GOLIATH TECHNOLOGIES®
BE PROACTIVE

TECHNICAL OVERVIEW

Resolve End User Experience Issues for Citrix or VMware-Delivered Applications Including Epic

Contents

Goliath Performance Monitor is available in Epic Connection Hub

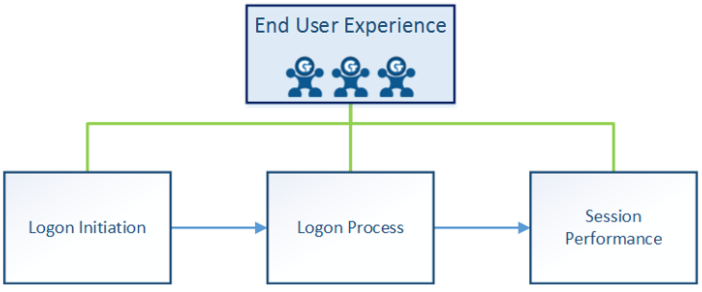
Introduction - Proactively Resolve End User Experience Issues with Epic

While healthcare IT leaders take great care in choosing the right Electronic Health Records system, some may overlook the critical role that a virtualized desktop delivery infrastructure like Citrix and VMware Horizon plays by providing access to Epic and other mission-critical applications. The reality is that an organization's on-premises desktop virtualization infrastructure, and performance requirements for delivery of other applications, may negatively impact end user experience with Epic. Understanding how the performance of the on-premises delivery infrastructure impacts the end user experience requires powerful, purpose-built tools that allow them to proactively anticipate, troubleshoot, and prevent access and performance issues. Without these tools, the true root cause of performance issues cannot be established and corrected.

In this technical overview, we will review the Goliath Performance Monitor as it is used to support Citrix, VMware Horizon, Epic and other business applications on-premises in a healthcare setting. We will describe the technical elements that make up the healthcare IT-specific functionality and how to leverage the specific features to ultimately be proactive and anticipate, troubleshoot, and prevent end user experience issues.

Goliath Performance Monitor for hospitals using Epic is purpose-built to proactively anticipate, troubleshoot and prevent issues with the entire on-premises virtual desktop infrastructure used to deliver mission-critical applications including Epic. Goliath Technologies' troubleshooting capabilities combined with Epic's remote hosting technologies and services, provide healthcare organizations with advanced warning of potential end user experience issues and objective technical evidence of root cause to prevent future issues. This results in faster detection, identification and resolution of these issues before users, or patients, are impacted. Our technology has automatic application availability monitors for Epic that run behind the scenes 24/7 at the hospital location and trigger alerts before a clinician or healthcare worker experiences a problem. This is what we call better than real-time, or before an issue is actually realized by the end user community. In the context of a Citrix environment, administrators need advance warning in the three key areas where users most often encounter difficulty: logon initiation, logon process, and session use.

Anticipate, Troubleshoot and Prevent End User Experience Issues at Key Failure Points



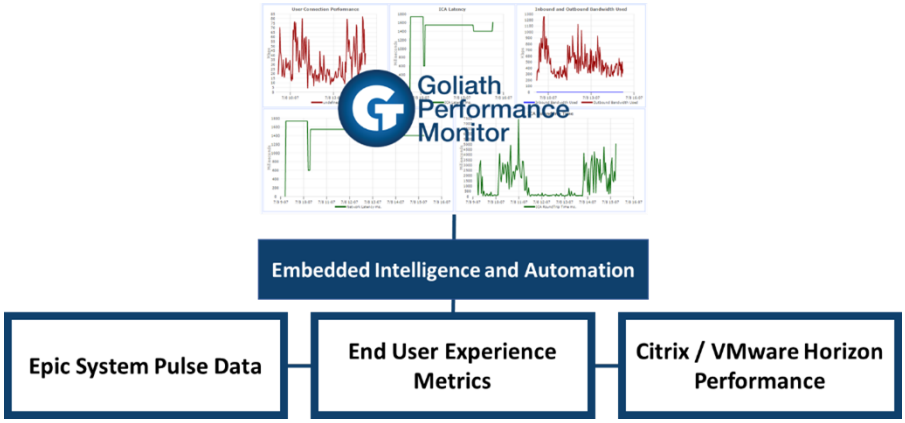
Goliath Performance Monitor for hospitals using Epic offers complete visibility into user experience from the hospital endpoint to the datacenter where the electronic health records are hosted. Because of this we are able to:

- Have better than real-time visibility that solves issues before they occur
- Resolve remaining issues that may occur faster and more efficiently

- Obtain actionable intelligence that promotes productive collaboration with Epic in hosted models

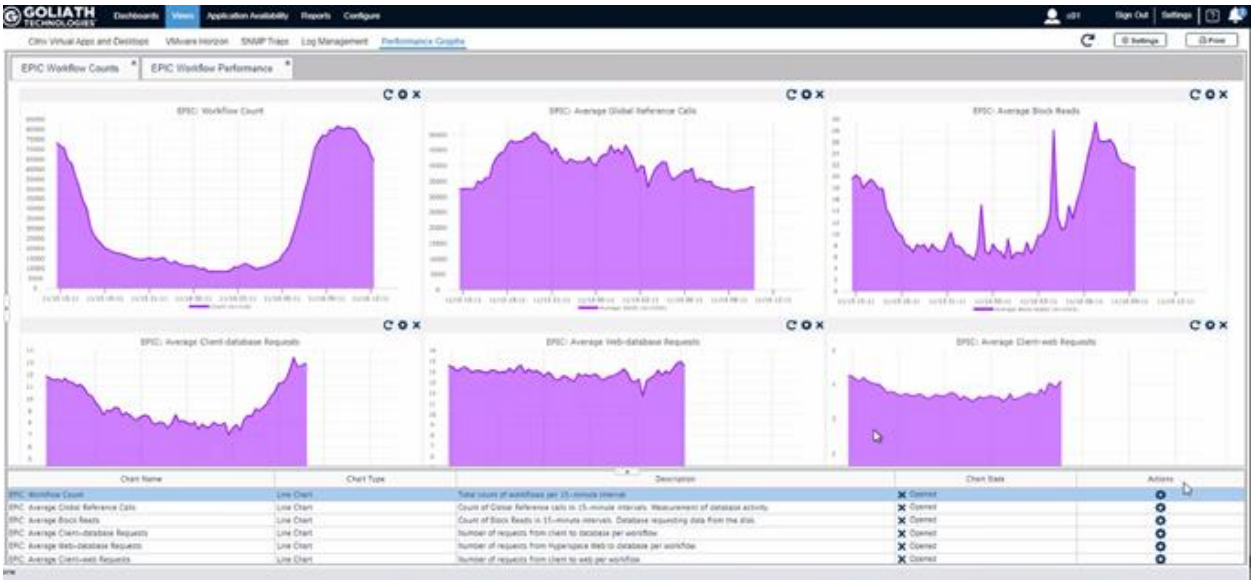
Epic System Pulse Integration

Goliath Performance Monitor's module for hospitals using Epic provides a unified view combining performance metrics for Epic System Pulse, End User Experience, and the underlying Citrix or VMware Horizon virtualization delivery infrastructure. This is the only IT operations software with purpose-built technology to integrate these three data sources to help Healthcare IT proactively anticipate, troubleshoot and prevent end user experience issues.



Many factors external to Epic's core systems can affect application access, user logon speed, network latency, and system latency. These areas are key to the end user experience and are often root causes of end user frustration and support requests. With integrated metrics from these three areas, system administrators can easily isolate root cause anywhere in this complex environment. Additionally, the software's embedded intelligence and automation provides performance thresholds to proactively monitor events and conditions that precede end user experience issues and resolve them before users are impacted. This combination of a proactive solution with broad and deep visibility alleviates frustration for end users and system administrators alike.

The Goliath Performance Module for hospitals using Epic correlates the Epic System Pulse metrics, such as Workflow Activity, Workflow Latency and Environment Response Time to the end user experience metrics and Citrix or VMware Horizon performance metrics. This unique integration and end-to-end visibility allows corrective action before end users are impacted.



Solution Components

Complete end user experience monitoring and management consists of several components. Collectively, these technologies allow administrators to monitor, identify, and troubleshoot issues in better than real-time.

Goliath Performance Monitor with Epic Module

Goliath Performance Monitor enables proactive IT performance monitoring for virtual server, virtual desktop, hybrid cloud, and healthcare environments. Goliath Performance Monitor is the primary engine for delivering visibility, metrics, alerting, reporting, and self-healing capabilities to IT, and specifically, Epic and Citrix or VMware administrators. Additionally, it provides the primary lens into both the on-premises virtual desktop delivery infrastructure allowing for enhanced and more productive collaboration with Epic.

Goliath Topology View for Citrix

The Goliath Topology view provides a visual guide to the logical relationships and connections of your entire Citrix infrastructure and shows the health of each individual component at a glance. It provides detailed information on the status of your delivery groups, machine catalogs, images, clusters and hosts that allows you to quickly identify and troubleshoot macro-level events affecting locations, regions, and other large groups of users. This allows you to identify and troubleshoot onsite Citrix issues that may be creating a false impression of Epic performance, especially when monitoring end user experience from the Epic datacenter perspective does not find any issues.

Goliath Application Availability Monitor

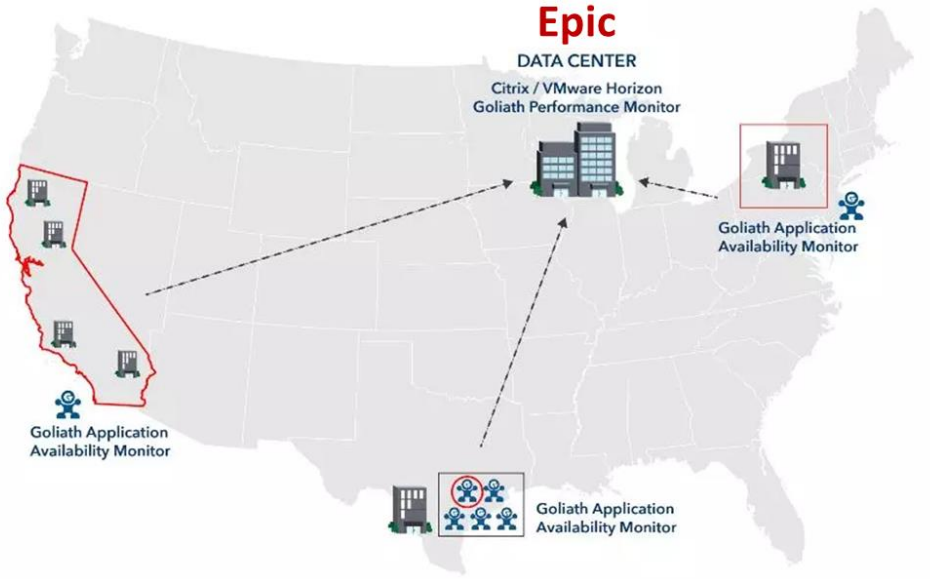
Ensuring that the Epic Hyperspace applications and any other Citrix- or VMware Horizon-delivered applications are always available is the goal of the Goliath Application Availability Monitor. The monitor tests and confirms that applications will launch when end users attempt to access them. By simulating actual user access and application launches from the hospital or clinic where users are located, in the exact same way that a real end user does, the technology allows for advance discovery of issues by

validating that the entire virtual desktop delivery workflow will execute properly. The key benefit is that when an issue is discovered by a simulated user, it can be addressed *before* end users are ever impacted. In short, the Goliath Application Availability Monitor is leveraged for confirming the process of logon availability, logon duration, and application launch to ensure that Epic applications are available from any hospital, anywhere, in better than real-time.

Sample Deployment

Goliath's module for hospitals using Epic provides end-to-end correlation between the key metrics System Pulse provides, the underlying Citrix or VMware infrastructure, and end user experience. This information is leveraged to proactively anticipate, troubleshoot and prevent problems that might otherwise adversely impact end user experience, reducing support requests and increasing overall productivity. These products are available hosted in the cloud or on-premises for maximum deployment flexibility.

In this sample deployment, Goliath Performance Monitor manages and troubleshoots all aspects of the end user experience, while the Goliath Application Availability Monitor proactively tests the entire delivery infrastructure from the physical end points where users are located, using the same profiles and processes a real user would, to ensure that all required components, permissions, and connections are working properly to deliver Epic and other applications.

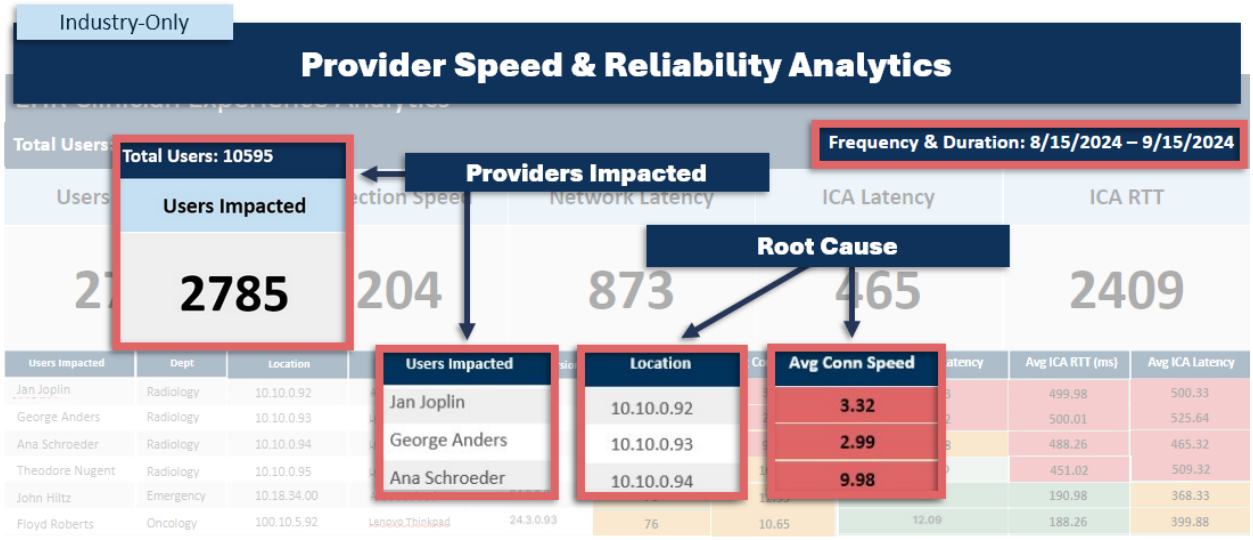


Benchmark Clinician Experience

Establish an objective baseline of the health of your IT delivery and quantifiably measure improvement over time.

The Citrix End User Experience report utilizes embedded intelligence to provide a distilled objective view of user experience. Goliath automatically analyzes complex connectivity and performance metrics from the user's perspective and calculates a top-line user experience score. The report then enables easy filtering to analyze subsets of the environment for focused analysis, even down to individual users. Not only is IT able to easily see what the objective user experience is, but it also explains why by breaking out the primary elements responsible for the user experience score (ICA Latency, Network, Local Connection). This capability expedites cross-departmental analysis and streamlines both IT operations and IT management's ability to act confidently on objective data.

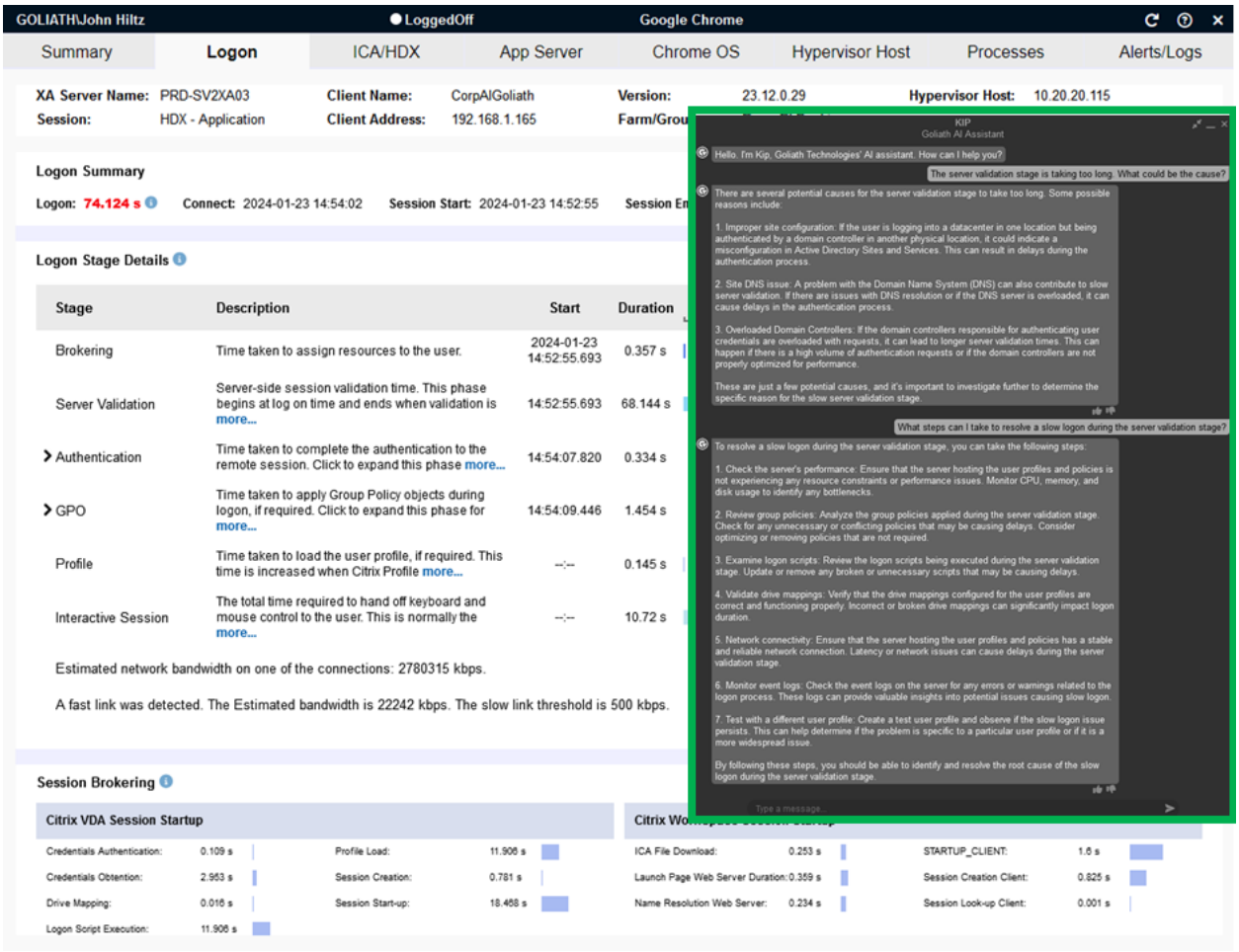
Use this report to provide a benchmark for new pilots or deployments, provide management with objective reporting that is easy to consume, proactively identify trouble spots and focus resources on areas of need, and much more.



AI-Powered Troubleshooting

Goliath introduced the first AI Citrix troubleshooting assistant, KIP. By leveraging AI in the troubleshooting workflow, IT teams can:

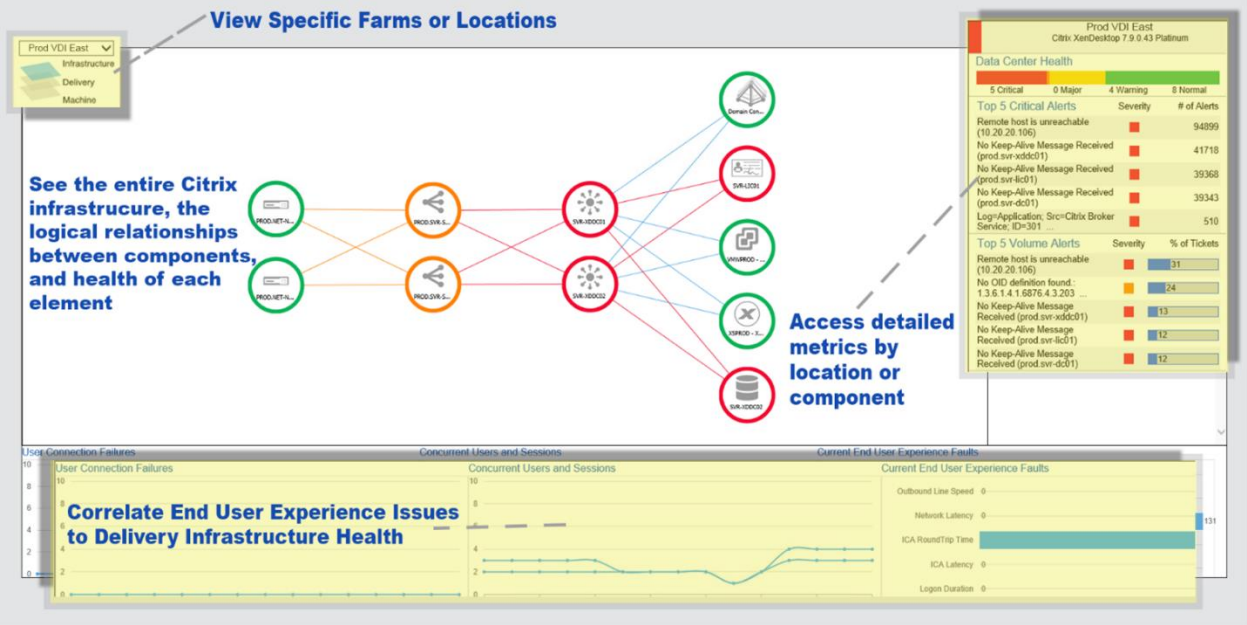
- Quickly troubleshoot Citrix issues without Citrix-specific expertise
- Make up for limited resources such as IT budget and headcount
- Empower all levels of the IT Support team to troubleshoot ultimately reducing escalations
- Reduce remediation times



The Goliath Topology View for Citrix

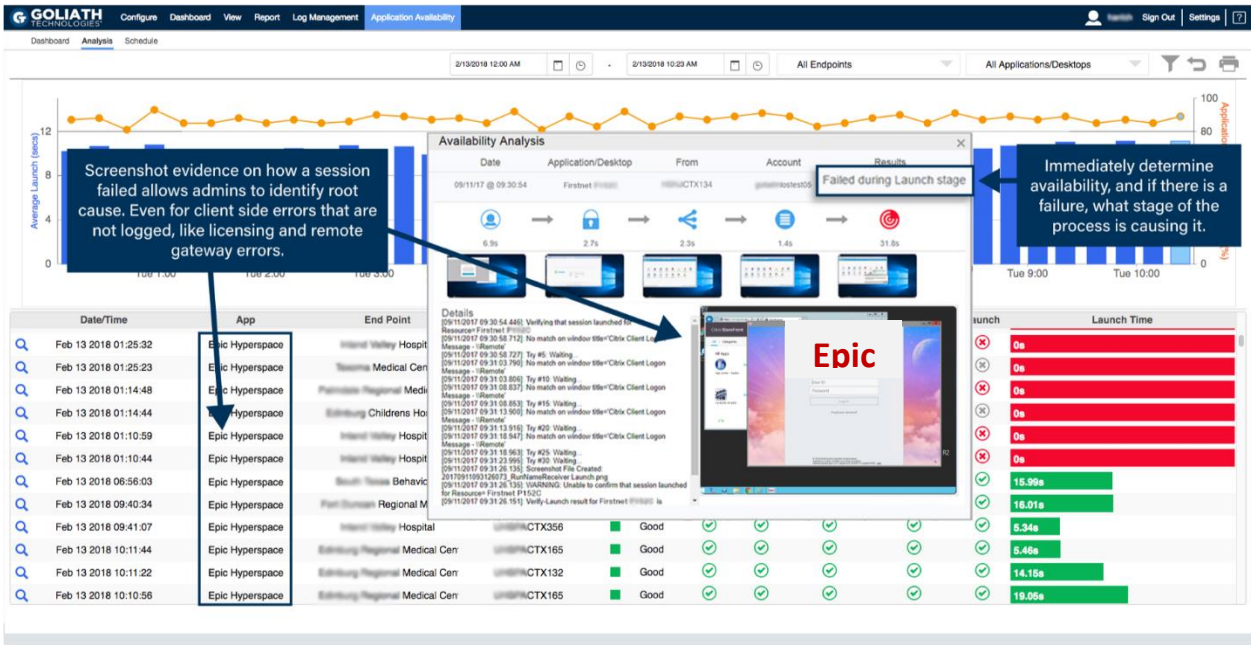
The Goliath Topology View provides an overarching view, which allows you to understand specific issues at the delivery group, machine catalog, image, cluster or host level. Clients use this to determine if a reported user issue is actually indicative of a much larger problem, or to understand the health and performance of the architecture as a whole. Instead of tracking a specific end user issue, this tool allows you to see macro-level events impacting entire groups of users.

The screenshot below shows the machine level view of this system, with faults made evident in the display by changing the health color to red and orange when problems are identified. The right side shows aggregate resource and end user experience metrics for the entire selected Delivery Group, so administrators can determine if all users may be experiencing high network latency, ICA Latency, CPU, Memory, or storage performance issues. The lower window shows concurrent users and average logon duration for the delivery group as well as the different Citrix receiver versions currently active, with the relative number of each version represented.



Automated Logons Confirm Hyperspace/Hyperdrive Availability

Goliath is the industry's leading proactive, production-ready end-user experience software that validates availability of the entire Citrix or VMware Horizon delivery infrastructure. It ensures availability by executing real Citrix or VMware Horizon sessions that exercise the exact same steps a user takes during the Cerner logon process. Regardless of whether a user is remote or local, Goliath's virtual user is deployed at the remote health systems giving administrators an "early warning system" that allows them to know exactly what the Cerner end-user experience will be like for their clinicians – in advance.



The image above is a screen capture of the launch drilldown. To identify the root cause of the failure, administrators can click to drilldown and view further detail. As seen here, the Application Availability Monitor identified a failure launching the application, specifically with respect to licensing issues, as evidenced in the screenshot, and therefore indicated a failure in the last stage and sent an alert. Having the tools for drilling directly into the root cause allows for faster time to resolution.

Goliath Performance Monitor and Goliath Application Availability Monitor, the Goliath End User Experience Monitoring and Management products, are a complete end-to-end visibility toolset that will empower your organization with advance warning and actionable intelligence, ensuring that your Epic end users have the highest quality user experience possible.

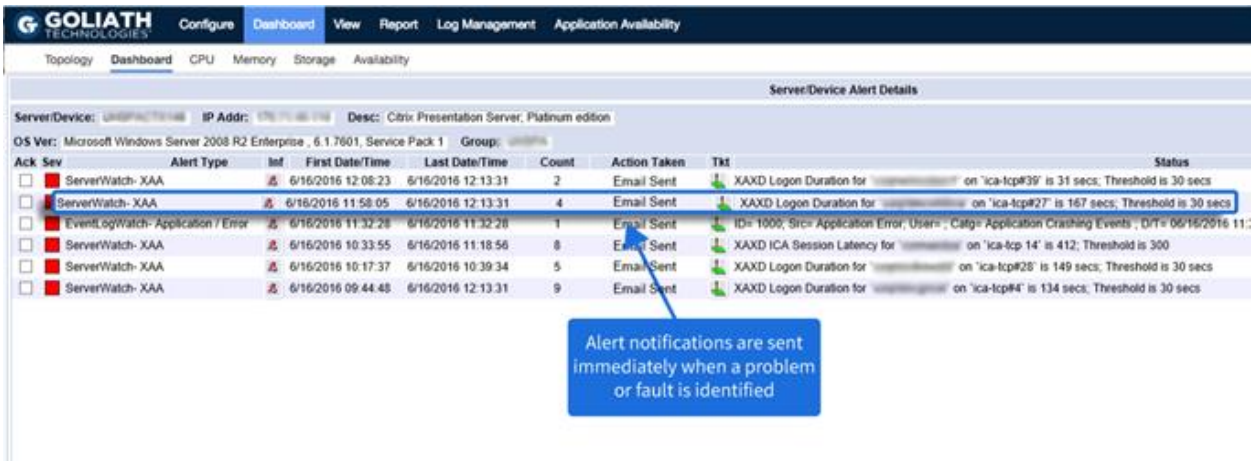
End User Experience Monitoring and Management Capabilities

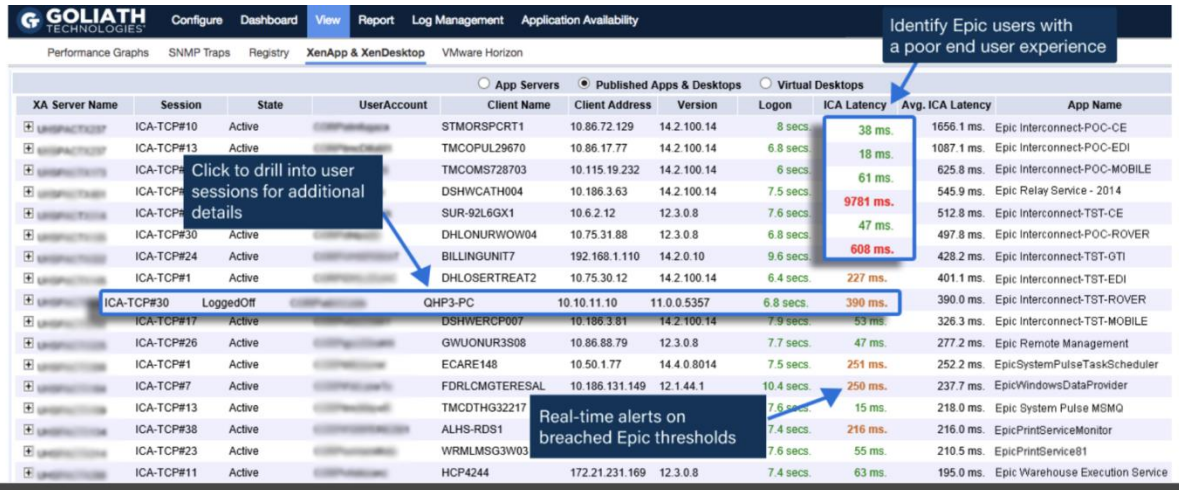
Goliath end user experience monitoring and management products include, pre-configured monitoring rules, alerts, dashboards, and reports. This level of visibility provides actionable intelligence for differentiating Epic application-related issues from environmental issues such as network latency, device malfunction, or hospital IT infrastructure.

The Application Availability Monitor, combined with comprehensive monitoring of the application access process empowers IT administrators to discover and resolve problems with session initiation, duration, and application launch in advance of lost productivity.

In addition to comprehensive monitoring of application performance and availability, Goliath can send real-time alerts. In the image below, you can see a screen capture of our alerting dashboard. Highlighted is an end user whose logon duration was significantly higher than the defined threshold triggering an email to be sent to the administrators.

Goliath provides industry-leading visibility into Citrix session performance by breaking down the ICA/HDX protocol and returning precise metrics around individual ICA/HDX channel performance. As seen in the below image, Goliath has the ability to trend ICA Latency for a user session, as well as the 50 ICA/HDX channels, which can help identify performance bottlenecks. Similarly, Goliath Performance Monitor will provide detailed protocol and channel metrics for PCoIP, and Blast for VMware Horizon deployments.

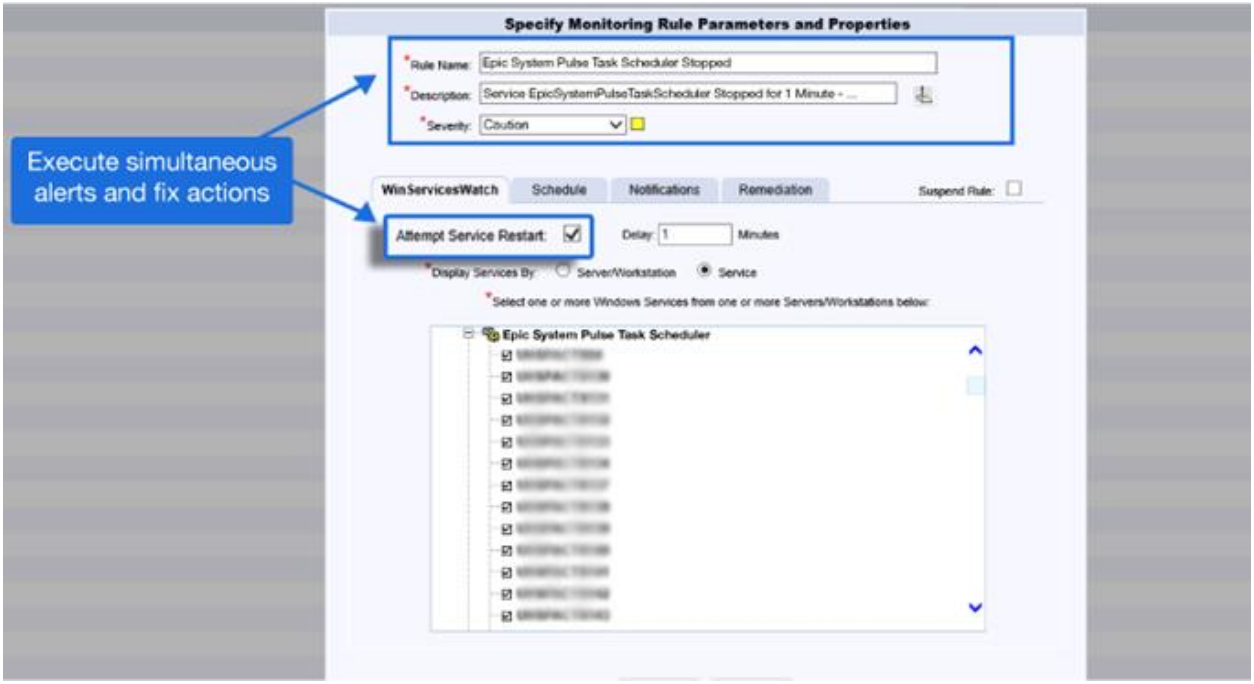




Identify users experiencing session slowness by analyzing ICA latency and slow logon times. Alert notifications via email, text message, or integration into other tools can notify admins to problems before the end user reports it. Admins can also drill down through the dashboard to identify root cause in infrastructure configuration, user behavior, or resource utilization.

Goliath Technologies vastly improves the time to resolution with auto-detection and self-healing capabilities. End user experience is often impacted by issues related to application components such as processes or services failing. The self-healing capability enables the IT administrator to resolve issues immediately when they are discovered.

This image shows an example of the self-healing functionality applied to an alert notification. Out-of-the-box, IT staff can monitor their Windows services and direct them to stop instantly, or for a period of time, Goliath will attempt to restart the service and notify the end user.



The below image shows a real historical report on end user experience where access duration, ICA latency, and client speed are all brought into a single view. As seen below, one can easily identify the users who had poor performance. Overall, Goliath's deep historical reporting and analytics provide objective data points over a period of time, enhancing the ability to collaborate with Epic to address and permanently fix complex issues.

Available from the Epic Connection Hub

Goliath Technologies is an approved application available in the Epic Connection Hub. Users may use the Goliath page to contact Goliath directly.

Goliath Technologies empowers health IT to be proactive and prevent end-user experience issues before clinicians and patients are impacted. **Goliath is trusted by healthcare organizations using Epic, including Adena Health System, Children's Hospital Colorado, CommonSpirit Health, Hamilton Health Sciences, Olmsted Medical Center, Penn Medicine, Phelps Health, The University of Kansas Health System (KUMC), University of Mississippi Medical Center and many others to improve patient care.**

For more information on how Goliath Technologies can enhance your Epic end user experience, contact a member of the Goliath Technical team at techinfo@goliathtechnologies.com.

Get started today with a free demo or a trial of GPM for Epic

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