Monitoring SIOS DataKeeper Cluster

eG Innovations Product Documentation

www.eginnovations.com

Total Performance Visibility

Table of Contents

Table of Figures

Chapter 1: Introduction

SIOS DataKeeper Cluster is a software add-on that integrates simply and seamlessly with Windows Server Failover Clustering (WSFC) to add performance-optimized host-based synchronous or asynchronous replication. SIOS DataKeeper Cluster allows you to easily create a SANless cluster to achieve high availability and disaster recovery for the most important applications operating in the cloud, in virtualized environments such as VMware or on physical servers using only local storage. SIOS DataKeeper Cluster is used to protect the business-critical Windows environments, including Microsoft SQL Server, Oracle, SharePoint, Lync, Dynamics, and Hyper-V from downtime and data loss in a physical, virtual, or cloud environment.

Since the continuous availability of the data access is critical to such environments, even the slightest performance setbacks suffered by the SIOS DataKeeper can adversely impact the smooth functioning of such environments. To avoid such an eventuality, administrators need to continuously monitor the performance of the SIOS DataKeeper. This can be easily achieved using a specialized monitoring model offered by eG Enterprise!

Chapter 2: How to Monitor SIOS DataKeeper Using eG Enterprise?

eG enterprise monitors the SIOS DataKeeper cluster in an agent-based manner. For this purpose, you need to deploy an eG agent on the target host. This agent executes various tests to collect the performance metrics from the SIOS DataKeeper cluster. Before attempting to monitor the target cluster, manage the SIOS DataKeeper component using eG admin interface. The steps for managing the component are explained in the following section:

2.1 Managing SIOS DataKeeper

eG Enterprise cannot auto-discover the SIOS DataKeeper. This implies that you need to manually add the SIOS DataKeeper component for monitoring. Remember that eG Enterprise automatically manages the components that are added manually. To manage a *SIOS DataKeeper* component, do the following:

1. Log into the eG admin interface.
2. Follow the Components -> Add/Modify menu sequence in the **Infrastructure** tile of the **Admin** menu to manually add the component using the **Components** page. Remember that components manually added are managed automatically.
3. In the **Components** page that appears next, select *SIOS DataKeeper* as the **Component type**. Then, click the **Add New Component** button. This will invoke Figure 2.1.

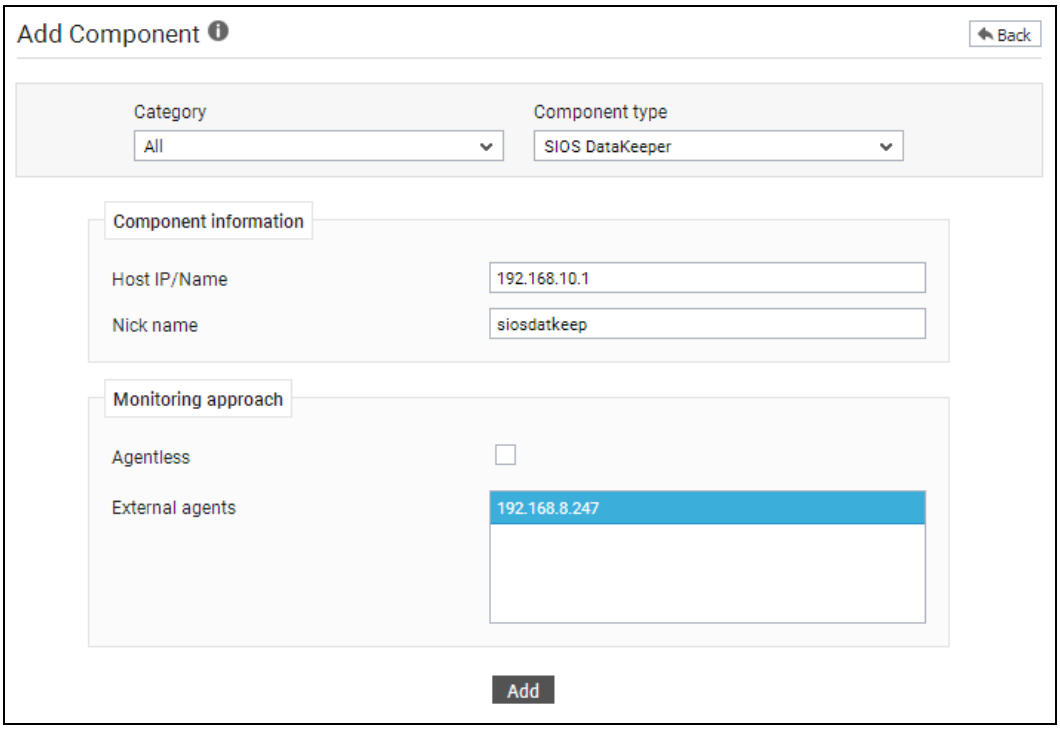

Figure 2.1: Adding the SIOS DataKeeper component

4. Specify the **Host IP/Name** and the **Nick name** for the *SIOS DataKeeper* component.
5. Then, click the **Add** button to register the changes (see Figure 2.1).
6. Finally, signout of the eG admin interface.

Chapter 3: Monitoring SIOS DataKeeper

eG Enterprise offers a dedicated monitoring model for the SIOS DataKeeper cluster (see Figure 3.1).

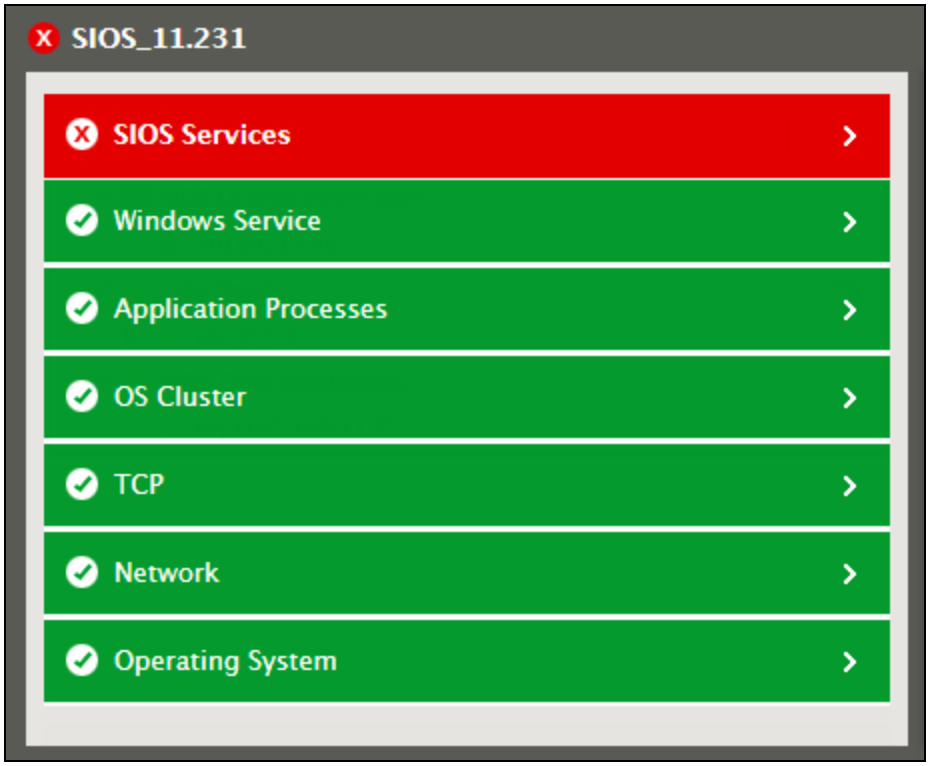

Figure 3.1: The layer model of a SIOS DataKeeper

Using the metrics reported by eG Enterprise, administrators can find quick answers to the following questions:

- What is the current status of the mirror?
- What is the type of mirroring each volume involved in?
- What is the current resynchronization phase of the volume?
- What is the time taken for resynchronizing the volumes?
- How many writes on the source volume to be resynchronized to the target volume?
- How many blocks are marked as dirty in the intent log while resynchronizing the volumes?
- How many network reconnects have been made while mirroring each volume?

- What is the current status of the job?
- What is the type of mirroring each job performed?
- What is the amount of space allocated for each job on the SIOS DataKeeper?
- How many days are left for the SIOS licenses to expire?

Since the five layers at the bottom of the SIOS DataKeeper monitoring model have been discussed in the *Monitoring Unix and Windows Servers* document, the section that follow will deal with the **SIOS Service** layer alone.

3.1 SIOS Services Layer

The tests mapped to this layer help administrators to determine the details on the SIOS licenses and the jobs created on the SIOS DataKeeper. In addition, the mirror state and mirror type of each source volume,

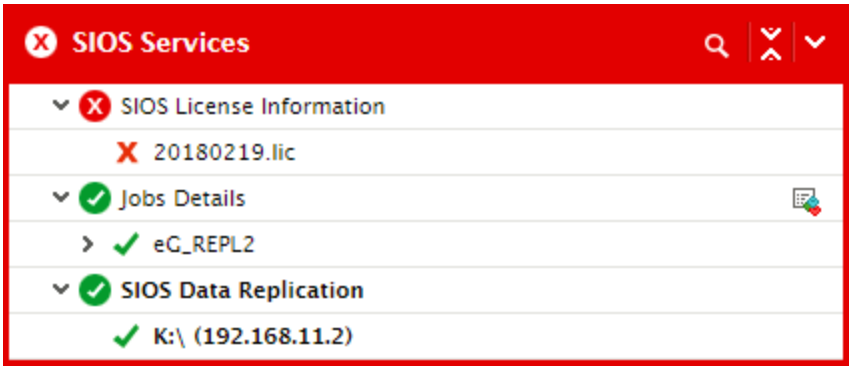

Figure 3.2: Tests mapping to the SIOS Services layer

3.1.1 SIOS Data Replication Test

At the highest level, SIOS DataKeeper provides the ability to mirror a volume on one system (source) to a different volume on another system (target) across any network. When the mirror is created, all data on the source volume is initially replicated to the target volume by overwriting the target volume. When the initial synchronization (also referred to as a full resync of the data) of the volumes is complete, the target volume is an exact replica of the source volume in terms of size and data content. The mirroring is performed in one of the following ways:

- **Synchronous Mirroring** - With synchronous mirroring, each write is intercepted and transmitted to the target system to be written on the target volume at the same time that the write is committed to the storage device on the source system. Once both the local and target writes are complete,

the write request is acknowledged as complete and control is returned to the application that initiated the write.

- **Asynchronous Mirroring** -In most cases, SIOS recommends using asynchronous mirroring. With asynchronous mirroring, each write is intercepted and a copy of the data is made on the source system. The copy of the data is queued to be transmitted to the target system as soon as the network will allow it. Meanwhile, the original write request is committed to the storage device on the source system and control is immediately returned to the application that initiated the write.

Once the mirror is established between the source and target volumes, the SIOS DataKeeper intercepts all writes to the source volume and resynchronizes the data to the target volume. If the Asynchronous or Synchronous mirroring is interrupted or failed due to poor network connection, then the sync between the source and target volumes will be lost. In such cases, SIOS DataKeeper will use an intent log (also referred to as a bitmap file) to resynchronize the source and target volumes. The intent log has changes made to the source, or to target volume and gives SIOS DataKeeper the ability to survive a source or target system failure or reboot without requiring a full mirror resync after the recovery of the system.

If the source volume is unable to reach the target volume (eg., due to network errors), then the data on the source and target will not be in sync. In the event that the source volume crashes, this non-sync can lead to data loss, reduce data integrity, and render the system unreliable. To avoid such eventualities, administrators should track the progress of mirroring and resynchronization between the target and source volumes, promptly detect failures/bottlenecks in the replication process, investigate the reasons for the same, and fix them in time. This can be easily achieved using the **SIOS Data Replication** test!

This test auto-discovers the volumes on the source system. For each volume, the test reports the mirror state, and thus sheds light on broken synchronization attempts. Besides, this test also captures network reconnects, which can potentially cause delays in replication. The test additionally reports the length of the write queue, so that you can figure out if too many writes are pending. The count of dirty blocks in the intent log and its impact on resynchronization time is also revealed.

Target of the test : A SIOS DataKeeper

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each volume on the source system being monitored.

Configurable parameters for the test

Parameter	Description
Test period	How often should the test be executed
Host	The host for which the test is to be configured.
Port	The port number at which the specified host listens to.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Mirror elapsed time	Indicates the total time that this volume has been in the Mirror state.	Secs	If the value of this measure is zero, it indicates that the volume is not involved in mirroring.
Mirror state	Indicates the current mirroring status of this volume.		The values that this measure can report and their corresponding numeric values have been discussed below: **Measure Value** / **Numeric Value** None — 0 Mirror — 1 Resync — 2 Broken — 3 Paused — 4 Resync pending — 5 **Note:** By default, this measure reports the States listed in the table above to indicate the current mirroring status of each volume on the source system. The graph of this measure however, represents the same using the numeric equivalents only.
Mirror type	Indicates the type of mirroring this volume is involved in.		The values that this measure can report and their corresponding numeric values have been discussed below:

<table>
<tr><th>Measurement</th><th>Description</th><th>Measurement Unit</th><th>Interpretation</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><th>Measure Value</th><th>Numeric Value</th><th>Description</th></tr>
<tr><td>None</td><td>0</td><td>The volume is not currently involved in a mirror.</td></tr>
<tr><td>Synchronous</td><td>1</td><td>Data is put on the Write Queue to be sent to the target volume, and written to the local volume, simultaneously. The write is not acknowledged as "complete" until operations on both the volumes complete.</td></tr>
<tr><td>Asynchronous</td><td>2</td><td>Data is put on the Write Queue to be sent to the target volume, and written to the local volume, simultaneously. The write is acknowledged when the write operation on the local volume is complete.</td></tr>
</table>
Note:
By default, this measure reports the States listed in the table above to indicate the current mirroring type of each volume on the source system. The graph of this measure however, represents the same
</td></tr>
</table>

Measurement	Description	Measurement Unit	Interpretation
			using the numeric equivalents only.
Network number of reconnects	Indicates the number of network reconnections that have been made while this volume has been mirrored.	Number	A low value is desired for this measure. A high value of this measure indicates the poor connectivity between the source and target volumes.
Queue byte limit	Indicates the maximum number of bytes that can be allocated for write queue of this volume. This value is set against the WriteQueueByteLimitMB registry value.	Number	If zero is set against the WriteQueueByteLimitMB, this indicates that there is no limit for the bytes that can be allocated to the write queue. Lets say for an example, the byte limit is set to 200. In such a case, if the *Queue current bytes* value reaches the value of this measure, the SIOS DataKeeper driver momentarily pauses the mirror volume, drains the queue and automatically starts a partial resync. Then, you may need to increase the WriteQueueByteLimitMB registry value and execute *READREGISTRY* command so that the SIOS DataKeeper immediately will start using the new value. This way, you can avoid loss of bytes during synchronization due to inadequate byte limit setting.
Queue current bytes	Indicates the number of bytes allocated for the Write Queue of this volume.	Number	If the value of this measure is close to the value of the Queue byte limit, it is a cause for concern. Then, you may need to increase the value of the *WriteQueueByteLimitMB* in the registry as required.
Queue current length	Indicates the number of writes to be mirrored in the Write Queue for the selected mirror.	Number	
Queue high water	Indicates the high water mark of the Write Queue	Number	If the *Queue current length* reaches the value of this measure due to intensive I/O

Measurement	Description	Measurement Unit	Interpretation
	that is set in the WriteQueueHighWater registry value.		traffic, SIOS DataKeeper driver momentarily pauses the mirror, drains the queue and automatically starts a partial resync. This value represents the number of write requests in the queue, not the number of bytes. After updating this registry value, executing the READREGISTRY command enables the SIOS DataKeeper to immediately start using the new value.
Resync current block	Indicates the number of blocks that are currently resynchronized to the target volume from this volume.	Number	
Resync dirty blocks	Indicates the number of blocks that are marked as dirty in the intent log while resynchronizing this volume.	Number	Dirty blocks are the blocks in the intent log that need to be updated and transferred to the target volume before synchronization is complete. Note that the value of this measure may actually increase during a mirror synchronization if a large number of incoming writes are made to the volume.
Resync elapsed time	Indicates the time taken for resynchronizing this volume.	Secs	The value will be 0 for volumes that either never have been synchronized or volumes that were not synchronized during the last boot. Compare the value of this measure to identify the volume which took maximum time to synchronize.
Resync new writes	Indicates the number of writes to this volume since the resynchronization operation has begun.	Number	A high value of this measure indicates that the synchronization process will take longer duration to finish.
Resync pass	Indicates the number of passes that have been made by this volume to update the target volume	Number	The value of this measure increases/decreases based on the value of the *Resync new writes* measure. If the value of the *Resync new writes* measure

<table>
<tr><th>Measurement</th><th>Description</th><th>Measurement Unit</th><th>Interpretation</th></tr>
<tr><td></td><td>during the resynchronization process.</td><td></td><td>increases, the value of this measure also increases simultaneously.</td></tr>
<tr><td>Resync phase</td><td>Indicates the current resynchronization phase of this volume.</td><td></td><td>The values that this measure can report and their corresponding numeric values have been discussed below:
<table><tr><th>Measure Value</th><th>Numeric Value</th></tr><tr><td>Unknown</td><td>0</td></tr><tr><td>Initial</td><td>1</td></tr><tr><td>Update</td><td>2</td></tr><tr><td>Done</td><td>3</td></tr></table>
Note:
By default, this measure reports the Measure Values listed in the table above to indicate the current phase of the resynchronization process. The graph of this measure however, represents the same using the numeric equivalents only.</td></tr>
<tr><td>Resync reads</td><td>Indicates the maximum number of disk blocks that can be kept in progress during the resynchronization of this volume.</td><td>Number</td><td></td></tr>
<tr><td>Resync total blocks</td><td>Indicates the total number of 64k blocks used for resynchronization of this volume.</td><td>Number</td><td>The value of this measure is approximately equal to the file system size of each volume divided by 64K.</td></tr>
</table>

3.1.2 SIOS Jobs Details Test

For ease of use and configuration, the SIOS DataKeeper manages mirrors through an entity called a job. A job is a logical grouping of related mirrors and servers. This feature allows you to create a job for complex repetitive tasks and run the tasks quickly from the SIOS DataKeeper user interface. If a

job does not run the tasks quickly due to any fatal errors, the mirrors grouped under that job will experience the slowdown and processing-bottleneck. As a result, the synchronization between the mirrors will be paused temporarily or broken forever. To avoid such unpleasant events, it is necessary that the jobs should be continuously monitored. This where the **SIOS Job Details** test helps administrators!

This test auto-discovers the jobs created on the SIOS DataKeeper, and reports the current status of each job. This way, this test proactively is alerted to the administrators. In addition, this test also reveals the type of mirroring that each job performs and the disk space allocated for each job.

Target of the test : A SIOS DataKeeper

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each job created on the SIOS DataKeeper being monitored.

Configurable parameters for the test

Parameter	Description
Test period	How often should the test be executed.
Host	The host for which the test is to be configured.
Port	The port number at which the specified host listens to.
EM Command Path	EMCMD utility that ships with SIOS DataKeeper provides users with a command line method to manipulate the mirror. The EMCMD scripts run in situations where the "normal" validation rules are not applicable. EMCMD utility does not perform the same kinds of sanity checks that the user would experience using the SIOS DataKeeper User Interface. EMCMD utility simply passes commands to the SIOS DataKeeper Replication service allowing the service to make any decisions. Sometimes, the eG agent may use the EMCMD to collect metrics from the mirrors. For this purpose, the eG agent auto-discovers the *EMCMD.exe* file in the SIOS DataKeeper install directory and report metrics. If the *EMCMD.exe* file is installed in a different location, then you can explicitly specify the exact location of the install directory here. For example, *c:\programs\SIOSData*.
DD Frequency	Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is *1:1*. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying *none* against DD frequency.

Parameter	Description
Detailed Diagnosis	To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option. The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled: • The eG manager license should allow the detailed diagnosis capability • Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
State	Indicates the current status of this job.		The values that this measure can report and the numeric values they indicate have been listed in the table below: **Measure Value** / **Numeric Value** Invalid: -6 No mirror: 0 Mirroring: 1 Mirror is resyncing: 2 Mirror is broken: 3 Mirror is paused: 4 Resync is pending: 5 **Note:** By default, this measure can report the **Measure Value**s mentioned above while indicating the current status of each job. However, the graph of this

<table>
<tr><th>Measurement</th><th>Description</th><th>Measurement Unit</th><th>Interpretation</th></tr>
<tr><td></td><td></td><td></td><td>measure is indicated using the numeric equivalents.

The detailed diagnosis of this measure reveals the name of the server and source volumes and the name and IP address of the source and target systems.</td></tr>
<tr><td>Mirror type</td><td>Indicates the type of mirroring performed by this job.</td><td></td><td>The values that this measure can report and the numeric values they indicate have been listed in the table below:

<table><tr><th>Measure Value</th><th>Numeric Value</th></tr><tr><td>No Mirror</td><td>0</td></tr><tr><td>Synchronous</td><td>1</td></tr><tr><td>Asynchronous</td><td>2</td></tr></table>
Note:

By default, this measure can report the Measure Values mentioned above while indicating the type of mirroring performed by each job. However, the graph of this measure is indicated using the numeric equivalents.</td></tr>
<tr><td>Disk space</td><td>Indicates the amount of space allocated for this job.</td><td>GB</td><td></td></tr>
</table>

3.1.3 SIOS License Details Test

To track and control every server involved in mirroring, the SIOS DataKeeper requires a unique license for each server. If valid licenses are not available, then the servers will go unmanaged by the SIOS DataKeeper, thus increasing the risk of losing the synchronization among the servers. Likewise, if the license is not renewed in time, administrators will not be able to maintain the data integrity if any server goes down. To avoid this, administrators can use the **SIOS License Details** Test.

This test auto-discovers the licenses installed with the SIOS DataKeeper, and for each license determines when the license is likely to expire.

Target of the test : A SIOS DataKeeper

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each license on the SIOS DataKeeper being monitored.

Configurable parameters for the test

Parameter	Description
Test period	How often should the test be executed
Host	The host for which the test is to be configured.
Port	The port number at which the specified host listens to.
DataKeeper License Path	Provide the full path to the location where the license files of the SIOS DataKeeper have been installed. By default, this parameter is set to '**None**' indicating that the eG agent will monitor the license files in the install directory of the SIOS DataKeeper by default. In case, the license files are installed in a different location, you should explicitly specify the exact location of the license files here. For example, *D:\programs\SIOSData\dklin*
Show Expired License	By default, this flag is set to **No** indicating that this test will not monitor the licenses of the SIOS Datakeeper that have expired. Set this flag to **Yes**, if you want to monitor the licenses that have expired.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Days to expire	Indicates the number of days by which this license will expire.	Number	A very low value for this measure indicates that the license is nearing expiry. You may have to request for a license extension if you want the server to continue . If the Show Expired License parameter is set to **Yes**, this test will display *Expired* against this measure to denote the expired licenses (if any). If the license comes with life time validity, then this test will display

<table>
<tr><th>Measurement</th><th>Description</th><th>Measurement Unit</th><th>Interpretation</th></tr>
<tr><td></td><td></td><td></td><td>Permanent against this measure.

The values that this measure can report and their corresponding numeric values have been discussed below:

<table><tr><th>Measure Value</th><th>Numeric Value</th></tr><tr><td>Expired</td><td>-6</td></tr><tr><td>Permanent</td><td>99999</td></tr></table>
Note:

By default, this measure reports the Measure Values listed in the table above. The graph of this measure however, represents the same using the numeric equivalents only.</td></tr>
</table>

About eG Innovations

eG Innovations provides intelligent performance management solutions that automate and dramatically accelerate the discovery, diagnosis, and resolution of IT performance issues in on-premises, cloud and hybrid environments. Where traditional monitoring tools often fail to provide insight into the performance drivers of business services and user experience, eG Innovations provides total performance visibility across every layer and every tier of the IT infrastructure that supports the business service chain. From desktops to applications, from servers to network and storage, from virtualization to cloud, eG Innovations helps companies proactively discover, instantly diagnose, and rapidly resolve even the most challenging performance and user experience issues.

eG Innovations is dedicated to helping businesses across the globe transform IT service delivery into a competitive advantage and a center for productivity, growth and profit. Many of the world's largest businesses use eG Enterprise to enhance IT service performance, increase operational efficiency, ensure IT effectiveness and deliver on the ROI promise of transformational IT investments across physical, virtual and cloud environments.

To learn more visit www.eginnovations.com.

Contact Us

For support queries, email support@eginnovations.com.

To contact eG Innovations sales team, email sales@eginnovations.com.