GOLIATH TECHNOLOGIES®
HEALTH IT OBSERVABILITY

TECHNICAL OVERVIEW

Oracle Health Solution Overview

The only solution permitted to deploy in both the Oracle Health Hosted (OHH) and the health system to provide complete visibility of the Oracle Health delivery infrastructure.

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Introduction

Goliath's monitoring, troubleshooting & analytics solution focuses on analyzing end user experience, from the users perspective, and uses embedded intelligence and automation to enable IT to identify the underlying IT elements that impact it. Goliath is uniquely purpose-built for Oracle Health clients because it links Oracle OHH with the on-premise environment for a complete end-to-end view. With our industry-only purpose-built Oracle Health module with embedded intelligence and automation, health systems using Oracle can anticipate, troubleshoot, and document end-user experience issues before they are impacted to improve the clinician and patient experience.

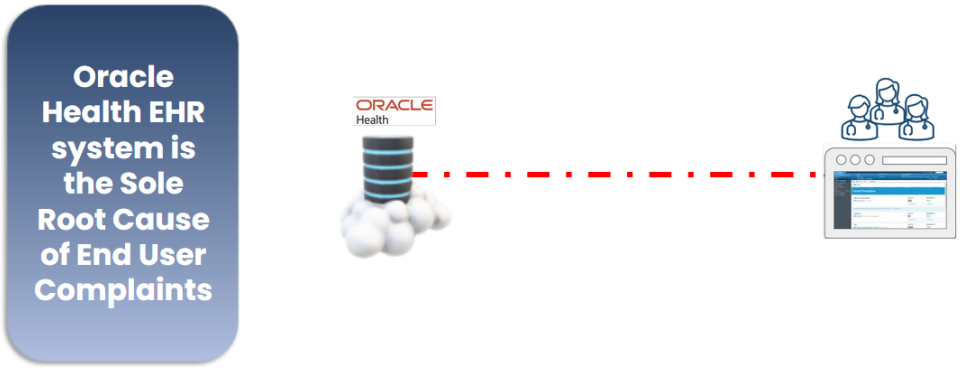
Health IT professionals can now:

- Have an end-to-end view of Oracle, end-user experience, and Omnissa Horizon/Citrix metrics
- Collaborate with Oracle 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 Oracle 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.

Perception



Reality

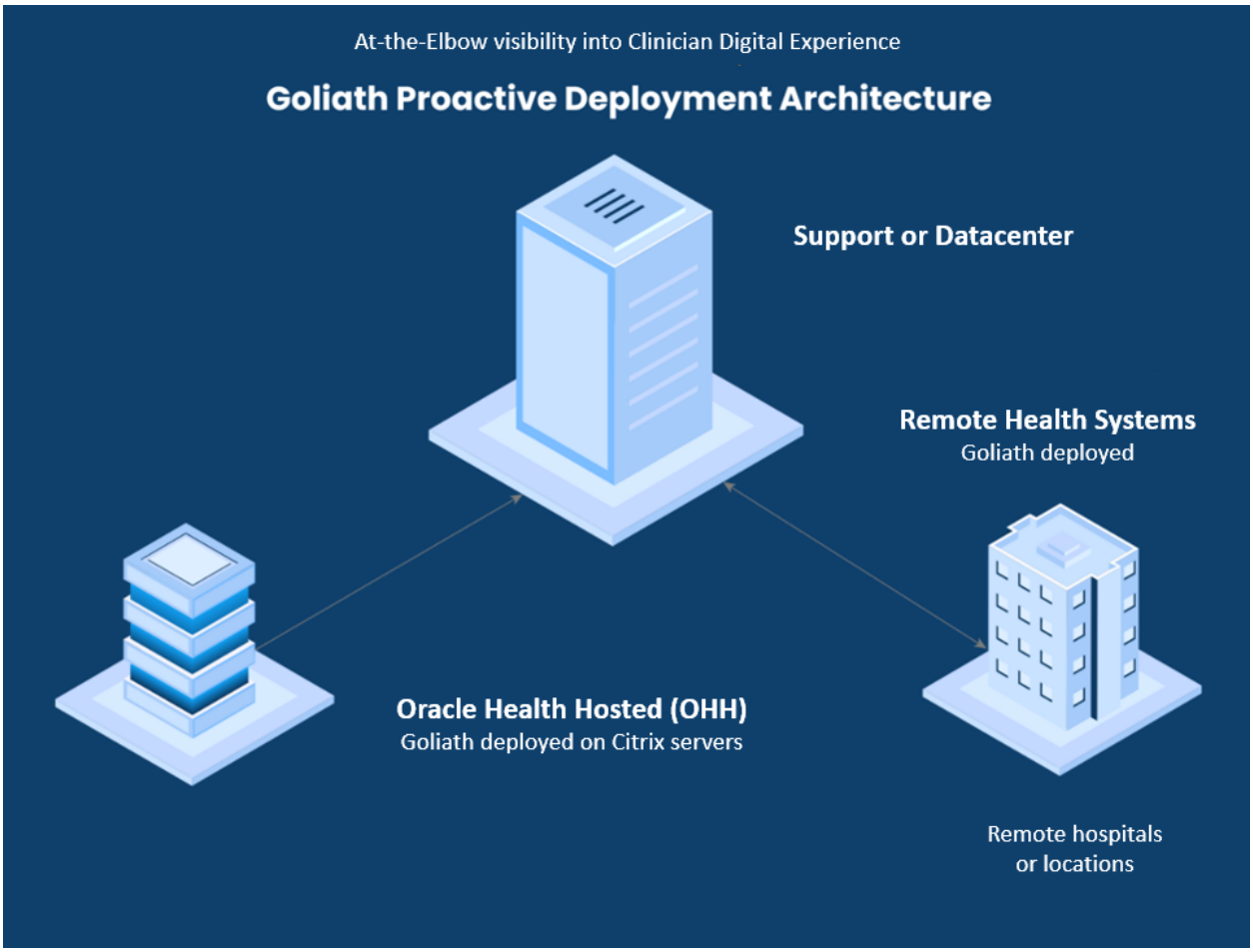
Reality: There are Over 20 Vendors & Many Failure Points

Solution:

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

Goliath Proactive End-User Troubleshooting Architecture

The deployment architecture includes technology across all hospital locations and, optionally, at the Oracle-hosted facility. In the data center hosting the electronic health record application, intelligent agents are deployed on Citrix and/or VMware/Omnissa servers running Oracle applications. Onsite at the hospital, Goliath Performance Monitor is deployed on virtual servers, desktops, tablets, Citrix, Omnissa Horizon and other general IT infrastructure.



Hospitals rely on complex architecture to deliver not just Oracle, 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 document clinician experience issues across this virtual desktop delivery infrastructure.

Benchmark Clinician Experience

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

Oracle Health Clinician Experience reports utilize embedded intelligence to provide an at-the-elbow visibility into clinician digital experience not otherwise possible. Goliath automatically analyzes complex connectivity and performance metrics from the user's perspective and calculates a top-line user experience score. The reports then enable easy filtering to analyze subsets of the environment for focused analysis, even down to individual clinicians. Not only is IT able to easily see what the objective clinician experience is but also understand why by breaking out the primary elements responsible for the user experience score (Location, Network, User Activity). 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.

Oracle Health Clinician Experience Analytics

Health System Location	Clinician Experience Score	Total Users	Users Experiencing Speed and Reliability Issues	Root Cause Analysis				Logon Specific Issues	
				Slow Speed from User Location	Slowness Due to Network	Slowness Due to User Activity	Critical Slowness	Logon >= 30s	Reconnects >= 10s
University Hospital	93	23180	198 0.9%	20	179	10	0	4,425 6.0%	679 2%
Oncology Center	93	6009	192 3.2%	119	18	57	0	337 8.5%	400 3.60%
Children's Hospital	92	6807	580 8.5%	418	158	78	12	1101 6.0%	239 2%
Orthopedic Surgery Center	93	7707	Number of users impacted					1746 21.0%	650 8.50%
Ambulatory Surgery Center	68	1492	152 10.2%	359	291	79	317	30 7.0%	23 3%
Regional Hospital	61	19306	7380 38.2%	7041	3983	1830	3611	9695 80.0%	6147 95%

Drill down further to understand specifically who is impacted, the frequency & duration, and the likely root cause.

Millennium Fault Isolation Analytics

Total Users: 10595

Users Impacted	Connection Speed	Network Latency	ICA Latency	ICA RTT
1240	677	427	298	1090

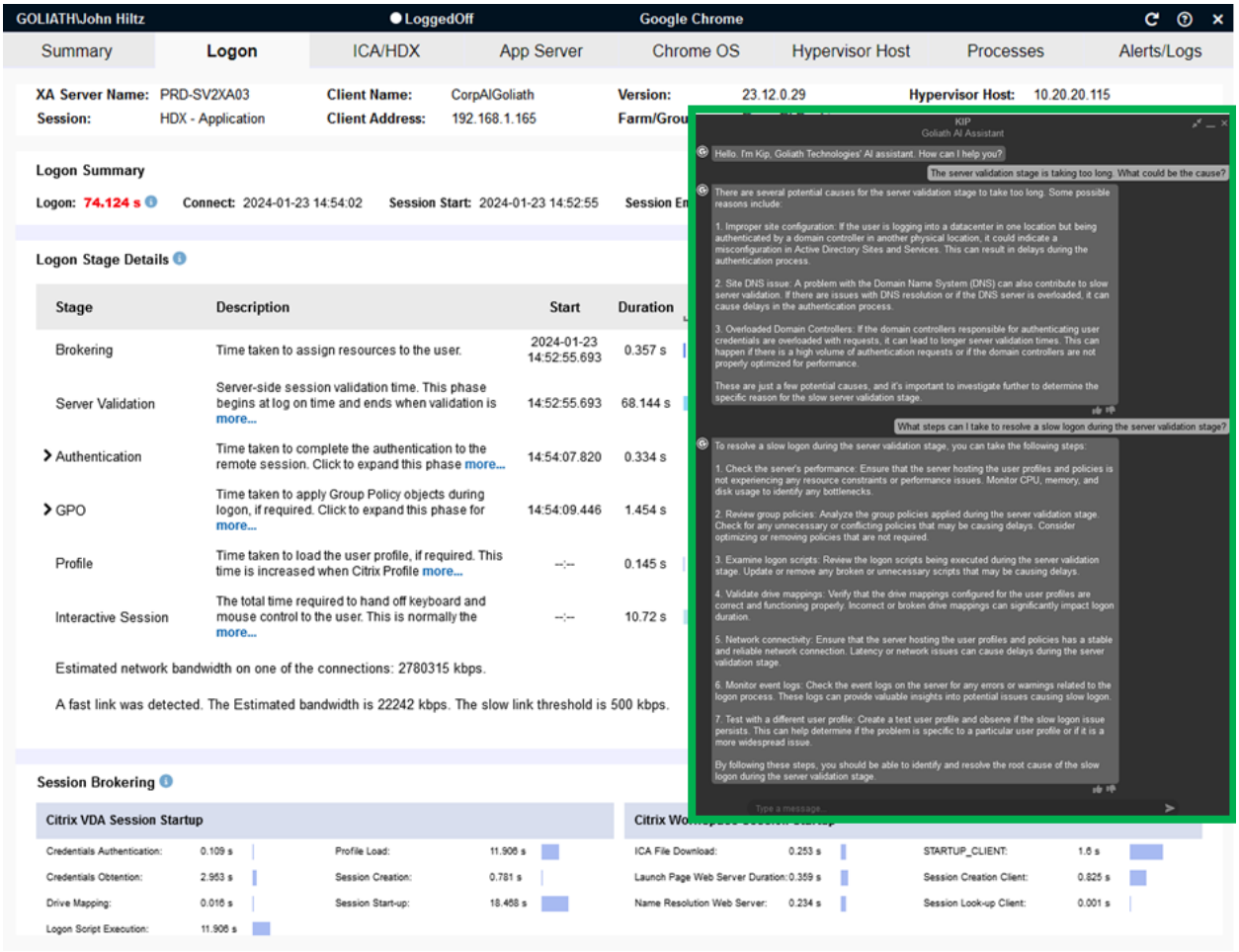
User Name	Dept	Client IP Address	Client Device	Workspace Version	EUE Score	Avg Conn Speed	Avg Network Latency	Avg ICA RTT (ms)	Avg ICA Latency
Jan Joplin	Radiology	10.10.0.92	ASUS Zenbook	24.3.0.93	34	3.32	253.03	499.98	500.33
George Anders	Radiology	10.10.0.93	Lenovo Thinkpad	24.3.0.93	44	2.99	451.02	500.01	525.64
Ana Schroeder	Radiology	10.10.0.94	Lenovo Thinkpad	24.3.0.93	44	3.65	395.22	488.26	465.32
Theodore Nugent	Radiology	10.10.0.95	Lenovo Thinkpad	24.3.0.93	48	9.98	333.65	451.02	509.32
John Hiltz	Emergency	10.18.34.00	ASUS Zenbook	24.3.0.93	50	7.05	456.35	456.32	466.33
Floyd Roberts	Emergency	10.10.0.94	Lenovo Thinkpad	24.3.0.93	55	6.33	325.95	501.22	509.87
Chris Mann	Emergency	10.10.0.92	ASUS Zenbook	24.3.0.93	57	9.99	428.36	499.58	510.25
Kim Chang	Radiology	10.10.0.93	Lenovo Thinkpad	24.3.0.93	57	8.97	249.98	492.36	498.24
Tom Charles	Radiology	10.10.0.94	ASUS Zenbook	24.3.0.93	60	9.99	164.25	449.99	509.39
Bruce Cornelius	Oncology	100.10.5.92				10.98	149.00	450.36	448.87

Users at this location are having poor connection speeds

AI-Powered Troubleshooting

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

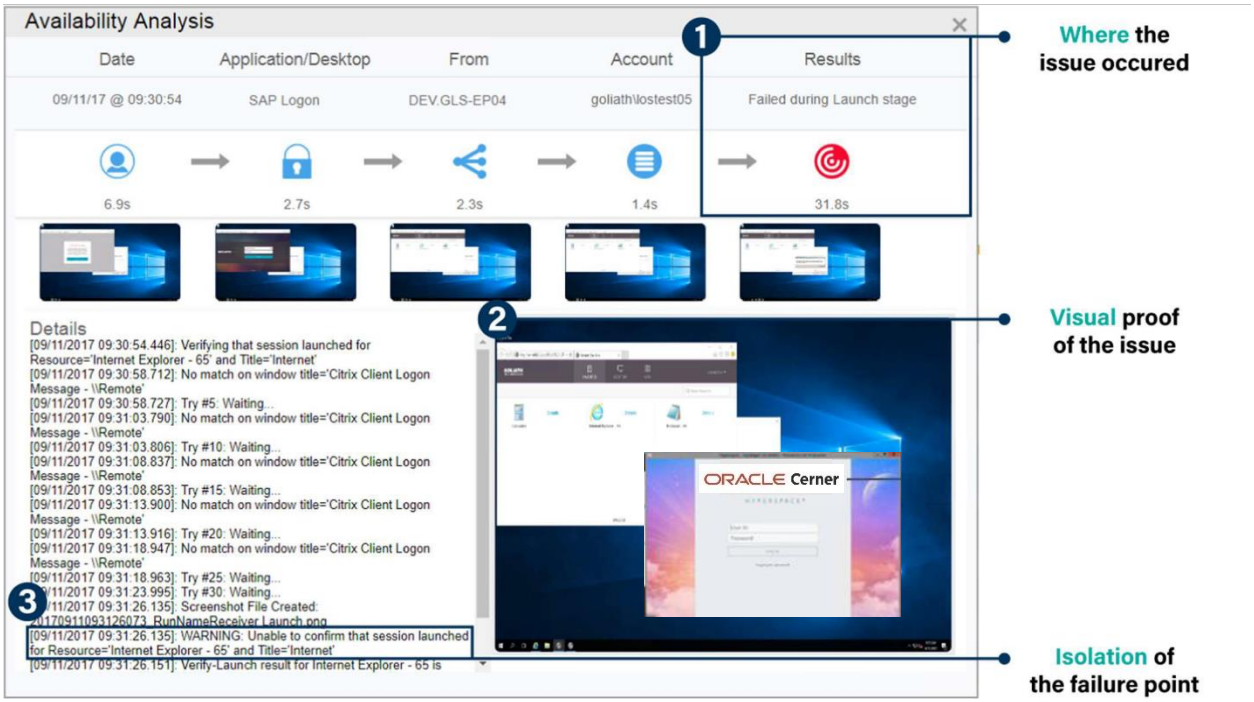
- Quickly troubleshoot Citrix issues without Citrix-specific expertise
- Make up for limited resources such as IT budget and headcount
- Empower all levels of the IT Support team to troubleshoot ultimately reducing escalations
- Reduce remediation times



Automated Logons Confirm Oracle Availability

Goliath is the industry's leading proactive, production-ready end-user experience software that validates availability of the entire Citrix and/or Omnissa Horizon delivery infrastructure. It ensures availability by executing real Citrix or Omnissa Horizon sessions that exercise the exact same steps a user takes during the Oracle Health 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 Oracle end-user experience will be like for their clinicians – in advance.

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



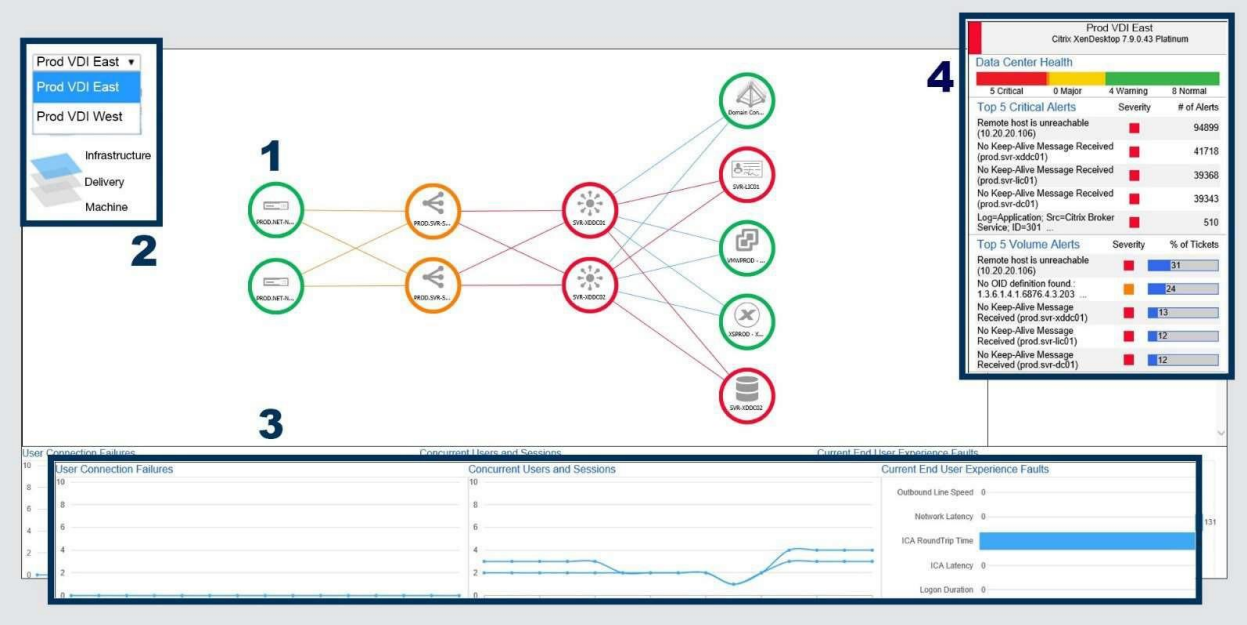
1. In this case, failure occurred at the launch stage (marked by the '1')
2. The screenshot (2) proves that the application failed to launch and shows the root cause of the Citrix workflow and application launch failure as being the result of a licensing problem
3. By navigating to the "Details" or "Analytics" section (3), we can see that the launch failed at the point of verifying that Internet Explorer launched

The Automatic Citrix Discovery and Dependency Map

Goliath's Automatic Citrix Discovery and Dependency Map intelligently creates a dependency map of your entire Citrix infrastructure with true end-to-end visibility of the health of your Citrix infrastructure. This single, macro view used as a real-time NOC display of your Citrix environment gives administrators the ability to monitor, manage and troubleshoot issues with Citrix, whether the root cause is the Citrix infrastructure or the supporting IT elements. It shows the overall health of your environment at-a-glance and provides context-sensitive supporting metrics and details as you select each element. You can drill down and dynamically examine your environment and troubleshoot issues more easily since everything is broken down logistically.

Highlights:

- Automatically deploys to your environment, with no manual set-up.
- 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.



Critical Components Highlighted in the above image:

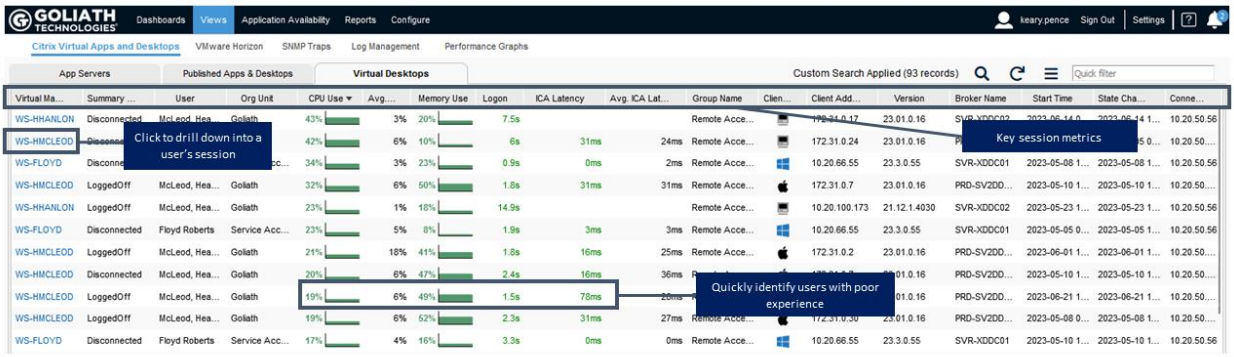
1. Automatically map your entire Citrix infrastructure to visualize connections, relationships, and health of components.
2. Easily switch views to different data centers or locations.
3. Correlate end user experience issues to delivery infrastructure components and health.
4. See context-sensitive metrics and alerts for selected components.

Real-Time Citrix 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 Latency and Logon Duration as well as resource utilization of each server.

Correlate End-User Experience Performance Metrics

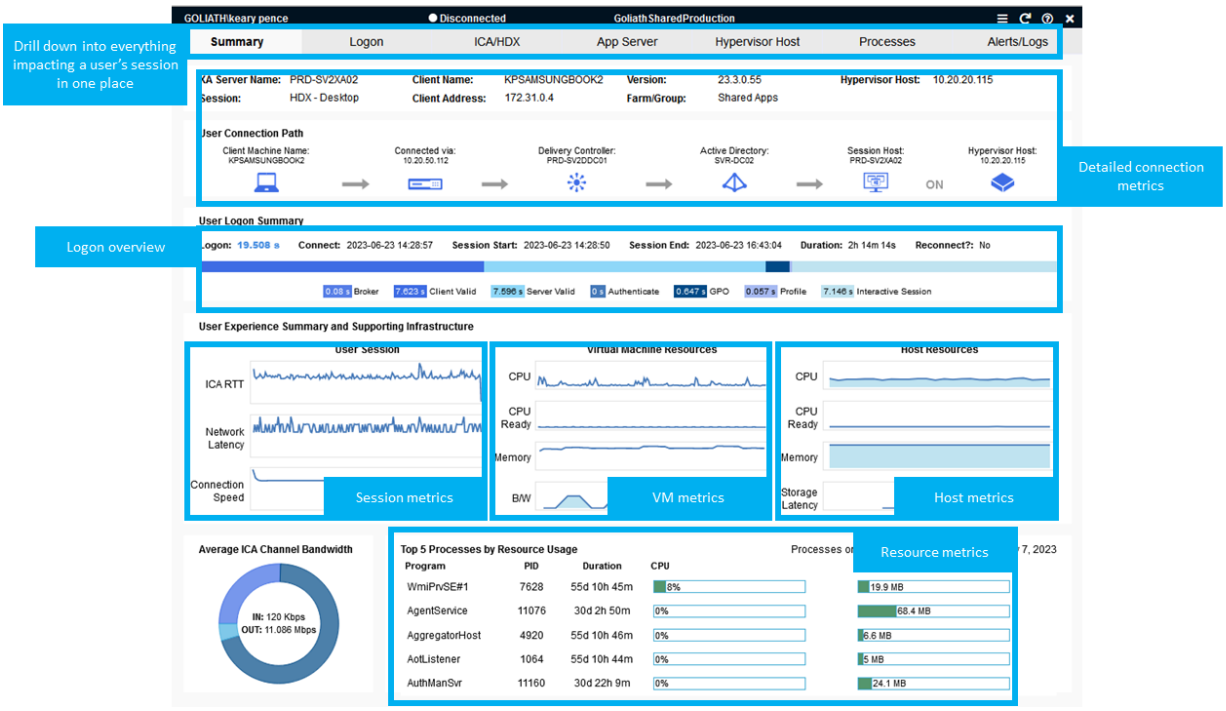
Goliath provides granular real-time and historic data for all Citrix Sessions. When there are end user experience issues, administrators can drill into an individual user session to gain deeper visibility and identify the root cause.



Automated Intelligence Isolates Clinician Performance Issues

Goliath provides the ability to drill down into a single end user's session and, at a glance, review key analytics around that session performance: logon duration summary, key performance metrics from ICA/HDX, VM resources, host resources along with application resource usage data.

This quick summary enables an administrator to quickly view correlated performance metrics and rule out what isn't causing the performance bottleneck and focus on the metrics that appear to indicate root cause.



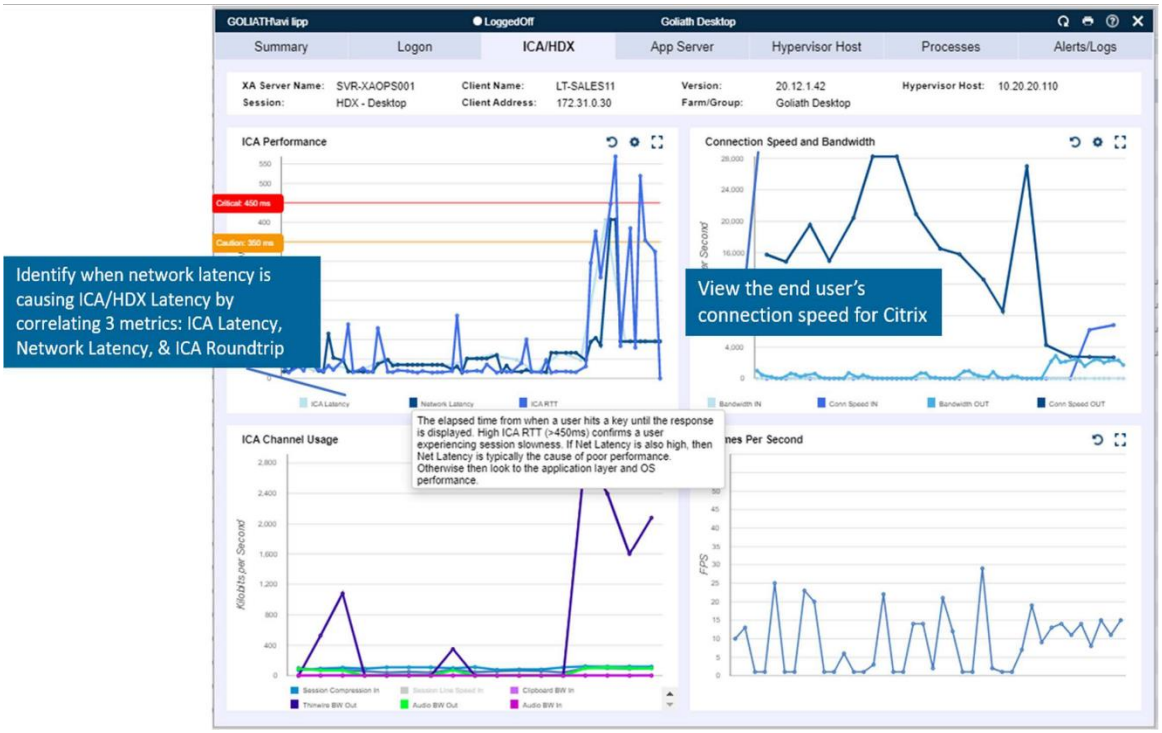
Real-Time ICA Channel Drill Down from Session Display

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.

Detailed ICA/HDX Channel Metrics Include:

- User Connection Performance
- Printing Bandwidth
- Audio Bandwidth
- Clipboard Bandwidth
- And more!
- Keyboard and Mouse Bandwidth
- Thinwire Bandwidth
- DCR Bandwidth
- Multimedia Bandwidth

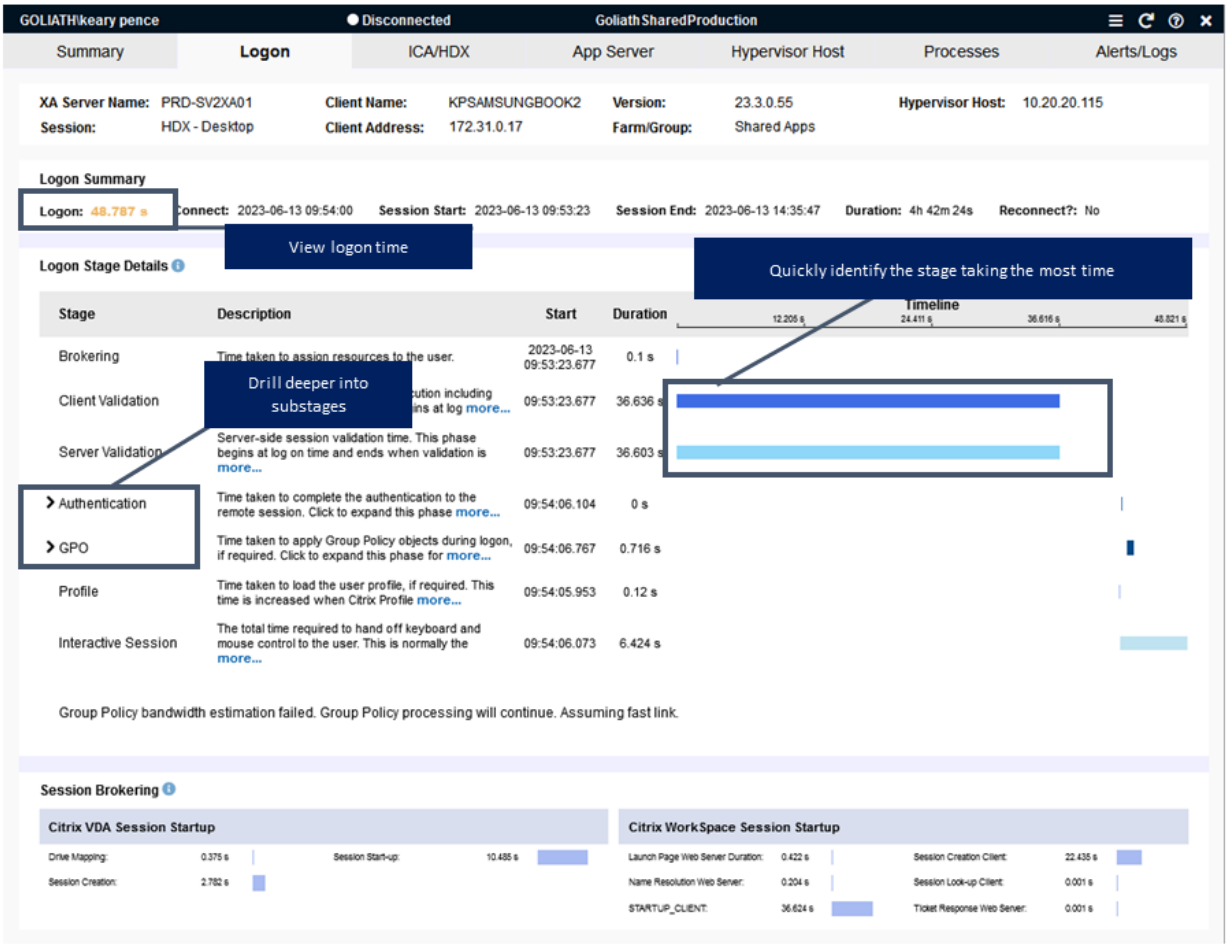
Goliath's industry-leading visibility Goliath trends ICA Latency for a user session, as well as ICA/HDX channels, which can help identify performance bottlenecks. IT admins can view this data in context of other session metrics or drill down into more detail under the ICA/HDX tab. Similarly, Goliath Performance Monitor will provide detailed protocol and channel metrics for PCoIP/BLAST for Omnissa Horizon deployments.



Real-Time Logon Duration Drilldown

If you can't drill down into all 33+ stages of the Citrix logon process, then you can't isolate and fix root cause of logon slowness. With the Citrix Logon Duration monitoring and troubleshooting functionality you can 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 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.



The logon duration drilldown allows an administrator to parse logon times into each of the stages and sub- stages. 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 CVAD 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
- Desktop Load

When the session is established on the CVAD Server or VDI, GPM 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
- OU Policy Execution
- Citrix Profile Management
- Drive Mapping
- Printer Mapping

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

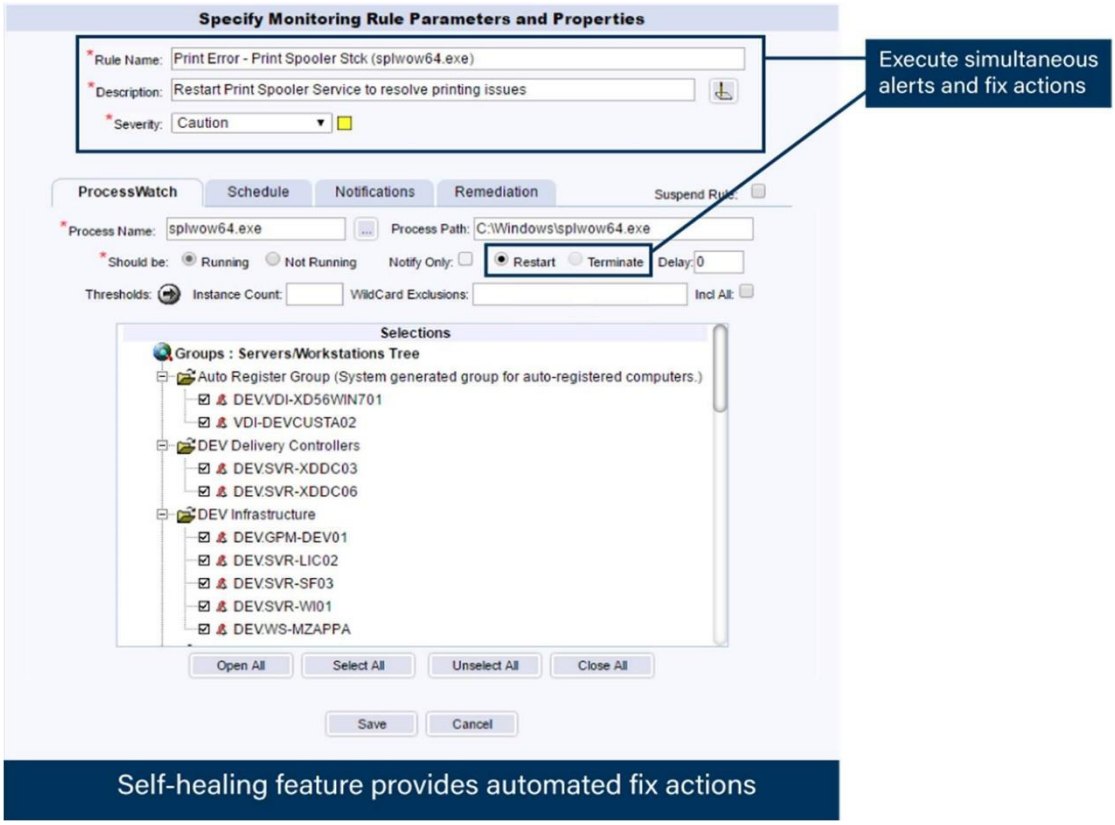
Embedded Intelligence and Automation

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

With its embedded intelligence, Goliath 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.



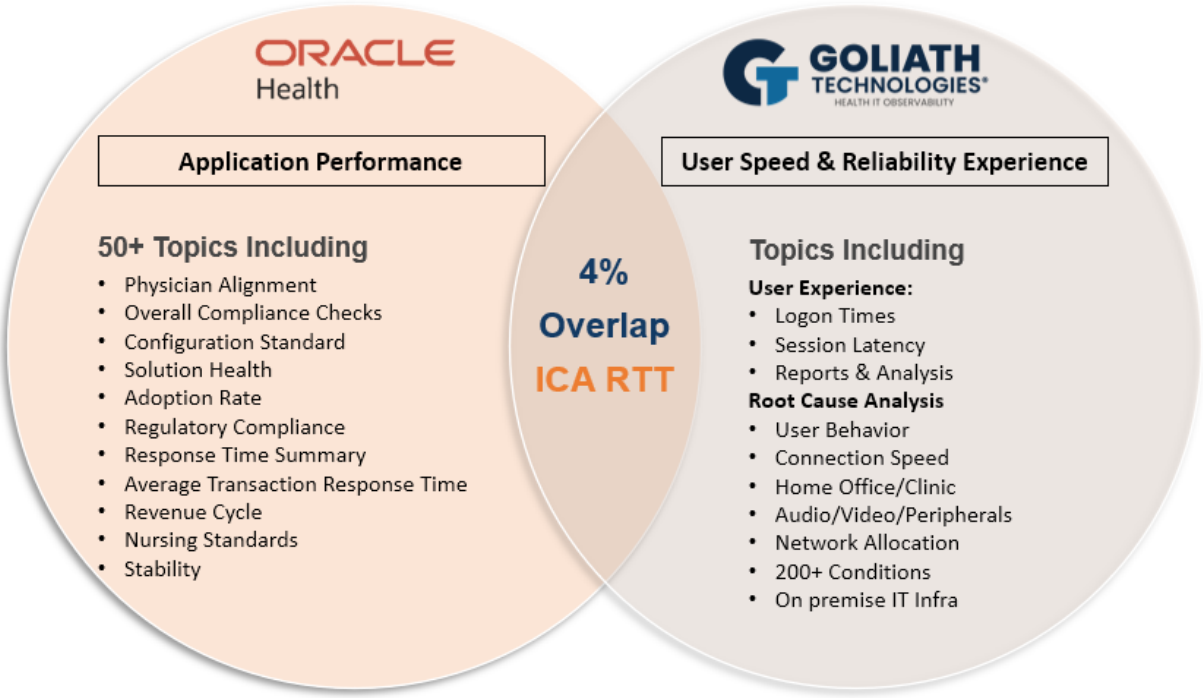
Working with Oracle Health to Improve End-User Experience

Oracle Lights On Network® and Goliath Technologies offer a powerful and complementary feature set that together deliver significant value to our mutual customers. Oracle Lights On Network® is the best technology available to support Oracle and Oracle Health 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/Omnissa 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 Oracle Health over Citrix and Omnissa, 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 Omnissa Horizon delivered applications. Most Oracle Health hospitals are using Citrix and/or Omnissa Horizon to deliver access to multiple corporate applications, not just access to Oracle OHH.

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

- The combined metrics available from both Oracle 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 Oracle itself.
- Goliath's proactive approach to Citrix performance issues leads to less criticism for Oracle and reduces support calls to Oracle.

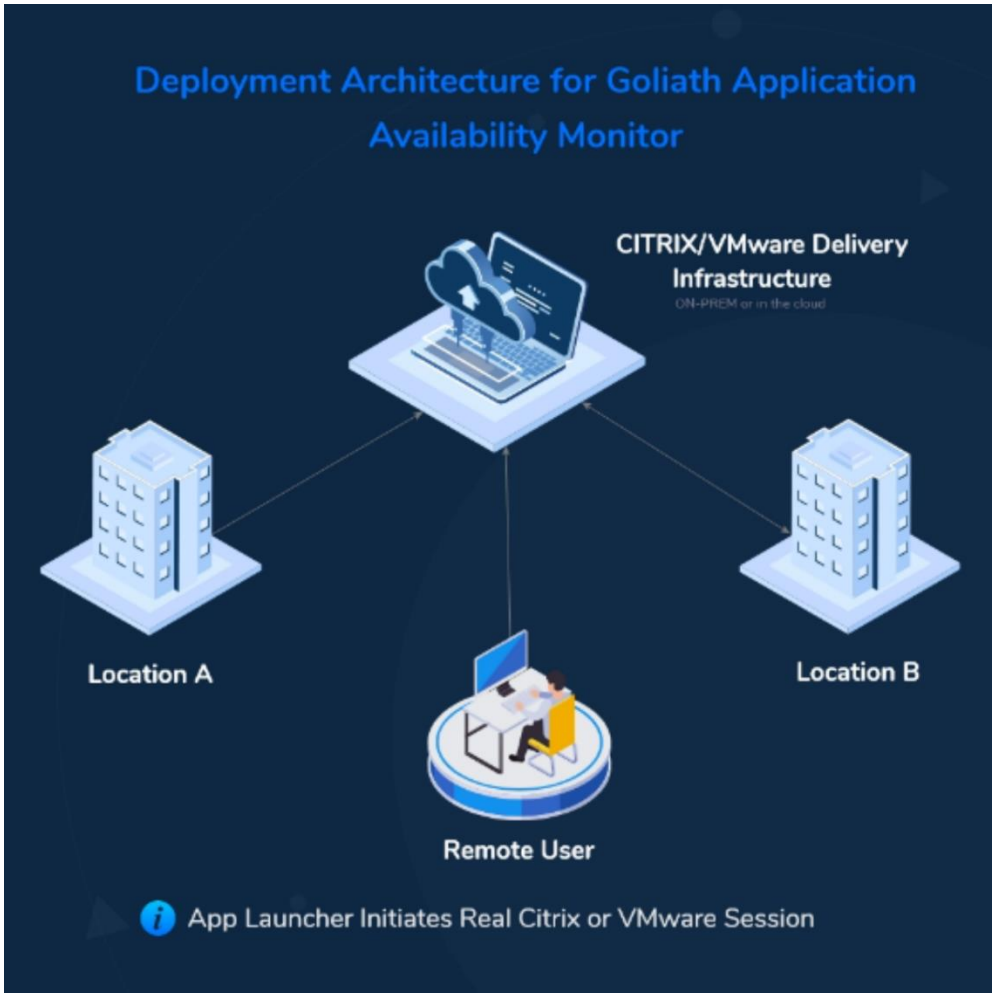


Sample Deployment: Universal Health Services

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 Oracle Health datacenter on Citrix servers running Oracle 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 Oracle Health 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 Oracle, 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.



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 Oracle Health, including Universal Health Services, Ascension, Children's National, NorthBay Healthcare, AtlantiCare, Westchester Medical Center, CommonSpirit, and many others to improve patient care.**

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

Get started today with a free demo or a trial of Goliath Performance Monitor

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BE PROACTIVE