

Benjamin Berman

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Overview

I am a software engineer with a PhD and 9+ years of experience in industry who likes creating **high-quality** systems. Problems I am interested in often relate to **correctness** (disambiguating requirements, naming things, code readability, identifying variants/invariants/preconditions, functional programming), **reliability** and recoverability (logging, monitoring, testing, configuration minimization, redundancy, concurrency and memory issues), **data storage and retrieval** (sharding, transactions, high availability, SQL and NoSQL), **streaming data** (reactive programming, serialization/deserialization, joining, aggregation, retention, partitioning), reliable and repeatable **deployment** with zero downtime, **cloud infrastructure** (IaC, provisioning, AWS, cost tradeoffs), **performance** (latency, throughput/bandwidth, resource consumption, parallelization), **security** (authorization, authentication, confidentiality and encryption, availability, integrity, vulnerability detection and remediation), **devops** (automation, continuous integration, containerization), **usability** (understanding stakeholders, learnability, workflow efficiency), **communication** (technical and semi-technical presentations, documentation, multi-team coordination) and **developer productivity** (build speed, build tools, editing/refactoring tools, local environment setup, mentoring, knowledge sharing). I also enjoy writing lists.

Work Experience

UPMC Enterprises, Pittsburgh, PA

Senior Software Engineer, February 2022 to April 2024

Part of the Alexandria Charts medical records platform team. The main challenge in this position was the **wide range** of applications/services to be upgraded, improved, and debugged. Highlights included:

- Using Java reactive streams to improve document download speeds by more than 3x
- Debugging our CI/CD pipeline to significantly improve job completion times (e.g. 8x)

M*Modal / 3M, Pittsburgh, PA (3M acquired M*Modal in February, 2019)

Senior Software Engineer, July 2017 to February 2022

Primarily Java/Spring Boot, with heavy usage of supporting technologies, plus leadership (included time as **tech lead**), architectural, and mentoring activities. The umbrella project/product was Computer Assisted Provider Documentation (CAPD) Services, a web service connecting a physician-facing GUI with a real-time natural language processor, providing layers for security and feedback customization. Highlights included:

- Designing and implementing CAPD "Data Services", a Kafka Streams microservices project that processed/aggregated data from ~1000 req/second in real time
 - Worked across teams (main app front-end, reporting app, legacy ETL, and product/sales) to resolve critical ambiguities

Skills/Tech

Java, Bash, Scala, Ruby, JavaScript, TypeScript, Spring (Spring Boot, Spring WebFlux, Spring MVC, Spring Data JPA, Spring Cloud Stream), microservices, Angular, AngularJS, SQL (PostgreSQL, MySQL, Oracle), NoSQL databases (MongoDB, Redis, Elasticsearch), Gitlab CI/CD, Docker, Kubernetes, Terraform, Ansible, AWS (CCP Certified, EC2, EKS, Batch, MSK, Secrets Manager, Parameter Store, CloudWatch, S3, API Gateway, ELB, CloudFront, Route 53, Cognito, RDS, SQS, Java/Ruby SDKs, CLI), Project Reactor, Kafka, Kafka Streams, Kibana, Grafana, OAuth, JWTs, SSL/TLS, Java EE (Servlets, JSPs, EJBs), REST, SOAP, JSON, XML, YAML, nginx, Tomcat, JBoss, Unix/Linux cli tools (ssh, tmux, vi/vim, curl, gpg, etc.), Gradle, Maven, Ant, JUnit, TestNG, Git, Mercurial, Subversion, Coq, Alloy, Lustre, ESC/Java2, Flyway, Jackson, jEdit plugin development, Piccolo (Java library for zoom-able UIs),

- Adding support for "Encounter-Based Reasoning", which connected CAPD's real-time NLP service with previous analysis of documents for a given patient visit
 - Handled identifier mappings, configuration and credential caching, OAuth, fallback mechanisms, additional API calls for NLP evidence, and improved metrics, monitoring, and logging
- Migrating to AWS
 - Created a library of Terraform and Ansible scripts that allowed our services to be deployed, consistently, across multiple environments

Interactive Brokers Group, Greenwich, CT

Secure Application Developer, February 2015 to July 2017.

Primarily Java/J2EE development, with some PL/SQL. Projects included:

- Signed/encrypted file-based access to the account management system
- 2FA device mailing system
- A client for an OCR web service (SOAP) for processing passport images

The University of Iowa, Iowa City, IA

Research/Teaching Assistant, Instructor, August 2008 to December 2014

- Taught and developed course material for introductory Java
- Developed and tested UIs for programming tools
 - Collaborated on securing NSF grant CCF-1250306
- Assisted for various courses, including HCI and Formal Methods

Education

- Ph.D. Computer Science, The University of Iowa, Iowa City, IA, December 2014
 - Dissertation Title: *Development And User Testing Of New User Interfaces For Mathematics And Programming Tools*
- B.S. Physics, Rice University, Houston, TX, May 2008

Publications / Presentations

Berman, B. A. and Hourcade, J. P (2014). Keyboard Card Menus: A New Presentation of Non-Standard Shortcuts. *Journal of Universal Computer Science, Special Issue on Trending Breakthroughs in Human-Computer Interaction*.

Berman, B. A. and Hourcade, J. P (2014). Keyboard Card Menus: Faster Learning of Many Fast Commands. In *Proceedings of the XIV International Congress of Human-Computer Interaction (Interaction 2013), in the Spanish Congress of Informatics (CEDI)*, pages 105-112, Spain, 2013. ISBN 978-84-695-8352-4.

New Coq User Interfaces: Survey and Ideas. Presentation co-authored with Aaron Stump and Juan Pablo Hourcade. Presented at *The Coq Workshop 2012*, Princeton, NJ, USA, August 12, 2012.