Monitoring APC UPS

eG Innovations Product Documentation

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Total Performance Visibility

Table of Contents

Table of Figures

Chapter 1: Introduction

APC Smart-UPS® is a leading server class UPS that protects critical data by supplying reliable, network-grade power in either traditional tower or rack-optimized form factors. These UPS devices play a crucial role in ensuring the 100% availability and uninterrupted delivery of business-critical services such as voice and data networks, point of sale, retail/bank back office and ATMs, as they provide timely and adequate power backups to these services in the event of a power crisis. Hence, these mission-critical devices need to be monitored continuously, and any deviation from the norm should be instantly brought to the notice of the relevant personnel. This is where eG Enterprise helps administrators.

Chapter 2: How to Monitor APC UPS Using eG Enterprise ?

eG Enterprise monitors the UPS using an eG external agent that is deployed on any remote host in the environment. This agent periodically polls the SNMP MIB of the UPS and gathers metrics related to its performance. To enable the eG agent to collect metrics, you should enable SNMP on the UPS. Once you enabled the SNMP on the target device, manage the APC UPS component for monitoring using eG Enterprise. The procedure to achieve this is explained in the following section.

2.1 Managing the APC UPS

The eG Enterprise cannot automatically discover the APC UPS device. This implies that you need to manually add the component for monitoring. Remember that components manually added are managed automatically. To add a APC UPS component, do the following:

1. Log into the eG administrative interface.
2. Follow the Components -> Add/Modify menu sequence in the Infrastructure tile of the **Admin** menu.
3. In the **COMPONENT** page that appears next, select APC UPS as the **Component type**. Then, click the **Add New Component** button. This will invoke Chapter 2.

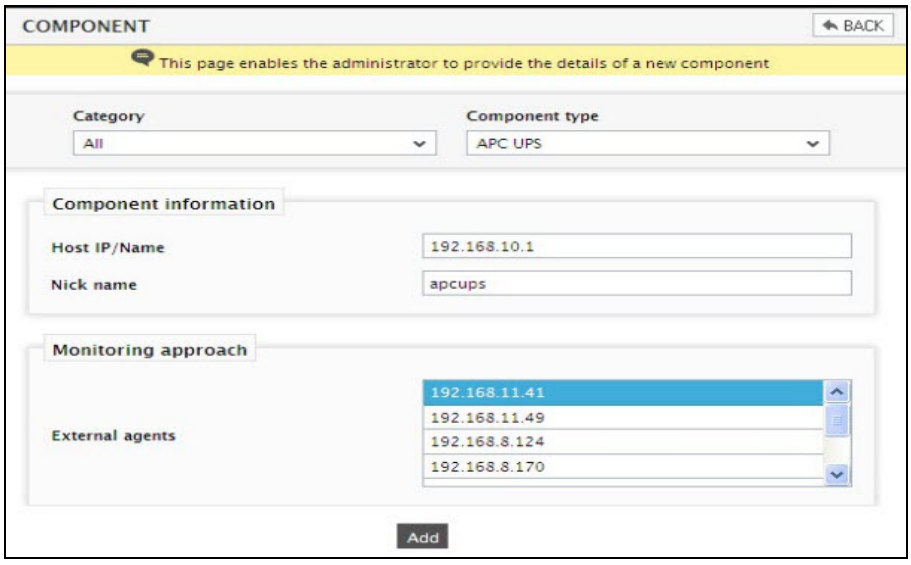

Figure 2.1: Adding the APC UPS

4. Specify the **Host IP/Name** and the **Nick name** of the APC UPS component in Chapter 2. Then, click on the **Add** button to register the changes.

5. When you attempt to sign out, a list of unconfigured tests appears (see Figure 2.2).

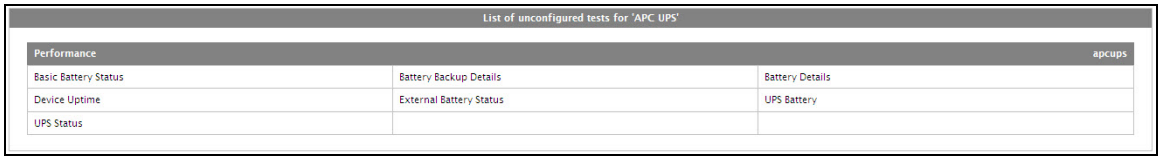

Figure 2.2: List of unconfigured tests for an APC UPS

6. Click on any test in the list of unconfigured tests. For instance, click on the **Basic Battery Status** test to configure it. In the page that appears, specify the parameters as shown in Figure 2.3.

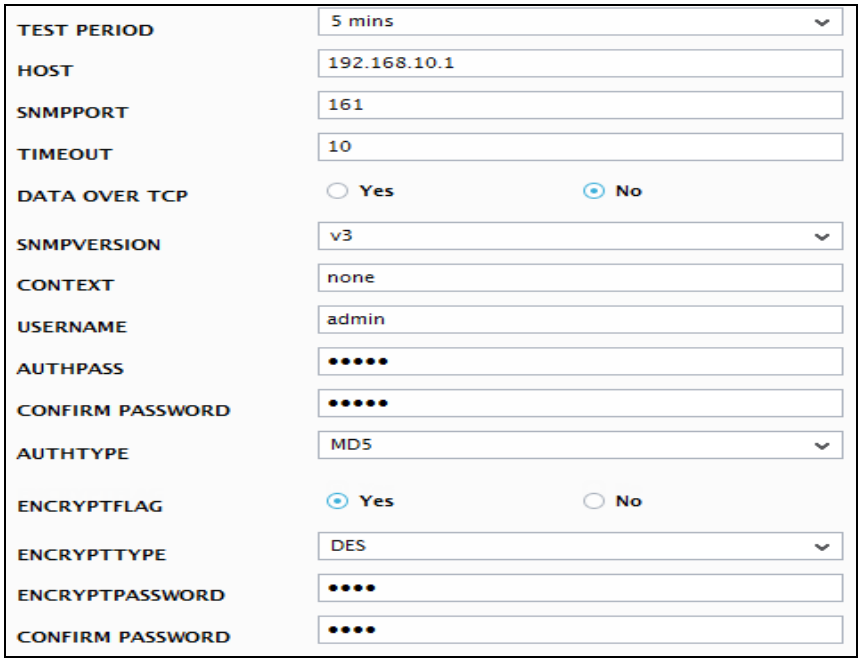

Figure 2.3: Configuring the Basic Battery test

7. To know how to configure these parameters, refer to the **Monitoring the APC UPS** chapter.
8. Next, try to signout of the eG administrative interface, now you will be prompted to configure the **Device Uptime** test. To know details on configuring this test refer to *Monitoring Cisco Router* document.
9. Next, signout of the eG administrative interface.

Chapter 3: Monitoring the APC UPS

eG Enterprise provides a specialized monitoring model for APC UPS' (see Figure 3.1) that monitors the network connectivity and the internal workings of a UPS, and proactively alerts administrators to potential performance issues.

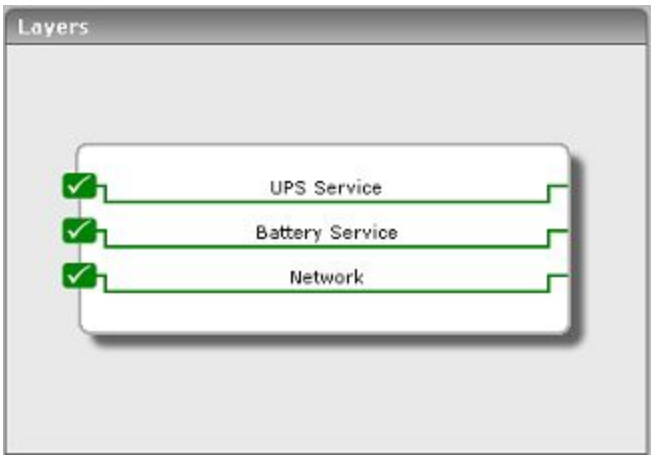

Figure 3.1: The layer model of the APC UPS

Every layer of Figure 3.1 is mapped to some tests, which collect a wide range of performance data from the SNMP MIB of the UPS device, so that administrators can find accurate answers to the following performance queries:

- What is the current state of the UPS?
- Is the UPS accessible over the network?
- What is the current state of the UPS battery? Will the battery be able to sustain the current load?
- Has the battery capacity been utilized fully?
- Are any defective battery packets in use currently? Do they need to be replaced?
- Is the battery bus currently handling a very high voltage?
- Is the battery temperature maintained at a minimum or has it increased?
- Are any UPS components in an abnormal state currently?
- Did your environment experience a power shutdown recently? For how long were the systems supported by the UPS battery when there was no power supply? How much longer can the UPS battery be used?

The following sections deal with the first two layers of Figure 3.1, as the final layer has already been discussed in the *Monitoring Unix and Windows Servers* document.

3.1 The Battery Service Layer

The tests associated with this layer focus on the performance of the UPS battery, and helps administrators decide whether the battery configuration needs to be changed or the battery needs to be replaced to ensure peak performance.

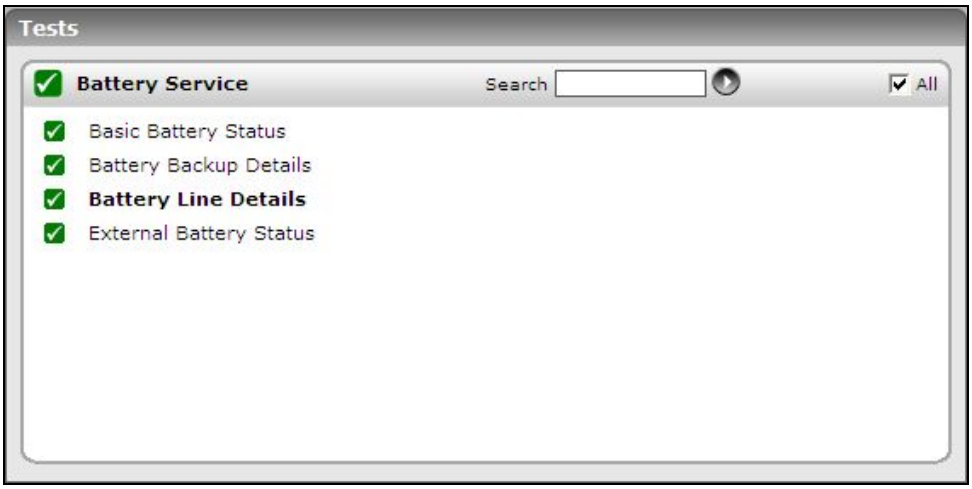

Figure 3.2: The tests associated with the Battery Service layer

3.1.1 Basic Battery Status Test

This test reports on the status of the batteries used for a monitored APC UPS device.

Target of the test : An APC UPS device

Agent deploying the test : An external agent

Outputs of the test : One set of results for every UPS monitored.

Configurable parameters for the test

Parameter	Description
Test period	How often should the test be executed
Host	The IP address of the host for which this test is to be configured.
SNMPPort	The port at which the monitored target exposes its SNMP MIB; The default value is 161.

Parameter	Description
SNMPVersion	By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the SNMPversion list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
SNMPCommunity	The SNMP community name that the test uses to communicate with the firewall. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the SNMPVersion chosen is **v3**, then this parameter will not appear.
Username	This parameter appears only when **v3** is selected as the SNMPversion. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against this parameter.
Context	This parameter appears only when v3 is selected as the SNMPVersion. An SNMP context is a collection of management information accessible by an SNMP entity. An item of management information may exist in more than one context and an SNMP entity potentially has access to many contexts. A context is identified by the SNMPEngineID value of the entity hosting the management information (also called a contextEngineID) and a context name that identifies the specific context (also called a contextName). If the Username provided is associated with a context name, then the eG agent will be able to poll the MIB and collect metrics only if it is configured with the context name as well. In such cases therefore, specify the context name of the Username in the Context text box. By default, this parameter is set to *none*.
AuthPass	Specify the password that corresponds to the above-mentioned Username. This parameter once again appears only if the SNMPversion selected is **v3**.
Confirm Password	Confirm the AuthPass by retyping it here.
AuthType	This parameter too appears only if **v3** is selected as the SNMPversion. From the Authtype list box, choose the authentication algorithm using which SNMP v3 converts the specified username and password into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: • **MD5** – Message Digest Algorithm • **SHA** – Secure Hash Algorithm
EncryptFlag	This flag appears only when **v3** is selected as the SNMPversion. By default, the eG agent does not encrypt SNMP requests. Accordingly, the this flag is set to **No** by

Parameter	Description
	default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **Yes** option.
EncryptType	If this EncryptFlag is set to **Yes**, then you will have to mention the encryption type by selecting an option from the EncryptType list. SNMP v3 supports the following encryption types: • **DES** – Data Encryption Standard • **AES** – Advanced Encryption Standard
EncryptPassword	Specify the encryption password here.
Confirm Password	Confirm the encryption password by retyping it here.
Timeout	Specify the duration (in seconds) within which the SNMP query executed by this test should time out in this text box. The default is 10 seconds.
Data Over TCP	By default, in an IT environment, all data transmission occurs over UDP. Some environments however, may be specifically configured to offload a fraction of the data traffic – for instance, certain types of data traffic or traffic pertaining to specific components – to other protocols like TCP, so as to prevent UDP overloads. In such environments, you can instruct the eG agent to conduct the SNMP data traffic related to the monitored target over TCP (and not UDP). For this, set this flag to **Yes**. By default, this flag is set to **No**.
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.
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

Parameter	Description
	measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Battery normal	Indicates the current status of the UPS batteries.	Status	The value 1 for this measure indicates a 'Battery normal' state, and 0 indicates 'Battery low' state. A 'Battery low' (0) value indicates that the UPS will be unable to sustain the current load, and its services will be lost if power is not restored. The amount of run time in reserve at the time of low battery can be configured by the upsAdvConfigLowBatteryRunTime. A 'Battery low' state may occur due to less charge in battery, low acid in battery, a weak battery, etc. Use the detailed diagnosis of this measure to know when the battery was last replaced.

3.1.2 Battery Backup Details Test

This test reports statistics related to battery backup.

Target of the test : An APC UPS device

Agent deploying the test : An external agent

Outputs of the test : One set of results for every UPS monitored.

Configurable parameters for the test

Parameter	Description
Test period	How often should the test be executed
Host	The IP address of the host for which this test is to be configured.

Parameter	Description
SNMPPort	The port at which the monitored target exposes its SNMP MIB; The default value is 161.
SNMPVersion	By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the SNMPversion list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
SNMPCommunity	The SNMP community name that the test uses to communicate with the firewall. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the SNMPVersion chosen is **v3**, then this parameter will not appear.
Username	This parameter appears only when **v3** is selected as the SNMPversion. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against this parameter.
Context	This parameter appears only when v3 is selected as the SNMPVersion. An SNMP context is a collection of management information accessible by an SNMP entity. An item of management information may exist in more than one context and an SNMP entity potentially has access to many contexts. A context is identified by the SNMPEngineID value of the entity hosting the management information (also called a contextEngineID) and a context name that identifies the specific context (also called a contextName). If the Username provided is associated with a context name, then the eG agent will be able to poll the MIB and collect metrics only if it is configured with the context name as well. In such cases therefore, specify the context name of the Username in the Context text box. By default, this parameter is set to *none*.
AuthPass	Specify the password that corresponds to the above-mentioned Username. This parameter once again appears only if the SNMPversion selected is **v3**.
Confirm Password	Confirm the AuthPass by retyping it here.
AuthType	This parameter too appears only if **v3** is selected as the SNMPversion. From the Authtype list box, choose the authentication algorithm using which SNMP v3 converts the specified username and password into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: • **MD5** – Message Digest Algorithm • **SHA** – Secure Hash Algorithm

Parameter	Description
EncryptFlag	This flag appears only when **v3** is selected as the SNMPversion. By default, the eG agent does not encrypt SNMP requests. Accordingly, the this flag is set to **No** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **Yes** option.
EncryptType	If this EncryptFlag is set to **Yes**, then you will have to mention the encryption type by selecting an option from the EncryptType list. SNMP v3 supports the following encryption types: • **DES** – Data Encryption Standard • **AES** – Advanced Encryption Standard
EncryptPassword	Specify the encryption password here.
Confirm Password	Confirm the encryption password by retyping it here.
Timeout	Specify the duration (in seconds) within which the SNMP query executed by this test should time out in this text box. The default is 10 seconds.
Data Over TCP	By default, in an IT environment, all data transmission occurs over UDP. Some environments however, may be specifically configured to offload a fraction of the data traffic – for instance, certain types of data traffic or traffic pertaining to specific components – to other protocols like TCP, so as to prevent UDP overloads. In such environments, you can instruct the eG agent to conduct the SNMP data traffic related to the monitored target over TCP (and not UDP). For this, set this flag to **Yes**. By default, this flag is set to **No**.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Battery discharge time	Indicates the battery discharge time.	Mins	The battery discharge time refers to the duration for which the system(s) supported by the UPS has been running using the battery.
Battery backup time	Indicates the battery backup time.	Mins	This indicates how much longer systems can run using the battery. Typically, this depends upon the output load. Normally, at half load, the battery backup time is 18.7 minutes, and at full load, it is 5.7 minutes.

3.1.3 Battery Line Details Test

This test monitors the power and voltage levels handled by the UPS' batteries.

Target of the test : An APC UPS device

Agent deploying the test : An external agent

Outputs of the test : One set of results for every UPS monitored.

Configurable parameters for the test

Parameter	Description
Test period	How often should the test be executed
Host	The IP address of the host for which this test is to be configured.
SNMPPort	The port at which the monitored target exposes its SNMP MIB; The default value is 161.
SNMPVersion	By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the SNMPversion list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
SNMPCommunity	The SNMP community name that the test uses to communicate with the firewall. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the SNMPVersion chosen is **v3**, then this parameter will not appear.
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Parameter	Description
	eG agent will be able to poll the MIB and collect metrics only if it is configured with the context name as well. In such cases therefore, specify the context name of the Username in the Context text box. By default, this parameter is set to *none*.
AuthPass	Specify the password that corresponds to the above-mentioned Username. This parameter once again appears only if the SNMPversion selected is **v3**.
Confirm Password	Confirm the AuthPass by retyping it here.
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Timeout	Specify the duration (in seconds) within which the SNMP query executed by this test should time out in this text box. The default is 10 seconds.
Data Over TCP	By default, in an IT environment, all data transmission occurs over UDP. Some environments however, may be specifically configured to offload a fraction of the data traffic – for instance, certain types of data traffic or traffic pertaining to specific components – to other protocols like TCP, so as to prevent UDP overloads. In such environments, you can instruct the eG agent to conduct the SNMP data traffic related to the monitored target over TCP (and not UDP). For this, set this flag to **Yes**. By default, this flag is set to **No**.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Num of external battery	Indicates the number of external battery packs currently connected to the UPS.	Number	
Num of bad battery	Indicates the number of defective external battery packs currently connected to the UPS.	Number	A zero value is desired for this measure.
Nominal voltage	Indicates the nominal battery voltage.	Volts	
Actual voltage	Indicates the actual battery bus voltage.	Volts	Ideally, this value should be lesser than the Nominal voltage value.
Nominal current	Indicates the nominal battery current.	Amps	
DC current	Indicates the total DC current (in amps) currently handled by the battery.	Amps	Ideally, this value should be lesser than the Nominal current value.

3.1.4 External Battery Status Test

The External Battery Status test monitors the external batteries used by an UPS.

Target of the test : An APC UPS device

Agent deploying the test : An external agent

Outputs of the test : One set of results for every UPS monitored.

Configurable parameters for the test

Parameter	Description
Test period	How often should the test be executed
Host	The IP address of the host for which this test is to be configured.
SNMPPort	The port at which the monitored target exposes its SNMP MIB; The default value is 161.

Parameter	Description
SNMPVersion	By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the SNMPversion list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
SNMPCommunity	The SNMP community name that the test uses to communicate with the firewall. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the SNMPVersion chosen is **v3**, then this parameter will not appear.
Username	This parameter appears only when **v3** is selected as the SNMPversion. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against this parameter.
Context	This parameter appears only when v3 is selected as the SNMPVersion. An SNMP context is a collection of management information accessible by an SNMP entity. An item of management information may exist in more than one context and an SNMP entity potentially has access to many contexts. A context is identified by the SNMPEngineID value of the entity hosting the management information (also called a contextEngineID) and a context name that identifies the specific context (also called a contextName). If the Username provided is associated with a context name, then the eG agent will be able to poll the MIB and collect metrics only if it is configured with the context name as well. In such cases therefore, specify the context name of the Username in the Context text box. By default, this parameter is set to *none*.
AuthPass	Specify the password that corresponds to the above-mentioned Username. This parameter once again appears only if the SNMPversion selected is **v3**.
Confirm Password	Confirm the AuthPass by retyping it here.
AuthType	This parameter too appears only if **v3** is selected as the SNMPversion. From the Authtype list box, choose the authentication algorithm using which SNMP v3 converts the specified username and password into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: • **MD5** – Message Digest Algorithm • **SHA** – Secure Hash Algorithm
EncryptFlag	This flag appears only when **v3** is selected as the SNMPversion. By default, the eG agent does not encrypt SNMP requests. Accordingly, the this flag is set to **No** by

Parameter	Description
	default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **Yes** option.
EncryptType	If this EncryptFlag is set to **Yes**, then you will have to mention the encryption type by selecting an option from the EncryptType list. SNMP v3 supports the following encryption types: • **DES** – Data Encryption Standard • **AES** – Advanced Encryption Standard
EncryptPassword	Specify the encryption password here.
Confirm Password	Confirm the encryption password by retyping it here.
Timeout	Specify the duration (in seconds) within which the SNMP query executed by this test should time out in this text box. The default is 10 seconds.
Data Over TCP	By default, in an IT environment, all data transmission occurs over UDP. Some environments however, may be specifically configured to offload a fraction of the data traffic – for instance, certain types of data traffic or traffic pertaining to specific components – to other protocols like TCP, so as to prevent UDP overloads. In such environments, you can instruct the eG agent to conduct the SNMP data traffic related to the monitored target over TCP (and not UDP). For this, set this flag to **Yes**. By default, this flag is set to **No**.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Percent charge	Indicates the percentage of unused battery capacity.	Percent	Ideally, the value of this measure should be high. A low value is indicative of high battery utilization.
Battery temperature	Indicates the current internal UPS temperature.	Celsius	Ideally, this value should be low.
Battery replace indicator	Indicates whether the UPS batteries need replacing.	Status	While the value 1 indicates that the battery does not require replacing, the value 0 indicates that the battery has to be replaced.

3.2 The UPS Service Layer

The test associated with this layer continuously monitors the status of an APC UPS, and reports statistics related to the voltage and power handled by the UPS.

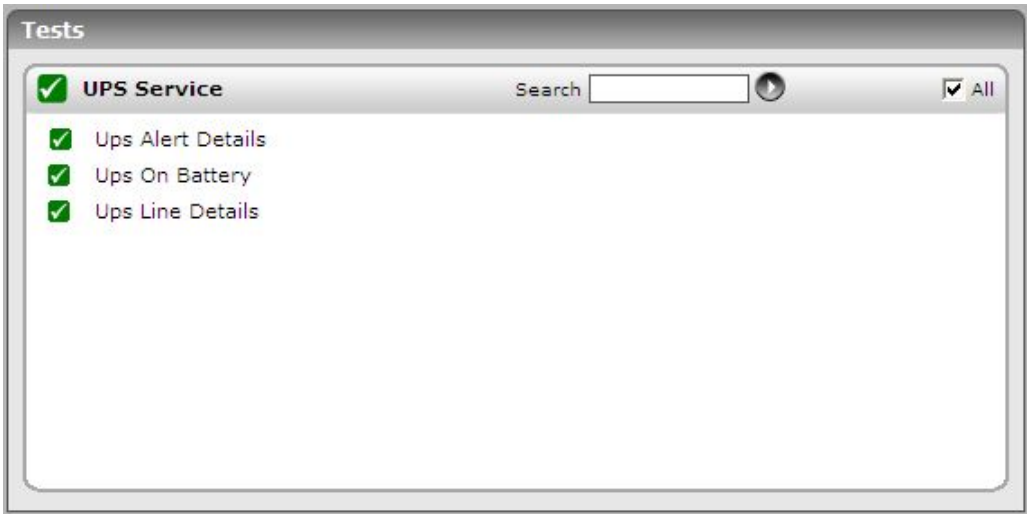

Figure 3.3: The test associated with the UPS Service layer

3.2.1 Ups Line Details Test

This test monitors the current status of a target UPS, and reports a wide variety of performance statistics pertaining to that UPS.

Target of the test : An APC UPS device

Agent deploying the test : An external agent

Outputs of the test : One set of results for every UPS monitored.

Configurable parameters for the test

Parameter	Description
Test period	How often should the test be executed
Host	The IP address of the host for which this test is to be configured.
SNMPPort	The port at which the monitored target exposes its SNMP MIB; The default value is 161.
SNMPVersion	By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the SNMPversion list is **v1**. However, if a different SNMP framework is in use in your

Parameter	Description
	environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
SNMPCommunity	The SNMP community name that the test uses to communicate with the firewall. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the SNMPVersion chosen is **v3**, then this parameter will not appear.
Username	This parameter appears only when **v3** is selected as the SNMPversion. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against this parameter.
Context	This parameter appears only when v3 is selected as the SNMPVersion. An SNMP context is a collection of management information accessible by an SNMP entity. An item of management information may exist in more than one context and an SNMP entity potentially has access to many contexts. A context is identified by the SNMPEngineID value of the entity hosting the management information (also called a contextEngineID) and a context name that identifies the specific context (also called a contextName). If the Username provided is associated with a context name, then the eG agent will be able to poll the MIB and collect metrics only if it is configured with the context name as well. In such cases therefore, specify the context name of the Username in the Context text box. By default, this parameter is set to *none*.
AuthPass	Specify the password that corresponds to the above-mentioned Username. This parameter once again appears only if the SNMPversion selected is **v3**.
Confirm Password	Confirm the AuthPass by retyping it here.
AuthType	This parameter too appears only if **v3** is selected as the SNMPversion. From the Authtype list box, choose the authentication algorithm using which SNMP v3 converts the specified username and password into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: • **MD5** – Message Digest Algorithm • **SHA** – Secure Hash Algorithm
EncryptFlag	This flag appears only when **v3** is selected as the SNMPversion. By default, the eG agent does not encrypt SNMP requests. Accordingly, the this flag is set to **No** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **Yes** option.

Parameter	Description
EncryptType	If this EncryptFlag is set to **Yes**, then you will have to mention the encryption type by selecting an option from the EncryptType list. SNMP v3 supports the following encryption types: • **DES** – Data Encryption Standard • **AES** – Advanced Encryption Standard
EncryptPassword	Specify the encryption password here.
Confirm Password	Confirm the encryption password by retyping it here.
Timeout	Specify the duration (in seconds) within which the SNMP query executed by this test should time out in this text box. The default is 10 seconds.
Data Over TCP	By default, in an IT environment, all data transmission occurs over UDP. Some environments however, may be specifically configured to offload a fraction of the data traffic – for instance, certain types of data traffic or traffic pertaining to specific components – to other protocols like TCP, so as to prevent UDP overloads. In such environments, you can instruct the eG agent to conduct the SNMP data traffic related to the monitored target over TCP (and not UDP). For this, set this flag to **Yes**. By default, this flag is set to **No**.
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.
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

<table>
<tr><th>Measurement</th><th>Description</th><th>Measurement Unit</th><th>Interpretation</th></tr>
<tr><td>Ups operation mode</td><td>Indicates the current state of the UPS.</td><td>Status</td><td>If this measure reports the value 1, it indicates that the UPS is currently in the safe or online state. If the value 0 is reported, it indicates that the UPS is in an unsafe state currently.
If the value of this measure is 0, you can use the detailed diagnosis of the measure to determine the exact state of the UPS. Typically, unsafe is the generic term that the eG agent uses to indicate one of the following abnormal states:
<table><tr><th>State ID</th><th>Description</th></tr><tr><td>1</td><td>Unknown</td></tr><tr><td>3</td><td>onBattery</td></tr><tr><td>4</td><td>onSmartBoost</td></tr><tr><td>5</td><td>timedSleeping</td></tr><tr><td>6</td><td>softwareByPass</td></tr><tr><td>7</td><td>off</td></tr><tr><td>8</td><td>rebooting</td></tr><tr><td>9</td><td>SwitchedBypass</td></tr><tr><td>10</td><td>hardwareFailurebypass</td></tr><tr><td>11</td><td>SleepingUntilpowerReturn</td></tr><tr><td>12</td><td>onSmartTrim</td></tr></table></td></tr>
<tr><td>Input voltage</td><td>Indicates the current utility line voltage.</td><td>Volts</td><td>While the nominal voltage is 120 volts, the variable range is 92-147 volts.</td></tr>
<tr><td>Input frequency</td><td>Indicates current input frequency to the UPS system.</td><td>Hz</td><td></td></tr>
<tr><td>Output voltage</td><td>Indicates the current output voltage of the</td><td>Volts</td><td>The nominal voltage is 120 volts.</td></tr>
</table>

Measurement	Description	Measurement Unit	Interpretation
	UPS system.		
Output frequency	Indicates the current output frequency delivered by the UPS.	Hz	
Percent load	Indicates the percent output load.	Percent	
Output current	Indicates the current drawn by the load on the UPS.	Amps	This measure is directly proportional to the percentage of output load.

3.2.2 UPS Battery Test

This test reports the input line state of the UPS. The state of the input line determines the mode of operation of the UPS – i.e., whether the UPS is running in the Battery mode or not.

Target of the test : An APC UPS device

Agent deploying the test : An external agent

Outputs of the test : One set of results for every UPS monitored.

Configurable parameters for the test

Parameter	Description
Test period	How often should the test be executed
Host	The IP address of the host for which this test is to be configured.
SNMPPort	The port at which the monitored target exposes its SNMP MIB; The default value is 161.
SNMPVersion	By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the SNMPversion list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
SNMPCommunity	The SNMP community name that the test uses to communicate with the firewall. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the SNMPVersion chosen is **v3**, then this parameter will not appear.

Parameter	Description
Username	This parameter appears only when **v3** is selected as the SNMPversion. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against this parameter.
Context	This parameter appears only when v3 is selected as the SNMPVersion. An SNMP context is a collection of management information accessible by an SNMP entity. An item of management information may exist in more than one context and an SNMP entity potentially has access to many contexts. A context is identified by the SNMPEngineID value of the entity hosting the management information (also called a contextEngineID) and a context name that identifies the specific context (also called a contextName). If the Username provided is associated with a context name, then the eG agent will be able to poll the MIB and collect metrics only if it is configured with the context name as well. In such cases therefore, specify the context name of the Username in the Context text box. By default, this parameter is set to *none*.
AuthPass	Specify the password that corresponds to the above-mentioned Username. This parameter once again appears only if the SNMPversion selected is **v3**.
Confirm Password	Confirm the AuthPass by retyping it here.
AuthType	This parameter too appears only if **v3** is selected as the SNMPversion. From the Authtype list box, choose the authentication algorithm using which SNMP v3 converts the specified username and password into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: • **MD5** – Message Digest Algorithm • **SHA** – Secure Hash Algorithm
EncryptFlag	This flag appears only when **v3** is selected as the SNMPversion. By default, the eG agent does not encrypt SNMP requests. Accordingly, the this flag is set to **No** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **Yes** option.
EncryptType	If this EncryptFlag is set to **Yes**, then you will have to mention the encryption type by selecting an option from the EncryptType list. SNMP v3 supports the following encryption types:

Parameter	Description
	• **DES** – Data Encryption Standard • **AES** – Advanced Encryption Standard
EncryptPassword	Specify the encryption password here.
Confirm Password	Confirm the encryption password by retyping it here.
Timeout	Specify the duration (in seconds) within which the SNMP query executed by this test should time out in this text box. The default is 10 seconds.
Data Over TCP	By default, in an IT environment, all data transmission occurs over UDP. Some environments however, may be specifically configured to offload a fraction of the data traffic – for instance, certain types of data traffic or traffic pertaining to specific components – to other protocols like TCP, so as to prevent UDP overloads. In such environments, you can instruct the eG agent to conduct the SNMP data traffic related to the monitored target over TCP (and not UDP). For this, set this flag to **Yes**. By default, this flag is set to **No**.
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.
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

<table>
<tr><th>Measurement</th><th>Description</th><th>Measurement Unit</th><th>Interpretation</th></tr>
<tr><td>Ups input line state</td><td>Indicates the current input line state of the UPS.</td><td>Status</td><td>This measure reports the following states while indicating the input line state of the UPS.
a. No Transfer
b. Highline Voltage
c. BrownOut
d. BlackOut
e. Small Momentary Sag
f. Deep Momentary Sag
g. Small Momentary Spike
h. Large Momentary Spike
i. SelfTest
j. Rate Of Voltage Change
The numeric values that correspond to the above-mentioned states are as follows:
<table><tr><th>Numeric Value</th><th>State</th><th>Description</th></tr><tr><td>1</td><td>No Transfer</td><td>Indicates that the UPS battery is not transferred to power i.e., the UPS is still utilizing the battery power.</td></tr><tr><td>2</td><td>Highline Voltage</td><td>Indicates</td></tr></table></td></tr>
</table>

<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>Numeric Value</th><th>State</th><th>Description</th></tr>
<tr><td></td><td></td><td>that the transfer to battery power is caused by a voltage greater than the high transfer voltage.</td></tr>
<tr><td>3</td><td>BrownOut</td><td>A brownout is when the line voltage is severely reduced for a few minutes up to a few days.

This state is shown if the duration of the outage is greater than five seconds and the line voltage is between 40% of the rated output voltage and the low transfer voltage.</td></tr>
</table>
</td></tr>
</table>

Measurement	Description	Measurement Unit	Interpretation
			<table><tr><th>Numeric Value</th><th>State</th><th>Description</th></tr><tr><td></td><td></td><td>and the low transfer voltage</td></tr><tr><td>4</td><td>BlackOut</td><td>A blackout is the complete absence of AC power. This state is shown if the duration of the outage is greater than five seconds and the line voltage is between 40% of the rated output voltage and ground.</td></tr><tr><td>5</td><td>Small Momentary Sag</td><td>This state is shown if the duration of the outage is less than five seconds and the line voltage is between 40% of the rated output</td></tr></table>

Measurement	Description	Measurement Unit	Interpretation
			<table><tr><th>Numeric Value</th><th>State</th><th>Description</th></tr><tr><td></td><td></td><td>voltage and the low transfer voltage.</td></tr><tr><td>6</td><td>Deep Momentary Sag</td><td>This state is shown if the duration of the outage is less than five seconds and the line voltage is between 40% of the rated output voltage and ground.</td></tr><tr><td>7</td><td>Small Momentary Spike</td><td>This state is shown if the line failure is caused by a rate of change of input voltage less than ten volts per cycle.</td></tr><tr><td>8</td><td>Large Momentary Spike</td><td>This state is shown if the line failure is caused by a rate of</td></tr></table>

<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>Numeric Value</th><th>State</th><th>Description</th></tr>
<tr><td></td><td></td><td>change of input voltage greater than ten volts per cycle.</td></tr>
<tr><td>9</td><td>SelfTest</td><td>This state is shown if the UPS was commanded to do a self test.</td></tr>
<tr><td>10</td><td>Rate Of Voltage Change</td><td>This state is shown if the failure is due to the line voltage.</td></tr>
</table>
Note:
By default, this measure reports the above-mentioned states while indicating the input line state of the UPS. However, the graph of this measure will be represented using the corresponding numeric equivalents of the states as mentioned in the table above.
The detailed diagnosis of this measure, if enabled, displays the current configuration of the UPS; the configuration details include:
a. Model no
b. Firmware version
</td></tr>
</table>

Measurement	Description	Measurement Unit	Interpretation
			c. Manufacture date d. Serial no e. State id f. Battery state

3.2.3 Ups Alert Details Test

This test reports the number of enabled output states and abnormal states of the APC UPS 3000 that is being monitored.

Target of the test : An APC UPS device

Agent deploying the test : An external agent

Outputs of the test : One set of results for every UPS monitored.

Configurable parameters for the test

Parameter	Description
Test period	How often should the test be executed
Host	The IP address of the host for which this test is to be configured.
SNMPPort	The port at which the monitored target exposes its SNMP MIB; The default value is 161.
SNMPVersion	By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the SNMPversion list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
SNMPCommunity	The SNMP community name that the test uses to communicate with the firewall. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the SNMPVersion chosen is **v3**, then this parameter will not appear.
Username	This parameter appears only when **v3** is selected as the SNMPversion. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB

Parameter	Description
	using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against this parameter.
Context	This parameter appears only when v3 is selected as the SNMPVersion. An SNMP context is a collection of management information accessible by an SNMP entity. An item of management information may exist in more than one context and an SNMP entity potentially has access to many contexts. A context is identified by the SNMPEngineID value of the entity hosting the management information (also called a contextEngineID) and a context name that identifies the specific context (also called a contextName). If the Username provided is associated with a context name, then the eG agent will be able to poll the MIB and collect metrics only if it is configured with the context name as well. In such cases therefore, specify the context name of the Username in the Context text box. By default, this parameter is set to *none*.
AuthPass	Specify the password that corresponds to the above-mentioned Username. This parameter once again appears only if the SNMPversion selected is **v3**.
Confirm Password	Confirm the AuthPass by retyping it here.
AuthType	This parameter too appears only if **v3** is selected as the SNMPversion. From the Authtype list box, choose the authentication algorithm using which SNMP v3 converts the specified username and password into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: • **MD5** – Message Digest Algorithm • **SHA** – Secure Hash Algorithm
EncryptFlag	This flag appears only when **v3** is selected as the SNMPversion. By default, the eG agent does not encrypt SNMP requests. Accordingly, the this flag is set to **No** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **Yes** option.
EncryptType	If this EncryptFlag is set to **Yes**, then you will have to mention the encryption type by selecting an option from the EncryptType list. SNMP v3 supports the following encryption types: • **DES** – Data Encryption Standard • **AES** – Advanced Encryption Standard
EncryptPassword	Specify the encryption password here.
Confirm Password	Confirm the encryption password by retyping it here.

Parameter	Description
Timeout	Specify the duration (in seconds) within which the SNMP query executed by this test should time out in this text box. The default is 10 seconds.
Data Over TCP	By default, in an IT environment, all data transmission occurs over UDP. Some environments however, may be specifically configured to offload a fraction of the data traffic – for instance, certain types of data traffic or traffic pertaining to specific components – to other protocols like TCP, so as to prevent UDP overloads. In such environments, you can instruct the eG agent to conduct the SNMP data traffic related to the monitored target over TCP (and not UDP). For this, set this flag to **Yes**. By default, this flag is set to **No**.
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.
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
Output state count	Indicates the total number of enabled output states of this APC UPS 3000 server.	Number	Use the detailed diagnosis of this measure to figure out which are the output states that are enabled. Here, the detailed diagnosis will show the Flag number and description for each output state individually.

Measurement	Description	Measurement Unit	Interpretation
Abnormal state count	Indicates the total number of enabled abnormal states of this APC UPS 3000 server.	Number	Use the detailed diagnosis of this measure to figure out which are the abnormal states that are enabled. Here, the detailed diagnosis will show the Flag number and description for each abnormal state individually.

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.

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