DAVID C. DOHERTY

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Software/Services Architect & Developer

EXPERIENCE

BITWIXT SOFTWARE SYSTEMS LLC | Educational Software & Services
Architect / Developer / Administrator / Consultant - Software & Services
2007 – present

Designed and implemented the successful deployment and launch of Atomsmith® science education software and service products. Atomsmith products feature physics-based, 3D simulations and visualizations of atoms and molecules. Atomsmith software is now used by thousands of teachers and students around the world.

Atomsmith Online is a subscription-based HTML5 single-page app (SPA) deployed on AWS. It shares its high-performance numerical simulation (C++) and visualization (OpenGL/ES, WebGL) engines with native Windows, MacOS, and iOS Atomsmith apps. Its client UI is implemented in ES6 and is built using React.js, Bootstrap, and jQuery UI. The numerical simulation engine is written in C++ that compiles to asm.js and WebAssembly (using emscripten and LLVM) and runs in a web worker. The simulation engine communicates with the WebGL 3D visualization engine (running on the UI thread) using message passing. The product provides proprietary interactive curriculum, context-sensitive help, display and graphing of chemical information, and account administration tools for teachers and school administrators.

Atomsmith Online's application/authentication server and databases are hosted on AWS EC2 instances and run in node.js. The server runs through nginx and the API is implemented using Express.js and GraphQL. Atomsmith Online's implementation is stable, serves thousands of concurrent users, and is highly scalable.

NETWORK COMPUTING SERVICES / MN SUPERCOMPUTER CENTER / CRAY RESEARCH | Cloud High-Performance Computing Services
Director, Technical Support & Development / Computational Scientist
1990 – 2007

Led a team of 10-15 programming/scientific/engineering consultants in the support of customers running scientific, financial and engineering applications on heterogeneous high-performance computing systems (Cray, IBM, SGI, Sun, Thinking Machines). Managed customer relationships and support responsibilities: pre-sales technical contacts, feasibility studies, application development and deployment, and daily technical support. Team functions included: code porting and application optimization, re-architecture of large scale applications, allocation and monitoring of computing resources, analysis and re-configuration of computing hardware, operating systems and file systems, and development/delivery of training and documentation. Led ongoing efforts to define, implement, deploy and support a broad array of service products. Customers included Conoco, BP-Amoco, Chevron, Arco, Ford, 3M, Amoco Chemical, Allied Signal, GE, Harris Corp, Thiokol, Goldman Sachs, JP Morgan, the University of Minnesota, and the U.S. Army's High Performance Computing Research Center.

EDUCATION

M.S., Theoretical Physical Chemistry, University of Illinois-Chicago.
Chicago, Illinois. Dow Chemical Graduate Fellow.

Sc.B., Applied Mathematics and Biology, Brown University. Providence, Rhode Island.

SKILLS & INTERESTS

Products Developed & Deployed
o Full Stack Web App (subscription-based SaaS)
o Linux Admin/Dev Tools
o MacOS App Development (1 in App Store, 1 Outside Store)
o iOS App Development (2 iPad Apps in App Store)
o Windows App Development (Win32/C++)

Skills & Tools Deployed
o JavaScript
o C++/C
o Python
o Shell Scripting
o Node.js
o HTML/CSS
o AWS: EC2 (Ubuntu), S3
o RESTful Web services
o Express.js, GraphQL
o MongoDB/Mongoose
o React.js/Flux/JSX
o Emscripten/LLVM
o asm.js/WebAssembly
o Bootstrap
o jQuery/jQuery UI
o JSON
o Objective C/Cocoa/Cocoa Touch
o OpenGL/ES
o WebGL
o Git(Hub)
o Webpack
o npm/yarn
o Babel

Other Skills
o D3.js
o Rust
o Ruby/Rails

Professional Development
Involved with software development networking groups, including NodeMN and MN CocoaHeads. Presented talks on topics including OpenGL/ES development on iOS and running C++ code in a browser/node.js using emscripten, asm.js, and WebAssembly.