Total Performance Visibility

What's New in
eG Enterprise v6.2

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Introduction

Version 6.2 is a major release of eG Enterprise that includes many exciting new features that are designed to extend eG Enterprise's monitoring and diagnosis capabilities. Several enhancements to existing capabilities, intelligent analytics, new monitoring capabilities, and performance optimizations are also included. All of these capabilities together are designed to increase the reach of the monitoring solution, enhance the breadth of coverage and overall improve the speed to resolution of performance problems.

Here is a quick summary of what is new in this release:

- **Enhanced Real User Monitoring (RUM**): RUM offers complete, real-time visibility into user-perceived performance. A graphical dashboard helps to quickly identify if user-experience performance issues are being caused by the client, network, content or server.
- **Java Business Transaction Monitoring**: eG Enterprise now provides code-level application performance visibility, implemented as a tag-and-follow approach with an easy-to-use topology view. Transaction monitoring traces the precise time spent in every infrastructure tier, including Java code, SQL statements, third party calls, and more.
- **Virtualization monitoring improvements**: These include inside-outside monitoring support for Nutanix Acropolis hypervisor, Citrix XenServer 7 and VMware Horizon 7, including the new VMware Blast protocol.
- **Citrix monitoring enhancements**: Key advancements include the new Citrix Logon Simulator, GPU monitoring enhancements to extend application-level insights, visibility into active/idle times of user sessions in XenApp and XenDesktop, granular insights into the health of ICA sessions to virtual desktops via NetScaler Insight, and much more.
- **Additional platform and application coverage**: Adding to a list of 180+ applications, 10+ operating systems, and 10+ platforms supported, eG Enterprise 6.2 includes new platform support for Microsoft SQL Server 2016 and Microsoft Exchange 2016. New applications supported include the WildFly application server and Progress database server. Network and storage device support is expanded as well.
- **Expanded analytics capabilities**: New insights include Performance Rating, a customizable, composite metric that provides administrators with easy access to the most tailored and relevant performance indicators possible, plus many new pre-built reports for increased visibility and targeted analysis.

The sections that follow will discuss these changes in great detail.

Performance Monitoring for Web/Java Applications

The toughest performance issues that IT administrators deal with are the ones where users complain that their application is slow. To troubleshoot such complaints, administrators need to first of all be able to see the real user experience that users get when accessing their applications.

eG Enterprise includes synthetic monitoring capability to emulate a specific request to an application and reports availability and performance. Synthetic monitoring checks application performance even when there is no load on an application and therefore, can highlight performance issues in advance. However, synthetic monitoring is based on emulating a fixed sequence of requests to the application. So it does not represent the actual workload.

This is where eG Enterprise's real user monitoring (eG RUM) capability comes in. This technology relies on injecting a small JavaScript code snippet into every page of a web application. When the client browser executes this snippet, performance metrics relating to the request and its response are sent back to the monitoring system. By tracking every single request and response for a web application, eG RUM detects requests that were slow to be responded to. Version 6.2 includes a simplified drilldown into each slow request that helps administrators instantly identify the cause of slowness – whether it is the client, the network, the content or the server-side processing. This information helps administrators determine the next steps for resolving slowness.
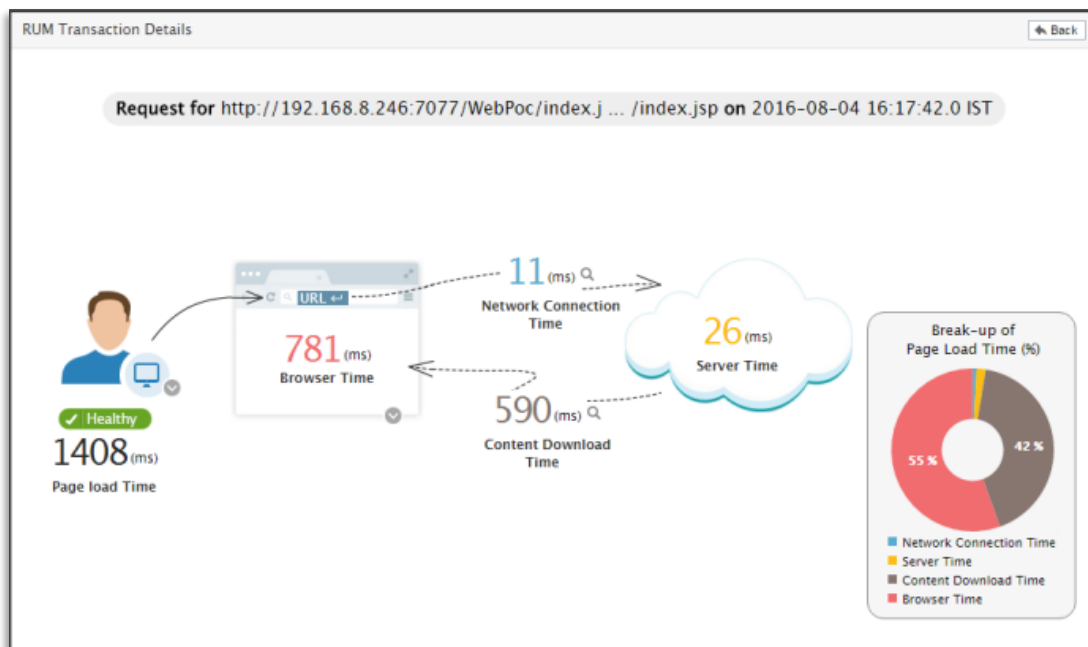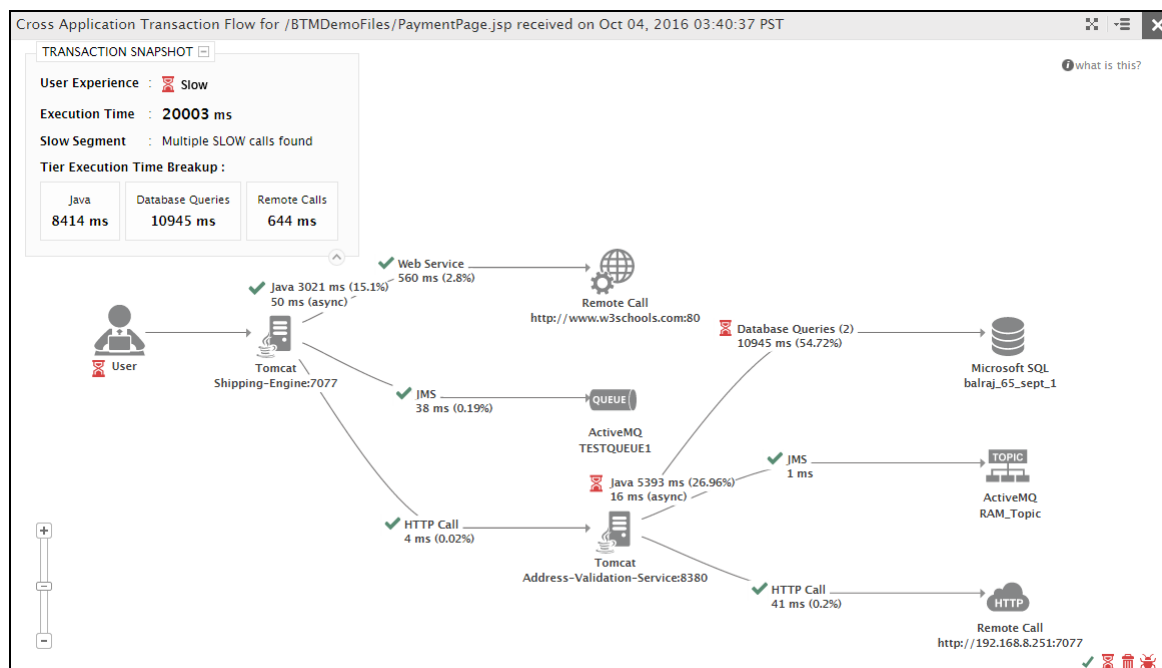

Figure 1: Graphical view of where time is being spent when processing a web request

Besides highlighting the source of slowness, eG RUM also alerts administrators to JavaScript errors that occur during request processing. This enables quick and effective troubleshooting of user experience issues.

What's New in v6.2

When eG RUM highlights that there is slowness on the server-end, administrators still need to determine if the slowness is caused by the application code, or by inefficient SQL queries, or third party API calls, or by infrastructure issues (e.g.., virtualization platform overload, storage bottlenecks, infrastructure service slowness such as Active Directory issues and so on). To determine if application slowness is caused by the application code or by inefficient SQL queries or third party API calls, eG Enterprise 6.2 introduces deeper capabilities for Java Transaction Monitoring (JTM).
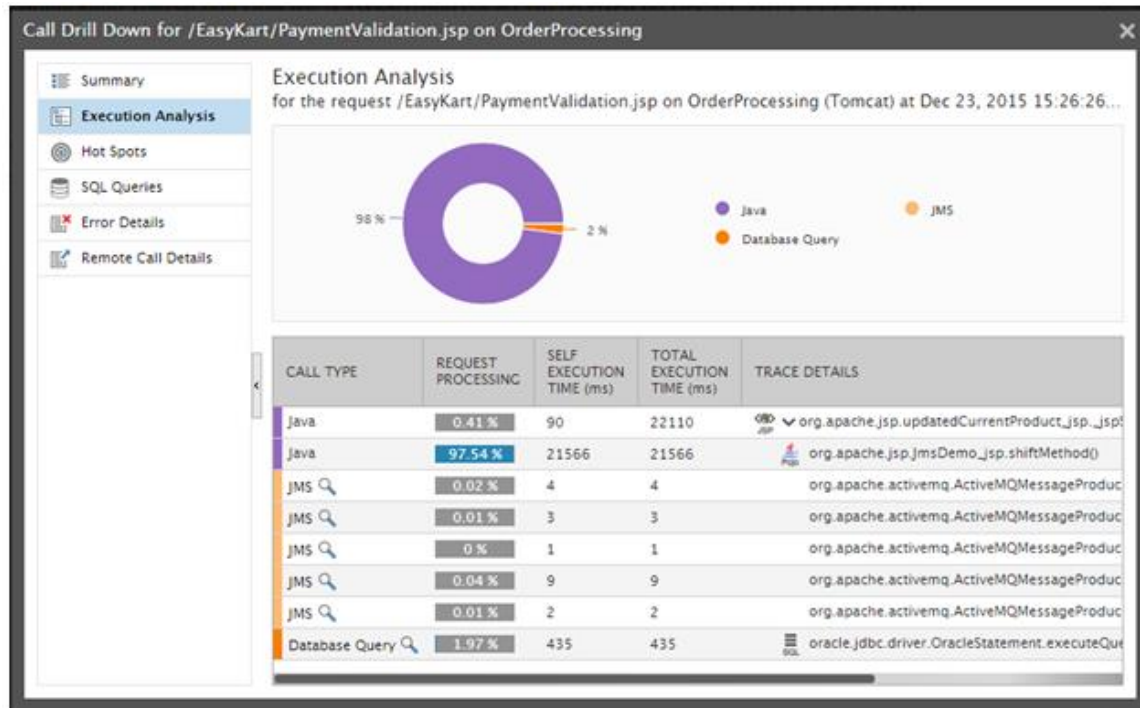
Based on byte-code instrumentation of the Java code, eG JTM employs a 'tag-and-follow' technique to trace the complete path of each business transaction. When doing so, it auto-discovers the applications the transaction travels through, and also automatically ascertains what remote service calls were made by the transaction when communicating with the servers. This knowledge is then translated into an easy-to-understand cross-application transaction flow in the eG monitoring console.

Figure 2: Cross-application flow of a specific slow web transaction

Once the transaction path is determined, the eG JTM measures the total response time of each transaction, the time spent by the transaction on each application server, and the time taken for processing every external service call (including SQL queries).

Using these analytics, the eG JTM precisely pinpoints which access to a web application are slow, stalled, and failed and why. Intuitive icons and color-codes used in the graphical transaction flow enables administrators to accurately isolate where – i.e., on which application server – the transaction was bottlenecked and what caused the bottleneck – an inefficient or errored query to the database? A slow HTTP/S call to another application server? a time-consuming POJO / JMX method execution? a slow SAP JCO/async call? By quickly leading administrators to the source of transaction failures and delays, the eG BTM facilitates rapid problem resolution, which in turn results in the low downtime of and high user satisfaction with the web application.

Figure 3: Execution analysis of a slow transaction on a particular JVM node, accurately pinpointing the exact method call that took too long to execute

While Java transaction monitoring capabilities were available in earlier versions of eG Enterprise, it had several limitations. Transaction tracing across multiple JVMs was not possible. Furthermore, the time taken by SQL queries could be captured, but third party calls including HTTP requests, web services calls, etc. were not handled. The tag and follow approach used in eG Enterprise 6.2 allows transaction tracing across JVM tiers. Furthermore, third party API calls, web service requests, HTTP accesses, etc. are separately tracked now, so third party access slowness can be clearly highlighted. The new graphical interface for displaying the request topology makes it easy for administrators and developers to see where bottlenecks in request processing lie.

eG JTM is effective when application slowness is caused by code level issues. When an infrastructure-level problem is responsible for application slowness, eG Enterprise's unified monitoring capabilities and automated root cause diagnosis is necessary.

Enhancements to Virtualization Monitoring

Monitoring Nutanix Acropolis Hypervisor

The Nutanix solution is a converged storage and compute solution which leverages local components and creates a distributed platform for virtualization. The solution is a bundled hardware and software appliance which houses 2 or 4 nodes. Each node runs an industry-standard hypervisor - namely, VMware ESXi, Microsoft Hyper-V, or Acropolis Hypervisor (AHV). To provide total performance visibility into a Nutanix powered data center, monitoring of the Acropolis Hypervisor is necessary. eG Enterprise v 6.2 provides comprehensive monitoring, diagnosis and

reporting for Nutanix Acropolis. All of the capabilities supported for other hypervisors such as VMware ESXi, Citrix XenServer and Microsoft Hyper-V are now supported for Nutanix Acropolis. These include:

- **Auto-discovery of the Nutanix servers in the infrastructure:** When you point the eG Enterprise manager to a Nutanix PRISM server, it automatically discovers all of the hypervisors running on the Nutanix hardware. With just one click, administrators can start managing their entire Nutanix infrastructure.

- **Extending eG Enterprise's Inside-Outside monitoring for virtualization platforms to Nutanix Acropolis:** Once a Nutanix Acropolis server is managed, eG Enterprise starts to track the performance of the hypervisor and all the VMs hosted on it. REST API calls to the Acropolis hypervisor are used to track the performance and utilization of the hypervisor resources. VMs running on the hypervisor are auto-discovered and their relative resource usage patterns are tracked to identify resource consuming VMs (the outside view of the VMs). At the same time, the same eG monitor that monitors the hypervisors also connects to each of the VMs and obtains an inside view of each VM that highlights the applications/processes running in the VMs that are responsible for the resource usage.
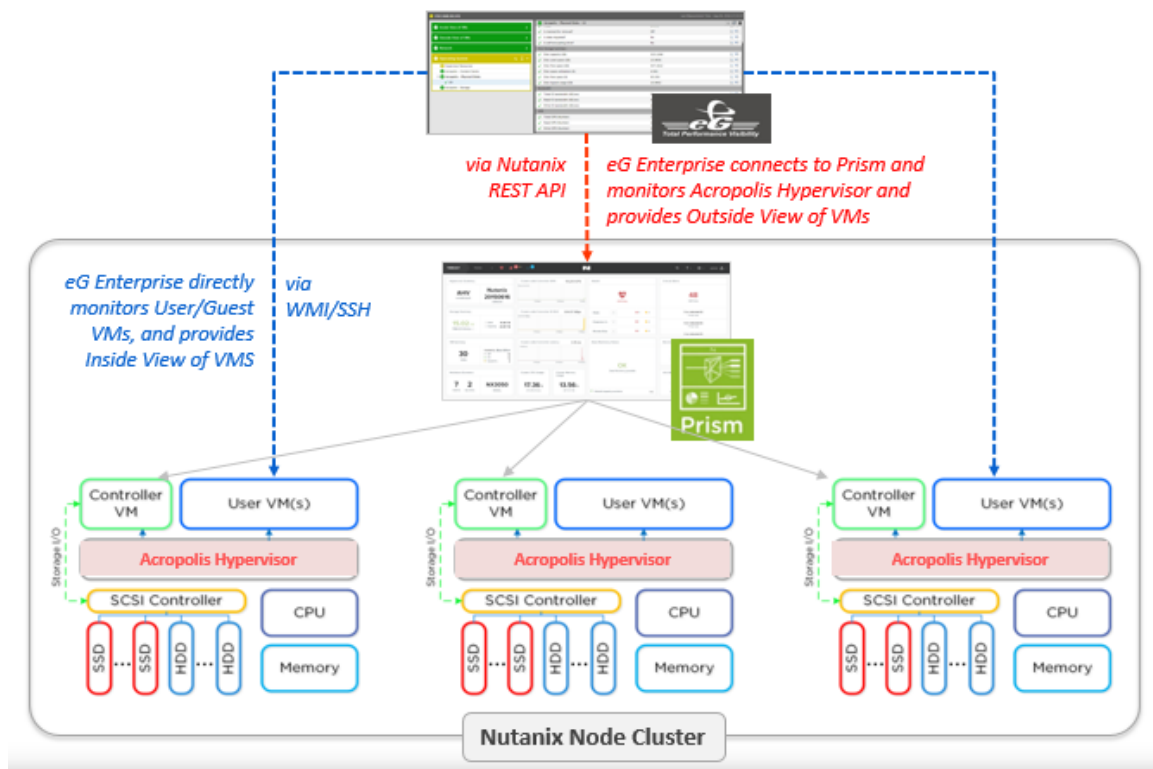

Figure 4: How eG Enterprise monitors Nutanix

- **Support for Acropolis-based virtual desktop infrastructures:** eG Enterprise v6.2 supports infrastructures where Acropolis hosts VMware Horizon or Citrix XenDesktop virtual desktops. Users logged on to each of the virtual desktops are identified, their logon/logout times are recorded for usage auditing, and user experience and virtual channel information for Citrix HDX, VMware PCoIP/Blast protocols are tracked.

- **Monitoring of Nutanix Prism for cluster-wide performance views:** Nutanix Prism is a distributed resource management platform which allows users to manage and monitor objects and services across their Nutanix environment. The availability and responsiveness of Prism's web console is checked, and administrators are alerted if the console is down or is responding slowly to requests. The status, capacity, and usage of the storage pools, containers, and clusters managed by each Prism instance are monitored, and abnormalities brought to the attention of administrators.
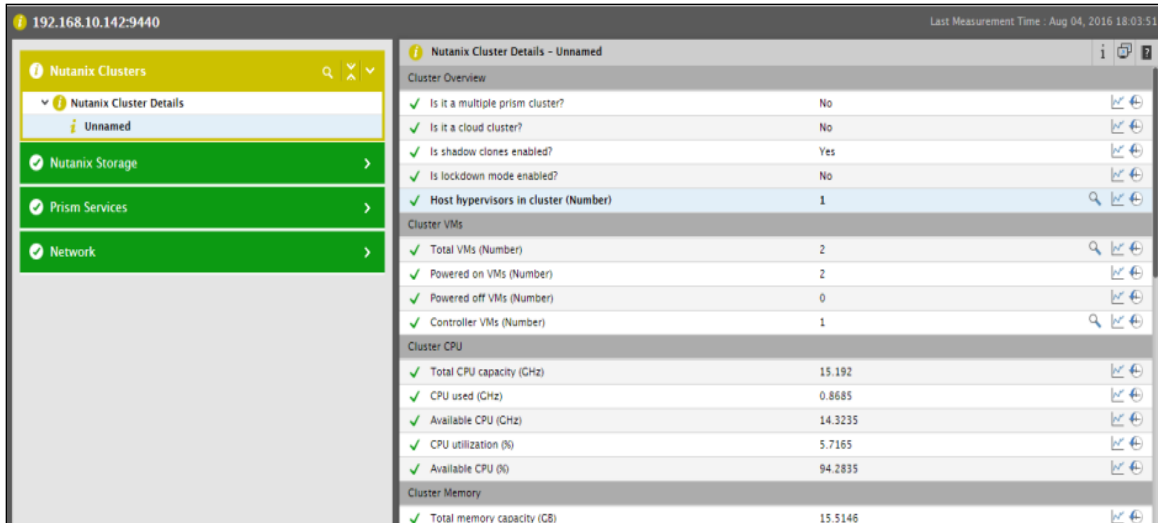

Figure 5: Metrics revealing the status and resource usage of a cluster managed by a Prism

- **Auto-discovery of VM to hypervisor mapping and use for automatic root-cause diagnosis:** eG Enterprise v 6.2 also extends its end-to-end virtualized infrastructure monitoring and single-click root-cause diagnostic capabilities to Nutanix infrastructures. Virtual machine to physical machine mappings and application to virtual machine dependencies are auto-discovered and a patented correlation engine then automatically correlates performance issues detected in the Nutanix environment to performance issues detected at the application tier and helps pinpoint the cause of slowness.
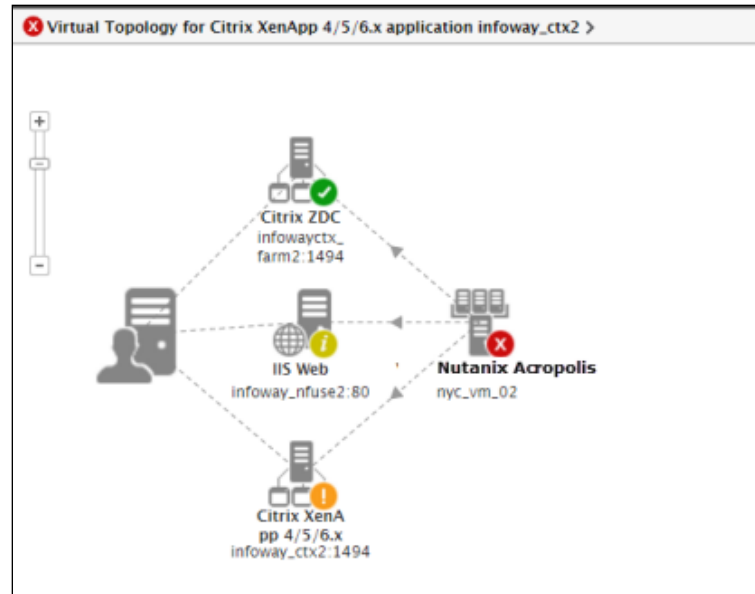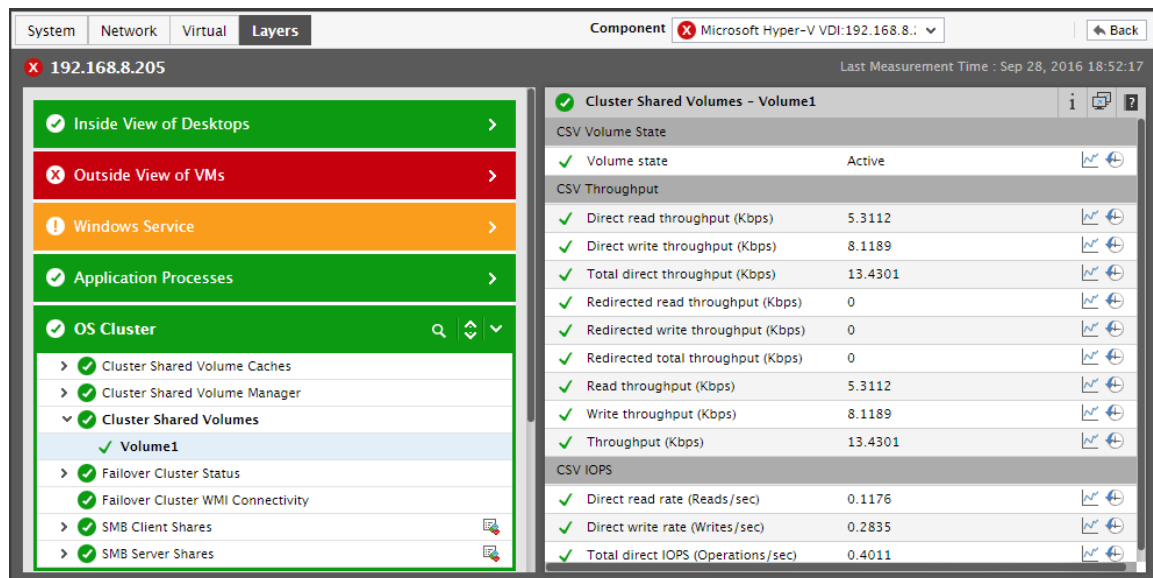
Figure 6: An auto-generated virtual topology map revealing the root-cause of issues in the Nutanix infrastructure

Improvements to Microsoft Hyper-V Monitoring

Microsoft Hyper-V is often deployed in production in a cluster-mode. Version 6.2 adds support for monitoring Microsoft Hyper-V clusters. In such infrastructures, cluster shared volumes (CSV) are used to provide a shared disk that is accessible for read and write operations by all nodes in a Windows server failover cluster. Performance bottlenecks in the storage layer can affect the performance of all VMs and applications running on the Hyper-V servers. Hence, monitoring I/O activity on the cluster shared volumes is critically important. eG Enterprise v 6.2 adds monitoring of the direct and redirected I/O (read and write) operations on each CSV and the throughput and I/O processing speed of each cluster volume.

Figure 7: Monitoring Cluster Shared Volumes in Hyper-V environment

Since CSV uses SMB to redirect traffic to the co-ordinating node in the cluster, eG Enterprise also measures the I/O operations, throughput, latency, and I/O queue length of each SMB server share and SMB client share. Additionally, the volume cache mapped to each CSV is monitored and the rate at which data is read from the cache is reported to indicate cache slowness (if any). The I/O performance of the volume manager and logical CSV associated with each CSV is also measured periodically, and administrators proactively alerted to probable processing bottlenecks.
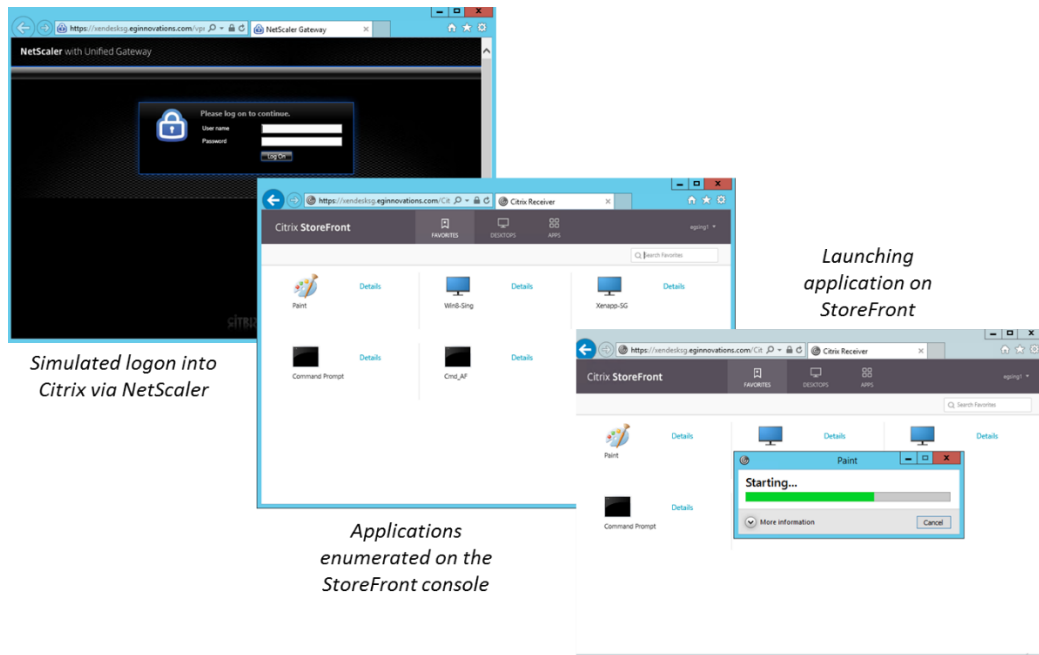
Improve diagnosis with better usability in viewing hypervisor-level metrics. eG Enterprise now presents detailed diagnosis of VMs and processes that are having high IOPS and keeping the hypervisor disk busy. In the Outside View of VMs, the number of errors encountered by each VM disk and the count of flush operations performed are reported. Monitoring of network adapters on the Hyper-V servers has also been enhanced. These enhancements provide proactive alerting of Hyper-V issues and diagnosis to help quickly identify the cause of problems.

Citrix Monitoring Enhancements

Version 6.2 includes many enhancements to eG Enterprise's Citrix monitoring capabilities:

- **Citrix Logon Simulator:** For years, Citrix logon slowness has been the most difficult problem for Citrix administrators to handle. Since there are over a dozen interactions between Citrix components (StoreFront, Delivery Controller, XenApp servers, License server) and other non-Citrix components (Active Directory, virtualization platform, etc.), Citrix logon issues are difficult to address. Citrix administrators are looking for proactive ways to detect and resolve Citrix logon issues. The Citrix logon simulator is the newest addition to eG Enterprise's capabilities.
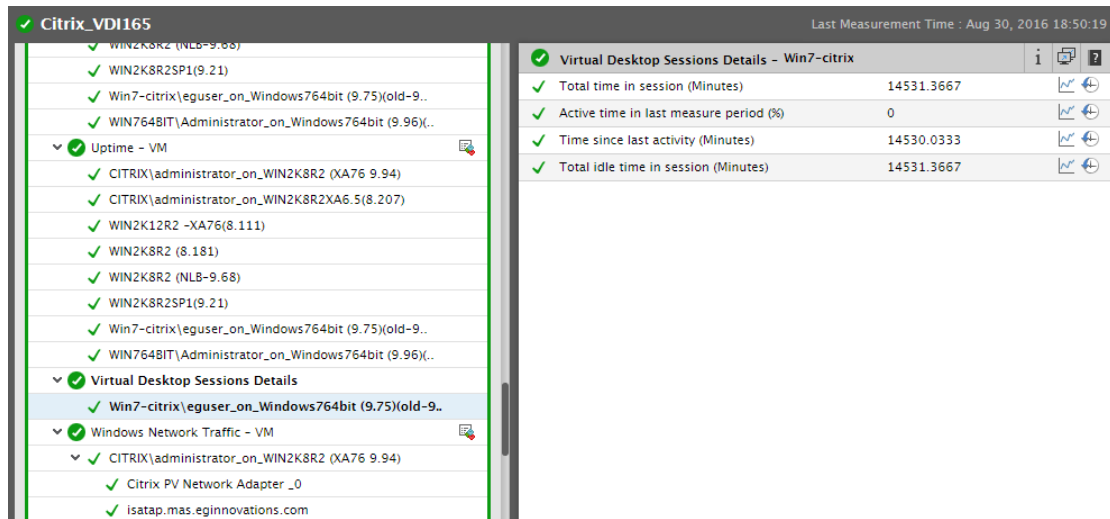
Figure 8: How the eG Citrix Logon Simulator simulates the logon process

Citrix administrators can now point this utility to a Citrix StoreFront server or a NetScaler front-end. As its name implies, the Citrix logon simulator simulates a user logging into the Citrix farm, seeing a list of enumerated applications or desktops and launching an application or a desktop. This simulation is done periodically and the success/failure of the simulation and the time taken for each step in the simulation are tracked and reported. Using the results, administrators can identify times when Citrix logon is slow and they can clearly see why – is it due to user authentication, application enumeration, or application/desktop launch? Since the simulation is done periodically, the Citrix logon simulator can alert administrators to potential issues proactively – even during times when no users are actively logged on to the server farm. The Citrix logon simulator is simple to set up – no recording/replay is necessary, all that an administrator has to do is point to the URL used to logon to the Citrix farm and provide the credentials used to simulate the logon. The new Citrix Logon Simulations dashboard simplifies monitoring.
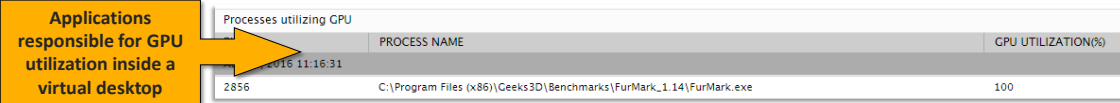
Figure 9: Citrix Logon Simulations Dashboard

- **Monitoring active/idle times of Citrix sessions:** Users often use Citrix to access productivity applications – e.g., work from home, remote access, etc. As a result, Citrix administrators are often asked to report on what percentage of time the user was idle during the session. eG Enterprise v6.2 now adds active and idle time tracking for Citrix user sessions. This information is reported in real time as well as for historical analysis. Reports provided by eG Enterprise document the percentage of active and idle time in each user session. Active/idle time information is provided for Citrix XenApp (7.x, 6.5) and XenDesktop sessions as well as for Microsoft RDS sessions.

Figure 10: Measures indicating the time for each a particular user session on a virtual desktop that was active and idle

- **Support for latest Citrix products:** eG Enterprise v6.2 adds support for the Citrix XenServer 7 hypervisor, XenApp and XenDesktop 7.11, StoreFront 3.7, and NetScaler 11.x. All monitoring capabilities supported for earlier versions are now supported for these new versions.

- **Monitoring I/O activity for XenServer VMs:** In version 6.2, eG Enterprise exploits new metrics available from XenServer 6.2 onwards to provide additional insights into I/O activity by different VMs. Metrics reported per VM include the number of I/O operations in progress, I/O operations in wait state, I/O requests in queue for processing, and read and write I/O activity. Comparing these values across VMs helps administrators identify VMs that are bottlenecked on I/O and VMs that are causing most of the I/O activity.

- **GPU monitoring enhancements:** eG Enterprise v6.2 provides deeper insights into GPU processing. For shared GPUs, detailed diagnosis at the hypervisor level points to VMs that are responsible for GPU usage. Within the VMs, as part of the inside view of the VMs, eG Enterprise now reveals the processes that are utilizing GPU and the relative GPU usage levels. This information helps administrators easily identify the applications that are benefiting from the usage of GPU technology. GPU encode and decode utilizations are also reported to help administrators be alerted to situations where graphics processing could be a bottleneck.

Figure 11: Detailed diagnosis displaying the applications responsible for GPU usage inside a virtual desktop

eG Enterprise also provides an overview of GPU capacity and usage at the hypervisor-level, so as to enable administrators to figure out inconsistencies in GPU sizing at the hypervisor and VM level. The number of physical GPUs per each GRID card is reported alongside the number of vGPUs per card. The maximum users per card is also reported, so that you can figure out if your vGPU allocation is aligned with the demand for GPU resources. The remaining capacity of vGPUs per board is also revealed, so that you can quickly identify an over-allocation (if any) of GPU resources to VMs. The GPU memory per VM and the maximum number of displays per VM are reported, so that you can determine whether/not the VMs have been sized with sufficient GPU memory to support the displays. Additionally, monitor encoder and decoder utilization for GPUs. eG Enterprise 6.2 provides out-of-the-box support for monitoring Tesla® M60 GPU accelerator from NVIDIA®.

- **Measuring resource usage by delivery groups configured on a Citrix Delivery Controller:** A delivery group is a collection of machines selected from one or more machine catalogs. The delivery group specifies which users can use those machines, and the applications available to those users. Version 6.2 of eG Enterprise makes it possible to review resource usage (CPU, memory, disk IOPS) and HDX bandwidth usage by delivery groups. Using this information, administrators can quickly identify the most resource consuming delivery groups and the ones that need additional capacity.

- **Identifying sub-optimal Provisioning services configurations:** In a PVS server, the Threads Per Port configuration governs the quality of communication between the Stream service and target devices. This setting indicates the number of threads in the thread pool that service UDP packets received on a given UDP port. Larger number of threads allow more target device requests to be processed simultaneously, but it consumes more system resources. If there are more threads, but less system resources, request processing is bound to suffer, as the excess threads will simply block waiting for I/O. This is why, the optimal configuration is to have more cores and less threads - i.e., the number of threads per port should be lesser than the number of cores. A sub-optimal configuration would be to have less cores and more threads per port. In version 6.2, eG Enterprise quickly indicates to administrators whether a threads per port configuration is optimal or sub-optimal.

- **Citrix NetScaler Insight integration improvements:** With version 6.2, eG Enterprise leverages its tight integration with Citrix NetScaler Web Insight to automatically discover the media types and web content types served by the NetScaler appliance to users. For each type of media and web content that is auto-discovered, eG then reports the total number of requests received for each of that media/web content type, and the bandwidth used when processing the requests. This reveals the most requested media and content types, and the ones that consume bandwidth excessively. Additionally, eG Enterprise also monitors cache performance by capitalizing on NetScaler Web Insight's ability to track and analyze the traffic flowing through NetScaler VPX/MPX to cache servers and origin servers. The count of cache

hits and misses are reported, and the bandwidth savings owing to caching are also highlighted. These metrics are only available when integrated with NetScaler Insight Center 11.x. Moreover, in this version, the count of user sessions and applications launched via each NetScaler appliance is also reported, the load on each appliance measured, and the overloaded appliances pinpointed.
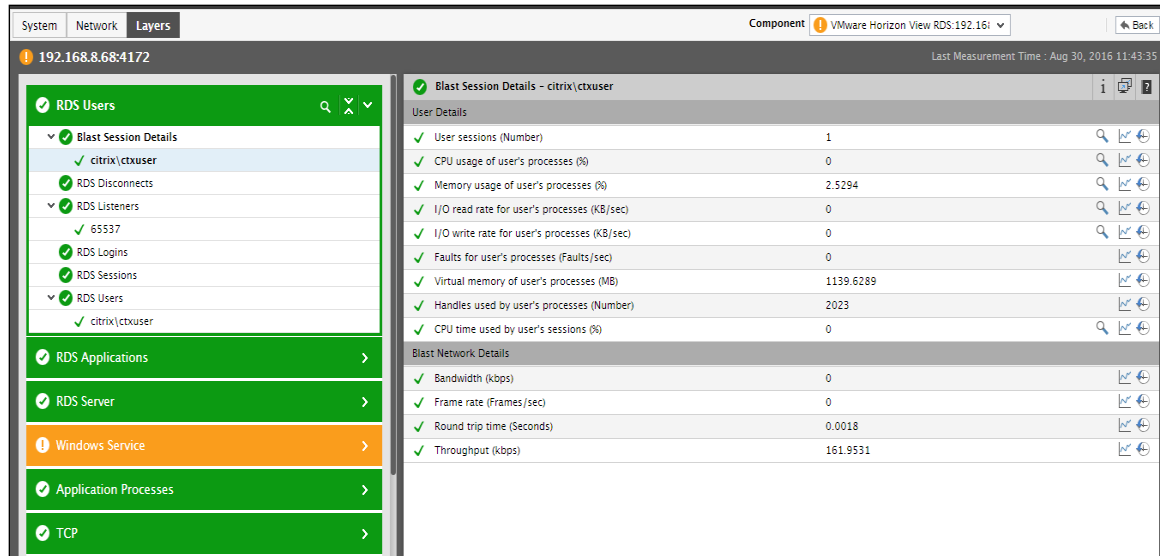
Also, when monitoring ICA sessions on a NetScaler appliance, this version additionally reports the count of client and server side retransmits experienced by each ICA session, thus pointing to the user whose requests suffered the maximum retransmits. Besides the above, the client and server-side latency of L7 packets flowing through the NetScaler appliance is also reported. If a user complains of slowness when accessing a virtual desktop through NetScaler, these latency measures will tell you whether the L7 packet flow is what is causing the slowness.

VMware Horizon Monitoring Enhancements

eG Enterprise v6.2 adds several enhancements for VMware Horizon monitoring and expands support for the new version of VMware Horizon version 7. Along with that, eG Enterprise now monitors two new Horizon components viz. Security Server and Identity Manager.

- **Support for VMware Horizon 7 and Monitoring of Blast sessions:** The Blast session protocol (newly introduced in VMware Horizon 7) allows files on a remote computer to be manipulated - i.e., to be deleted, renamed, or printed on the remote. Owing to its improved remote file management capabilities, VMware now supports the Blast protocol (in addition to PCoIP) for user communication with virtual desktops. Because of this, there is a need to know which users have connected to virtual desktops via Blast and how the experience of each user is.

    - eG Enterprise now **auto-discovers user sessions** to VMware Horizon regardless of whether these sessions use PCoIP or Blast protocols. The corresponding metrics are automatically tracked and reported for each protocol, without needing administrators to explicitly configure whether Blast or PCoIP metrics should be collected for each user session. At the Horizon Connection Server level, administrators, can use eG Enterprise to track Blast sessions by Horizon desktop pool, application pool, RDS farm and RDS host.

    - eG Enterprise provides **detailed metrics of user sessions** that are using the Blast protocol. Metrics reported include the bandwidth usage, frames processing ability, throughput, and CPU time used for each user's session. In the process, bandwidth-hungry or high latency sessions can be accurately identified. These metrics are reported for users connected to VMware RDS hosts via the Blast protocol and those connected to VMware Horizon virtual desktops through Blast.

Figure 12: Layer model of a VMware Horizon View RDS server displaying the details of Blast user sessions

- **Capturing errors in desktop launches, provisioning, and replication:** In version 6.2, eG polls the VMware View Events database at periodic intervals to collect the count and details of errors that occurred when launching and provisioning desktops, and failures that occurred during replication. The details of these errors enable administrators to identify the desktops that were impacted and the users who experienced the failure. Using the details of the replication failure, administrators can clearly understand where the failure occurred and the reason for the same, and can troubleshoot accordingly. Also, get crash details of VM from inside view.

- **Tracking application launch times on VMware Horizon RDS hosts:** Version 6.2 auto-discovers applications that are launched on a VMware RDS server and reports the average time taken to launch each application. This way, the monitor accurately pinpoints applications that are having trouble launching. Also, drill down to get detailed diagnosis on which users were affected due to slow application launch.

- New monitoring models have been introduced for the VMware Horizon Security server and the VMware Horizon Identity Manager. At the **Horizon Security Server** level, eG Enterprise monitors sessions by various categories including active sessions, clone sessions, full VM sessions, PCoIP gateway sessions, etc.

Enhancements to Infrastructure Monitoring

A wide range new infrastructure components are supported out-of-the-box in eG Enterprise v6.2, significantly expanding eG's monitoring scope.

- **Monitoring the WildFly application server:** The WildFly is a widely used Java application server that provides a J2EE certified platform for developing and deploying enterprise Java

applications, web applications, and portals. Version 6.2 of eG Enterprise provides deep insights into the availability, accessibility, and processing ability of the WildFly application server, helps proactively detect connection latencies and processing bottlenecks, and even points to the exact servlet that is obstructing speedy processing of requests.

- **Monitoring Progress database:** Progress RDBMS® is an open, flexible, scalable, and highly available database solution, used by many enterprises worldwide for efficient data storage and easy retrieval purposes. eG Enterprise v6.2 provides in-depth insights into the health and overall performance of a Progress database. The user session load on the database, the locking/latching activity of each user, and the speed with which the database processes queries issued by the users is measured, and anomalies brought to light.

- **Receiving Syslog messages in eG Enterprise:** With eG Enterprise v6.2, any eG agent on Windows can be configured to receive Syslog messages from network devices/applications. These messages can be analyzed and displayed in the eG Enterprise console.

- **Monitoring the Blue Coat ProxySG:** Blue Coat ProxySG appliance securely isolates general-purpose servers from direct access, acting as an intermediary between web applications and the external clients who attempt to access them. To ensure clients uninterrupted access to critical web applications, version 6.2 of eG Enterprise offers complete monitoring support to the Blue Coat ProxySG. Using the metrics that eG reports for this proxy server, idle connections, bottlenecks in HTTP connection processing, latencies in ICAP transactions between the Proxy and the ICAP server, resource contentions, and hardware failures on the proxy can be detected.

- **Monitoring RSA Authentication Manager:** RSA Authentication Manager is a multi-factor authentication solution that verifies authentication requests and centrally administers authentication policies for enterprise networks. eG Enterprise v6.2 performs in-depth monitoring of the authentication manager, and in the process, points to delays in the processing of service authentication requests, report ineffective cache usage, and captures authentication failures.

- **Monitoring Hitachi Compute Blade:** Hitachi Compute Blade 500 is an enterprise-class blade server platform. To ensure the high uptime of the blade and the virtualization benefits it provides, eG Enterprise v6.2 periodically monitors the health, power supply status, current voltage and power consumption of the server and each chassis on the server, the operational status of the memory and fan modules, and the colors emitted by the LED switches, and promptly reports abnormalities.

- **Monitoring support for new platforms:** From version 6.2, eG Enterprise provides monitoring support to Windows 2016 (Nano Server and Container are not supported), Microsoft SQL Server 2016, and Exchange 2016. All monitoring capabilities of the previous versions will be available to this version as well.

- **Enhancements to Active Directory monitoring:** In version 6.2, eG monitoring for Active Directory tracks changes to security groups, firewall policies, and registry settings, alerts administrators when changes are made, and also provides details of the changes made and who made them; this enables administrators to analyze the impact that changes on an Active Directory server have on its performance. In addition, eG Enterprise also captures new

application/packages/updates installed on the Active Directory server, storage masses newly installed on the server, and the number of times security logs were cleared along with details of who cleared them, and alerts administrators to these changes, so that unauthorized/unwanted changes can be detected. Moreover, in this version, eG also captures and reports replication failure events logged in event logs and alerts administrators when attempts to update group and user policies and/or to apply a group policy to the Active Directory server fail.

- **Enhancements to SAP WAS monitoring:** Version 6.2 of the eG Monitor for SAP web application server monitors the current workload on the server and points administrators to the type of sessions that is contributing the most to the workload. The locking activity on the server is monitored. The workload of the ICM is measured and sizing inadequacies of the ICM is revealed. HTTP responses are tracked and error responses are reported. The status of the central services processes is monitored and abnormalities revealed.

- **Monitoring SQL mirroring:** Database mirroring involves redoing every insert, update, and delete operation that occurs on the principal database onto the mirror database as quickly as possible, as any delay can cause data in the principal and the mirror databases to go out of sync, thus resulting in significant data loss during a failover. To avoid this, eG Enterprise v6.2 tracks the transactions started on a SQL server instance, measure the rate at which transaction log data is sent to the mirror server for synchronization, and reports the time taken by the mirror server to apply the data, so that bottlenecks in database mirroring can be proactively detected and the source of the bottleneck isolated.

- **Monitoring the eG Agent:** Version 6.2 provides a specialized monitoring model for the eG Agent component, and points to deficiencies in agent operations. Using this model, you can quickly detect breaks in manager-agent communication, be forewarned of overload conditions, spot inconsistencies in JVM heap sizing of the agent, and capture agent-related errors/warnings from the error logs.

Network and Storage Monitoring Enhancements

eG Enterprise's F5 monitoring capabilities have been significantly enhanced to report additional metrics and to provide monitoring support to its F5 Analytics module:

- **Monitoring F5 Analytics:** Analytics (also called Application Visibility and Reporting) is a module on the BIG-IP® system that lets you analyze performance of web applications. In version 6.2, eG integrates with the Analytics module to offer users the same deep visibility into web application performance that the Analytics module offers. Metrics on transaction processing, latencies, throughput are now available for applications, virtual servers, pool members, and URLs. Additional statistics about application traffic running through the BIG-IP system are also reported. This way, eG becomes the go-to solution for all the F5 monitoring needs of an enterprise.

- **Enhanced monitoring of F5 Local Traffic Manager (LTM):** In version 6.2, the eG agent additionally monitors the resource usage of, the HTTP request load, and network health of the F5 Traffic Management Module (TMM). Also, in this version, F5 virtual servers experiencing CPU contentions and slowness in request processing and connection handling can be identified. Moreover, TCP and UDP connections to the F5 LTM are now monitored and connection failures and latencies are highlighted.

In version 6.2, eG Enterprise extends monitoring support to a wide variety of new network devices. Some of the important additions include:

- **Monitoring of Palo Alto Firewalls** including reporting on the HA status of the firewall, tracking of session load on the firewall, utilization of the GlobalProtect gateways, auto-discovery of virtual systems protected by the firewall.

- **Specialized monitoring for Hewlett-Packard Routers** including hardware monitoring to determine if the router is handling more power than it should and whether there are excessive voltage fluctuations, CPU and memory monitoring to determine utilization levels of the router and monitoring of network traffic through tunnels.

- **Specialized monitoring for Cisco Nexus and Dell Switch M-Series switches** including hardware monitoring to determine the state of power supply units, voltage sensors, fans, etc., CPU, memory and NVRAM monitoring to determine utilization levels of the router and monitoring of network bandwidth through each interface.

- **Support for the Cisco IP SLAs:** Cisco IP SLAs is a part of Cisco IOS software that allows administrators to analyze IP service levels for IP applications and services by using active traffic monitoring—the generation of traffic in a continuous, reliable, and predictable manner—for measuring network performance. With Cisco IOS IP SLAs, service provider customers can measure and provide service level agreements, and enterprise customers can verify service levels, verify outsourced service level agreements, and understand network performance. Cisco IOS IP SLAs can perform network assessments, verify quality of service (QoS), ease the deployment of new services, and assist with network troubleshooting.

  eG agents can now report on the status of the monitoring operations performed by an IP SLA, and see detailed metrics reported by the IP SLA for each operation and operation type. This includes metrics such as the round trip time of each operation, packet loss, average latency, count of delayed packets, and packets out of sequence. With this integration, eG Enterprise has deeper network visibility.

eG Enterprise v6.2 also includes monitoring support for **Hitachi VSP and VSP Gx00 Series** storage**.** With eG Enterprise, you can monitor the availability, hardware health, I/O processing ability, and cache usage of the storage device and promptly report abnormalities.

Improved Analytics

To enhance the analytical capability of eG Enterprise, a set of new features have been introduced in v6.2.
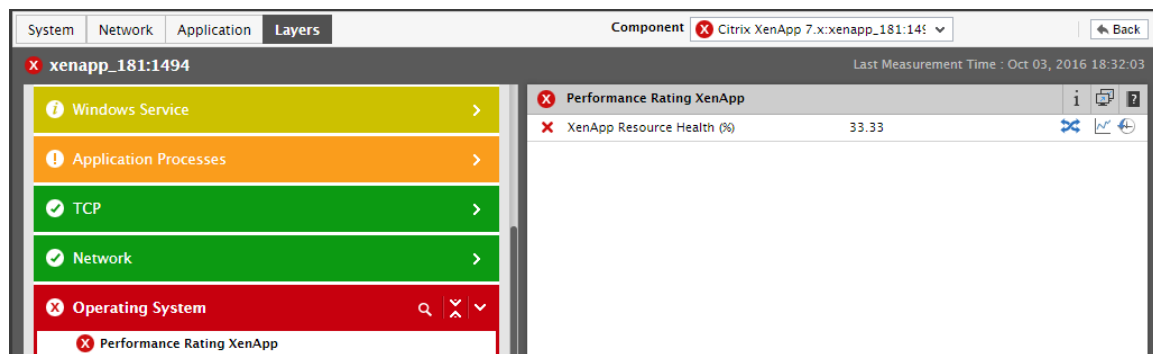
Performance Rating

Typically, in order to know the overall performance of a server, IT administrators should keep track of all metrics reported by eG Enterprise for that server. An executive on the other hand, may want to quickly determine server status, without having to look through hundreds of metrics. This is where performance ratings introduced in v 6.2 help.

Administrators can define a performance rating as an aggregate metric that is based on a number of other metrics collected and reported by an eG Enterprise agent. Consider this similar to APDEX rating or Customer Satisfaction Index (CSI). For example, the user experience of a Citrix user can be defined based on the logon time of the user, the screen refresh latency of the user, the profile size of that user and the network latency seen by that user. By looking a single metric that takes a percentage value between 0 and 100, an executive can easily determine if that user is happy or dissatisfied. Likewise, a stress rating for a server can be based on its CPU utilization, memory utilization, disk space available and disk activity level.

With a Performance Rating, administrators can:

- quantify the overall performance of an entity using a sub-set of metrics that eG Enterprise reports for that entity

- ascertain, at a glance, whether performance of that entity is within desired levels or not

- receive a single alert when the performance rating dips, instead of a flood of alarms, thereby enabling you to rapidly detect performance degradations

- instantly pinpoint which parameter/measure caused the overall performance of the entity to slide

- highlight the key performance indicator of a server, user, service on dashboards
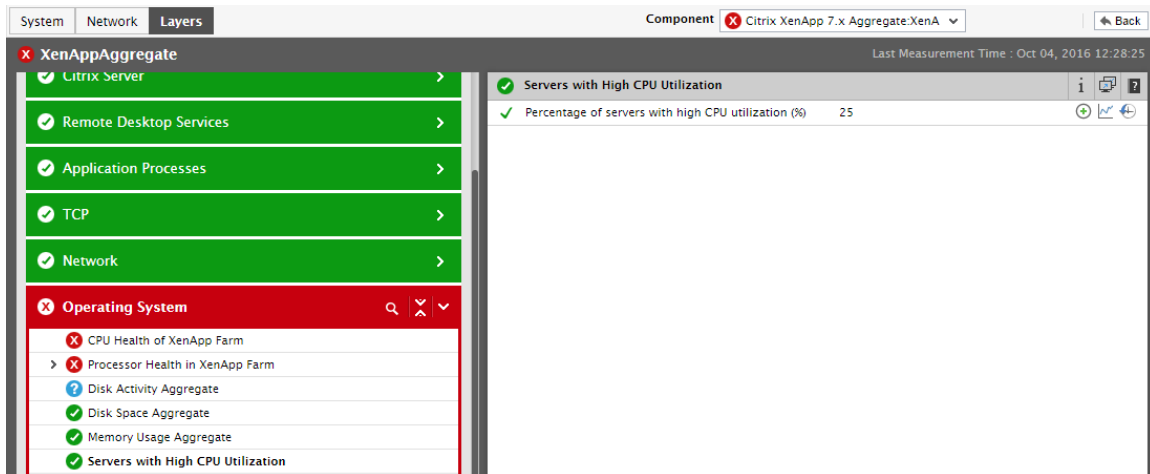

Figure 13: Performance Rating score for XenApp Server displayed on the layer model

Figure 14: The metrics used by eG Enterprise to calculate the performance rating

There are 3 out-of-the-box performance rating tests available in eG Enterprise 6.2.

1. Citrix User Experience Rating

2. Citrix XenApp User Experience Rating

3. VDI User Experience Rating

Administrators can customize these tests or easily build new ones to meet their desired criteria.

Conditional Aggregation

Aggregate metrics in eG Enterprise help administrators get a farm-wide view (rather than a server-by server view of the target infrastructure). Previously, eG Enterprise allowed users to use only mathematical functions like Avg, Sum, Min, Max, etc., for computing the aggregate measure values for new aggregate tests. However, these aggregation functions can hide problem conditions. What if an administrator wants to be alerted when:

*   At least 3 SQL servers out of 5 have CPU usage over 80%, or

*   At least 2 Exchange servers are down in a cluster of 4 servers

Metric aggregation did not allow comparison of metrics across servers and alert when a certain number of servers deviated from a target value.

What's New in v6.2

To allow administrators greater flexibility and visibility into the health of the target infrastructure, eG Enterprise v6.2 introduces the concept of Conditional Aggregation. This is most useful when administrators only want to know the count or percentage of components that fulfil a defined logical condition as opposed to an arithmetic function. For instance, administrators may just want to know how many Windows servers are consuming over 80% of the CPU resources.

Figure 15: Conditional Aggregation used to calculate percentage of XenApp Servers with CPU utilization >= 80%

Another use case of Conditional Aggregation would be to use multiple logical conditions, i.e. when administrators want aggregate measures to report health status and <u>not</u> the aggregated measure values. For example,

- Raise a <u>Critical alert</u> when 80% of XenApp servers in the farm have CPU utilization of at least 20%

- Raise a <u>Major alert</u> when 60% of XenApp servers in the farm have CPU utilization of at least 40%

- Raise a <u>Minor alert</u> when 30% of XenApp servers in the farm have CPU utilization of at least 60%
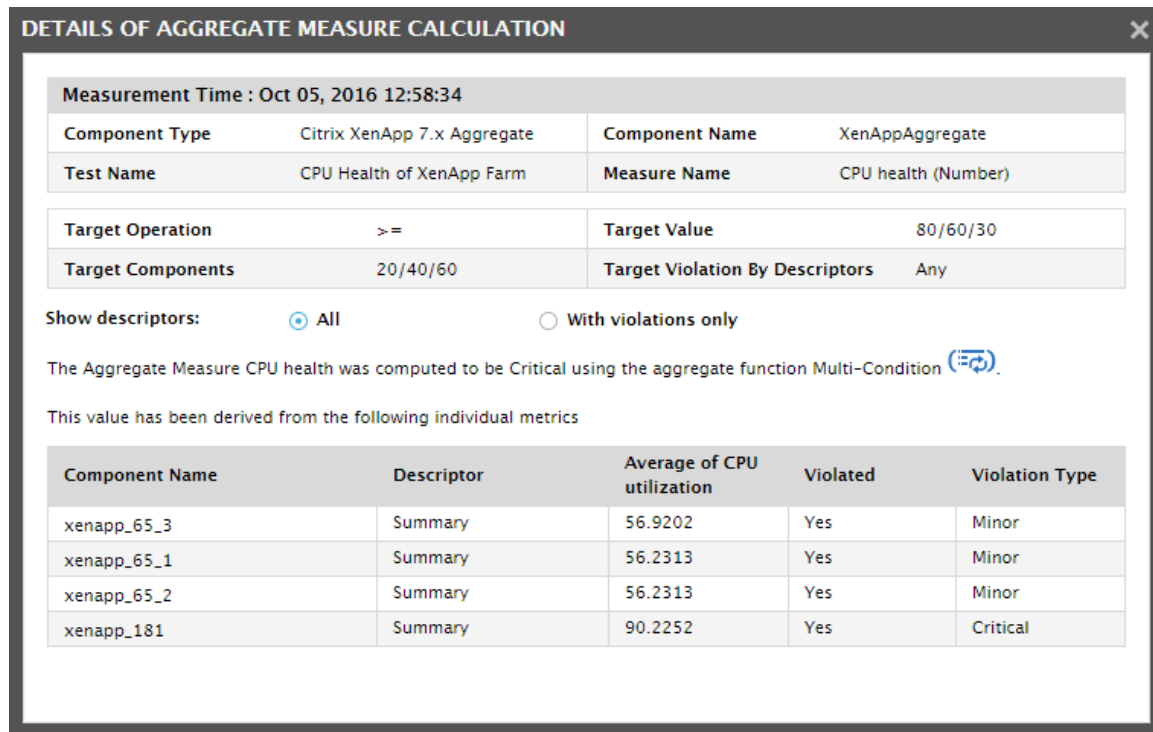
Figure 16: Drill-down details of Conditional Aggregation test for displaying the state of XenApp Servers in a farm.

eG User Interface Enhancements

Several enhancements in the user interface have been incorporated in v 6.2 to enhance usability of the monitoring solution.

- **Zone, service, segment, and group configuration has been simplified:** Previously, eG Enterprise imposed many restrictions on how components in an infrastructure can be grouped. For instance, once a component is added to a zone, the same component cannot be added to any other zone. Likewise, if a component is added to a zone, then to create a segment using that component, the segment should also belong to the same zone.

  It has been observed that different users use these groupings in different ways. In some cases, zones are used to segregate monitored infrastructures. In other cases, this concept is used to group components for reporting. To cater to these diverse requirements, eG Enterprise v6.2 avoids restrictions in zone, segment, service and group configurations. Administrators can now add a component to more than one zone. Zone components will now continue to be available for segment/service/group creation; you no longer have to add the segment/service/group to the zone prior to using the zone components.

- **Changes to User Experience Dashboard:** In version 6.2, the eG administrative interface has been enhanced to allow the addition, modification, and deletion of measures displayed in the User Experience Dashboard. You can also define the maximum number of records to be

displayed in the dashboard by default and the refresh frequency of the dashboard. Also, the dashboard now allows you to filter user logins on the basis of a chosen zone. This way, you can analyze the user experience of only those users who are logged into VDI/XenApp/Terminal servers that are part of a chosen zone. If your eG manager integrates with an AD server, then optionally, you can configure the dashboard to display a list of AD groups to choose from. By selecting a particular AD group, you can have the dashboard display the user experience metrics of only those currently logged in users who are part of the chosen group.

- **Configuring default thresholds for descriptors of a global threshold test:** Global threshold tests in eG Enterprise have threshold settings that are the same across all components/servers monitored (i.e., they cannot be set differently for different component/servers). Prior to v6.2, the thresholds also had to be the same for all descriptors of this test (e.g., for all processors of a server). Version 6.2 allows for the threshold settings to be set differently for different descriptors even for global threshold tests. This capability reduces the number of false alerts that the monitoring system can generate. For example, the inside view of a VM reports the CPU usage per processor and also an overall summary value. With this new capability, thresholds can be disabled for all processors of a VM and only the summary value can be set to generate alerts – this way an administrator is alerted only if the VM as a whole is experiencing high CPU utilization.

Reporting Enhancements

Some of the new reports added in v6.2 are described below.

VM Tools Report

Citrix XenServer and VMware vSphere provide tools that must be installed on VMs to improve the functionality of the VMs – for memory management, I/O handling and so on. If the VM tools are not installed on a VM or have not been kept updated, the VMs may not be performing optimally. The VM tools report helps administrator identify VMs on which the XenSever/vSphere Tools may not be installed or may not be updated.

XenServer Tools Details		
SUMMARY		NUMBER OF VMS
Total number of VMs		22
VMs with XenServer Tools installed		20
VMs with XenServer Tools not installed		2
VMS XENSERVER TOOLS BY STATUS		NUMBER OF VMS
⊞ XenServer Tools up to date		20
XenServer Tools not up to date		0
⊞ XenServer Tools not installed		2
VMS XENSERVER TOOLS BY VERSION		NUMBER OF VMS
⊞ 6.0.0.50762		4
⊞ 6.1.0.18		10
⊞ 6.1.0.59235		3

Figure 17: VM Tools report

Citrix Application Billing Report

Virtualization enables enterprises to provide end-users with on-demand access to business-critical applications/services, and to even charge them a fee for the services so provided. Enterprises offering such pay-per-use services are often interested in auditing user activity on their virtualized environments, so that they can identify the applications used, assess the extent of usage per user, and can bill the users accordingly. In addition, administrators may also want to determine the resource footprint of a user when a particular application was accessed, so that users who consistently engage in resource-intensive activities can be identified and their usage policies fine-tuned accordingly. The Application Billing report addresses all these requirements. Using this report, administrators can determine which applications are accessed the most in a given timeline, by whom, for how long and how many times the application was accessed by a user. This information provides valuable inputs for billing.

Figure 18: The Citrix application billing report

NetScaler Virtual Server Uptime

Uptime is a key measure of the general health and availability of the virtual servers configured on a Citrix NetScaler appliance. Periodic uptime values that the eG agent reports for target virtual servers can alert you to an unscheduled reboot that might have occurred recently. However, to figure out whether such a reboot was a one-off occurrence and can be ignored, or happens frequently and should be investigated, you need to analyze uptime historically. To enable such an analysis for critical virtual servers on a NetScaler appliance in an IT infrastructure, eG Enterprise provides the NetScaler Virtual Server Uptime report. The highly available/unavailable virtual servers can be instantly identified and the duration of their unavailability can be quickly determined using this report. Based on this analysis, administrators can isolate those virtual servers that suffered many unexpected reboots and those that experienced prolonged breaks in availability, and can mark those servers for deeper investigation.

Figure 19: The NetScaler virtual server uptime report

Outbound Domain Details Report

Administrators of an organization may often wish to know the domains to which most email messages are sent and the size of messages sent to each domain. The Outbound Domain Details

report helps administrators in this regard. With the help of this report, administrators can identify the individual domains to which the mails were sent, the number of mails sent to each individual domain and the total size of the mails. Using this report, administrators can rapidly figure out if their users engaged in mail correspondence with legitimate domains only or if their mail activity is suspect - i.e., were many mails sent to domains that seem phony? is the mail size unusually large? This way, the report points to probable mail server abuse/hacking, based on which administrators can fine-tune firewall policies.
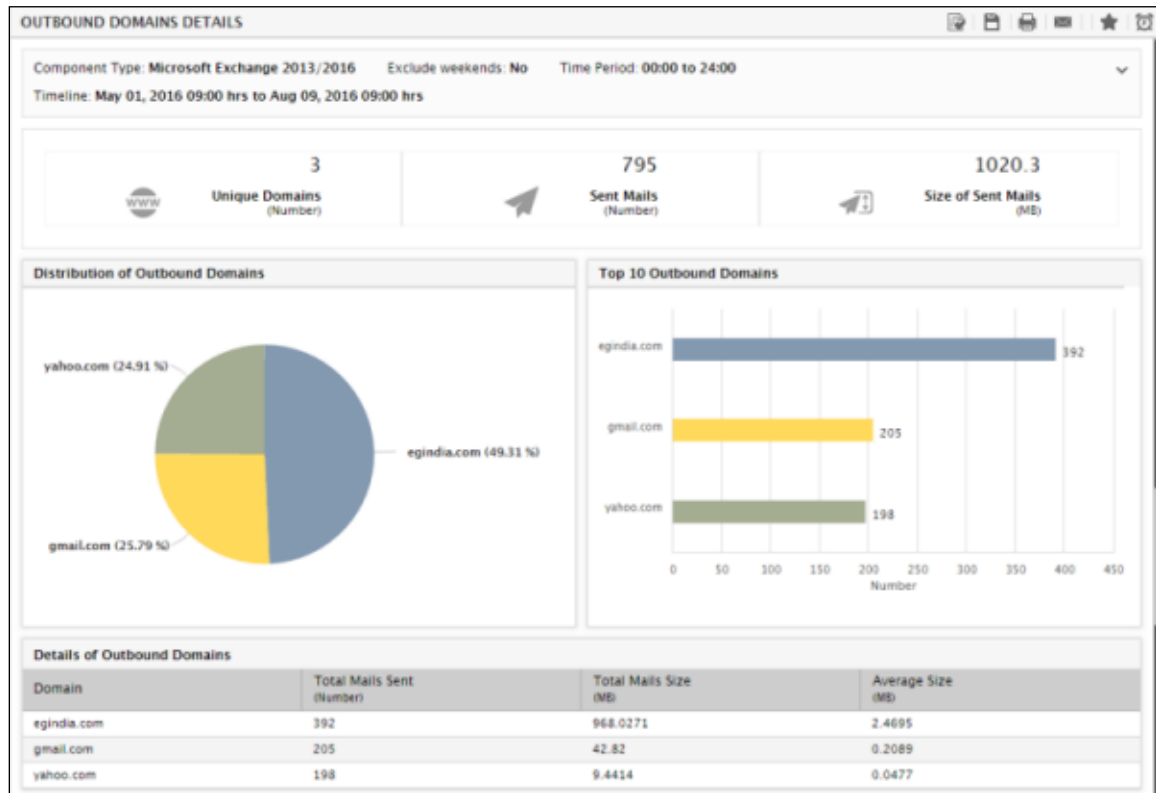

Figure 20: Outbound domain details report for Microsoft Exchange

Administration Enhancements

eG Enterprise v6.2 introduces some enhancements to the web-based administration interface:

- For monitoring heavily virtualized environments, the administration console makes it easy for users to see the mapping of remote agents to ESX hosts and vCenter servers. This at-a-glance view enables users to assign the monitoring of ESX hosts so as to distribute the load across all the remote agents.

- With eG Enterprise v 6.2, custom monitors added to an eG manager can be exported and imported to another eG manager, without having to reconfigure all of the monitoring in the second manager manually. This feature is extremely useful for service providers who have developed custom monitors as part of their best practices. They can save a lot of

time when provisioning a new client as a lot of manual work necessary for recreating the custom monitoring is no longer necessary.

- Version 6.2 allows using a single command (on the command line interface) to add a new component and include it as part of a group or zone. This used to be a 2-step activity and can now be achieved at one go with a single command.

- Many service providers have a pay-per-use model for their customers and they charge customers based on the peak usage of Citrix user licenses (named or concurrent). To facilitate this, the eG Enterprise admin console now reports the previous month's peak usage of Citrix user licenses. Email alerts are also now provided when the actual usage of user licenses is in excess of the permitted limit in the license.

Platform Enhancements

In v6.2, enhancements have been made to the eG Enterprise platform to enhance its scalability and simplify the licensing**.**

- **Scalability improvements:** Database handling has been optimized so repetitive actions (inserts, queries, etc.) happen faster. Our benchmark shows a 60-80% reduction in database operation time with this change. In turn, this will allow the eG manager to handle a larger number of agents reporting to it. Thread synchronization in the eG manager has been reduced thereby enabling it to be more responsive under high load. Handling of configuration files in the eG manager has also been optimized.

- **Licensing simplification:** Aggregate components are used in eG Enterprise to provide farm-wide views of performance in eG Enterprise dashboards. Previously, aggregate components could only be monitored using remote agents. Therefore, for every aggregate component that was added, a Premium Monitor license was required. This limited the flexibility that eG Enterprise users had in creating and using aggregate components. With version 6.2, aggregate components are treated in the same way as network devices. They are monitored using external agents and any number of aggregate components can be added without requiring additional licenses. The limit on the number of aggregate components is determined by the processing capacity of the external agent. This change provides eG Enterprise users with great flexibility in configuring and using aggregate components in eG Enterprise dashboards.

Detailed release notes available for eG Enterprise v 6.2 detail the above enhancements and other bug fixes in detail.