GOLIATH TECHNOLOGIES®

CERNER SOLUTION OVERVIEW

Industry-only software deployed in both Cerner RHO and Health Systems provides end-to-end view of entire Cerner delivery infrastructure

By The Goliath Technologies Technical Team

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"Goliath Technologies gives us complete visibility into the end-user experience from the time they log on to Cerner through their use of the application so we can stay ahead of performance issues that can impact our users."

– Chris Timbers, VP & CIO, NorthBay Healthcare

Introduction

Focused on end-user experience, Goliath links Cerner RHO with the on-premise environment for a complete end-to-end view. With our industry-only purpose-built Cerner module with embedded intelligence and automation, health systems using Cerner can anticipate, troubleshoot and prevent end-user experience issues before they are impacted to improve the clinician and patient experience.

Health IT professionals can now:

▸ Have an end-to-end view of Cerner, end-user experience, and VMware Horizon/Citrix metrics in one screen
▸ Collaborate with Cerner with actionable intelligence for data-driven conversations
▸ Proactively monitor to detect and resolve issues before end users are impacted
▸ Isolate root cause and troubleshoot performance issues reducing remediation time
▸ Prevent issues with historical reporting for trending and analysis
▸ Purchase Goliath software directly from Cerner

End-to-End Visibility Requires 3rd Party Tools

Health IT professionals know that an end-to-end view of the entire clinician experience is critical to visualize because if there are gaps in visibility there are gaps in monitoring and these invisible elements may be the root cause of performance issues.

The challenge for IT Pros is that the perception by management (Fig. 1) is there is a simple, direct connect between clinicians and Cerner Millennium in the hosted facility. This is not reality (Fig. 2) because the connection relies on many other IT elements to deliver a positive end-user experience. In addition, other applications are delivered to the end user with the same connection to the same device.
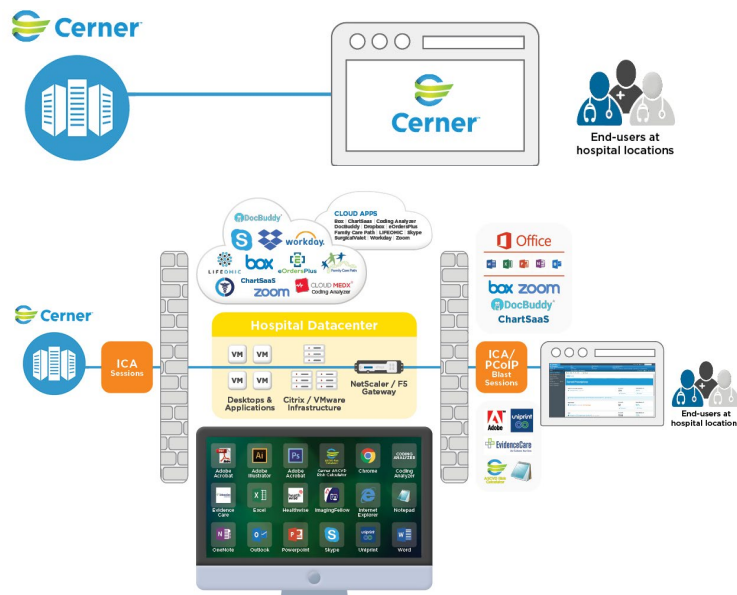

Fig. 1 Perception:
Cerner RHO is sole root cause of any performance issues.

Fig. 2 Reality:
There are many failure points. First, the connection goes through the hospital data center. Then other applications are delivered with Cerner further complicating the process.

Solution:

Troubleshoot by isolating the Cerner clinician experience and on-premises delivery infrastructure. To effectively monitor and troubleshoot the clinician experience **requires purpose built on-premise tools** with RHO visibility for the desktop delivery infrastructure.
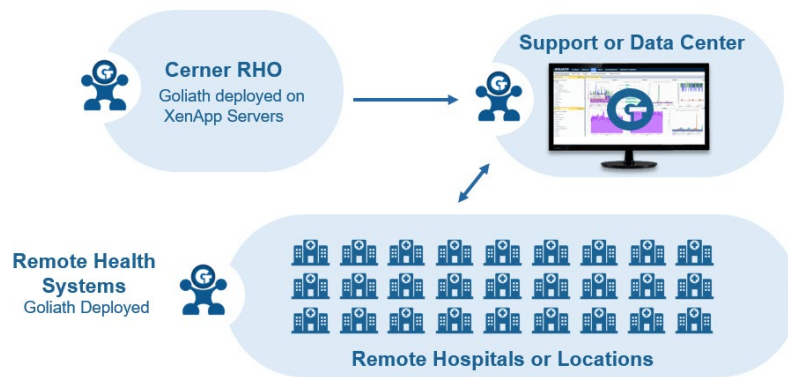
Goliath Technologies is the **only solution deployed in Cerner RHO** and across all system locations.

Goliath Proactive End-User Troubleshooting Architecture

The deployment architecture includes technology across all hospital locations and, optionally, at the Cerner-hosted facility. In the data center hosting the electronic health record application, intelligent agents are deployed on Citrix and/or VMware servers running Cerner applications. Onsite at the hospital, Goliath Performance Monitor is deployed on virtual servers, desktops, tablets, Citrix, VMware Horizon and other general IT infrastructure.
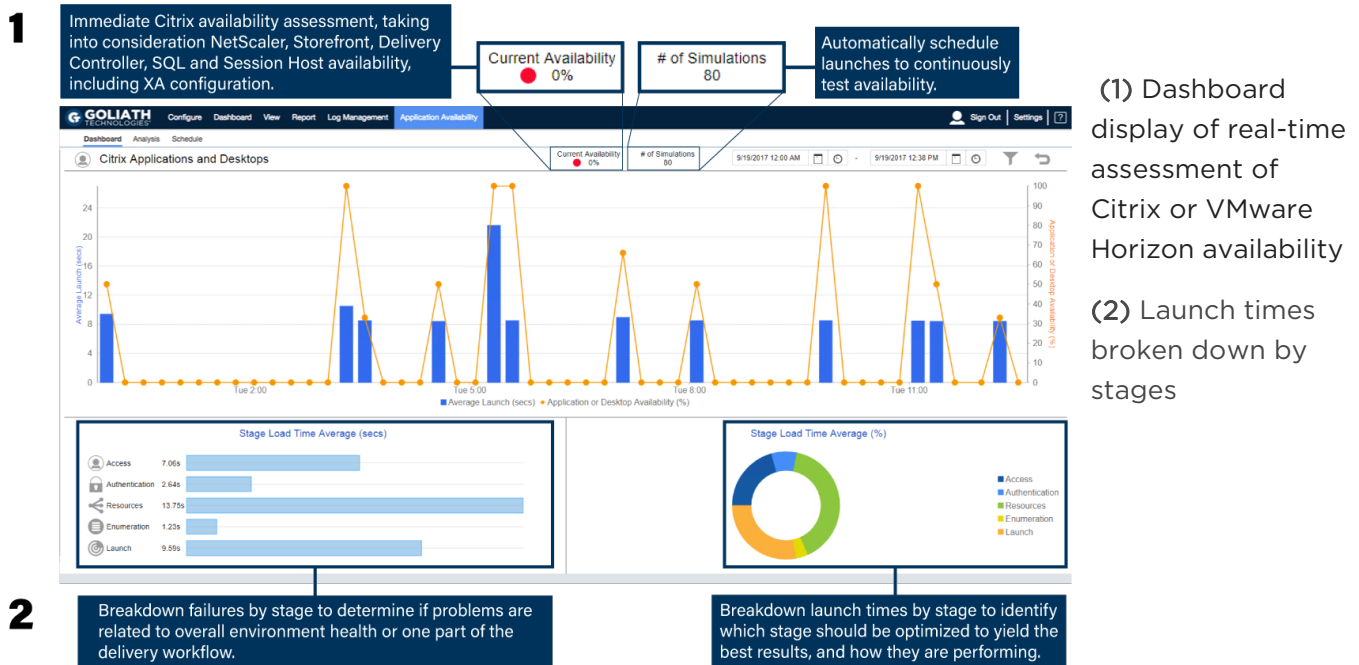
Hospitals rely on a complex architecture to deliver not just Cerner, but many other critical business applications to their facilities and users. It is imperative that they invest in the tools required to anticipate, troubleshoot, and prevent clinician experience issues across this virtual desktop delivery infrastructure.

Automated Logons Confirm Cerner Availability

Goliath is the industry's only 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, the Goliath Application Availability Monitor deployed at the remote health systems gives 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.

1 Immediate Citrix availability assessment, taking into consideration NetScaler, Storefront, Delivery Controller, SQL and Session Host availability, including XA configuration.

Current Availability ● 0%

# of Simulations 80

Automatically schedule launches to continuously test availability.

2 Breakdown failures by stage to determine if problems are related to overall environment health or one part of the delivery workflow.

Breakdown launch times by stage to identify which stage should be optimized to yield the best results, and how they are performing.

(1) Dashboard display of real-time assessment of Citrix or VMware Horizon availability

(2) Launch times broken down by stages

End-User Screenshot Analytics

When there is a logon failure, an administrator will be alerted immediately. Using the real-time analytics to isolate where the failure occurred and the root cause.

Illustrated Below: Quickly drill down to investigate failures right from the application availability dashboard. Now you can see *where* the logon issues occurred during the logon process and *what* the issue was – along with both detailed errors and screenshot evidence of the issue.
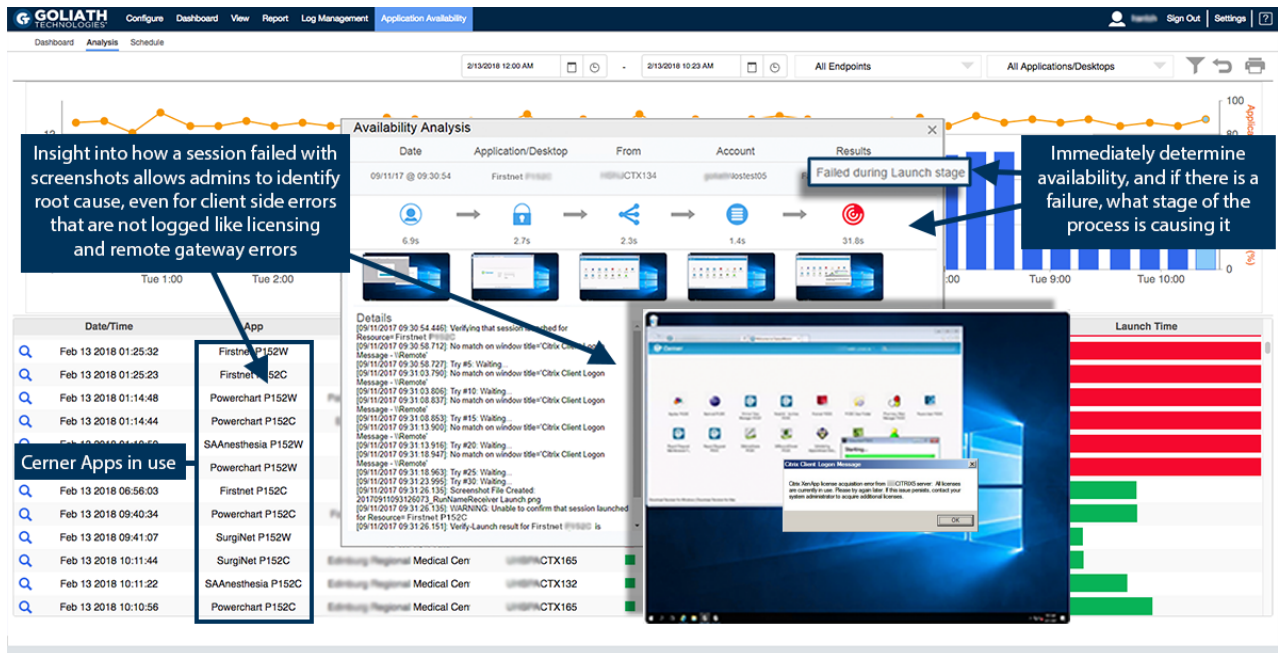
The Goliath Application Availability Monitor identified a failure launching the application caused by licensing issues, as evidenced in the captured screenshot, and, therefore sent an alert to the Health IT team indicating a failure and providing specific details. This provides Health IT with both the details and time required to resolve issues quickly – often before actual clinicians or patient care is impacted.

The Automatic Citrix Discovery and Dependency Map

The Goliath Automatic Citrix Discovery and Dependency Map intelligently builds out a dependency map of your Citrix infrastructure. It requires no manual set-up or scripting and adapts to new components as they are added. This eliminates the time it takes to correlate relationships between elements. Through color-coded connection line and specific metrics, it shows which elements are affecting other elements and how. Then, as issues occur in your infrastructure, alerts will 'bubble up' allowing IT professionals to see the impacted elements at a glance. This single, macro view of your Citrix environment allows administrators to switch between different data centers and farms, breaking down traditional siloed architecture and allowing effective management and troubleshooting of your environment.

Highlights

‣ Automatically discovers and intelligently draws a dependency map of the Citrix delivery infrastructure.
‣ Eliminates the time it takes to correlate root cause to elements in your environment by graphically representing all the connections between components in your Citrix infrastructure.
‣ Easily switch between data centers and farms to eliminate siloed architectures.

- ▸ Drill down to the host level and view specific metrics for each element in your environment.
- ▸ View end-user experience metrics for different layers in your environment at a glance.
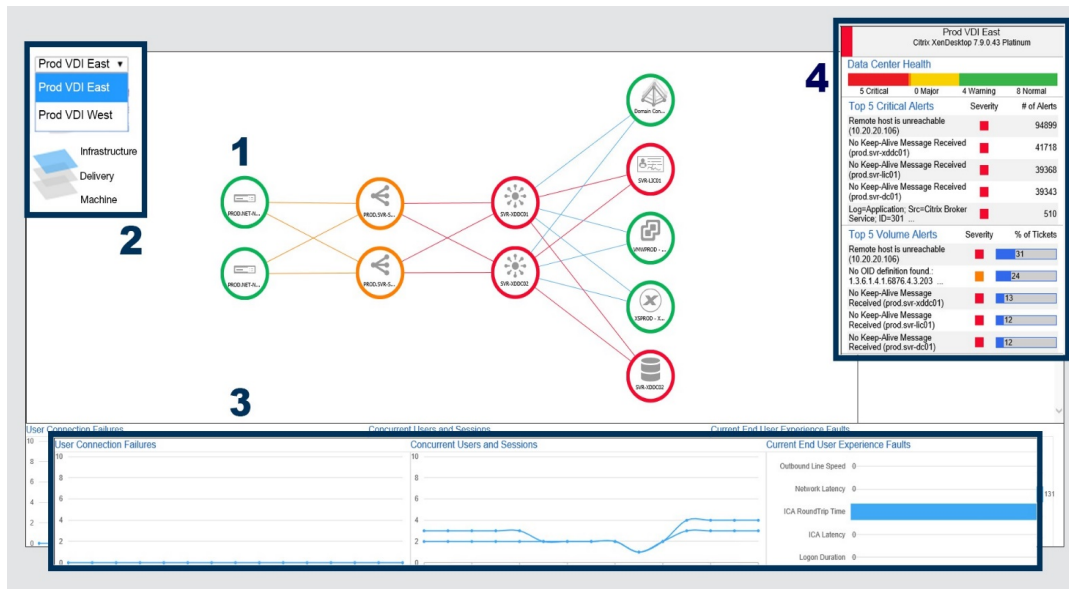
Real-Time Citrix or VMware Horizon Performance Graphs

Goliath provides five layers of visibility in one console: hardware, host, VM, OS and application. The performance graphs allow administrators to trend Citrix ICA/HDX or VMware PCoIP/BLAST latency and logon duration as well as resource utilization of each server.

Correlate End-User Experience Performance Metrics

Goliath provides granular real-time and historic data for Cerner and all other virtual applications. When there are issues, IT professionals drill into a user session to gain deeper visibility and identify the root cause.

Automated Intelligence Isolates Clinician Performance Issues

Goliath provides industry-leading visibility into Citrix or VMware session performance by breaking down the ICA/HDX or PCoIP/BLAST protocol and returning precise metrics around individual channel performance.

Detailed ICA/HDX Channel Metrics include, but not limited to:

- User Connection Performance
- Printing Bandwidth
- Audio Bandwidth
- Clipboard Bandwidth
- Keyboard and Mouse Bandwidth

- Thinwire Bandwidth
- DCR Bandwidth
- Multimedia Bandwidth

Goliath has the ability to trend ICA Latency for a user session, as well as ICA/HDX channels, which can help identify performance bottlenecks. IT admins can view this data in context of other session metrics or drill down into more detail under the ICA/HDX tab. Similarly, Goliath Performance Monitor will provide detailed protocol and channel metrics for PCoIP, and Blast for VMware Horizon deployments.
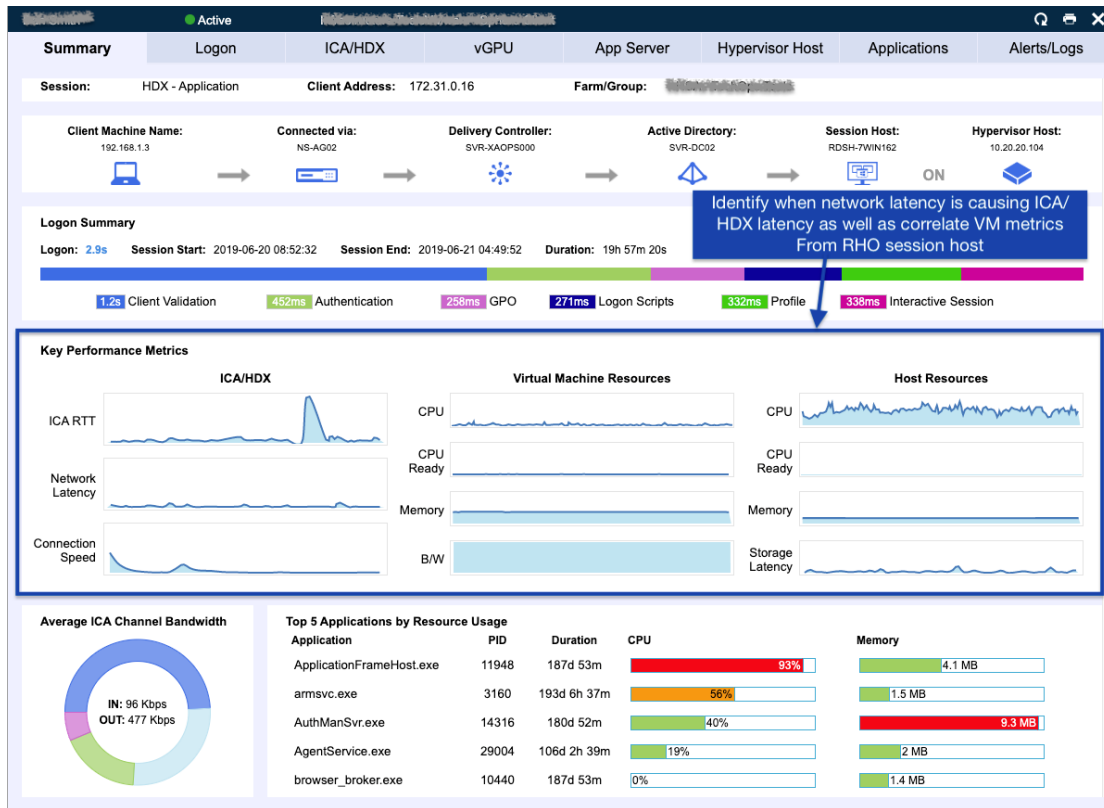
Real-Time Logon Duration Drilldown

If you can't drill down into all 33+ stages of the Citrix or VMware Horizon logon process, then you can't isolate and fix root cause of logon slowness. With the Citrix/VMware logon duration monitoring and troubleshooting functionality of Goliath Performance Monitor you can now capture real-time logon duration times and get alerted to end-user logon slowness on any of the 33+ logon duration stages.

The real-time Citrix/VMware Logon Duration Drilldown breaks down a user's logon process into each of the stages to help understand what needs to be optimized to improve logon times. This report can also be used to identify and troubleshoot session load problems by identifying what may be getting stuck or taking too long to process. Threshold-based alerting on user logon times is also possible.

Delivery controller and receiver brokering process
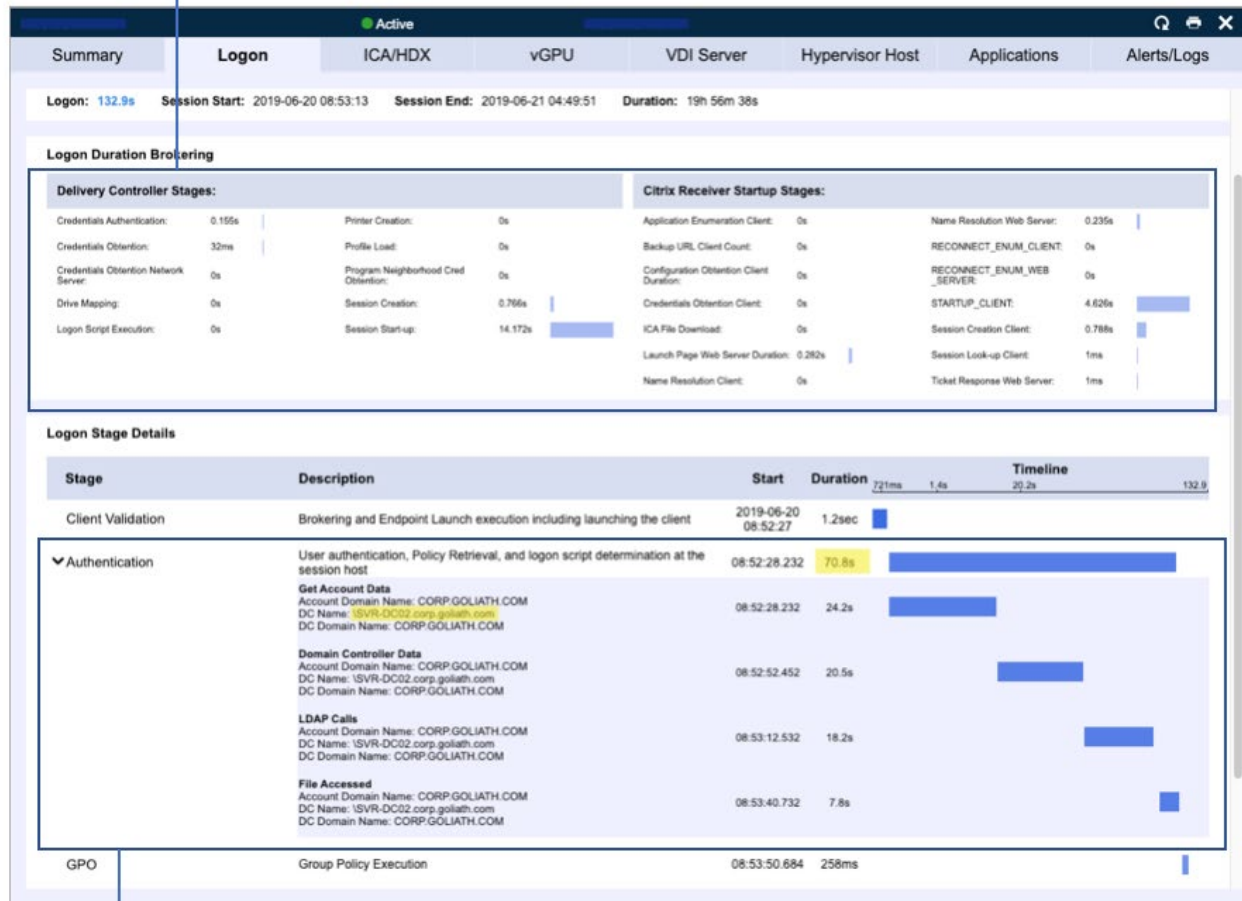
Drill down into each stage of the logon process.

The logon duration drilldown allows an administrator to parse logon times into each of the stages and substages. This includes the details of the brokering process that the Citrix Delivery Controller and Receiver is responsible for and the breakdown of the session launch from mouse click to being delivered onto the XenApp/XenDesktop Server or VDI, including, but not limited to:

▸ End User Mouse Click to Launch Application or Desktop to Session Host
▸ ICA/HDX File Download
▸ XML Service Name Resolution of an App or Desktop to a Session Host
▸ User Authentication
▸ Time to Request Session Creation

    ▸ Determine the Session Host
    ▸ STA Ticket Retrieval

- Logon Script Execution
- Profile Load and Drive Mapping
- Session Creation
- Desktop Load

When the Session is established on the XenApp/XenDesktop Server or VDI, Goliath Performance Monitor further breaks down the policy and profile load stages to determine the root cause of which script or stage caused the logon delay. This is accomplished by providing the details of how long each process took and iterating each execution stage and how that occurs including:

- Identifying and establishing connection to the Domain Controller for authentication
- LDAP calls to copy over policies
- Copying over each script file

Execution of each group policy and script to determine the execution time of:

- Registry Extensions
- Citrix Group Policy
- Folder Redirection
- Citrix Profile Management
- Drive Mapping
- Printer Mapping
- OU Policy Execution

The same metrics are available when diagnosing VMware Horizon logon durations.

Embedded Intelligence and Automation

Goliath's monitoring and troubleshooting software with embedded intelligence and automation guides users on what to monitor and how to monitor it. It includes specific metrics and analytics that empower Health IT Professionals to proactively anticipate issues before they happen, troubleshoot them when they do occur and prevent them from happening in the future.

Our out-of-the-box software will:

- Automatically deploy to your IT infrastructure
- Automatically Monitor over 250 known failure points & conditions
- Alert on performance threshold events, conditions & failures
- Automatically 24/7/365 ensure applications and infrastructure are operational
- Remediate issues on demand
- Resolve issues at the help desk level that would historically be escalated
- Schedule reports for insights and long-term planning
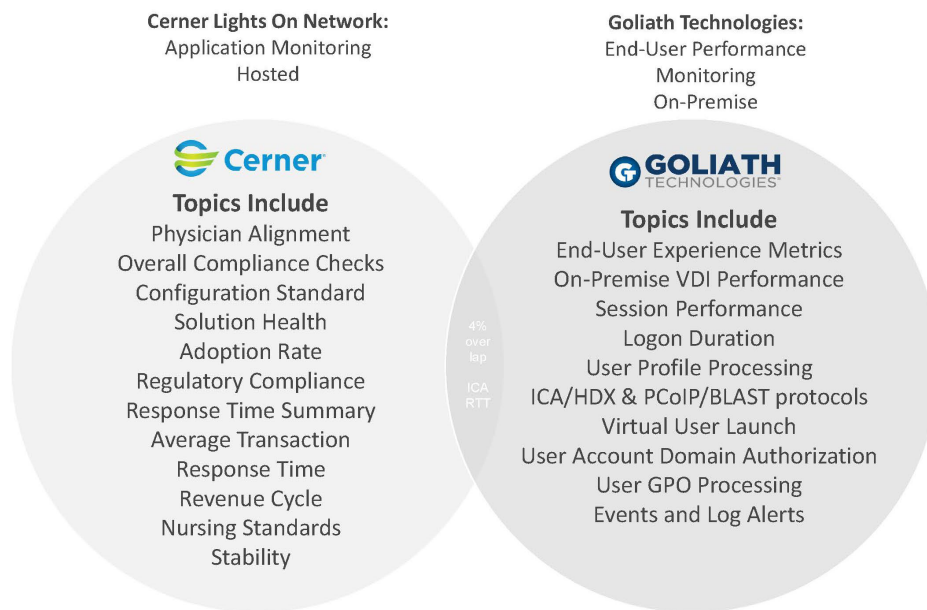
Working with Cerner to Improve End-User Experience

Cerner Lights On Network® and Goliath Technologies offer a powerful and complimentary feature set that together deliver significant value to our mutual customers. Cerner Lights On Network is

the best technology available to support Cerner and Cerner hospitals with the complex needs and requirements of multiple stakeholders throughout the hospital. It provides a robust, comprehensive set of features that covers many critical areas including Compliance, Security, Adoption, Configuration Standards, Performance, Users, Outcomes and much more.

Goliath Technologies focuses instead on the Citrix / VMware environment on-premises at the hospital locations. Goliath's software is specifically used by the systems engineers in hospital IT organizations that support both users accessing Cerner over Citrix and VMware, and other corporate staff at the hospital. Goliath focuses on reducing end-user experience issues on-premises when users are interacting with any Citrix or VMware Horizon delivered applications. Most Cerner hospitals are using Citrix and/or VMware Horizon to deliver access to multiple corporate applications, not just access to Cerner RHO.

The different roles and users for our products present additional value for both Cerner and Cerner hospitals.

▸ The combined metrics available from both Cerner Lights On Network and Goliath Technologies allow hospitals to analyze a holistic view of their environments.
▸ This holistic view allows hospitals to pinpoint the specific root cause of performance issues – which are likely to exist in the on-premises delivery infrastructure, not Cerner itself.
▸ Goliath's proactive approach to Citrix performance issues leads to less criticism for Cerner and reduces support calls to CernerWorks.

Cerner Lights On Network:
Application Monitoring
Hosted

Goliath Technologies:
End-User Performance
Monitoring
On-Premise

Topics Include
Physician Alignment
Overall Compliance Checks
Configuration Standard
Solution Health
Adoption Rate
Regulatory Compliance
Response Time Summary
Average Transaction
Response Time
Revenue Cycle
Nursing Standards
Stability

-4% over lap

ICA RTT

Topics Include
End-User Experience Metrics
On-Premise VDI Performance
Session Performance
Logon Duration
User Profile Processing
ICA/HDX & PCoIP/BLAST protocols
Virtual User Launch
User Account Domain Authorization
User GPO Processing
Events and Log Alerts

Sample Deployment: Universal Health Services

UHS is one of the 10 largest for-profit healthcare organizations in the United States. Today, UHS has Goliath Performance Monitor and Goliath Application Availability Monitor deployed at their corporate office, 30 acute care hospitals, and within the Cerner datacenter on Citrix servers running Cerner applications.

UHS has configured and scheduled the availability monitors to launch tests to confirm applications are available 24/7/365. Currently, approximately 15,000 application test launches occur daily with a real-time alert being triggered if a logon fails or exceeds a logon time threshold. This alerts administrators before the logon difficulty manifests to end users, so they have the ability to remediate the issue before clinicians or healthcare workers are impacted.

In one example, a number of the clinical staff were having difficulty accessing the Cerner applications, getting frequent disconnects, unable to load the application at all, and while connected, horrible slowness. By using Goliath Performance Monitor, the IT staff at the hospital was able to determine that the issue had nothing do with Cerner, saving hours and days in the troubleshooting process, but rather that the users were all connecting through the same Wi-Fi access point at the hospital.

UHS Cerner RHO Deployment

WEST	CENTRAL	EAST
93 Servers	**129 Servers**	**115 Servers**

27 Remote Acute Care Hospitals
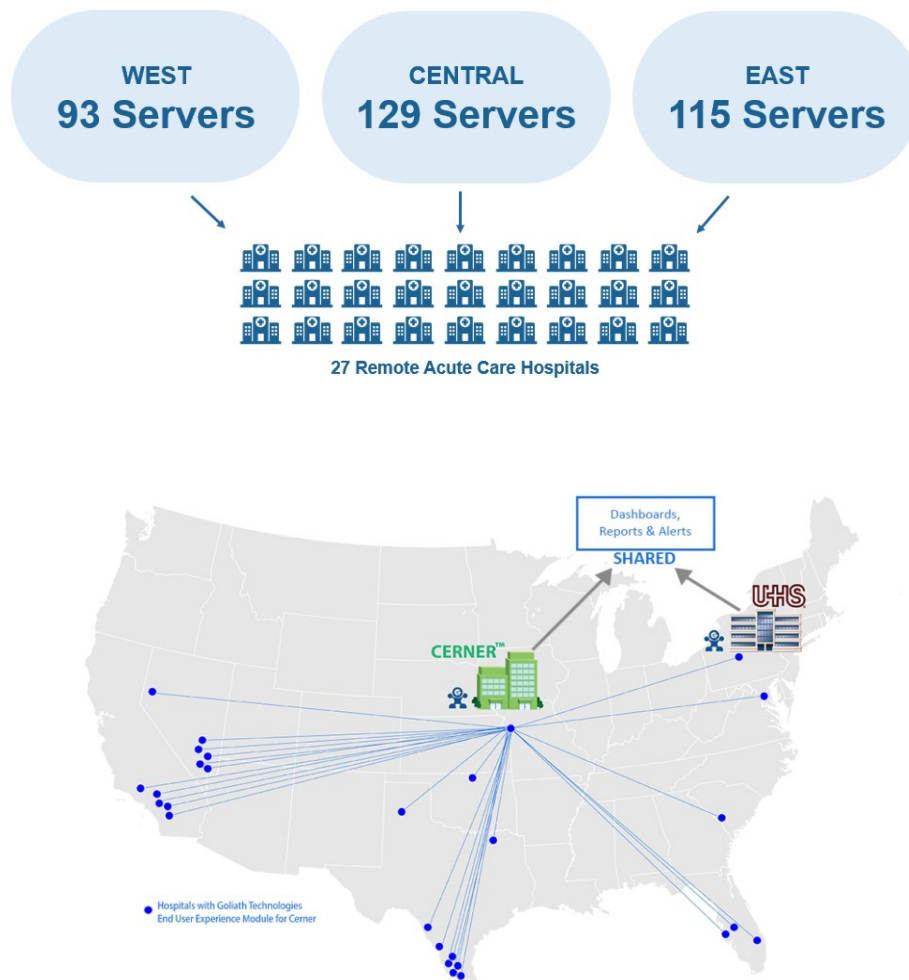
The Standard in Health IT

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 Cerner, including Universal Health Services, NorthBay Healthcare, AtlantiCare, Westchester Medical Center and many others to improve patient care.**

Goliath Technologies can be purchased directly through Cerner. If you would like to learn more about how we can provide value to your organization, email us at techinfo@goliathtechnologies.com.