Enabling Service Excellence

What's New in eG Enterprise v6

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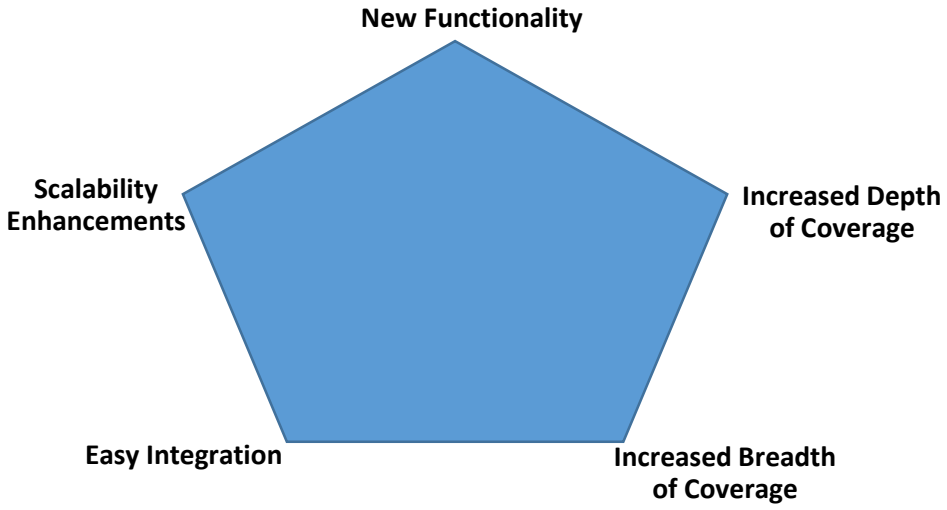
What's New in eG Enterprise v6

Version 6 is a major release of the eG Enterprise performance monitoring, diagnosis and reporting solution for business-critical IT infrastructures. This document summarizes some of the key enhancements that have been introduced in this version.

The enhancements in v6 of eG Enterprise can be grouped broadly into five major areas that are depicted in the figure below.



These include:

- **New functionality** which refers to new capabilities introduced in the product suite – for visualization, dashboards, reporting and configuration – to make it easier for customers to use the solution. eG Enterprise v6 has new capabilities in all of these areas – new dashboards, a sleek new user interface, easier navigation of reports, a mobile application, etc.
- **Increased depth of monitoring**: Customers evaluate monitoring solutions by how well they can detect problems and also by how quickly they can provide diagnosis of problems. At eG Innovations, we are constantly striving to add domain expertise into our solutions to make them more effective. eG Enterprise v6 introduces several additional monitoring capabilities for applications, virtualization platforms and storage tiers that we have supported in the past.
- **Increased breadth of monitoring**: As infrastructures evolve, new applications, storage devices and virtualization platforms are added. New versions of already supported infrastructure elements are also released over time. eG Enterprise v6 includes additional monitoring for new applications, storage devices, network elements and virtualization platforms.
- **Easy integration**: v6 includes enhancements that allow to closely integrate eG Enterprise into other parts of their IT operations. Enhanced integration to orchestration engines for automated provisioning and an open web services interface that allows easy integration of eG Enterprise with trouble ticketing and service desk systems are some examples of enhancements in this area.
- **Scalability enhancements**: With every new release, it is our endeavor to make the eG management system more scalable – to support a large number of users, larger number of managed

components and agent/agentless monitors. Towards this end, eG Enterprise v6 includes many enhancements.

The following sections delve into these enhancements in detail.

1.1 New Functionality

1.1.1 New Web 2.0 User Interface

In v6, eG Enterprise has a refreshing new user interface. Designed based on Web 2.0 concepts, the eG Enterprise interface is visually appealing, easier to navigate, intuitive, and fluid. The interface is designed to be pleasing on the eye, to be easier to navigate, so that users can get to the tasks they need to perform faster, and to function well over local and wide area networks and on any device (including tablets and big screens). A clear separation between the visual representation and the data that is rendered ensures that only changes in data values are sent over the network, leading to bandwidth optimization. Users can now choose between a light and dark color theme based on their tastes.

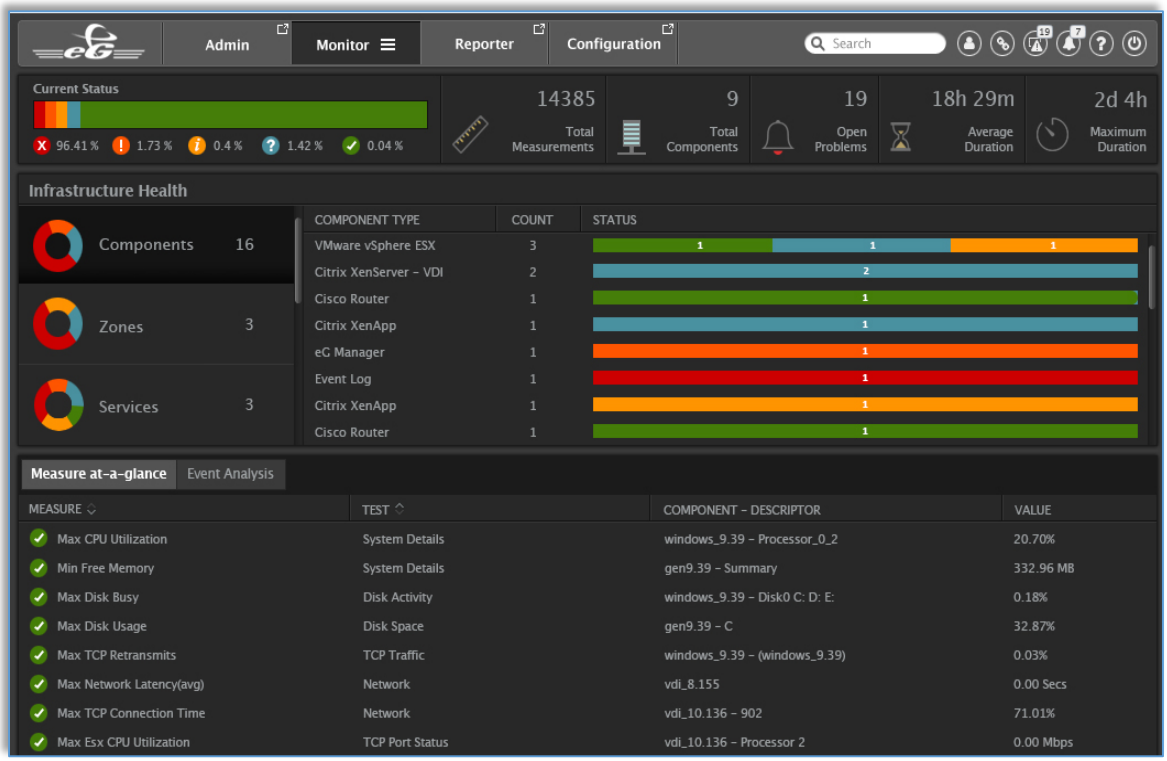


Figure 1: The enhanced Web 2.0 user interface

Support for color blindness has been added to allow users with such disabilities to use the monitoring solution effectively. The state of each component, test and metric is indicated both by colors and by distinctive icons, so that color-blind users can use eG Enterprise to detect problems in their environment.

Figure 2: The new Alarms window where both colors and icons are used to represent alarm severity

In addition, the eG management console now embeds an intelligent search capability. Regardless of which interface you are on (admin/monitor/reporter/configuration) or what you are doing, you can instantly check on the status of your mission-critical servers, services, segments, and zones using this intuitive search engine. All you need to do is use any of eG's pre-configured search prefixes and add your search condition to it, and within seconds, the element you are searching for and its current status will be made available to you.

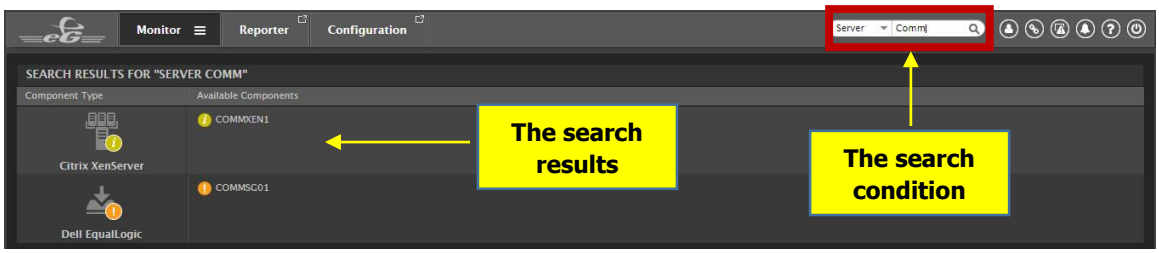


Figure 3: Locating Citrix servers and determining their current status using the Search capability of eG Enterprise

1.1.2 eG Enterprise Mobile Application

eG Enterprise v6 is now available as a mobile application for Android and iPhone devices. Mobile device users can now get a fully-optimized mobile experience – they can connect to the eG monitoring console from their mobile device, see an overview of the state of their infrastructure from the Monitor Dashboard, view current alerts, drill-down to the layer model of the problem components, and even view detailed diagnostics and graphs, just the way they would on their desktops. This way, administrators will be able to stay in touch with the goings-on in their IT environment even when on the move.

Figure 4: eG Enterprise on the Mobile

1.1.3 Enhanced Dashboards

Several new dashboard creation and display enhancements have been introduced in eG Enterprise v6.

1.1.3.1 Fully Customizable MyDashboards

The MyDashboard capability of eG Enterprise allows users to build completely customizable dashboards. Multiple dashboards can be created by each user and used for different purposes – to provide at-a-glance views of the performance of each IT service, to summarize the performance of a specific infrastructure tier, to reflect the status of each region or data center of an enterprise, etc.

In v6, MyDashboard has been enhanced to provide a completely modern new look and feel. The dashboard tool-kit used to build MyDashboards now includes a wide array of new visual tools, which allow the user great flexibility in dashboard design. A dashboard can now include a wide range of graphical elements from simple tables and line graphs to timeline charts, area charts, dial gauges, live measure displays, and tier health indicators. Each panel of the dashboard can be configured individually and even live aggregate metrics indicating the overall demand, quality, or consumption of each component, tier or IT service can be displayed. Dashboard panels can be resized, repositioned, added or removed at will - by stretching/shrinking each panel, or through an easy drag and drop interface. Users can even select from pre-specified color themes so the display of graphs and charts on each panel looks different, even if they are using the same graphical element.

Dashboard panels need not just display performance metrics collected by eG Enterprise. Other items of interest – e.g., local weather, latest news on a specific topic – can also be published on dashboard panels. The background of the dashboard can also be personalized. Any image of interest can be imported as a

dashboard's background to reflect a user's interest or mood.

Users can create any number of custom dashboards from scratch in minutes, publish them for other users or share them privately with other users of the monitoring system. Any of the created dashboards can also be published through Microsoft SharePoint to other users in the organization.

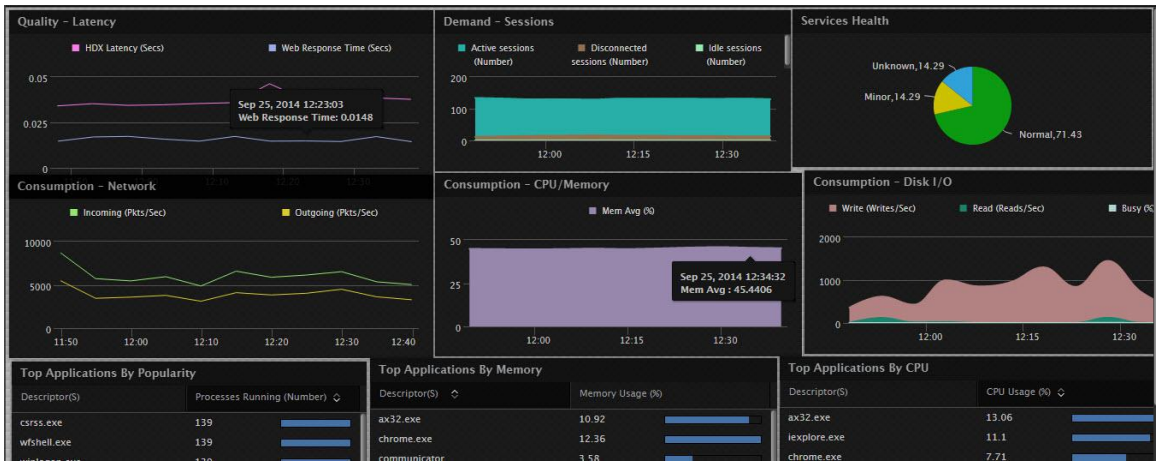


Figure 5: A Custom Dashboard in eG Enterprise

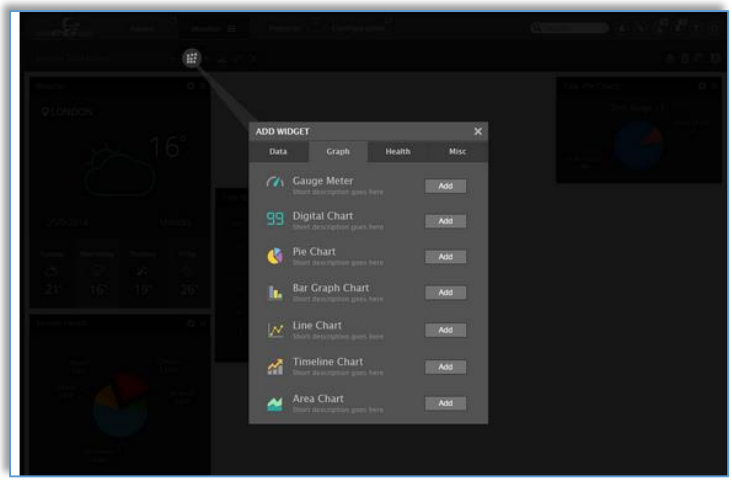


Figure 6: The new custom dashboard tool-kit

Figure 7: Customizing the dashboard, even including weather reports and news feeds

1.1.3.2 User Experience Dashboard for Citrix/Virtual Desktop Infrastructures

One of the biggest challenges that Citrix/virtual desktop administrators have is that they often have to spend time troubleshooting problems that may be caused in other parts of the infrastructure that they do not control. For instance, a slowdown in the home network that a user is connecting from can impact the user experience when accessing a Citrix service. eG Enterprise v6 includes an **User Experience Dashboard** that makes it possible for end-users themselves to view the performance metrics related to their access to the Citrix/VDI infrastructure. This way, end users can easily determine when they see a slowdown, is the problem being caused by connectivity to the Citrix infrastructure, by any application(s) that they are using within a Citrix session, or by the Citrix infrastructure itself. If a performance problem is in the interconnecting network or in one of the applications the user has launched, the user can initiate corrective action (e.g., kill the offending process, contact the local network team, etc.) to alleviate the issue.

End-users do not have to login to the eG monitoring console to access the dashboard. Administrators can publish the dashboard for public viewing. By entering his/her domain user name, an end-user can get to see the performance of his / her Citrix or virtual desktop session. Historical performance can also be observed for all key metrics.

Citrix/Virtual desktop administrators can also use the same dashboard to handle user complaints. When a specific user calls, they can view the performance dashboard for that user and determine what action needs to be taken to resolve the issue. This industry first end-user performance dashboard for Citrix/virtual desktop infrastructures great simplifies the day to day operation of a Citrix/virtual desktop infrastructure.

The self-service capability that the end-user performance dashboard provides results in fewer complaints and trouble calls to the Citrix/virtual desktop helpdesk. As a result, support costs are lower, end-users are less frustrated and the Citrix/virtual desktop deployment can proceed to successful completion.

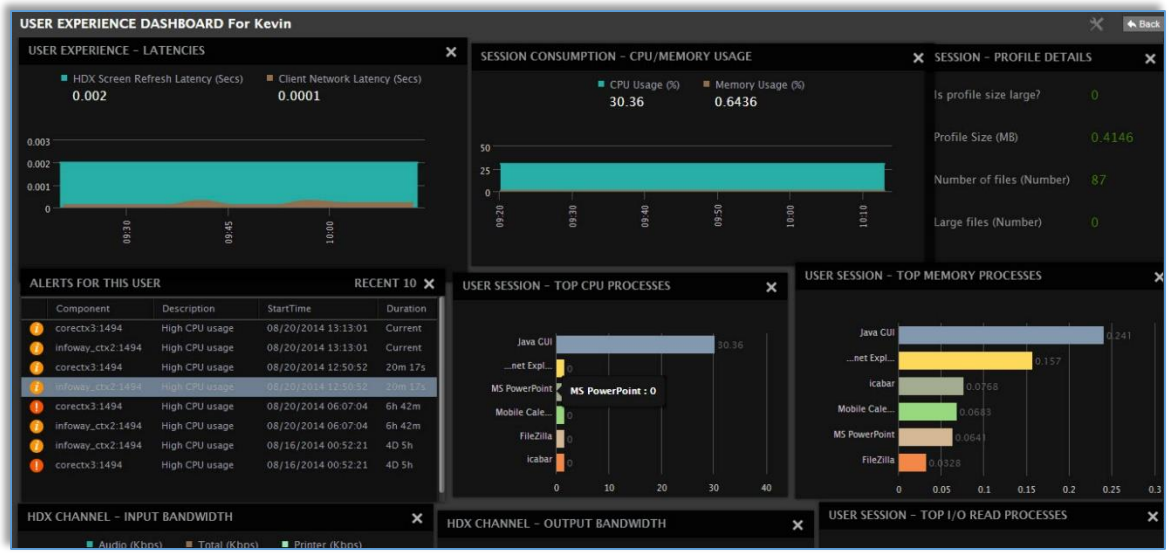


Figure 8: The End-User Dashboard

1.1.3.3 Business Dashboard

IT executives often require a high-level view of the performance of their mission-critical business services. The **Business Dashboard** of v6 provides this view in a form that is easy to comprehend and analyze. This dashboard quickly compares service demand with resource consumption and service quality to enable IT executives swiftly determine where service performance is most likely bottlenecked – at the demand level? resource consumption level? or user experience level? Moreover, it allows IT executives to rapidly triage performance issues tier-wise, so that they can accurately isolate the tier where the problem originated.

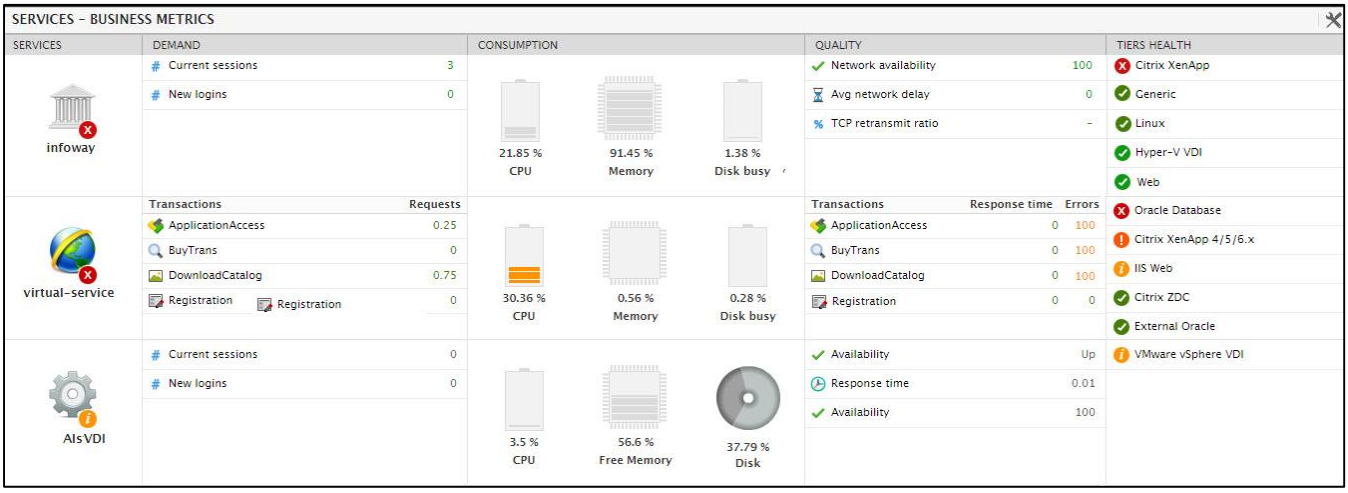


Figure 9: A Business Dashboard in v6

1.1.4 Multiple Time-Zone Support

eG Enterprise is often deployed to manage servers in different geographies and time zones. For example, a large enterprise may have a central eG Enterprise management console to which agents from different locations can be reporting. In a managed service provider environment, multiple customer infrastructures can be monitored from the same eG manager. In such situations, users (administrators in different geographies, customers of an MSP in different regions) prefer to see the performance metrics reported in their respective time zones.

eG Enterprise v6 now allows time zones to be associated to each user's profile. By default, all users are associated with the local time zone of the location where the eG manager is hosted. However, users can change their time zone preferences to suit their requirements. When a user logs into the eG Enterprise console, all the metrics, alerts, and reports that the user accesses are displayed in the respective local time zone. This new capability ensures that eG Enterprise users receive a completely 'local' experience, regardless of which part of the world the eG manager is located in.

1.1.5 Personalized Logos for Users

Earlier versions of eG Enterprise allowed the eG administrator to configure a custom logo for the login screen and for every module of the eG manager – i.e., the Admin, Monitor, Reporter, and the Configuration Management module. Managed service providers used this capability to publish their logo in the eG user interface and promote their brand/service offering to customers. Every user accessing the eG Enterprise system would see the logo configured by the service provider.

eG Enterprise v6 takes this capability a step further – allowing logos to be personalized for each user. Each user of the eG Enterprise system can now configure a custom logo that is displayed in the eG user interface on all the modules. This way, different users can see different logos in the eG user interface. This capability allows service providers to customize the experience for different users.

1.1.6 Reporter Enhancements

1.1.6.1 Easier Navigation

Previously, in the eG Reporter interface, reports were grouped by function – for instance, you had Snapshot reports, Top N reports, Event Analysis reports, Operations reports, etc. Many a times, users want access to reports from a specific application or virtualization platform's context. In eG Enterprise v6, administrators can find all the reports that are applicable to a specific component type easily. These reports are grouped in an easy to understand manner, so administrators need not click in several places to see the reports of most interest to them. Reports specific to component groupings such as zones, segments, and services are also available.

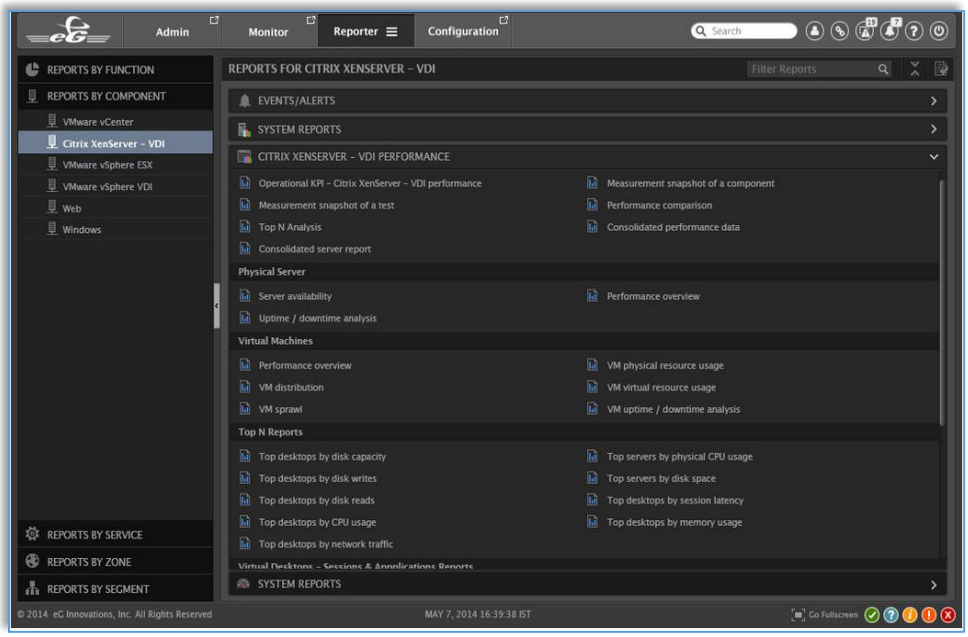


Figure 10: The Reporter Interface of eG Enterprise

1.1.6.2 New Performance Assessment Reports

Analyzing a large infrastructure with hundreds of servers can take a lot of time and effort, and it also requires a great deal of expertise. **New KPI health reports** in eG Enterprise allow administrators to analyze the performance of an IT infrastructure in a few clicks and highlight bottleneck areas in the infrastructure. Drilldowns provide more details of the bottlenecks.

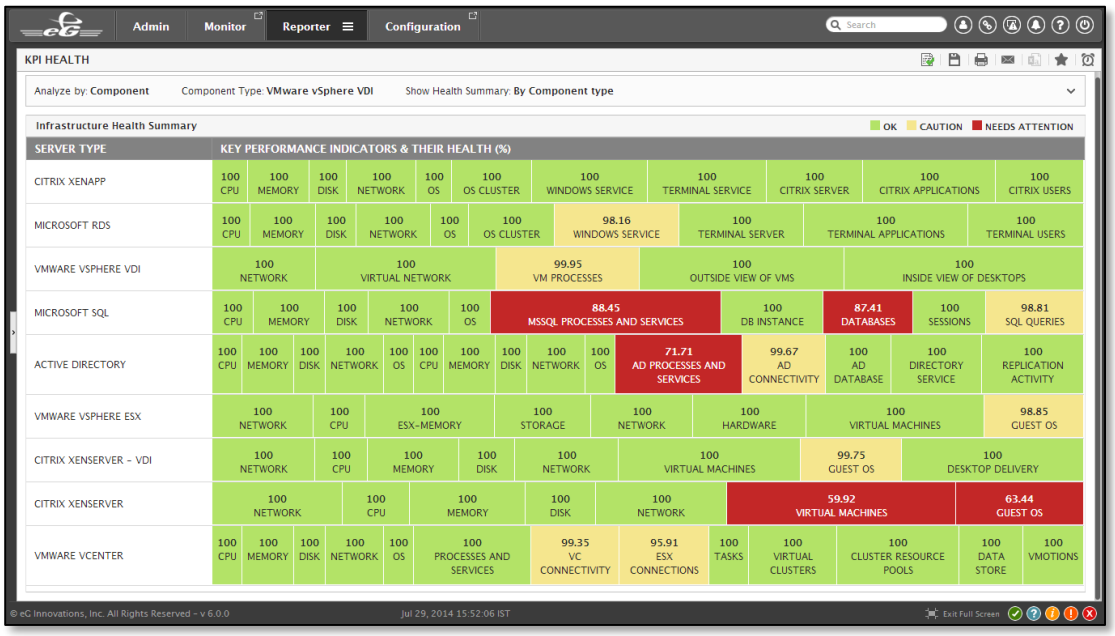


Figure 11: A KPI Health report

VDI assessment reports help administrators analyse the performance of virtual desktops. In an infrastructure with hundreds of virtual desktops, administrators need to quickly understand which desktops are consuming the highest amount of resources and which ones are configured with excessive resources. This is where the VDI assessment report helps. By identifying which desktops are taking resources, administrators can determine what action needs to be taken – e.g., prevent specific applications from running on the desktop, ensure that resource consuming desktops run on different physical hosts, etc.

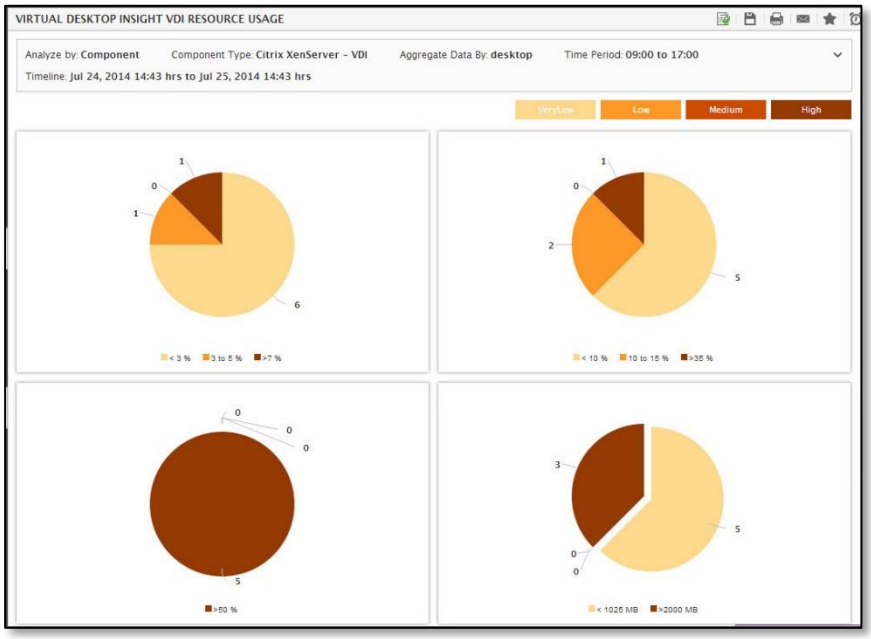


Figure 12: Virtual Desktop Insight – Resource Usage Report

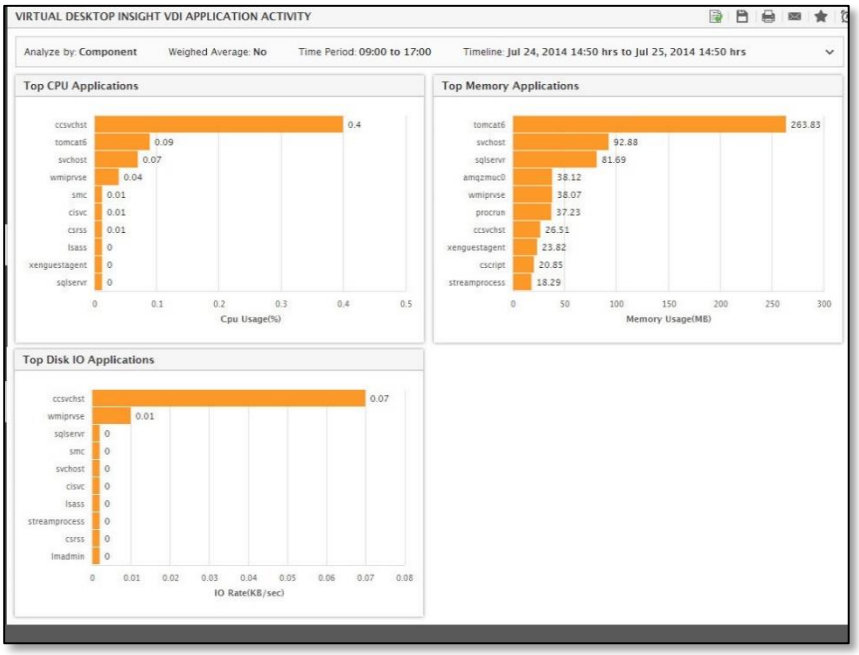
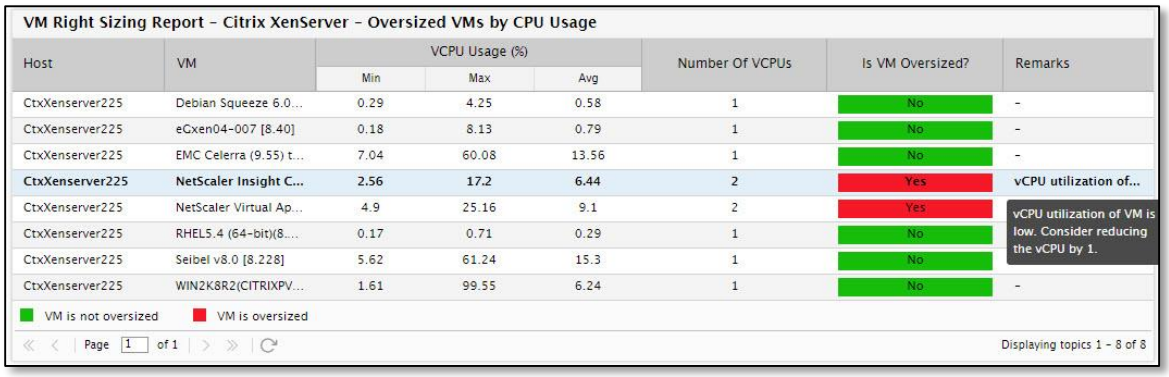


Figure 13: Virtual Desktop Insight – Application Activity report

If a VM is under-sized in terms of CPU resources, the performance of all the applications running on that VM will suffer. On the other hand, if a VM is over-sized, it may have too many resources allocated to it and could starve other VMs of key resources, thereby leading to performance degradation on applications running on those other VMs. Over-sizing of a VM also results in unnecessary wastage of resources, thereby resulting in lower return on investment.

In a large virtualized environment, it is often a challenge to identify which VMs are over-sized and which ones are under-sized. To help administrators quickly and accurately isolate such VMs, eG Enterprise includes a **VM Right-sizing** report. This report highlights the VMs on a chosen host(s) that either have more CPU resources than required or less CPU resources than they need. From this report, administrators can also get valuable hints on how to right-size these VMs. Administrators can use this information to right-size their virtual infrastructure for maximum return on investment.



VM Right Sizing Report - Citrix XenServer - Oversized VMs by CPU Usage

Host	VM	VCPU Usage (%)			Number Of VCPUs	Is VM Oversized?	Remarks
		Min	Max	Avg			
CtxXenserver225	Debian Squeeze 6.0...	0.29	4.25	0.58	1	No	-
CtxXenserver225	eGxen04-007 [8.40]	0.18	8.13	0.79	1	No	-
CtxXenserver225	EMC Celerra (9.55) t...	7.04	60.08	13.56	1	No	-
CtxXenserver225	**NetScaler Insight C...**	**2.56**	**17.2**	**6.44**	**2**	**Yes**	**vCPU utilization of...**
CtxXenserver225	NetScaler Virtual Ap...	4.9	25.16	9.1	2	Yes	vCPU utilization of VM is low. Consider reducing the vCPU by 1.
CtxXenserver225	RHEL5.4 (64-bit)(8....	0.17	0.71	0.29	1	No	
CtxXenserver225	Seibel v8.0 [8.228]	5.62	61.24	15.3	1	No	
CtxXenserver225	WIN2K8R2(CITRIXPV...	1.61	99.55	6.24	1	No	-

VM is not oversized VM is oversized

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Figure 14: A VM Right-sizing report that highlights over-sized VMs and indicates how many vCPUs are sufficient for these VMs

Citrix administrators are often interested in auditing user activity on their XenApp farms. They would like to understand who accessed each application in the farm and for how long. The new **Citrix Application Launch** in eG Enterprise v6 addresses this need. Using the information in this report, administrators can determine which applications are most accessed, by whom and for how long. This information can also be useful if Citrix administrators have to bill different organizations in an enterprise for usage of the different applications published in the Citrix XenApp farm.

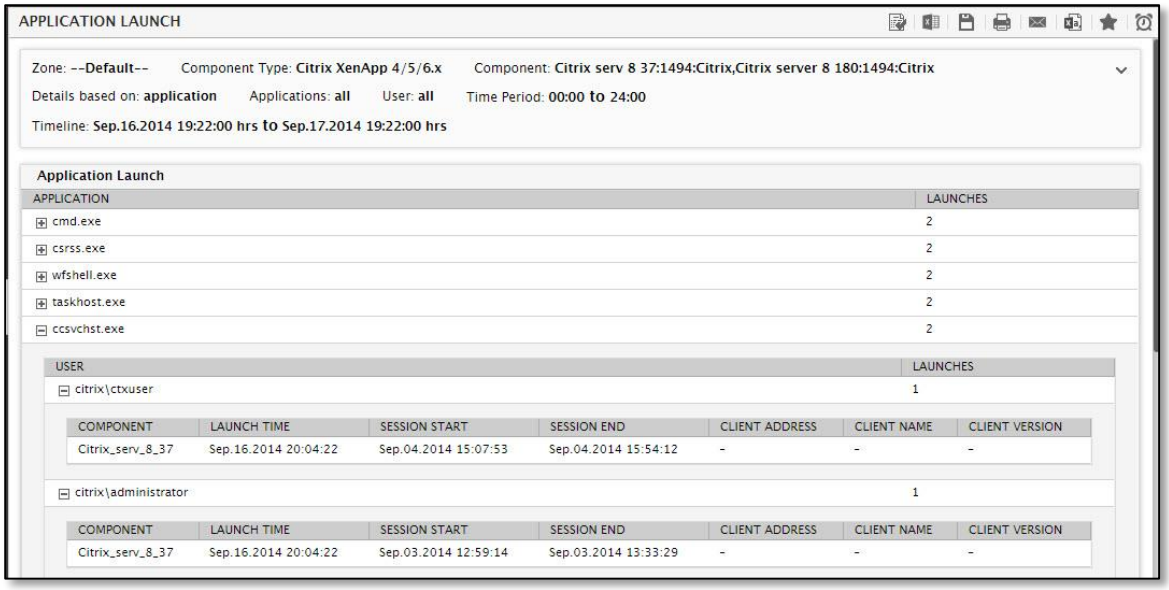

Figure 15: A Citrix Application Launch report

1.1.7 Administration Enhancements

eG Enterprise v6 adds key enhancements to simplify administration of the system.

- **Import/export of manager configuration:**

  Multiple eG managers are common in many IT infrastructures. Large environments that span geographies may choose to deploy an eG manager per geographic zone. In many enterprise environments, a separate manager may be deployed in a staging environment and another in production. System integrators too may have instances when they manage multiple eG managers – one for each customer that they service.

  In such cases, administrators may want the configurations of the eG managers to be consistent, so that best practices are implemented across the managers. Manually synchronizing the configurations of multiple managers is a laborious task. eG Enterprise v6 provides a configuration export/import capability that can help in such situations.

  Administrators can export the key configurations of an eG manager and reimport these configurations to another manager, so as to synchronize the configurations of both managers. When exporting the configuration of an eG manager, an administrator can choose to export any subset of the following configurations:

  - Default test configurations
  - List of enabled/disabled tests
  - Default threshold configurations
  - Global threshold settings
  - Alarm policies
  - Data cleanup frequencies
  - Fix history configurations

Using this capability, administrators can:

- Establish and maintain gold standard configurations across eG managers and thus ensure consistent policies and practices are in place.
- Simplify administration and avoid laborious reconfiguration activities on multiple managers.
- Ensure that a manager's configurations are easily saved for recovery in the event of a data corruption.

- **Auto-discovery enhancements:**

  Previously, when auto-discovery was enabled, the eG manager would detect all the possible components that could be mapped to a server and added all of these components to the eG manager's configuration. This meant that if a Microsoft SQL Server was executing on a Windows server, this server was added as a Microsoft SQL server, a Windows server, and an Event Log server. The administrator would ultimately only manage the server as a Microsoft SQL server component. In eG Enterprise v6, priorities are pre-assigned to different applications for the purposes of auto-discovery. When discovering a server, the discovery process first looks for high priority applications on that host; high priority applications are discovered first and if any high priority application is detected, the discovery process for that host will stop. Other applications are discovered only if the higher priority discovery is not successful. This new capability ensures that eG Enterprise's discovery process only discovers the key components that administrators are likely to be interested in monitoring.

- **Asset management:**

  In eG Enterprise v6, it is now possible to record asset information for every application, device, or server being managed. Administrators can use the administrative interface to record details such as the name of the asset, description, type, location and state. Additional details on manufacturer, serial number of the asset, maintenance information and license information can also be recorded. Ownership details including the person to be contacted in the event of an issue can also be recorded. Asset information can also be mass imported into eG Enterprise from CSV files.

  When an application, server, or device experiences performance degradation, through the Alarms window in the eG monitoring console, a help-desk person has single-click access to the asset information of each problematic application, server or device. Administrators can also configure the eG manager so that asset information can be included in email alerts sent out to users. By making useful asset details easily available to help desk staff and administrators, eG Enterprise helps minimize troubleshooting time and improves the efficiency of IT operations.

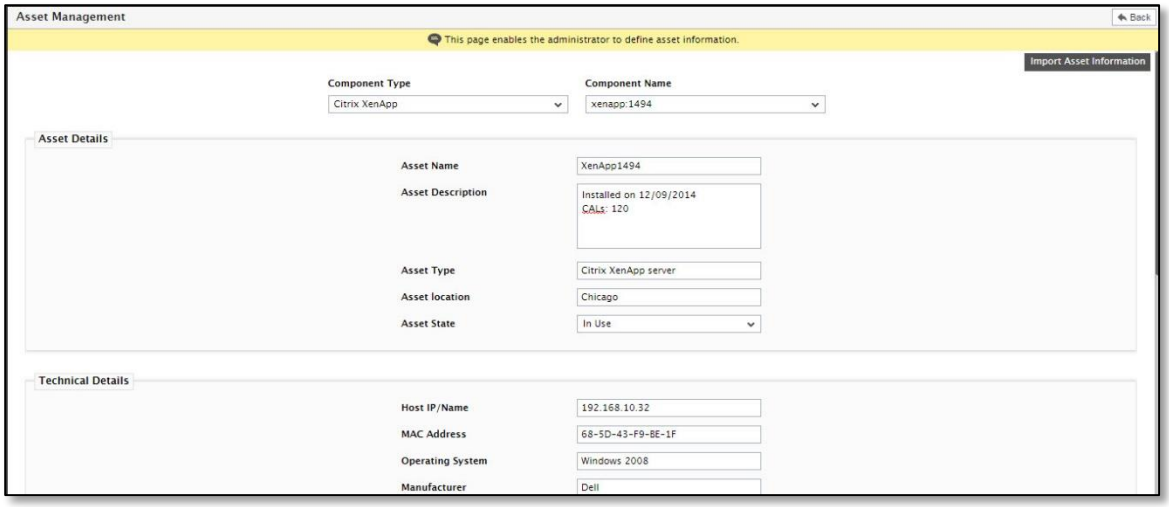

Figure 16: Recording the asset configuration

- **Thresholding enhancements:**

  eG Enterprise v6 includes a new and improved administrative interface for configuring specific thresholds for each application, server or device being managed. As seen in Figure 16, administrators can now clearly understand what type of thresholds currently apply to which test – i.e., which tests are governed by global, group, default, and specific thresholds. Previously, administrators had to access multiple web pages to obtain this information.

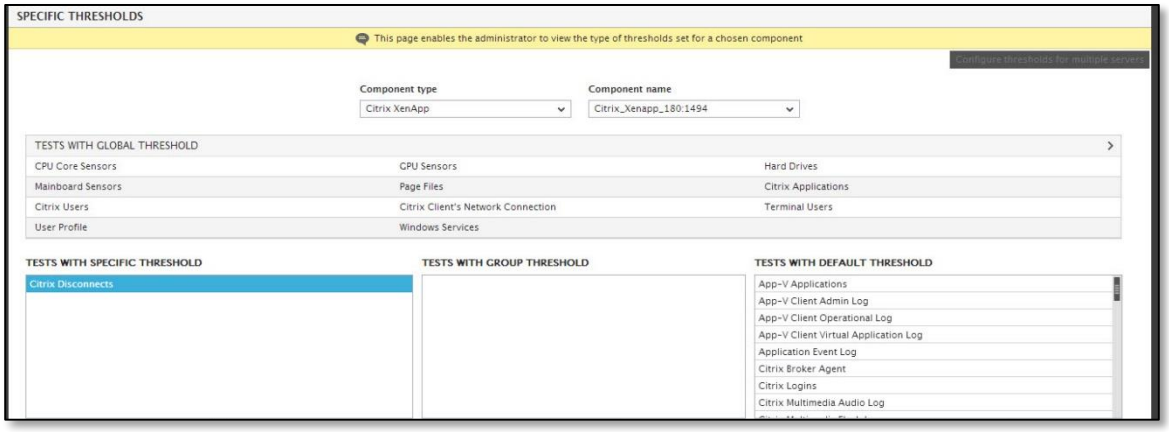

Figure 17: Viewing which threshold applies to which test

Thresholds can be set for each measure separately using intuitive controls. These easy-to-use configurations allow little room for errors and reduce the training required to use the monitoring tool.

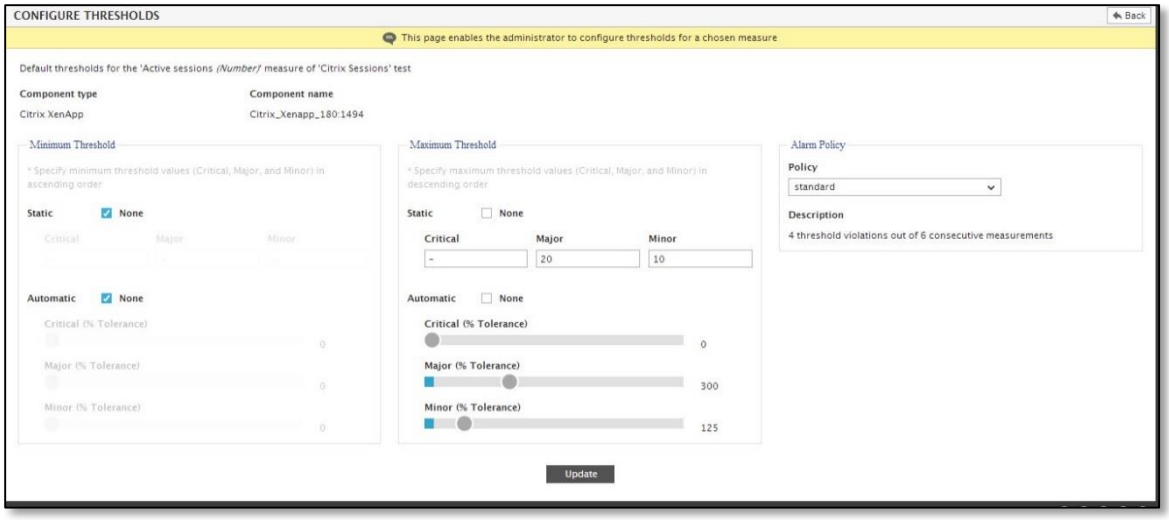

Figure 18: Threshold configuration in v6

Unlike the previous versions, administrators will no longer have to wait for 24 hours for threshold changes to take effect – even if these changes apply to a group of servers or to the default configurations across the entire managed infrastructure. Whenever threshold settings are modified, the changes will take effect within the next hour itself.

- **Default role providing limited admin support:**

  With eG Enterprise v6, administrators can now create additional users with administrative privileges to configure the monitoring for the components that are assigned to them. These users can now configure tests, thresholds, alarm policies and maintenance policies for the components in their purview. The *MonitorwithLimitedAdmin* role included in eG Enterprise can be used to create such users. This capability allows delegated administration, which is a key requirement for many enterprises and service providers.

1.1.8 Config Management Enhancements

- **Configuration changes over email/SMS:**

  Previously, if eG Enterprise noticed configuration changes in a component at around the same time that a performance issue was observed on that component, it allowed users to quickly access the details of these changes by launching the **Configuration Management** portal directly from the **Alarms** window in the eG monitoring console. This enabled users to instantly diagnose whether/not the configuration change caused the performance bottleneck. For faster root-cause diagnosis, v6 includes the details of such configuration changes in the email/SMS alerts sent out for performance issues.

- **XML file comparison:**

  In earlier versions, users to the **Configuration Management** console could use an intuitive interface to easily compare the configuration of two components and isolate discrepancies. In v6, this comparison capability has been extended to XML formatted configuration files. For instance,

administrators looking to synchronize the configuration of two of their Tomcat servers can use this specialized interface to quickly compare the **server.xml** file of both the Tomcat servers and understand how they are different.

1.2 Increased Depth of Coverage

So far, we have considered functional improvements that make it easier for organizations to use eG Enterprise. In this section, we review enhancements to eG Enterprise that make it possible for organizations to get a deeper view into applications, servers and devices that eG Enterprise has monitored in the past.

1.2.1 Enhancements to Microsoft Windows Server Monitoring

eG Enterprise v6 includes additional enhancements to eG Enterprise's capabilities to monitor Microsoft Windows systems. The enhancements in this category include:

- **Time Sync monitoring for Windows servers:**

  In a Microsoft Windows domain one of the most important settings is the time. The current time has to be as close as possible for all the machines in the domain. All of the machines in the domain use the time synchronization service to synchronize their time with that of the Domain Controller (often the Active Directory server).

  Many commonly used protocols use time information on the machines. For example, to prevent replay attacks, Kerberos authentication in the domain relies on the time stamps on the machine. If a machine's local time is very different from the Domain Controller (the default maximum tolerance is 5 mins), Kerberos authentication will fail. Applications may also begin to fail as a result. Many other applications – e.g., security applications and their antivirus configurations, web applications that use SSL certificates, etc. – also rely on time settings.

  The eG agents in v6 can now track the time difference between any Windows system in a domain and their domain controller. When the time difference exceeds a pre-set maximum, the agents can proactively alerts administrators to a probable time synchronization issue.

- **Hardware monitoring for Windows servers:**

  Earlier versions of eG Enterprise could monitor the hardware on which Windows operating systems were hosted. To do so, eG Enterprise required administrators to have a hardware agent (SNMP-based) from the hardware vendor - Dell, HP, or IBM - running on the server. In v6, eG agents can monitor the hardware status of physical servers running Microsoft Windows OS without requiring any third party agent to be present. Additionally, eG agents also integrate with integrated lights out (ILO) hardware management solutions from HP and IBM for hardware monitoring.

- **Microsoft DFS monitoring:**

  With Distributed File System (DFS), administrators can make it easy for users to access and manage files that are physically distributed across a network. If DFS fails or is slow, users will be unable to access the files they want when they want them. To avoid such situations, administrators will have to continuously monitor the namespace service, identify unavailable/slow namespaces and isolate the root-cause, and proactively detect potential issues in replication. For this purpose, eG Enterprise now provides deep insights into the availability, responsiveness, and operational levels of the DFS namespace service. In the process, the eG DFS Monitor detects probable delays in request processing by the namespace service and pinpoints the namespace that is most affected by it. It also monitors

the DFS replication service and helps accurately isolate what is causing replication to slowdown and result in a data non-sync – is it a poor compression algorithm? is it an inadequate quota configuration for staging and conflict and deleted items folders? Is it because the staging folders do not have enough free space? The monitor also captures inadequacies in namespace server sizing and reveals how it impacts API request processing.

- **Improved Windows cluster monitoring:**

  eG Enterprise v6 provides deeper insights into the composition, status, and performance of Windows clusters. By monitoring just a single node in a cluster, administrators can identify which other nodes are participating in the cluster setup and the current state of each node. The sudden failure of the cluster service on the monitored node can be promptly detected. The services/applications that have been clustered can be identified; if a service/application does not fail over, the reason for the anomaly is revealed. The current capacity and usage of cluster disks and cluster shared volumes are tracked, so that potential space crunches are proactively detected. Offline cluster resources and down cluster networks are also pinpointed.

1.2.2 Citrix Performance Management Enhancements

This section outlines enhancements in v6 to eG Enterprise's capabilities for monitoring the different Citrix tiers in the infrastructure.

- **Integration with Citrix ODATA API for enhanced Citrix XenApp and XenDesktop monitoring:**

  Citrix XenApp and XenDesktop version 7 and higher support an Open Data (ODATA) API that third party applications can use to access the same metrics that administrators have access to from the Citrix Director tool. These metrics include data related to connection failures to virtual desktops, machines in a failure state, session usage, user logon duration with breakups of the login duration, and load balancing data. In v6, eG Enterprise leverages the ODATA API and reports the same metrics published in the Director console in the eG monitoring console. This way, Citrix administrators need not have to work with multiple consoles and all the key performance information about the Citrix infrastructure is available from the eG Enterprise console itself.

- **Browser monitoring on Citrix XenApp and XenDesktop virtual desktops:**

  Until now, Citrix and virtual desktop administrators have been more concerned with the configuration and performance of their servers. As client applications become more sophisticated and play a more active role in an application's functioning, they can put a higher degree of stress on Citrix and virtual desktop infrastructures.

  Web browsers are often one of the most popular applications accessed by users in a Citrix and virtual desktop infrastructure. The increased use of Javascript and client side extensions by web sites is causing web browser instances to become resource hogs.

  When one or more browser instances consume excessive CPU, memory and disk I/O resources on a server or a desktop, in order to troubleshoot further, administrators have to determine which user was accessing the browser and what web site(s) was the user browsing when the problem started. A single browser instance with multiple tabs can spawn multiple processes. So identifying the URL accessed from each browser tab and mapping it to a specific browser process is critical for accurate diagnosis.

  With eG Enterprise v6, the eG agent tracks all browser instances running on a Citrix XenApp server or a virtual desktop. While only IE (Internet Explorer) browser instances can be monitored on a

XenApp server, IE, Firefox, and Chrome instances can be monitored on virtual desktops. For every IE instance monitored, administrators can now see a mapping of browser process to URL being accessed, as well as the resources used by each browser process. For other browsers, the URLs accessed and the resource used per URL is revealed. In this way, administrators can identify which URL/web site is causing excessive resource usage by the browser. Armed with this information, administrators can determine the steps required to avoid excessive resource usage by browser instances – e.g., whether specific web sites are responsible for this, whether users are accessing web sites (e.g., youtube, facebook, etc.) that they should not be accessing from a corporate network, etc.

Shows The User And Their Corresponding Process Details

USERNAME	PID	PARENT PID	CPU(%)	MEMORY(%)	VIRTUAL MEMORY (MB)	HANDLE COUNT	THREAD COUNT	DATA IO (KB/SEC)	IO OPERATIONS (OPS/SEC)	IO READS (KB/SEC)	IO WRITES (KB/SEC)	PAGE FAULTS (FAULTS/SEC)	IMAGE PATH	WEBSITE TITLE	WEBSITE URL	WEBSITE DOMAIN
Sep 25, 2014 19:47:51																
kal\ware	12820	1976	0	0.2141	163.1758	539	7	0	0	0	0	0	C:\Program Files\Internet Explorer\iexplore.exe	IEFrame	-	IEFrame
kal\ware	13152	19400	0	0.2263	160.625	559	8	0	0	0	0	0	c:\program files\internet explorer\iexplore.exe %1 http://maps.google.com/maps?q=http%3A%2F%2Faceware.com.au%2Faceware.kml	IEFrame	-	IEFrame
kal\ware	2068	12820	0	0.3539	191.5859	470	7	0	0	0	0	0	C:\Program Files (x86)\Internet Explorer\IEXPLORE.EXE SCODEF:12820 CREDAT:267521 /prefetch:2	IEFrame	-	IEFrame
kal\ware	8704	13152	0	1.0102	348.3164	613	19	0	0	0	0	0	C:\Program Files (x86)\Internet Explorer\IEXPLORE.EXE SCODEF:13152 CREDAT:267521 /prefetch:2	http://aceware.com.au/aceware.kml - Google Maps	https://maps.google.com/maps?q=http://aceware.com.au/aceware.kml	https://maps.google.com
kal\bett	10984	16396	0	0.2862	169.5859	648	8	0	0	0	0	0	C:\Program Files\Internet Explorer\iexplore.exe	IEFrame	-	IEFrame
kal\bett	3584	10984	0	0.8784	338.4141	721	20	0	0	0	0	0	C:\Program Files (x86)\Internet Explorer\IEXPLORE.EXE SCODEF:10984 CREDAT:267521 /prefetch:2	NAB Internet Banking - Register for online banking - NAB	http://www.nab.com.au/personal/internet-banking	http://www.nab.com.au

Figure 19: Detailed diagnostics revealing the web site URLs accessed using IE browser instances and the resource usage per instance

- **Enhanced user logon monitoring for Citrix XenApp/Microsoft RDS:**

  User login in a Citrix XenApp/Microsoft RDS infrastructure is a complex, multi-step process. First, the domain controller is discovered and the login credentials are authenticated. Then, the corresponding user profile is identified and loaded, possibly from a remote profile server. Next, system and group policies are applied and logon scripts are processed to setup the user environment. A slowdown in any of these steps can significantly delay the logon process for a user. Since logons on Windows happen sequentially, this may adversely impact the logins for other users who may be trying to access the XenApp/Microsoft RDS server at the same time.

User Logon - mas\tom	
User Logon Breakup	
Avg logon duration (msecs)	15000
User account discovery (msecs)	0
DC discovery time (msecs)	2786
LDAP bind time to active directory (msecs)	367
Total group policy object file accessed time (msecs)	671
Client side extension processed time (msecs)	11023
User profile load time (msecs)	0
Group policy	
Group policy starts (Number)	1
Client side extensions applied (Number)	0
Group policy completes (Number)	1
User Profile	
Profile load starts (Number)	1
Profile load successes (Number)	1
Profile loading failures (Number)	0
Profile load failures percent (%)	0
System Profile	
System policy starts (Number)	0
Avg system policy processing time (Secs)	0

Figure 20: User logon monitoring

Citrix/Microsoft RDS administrators need to be able to quickly identify, when a user complains that login is slow, where the problem lies – in the authentication process? during profile loading? during GPO processing and if so, which GPO? This is where eG Enterprise v6's new **User Logon** monitor helps. All logons to the Citrix XenApp/Microsoft RDS server are tracked and logon time breakdowns for every logon is provided, enabling administrators to quickly troubleshoot logon problems.

- **Enhanced Citrix Provisioning Services monitoring:**

  The capabilities of the eG Citrix Provisioning Server (PVS) Monitor have been enhanced in v6 to report the following:

  - The status of vDisks in a PVS store;
  - The target devices assigned to each vDisk;
  - The size and type of write cache of each vDisk;
  - The availability and responsiveness of the default store path and the default write cache path;
  - The streaming request load on the Citrix PVS and whether/not the server is configured right to handle the load;
  - Whether/not each vDisk in the PVS store is locked and if locked, how long it has been locked.

- **Enhanced Citrix XenServer monitoring:**

  In v6, the capabilities of the eG Citrix XenServer Monitor has been enhanced in many ways:

  - *Improved aggregated resource usage metrics for Citrix XenServer:* In addition to disk space usage metrics per disk partition of a XenServer host, v6 now reports aggregated space usage metrics across all disk partitions, so as to provide administrators with an overview of space usage on the host. Such aggregated performance views are also available for the XenServer's network and memory usage metrics.

  - *Monitoring of GPU performance:* In graphic intensive environments, the XenServer hypervisor is often configured with a separate graphics processing unit (GPU) to enhance application performance. In such cases, graphics intensive portions of the application are handled by the GPU while the central processing units (CPUs) handle the compute intensive portions. In such cases, it is not sufficient to monitor CPU utilization alone – doing so will not reveal any bottlenecks in graphics processing. Therefore, in v6, eG Enterprise includes monitors for the GPU as well. GPU usage is tracked at the host level to determine bottlenecks. The processing requirements are also monitored at the virtual machine level, so administrators can understand which of the VMs has more graphic intensive applications running on them. Processing, power and memory usage levels of the GPU are reported in real-time, so any graphics processing bottlenecks are reported instantly to the administrator.

GPU Stats - VM - Win-8 (11.156):#0 GRID K100 (id=11)	
Cooler rate (%)	0
GPU utilization (%)	0
Core clock (MHz)	4294967295
Memory clock (MHz)	4294967295
Power consumption (Watts)	0
Temperature (Celcius)	0
Total memory (MB)	255
Available memory (MB)	191
Used memory (MB)	64
Virtual memory (MB)	256

Figure 21: GPU usage statistics of a VM on a Citrix XenServer

1.2.3 Enhancements to Virtual Machine Monitoring Capabilities

Version 6 provides additional metrics as part of its "inside view" monitoring of virtual machines. These include.

- **Personal vDisk monitoring:**

  The personal vDisk retains the single image management of pooled and streamed desktops while allowing people to install applications and change their desktop settings. Personal vDisks redirect all changes made on the user's VM to a separate disk (the personal vDisk) attached to the user's VM. The content of the personal vDisk is blended at runtime with the content from the base VM to provide a unified experience. In this way, users can still access applications provisioned by their administrator in the base VM. However, if the personal vDisk runs out of space, users will no longer be able to hold on to their customizations, allowing them access to only the base VM and the applications installed therein. This outcome beats the entire purpose of having personal vDisks. To enable administrators avert such anomalies, eG Enterprise v6 tracks the status and space usage of the personal vDisk of each VM and promptly reports errors / abnormal space usage. This way, administrators can accurately identify personal vDisks with very limited space, which VM such personal vDisks are associated with, and what is consuming too much disk space – user profiles? Or user applications?

- **Additional monitoring of Windows VMs:**

  Additional monitoring for Windows VMs is included in v 6. This includes monitoring of page file usage and time synchronization between a VM and the Domain Controller that it is communicating with. Total IOPS is now reported for all applications accessed on virtual machines, making it easier to determine when a storage bottleneck is observed, which of the applications is causing the highest amount of IOPS.

- **Additional visibility into Citrix HDX channels:**

  In v6, when monitoring the quality of user connections to desktops via ICA, eG Enterprise additionally reports the bandwidth used by every user, the input and output session line speeds for every user, the bandwidth utilized by each user for incoming and outgoing thinwire traffic, bandwidth used by each user when accessing multimedia content, and also the count of resource shared used by every user. With the help of these metrics, administrators can determine which user is using bandwidth excessively and what type of bandwidth intensive operations that user is engaged in.

1.2.4 Enhancements to Microsoft Hyper-V Monitoring

eG Enterprise's monitoring capabilities for Microsoft Hyper-V have been enhanced to make it comparable to its monitoring capabilities for VMware vSphere. The monitoring enhancements include:

- Scanning of key Hyper-V logs – eg., Hyper-V config, Hyper-V High Availability, Hyper-V Integrations, etc. - for configured patterns of errors/warnings/general information messages. If entries matching the specified patterns are found in the logs, the count of such entries and their complete details are reported to aid troubleshooting efforts.

- Reporting of how the Hyper-V server and its VMs utilize the physical memory resources of the server. Detailed metrics reveal which VMs are draining the physical memory of the server.

- Metrics that track the current replication state, replication health, replication mode, and last replication time for each VM on Hyper-V, so that replication failures can be proactively detected and reasons for the same can be investigated;

- Tracking of large-sized and obsolete snapshots, which can be removed to conserve space on the hypervisor.

1.2.5 Enhancements to Active Directory Monitoring

Active Directory is an integral part of any enterprise infrastructure. eG Enterprise includes additional monitors for Active Directory servers that make it possible for administrators to proactively detect and fix a number of common issues. Some of the new capabilities in this release include:

- Ability to track all the users and computers in each domain and to identify the inactive computers and unused user accounts in a domain (Windows 2008/2012);
- Detecting and alerting on user lockout events;
- Pinpoint unavailable global catalogs;
- In-depth visibility into Windows DNS server health;
- Tracking of replication bottlenecks and identify the type of synchronization requests that are in the Active Directory server's replication queue;
- Determining domain configuration changes and who changed it, using Audit account management events;
- Prevent domain conflicts by monitoring the health of Flexible Single Master Operations
- (FSMO) controllers and roles;

1.2.6 Enhancements to Microsoft Exchange Monitoring

eG Enterprise v6 includes monitoring support for Microsoft Exchange 2013. In addition, eG Enterprise now provides deeper insights into the ActiveSync experience of users accessing Microsoft Exchange. Metrics reported by eG Enterprise for ActiveSync monitoring include:

- The number of hits/accesses made by each device synchronizing with the Exchange server and the amount of data transmitted and received by that device, so as to pinpoint:
- Devices that are currently connected to the Exchange server; unauthorized devices can thus be

quickly captured;

- Devices that are accessing the Exchange server mailboxes frequently and those that seldom use the mailboxes; sizing and policy decisions can be taken based on this observation
- Devices that are consuming excessive bandwidth resources and could hence be contributing to the sluggish quality of the network;
- The number and percentage of accesses that returned each HTTP status code, thus shedding light on ActiveSync errors that occurred frequently.
- The number of ActiveSync accesses and the number and size of items transmitted and received by each device type synchronizing with Exchange; this pinpoints those device types that are utilizing the available network and server resources excessively, thus degrading the experience of some or all device users.
- Devices that are not OK – i.e., devices that are either unable to connect to ActiveSync or cannot synchronize with Exchange Server via ActiveSync
- The error/warning conditions captured recently by ActiveSync logs;
- Count of requests that fail to comply with or are only partially compliant with ActiveSync policies, so that the probable reason for synchronization failures can be ascertained.
- These key metrics allow administrators to easily monitor, diagnose and report on the performance of their Microsoft Exchange environments.

1.2.7 Enhancements to Oracle Database Monitoring

eG Enterprise v6 reports additional metrics for Oracle database monitoring. The new capabilities are discussed below:

- How the Oracle SGA uses the memory allocated to it, thus pinpointing the exact SGA components that are hogging memory resources;
- How the Oracle PGA uses the memory allocated to it, so that potential memory contentions in the PGA can be proactively detected and irregularities in PGA sizing can be discovered;
- Identifies the 'costliest' query, and reports the time it takes for execution, for reading from disk, and for performing buffer gets. The exact query and the user executing it are also revealed;
- Tracks the workload of the Oracle database server, measures the server's ability to handle the load, and thus points to current/probable processing bottlenecks on the server. The activity levels of the Oracle database server are measured at a per-second and a per-transaction basis.
- The current size and the growth in size of Oracle alert logs are tracked, so that abnormal log file growth can be captured early and reported before it drains space on the database server.

1.2.8 Enhancements to Microsoft SQL Monitoring

eG Enterprise v6 supports monitoring of Microsoft SQL server 2014. In addition, many new monitoring capabilities for SQL servers have been introduced in this version.

- When monitoring the root blockers on a Microsoft SQL server, eG Enterprise now reports the count of blocked processes. Detailed metrics reveals the names of these blocked processes, so that administrators can identify the processes that are bottlenecked owing to incessant blocking on the

SQL server.

- The current size and the growth in size of SQL error logs are tracked, so that abnormal log file growth can be captured early and reported before it drains space on the SQL server. Additionally, the number and nature of warning events and fatal hardware errors captured by the error logs are also reported.
- eG Enterprise's monitoring of SQL server clusters has been enhanced. eG Enterprise now reports the uptime of the cluster, so that administrators can accurately identify cluster downtimes. Uptime monitoring also reveals whether/not fail-over has occurred, so that administrators can detect the failure of the active cluster node from the comfort of their seats. In addition, eG Enterprise now tracks the space usage locking activity, session load, errors, transactions, wait events, cache usage, and memory usage of the active cluster node, so that threats to the operational health of the active node can be captured early and averted. Moreover, the availability of the cluster service on the active node is checked time and again and the resource usage of the service is monitored, so that the sudden non-availability of the service and abnormal resource usage by the service can be detected.

1.2.9 Enhancements to Java Transaction Monitoring

In v6, eG's Java Transaction Monitoring (JTM) capabilities have been improved. Additional metrics are reported and the resource consumption is much lower than before.

- **Excluding specific error conditions from the eG JTM's monitoring scope:**

  Previously, whenever a transaction encountered any error/failure, the eG JTM automatically included that transaction in its *Error transactions* count. In some cases, administrators may want to disregard certain errors. For instance, administrators may have handled certain exceptions/errors programmatically, so that such errors do not cause transactions to fail. Some other errors could be temporary and may therefore need to be ignored. There may also be some "known" errors that the administrators do not wish to be alerted to. In all these cases, administrators may want to make sure that the transactions in which such errors occur are not counted as *Error transactions*. To enable this, eG JTM v6 allows administrators to specify errors that can be excluded from monitoring.

- **Minimizing the overheads in transaction monitoring:**

  An application may involve hundreds of methods invoked from within a multitude of packages (where a package is a container for classes). Earlier, when monitoring application transactions, the eG JTM monitored every method in every class file to locate the exact method that caused application performance to degrade. For instance, in case of an application deployed on Tomcat, the eG JTM profiles the class files related to the target application and also the Tomcat server-specific class files to identify inefficient methods. Some administrators however may want certain packages or classes to be excluded from monitoring – in the case of the example above, administrators may want the eG JTM to monitor only the application-related packages and not the Tomcat server-related ones. This is why, the eG JTM v6, by default, ignores all application server-specific packages (eg., class files related to Tomcat, WebLogic, WebSphere, JBoss, etc.) from its monitoring purview. Optionally, you can include/exclude more packages/classes for monitoring by editing the **exclude.props** file file in the directory that contains the **eg_jtm.jar** file. Once done, this will significantly minimize monitoring overheads.

- **Additional transaction metrics:**

  The eG JTM has been enhanced in v6 to additionally monitor the following:

  - The outbound HTTP requests per Java transaction can now be tracked and the average

responsiveness of the requests can be measured, so that administrators can accurately isolate the transaction for which HTTP calls are slow.

- The requests made by a Java transaction to web services and the response time of these web service requests are now monitored to enable administrators to precisely pinpoint the transaction for which web service interactions are slow.

- **Enhancements to URL pattern discovery:**

  Typically, the eG JTM automatically discovers all transactions to a Java/J2EE application by default and reports metrics for each transaction. Most environments however may not be interested in monitoring all their Java transactions and may prefer to focus on only a few. Moreover, in environments where the transaction activity is high, auto-discovery presented the eG JTM with a large number of transactions for monitoring, thus increasing processing overheads. To cater to these requirements, eG JTM v6 allows administrators to choose between automatic transaction (or URL) discovery and manual transaction (or URL) configuration. If automatic transaction discovery is chosen, then administrators should indicate how the discovered transactions need to be grouped – i.e., at which URL segment-level – so that the eG JTM monitors the groups alone (and not the individual transactions); this helps in minimizing monitoring overheads. On the other hand, if manual transaction configuration is chosen, then administrators can configure a comma-separated list of URL patterns that they want the eG JTM to monitor.

1.2.10 Enhancements for SAP Monitoring

Version 6 of eG Enterprise provides deep visibility into the performance of the SAP ABAP stack. Enhancements in this release are focused on many areas – tracking the health of all the communications from the SAP ABAP stack to external applications, the health of the internal processes of the SAP ABAP system and understanding and analysing the user experience and activity on the SAP ABAP system. The details of these enhancements are as follows:

- **Monitoring of IDocs:**

  IDocs are structured ASCII files (or a virtual equivalent). They are the file format used by SAP ABAP to exchange data with foreign systems. eG Enterprise now monitors the inbound and outbound IDocs generated and reports the rate at which these IDocs were processed at various stages of transmission/reception, thus accurately pointing to processing slowdowns and where exactly the processing was bottlenecked. In addition, the Monitor also reports the number of IDocs that were found to be erroneous every second and the exact stage of transmission/reception at which the rate of errors peaked. This way, administartors can easily determine why and where errors have occurred in electronic data exchange.

- **Monitoring of RFCs:**

  Communication between applications within an SAP system and also with a remote system can basically be achieved using the Remote Function Call (RFC). tRFC or Transactional RFC is appropriate for communication between two independent SAP systems. In this scenario, data is transferred by tRFC, meaning that each function module sent to the target system is guaranteed to be executed one time only. qRFC performs a serialization of tRFC (Transactional RFC) using wait queues. While the actual sending process is done by the tRFC, inbound and outbound queues are added to the tRFC, thus resulting in a qRFC (queued Remote Function Call). qRFC can be used for communications between a SAP system and a non-SAP system. In v6, eG Enterprise tracks the tRFC and qRFC calls sent and received by the SAP ABAP system and reports the status of the calls, captures errors in the

process, and highlights long running calls, thus pinpointing what is ailing communication between SAP systems and with non-SAP systems.

- **Monitoring of ICM:**

  The Internet Communication Manager (ICM) facilitates communication between SAP system(s) and the internet using the HTTP, HTTPS, and SMTP protocols. eG Enterprise periodically checks the availability, thread pool usage, and connection utilization of the ICM, and promptly reports the non-availability of the ICM, abnormal usage of worker threads by the ICM, and the over-utilization of ICM connections.

- **Database consistency monitoring:**

  Inconsistencies in data between a SAP ABAP system and the database can cause critical SAP transactions to fail. To help administrators avoid such failures, eG Enterprise runs periodic consistency checks on primary indexes, secondary indexes, tables, and views, and proactively alerts administrators to inconsistencies.

- **Workload analysis:**

  In v6, the SAP workload is analyzed, overload conditions are isolated, and probable processing bottlenecks are detected. Moreover, the SAP task types and transactions contributing to the heavy load, excessive resource usage, and processing slowdown of the SAP ABAP system are highlighted.

- **Workflow linkages monitoring:**

  When defining a SAP workflow, you can create event linkages to specify the provider for the events that your application raises, to define the conditions based on which the events must be raised, and to map the event data type and event provider operation type. eG Enterprise scans workflows for event linkages, reports the total number of linkages, and brings linkage failures to the attention of administrators. Additional diagnostics also reveal the details of the failed linkages.

- **Work process monitoring:**

  Work processes of the SAP ABAP stack are components that are able to execute an application (that is, one dialog step each). When the SAP ABAP stack is initialized, it is configured with a pre-set maximum number of work processes. If the number of work processes configured is fully utilized at any point of time, new requests will not be processed and applications using the SAP ABAP stack will fail. Hence, the utilization of work processes is a key metric of SAP ABAP health. In v6, eG Enterprise tracks the utilization of work processes and alerts administrators if the utilization of work processes is high. Using eG's detailed diagnosis capability, administrators can determine which applications are responsible for the high utilization of work processes - e.g., is a situation where the work processes are fully utilized caused by heavy load or is a specific application utilizing all of the work processes.

- **User activity monitoring:**

  SAP is a shared infrastructure where multiple user simultaneously login and perform activities and transactions. If a specific transaction is very resource intensive, it can slow down the performance seen by other users. Background jobs can consume server resources. eG Enterprise v6 provides deep visibility into user activity and user experience in a SAP ABAP environment. The number of users logged in and their session details (time logged in, time logged out, etc.) are tracked, so

administrators can determine which users access the SAP servers for the longest period of time. Login failures are monitored and the reasons for failure are detected and reported. The resource usage of each user, the number of transactions executed and detailed response time for each step of a transaction are all monitored. This way, eG Enterprise can help SAP administrators answer some of the key questions about the SAP infrastructure including:

- Which user is executing resource-intensive transactions on the ABAP system?
- Which user is overloading the system?
- Which user is experiencing slowness when running transactions on the system? Where did this delay occur? – in the dispatcher queue? when loading/generating objects? when rolling-in/rolling out user contexts? in the database? when performing enqueue operations? or when waiting for RFC calls to complete?
- What scheduled jobs are running in the SAP ABAP stack?

1.3 Increased Breadth of Coverage

Version 6 extends eG Enterprise's monitoring capabilities to new applications, virtualization platforms, storage devices and network devices. These enhancements are discussed in detail in the sections below.

1.3.1 Monitoring Citrix XenMobile & ShareFile

Citrix XenMobile is an enterprise mobility management solution that provides administrators with mobile device management (MDM), mobile application management (MAM) and online file-sharing capabilities. To deliver these services to end-users, the XenMobile software suite includes a wide range of components – the Citrix Netscaler that authenticates remote user sessions to the app store and ensures secure access, the XenMobile App Controller that stores the applications and data sources that can be accessed by users, Citrix ShareFile that enables efficient data sharing and synchronization across users, and the XenMobile MDM (a.k.a the XenMobile Device Manager) that protects the corporate network from mobile threats by applying configured mobile usage policies on devices and detecting non-conformances.

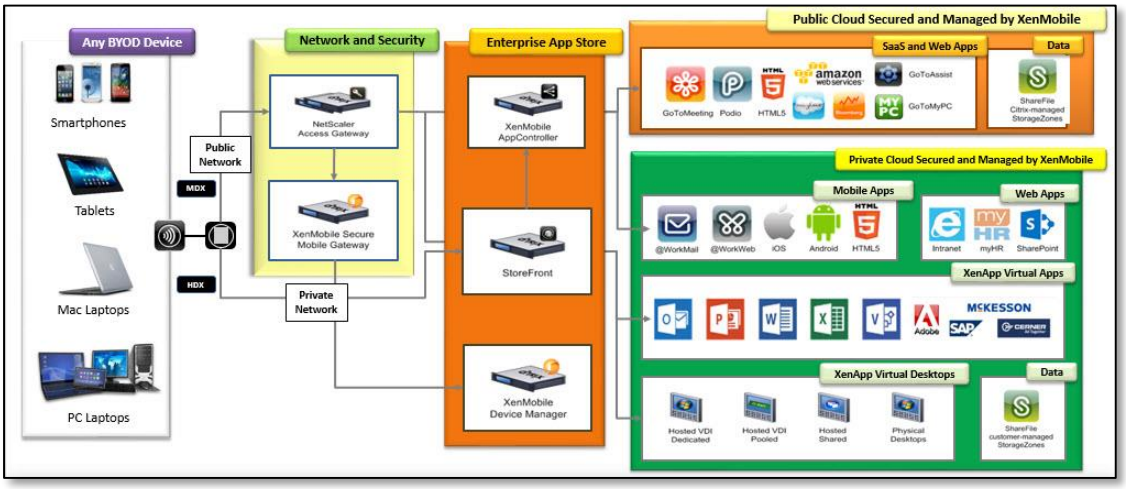

Figure 22: The Citrix XenMobile Architecture

Version 6 of the eG Enterprise Suite provides specialized monitors for each of the core components of the Citrix XenMobile service.

- **Citrix XenMobile MDM:**

  XenMobile MDM (also known as the XenMobile Device Manager (XDM)) is the MDM component within Citrix XenMobile, which provides role-based management, configuration and security of corporate and user-owned devices. If the XenMobile MDM server is unavailable, then new mobile devices will not be able to register with XenMobile and registered devices will be unable to download the latest policies. As a result, unauthorized devices and usage of blacklisted applications could go undetected; confidential information may travel beyond authorized boundaries increasing the risk of abuse.

  To enable administrators to provide a secure mobile experience for users, eG Enterprise v6 provides in-depth insights into the availability and overall performance of the **Citrix XenMobile MDM**. Using the MDM's web services API, the eG Enterprise periodically checks whether/not the MDM server is online, and alerts administrators if it is not. In addition, eG Enterprise tracks the thread usage by the server and warns administrators of a slowdown in server operations if adequate threads are not available to handle the device load on the server. With the help of eG Enterprise, jail-broken, perimeter-breaching, out-of-compliant, and passcode non-compliant devices can be quickly identified, so that applications running on them can be blocked. Likewise, devices on which 'mandatory' (eg., virus scanner) applications are missing can also be accurately isolated, so that administrators can compile packages containing the missing applications and deploy them on the devices. If the deployment fails, the eG Monitor promptly notifies administrators of the failure, so that the reasons for the same can be investigated.

  eG Enterprise also monitors the underlying operating system and the Apache Tomcat Java server that hosts the MDM application. Inconsistencies in JVM performance including threads consuming excessive CPU and insufficient memory allocations for the JVM are detected.

- **Citrix AppController:**

  Citrix App Controller delivers mobile device users with secure access to web, SaaS, Android, and iOS apps, as well as integrated ShareFile data and documents. Any issue that threatens the availability or overall health of the AppController will hence impact user access to all mobile, web, and SaaS apps and ShareFile data configured on it. For instance, if AppController uses an expired SSL certificate to establish a connection with a mobile app, users will be denied access to that app. Similarly, application-level policies and device-level securities, if not configured properly using the AppController, may also affect a user's experience with the apps.

  To help administrators assure mobile device users of uninterrupted and secure access to their applications, eG Enterprise v6 monitors the availability and overall health of the Citrix AppController and reports abnormalities. The monitoring is done in an agentless manner.

  Key performance metrics reported by eG Enterprise for Citrix AppController include the status and validity of SSL certificates deployed on the AppController, the number of locked and erased devices from time to time, tracking of which policies have been enforced on which devices, etc. The monitoring of AppController also reveals the most popular receivers and the most popular applications on the AppController.

- **Citrix ShareFile:**

  Citrix ShareFile is a secure enterprise file sync and sharing service that enables users to exchange large documents with others, securely handle document transfers to third parties, and access a collaboration space from desktops or mobile devices. Two key components of the ShareFile

architecture are the ShareFile Control Plane that performs user authentication and access control, and Storage Zones where corporate data is stored. If a user is unable to access the control plane's web interface or finds that sufficient storage space is not available for storing documents in storage zones, the productivity of that user will be affected. eG Enterprise v6 enables administrators to proactively capture such issues and take pre-emptive action before users complain.

The ShareFile Control Plane is monitored agentless. By simulating user logins to the Control Plane, eG Enterprise tracks the time taken to connect to the Control Plane and authenticate a user. Network connectivity to the Control Plane is also checked so that network issues affecting ShareFile access are detected and reported. By connecting to the ShareFile Control Plane, eG Enterprise also monitors the user accounts that are enabled and identifies the users and devices that seldom use the ShareFile service. This way an organization's usage of ShareFile licenses can be optimized and future license requirements can be accurately ascertained.

eG Enterprise offers monitoring for both Citrix-managed cloud-based Storage Zones as well as customer-managed On-Premise storage zones used to store corporate data. For cloud-based storage zones, eG Enterprise tracks the availability and space usage on each zone used by the enterprise. Alerts are generated in the event any abnormality is detected. By providing details of inactive folders on the zones, eG Enterprise also helps administrators identify folders that can be deleted to avert the potential space contention.

All key aspects of on-premise storage zones can also be tracked including monitoring the key processes and services supporting the storage zone, CPU, I/O and network activity on the servers supporting the storage zone, and the status of the web server that enables access to the files and folders stored in the zone. The breadth of metrics provided by eG Enterprise can help administrators determine when a slowdown happens, is it because of the network, or the ShareFile Control Plane or due to the ShareFile Storage Zone.

1.3.2 Monitoring App-V Client and Server

Microsoft Application Virtualization, also known as **App-V** is an application virtualization and application streaming solution. The key components of this solution are the Microsoft App-V Management server, the Microsoft App-V Publishing server, and the Microsoft App-V Application Virtualization for Desktops (a.k.a App-V Clients). The App-V Management Server authenticates requests and provides the security, metering, monitoring, and data gathering required by the administrator. It uses a SQL server data store and also serves as the communication conduit between the App-V management console and the store. The App-V publishing server provides App-V clients with entitled applications for the specific user and hosts the virtual application package for streaming. The App-V client retrieves virtual applications, publishes the applications on the client, and automatically sets up and manages virtual environments during runtime on Windows endpoints. If the App-V management server is unable to authenticate requests, or if the App-V publishing server is unavailable, or if one/more applications installed on the App-V client are taking a long time to load, then the user experience will be affected.

This is why, eG Enterprise v6 provides specially-designed monitors for the App-V Management Server and the App-V client. While the App-V Server Monitor promptly captures the unavailability of the server and its failure to authenticate requests, the App-V Client Monitor reports whether/not the App-V publishing server is available, discovers the applications installed on the client, tracks the status of each application, and reports the resource usage per application. This way, the eG App-V Monitors proactively alerts administrators to performance issues that are likely to impact user productivity, and thus enables prompt and speedy resolution.

Also, in the real world, it is common for XenApp/RDS and App-V to co-exist and co-work. To enable XenApp/RDS administrators to assess and understand whether App-V applications and App-V components enhance or degrade the experience of XenApp/RDS users, eG Enterprise's XenApp and RDS monitors have now been enhanced to run additional checks for App-V performance.

1.3.3 Monitoring Microsoft Lync

Microsoft Lync is an instant messaging client used with Microsoft Lync Server or Lync Online available with Microsoft Office 365 and Live@Edu. Using the eG Enterprise monitor for Microsoft Lync an administrator can:

- Observe address book accesses, measure the speed of these accesses, and report slowness;
- Monitor the message processing ability of the server and report deficiencies;
- Capture failed messages and when failures occurred – during message validation? in the MSMQ queue? or when written to the database?
- Measure the quality of the audio/video conference experience with the Lync server;
- Understand how well the server processes car park requests and report slowdowns;
- Know how many users/clients are currently connected to the server, and thus gauge the current load on the server;
- Identify dropped conference activities and unfinished tasks
- Monitor the server's interactions with the database and in the process, reveal the requests queued for processing by the database and the time these requests spent in queue; database slowdowns can thus be captured;
- Rapidly detect client and server authentication failures and DNS resolution failures;
- Messages that could not be sent to the server
- DNS resolution failures

1.3.4 New Virtualization Platforms Supported

1.3.4.1 Monitoring Oracle VM

Oracle VM is an enterprise-class server virtualization solution comprised of Oracle VM Server for x86, Oracle VM Server for SPARC and Oracle VM Manager. An Oracle VM Server is comprised of a hypervisor and privileged domain (Dom0) that allows multiple domains or virtual machines (i.e. Linux, Solaris, Windows, etc.) to run on one physical machine. Oracle VM Manager controls the virtualization environment, creating and monitoring Oracle VM servers and the virtual machines.

Since the VMs on an Oracle VM server share resources with each other and with the server, a resource contention at the host-level can impact the performance of the VMs on the host; likewise, a resource-hungry application running on a VM can cause the performance of the other VMs on that Oracle VM server to degrade. This is why, when a slowdown occurs, administrators take hours to figure where the bottleneck is.

eG Enterprise v6 supports 'agentless' monitoring of the Oracle VM server. In this approach, an eG monitor connects to an Oracle VM server via the Oracle VM Manager and uses the Oracle VM's web services API to report on the health of the Oracle VM server and its VMs. The patented 'In-N-Out' monitoring approach employed by this monitor intelligently measures the health of the system hosting the Oracle VM server, tracks the state of the control domain of the server and reports abnormalities (if any), automatically discovers the VMs on the server, and for each VM, reports an outside view" and an "inside view" of performance. As part of the "outside view", the Monitor reports the powered-on state of each VM and pulls up the powered-off VMs. In addition, it reports how each VM uses the physical CPU and memory resources of the host; this sheds light on the resource-hungry VM on the host. The "inside view" takes administrators up, close with the internal

operations of each VM, monitors how each VM uses the CPU, memory, and disk space resources allocated to it, and thus reveals the exact process/service that is draining a VM off its resources.

In the event of a slowdown therefore, this unique monitoring approach accurately indicates the root-cause of the slowdown – is it because of resource-intensive processes running on the host? Is it because of resource-starved VMs? Or is it because of resource-hungry processes running on one/more VMs?

1.3.4.2 Monitoring the Kernel-Based Virtual Machine (KVM)

KVM is implemented as a loadable kernel module that converts the Linux kernel into a bare metal hypervisor. eG Enterprise v6 now supports monitoring of virtual server and virtual desktop deployments on the KVM hypervisor. Using a patented In-N-Out monitoring approach, the eG agent deployed on the KVM hypervisor monitors the health of the hypervisor hardware, measures the resource usage of the hypervisor, assesses the resource usage of the VMs in relation to the physical resources of the host, and also determines how each VM uses the resources allocated to it. This way, administrators can identify resource-hungry VMs and the resource-intensive processes executing on the VMs, and are thus enabled to accurately pinpoint what is causing hypervisor performance to degrade. In case of virtual desktop deployments, the eG agent additionally reports who logged into each desktop, at what time, the duration of access, the applications accessed, and the resource usage per application. This way, administrators will be able to accurately pinpoint resource-hungry users and the applications they accessed.

1.3.5 Storage Monitoring Enhancements

Storage systems are critical elements of any virtualized infrastructure – whether it hosts server applications or virtual desktops. eG Enterprise v6 includes several key enhancements for storage performance monitoring. Some of the key enhancements are mentioned below.

- **Monitoring Atlantis ILIO:**

  Atlantis ILIO is a storage optimization solution for desktop virtualization solutions which when deployed as a dedicated VM on each host presents itself as a conventional datastore that all the VMs on that host can use. eG Enterprise v6 provides agent-based and agentless monitoring support to Atlantis ILIO. By reporting how the virtual desktops utilize the disk resources with and without the ILIO, the eG Atlantis ILIO Monitor enables administrators to quickly compare the two scenarios and evaluate the effectiveness of the Atlantis ILIO appliance. The eG Monitor also measures the time taken by ILIO to respond to backend I/O requests, thus pointing to processing bottlenecks in the ILIO. The read/write requests offloaded and the NFS threads utilized by the Atlantis ILIO are also reported from time to time. The space usage and the level of I/O activity on the NFS datastore are also monitored, so that potential space crunches and I/O overloads are highlighted.

- **Monitoring any SMI-s Compliant Storage System:**

  SMI-S, or the Storage Management Initiative Specification, is a storage standard developed and maintained by the Storage Networking Industry Association (SNIA). Many storage systems support SMI-S. With eG Enterprise v6, administrators can monitor the performance of any SMI-S compliant storage device. Every aspect of storage performance – from the health of the hardware (batteries, LED sensors, power supply units etc.) to the health of core components of the storage device – e.g., disks, LUNs, RAID ports, controllers – is monitored in an agentless manner. Failures, error conditions, high load situations, load balancing irregularities and hot-spots are detected and alerted to administrators so they can initiate corrective actions.

- **Monitoring Clustered NetApp USD:**

  In v6 of the eG Enterprise Suite, monitoring support is available for NetApp USD clusters. Using Data ONTAP Clustered API, the eG agent v6 discovers the vServers in a cluster and reports the current state, failover, and interconnect states of every vServer. Also, at the cluster-level, the state, space, IOPS, usage, and throughput of cluster nodes, aggregates, the CIFS service, physical disks. LUNS, and volumes are reported, so that irregularities in load-balancing can be captured. The availability, throughput, and errors of the FCP and iSCSI services are also monitored at pre-configured intervals and reported. The overall CPU usage, temperature, and battery status of the cluster is also checked from time-to-time, so as to capture potential problems to cluster health.

In addition to the above, specialized monitors are available in version 6 for HP 2000, IBM Storwize, QNAP NAS, EMC VNX, Nexenta Stor and Data Domain devices.

1.3.6 Additional Platforms Supported

Besides the above enhancements, eG Enterprise v6 supports additional network, server, application and virtualization platforms. On the networking front, Sonic Firewall, Watchguard Firewall, Delta UPS devices, and Coyote Load Balancers are supported. Additional support for monitoring Veeam and Symantec backup servers is also included. Monitoring support for Microsoft CRM, Microsoft Sharepoint 2013, and Microsoft Project is included. NGINX web server and IBM WebSphere Integration Bus application platforms are supported. Monitoring for the QVD (Quality Virtual Desktop) desktop virtualization platform is also supported.

1.4 Easy Integration

1.4.1 Trouble Ticket Integration Enhancements

Many trouble ticketing (TT) systems support web services APIs that monitoring tools can use to create, update and delete trouble tickets. eG Enterprise v6 can now be easily configured to route its alarms to a a TT system using a web services API. A generic framework supported in v6 allows any TT system, such as Autotask, to be easily integrated with eG Enterprise.

1.4.2 Enhancements to eG CLI

The eG command line interface (CLI) can now be used to enable/disable tests and test descriptors. Multiple tests and descriptors can also be enabled/disabled in one shot using the CLI. Moreover, starting from v6, user profiles can also be created and maintained easily using the eG CLI. This paves the way for touch-free administration of the eG Enterprise system.

1.4.3 Enhancements to eG Enterprise's Microsoft SCOM Integration

Starting from v6, eG Enterprise supports two-way integration with Microsoft SCOM. In earlier versions, the eG SCOM Connector collects state and alarm information pertaining to eG-managed components from the eG manager and transmits it to the SCOM manager. In version 6, administrators can optionally configure the connector to also check the SCOM server at configured intervals (default: 3 minutes) for eG alarms that may have been closed in the SCOM management console. If there are closed alarms in SCOM, the connector

communicates their closure to the eG manager, thus enabling the manager to automatically close the same alarms at its end. This way, eG SCOM connector eliminates the need to manually synchronize the status of eG alarms between the eG and the SCOM managers.

1.5 Scalability and Architecture Enhancement

- **Faster installation of the manager:**

  In earlier versions, configuration information was maintained in the eG manager both in its database and in configuration files. When the manager was installed and during the normal operation of the manager, both of these configurations had to be updated and kept synchronized. I v6, the duplication of eG manager configurations in the database and configuration files has been removed. This allows the eG manager installation to be faster.

- **Heartbeat option for manager/agent communication:**

  If an agent stops running or reporting metrics, the eG manager detects the status change and intimates administrators of it. In earlier versions, the eG manager would detect the status change of an agent only when all of the tests that the agent was supposed to execute did not return any metrics. Also, if the eG manager was busy processing requests (e.g., in an environment with several hundred agents), it would take the manager a longer period of time to determine that an agent was not running.

  To ensure that administrators are notified of such anomalies promptly, the eG manager v6 can be optionally configured with an explicit heartbeat capability. If this capability is enabled, at configured frequencies (default: 5 minutes) the eG manager checks whether each agent is sending heartbeats in a timely manner or not. If an agent does not send a heartbeat message at the configured frequency, the manager marks the agent as not running and alerts administrators. With this capability, the eG manager can now detect and report on agent failures immediately.

- **SNMP monitoring over TCP is now supported:**

  In some environments, to ensure reliability, SNMP is configured over the reliable TCP protocol. eG Enterprise v6 now supports monitoring of network devices that are configured to respond to SNMP over TCP. All the out of the box SNMP monitoring and alerting capabilities can be configured this way. Custom SNMP monitors too can be configured to use TCP for SNMP communication instead of the UDP protocol.

- **Making eG Enterprise's email alerting more reliable:**

  The eG manager must to be configured to use a mail server for routing email alerts to users. If this mail server fails for any reason, then important problem notifications may not reach administrators. In turn, this causes performance issues to remain undetected (and hence, unresolved!).

  eG Enterprise v6 allows administrators to configure more than one mail servers for routing email alerts to users. When an alert is generated, the eG manager will first attempt to send out an email alert using the primary mail server. If it is unable to do so, then the eG manager will automatically try and send the email alerts using each of the configured backup mail servers in sequence, until it succeeds. This ensures that no problem goes unnoticed by administrators, even if one mail server is unavailable. Moreover, the next time an email alert needs to be sent out, the eG manager intelligently picks the mail server that successfully sent out alerts during the last attempt and uses

that server first to process the alert.

- **IPV6 support:**

  From v6, eG Enterprise supports both IPV4 and IPV6 addresses. IPV6 addresses can now be used during eG manager configuration, when adding components using the eG administrative interface, and during component discovery.

- **Support for AD groups:**

  Previously, if a user profile was created using the eG administrative interface, the monitoring preferences, scope, and privileges that were set as part of that profile applied to an individual user only. This means that if multiple users belonged to an Active Directory Group, then even if the rights and responsibilities of these users were the same, individual user profiles had to be created in eG for each of the users in this group. This involved the redundant task of repeating the same set of configurations for every user in the group. This also meant that if monitoring access was to be revoked for an entire AD group, it had to be painstaking done for each user in the group, separately. To avoid this cumbersome, time-consuming procedure, v6 of the eG Enterprise Suite provides support for Active Directory Groups. This capability involves creating a profile in eG for the AD group as a whole, and not for every user in the group. This ensures that the monitoring preferences set for the group automatically apply to all the domain users in that group. This not only simplifies profile creation, but also significantly reduces the effort involved in modifying the profiles of users in an AD group or revoking the monitoring rights of the group users.

- **Alarm retention on restart:**

  Previously, if the eG manager was restarted, the state of all managed infrastructure elements was by default re-initialized to **Normal** after the restart. Changes occurred in the state only later, when agents started reporting metrics to the manager and problems were noticed. In this process, the eG manager ended up generating alarms once again for all those problems that had been open at the time of the restart. As a result, users were alerted twice to the same problem – once before the restart and once after it. To avoid this confusion, the eG manager has now been configured to retain the state of managed elements even after a restart. This way alarms and state are preserved even after a manager restart.

1.6 Licensing Changes

Previous versions of eG Enterprise offered administrators two licensing models. The default licensing model is per operating system monitored – any operating system hosting one or more components monitored by eG Enterprise requires a monitoring license. For Citrix, virtual desktops and Microsoft Terminal/RDS environments, eG Enterprise also includes a named user licensing option. In this model, the number of unique users accessing Citrix/VDI/Microsoft RDS is tracked and servers hosting these applications can be monitored using named user licenses (instead of operating system based licenses). The named user licensing model is ideal for virtualized environments, where the number of users per server is low.

In some virtualized environments however, a large number of users could be accessing the servers every day, but only a small subset of this user population may access the servers concurrently – i.e., at the same time. For example, in a university, you could have thousands of students coming in every day; but, every time a class is in session, you will have a few students accessing their desktops simultaneously to attend the class. With the named user licensing model here, one would have to obtain licenses for all the users who log into their desktops each day; this could be expensive. To provide a cost-effective licensing option for such

virtualized environments, eG Enterprise v6 now supports a **concurrent user licensing** model. In this model, the maximum number of concurrent users logged into Citrix/Microsoft RDS/virtual desktops is tracked and compared with the licensed limit. Customers will need to ensure that they have sufficient licenses procured to handle their current workload.

Customers can also use a mix of server-based and one of the user-based licenses (either named user license or concurrent user license).

1.7 Conclusion

This document provides a brief overview of the new features and enhancements introduced in v6. A detailed list of changes and bug fixes that have gone into v6 will soon follow.

Feel free to contact eG Support in your region for technical issues or info@eginnovations.com for general enquiries related to the product.