Andrew Holm-Hansen

Director of Health IT Engineering

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I am a veteran Solutions and Enterprise Architect with over two decades of enterprise product development experience and a long history of successful projects in the Health IT sector. I am an effective leader of interdisciplinary teams, where I emphasize the value of communication and consensus building.

Management, Audits, & Compliance Consulting

AI Company Audit | Sept 2022–2023

- Reviewed a production Machine Learning Pipeline and the MLOps techniques and practices used to operationalize several ML models
- Analyzed and documented complex Machine Learning code including processes for data gathering, data formatting, modeling, training and testing code contained in dozens of Jupyter notebooks and other source code.
- Reviewed, analyzed and documented various feature, label and data sets

SQOO Project | Apr 2019–May 2022

- Led technical oversight in eCW Corporate Integrity Agreement (CIA) as a member of the Software Quality Oversight Organization (SQOO) responsible for advising eClincalWorks (eCW) on creation and execution of a technical transition plan to reach compliance with the The Office of the National Coordinator for Health Information Technology (ONC) and Office of Inspector General (OIG).
- As part of the SQOO, I advised and worked closely with the internal eCW Solution Architecture team to improve software quality with a goal of measurably reducing risk to patient safety.
- Worked with eCW leadership and SQOO team members to identify gaps in strategic capability and align plans for IT procurement, hiring and resource allocation to address these gaps.
- As part of the SQOO, I investigated causes of software failure and sources of patient safety risk, presenting these findings to the OIG/ONC along with recommendations for remediation. This required communicating complicated technical and patient safety risks to a non-technical audience.
- In addition to the above, my work with the SQOO included:
    - Evaluating risks in software architectures
    - Evaluating SDLC and software risk management practices
    - Evaluating compliance with ONC-certifications and recommendations for EHR software
    - Evaluating code management and code deployment strategies and plans
    - Evaluating the quality of software in accordance with industry standards and best practices
    - Documenting the structure and behavior of complex systems
    - Making recommendations for improving software safety, reliability, and maintainability based on industry best practices

Masonicare v. Cerner | 2022–2023

- Assisting with the review and discovery production of electronic health record implementation components relevant to the matter and providing analysis regarding industry standards for electronic health record implementation.

Kilterly v. SolutionStream | 2021

- Provided analysis of SDLC and DevOps process, and execution of those processes. Provided analysis of software quality, architecture and design.

Litigation Consulting

- **HealthbookPlus Holdings, Inc v. Rod Jardine** | Sept 2024–Present
  Jurisdiction: JAMS
  Case Number: 5220003477
  Counsel: Burns Figa & Will
  Nature of Suit: Breach-of-Contract
- **WESCA / VonBergen v. Liberty Mutual Insurance Company |** Oct 2023–Nov 2023
  Jurisdiction: Eastern District of Pennsylvania
  Case Number: 2:22-cv-04880
  Counsel: Marcus & Zelman LLC
  Nature of Suit: Class Action
- **WESCA / Vonbergen v. Bloomingdales.com, LLC |** Oct 2023–Jan 2024
  Jurisdiction: Eastern District of Pennsylvania
  Case Number: 2:22-cv-04724
  Counsel: Marcus & Zelman LLC
  Nature of Suit: Class Action
- **WESCA / Munday v. Avis Budget Group, Inc |** Oct 2023–Jan 2024
  Jurisdiction: Eastern District of Pennsylvania
  Case Number: 2:22-cv-04807
  Counsel: Marcus & Zelman LLC
  Nature of Suit: Class Action
- **WESCA / Farst v. Michaels Stores, Inc |** Oct 2023–Jan 2024
  Jurisdiction: Middle District of Pennsylvania - Harrisburg
  Case Number: 1:22-cv-01433
  Counsel: Marcus & Zelman LLC
  Nature of Suit: Class Action
- **WESCA / Farst v. Autozone, Inc |** Oct 2023–Nov 2023
  Jurisdiction: Middle District of Pennsylvania - Harrisburg
  Case Number: 1:22-cv-01435
  Counsel: Marcus & Zelman LLC
  Nature of Suit: Class Action
- **WESCA / Huber v. Expedia, Inc |** Oct 2023–Nov 2023
  Jurisdiction: Eastern District of Pennsylvania
  Case Number: 2:22-cv-03570
  Counsel: Marcus & Zelman LLC
  Nature of Suit: Class Action

- **University of Victoria v. FreshWorks Studio Inc** | July 2023–June 2024
  Jurisdiction: BC Supreme Court
  Case Number: S-226081
  Counsel: Smart & Biggar LLP
  Nature of Suit: Patent
- **WIPRO Limited v. First Data Government Solutions, LP** | July 2023–Present
  Jurisdiction: District Court, D. Nebraska
  Case Number: 4:22-cv-03116-JMG-MDN
  Counsel: IMS Consulting & Expert Services
  Nature of Suit: Breach of Contract
- **Kasandra Izquierdo vs. The New York and Presbyterian Hospital** | Apr 2023–Sept 2023
  Jurisdiction: Supreme Court of the State of New York County of Bronx
  Counsel: Heidell, Pittoni, Murphy & Bach, LLP
  Nature of Suit: Medical Malpractice
  Health IT System: Eclipsys (Now Allscripts/ Veradigm)
- **K+S Potash Canada General Partnership v. Veolia Water Technologies Inc** | Mar 2023–Present
  Jurisdiction: Court Of Queen's Bench For Saskatchewan
  Case Number: QB No. 817 (filed 2018)
  Nature of Suit: Breach of Contract
  Retained by: Veolia Water Technologies Inc
  Counsel: Stikeman Elliott LLP
  Technology: Plant Design Management Systems (PDMS), Clash Detection, Database synchronization
  Role: Software Engineering and Implementation Lead
- **WESCA / Jamie Huber et al. v. Zillow Group, Inc** | Jan 2023–Mar 2024
  Jurisdiction: US District Court for the Western District of Washington
  Case Number: 2:2022cv01699
  Counsel: Marcus & Zelman
  Nature of Suit: Class Action Privacy
- **WIPRO Limited, LLC v. State of Nebraska** | 2021–Present
  Provided analysis of a large systems integration project including analysis of software, documentation, solution and data architecture design specifications, TOGAF enterprise architecture artifacts and operational processes.
- **Aetna Inc v. Mednax, Inc** | Oct 2020–July 2021
  Provided analysis of a pediatric EHR for the client and produced material for an expert report.
  Analyzed opposing expert report and wrote rebuttal arguments identifying multiple flaws and inaccuracies
- **FinancialApps, LLC v. Envestnet, Inc and Yodlee, Inc** | 2019–Present
  Provided analysis of complex financial systems including analysis of software, documentation, design specifications, architecture decisions and operational processes for expert report.

Tech Due Diligence Consulting

- **Acquisition Expert Consultant** | 2020

- Reviewed architecture plan and implementation details of a large content aggregation and comprehension system and contributed to the report.
- Performed code quality and Cyclomatic complexity analysis.
- Evaluated Lambda architecture implementation and fit for purpose.

Other Consulting Assignments

- **Confidential Investigation** | Oct 2023–Feb 2024
  Nature of suit: Illinois Biometric information Privacy Act (BIPA)
  Technology: optical fingerprint readers and time clocks, network traffic capture, SQL monitoring.

Employment

Director of Health IT Engineering

Quandary Peak Research | Nashville, TN | Jan 2020–Present

- Lead a multidisciplinary team of developers, clinical informaticians, data analysts and security experts to evaluate the software development process, software quality and safety of EHR vendors
- This includes analysis of SDLC, Incident Response, QA, DevOps and Security Posture in the context of HHS, OIG and ONC rules and guidelines
- Provided leadership and strategic direction for our clients by pushing new initiatives that improved software quality through modernizing the development process, and aligning QA and DevOps processes with leadership goals and compliance requirements

Enterprise Architect

Vanderbilt University | Nashville, TN | 2015–2019

- Completed TOGAF certification and participated in Enterprise Architecture Review Board as a voting member, representing Product Development and Enterprise Architecture.
- Lead Architecture Development Method (ADM) iterations to plan and execute migrations through transition architectures to target architectures for several business services including our Pharmacogenomic CDS platform (PREDICT) and our specialty pharmacy lab integration (AtlasRX).
- Participated in ADM iterations to plan and execute transition to Epic EHR. I was attached to this project for three years. During this period we performed countless vendor deep dives, product evaluations and performed analysis on dozens of large products with the participation and input of multiple departmental stakeholders, including legal, patient safety, security, operations, procurement, disaster management, business continuity services and executive leadership. I am very proud to say that the migration was successful.

Principal Integration Architect

Vanderbilt University | Nashville, TN | 2013–2019

- Developed process to operationalize machine learning models produced by the Department of Biomedical Informatics (DBMI).
- Enabled DBMI to create predictive models by providing APIs to access training and outcome data.
- Solution architect for the NICU Discharge Prediction project. Our team built an event driven system, based on clinical and academic research, to predict when a patient would be eligible for discharge. The system reasoned on event stream data from four other systems (labs, admissions, nursing observations and nursing documentation) using a rules engine. Conclusions were sent to our Epic via FHIR and displayed on the patient chart, reducing time to discharge for candidate patients by a day, on average.

- Solution architect for the Cornellius project. Another event driven, Epic integration project based on research from our DBMI department that gathered data from multiple systems to calculate a readmission risk score for each patient. Once identified as a high risk patient, they were given higher priority and their readmission rates were reduced as a result.
- Architect and team lead for the ESB infrastructure project. We developed the business capability to integrate external and internal services through our ESB with BusinessWorks. This work enabled the NICU and Readmission projects (among many others) to listen to events originating in Epic, by making event streams of concern available to the enterprise in real time.
- Used Business Events rules engine to implement lab value surveillance and alert processes.
- Led migrations of several applications to an SOA/microservice architecture opening up data that was previously inaccessible.
- Worked with many different teams on their development processes to enable them to consume these services.

Senior Health Systems Engineer

Vanderbilt University | Nashville, TN | 2012–2013

- In 2013 I joined the Clinical Informatics team to work on decision support services. Using Tibco we created an event-based, lab value surveillance system. This application uses Business Events to consume data from a lab JMS queue and posts conclusions to drive a Business Works process.
- Wrote several RESTful web services to support our EHR and Order Entry using Spring's MVC framework.
- SendToStar enabled the Vanderbilt Oncology Information System (VOIS) team's application to publish FHIR documents to Star (our in-house EHR).
- OrdersService decoupled us from our current CPOE system (Heo/McKesson), giving us a point of integration for a future replacement while supporting the existing system.
- Joined the team in the middle of developing the Cardio-Pathways web application, a new development project designed to manage care of stage-based, fixed-price patients (in this case valve replacement patients) from pre-admission to discharge, with the goal of applying it to many classes of patients in the future. This application is J2ee/Spring, Hibernate, jQuery and AngularJS.
- Since this team had little experience with Spring, unit testing or JPA, I presented example projects and shared experiences from previous projects.

DevOps Lead

Vanderbilt University | Nashville, TN | 2008–2012

- Developed a web application "Metadata Annotation Tool" for the Enterprise Data Warehouse (EDW) team. This tool provided a way for domain experts to share their knowledge about components of the EDW in a collaborative manner. The project uses Spring Roo, custom taglibs, Spring-MVC, Spring Security, JMS, Spring Data, JPA, AOP and Hibernate.
- My DevOps roles included task and workflow automation, gathering diagnostic and performance data, tuning and monitoring our middleware and infrastructure and application monitoring.
- Created and supported a CI development pipeline that enabled developers to deploy to non-prod environments while making sure we could easily and automatically test builds and roll back changes.
- Assisted many development teams and planned system integration, for example helping teams to use JMS to publish data behind a standardized interface rather than building free standing solutions.

- Automated the buildout of new environments by developing an application to use gathered requirements to generate the environment. This reduced errors and decreased turnaround time.

Senior Java J2EE Application Developer

Vanderbilt University | Nashville, TN | 2005–2008

- Our team successfully launched, maintained and supported several J2EE applications including Darts, Lego and Olga.
- OLGA - Online Giving Application. A web service that accepts and manages donations, composed of a skinnable front end that each department customizes for their needs and a page embedded payment transaction service.
- LEGO (“Let it Go“) - A web application designed to replace the unsupported alumni tracking application that DARTS relied upon. We migrated the data by adding triggers that updated the new database each time the old database was modified, then refreshed the old data, forcing each row to be evaluated by the triggers.
- DARTS - Department of Alumni Relation Tracking System. Added functionality to the existing alumni relations software including relationship management.
- All three projects relied on a Hibernate, Struts, Tiles, DWR, Spring stack. Development was test driven and the teams used Agile practices including paired programming, iterative development and frequent customer meetings.

Senior Java J2EE Developer

Franklin American Mortgage Co. | Nashville, TN | Oct 2004–July 2005

- Worked primarily on automated loan origination software (qDocs and qWrite) and was responsible for bug fixes, feature requests, supporting new functionality and vendor integration. The system was a cgi-script, written in Perl, that wrote data to a flat file for future batch processing.
- Brought in a more modern MVC based technology stack by introducing Struts to the development group.
- Tasked with training developers to build web applications. Weekly presentations introduced technology, concepts and techniques. Presented topics included "The MVC pattern", “Maven”, "Debugging web Applications with Eclipse", "Refactoring", "Unit Testing" and "Writing Testable Code”.
- Designed a deployment process that used Maven to deploy applications built directly from source control, using artifacts from a maven repository, to different environments.
- Tracked down memory leaks using JProfile, JMeter, hprof & hat, and jmp. Discovered and reported a memory leak in Tomcat. Learned about PermGen and long running container applications.
- Modified our loan bundling application to consume Fannie Mae's XIS (XML Integrated Service). This allowed the automation of several steps that would otherwise require manual entry and pricing.

Lead Architect/Lead Java Developer/Sys. Admin

Custom Software Group | Lincoln, NE | 2008–2012

- Designed and implemented a point-of-sale program “SecureCheque 2” for deferred deposit companies which tracked financial transactions as well as customer and employee data.
- Converted ten years of legacy data previously collected by a console application with no input validation, using an ORM I wrote during the development period for the application (Hibernate was launched only a year before and didn’t support our needs at the time).
- Organized the application according to the MVC pattern with a database, Tomcat application server, SWING client application and JSP-based server management console.

- Wrote an object relational mapper and code generator to produce objects representing database tables and their relationships as JavaBeans using JDBC. The first version of the code generator read a schema and produced javabeans corresponding to the data model. The second iteration read an xml file and created both the javabeans and the ddl for the database.
- Developed a migration strategy to convert MSSQL7 records from the schema for the legacy application into the Postgres schema for the new application. Existing field validation code from the new application was used in the migration to ensure data consistency and to flag records that fail regulatory standards.

Java Developer/Sys. Admin

Metalogic Inc | Lincoln, NE | Sept 2000–Dec 2002
Metalogic provided several educational products aimed at media presentation and organization

- Converted an existing local database application (CSSAP) to a web based application. My first web based project. This was a fairly standard CRUD app that introduced me to java servlets, CSS, javascript and browser compatibility issues.
- Migrated the metacat application's MS Access database data to Postgres. First experience with JDBC.
- Reimplemented the existing metacat fat client as a web app. Moved the control layer into a servlet container and wrote JSP to generate the HTML for the client.
- Designed and implemented a web based user management solution for the application that took advantage of our existing jdbc codebase. Prior to this we manually executed java from a jar to manage users.

Objective C Developer

Hickman Kenyon Systems | Omaha, NE | Summer 2000
HKS developed Ottr; hospital software geared towards organ transplant management

- Developed an application to represent selected Objective C data structures as XML formatted documents; the application was used to serialize and deserialize objects for a remote invocation framework.
- Worked with Objective C, the Oracle 8i database system and a proprietary scripting language to convert a foreign database schema and dataset into one compatible with our application.
- Made contributions to the existing methods and procedures for performing the conversion including a process to manage field mappings and type conversions.
- Volunteered for side projects including network wormhole implementation and database report generation.

Education

Bachelors in Computer Science

Nebraska Wesleyan University, Lincoln, NE | 2001

Certifications

- **TOGAF** 9.1 2018

Skills

Tools: Linux , Windows, Eclipse, Java Application Servers (Tomcat, Weblogic, OC4J, JBoss), SVN/CVS/git, Oracle, Postgres, mysql, Jenkins, Bamboo, CI, Tibco BW/BE, SOA, TOGAF, Jira, Confluence

Languages, Protocols and Formats: Java, Python, Bash, Sed/Awk, XML, HTML, Javascript, HL7, FHIR, mLLP, TCP/IP

Frameworks: Spring, JEE, J2EE, Struts, DWR, jQuery, AngularJS, Hibernate and My/IBatis, TIBCO

Methodologies: XP, Agile, BDUF, Waterfall. TOGAF. Domain Driven Development