Monitoring NexentaStor

eG Enterprise v6.0

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Monitoring the NexentaStor

The Nexenta Storage Appliance, or NexentaStor, is a software-based network-attached storage (NAS) or storage-attached network (SAN) solution. NexentaStor supports file and block storage and a variety of advanced storage features, such as replication between various storage systems and virtually unlimited snapshots and file sizes.

NexentaStor delivers richly-featured software on a software appliance. You can use NexentaStor to manage primary storage in NAS/SAN-based deployments, or to manage second-tier storage for backup.

Owing to this flexibility in usage, the NexentaStor appliance is the preferred storage services provider in many mission-critical environments. In such environments, the storage appliance has to perform at its best at all times, so that the delivery of the critical business services that overlay the IT environment is not impacted. This is why, any deviation from normal behavior – be it the sudden unavailability of an actively used volume, or slowdown in I/O processing of the appliance or the lack of storage space – should be proactively captured by the storage administrator and promptly resolved. This is where eG Enterprise helps!

eG Enterprise offers a specialized monitoring model for the NexentaStor appliance.

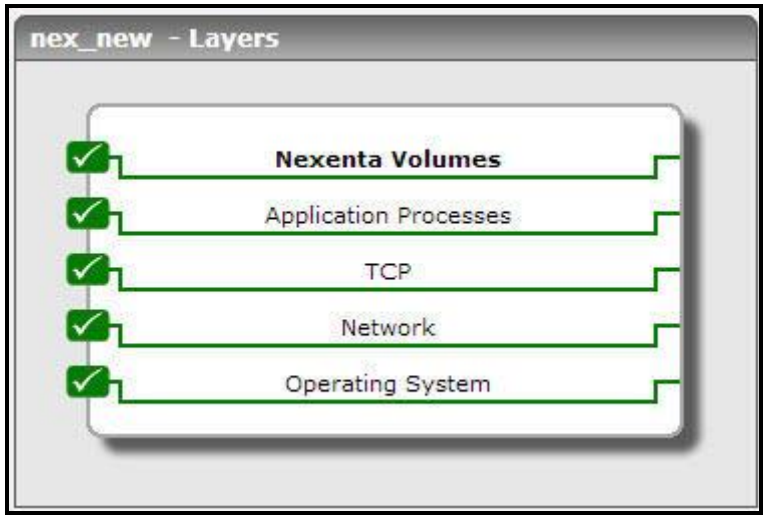

Figure 1: The layer model of the NexentaStor

Each layer of this model is mapped to tests that report on the overall health, I/O performance, and resource usage of the NexentaStor appliance. Using the metrics so reported, the following performance queries can be easily answered:

- Is any volume processing I/O requests very slowly?
- Is any volume running out of space?
- Which volume is currently in a faulty/degraded state?
- Is the storage appliance using memory excessively?
- Is the appliance overloaded with users sessions?

The **Operating System**, **Network**, **TCP** and **Application Processes** layers of a *NexentaStor* model are similar to that of a *Windows Generic* server model. Since these tests have been dealt with in the *Monitoring Unix and Windows Servers* document, Section 1.1 focuses on the **Nexenta Volumes** layer.

1.1 The Nexenta Volumes Layer

This layer tracks the status of the volumes in the NexentaStor and reports how well each volume handles the I/O requests. This layer also sheds light on the space utilization in the volume and the physical memory utilization. In addition, this layer helps you understand the load on the NexentaStor by monitoring the number of users connected to the appliance.

Figure 2: The tests mapped to the Nexenta Volumes layer

1.1.1 Nexenta Volume Performance Test

NexentaStor enables you to aggregate the available disks in the system into logical data volumes, and then to allocate file or block-based storage from the data volume. The data volume provides a storage pooling capability, so that the file systems, or blocks, can expand without being over-provisioned.

If one/more of these data volumes are slow in processing I/O requests, storage I/O performance may deteriorate, thereby adversely impacting the user experience with the storage device. If this is to be avoided, storage administrators should quickly isolate latent volumes and investigate the reasons for the slowness, so that the problem is fixed before end-users notice the slowdown. The **Nexenta Volume Performance** test helps administrators with this!

This test auto-discovers the volumes in the NexentaStor device and reports how well each volume handles the I/O requests it receives. In the process, the test points administrators to those volumes that are slow in I/O processing.

Purpose	Auto-discovers the volumes in the NexentaStor device and reports how well each volume handles the I/O requests it receives. In the process, the test points administrators to those volumes that are slow in I/O processing
Target of the test	A NexentaStor appliance
Agent deploying the	An external/remote agent

<table>
<tr><td>test</td><td colspan="3"></td></tr>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
2. HOST - The host for which the test is to be configured.
3. PORT – The port number at which the specified HOST listens to. By default, this is NULL.
4. TIMEOUT – Here, specify the duration (in seconds) within which the test should wait for a response from the storage device. The default is 10 seconds.</td></tr>
<tr><td>Outputs of the test</td><td colspan="3">One set of results for each volume that is to be monitored</td></tr>
<tr><td rowspan="6">Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>Reads:
Indicates the rate at which read operations were performed on this volume.</td><td>Reads/sec</td><td>Ideally, the value of this measure should be high. A steady dip in this measure value could indicate a potential reading bottleneck.</td></tr>
<tr><td>Writes:
Indicates the rate at which write operations were performed on this volume.</td><td>Writes/sec</td><td>Ideally, the value of this measure should be high. A steady dip in this measure value could indicate a potential writing bottleneck.</td></tr>
<tr><td>Read I/O:
Indicates the rate at which data is read from this volume.</td><td>KB/sec</td><td rowspan="2">Comparing the value of these measures across the volumes will clearly indicate which volume is the slowest in I/O processing, and when exactly the slowdown occurred – when reading data? Or when writing data? .</td></tr>
<tr><td>Write I/O:
Indicates the rate at which data is written to this volume.</td><td>KB/sec</td></tr>
<tr><td>Read latency:
Indicates the time taken to read the data from this volume.</td><td>Millisecs</td><td>Compare the value of this measure across volumes to know which volume is the slowest when processing read requests.</td></tr>
<tr><td>Write latency:
Indicates the time taken to write the data to this volume.</td><td>Millisecs</td><td>Compare the value of this measure across volumes to know which volume is the slowest when processing write requests.</td></tr>
</table>

1.1.2 Nexenta Volume Status Test

To ensure peak storage performance, storage administrators should continuously track the status and space usage of each of the volumes in the NexentaStor device, proactively identify faulty, unavailable, and space-hungry volumes, and promptly remedy the problem condition. If this is not done, the abnormal state of or the lack of space in some volumes may go unnoticed, causing I/O requests to the device to fail consistently! This is where the **Nexenta Volume Status** test helps!

This test auto-discovers the volumes on the NexentaStor and reports the current status and space utilization of the volume. Using this test, you can easily identify abnormal volumes and those that are running short of space.

Purpose	Auto-discovers the volumes on the NexentaStor and reports the current status and space utilization of the volume. Using this test, you can easily identify abnormal volumes and those that are running short of space		
Target of the test	A NexentaStor appliance		
Agent deploying the test	An external/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST -** The host for which the test is to be configured. 3. **PORT** – The port number at which the specified **HOST** listens to. By default, this is *NULL*. 4. **TIMEOUT** – Here, specify the duration (in seconds) within which the test should wait for a response from the storage device. The default is 10 seconds.		
Outputs of the test	One set of results for each volume that is to be monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Allocated size: Indicates the amount of space that is currently in use in this volume.	MB	
	Free size: Indicates the amount of space that is currently available for use in this volume.	MB	A high value is desired for this measure. Compare the value of this measure across the volumes to identify the volume with the least space. You may want to expand the storage capacity of such volumes, by adding more disks to them.
	Utilized: Indicates the percentage of space that is currently utilized in this volume.	Percent	A value close to 100% indicates that the volume is currently running out of space. Compare the value of this measure across the volumes to know which volumes are experiencing a space crunch right now. You may want to expand the storage capacity of such volumes, by adding more disks to them.

	Status: Indicates the current status of this volume.		The values that this measure can report and their corresponding numeric values are tabulated below: **Note:** By default, this measure reports the above-mentioned **Measure Value**s while indicating the status of the volume. However, in the graph of this measure, volume status will be represented using the corresponding numeric equivalents only.

Measure Value	Numeric Value
Offline	0
Online	1
Degraded	2
Unavail	3
Faulted	4
Removed	5

1.1.3 Nexenta Memory Test

By proactively detecting a potential memory contention on the NexentaStor appliance, administrators can easily avert slowdowns or outages of the NexentaStor appliance. The **Nexenta Memory** test helps administrators in this exercise. This test reports how well the NexentaStor appliance uses the physical memory allocated to it, and leads administrators to abnormal memory usage patterns (if any).

Purpose	Reports how well the NexentaStor appliance uses the physical memory allocated to it, and leads administrators to abnormal memory usage patterns (if any)
Target of the test	A NexentaStor appliance
Agent deploying the test	A remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST -** The host for which the test is to be configured. 3. **PORT** – The port number at which the specified **HOST** listens to. By default, this is *NULL*. 4. **SNMPPORT** – The SNMP Port number of the NexentaStor appliance. The default port number is 161. 5. **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. 6. **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. 7. **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 the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the snmpversion selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **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 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **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 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here. 15. **TIMEOUT -** Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the **TIMEOUT** text box. The default is 10 seconds.
Outputs of the test	One set of results for every NexentaStor appliance being monitored

Measurements made by the test	Measurement	Measurement Unit	Interpretation
	Total physical memory: Indicates the total amount of physical memory allocated for the NexentaStor appliance.	MB	
	Free physical memory: Indicates the amount of physical memory that is currently available on the NexentaStor appliance.	MB	A high value is desired for this measure.
	Used physical memory: Indicates the amount of physical memory that is currently used by the NexentaStor appliance.	MB	Ideally, the value of this measure should be low. A consistent increase in this value could be a cause for some serious concern, as it indicates a gradual, but steady erosion of valuable memory resources. If this unhealthy trend is not repaired soon, it could severely hamper storage performance.
	Physical memory utilized: Indicates the percent usage of physical memory by the NexentaStor appliance.	Percent	A low value is desired for this measure. A consistent increase in this value is a sign that physical memory is being over-utilized by the appliance.

1.1.4 Nexenta Users Test

Ths test reports the number of users who are currently connected to the NexentaStor. By continuously tracking the users who are accessing the NexentaStor, the load on the appliance can be easily identified.

Purpose	Reports the number of users who are currently connected to the NexentaStor. By continuously tracking the users who are accessing the NexentaStor, the load on the appliance can be easily identified.
Target of the test	A NexentaStor appliance
Agent deploying the test	A remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST -** The host for which the test is to be configured. 3. **PORT** – The port number at which the specified **HOST** listens to. By default, this is *NULL*. 4. **SNMPPORT** – The SNMP Port number of the NexentaStor appliance. The default port number is 161. 5. **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. 6. **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. 7. **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 the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the snmpversion selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **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 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **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 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here. 15. **TIMEOUT -** Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the **TIMEOUT** text box. The default is 10 seconds.
Outputs of the test	One set of results for every NexentaStor appliance being monitored

Measurements made by the test	Measurement	Measurement Unit	Interpretation
	User connections: Indicates the number of users who are currently connecting to the NexentaStor.	Number	The higher the value of this measure, the greater is the load on the NexentaStor.

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Conclusion

This document has described in detail the monitoring paradigm used and the measurement capabilities of the eG Enterprise suite of products with respect to the **Nexenta Stor**. For details of how to administer and use the eG Enterprise suite of products, refer to the user manuals.

We will be adding new measurement capabilities into the future versions of the eG Enterprise suite. If you can identify new capabilities that you would like us to incorporate in the eG Enterprise suite of products, please contact support@eginnovations.com. We look forward to your support and cooperation. Any feedback regarding this manual or any other aspects of the eG Enterprise suite can be forwarded to feedback@eginnovations.com.