for building applications on top of **JAIN SLEE** AS;
- Incorporates high-performance asynchronous database access layer on top of **JDBC**;
- Demonstrates very low call processing latency and high throughput;
- Tightly integrated with the **J2EE**-based backend and into company-wide build process;
- Uses advanced **memory management** techniques (immutable objects, pooling and caching) to avoid performance loss due to GC.

Technologies and software used: Java, JAIN SLEE (jNetX OCFS), J2EE EJB (JBoss), Spring, JSP/Servlets/Struts/Ext JS, JDO, XML/XSL technologies, SIP Servlets, SIP/SDP/VoiceXML

01/2005–04/2006 **Software Engineer, jNetX Inc**, Moscow

Designed and developed core **Java** network components of the telecom application server. Component features:

- Interacts with network using **TCP/UDP** sockets in **multithreaded** asynchronous code;
- Uses custom storage engine based on **Java NIO**'s buffers and B-trees for persistence.

Technologies and software used: Java, JAIN SLEE (jNetX OCFS), SIP Servlets, SIP/SDP/VoiceXML, IETF/3GPP/ETSI standards and APIs

Education

09/1998–03/2004 **M.Sc. in Computer Science, Moscow Aviation Institute (State Technical University)**

Department of Computer Science and Numerical Mathematics, Faculty of Applied Mathematics and Physics
Thesis project: “LIMA: Heterogeneous programming language with database and knowledgebase integration for Microsoft .NET”

Skills

Programming languages and technologies

Python (Bottle, boto, SQLAlchemy), Objective-C (Cocoa Touch on iOS, ARC, GCD), Java (JAIN SLEE, J2EE, Spring, EJB, JSP/Servlets, JDBC, JDO), ORM frameworks (SQLAlchemy, JPOX/Data Nucleus, Hibernate), Web frameworks (Bottle, Wicket, Struts, Cocoon), XML/XSL (DOM/SAX models), SQL, Web (HTML/CSS/JavaScript, jQuery, YUI3, Ext JS frameworks), workflow tools (Maven, JUnit, Ant, Ivy, Quickcheck, Buildout)

Software engineering

Software development methodologies (agile methods, Scrum, TDD, XP), software architecture, design patterns

Languages

Russian (native), English (fluent), German (B1 CEFR level)

Referees

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