Alexandr Lavrinenko

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Position: Software Engineer, Team Lead, C++, Linux, R&D

Professional Experience 15+ years

- **Developing**, architecture and design of computer systems and Linux based software;
- **Embedded** Linux software;
- **Design**, development, administration and exploitation of high performance multiprocessor systems, Linux clusters. Expertise in HPC-clusters, supercomputers, GRID systems;
- **Research** and development, image and data processing;
- **Expertise** in security and Public Key Infrastructure (PKI, CA, x509, SSL/TLS);
- **Technical coordination**, team leading, project estimation and technical documentation, architecture and design. Mentoring, team and candidates reviewing, Linux and PKI courses teaching.

Technical Skills

- **LINUX,** POSIX, Windows, cross compiling, system programming, kernel modules, Linux-clusters, GRID, Red Hat Linux, Embedded Linux, LFS(Linux From Scratch) , OpenWRT, Raspberry Pi.
- **PKI** (Public Key Infrastructure), SSL/TLS, x509, Certificate Authority (CA);
- **R&D**, Digital signal processing(DSP), Image processing, MatLab, OpenCV, PCL, MVE;
- **HPC** - High performance computing MPI, Linux-clusters, GRID, Nagios, SNMP, NTP, Ganglia, Globus toolkit, gLite, Unicore;
- **Robotics**, Denavit-Hartenberg kinematic model, control, monitoring, visualization.
- **Enterprise** Architect, AUTOSAR Architect, AUTOSAR, DOORS, UML, V-Model, ISO26262, CUnit;
- **C++, C,** Python, GIT, Subversion, GNU toolchain, gdb, valgrind, mtrace, bash, make, cmake, Doxygen, Linux kernel, IPC, Multithreading, TCP/IP, Socket, WireShark, x509, TLS, SSL, MPI, QT, GTK, XML-RPC, SDL, SSH, XEN, VMWare, RPM, Opensource, OpenCV, XML-RPC, AWS(EC2, Route53, VPC);

Work Experience

2017 - c.t.	Professional Software Associates Inc. www.psa.inc **Technical coordinator, Senior Software Engineer.**
2014 - 2017	EPAM Systems, **Senior Software Engineer.** www.epam.com
2011 - 2014	Professional Software Associates (PSA R&D). www.psa.inc **Senior Software Engineer.**
2001 - 2011	The United Institute of Informatics Problems of the National Academy of Sciences of Belarus (UIIP NASB) http://www.uiip.bas-net.by/eng/ **Chief designer, Researcher, Lead Software Engineer.**

Education

1996-2001
Belarussian State University Informatics and Radio-Electronics (**BSUIR**), www.bsuir.by/en/
Faculty of Computer-Aided Design, Design and Technology Computers System.

2001-2003
Belarussian State University Informatics and Radio-Electronics (**BSUIR**), www.bsuir.by/en/
PhD candidate, Elements and Devices of Computer System.

Languages skills

English - Intermediate (2021).
Russian, Belarussian native.

Projects

PSA Jun 2021 c.t.	**Cryptographic Key Management System Communication library** for on-line distribution of the Cryptographic information between Key Management Centers and elements of railroad on-track and on-board devices. **- Project estimation and technical documentation;** **- Examined and clarified requirements;** **- Architecture and design creation;** **- Technical coordination and team leading.** C++, Linux, bash, make, TLS/TCP/IP client/server, WireShark, UT, TLS, SSL, PKI, OpenSSL, x509, Certificate Authority (CA), Online Certificate Status Protocol (OCSP), Certificate Management Protocol(CMP), Certificate Revocation List (CRL).	Technical Coordinator, PKI expert
PSA Jan 2021 c.t.	**Automated system of quality control and rejection of finished products for packaging manufacturers.** Detecting unsealed areas on bobbin-cutting machines at printing factory. Design and architecture of client-server multi complex system with image detection, machine speed control, statistics collection, web user interface, customer license protection sub-system. **- Project estimation and technical documentation;** **- Examined and clarified requirements;** **- Technical coordination and team leading.** Linux, Embeded Linux, poky/Yocto, bash, C++, Python, C STM8, MQTT, ssh, Git, UI.	Technical Coordinator
PSA Jun 2020 Dec 2020	**Rail road devices continuous Integration Automated Deployment and Testing.** Implementation of the continuous integration environment with automated builds preparation and deployment in order to perform a variety of automated tests to eliminate generic errors and reduce the manual testing efforts after the source code updates. **- Project estimation and technical documentation;** **- Architecture and design creation;** **- Creating deploy and testing infrastructure for railroad devices.** Linux, Embeded Linux, poky/Yocto, bash, Python, ssh, SVN, Git, Jenkins.	Technical Coordinator
PSA Apr 2020 c.t.	**Particle Counter Device Embedded Firmware Implementation.** Complex embedded firmware intended to control operations and provide the ability to interact with the user using GUI and Web GUI controls for the 4th generation of the portative particle counter device. **- Project build master, build test/release firmware, branch managing;** **- Code analysis, code review.** Git, bash, vxWorks, bitbucket, Coverity Service, C++, MISRA code standard, cppcheck.	Build master
PSA Feb 2020 Dec 2020	**Rail road SNMP event message server.** Implementation of a centralized event processing service with configurable filtering mechanism to receive, store, and send external SNMP notifications. Linux server daemon, IPC POSIX messages, UNIX signal processing. **- Project estimation and technical documentation;** **- Architecture and design creation;** **- Coding and code review.**	Technical Coordinator, Senior Software Engineer

	C++, Embedded Linux, poky/Yocto, TCP/IP sockets, multithreading, railroad EMP and ClassD protocols, SNMP client/server, Git.	
PSA Jan 2019 Jun 2019	**Universal Robots (UR-10 Arm) control software.** Proof of Concept development to demonstrate the ability to deploy a collaborative robot (cobot) equipped with an array of cameras and vision software for defect detection within a production environment that is configurable by technician personnel familiar with vision systems and limited knowledge of programming collaborative robots. **- Project estimation and technical documentation;** **- Architecture and design creation;** **- Denavit-Hartenberg kinematic model for simulation;** **- Safety zone calculation;** **- 3D Visualisation;** **- Camera integration;** **- Robot arm control and monitoring.** C++, Linux, Windows cross platform software, QT, QT 3D visualization, TCP/IP, XML-RPC, SQLite, Git, Robotics, Denavit-Hartenberg kinematic model, control, monitoring, visualization.	Senior Software Engineer, R&D
PSA Feb 2018 Dec 2018	**X509 Key Management System and Remote Distribution System.** Design and Implementation of the Token Management and Remote Distribution System for secure communications between railroad vehicles and wayside equipment. The system provides an efficient method for managing and updating secure configurations for the vehicles, trains and wayside devices, keeping data up to date, with a high level of security and protection against unauthorized access. Activities included update of the onboard locomotives and wayside units' firmware to support communications with the developed management system and use of secure communication utilizing the distributed tokens. **- Project estimation and technical documentation;** **- Examined and clarified requirements;** **- Architecture and design creation;** **- Coding and code review;** **- Unit test creation and verification;** **- Customer support;** **- Developing Client-Server SSL communication with start network topology;** **- Creating testing Certificate Authority and Public Key Infrastructure.** Python, Root CA, CRL, OSCP server, subordinate CAs, ECC (Elliptic Curve Certificate), ZeroMQ, Python Asynchronous I/O API, Linux, Python unit tests, MySQL, Git, SSH, TLS/SSL, x509, OpenSSL.	Senior Software Engineer, PKI expert
PSA Dec 2017 Mar 2018	**WDC/CTC Messaging Server Prototype.** Development of a prototype of the CTC ITC Messaging service from Meteorcomm for operating on the Zynq-7000 platform. It shall support client-side WDC/CTC protocol to communicate over EMP and Class D links. **- Software architecture and design development;** **- Development activities;** **- Test development;** **- Defect resolution.** C++,Linux, Embedded Linux (LFS, Yocto), C Shell, Eclipse, bash, gcc, make, gdb, TCP/IP, sockets, multithreading, Class D, SSH.	Senior Software Engineer

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EPAM Jun 2016 Jan 2017	**Electronic Power Steering Systems.** Designing and developing software for cars Electronic Power Steering System. **- Component design;** **- Platform support and defect resolution;** **- Testing.** C, gcc, gdb, make, DOORS, Enterprise Architect, AUTOSAR Architect, AUTOSAR, UML, SVN, V-Model, ISO26262, Jenkins, CUnit.	Senior Software Engineer
EPAM Jan 2016 Jun 2016	**Car recognition algorithm.** Designing and prototyping car recognition algorithm for projecting and comparison of 3D model. **- Design and developed Canny filter processing application** **- Design and developed edge projection algorithm**	R&D, Senior Software

	- Created 3D to 2D projections application **- Developed edge matching application and matching metrics processing.** OpenCV, OpenGL, Multi-View Environment, PCL (Point Cloud Library), Visualization ToolKit (VTK), Opensource, C/C++.	Engineer,
EPAM Nov 2014 Jan 2016	**Network management system for big Internet segments.** Infoblox network control system. Integration Infoblox network management system with Amazon, VMWare cloud platforms. **- Developing AWS and Infoblox interface interaction;** **- Creating AWS and Infoblox gateway;** **- Developing tools for data synchronization between AWS VPS, Route53 and Infoblox system;** **- New features implementation;** **- Platform support and bugfixing.** Python, Linux, SSL, TCP/IP, Perforce, VMWare, Cloud, Amazon Web Services (AWS, EC2, Route53, VPC).	Senior Software Engineer

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PSA Feb 2014 Jun 2014	**Security and Graphics Control Module Implementation.** The project was to implement front-end graphical user interface for a perimeter security system. The system helps to process the data from a number of security sensors, providing a convenient perimeter control tool and control user access based on x509 certificates and PKI, CRL. **- New features implementation;** **- GUI update;** **- Defect resolution.** C++, Linux, Qt, MySQL, gcc, bash, cmake, gdb, PKI, CRL, x509.	Senior Software Engineer, PKI Expert
PSA Apr 2012 Mar 2014	**Interoperable Train Control System Management.** Porting and adaptation of the third-party ITC (Interoperable Train Control) Management System to the MLK WIU board and provide support of the system. The ITC System is designed to allow applications in the Railroad' back offices, locomotives and waysides communicate with each other in an interoperable fashion across railroad boundaries. Remotely managed over the special secure shell. **- Software architecture and design development;** **- Development and Platform porting;** **- Tests development;** **- Automated testing scripts development;** **- Defect resolution.** C++, Embedded Linux (uCLinux, LFS), C Shell, bash, gcc, make, gdb, valgrind, TCP/IP, SNMP, Class D, UML, SSH, AES128, DSA, RSA, SVN	Senior Software Engineer, SSH expert
PSA Jan 2012 Sep 2012	**ARGUS Train Control System.** Development and design of a new STEGCI module for the ARGUS Train Control System (TCS), to provide a software communication interface between the ARGUS TCS and the STEG system. Module provides capability for the STEG system provided by Trafikverket (TRV) to request execution of route requests through the ARGUS system. **- Software architecture and design development;** **- Development activities;** **- Test development;** **- Automated testing scripts development.** C/C++, Linux, IPC, TCP/IP Socket, Tcl/Tk, GCC, Valgrind, WireShark, Multithreading, UML.	Senior Software Engineer

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UIIP NASB 2006 2012	**National Grid Operations Center.** Complex software, hardware and infrastructure implementation to maintain the health National Belarusian grid network. Web-service for monitoring, statistics and test performance National Grid Network. **- Center management;** **- Design system architecture;** **- Developing test and monitoring system;** **- Writing scripts for automated testing;**	Chief designer, Center manager, PKI Expert

	- Development of the rules and regulatory documents for the grid network management. PKI, Linux, Windows, Apache, wiki, CA, TLS/SSL, UNICORE, MPI, Nagios, Ganglia, MySQL, GRID, TCP/IP, SQL, SSH, virtualization XEN.	
UIIP NASB 2006 2011	**Software for cluster and supercomputer for universal processing large amounts of information.** Universal software for processing large amounts of information (such as processing of genetic sequences, cryptographic analysis, pattern matching, etc.) for supercomputers, clusters and grid-environments. Software has the properties of scalability in the number of processors and fault tolerance. **- Design architecture of client-server part;** **- Development activities;** **- Defect resolution;** **- Writing scripts for automated testing.** Multiplatform integration for Linux, Windows, C, Assembler, XML-RPC, GTK, IPC, MPI, GRID.	Senior Software Engineer, R&D
UIIP NASB 2001 2005	**Library of parallel applications for HPC-clusters and supercomputers.** Scientific programming for multiprocessor systems and super-computers. **- Design architecture of client-server parts;** **- Prototyping;** **- Development activities;** **- Defect resolution.** C, C++, Linux, MPI, IPC, TCP/IP, SVN, Doxygen.	R&D, Senior Software Engineer
UIIP NASB 2001 2005	**Medical cardiology complex.** Medical cardiology complex based on supercomputer computational modules. Medical system of heart disease early diagnosis based on analysis of blood vessels (video or photographic images). **- Design architecture of client-server parts;** **- Optimization for cluster systems and supercomputers;** **- Implementation of input and image processing modules;** **- Defect resolution.** C++/C, Linux, Windows, Linux kernel, GTK, SDL, Delphi, IPC, MPI, HPC, Image processing, SVN, Doxygen.	R&D, Senior Software Engineer
UIIP NASB 2001 2005	**Traffic optimization system.** Software for car traffic optimization on supercomputers SKIF family. Parallelization and adaptation of the algorithm for traffic management on supercomputers SKIF family. **- R&D;** **- Design architecture;** **- Prototyping;** **- Development activities.** C++/C, Linux, IPC, MPI, HPC, Data processing, SVN, Doxygen.	Researcher
UIIP NASB 2001 2005	**Radio frequencies plan optimization.** The system for simulation and optimization of the distribution of radio frequencies to increase the number and density of stations and other sources of radio signals. Parallelization and adaptation of the algorithm for traffic management on supercomputers SKIF family. **- R&D;** **- Design architecture;** **- Prototyping;** **- Development activities.** C++, Linux, IPC, MPI, HPC, Data processing, SVN, Doxygen.	Researcher

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Publications

- Integration of cluster supercomputer SKIF family in LCG network. / Lavrinenko A.L. Murashko V.V., Tchij O.P. / / Distributed Computing and Grid-technologies in Science and Education, Dubna, July 26-30, 2006.
- Implementation details of virtualization technologies runtime environment on supercomputer system SKIF K-1000M / Lavrinenko AL, Lapa, VA, Volkov AV // 2nd International Conference "Supercomputer systems and applications»

SSA'2008, 27-29 October 2008, Minsk, Belarus: report of the conference / UIIP NASB - Minsk, 2008. - p. 181-184.

- Select middleware for building a national grid segment / OP Tchij, Lavrinenko AL, Kuleshova ME // 2nd International Conference "Supercomputer systems and applications» SSA'2008, 27-29 October 2008, Minsk, Belarus: report of the conference / UIIP NASB - Minsk, 2008. - p. 209-218.
- Creating a national grid network "SKIF". 364_NSSI_2009_Abrau-2009. Anishenko, Krishtofik, Tchij, Lavrinenko
- Operation Centre of National Grid network./ AL Lavrinenko, OP Tchij, ME Kuleshovf, VV. Murashko / / 2nd International Conference "Supercomputer systems and applications» SSA'2010
- Creating the develop environment of parallel applications with open architecture. AL Lavrinenko, EV Potachits, OP Tchi, \ \ Information Technology of the Union State "Triada", Main results and prospects. Collection of scientific papers. Minsk, Belarus National Academy of Sciences UIIP 2010.
- Technologies for efficient use of supercomputer resources. AM Krishtofik, AL Lavrinenko / / 2nd International Conference "Supercomputer systems and applications» SSA'2010

Others

Hobbies – biking, hiking, climbing and open water swimming.