

MEDITECH MAGIC & Expanse Solution Overview

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Introduction

Focused on the end-user experience, Goliath links MEDITECH MAGIC and Expanse with the entire virtual desktop infrastructure used to deliver mission-critical applications including MEDITECH. With our industry-only purpose-built MEDITECH module containing embedded intelligence and automation, health systems using MEDITECH MAGIC and Expanse 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 MEDITECH, end-user experience, and VMware Horizon/Citrix metrics
- Isolate root cause and troubleshoot performance issues reducing remediation time
- Collaborate with MEDITECH including actionable intelligence for data-driven conversations
- Proactively monitor to detect and resolve issues before end users are impacted
- Prevent issues with historical reporting for trending and analysis

End-to-End Visibility Requires 3rd Party Tools

While Healthcare IT leaders take great care in choosing the right Electronic Health Records system, many underestimate the complexity of the virtualized desktop delivery infrastructure like Citrix and VMware Horizon and the critical role it plays in providing access to MEDITECH and other mission-critical applications. Desktop delivery infrastructure requires specific attention and tools to properly support it. The reality is that an organization's desktop delivery infrastructure, and performance requirements for delivery of other applications, may negatively impact end-user experience with MEDITECH. Understanding how the performance of the delivery infrastructure impacts the end-user experience requires powerful, purpose-built tools that allow Health IT 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. Furthermore, the hospital IT department will not have the performance metrics to have data driven conversations with management, counterparts in other departments, MEDITECH and or other vendors so they can collaborate to determine root cause, document and fix issues permanently.



Fig. 1 Perception:

MEDITECH 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 MEDITECH further complicating the process.

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 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.

Clinician Experience									
Citrix XenApp End User Experience Scorecard									
Reporting Period: Sun Jan 14 2024 10:31:59 – Thu Mar 14 2024 11:31:59					Sort By: Avg Conn Speed (Mbps)		Report Run: Thu Mar 15 2024 11:31:59		
Total Users: 14									
86 Overall EUE Score		70 Connection Speed Score		96 Network Latency Score		98 ICA RTT Score		96 ICA Latency Score	
		36.05 Avg Connection Speed (Mbps)		18.75 Avg Network Latency (ms)		15.93 Avg ICA RTT (ms)		22.54 Avg ICA Latency (ms)	
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	85	12.00	5.11	8.15	5.00
george anders	Radiology	10.10.0.56	Lenovo Thinkpad	24.3.0.93	84	17.38	24.78	30.82	23.80
aschroeder	Radiology	10.10.32.55	Lenovo Thinkpad	24.3.0.93	64	20.32	164.40	146.66	193.50
theodore nugent	Radiology	10.10.46.67	Lenovo Thinkpad	24.3.0.93	68	23.00	149.00	102.00	172.50
john hiltz	Emergency	10.18.34.00	ASUS Zenbook	24.3.0.93	84	24.15	33.08	37.33	56.72
floyd roberts	Oncology	100.10.5.92	Lenovo Thinkpad	24.3.0.93	91	35.29	12.09	6.79	8.63
avi lipp	Emergency	10.18.0.46	ASUS Zenbook	24.3.0.93	89	52.78	91.30	39.41	39.72
heather mcleod	Pediatrics	100.15.6.76	Lenovo Thinkpad	24.3.0.93	95	62.12	34.21	33.85	33.03
cgiardinelli	Emergency	10.18.25.34	ASUS Zenbook	24.3.0.93	93	63.60	64.36	86.73	28.91
keary pence	Oncology	100.10.2.01	Lenovo Thinkpad	24.3.0.93	78	74.45	72.45	156.83	374.33
martin quinan	Emergency	10.18.74.00	Lenovo Thinkpad	24.3.0.93	93	77.61	72.64	32.54	42.76
mnagel	Pediatrics	100.15.5.77	Lenovo Thinkpad	24.3.0.93	94	91.46	64.87	28.35	41.75
brian may	Emergency	10.18.92.56	ASUS Zenbook	24.3.0.93	95	84.00	34.50	34.30	40.14
jgeorge	Oncology	100.10.5.00	Lenovo Thinkpad	24.3.0.93	93	116.14	27.20	35.18	85.45

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 screenshot displays the Goliath AI Assistant interface within a Google Chrome browser window. The interface is divided into several sections:

- Summary:** Shows session details including XA Server Name (PRD-SV2XA03), Client Name (CorpAI/Goliath), Version (23.12.0.29), and Hypervisor Host (10.20.20.115).
- Logon Summary:** Provides a high-level overview of the login process, including the Logon time (74.124 s), Connect time (2024-01-23 14:54:02), and Session Start time (2024-01-23 14:52:55).
- Logon Stage Details:** A table detailing the stages of the login process, including Brokering, Server Validation, Authentication, GPO, Profile, and Interactive Session, with their respective descriptions, start times, and durations.
- Session Brokering:** A section showing the progress of session brokering, including Citrix VDA Session Startup and Citrix WDD Session Startup.

Overlaid on the right side of the interface is a chat window for the KIP (Goliath AI Assistant). The chat history shows a user query: "The server validation stage is taking too long. What could be the cause?" and the assistant's response, which lists several potential causes for a slow server validation stage:

1. Improper site configuration: If the user is logging into a datacenter in one location but being authenticated by a domain controller in another physical location, it could indicate a misconfiguration in Active Directory Sites and Services. This can result in delays during the authentication process.
2. Site DNS issue: A problem with the Domain Name System (DNS) can also contribute to slow server validation. If there are issues with DNS resolution or if the DNS server is overloaded, it can cause delays in the authentication process.
3. Overloaded Domain Controllers: If the domain controllers responsible for authenticating user credentials are overloaded with requests, it can lead to longer server validation times. This can happen if there is a high volume of authentication requests or if the domain controllers are not properly optimized for performance.

The assistant also provides a list of steps to resolve a slow login during the server validation stage:

1. Check the server's performance: Ensure that the server hosting the user profiles and policies is not experiencing any resource constraints or performance issues. Monitor CPU, memory, and disk usage to identify any bottlenecks.
2. Review group policies: Analyze the group policies applied during the server validation stage. Check for any unnecessary or conflicting policies that may be causing delays. Consider optimizing or removing policies that are not required.
3. Examine logon scripts: Review the logon scripts being executed during the server validation stage. Update or remove any broken or unnecessary scripts that may be causing delays.
4. Validate drive mappings: Verify that the drive mappings configured for the user profiles are correct and functioning properly. Incorrect or broken drive mappings can significantly impact logon duration.
5. Network connectivity: Ensure that the server hosting the user profiles and policies has a stable and reliable network connection. Latency or network issues can cause delays during the server validation stage.
6. Monitor event logs: Check the event logs on the server for any errors or warnings related to the logon process. These logs can provide valuable insights into potential issues causing slow logon.
7. Test with a different user profile: Create a test user profile and observe if the slow logon issue persists. This can help determine if the problem is specific to a particular user profile or if it is a more widespread issue.

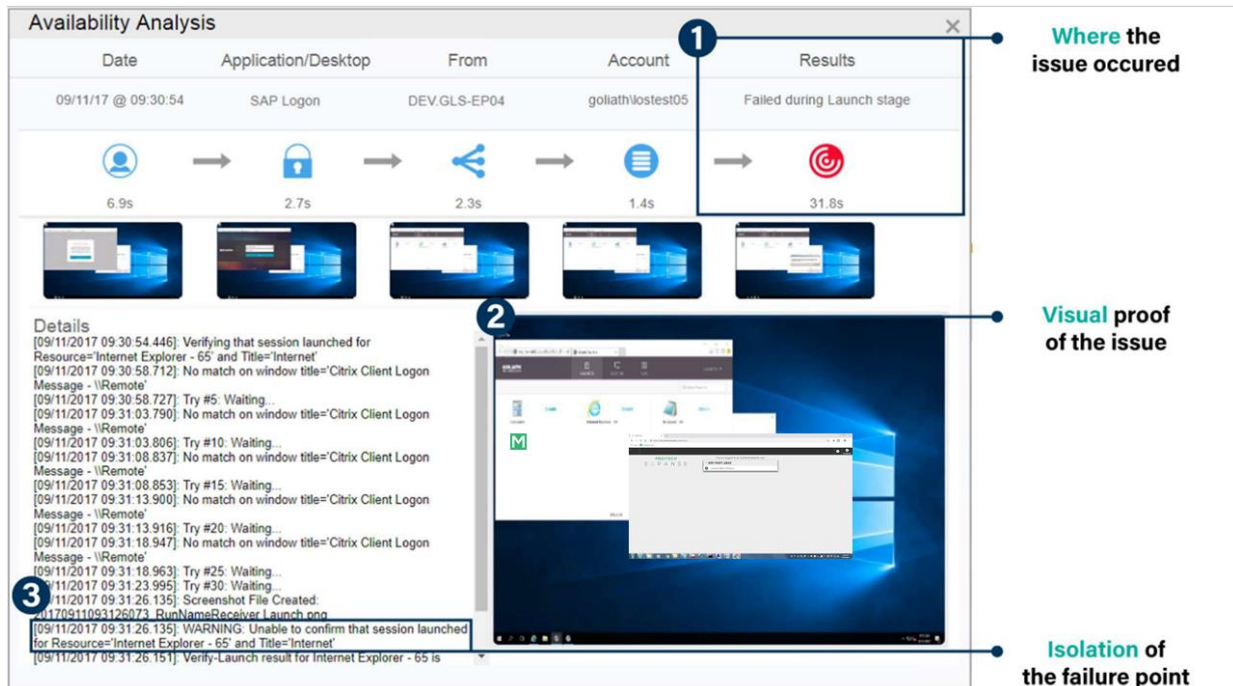
The chat window concludes with a summary statement: "By following these steps, you should be able to identify and resolve the root cause of the slow logon during the server validation stage."

Automated Logons Confirm MEDITECH 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 MEDITECH 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 MEDITECH 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.

Physical Layer:

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.

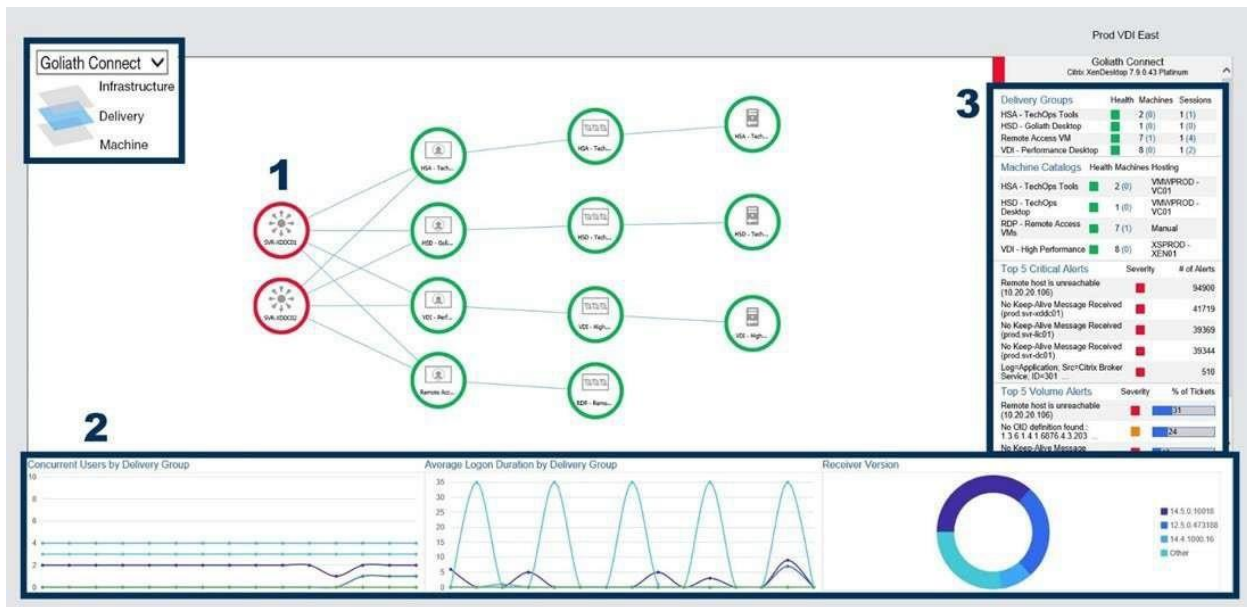


Critical Components Highlighted in the above image:

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.

Delivery Layer:

1. Shows the logical connections and dependencies of your Citrix environment by delivery group, machine catalog, and down to the specific image.
2. Correlates end user experience metrics for the selected delivery groups.
3. Delivers context sensitive metrics for any selected component.



Machine Layer:

1. In addition to the delivery group elements, the machine layer displays Citrix PVS and/or MCS as well as the hypervisor resources and hosts.
2. The details on the right pane will update according to the selected node.

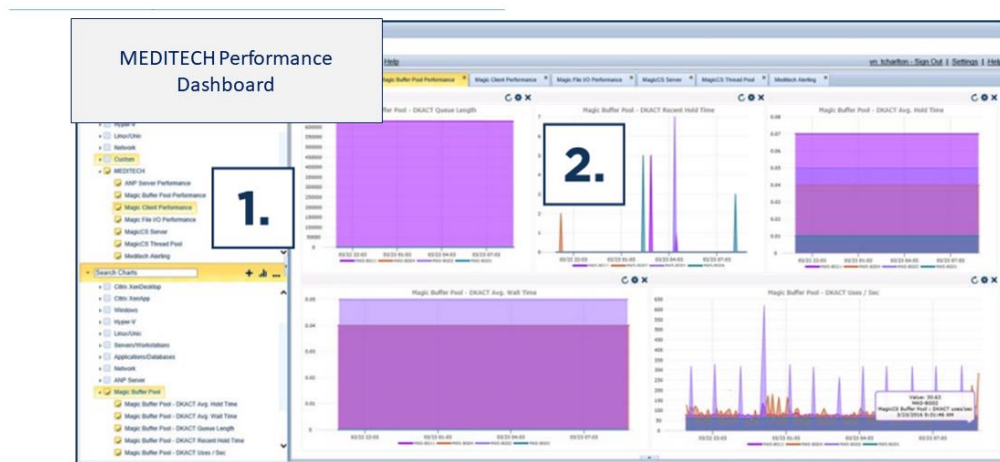


Real-Time Citrix Performance Graphs

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.

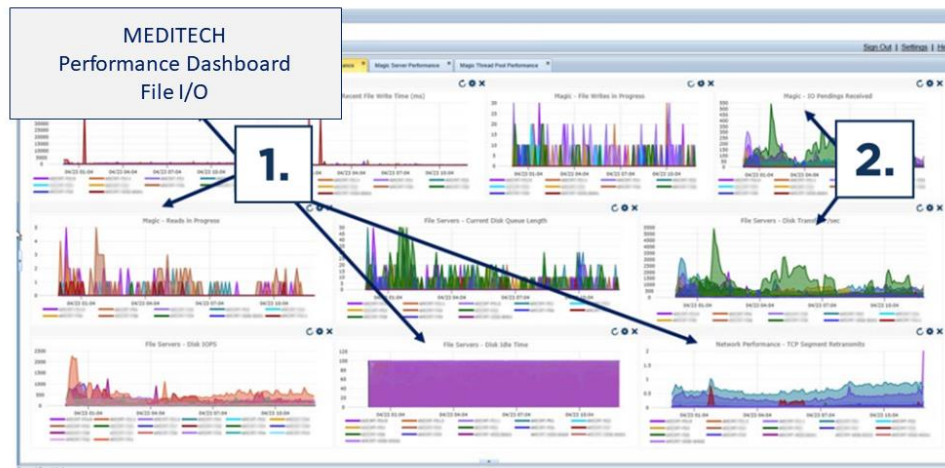
MEDITECH Performance Graphs

Goliath's MEDITECH module includes specific performance graphs to trend MEDITECH specific counters as well as resource utilization for each server to identify faults and errors. The MEDITECH module includes specific dashboards for Pool performance, ANP Server performance, I/O Performance, Server Performance and more.



The image above is a MEDITECH performance dashboard offering five layers of visibility in one console to view Hardware, Host, VM, OS, and MEDITECH performance data.

1. View MEDITECH and the entire supporting infrastructure in one view.
2. Use dashboard with corresponding alerts to determine spikes versus trends.



The image above is the MEDITECH File I/O performance dashboard that tracks MEDITECH, Windows, and Storage data in a single view.

1. Single view to trending metrics around MEDITECH, Windows, Storage, and Network performance all in one console.
2. Correlate data between MEDITECH performance and disk performance.



The image above tracks the availability of the environment to support additional growth by tracking the number of threads available for capacity planning.

1. Servers with available capacity.
2. Maximized servers with no additional capacity.
3. Use with corresponding alerts to determine spikes vs. trends.



The image above is the MEDITECH Server performance dashboard that identifies spikes in transaction requests and trends transaction volume.

1. High transaction queue lengths causing slowness.
2. Server imbalance: majority of traffic handled by just two servers.

Correlate End-User Experience Performance Metrics

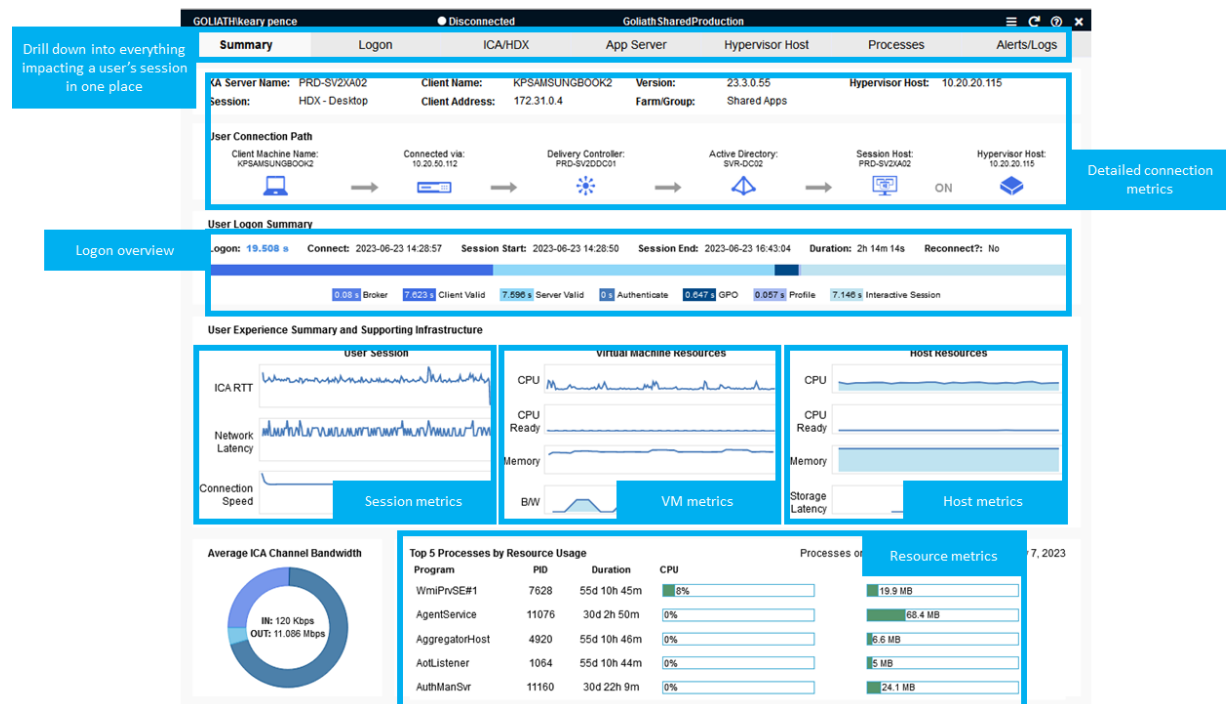
Goliath provides granular real-time and historic data for all Citrix Sessions. When there are end user experience issues, administrators can drill into an individual user session to gain deeper visibility and identify the root cause.

GOLIATH TECHNOLOGIES															
Citrix Virtual Apps and Desktops															
Virtual Desktops															
Virtual Ma...	Summary ...	User	Org Unit	CPU Use	Avg...	Memory Use	Logon	ICA Latency	Avg. ICA Lat...	Group Name	Clie...	Client Add...	Version	Broker Name	Start Time
WS-RHANLON	Disconnected	McLeod, Hen	Goliath	43%	3%	20%	7.5s	6s	31ms	24ms	Remote Acce...	172.31.0.24	23.01.0.16	SVR-XDDC01	2023-05-14 1...
WS-HMCLEOD	Disconnected	McLeod, Hen	Goliath	42%	6%	10%	6s	31ms	24ms	Remote Acce...	172.31.0.24	23.01.0.16	SVR-XDDC01	2023-05-14 1...	10:20:50:56
WS-FLOYD	Disconnected	Floyd Roberts	Service Acc...	34%	3%	23%	0.9s	0ms	2ms	Remote Acce...	10.20.66.55	23.3.0.55	SVR-XDDC01	2023-05-10 1...	10:20:50:56
WS-HMCLEOD	LoggedOff	McLeod, Hen	Goliath	32%	6%	50%	1.8s	31ms	31ms	Remote Acce...	172.31.0.7	23.01.0.16	PRD-SV200...	2023-05-10 1...	10:20:50:56
WS-RHANLON	LoggedOff	McLeod, Hen	Goliath	23%	1%	18%	14.9s	3ms	3ms	Remote Acce...	10.20.100.173	21.12.1.4030	SVR-XDDC02	2023-05-23 1...	10:20:50:56
WS-FLOYD	Disconnected	Floyd Roberts	Service Acc...	23%	5%	8%	1.9s	3ms	3ms	Remote Acce...	10.20.66.55	23.3.0.55	SVR-XDDC01	2023-05-05 1...	10:20:50:56
WS-HMCLEOD	LoggedOff	McLeod, Hen	Goliath	21%	18%	41%	1.8s	16ms	25ms	Remote Acce...	172.31.0.2	23.01.0.16	PRD-SV200...	2023-06-01 1...	10:20:50:56
WS-HMCLEOD	Disconnected	McLeod, Hen	Goliath	20%	6%	47%	2.4s	16ms	36ms	Remote Acce...	172.31.0.2	23.01.0.16	PRD-SV200...	2023-05-10 1...	10:20:50:56
WS-HMCLEOD	LoggedOff	McLeod, Hen	Goliath	19%	6%	49%	1.5s	78ms	20ms	Remote Acce...	172.31.0.2	23.01.0.16	PRD-SV200...	2023-06-21 1...	10:20:50:56
WS-HMCLEOD	LoggedOff	McLeod, Hen	Goliath	19%	6%	52%	2.3s	31ms	27ms	Remote Acce...	172.31.0.2	23.01.0.16	PRD-SV200...	2023-05-08 0...	10:20:50:56
WS-FLOYD	Disconnected	Floyd Roberts	Service Acc...	17%	4%	16%	3.3s	0ms	0ms	Remote Acce...	10.20.66.55	23.3.0.55	SVR-XDDC01	2023-05-10 1...	10:20:50:56

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.



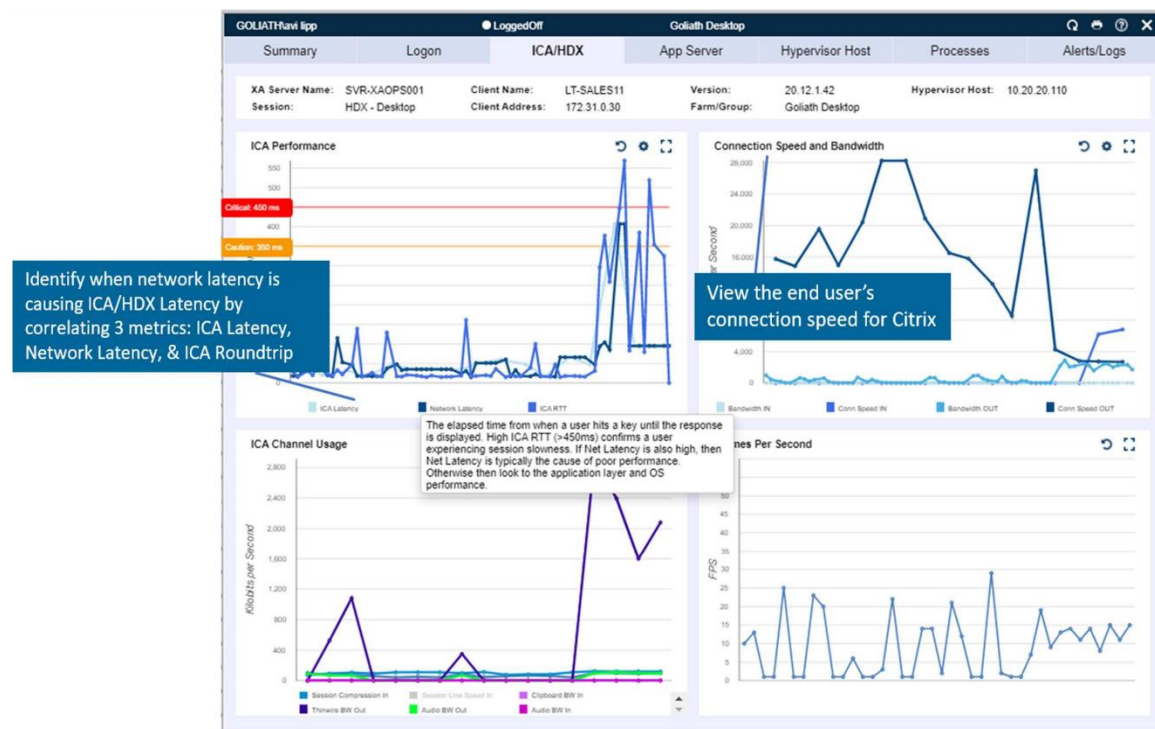
Real-Time ICA Channel Drill Down from Session Display

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
- Keyboard and Mouse Bandwidth
- Thinwire Bandwidth
- DCR Bandwidth
- Multimedia Bandwidth
- And more!

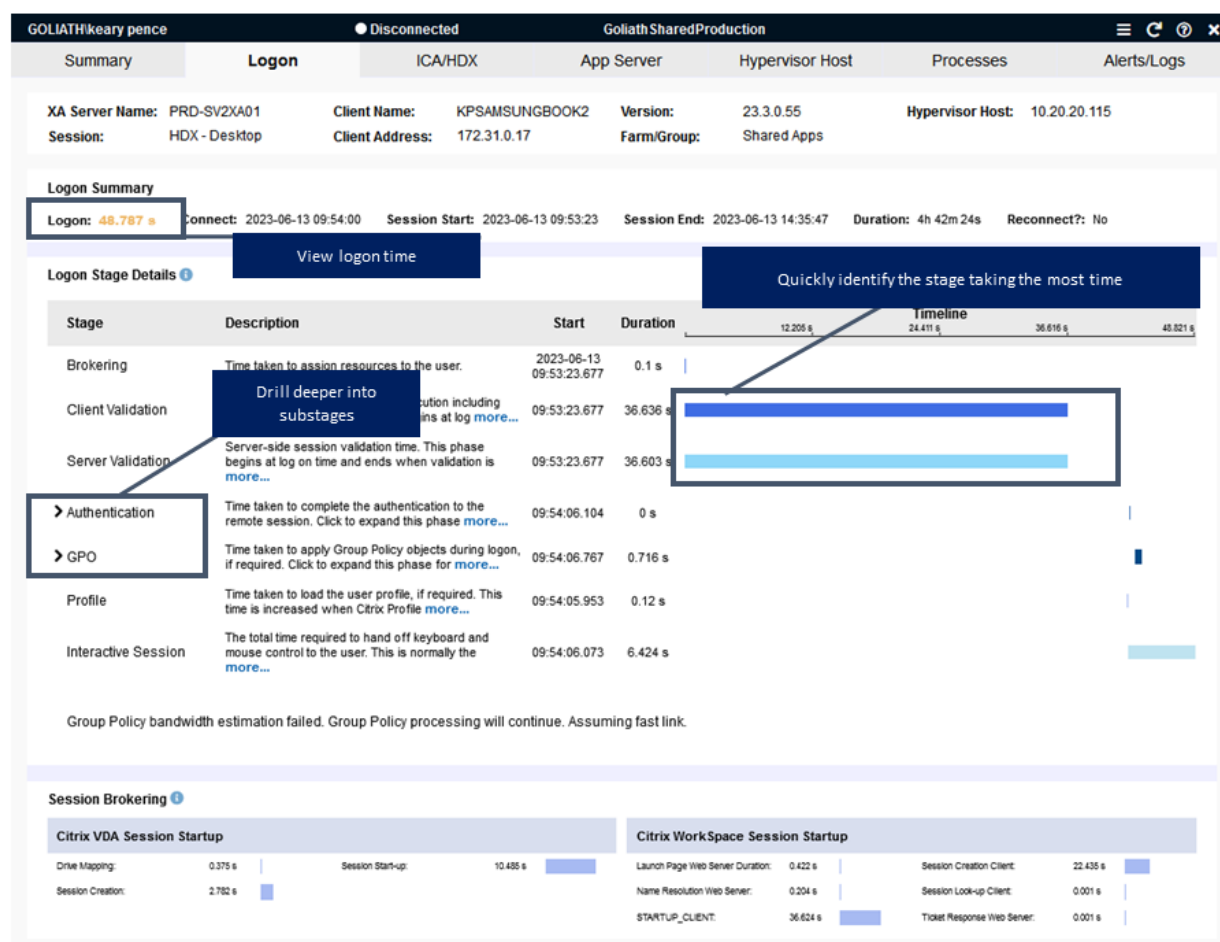
Goliath has the ability to trend ICA Latency for a user session, as well as ICA/HDX channels, which can help identify performance bottlenecks. IT admins can view this data in context of other session metrics or drill down into more detail under the ICA/HDX tab. Similarly, Goliath Performance Monitor will provide detailed protocol and channel metrics for PCoIP/BLAST for VMware 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
- Citrix Profile Management
- Drive Mapping
- Printer Mapping
- OU Policy Execution

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

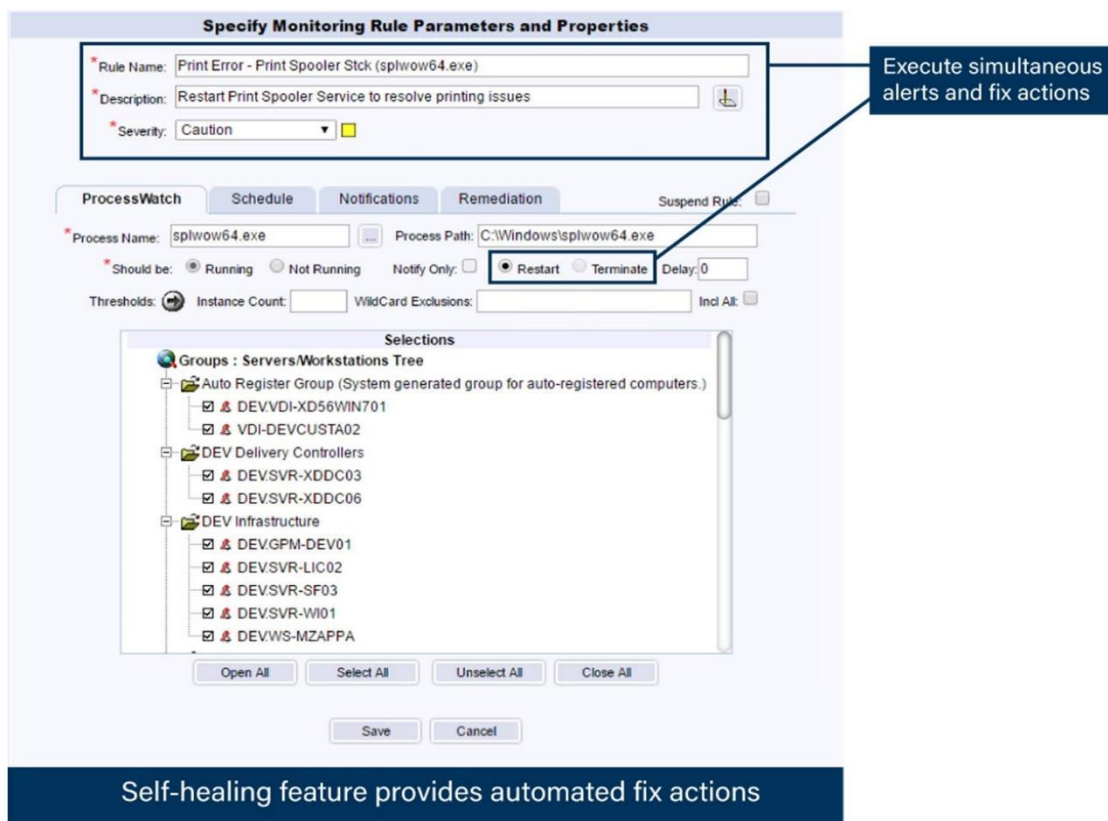
Embedded Intelligence and Automation

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

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.



Example User Story: Augusta Health IT Resolves MEDITECH and Citrix End-User Issues and Improves Patient Care

Augusta Health is a community hospital with 4,000 MEDITECH end users and 255 physicians. The challenge was that the hospital lacked a purpose-built technology that brought together the three key components of their IT infrastructure that impact the end-user experience with the EHR application: MEDITECH, Citrix XenApp, and VMware. Not having a single software solution that gave Augusta Health visibility and performance data from MEDITECH, Citrix XenApp, and VMware caused significant issues when we attempted to resolve complaints or support tickets that claimed MEDITECH was slow. Historically, the IT team deployed multiple products and utilities to manually disqualify each potential failure point until they determined the root cause. The other problem was that we spent more time figuring out what wasn't causing the end-user performance issues than what was.

Becoming Proactive with a Simplified Solution

While Augusta Health was working to find fixes for performance issues, they began defining specific IT requirements for a technology that would solve their problems based on the gaps in visibility, such as: 4 MEDITECH servers and how they were performing 4 Deep performance metrics on Citrix XenApp and all of their VMware virtual machines, and 4 End-user experience, such as Citrix logon duration and Citrix ICA/HDX latency. As they searched for the type of solution that could meet their needs, they realized it would require a tremendous investment in licensing, consulting, customization, or deployment of The Standard in Health IT | goliathtechnologies.com 14 multiple products. And although VMware offers vCenter Operations Manager, it didn't give them visibility into any data outside of VMware, like MEDITECH and Citrix, so it required Augusta Health to consider additional products to find and fix the root cause of end-user performance issues.

The Solution

August Health selected Goliath Technologies because it brings together, in one console, the performance metrics for MEDITECH, Citrix XenApp, and VMware along with actual end-user behavior details. Once deployed, August Health used Goliath to:

- Reduce troubleshooting times by being able to immediately see their entire MEDITECH and VMware server infrastructure to quickly rule things out as potential root cause issues. For instance, they could quickly rule out host, storage latency, memory, and CPU on all their MEDITECH and VMware servers.
- Improve end-user performance and put a stop to the blame game. If Augusta Health has a clinician complaining that MEDITECH is slow, they now have actual data on whether it is MEDITECH and why or why not. The IT team is armed with real-time details of each logon stage and Citrix ICA channel utilization to more effectively determine the root cause of "slow." The blame game has stopped cold with objective evidence as to the root cause of the issue. And, often, it isn't the MEDITECH application.
- Proactively manage Citrix using performance metrics pertaining to a clinician's Citrix session (both logon times and performance in session) enabling the IT team to compare reported slowness to actual values and trends over time.

Get started today with a free
[demo](#) or a [trial](#) of

GPM for MEDITECH



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BE PROACTIVE