

EQRS

Center for Clinical

End Stage Renal Disease Quality Reporting System (EQRS)

Working collaboratively with the Centers for Medicare & Medicaid Services' Center for Clinical Standards and Quality (CCSQ), ManTech is consolidating three mission-critical, disparate, on-premises legacy systems, which utilize Oracle technology stack, into a single platform for EQRS. Using Agile development, DevOps methodologies, and Open source tools, ManTech is incrementally rebuilding components of these systems in cloud environments, ultimately creating a suite of modernized, integrated applications.

- ManTech performed a breakdown of the systems-based functionality and identified redundant components that could be integrated to improve the user experience.
- As features are modernized, they are developed using microservices, which provides loosely coupled code within an AWS environment that supports on-demand scaling.

We adopted a learn quick approach (Fail Fast) to solve critical business questions through rapid design, prototyping, and hands-on customer verification within short feedback cycles, typically a two-week iteration. An integrated demonstration is provided at the end of the iteration as part of the customer delivery.

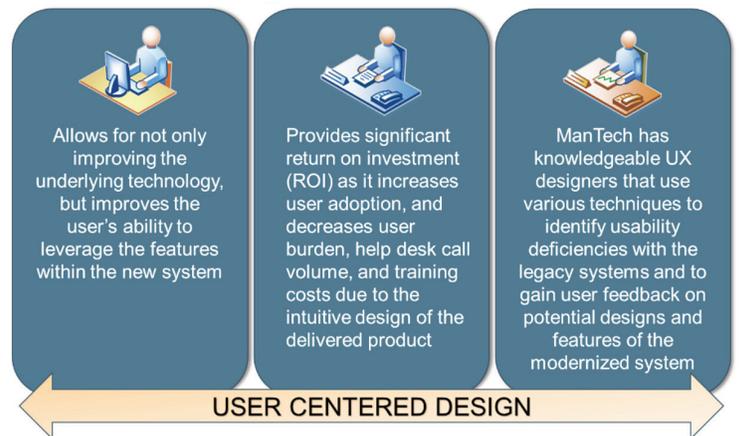
Primary Tools and Technologies

- Microservice Modular Technology
 - Netflix Open Source Stack (OSS)
 - Service Discovery – Eureka
 - Circuit Breaker – Hystrix
 - Hystrix Monitoring – Turbine
 - Inter Process Communication – Ribbon
 - Intelligent Routing – Zuul

- Java Spring Boot, Swagger, Angular JS, NPM, JMeter, SonarQube
- Commoditized Toolchain – Ansible, GitHub, Docker, Shipyard, Jenkins, Maven, JFrog Artifactory, FitNesse, Selenium, Nessus, Splunk
- Data – Cloudera, Kafka, HBASE, Hive, Hue, PostgreSQL, Oracle RDBMS, Oracle DCN

Key Solutions

User Centered Design



INNOVATION AT WORK

- ▶ The UX team hosts an end-user interface trial environment. The community of users can log in, test interface features, provide feedback and suggestions, all without impacting one another or actually altering any data in the environment.
- ▶ Utilizing AWS S3 Simple Storage Service alleviates the challenge of multiple users performing functions that change the underlying data in the trial environment.
- ▶ The UX trial environment is also cost effective as it is shut down when not in use and easily instantiated on-demand in AWS.

Developing a Minimal Viable Product

- The tools used depend on the feature, but tools we have used include Java, COTS, and open source products
- Agile teams are guided by their product owner to create the minimum viable products
- Our UX Team typically engages with the client after deployment to elicit feedback, which goes into the product backlog for future enhancements to the feature

SAFe Agile Practitioners

- CMS' implementation of SAFe is slightly different from the formal SAFe, but adaptations were needed to support CMS' needs. The Program Increment (PI) is a 12-week development period comprised of six 2-week sprints.
- CMS Chief Product Owner (CPO) is supported by the EQRS CPO and the EQRS Enterprise Architect; this group determines the priority of work to be performed within the PI, and the decision is made by the CMS EQRS CPO based on recommendation from EQRS.
- Agile teams, which are typically comprised of cross-functional experts including developers, DevOps engineers, test automation engineers, business analysts, product owners, and scrum masters, sign up to champion specific innovation tasks.
- EQRS sprint teams contain BAs that support the sprint team product owners in backlog refinement, answering questions from the developers, and creating acceptance criteria, thus allowing the BAs to continuously refine the backlog.

DevOps

- ManTech applies repeatable, reliable process to deliver innovation to the customer, "concept to cash", by creating an automated Continuous Delivery Pipeline via Jenkins.
- Through automated Continuous Integration, new code units are consolidated into a central repository; unit, performance and security tested; containerized; registered; and, delivered to the development-integration environment.
- Automated Continuous Delivery allows for the distribution of code to target environments, or pipeline stages, where each stage gages the quality of new features with testing that validates functionality and eliminates defects.

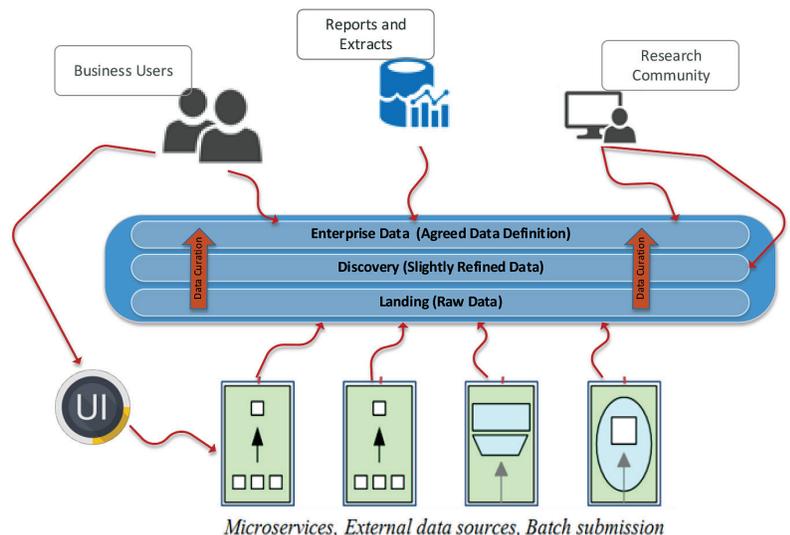
- Automated Platform Provisioning supports the Continuous Delivery Pipeline by treating infrastructure as code, which is bundled from one environment to another without configuration drift or need for manual intervention, increasing reliability and making embedded test automation consistent.

EQRS DevOps Process Gains

- **Continuous Integration** – 77% Decrease in time to test, build and containerize units of code vs. legacy process
- **Continuous Delivery** – 73% Decrease in time to deploy new and updated Microservices to target environments vs. legacy process
- **Automated Platform Provisioning** – 99% Decrease in time to stand up or tear down and re-create environments vs. legacy process

EQRS Data Lake

- ManTech is in the process of developing a data lake on a Cloudera Hadoop platform.
- The platform will ingest near-real time data from the OLTP microservices and batch data from external stakeholders.
- Metadata will be captured, including operational and business metadata.
- Our current plan is to use navigator to capture operational metadata and we are investigating a COTS solution for business metadata management. Maintenance of the metadata is critical in order for end users to have a comprehensive understanding of the data contained within the data lake.



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Melinda Plaugher, Vice President, HHS, Division Manager | (443) 364-3562 | melinda.plaugher@mantech.com