TECHNICAL OVERVIEW

Technical Overview: VMware Horizon

Goliath Performance Monitor

"Goliath is a great alternative to vRealize Operations. It's easy to setup and deploy, has the ability to create simple overview of the metrics required for troubleshooting. Also, the ability to monitor application availability is a great feature to troubleshoot one part of the user experience that is often quite neglected."

- Johan Van Amersfoort

VMware EUC Champion, VCDX-DTM, and author of VDI Design Guide

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Goliath Technologies: Product Overview

This product overview document highlights some of the differentiating features Goliath Technologies offers that are currently unavailable with any other solutions in the marketplace today. These capabilities enable organizations to proactively monitor and troubleshoot not only their VMware Horizon environments but associated end-user experiences. As a member of the VMware TAP program, Goliath works alongside VMware product managers to bring to market solutions which allow VMware customers to improve the experience for their end users.

Transforming IT from Reactive to Proactive

Goliath Technologies offers IT professionals monitoring and troubleshooting software with embedded intelligence and automation that is purpose-built to help IT proactively anticipate, troubleshoot and prevent end-user experience issues - regardless of where IT workloads or users are located. By doing so, Goliath helps IT break out of reactive mode, into proactive mode.

Goliath provides IT teams an end-to-end view across the end-user experience, the IT delivery infrastructure (includes Citrix and/or VMware Horizon) and, if in healthcare, associated EHR applications (Epic, Cerner, MEDITECH, Allscripts). This view includes granular metrics that help IT quickly troubleshoot and resolve issues in hours, not days. In addition, early warning alerts and reports can be automated to anticipate issues before they occur, preventing them from ever impacting an end user. Finally, by leveraging objective evidence, in the form of reports and analytics, IT teams can effectively diagnose root cause and collaborate with management, cross-departmental counterparts and vendors to deliver permanent resolutions.

Anticipate

- Holistic view and correlation of insights combining end-user experience, Citrix or VMware Horizon delivery infrastructure and application (i.e. EHR) metrics all within a single view.
- Proactive proof of Citrix or VMware Horizon availability with automated end-user logons from key locations to confirm all aspects of the delivery infrastructure and applications are available and performing as expected.
- Preemptive, threshold-based alerting to monitor common failure points and alert if any of those points exceed a performance threshold.

Troubleshoot

- Broad and deep metrics around the end-user experience to identify the "where" and the "what" of an issue.
- Historical session data is stored to easily identify when something changed and how it impacted the overall digital workspace experience.
- Deep metrics around logon initiation and duration to identify majority of slowness issues quickly.
- Analysis of Citrix ICA/HDX or VMware Horizon's PCoIP/Blast protocols to quickly identify user behavior impacts to performance.

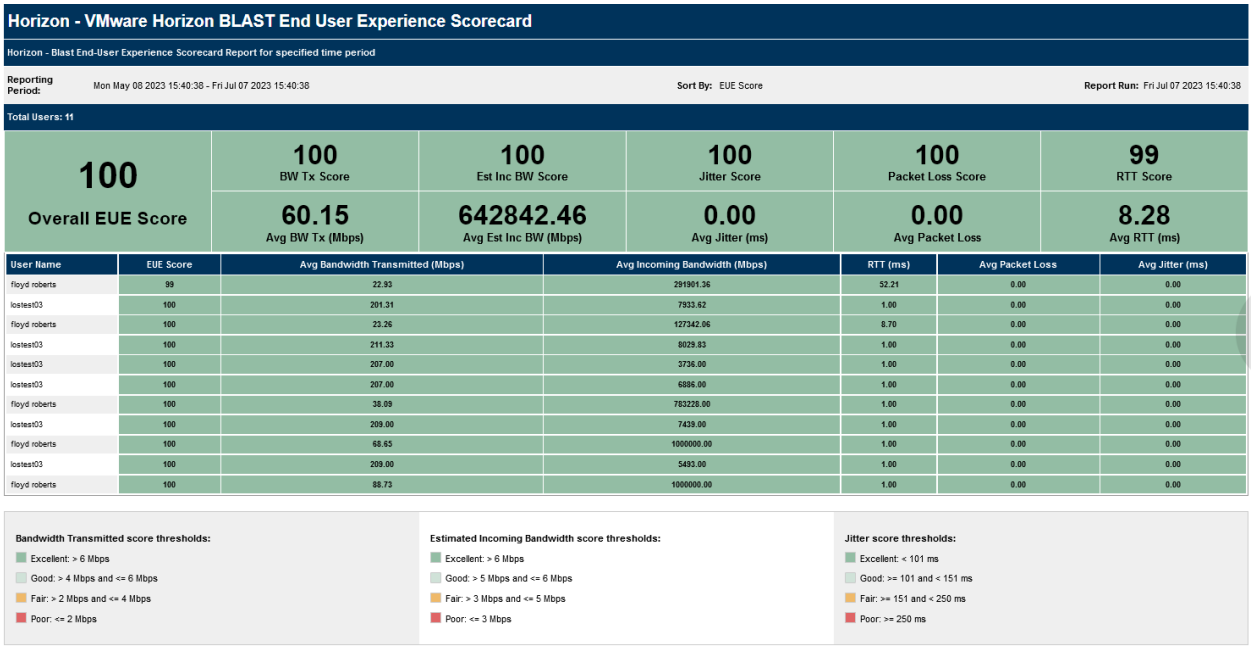
Document

- Goliath's detailed telemetry allows IT professionals to isolate true root cause and then document the issues so permanent fix actions can be put in place. This ends the finger-pointing and focuses resources quickly on solving the issue.
- Screenshots document logon success or failure – including errors previously only seen from the user perspective. This allows you to collaborate efficiently with other teams, vendors, or stakeholders by showing them clear proof of the issues involved without relying on the end user to screen share or describe the conditions.
- Goliath provides out-of-the-box reports and integration to third party reporting tools that provide critical insights into the end user experience trends in your environment, document root cause and provide an analysis of what their end user experience is compared to industry best practices – all aggregated or segmented by location, department, remote worker, or other organizational unit.

Benchmark Your User Experience

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

The Horizon 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 (RTT, Jitter, Bandwidth, and Packet Loss). This capability expedites cross-departmental analysis and streamlines both IT operations and IT management's ability to act confidently on objective data.



Horizon - VMware Horizon BLAST End User Experience Scorecard

Horizon - Blast End-User Experience Scorecard Report for specified time period

Reporting Period: Mon May 08 2023 15:40:38 - Fri Jul 07 2023 15:40:38 | Sort By: EUE Score | Report Run: Fri Jul 07 2023 15:40:38

Total Users: 11

100 Overall EUE Score	100 BW Tx Score	100 Est Inc BW Score	100 Jitter Score	100 Packet Loss Score	99 RTT Score
	60.15 Avg BW Tx (Mbps)	642842.46 Avg Est Inc BW (Mbps)	0.00 Avg Jitter (ms)	0.00 Avg Packet Loss	8.28 Avg RTT (ms)

User Name	EUE Score	Avg Bandwidth Transmitted (Mbps)	Avg Incoming Bandwidth (Mbps)	RTT (ms)	Avg Packet Loss	Avg Jitter (ms)
floyd roberts	99	22.93	291901.36	52.21	0.00	0.00
lostest03	100	201.31	7933.62	1.00	0.00	0.00
floyd roberts	100	23.26	127342.06	8.70	0.00	0.00
lostest03	100	211.33	8029.83	1.00	0.00	0.00
lostest03	100	207.00	3736.00	1.00	0.00	0.00
lostest03	100	207.00	6886.00	1.00	0.00	0.00
floyd roberts	100	38.09	783228.00	1.00	0.00	0.00
lostest03	100	209.00	7439.00	1.00	0.00	0.00
floyd roberts	100	68.65	1000000.00	1.00	0.00	0.00
lostest03	100	209.00	5493.00	1.00	0.00	0.00
floyd roberts	100	88.73	1000000.00	1.00	0.00	0.00

Bandwidth Transmitted score thresholds:
- Excellent: > 6 Mbps
- Good: > 4 Mbps and <= 6 Mbps
- Fair: > 2 Mbps and <= 4 Mbps
- Poor: <= 2 Mbps

Estimated Incoming Bandwidth score thresholds:
- Excellent: > 6 Mbps
- Good: > 5 Mbps and <= 6 Mbps
- Fair: > 3 Mbps and <= 5 Mbps
- Poor: <= 3 Mbps

Jitter score thresholds:
- Excellent: < 101 ms
- Good: >= 101 and < 151 ms
- Fair: >= 151 and < 250 ms
- Poor: >= 250 ms

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.

An Early Warning System

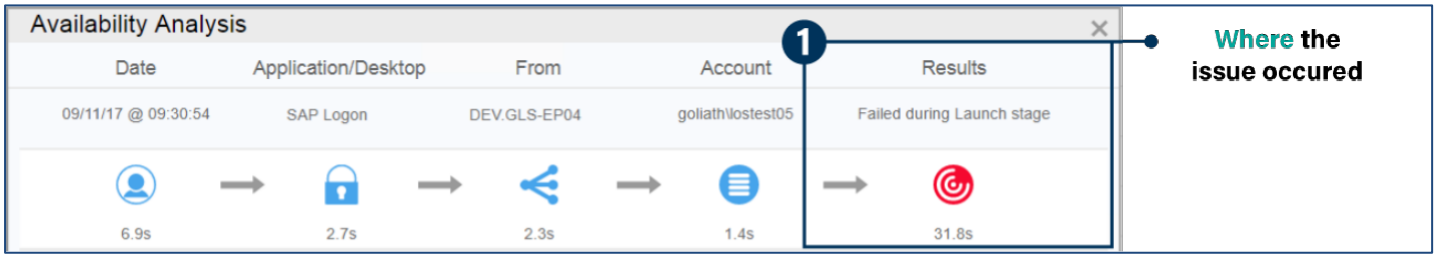
Goliath is the industry's only proactive, production-ready end-user experience software that validates availability of the entire VMware Horizon delivery infrastructure. It intelligently ensures availability by executing real VMware sessions that exercise the exact same steps a user takes during the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

Illustrated Below: (1) The Application Availability Monitor Dashboard displaying a real-time assessment of VMware availability and then (2) breaking down launch times by stage.

End User Screenshot Analytics

The Goliath Virtual User proactively accesses VMware Horizon and other mission-critical applications just like a real user. This provides hard data on what will happen when an actual user logs on from their location and begins launching applications. IT professionals are alerted immediately if an issue occurs, and the system provides specific data on where the failure happened. This allows IT to identify root cause and troubleshoot quickly before actual users are impacted.

When there is a logon failure, an administrator will be alerted immediately. Using the virtual user logon details, an administrator can quickly pinpoint where the failure occurred and the root cause. What the administrator will see is if an issue occurred is an exact snapshot of where the issue occurred as shown below.



Below that then the administrator will see screenshot evidence of exactly what the virtual logon screened looked like and what applications were launched at each step of the logon process.

Finally, with details spelled out for each stage at each second, administrators can quickly see that the launch failed at a specific point in time (like launching Google Chrome).

Proactive Monitoring and Troubleshooting

Real-Time VMware Performance Metrics

Goliath for VMware Horizon consolidates all the pertinent data about your infrastructure into a single view for broad and deep visibility into VMware vSphere and the end-user experience. You get metrics for 5 layers (Hardware, Host, VMs, OS, Apps) of the VMware Horizon infrastructure in the form of detailed screens and customizable performance graphs.

- **RDSH Host Display**: Number of users, sessions, and resource utilization
- **Real-time Session Display:** user, farm/site, machine, session ID, session start, duration, logon time, CPU usage, memory, RTT and more
- **PCoIP Blast Protocol Metrics:** RTT, bandwidth, channels, FPS, session latency, packet loss
- **Server Info:** CPU, memory, disk drives, host latency, datastore usage, queue length, IOPs, storage latency
- **Logon Duration**: All stages of the logon process for precise troubleshooting
- **End-User Experience**: Pertinent metrics to quickly determine a user's experience

VMware Delivery Infrastructure Performance

Goliath provides visibility into the underlying delivery infrastructure supporting VMware Horizon including:

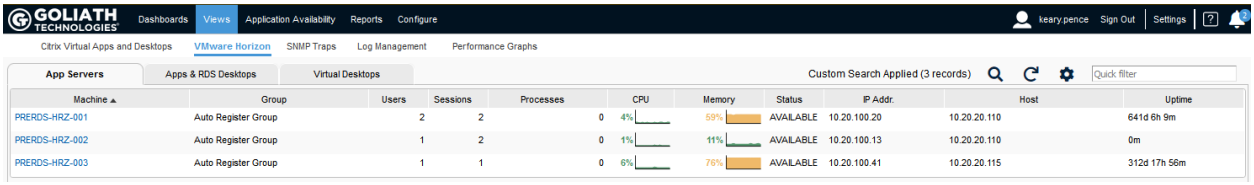
- vSphere hosts
- Connection servers
- Secure gateway'
- RDSH servers
- Supporting infrastructure such as:
  - Active Directory,
  - Back-end applications
- And more

This enables administrators to quickly identify the root cause whether it be due to specific user behavior, impacting a focused group of users, or impacting everyone due to a core infrastructure challenge.

Integrated RDSH Hosts Display

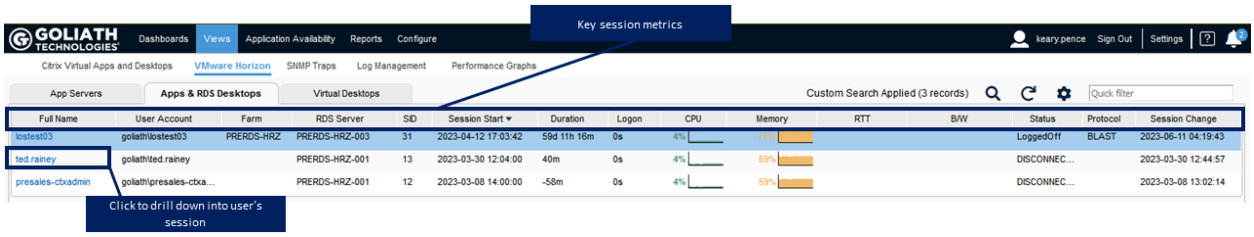
Goliath for VMware Horizon provides a single place to view all the RDSH servers, the number of users, sessions, and resource utilization of each. With a single glance, administrators can immediately determine if:

1. An RDSH server is overloaded with users which may indicate a load balancing issue.
2. The environment is properly balanced or if certain servers have more users than others.
3. User activity may be generating high CPU or Memory conditions



Real-Time Session Display

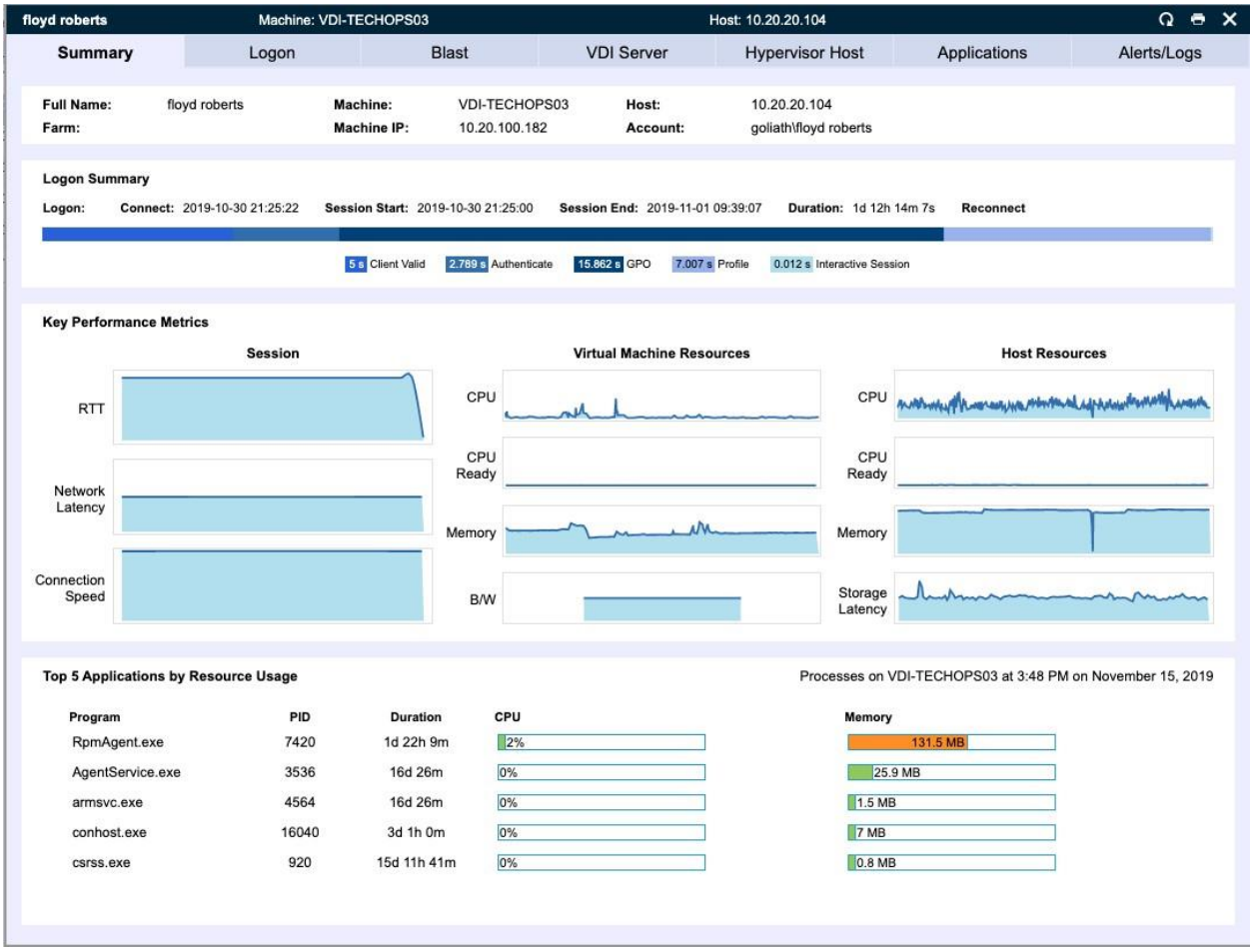
Goliath provides granular real-time and historic data for all VMware Horizon sessions. When there are end-user experience issues, drill into a user session to gain deeper visibility and identify the root cause.



In Session Real-Time Analytics Overview

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 PCoIP/BLAST, 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.

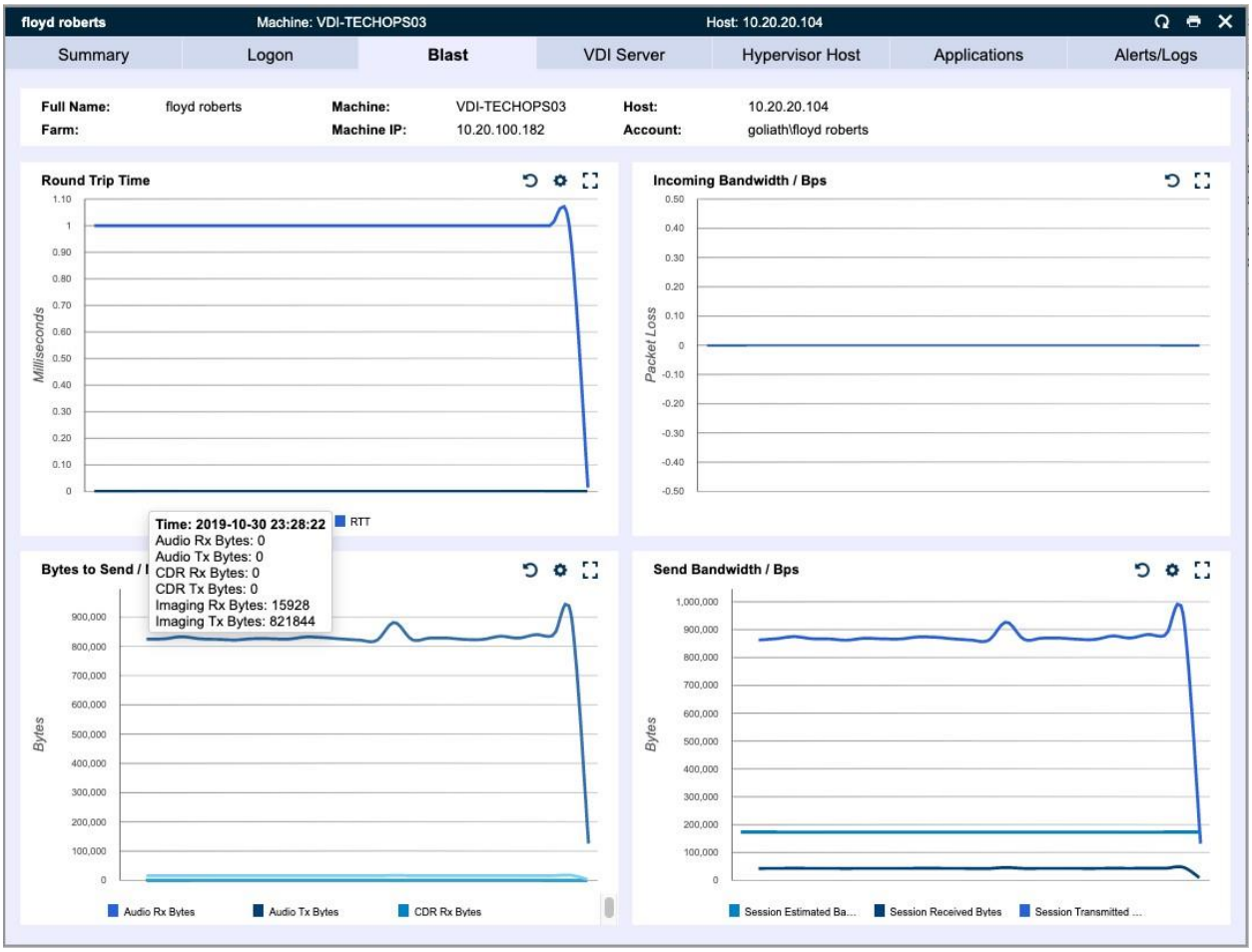


Real-Time PColP/BLAST Drill Down from Session Display

Goliath provides industry-leading visibility into VMware Horizon session performance by breaking down the PColP/BLAST protocol into its key parts. Viewing these metrics in a single dashboard gives administrators the ability to quickly identify relationships between user behavior and connection performance.

Details metrics include:

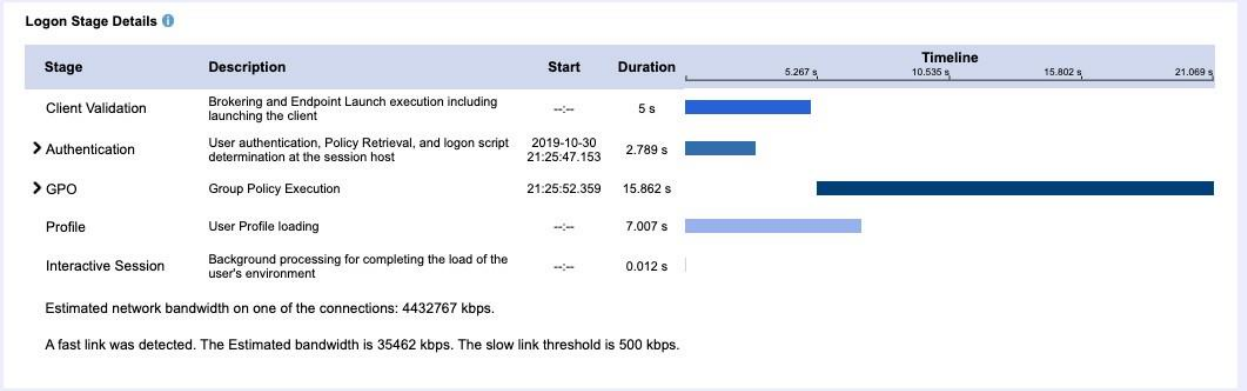
- **Round Trip Time:** Round Trip Time is the primary indicator of user experience. Values over 400ms are indicative of poor performance. RTT includes network latency, server TCP load, and presentation layer response time in the calculation.
- **Bandwidth:** These charts include the bandwidth usage and break it down into various factors analyzing bandwidth at different channels. For example, on the bottom left chart you can see audio bandwidth.



Real-Time VMware Horizon Logon Duration Drilldown

If you can't drill down into all of the detailed stages of the VMware Horizon logon process, then you can't isolate and fix root cause of logon slowness. With the VMware Logon Duration monitoring and troubleshooting functionality, you can capture real-time Logon Duration times and get alerted to end user logon slowness on all of the detailed Logon Duration Stages.

The real-time 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.



The logon duration drill down allows an administrator to parse logon times into each stage, policy, application and machine. This includes the details from the time that the connection server determines where the user is connecting to (RDSH Server or VDI) to the point where the session is fully established. The same capability is present for both VDI and RDSH published applications and desktops.

These stages include:

- Client Validation
- Authentication
- Group Policy Processing
- Profile Loading
- Interactive Session

Embedded Intelligence for Common Failure Points

Goliath Performance Monitor comes with "embedded intelligence" consisting of hundreds of pre-configured monitoring rules and alerts based upon best practices from VMware and our own Goliath consulting experience. This means that, immediately upon deployment; the product begins using this embedded intelligence to automatically search out these known failure points and conditions. This out-of-the-box functionality simplifies deployment and allows for administrators to immediately begin focusing on improving environmental bottlenecks or failure points. These alerts scan for common problems end users may encounter:

- Applications: crashes, hangs, leaking CPU and memory
- Profile: profile corruption, temporary profiles, profile load failures, insufficient rights
- Printing: printing service failures, printer driver issues, printer mapping, and driver compatibility
- Registry: registry corruption, profile load failures, registry loading failures

VMware Virtual Machine Alert	ServerWatch	Critical
VMware Host Alert	ServerWatch	Critical
VMware Horizon View- Connection Server Errors Events	EventLogWatch	Critical
VMware Horizon View - Session & Server Performance	ServerWatch	Critical
VMware Horizon View - Connection Server Logs	SyslogWatch	Normal
Vmware Horizon Security Server- View Security Gateway Component	WinServicesWatch	Critical
VMware Horizon Security Server- Framework Component	WinServicesWatch	Critical
VMware Horizon Security Server - Security Server	WinServicesWatch	Critical
VMware Horizon Security Server - PCoIP Secure Gateway	WinServicesWatch	Critical
VMware Horizon Security Server - Blast Secure Gateway	WinServicesWatch	Critical
VMware Horizon Connection Server - Web Component Service	WinServicesWatch	Critical
VMware Horizon Connection Server - VMwareVDMDS	WinServicesWatch	Critical
VMware Horizon Connection Server - PCoIP Secure Gateway	WinServicesWatch	Critical
VMware Horizon Connection Server - Message Bus Component	WinServicesWatch	Critical
VMware Horizon Connection Server - Framework Component	WinServicesWatch	Critical
Vmware Horizon Connection Server - Connection Server Service	WinServicesWatch	Critical
VMware Horizon Connection Server - Blast Secure Gateway Service	WinServicesWatch	Critical

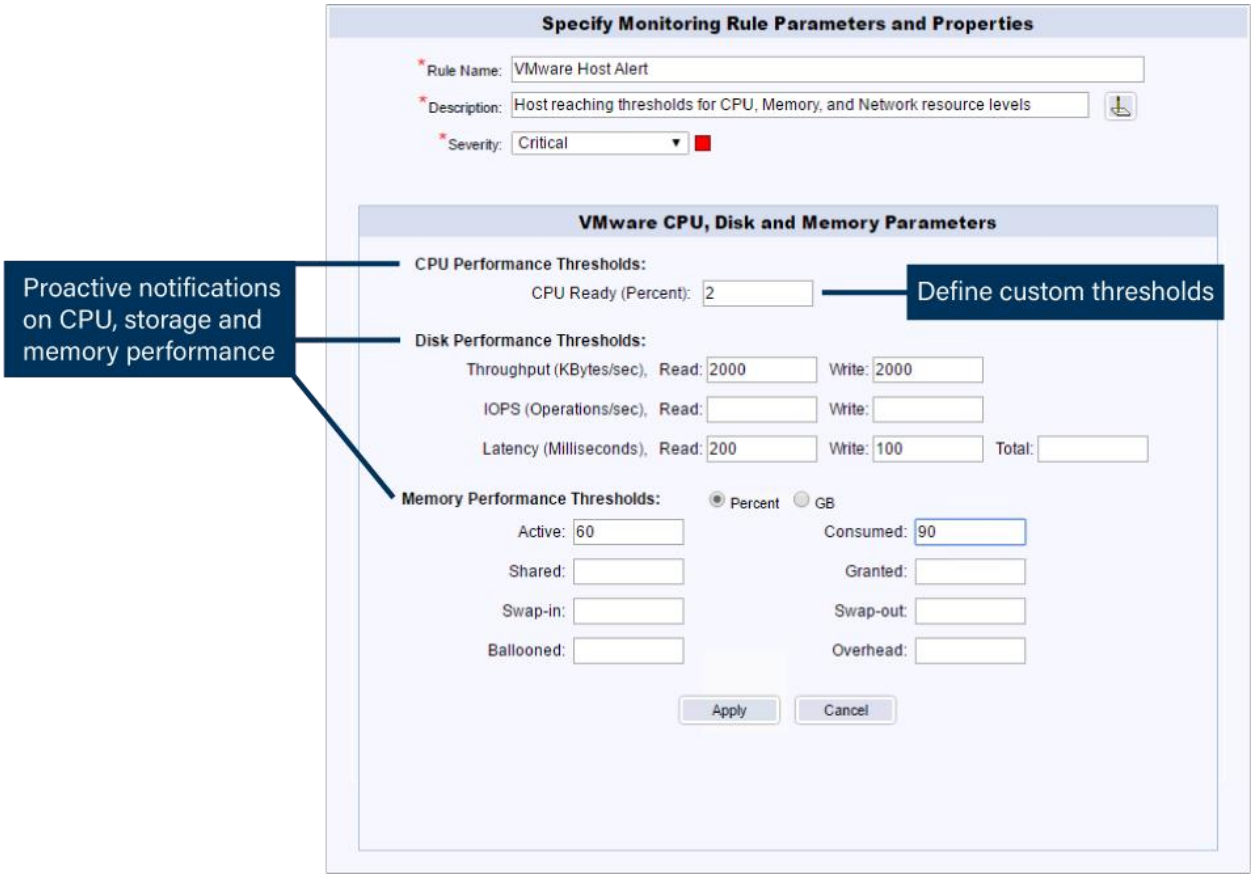
Advanced Remediation Capabilities to Improve

Troubleshooting

Goliath goes beyond providing differentiating VMware Horizon visibility and granular metrics by also delivering unique operational features that allow organizations to take the next step in improving operational IT troubleshooting and Help Desk workflows.

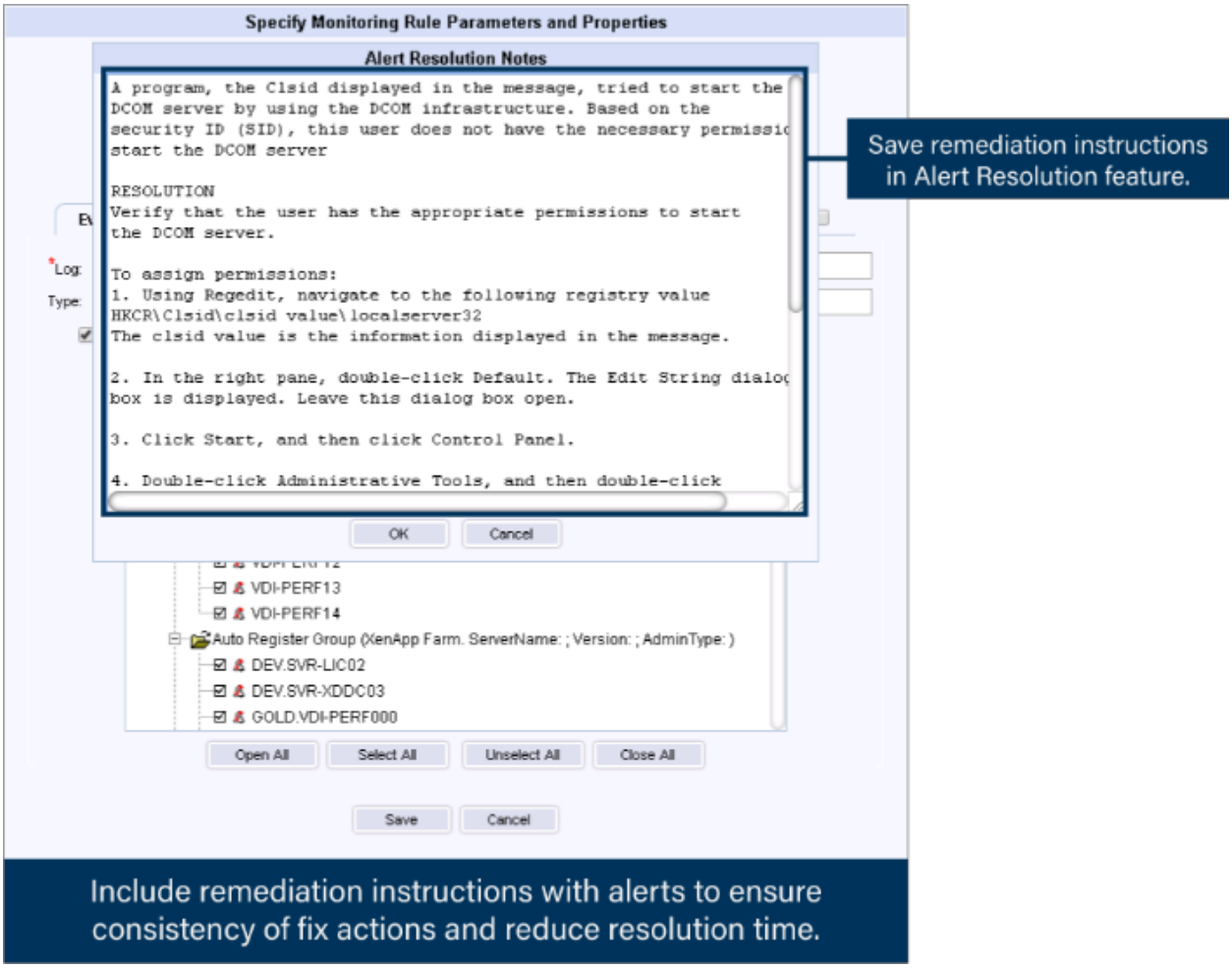
Threshold-Based Alerting

Define custom thresholds and receive proactive notifications based on faults, errors, and conditions so administrators can resolve issues before end users complain. Configuring alerts and tuning them to the specifications of each department requires no scripting or customizations because there are prebuilt templates for each type of alert.



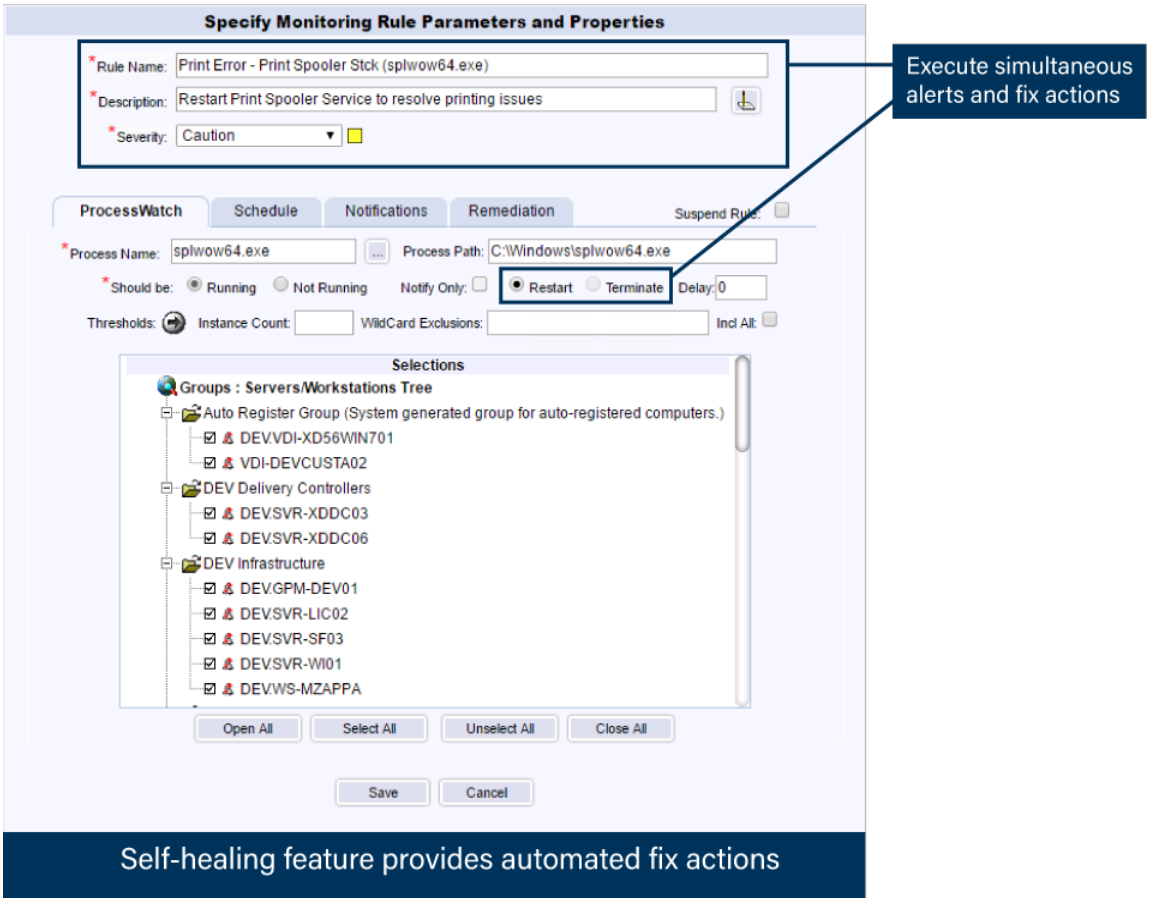
Alert Resolution Feature

For workflows that cannot be automated, Goliath allows administrators to automatically pass on troubleshooting instructions to the appropriate administrators when certain alerts are triggered. This enables consistent response quality regardless of the help desk responder and frees up senior resources for other projects rather than responding to recurring issues.



Automated Remediation Actions

You can configure automatic remediation fixes to take place when certain alerts are triggered based on faults, events or conditions. Whether it be restarting a service or running a PowerShell script, Goliath supports a number of "self- healing" workflows to allow IT organizations to dramatically increase Help Desk response times and implement truly proactive IT processes.



Automated infrastructure fix actions:

- Restart SQL service
- Unlock user account
- Rebalance VDI sessions across host
- Restart ANY application
- Terminate applications processes
- Restart backup job
- Reboot servers

Reporting

Out-of-the-box reports allow administrators to report on session activity, trending faults and errors, and trend performance. Whether for troubleshooting or capacity planning, reports in Goliath enable administrators to have a historical reference to environment performance and events.

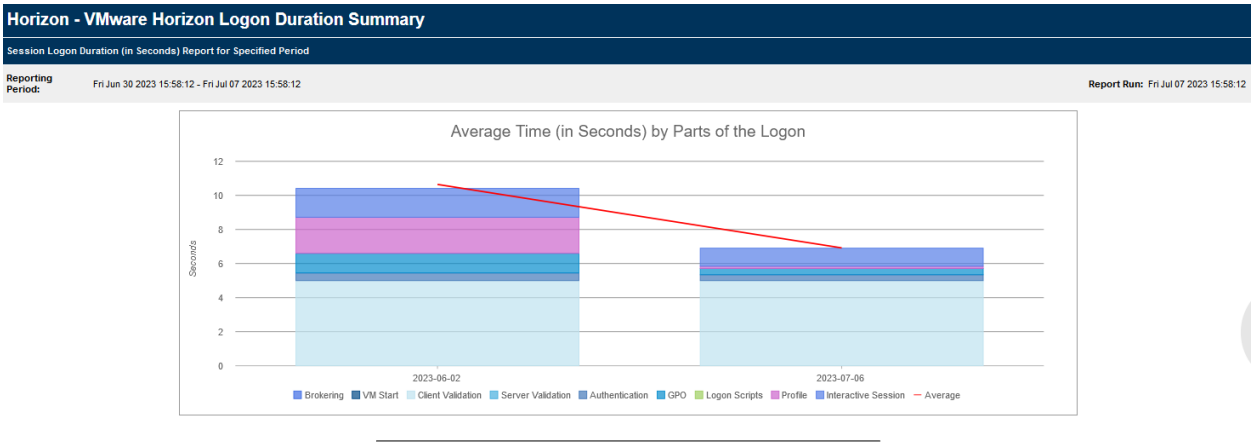
- Horizon End User Experience Reports
- Horizon Logon Duration Summary
- VMware Performance Reports
- VMware ESX/ESXi - Host Performance
- VMware ESX/ESXi - Virtual Machine Performance
- VMware ESX/ESXi - Storage Usage

In order to assist you in proactively managing your entire virtual and physical IT infrastructure, along with your operation systems and network, Goliath offers a variety of IT Infrastructure Performance Reports that can help you get ahead of infrastructure performance issues that may cause end users to experience problems such as printing and profile failures. Here is a sample of reports available:

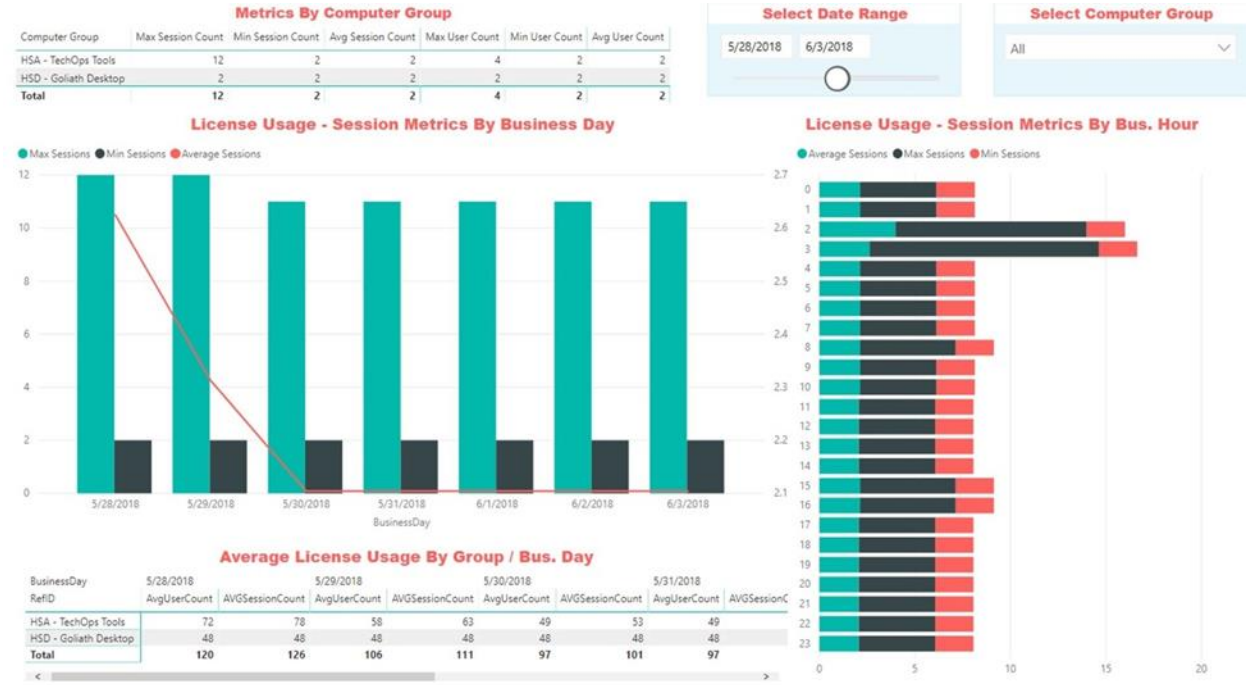
- Alert analysis
- Group policy & registry health
- Logical drive utilization status
- Memory utilization status
- Printing health
- Profile errors
- Registry monitor status
- Sever configuration details
- User security
- Server monitoring rules assignments
- SSL & communication errors
- Syslog message analysis
- Uptime & availability
- Windows event log analysis
- Windows server & configuration errors
- Operating system inventory
- Group inventory

Sample Reports

Horizon Logon Duration Summary: Summary breakdown of logon duration by stage over a set period of time.



License Usage Report: This interactive template shows license usage by group or time period, with adjustable filters for date ranges and specific groups.



Session Logon Duration Pivots: This template shows another way to visualize and interact with Logon Duration data in pivot tables and charts.

End User Activity: This template shows end-user activity by time period and account name. It displays number of sessions, active hours, and session length.

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

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BE PROACTIVE