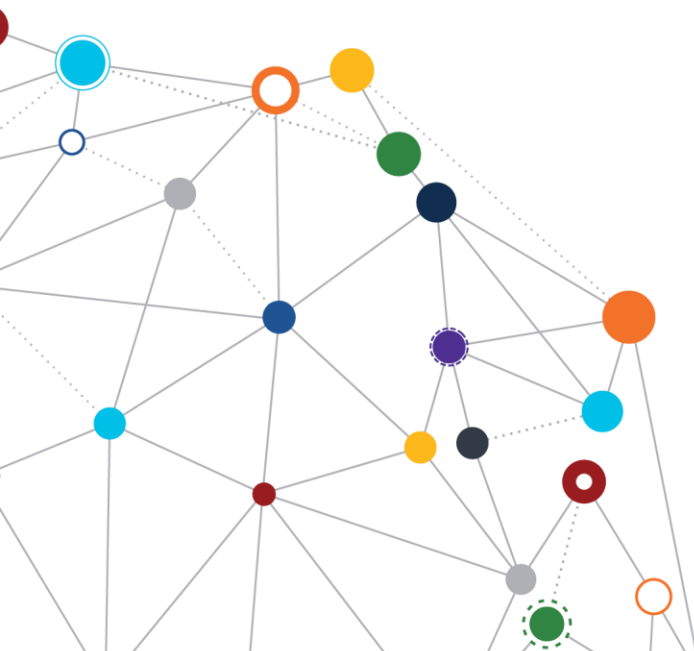# Telehealth Monitoring, a DevSecOps Success Story

White Paper

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Overview

As telehealth visits surged amid the COVID-19 pandemic, IT experts at the Department of Veterans Affairs (VA) assembled performance monitoring dashboards to identify potential issues in real-time, created solutions when needed, and improved VA's telehealth capabilities. With more than ten data sources and 72 million events per day, telehealth monitoring helped teams extract actionable insights to improve the Veteran experience.

Sophisticated Monitoring Solutions Improve Veteran and Clinician Telehealth Experience

Ensuring a seamless telehealth experience for Veterans and clinicians in the face of rising demand for virtual medical visits during the COVID-19 pandemic is a priority for the Department of Veterans Affairs (VA). As VA expanded its telehealth capabilities, it also expanded its ability to track and troubleshoot issues leveraging the latest technology and digital dashboards to identify and troubleshoot issues. These cutting-edge end-to-end performance monitoring and integration tools allow OIT to predict and swiftly respond to system performance or user experience issues.

VA Video Connect is the primary telehealth system that Veterans Health Administration (VHA) clinicians use to conduct virtual medical appointments with Veterans. Within a month of the rollout of OIT's set of new monitoring dashboards, leveraging the tools has either helped avert real-time VA Video Connect system failures or prevented call quality issues on at least five separate occasions.
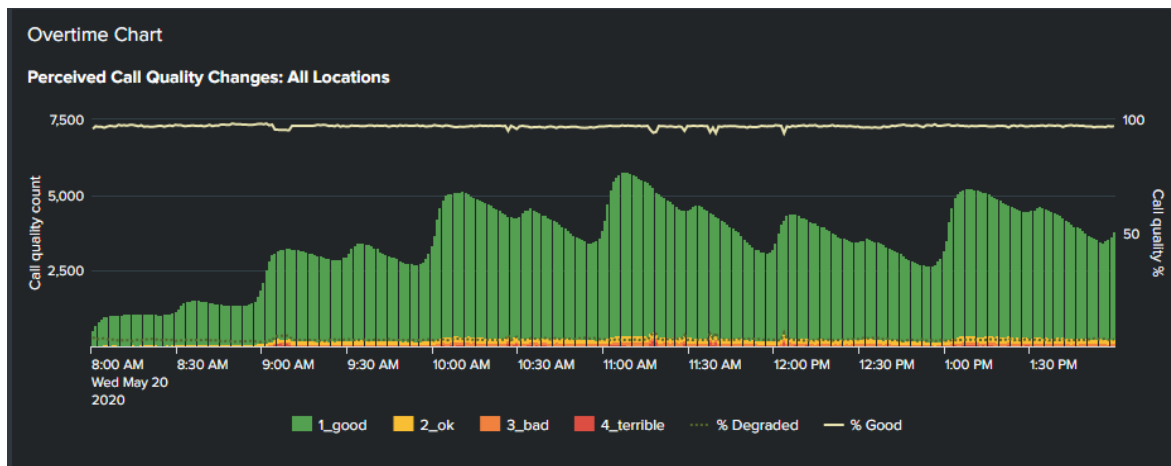

Figure 1: A time series chart displays an analysis of VA Video Connect call volume and quality of the course of half a day.

The development of these tools stems from OIT's Enterprise Command Center, which provides a comprehensive view of the performance of many complex VA IT systems. In March, the Enterprise Command Center tasked the Operations Triage Group to create a consolidated dashboard that quickly aggregates data from multiple sources to shed light on telehealth system component behavior. Using a sophisticated tool, the monitoring team—comprising experts from the Operations Triage Group and the Enterprise Command Center—stood up a customized platform that provides a comprehensive view of VA's telehealth system. The platform correlates the VA Video Connect system or user-reported issues with specific events. As of early June, OIT's monitoring experts are using the integration tool to examine data from 10 different sources (with plans to ingest data from an additional five sources), analyzing 72 million events each day.

These new dashboards allow the IT monitoring team to easily correlate disparate data and work with system engineers to investigate and mitigate issues within hours as opposed to days. Because system issues have potentially serious real-life implications for Veterans and VA's clinicians, OIT extended dashboard access and training to its business partners in the Veterans Health Administration (VHA). This training provides insight into system performance trends that Veterans and their clinicians rely on for telemedicine appointments. The dashboards allow VHA staff to examine trends and ask data-informed questions about the telehealth ecosystem's real-time performance, then receive prompt and meaningful answers from OIT's monitoring and engineering experts.

On several occasions, OIT has held "bridge calls" with VHA telehealth partners and VA digital support staff to scrutinize and diagnose issues in real-time. Groups like VA's Telehealth Help Desk, VA Video Connect's technical system owners and engineers, and the VHA Telehealth Business Owner, Dr. Kevin Galpin, have been instrumental in these bridge calls. The calls allowed all stakeholders to demonstrate their approaches to dealing with technical challenges and improve their understanding of each other's perspectives and unique roles in the problem-solving process. In addition to these bridge calls, OIT and VHA stakeholders continue to have 24/7 direct access to the dashboards and real- and near-real time data about VA's telehealth systems. Cross-organizational access to the dashboards puts everyone on the same page and helps VHA and OIT to work together to quickly respond to user needs and make data-driven decisions for future system enhancements.

"It's very exciting for us. I mean, this is exactly the direction we need to be going—how we're working on the VA Video Connect experience and ensuring stability. The monitoring capabilities are providing tremendous value already and will be a huge part of the effort going forward. We really appreciate it."

—Dr. Kevin Galpin, Telehealth Executive Director at VA.

Viewing data through the ultimate zoom lens: 30,000-Foot view and Deep dives

The Operations Triage Group created a series of dashboards that convey, at a glance, the business health as well as the technical health of the telehealth ecosystem. OIT's innovative monitoring efforts provide insight into high-level performance trends like system availability and concurrent appointments as well as more granular data. Because Veterans and their VA clinicians rely on VA Video Connect for telemedicine appointments, the dashboards shed light on end-to-end system behavior—from infrastructure to Veteran and clinical interfaces.

In other words, stakeholders can see the business key performance indicators (KPIs) at the same time as the technical KPIs and drill down to see individual end-user experience with just a few clicks.
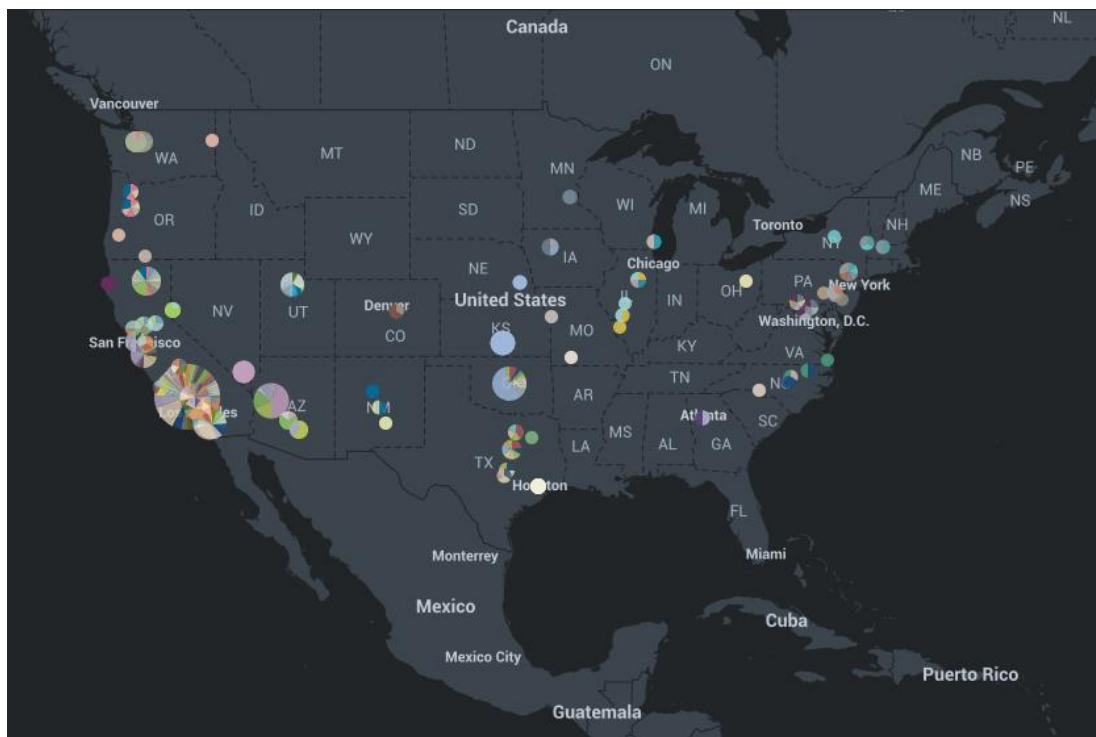

Figure 2: Pie charts of various sizes and colors across a map of the United States show a VA dashboard's ability to visualize VA Video Connect calls by caller location.

In addition to providing a real-time view of call and video quality, call and conference counts, and errors and warnings, the dashboard also makes it possible to see calls by caller location. Featuring a clear format that is easy for VHA stakeholders to navigate, this function also grants technicians easy access to technical details to guide system optimization efforts.

To stay ahead of unprecedented demand for its telehealth platform, VA made a series of changes to VA Video Connect on-premises infrastructure and expand the telehealth system to the cloud to rapidly quintuple the capacity (maximum volume of appointments that can be conducted simultaneously). Leading up to these changes, the overall environment was

generally stable; however, this unprecedented rapid capacity increase initially introduced a few errors and intermittent systems slowdown; however, the newly stood-up monitoring capabilities immediately alerted IT experts and video engineers to these issues. Thanks to VA's new telehealth monitoring capabilities, OIT was able to quickly isolate and resolve problems. The monitoring systems have helped troubleshoot several issues, including identifying and resolving a VA Video Connect system configuration issue that was impacting some Veterans' ability to connect to the system for their appointment. By tuning the cloud environment and leveraging insights from log data, OIT identified connection errors in mere minutes of them occurring and reduced errors for as many as 1,000 users per day to fewer than 10. OIT also established event thresholds that would trigger capacity alerts as VA Video Connect use approached or exceeded saturation. The monitoring team's work helped identify several issues related to capacity within mere minutes, which informed the engineering team about how to adjust the VA Video Connect system's environment accordingly and helped them increase concurrent users.

"The investment in technology has been a game changer; it allows us to quickly aggregate and ascertain system health in timely response to demands on our system. It also stands as a model of the 'new normal' for application performance monitoring at VA."

—Mr. Jay Paluch, Operations Triage Group Executive Director at VA.

Building on a Solid Foundation: Pre-COVID-19 Investment in Efforts, Expertise, and Tools Allowed VA to Quickly Stand Up New Monitoring Systems

The innovative monitoring techniques, cross-functional teams of IT experts, and high-caliber tools that VA is leveraging to gain a holistic, nuanced view of VA's telehealth systems were all in place prior to the COVID-19 pandemic.

More than two months ago, OIT began upgrading hardware to increase VA Video Connect's call capacity to stay ahead of surging demand from Veterans and VA clinicians for virtual health appointments during the pandemic. VA's IT experts immediately recognized the importance of ramping up telehealth performance monitoring efforts at the same time. OIT's executive leadership pushed for more robust monitoring since it would help limit technical issues and ensure Veterans could continue to access high quality care whenever and wherever they need it.

Fortunately, VA had a great deal of experience to draw from to develop a robust telehealth dashboard and a strong relationship with industry partners who specialize in aggregating and integrating data. Years ago, VA created enterprise-wide dashboards to monitor security issues. OIT created summation dashboards for critical VA initiatives including MISSION Act, Colmery Veterans Educational Assistance Act, and Blue Water Navy. In late summer 2019, VA started planning dashboards integrating multiple data sources to support Electronic Health Record Modernization and other major transformation efforts. When the pandemic began to affect

Veterans, these existing teams pivoted to assemble a telehealth monitoring dashboard to respond to emerging needs.

A DevSecOps Success Story: Hard Work Across a Dozen Teams Accelerated Complex Time-Intensive Processes

"The telehealth monitoring initiative underscored the value of DevSecOps by bringing together the best of Operations, Security, and Development teams to deliver better performance and availability to our business partner, VHA. Thanks to that collaboration, VHA is providing improved care to Veterans and the Agile approach has set a new standard for OIT DevSecOps, demonstrating the power of joining shoulder to shoulder with our peers to deliver business success."

—Ms. Lynette Sherrill, Enterprise Command Operations Executive Director at VA

Collaboration between many teams was the key factor both in launching telehealth monitoring, as well as supporting actual triage efforts. In addition to VHA's Office of Connected Care and OIT's Operations Triage Group, VA Video Connect engineers (Enterprise Networking Engineering), and Enterprise Command Center's Enterprise Performance Monitoring, experts from the following teams have been invaluable: Infrastructure Operations, Performance Reporting, Solution Delivery, Enterprise Cloud Solutions Office, Information Assurance, Office of Information Security, Demand Management's Capacity Performance Engineering, Connected Care Solutions Architects, Mobile Development, National Telehealth Help Desk, Enterprise Service Desk, the Office of Strategic Sourcing, and the Account Management Office.

One of the biggest challenges that the teams faced in pivoting from planning Electronic Health Record Modernization monitoring to telehealth dashboard creation and monitoring was performing implementation tasks associated with standing up a new system—Splunk Cloud. This cloud-hosted, Software-as-a-Service platform helps users search, monitor, and analyze machine-generated big data through a web-style interface. Thanks to good synergy and familiarity tackling complex projects with agile project management and other DevSecOps approaches, the teams successfully rose to the challenge. With a unified goal and exceptional work by all teams, VA was able to fast track an authority to operate for the data integration tool in the cloud—securing it in three weeks instead of the standard six months (26 weeks).

This collaboration has had positive, real-world impacts on Veterans and the clinicians who provide care. Predicting user needs from system trends, mitigating outages or problems for Veterans, and giving VHA's Office of Connected Care more visibility into the systems it depends on are some of the ways dashboard development has improved system reliability and telehealth for Veterans.

Now that OIT has addressed the need for a sophisticated telehealth monitoring solution during the COVID-19 pandemic, VA will expand this methodology to a large number of systems across the enterprise to improve not only the monitoring of these systems, but the interactions between them as well.