



**Driving
Automation
to Reduce
Touchpoints
and Improve
Quality**

Healthcare Clinical Data Reporting System (HCDRS)

ABOUT THE CLIENT

Our client is a healthcare payor with considerable clinical data and associated processes needed to both pay for care and to supply providers with the best possible information to improve the quality of care and resulting outcomes for their patient populations.

CLIENT CHALLENGE

The client needed to supply providers with a Patient Registry & Quality Improvement Tool that describes the latest, best clinical practices to ensure a high quality of care for patients. This registry would contain meaningful measures and reduce reporting burden while maintaining data accessibility and accuracy for public reporting of quality information directly to patients in accordance with policy.

Ventech Solutions' challenge was to identify and implement an infrastructure model that could host a registry application and automate application updates quickly and efficiently. The HCDRS application suite is a collection of components that converge to support company goals. HCDRS components are listed in Figure 1.

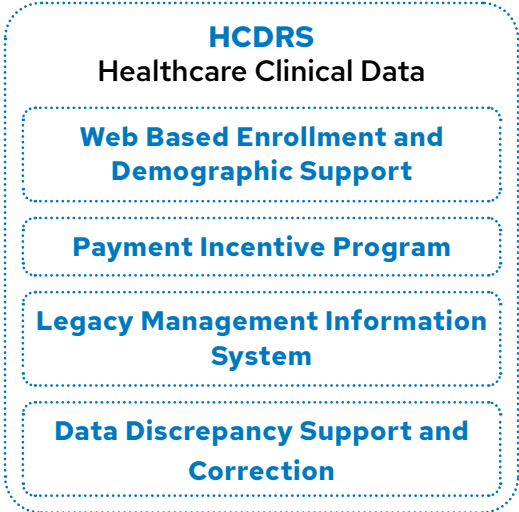


Figure 1: HCDRS Components

Each of the above applications began life at different times, using varying generations of technology. A single interface renders some usable information, however each application works independently without a consolidated data view.

OUR SOLUTION

Driving Automation to Reduce Touchpoints and Improve Quality

Ventech Solutions conducted a review of the HCDRS server environment to identify touchpoints where automation could be applied. A primary issue identified was the lack of an integrated systems environment to help application development contractor organizations become more efficient. Our team created a repeatable release model that could infuse new code updates into a chain of events that test and deploy application releases. In Figure 2 below, we show that model. Each arrow represents opportunities to add automation code.

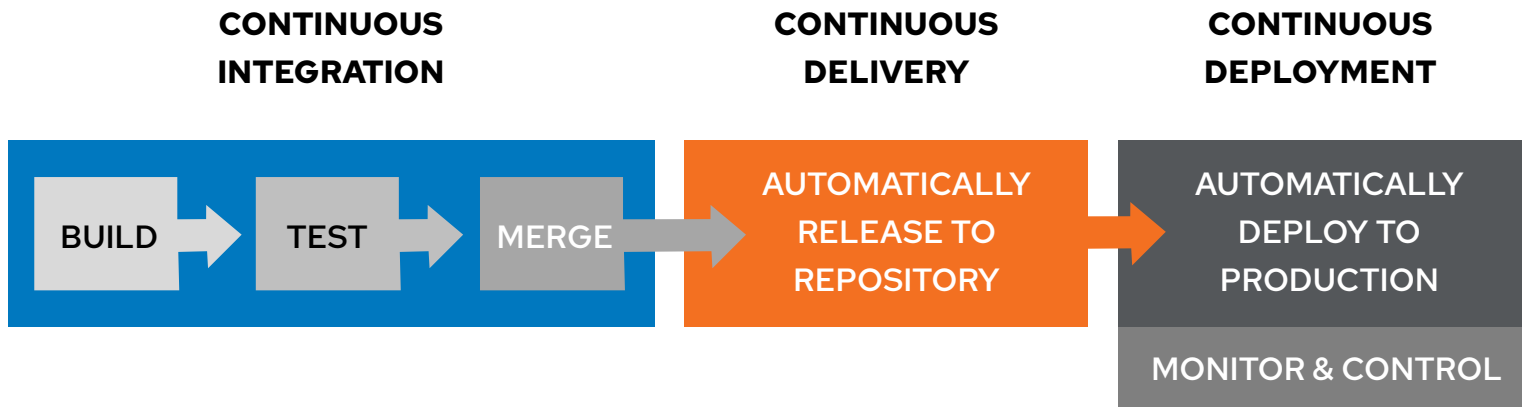
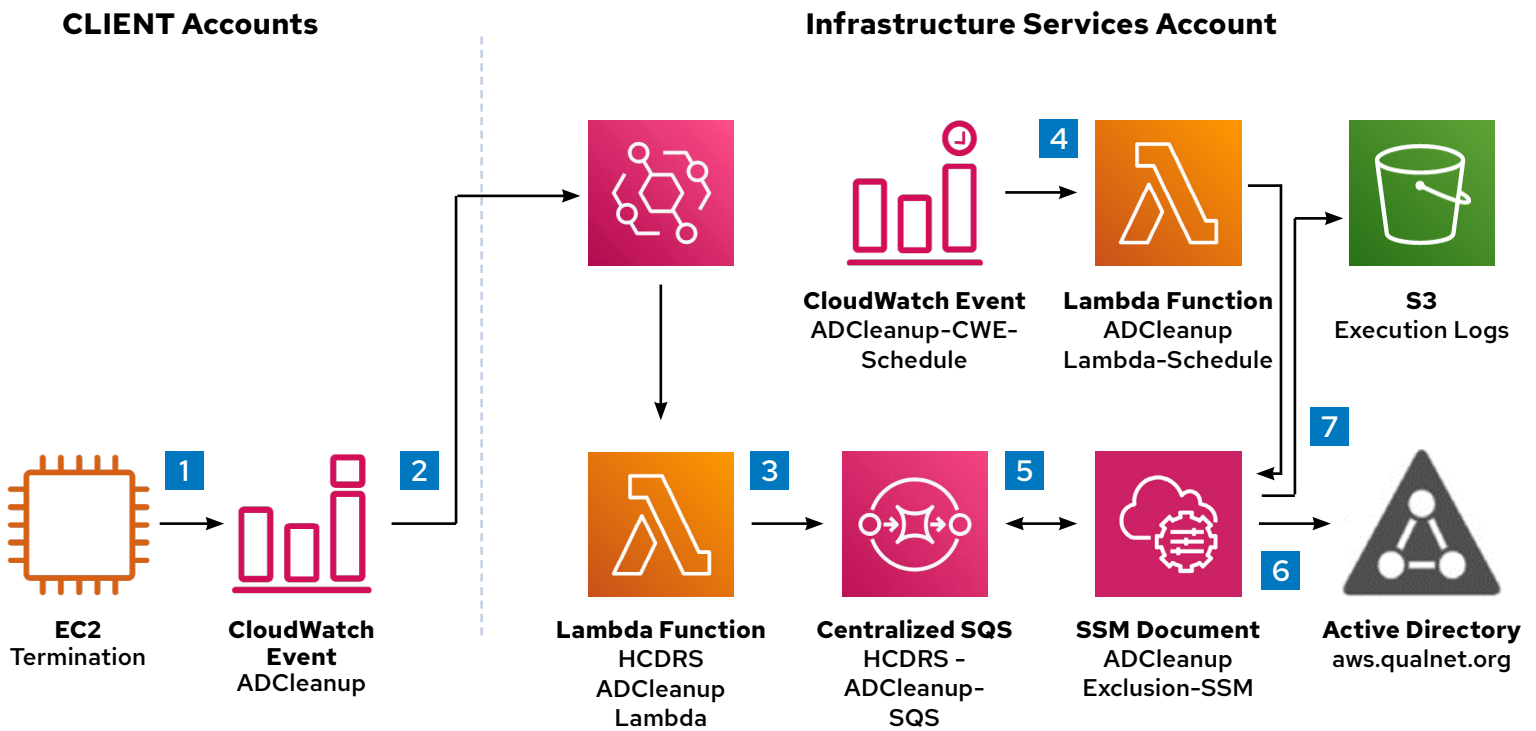


Figure 2: CI/CD Workflow Model

Our groundwork succeeded by helping our cloud development teams establish a refined Infrastructure as Code (IaC) self-service operating model, whereby development teams could deploy needed infrastructure with zero touchpoints to support Continuous Integration (Build, Test, Merge). With IaC in place, HCDRS infrastructure builds became part of automated application release packages. What took weeks of meetings and service tickets in an on-premise data center model, now takes less than 15 minutes in the Amazon Web Services (AWS) cloud.

Our team also identified the need to better address server termination events in HCDRS. Unexpected termination events cause gaps in services and application failure in some cases. Our engineers developed an automation framework to detect and recover from these events. When applications terminate, they require a "clean-up" of supporting processes that have been running to ensure they are not using computer resources needlessly. One example is Active Directory objects and other infrastructure tools that connect to the terminated instance. Previously, this activity was manually performed with ad hoc administrative actions.

In Figure 3 below, we show a design pattern that collects and sends CloudWatch event details to a centralized AWS SQS queue for processing. Lambda scripts are then executed to manage EC2 instance "post termination" requirements.



- 1 EC2 Instance State-change Notification: **Termination**
- 2 CloudWatch Event match sends Termination event details to Event Bus in Infra Services Account which trigger Function invocation
- 3 Lambda function executes sending message to SQS queue that includes **NAME** and **AMIOperatingSys** tags from terminated instances
- 4 Lambda Function: **ADCleanup-Lambda-Schedule** @Q15 Mins
- 5 SSM Document retrieves **Name** and **Exclusion** from SQS queue
- 6 SSM Document runs against **aws.qualnet.org domain controller**. Joined Instances removed from AD. Windows DNS entries removed.
- 7 SSM Execution logs are stored in Multi-tenant S3 bucket **ADCleanup**

Figure 3: An AWS automation framework used to address server termination events

Ventech Solutions now collects and automates infrastructure support actions based on event queues shown in Figure 3. For HCDRS, this means DevOps environments are more efficiently managed with less human resource needs. Another benefit is accelerated responsiveness and overall operational efficiencies applied to the infrastructure.

RESULTS & BENEFITS

Today, the HCDRS systems development process incorporates our AWS-centric automation and cloud-native strategy. By introducing AWS design patterns as well as streamlining the DevOps process, the Ventech Solutions team has reduced the cost of ongoing maintenance by an estimated 24%.

ABOUT VENTECH SOLUTIONS

Ventech Solutions is a technology and healthcare solutions provider that leverages emerging technologies to deliver a wide range of enterprise services including cloud modernization, infrastructure, data, security and service integration support. Ventech Solutions leads and manages some of the most critical technology transformation initiatives for the public sector that empower government agencies to achieve their mission. For more information, visit www.ventechsolutions.com.