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SYNOPSIS

Software Architect, Systems Engineer, Computational Scientist

Demonstrated expertise in:

- Agile/Exploratory development
- Build/release processes
- Cloud/Cluster/Distributed computing
- Concurrency/synchronization
- Configuration management
- Design for usability, maintainability, correctness, compatibility
- Fault-tolerant systems
- Parallel computing
- Performance optimization
- Phased development and integration
- Physical modeling/simulation
- Rigorous testing
- Scientific/numerical computing

Experienced in many domain areas, including:

- Geolocation
- Wireless/cellular communications
- Radio-frequency propagation
- Global banking: back-end transaction processing
- Air quality modeling
- Medical instrumentation
- Interactive Television and Video-On-Demand;
- Personalized, web-delivered story- and music-based entertainment experiences.

Record of significant innovations and improvements to the functionality, usability, speed, reliability, and maintainability of complex, highly concurrent, mission-critical systems and applications

EDUCATION

Ph.D. Rutgers University, **Electrical and Computer Engineering**

Research area: **Scalable communication, fault-tolerant synchronization and programming language support for dynamic distributed and parallel systems.**

M.S. Rutgers University, **Computer Science**

B.S.E University of Pennsylvania, Dept. of **Electrical Engineering**

PROFESSIONAL HISTORY

R&D Consultant

Edge Technical Associates, 1999-2000

Edge Technical Associates LLC, **2002-present**

<http://www.edge-technical.com>

- Conceptualize innovative new products;
- Work with clients to identify and understand requirements;

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- Research feasibility and enabling technologies;
- Assist drafting of proposals and patent applications;
- Develop specialized algorithms;
- Plan phased implementation and delivery;
- Design, develop and support software;
- Support clients in technical presentations, technical due diligence reviews, negotiations, and other activities as needed;
- Corporate Training: develop curricula and teach courses.

Projects completed for Edge to date include:

(For [TruePosition, Inc.](#) while consulting as part of [CTO's](#) team, 2004–December 2009)

U-TDOA Location Accuracy improvements

As part of a significant team effort to improve outlier results (95th percentile accuracy):

- Proposed several strategies for addressing accuracy issues, organized a systematic survey of all strategies under consideration, and estimated benefit vs. effort for proposed methods;
- Defined an evaluation metric that effectively identified the most useful improvements;
- Experimentally evaluated several of the selected methods. Collaborated with team members on other methods, making analytical contributions that resulted in net accuracy improvements;
- Performance-tuned the improved code to be faster than the unimproved version.

Co-recipient of **TruePosition 2008 Invention of the Year award** for this work, which improved overall 95th percentile accuracy by approximately 30 meters (10%).

Selection of U-TDOA demodulating and cooperating receivers (“Coop Generation”):

- Invented new coop generation algorithms for locating calls served by [UMTS](#) networks (and other networks that exploit [soft or selective combining](#));
- **Primary inventor** on two patent applications for these algorithms (Dec. 2009).
- Implemented, tested and delivered one of these algorithms for production release.
- Designed and implemented new coop generation algorithm for locating calls served by [Distributed Antenna Systems \(DAS\)](#) antennas.
- Resolved long-standing differences between coop generation results calculated for configuration vs. location processing.

Scheduling LMUs

- Invented a new load- and fault-tolerant method for scheduling selected LMUs (Location Measurement Units; each LMU contains multiple uplink receivers).

Accuracy Prediction Software

This proprietary tool has been used to successfully engineer nationwide networks and has brought in new business through proposal support.

- Improved speed by 50X and substantially reduced memory footprint, making server farm obsolete.
- Improved overall robustness across multiple platforms.
- Introduced and/or significantly improved several features and related processes.
- Served as accuracy prediction system engineer and subject matter expert / internal consultant to Network Design team, Product Line Management, FOA and IOT teams, and others throughout TruePosition.

Standards

- Contributed via RAN4 work items [see *PATENTS, PUBLICATIONS and PRESENTATIONS, below*] to 3GPP UMTS standard **TS 25.111** “*Location Measurement Unit (LMU) performance specification; User Equipment (UE) positioning in UTRAN*”.

Reference selection metric

- Working with System Test, LMU, and System Engineering teams, led resolution of anomalous GSM reference selection metric values found in testing.

CGI+TA and E-CID location processing

System engineering, software design and implementation for:

- New capability to configure percentile threshold for CGI+TA confidence radius;

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- Port delay correction for DAS & remote antennas;
- New feature enabling computed confidence radius for emergency locations;
- Validated cross-platform rounding consistency;
- Implementation & characterization of E-CID location processing.

Other

- Many other activities within the CTO organization, including developing and improving other products and tools, consulting to other departments on a variety of analytical and system issues, and writing white papers for specific applications and/or general reference.

(For [Scientific Computing Associates, Inc.](#) – 2004)

- Developed a distribution-ready Microsoft Visual Studio .NET port of the Unix TCP **Linda parallel/distributed programming language**, based on a Cygwin / Windows prototype.

(For [SevenEcho LLC](#) – 2003-2004)

Designed and developed the core system architecture and initial implementation of Personal Media Director—a highly scalable **Flash** client + **JSP** server-based system that delivers dynamically personalized, preference-based multimedia content – and Personal Narrative Toolkit (PNT), a lightweight version of the PMT suitable for individual developer use.

- Attained Microsoft ISV/Software Solutions Competency for the PNT.
- Represented client through a successful technical due diligence review.

(For [IntelliTrans LLC](#), originally [August Design, Inc.](#) 2002-2003)

Led a multi-organizational team in converting the [STARR](#) legacy ERP system to a workflow-centric, web-based (Java+JSP) user interface:

- Performed requirements elicitation from primary customer.
- Designed overall system architecture and interfaces to existing programs, database tables, EDI subsystems, and jobs.
- Systematically improved application performance by restructuring API usage patterns and database queries.
- Acted as liaison between the primary customer (Rail Management Corporation), AS/400 developers and system operators at Montana Rail Link, the original STARR system developers at the Paducah and Louisville (P&L) Railway and IBM Websphere/J2EE/IBM WebFacing developers at IntelliTrans.

(For [Liberate Technologies, Inc.](#), 2000)

- Redesigned and enhanced the layout engine of an Internet-over-television web browser (an embedded set-top box application) to improve display of images, tables, and text and bring it into compliance with HTML 4.01 standards.

Other

“Smart building” energy technology development, including consultations, software system architecture, and evaluation of 3rd-party components.

Senior Software Engineer, Video-On-Demand (VOD) Server Products

Liberate Technologies, Inc. (originally MoreCom, Inc.) Horsham, PA 2000-2002

- Led integration of all VOD server products with Liberate's Connect Suite product line: Integrated installation, logging, configuration and operational management of new VOD Gateway servers and server processes with Liberate platform APIs. Developed compatible Java and Perl interface libraries and configuration and startup script templates. Integrated with existing source control, build and release processes.
- Developed multithreaded, TCP socket-based client for [nCUBE](#) asset metadata publisher protocol; developed Java library and API that flexibly maps XML asset metadata from nCUBE, [SeaChange](#), and other XML-based video metadata servers to VOD Gateway parameters.
- Led server development work on Vidéotron Health project.
- Researched JVMs (Java Virtual Machines) for embedded systems. Taught an internal short course on this topic.

- Actively participated in Integrated Services Architecture (ISA) working group along with representatives from Time-Warner Cable, nCUBE, SeaChange, Concurrent, and other cable system operators and middleware vendors.
- Mentored junior members of engineering staff.

Senior Software Engineer, Greystone Group

Sanchez Computer Associates, Inc. (now [FIS](#)), Malvern, PA 1998-1999

Database internals development for [G.T.M.](#), a proprietary SMP (Symmetric Multiprocessing) [parallel database engine](#):

- Analyzed new replication and failover features for potential impact to system performance and business continuity, resulting in several design and implementation refinements.
- Designed and implemented **ACID-safe, hard real-time transaction timeouts** to enable controlled failover during long transactions.
- Identified and eliminated concurrency hazards including race conditions, **livelock**, and out-of-design operation during "normal" system load peaks.
- Improved system performance, reliability and behavior during exceptional conditions.
- Designed and implemented crash/recovery tests that led to the understanding and resolution of several long-standing bugs. Repair of these bugs **significantly improved database recoverability after failure events**.

[Assistant Professor, Department of Computing Sciences](#)

[Consultant, NSF I/UCRC Center for Advanced Communication](#)

Villanova University 1996-1998

- Extensively revised and taught graduate courses in **Distributed Systems and Object-Oriented Design and Programming**.
- Taught undergraduate **Algorithms and Data Structures** courses in C and Java.
- Led class-wide **Rapid Application Development** projects.
- Closely supervised many M.S. independent projects.

[Visiting Assistant Professor, Dept. of Computer and Information Science](#)

University of Delaware 1995-1996

- Revised and taught graduate courses in **Discrete-Event Simulation and Programming Languages**.
- Taught undergraduate courses Algorithms and Data Structures in C and C++.

System Scientist

[Carnegie Mellon University School of Computer Science 1992-1995](#)

Research project: "Distributed Computational System for Environmental Modeling", a National Science Foundation High-Performance Computing and Communications (HPCC) initiative Grand Challenge project:

- Parallelized the Urban-to-Regional Multiscale Airshed air quality model, achieving the **highest regional air quality model performance ever reported** as of that time.
- Developed a variety of parallelization strategies for improving execution speed, making use of **task and data parallelism, network-optimized communication, application-dependent data distribution, and pipelined I/O**.
- Ported the model to vector supercomputers, massively parallel processors, networks of workstations, and **wide-area heterogeneous combinations of these systems**.
- Designed **model verification methods** that led to quick identification and resolution of model errors introduced during the restructuring process.
- Integrated the URM Airshed model with the Geographic and Environmental Modeling System (GEMS), a GUI database and simulation interface.
- Supervised staff and undergraduate programmers and managed tight schedules.

PRIOR EXPERIENCE

Software, firmware, and analog & digital hardware design, including real-time signal processing, medical instrumentation, robotics, and real-time optical measurement systems.

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PATENTS, PUBLICATIONS AND PRESENTATIONS

Recent:

- Patent Applications No. 12/648,753 and No. 12/648,783, (filed December, 2009) both titled *“Cooperating Receiver Selection for UMTS Wireless Location”*
Inventors: Edward Joseph Segall, Simon Issakov, and Rashidus S. Mia
- Patent Application No. 12/346,146 (filed December 2008)
“Method for Position Estimation Using Generalized Error Distributions”
Inventors: Pete A. Boyer, Rashidus S. Mia, and Edward J. Segall
(TruePosition 2008 Invention of the Year)
- [TruePosition 3GPP RAN Working Group 4 contribution R4-070478](#), *“Simulation Proposal for UTDOA LMU Performance”*, Kobe Japan, May 2007, with Pete Boyer, Rashidus Mia, and Ron Lefever
- [TruePosition 3GPP RAN Working Group 4 contribution R4-070490](#), *“Simulation Results for UTDOA LMU Performance”*, Kobe Japan, May 2007, with Pete Boyer and Rashidus Mia
- TruePosition internal specifications, design documents, white papers, knowledge transfer presentations and contributions to executive presentations on topics including Coop Generation for UMTS, Distributed Antenna Systems, UTDOA accuracy enhancements, accuracy prediction software enhancements, use of E911 data in weighting accuracy prediction calculations, how to specify antenna port information for best cellsite density estimation, and methods for scheduling LMU maintenance for minimal network disruption.

Earlier:

- <http://www.edge-technical.com/esegall-publist.html>

SYSTEMS, LANGUAGES, TECHNOLOGIES

Programming Languages	Java / J2EE / J2ME, C, C++, XML, Adobe Flash, Perl, Smalltalk, Eiffel, M/MUMPS, HTML, ADA, High-Performance FORTRAN (HPF, F90), Lisp, Pascal, Postscript, Prolog, RPG-IV, CL, and others.
Scripting, build	sh (Bourne shell), bash, csh / tcsh, awk, ant, make / Imake, and others.
Assembly Languages	HP (DEC) Alpha, HP RISC, IBM RS6000/PowerPC, Sun SPARC, others.
Web Application Platforms	Apache Tomcat, IBM WebSphere, and others.
Databases	MySQL, IBM DB2/400, Sanchez/FIS GTM (Mumps)—a highly parallel SMP database, and others.
IDEs	NetBeans, Eclipse, Forte, Visual C++, JBuilder, Visual Cafe, Flash MX, Smalltalk-80, X-Windows, etc.
OS + Platforms	Single and Multi-processor UNIX and Linux systems, incl. Sun Solaris, IBM AIX, HP (Compaq/DEC) Tru64 UNIX, RedHat Linux and OpenVMS. Windows NT/2000/XP, SGI (Cray) T90/T3E supercomputers, Scientific Atlanta PowerTV.
Inter-process communication	TCP/IP socket-level programming, DCOM, CORBA, shared memory (various), message-passing (PVM/MPI), Linda, & others.
Source control	ClearCase (Base and UCM), Perforce, CVS, Visual SourceSafe.
Miscellaneous	IBM WebFacing

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