Audit message overview

StorageGRID 11.5

NetApp
January 04, 2024

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Audit message overview

These instructions contain information about the structure and content of StorageGRID audit messages and audit logs. You can use this information to read and analyze the audit trail of system activity.

These instructions are for administrators responsible for producing reports of system activity and usage that require analysis of the StorageGRID system's audit messages.

You are assumed to have a sound understanding of the nature of audited activities within the StorageGRID system. To use the text log file, you must have access to the configured audit share on the Admin Node.

Related information

Administer StorageGRID

Audit message flow and retention

All StorageGRID services generate audit messages during normal system operation. You should understand how these audit messages move through the StorageGRID system to the `audit.log` file.

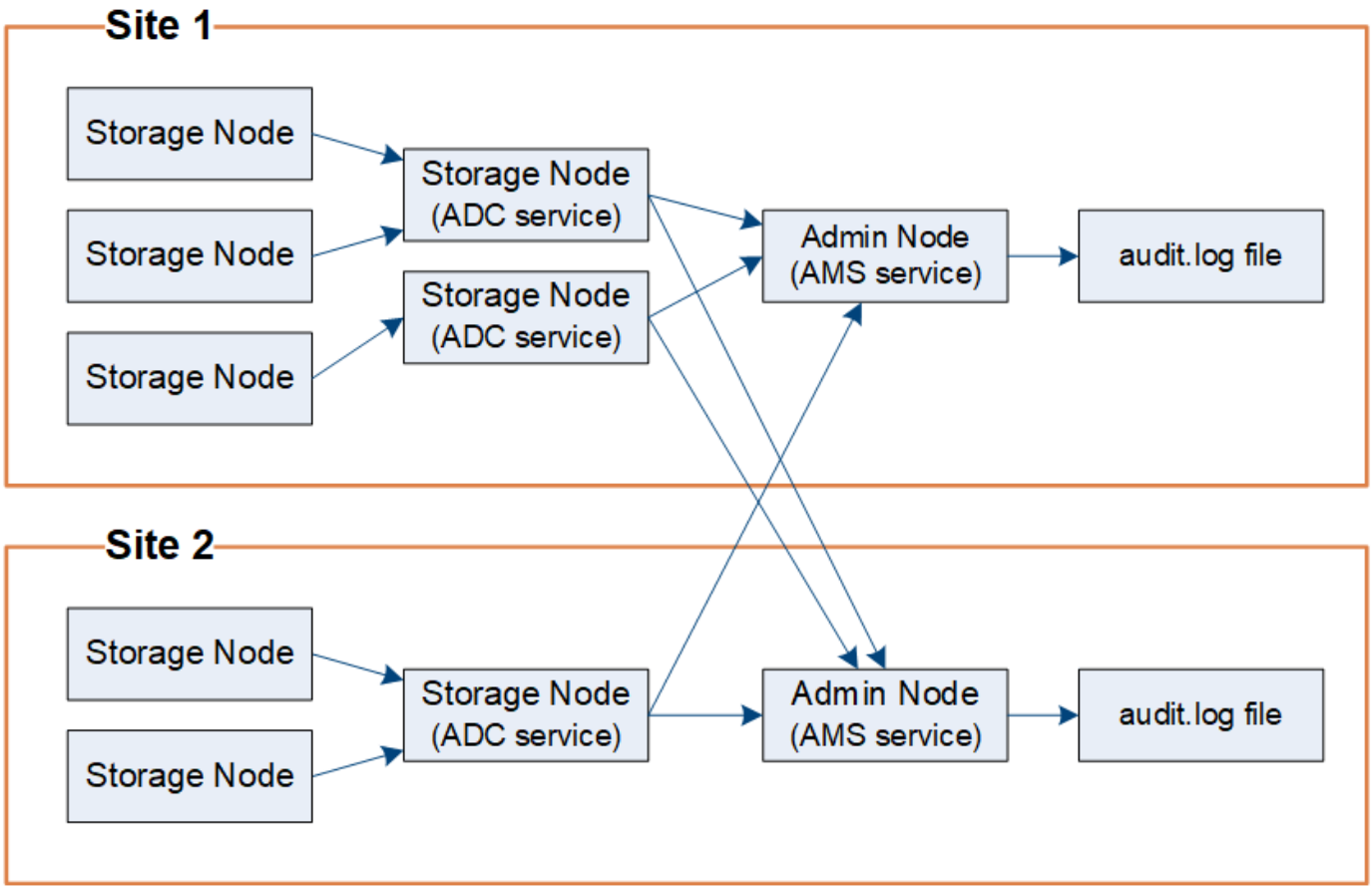
Audit message flow

Audit messages are processed by Admin Nodes and by those Storage Nodes that have an Administrative Domain Controller (ADC) service.

As shown in the audit message flow diagram, each StorageGRID node sends its audit messages to one of the ADC services at the data center site. The ADC service is automatically enabled for the first three Storage Nodes installed at each site.

In turn, each ADC service acts as a relay and sends its collection of audit messages to every Admin Node in the StorageGRID system, which gives each Admin Node a complete record of system activity.

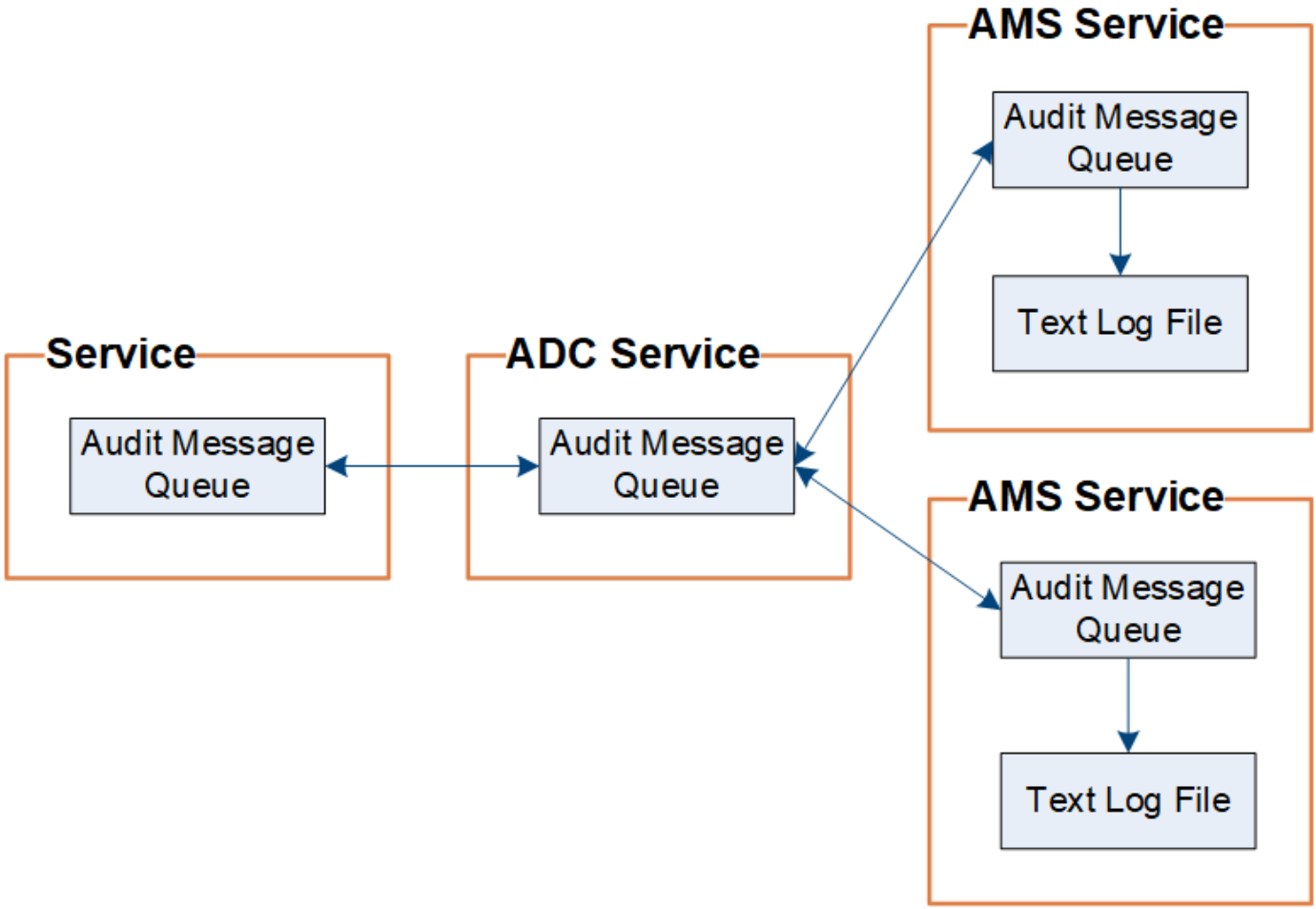
Each Admin Node stores audit messages in text log files; the active log file is named `audit.log`.



Audit message retention

StorageGRID uses a copy-and-delete process to ensure that no audit messages are lost before they can be written to the audit log.

When a node generates or relays an audit message, the message is stored in an audit message queue on the system disk of the grid node. A copy of the message is always held in an audit message queue until the message is written to the audit log file in the Admin Node's `/var/local/audit/export` directory. This helps prevent loss of an audit message during transport.



The audit message queue can temporarily increase due to network connectivity issues or insufficient audit capacity. As the queues increase, they consume more of the available space in each node's `/var/local/` directory. If the issue persists and a node's audit message directory becomes too full, the individual nodes will prioritize processing their backlog and become temporarily unavailable for new messages.

Specifically, you might see the following behaviors:

- If the `/var/local/audit/export` directory used by an Admin Node becomes full, the Admin Node will be flagged as unavailable to new audit messages until the directory is no longer full. S3 and Swift client requests are not affected. The XAMS (Unreachable Audit Repositories) alarm is triggered when an audit repository is unreachable.
- If the `/var/local/` directory used by a Storage Node with the ADC service becomes 92% full, the node will be flagged as unavailable to audit messages until the directory is only 87% full. S3 and Swift client requests to other nodes are not affected. The NRLY (Available Audit Relays) alarm is triggered when audit relays are unreachable.

  > If there are no available Storage Nodes with the ADC service, the Storage Nodes store the audit messages locally.

- If the `/var/local/` directory used by a Storage Node becomes 85% full, the node will start refusing S3 and Swift client requests with `503 Service Unavailable`.

The following types of issues can cause audit message queues to grow very large:

- The outage of an Admin Node or a Storage Node with the ADC service. If one of the system's nodes is down, the remaining nodes might become backlogged.
- A sustained activity rate that exceeds the audit capacity of the system.
- The `/var/local/` space on an ADC Storage Node becoming full for reasons unrelated to audit messages. When this happens, the node stops accepting new audit messages and prioritizes its current backlog, which can cause backlogs on other nodes.

Large audit queue alert and Audit Messages Queued (AMQS) alarm

To help you monitor the size of audit message queues over time, the **Large audit queue** alert and the legacy AMQS alarm are triggered when the number of messages in a Storage Node queue or Admin Node queue reaches certain thresholds.

If the **Large audit queue** alert or the legacy AMQS alarm is triggered, start by checking the load on the system—if there have been a significant number of recent transactions, the alert and the alarm should resolve over time and can be ignored.

If the alert or alarm persists and increases in severity, view a chart of the queue size. If the number is steadily increasing over hours or days, the audit load has likely exceeded the audit capacity of the system. Reduce the client operation rate or decrease the number of audit messages logged by changing the audit level for Client Writes and Client Reads to Error or Off. See "Changing audit message levels."

Duplicate messages

The StorageGRID system takes a conservative approach if a network or node failure occurs. For this reason, duplicate messages might exist in the audit log.

Changing audit message levels

You can adjust audit levels to increase or decrease the number of audit messages recorded in the audit log for each audit message category.

What you'll need

- You must be signed in to the Grid Manager using a supported browser.
- You must have specific access permissions.

About this task

The audit messages recorded in the audit log are filtered based on the settings on the **Configuration** > **Monitoring** > **Audit** page.

You can set a different audit level for each of the following categories of messages:

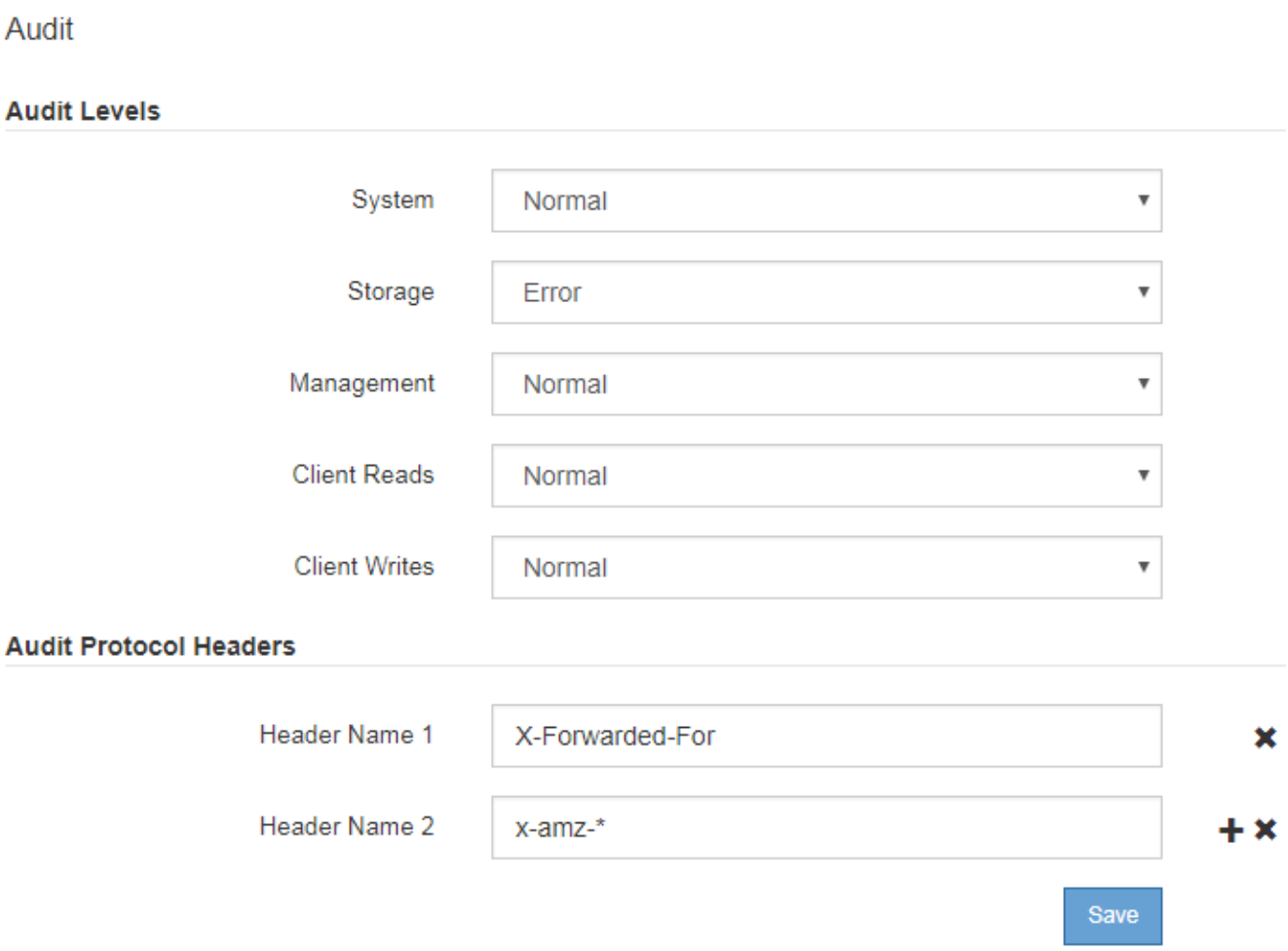
- **System**: By default, this level is set to Normal.
- **Storage**: By default, this level is set to Error.
- **Management**: By default, this level is set to Normal.
- **Client Reads**: By default, this level is set to Normal.
- **Client Writes**: By default, this level is set to Normal.

These defaults apply if you initially installed StorageGRID using version 10.3 or later. If you have upgraded from an earlier version of StorageGRID, the default for all categories is set to Normal.

During upgrades, audit level configurations will not be effective immediately.

Steps

1. Select **Configuration** > **Monitoring** > **Audit**.



2. For each category of audit message, select an audit level from the drop-down list:

Audit level	Description
Off	No audit messages from the category are logged.
Error	Only error messages are logged—audit messages for which the result code was not "successful" (SUCS).
Normal	Standard transactional messages are logged—the messages listed in these instructions for the category.
Debug	Deprecated. This level behaves the same as the Normal audit level.

The messages included for any particular level include those that would be logged at the higher levels. For example, the Normal level includes all of the Error messages.

3. Under **Audit Protocol Headers**, enter the name of the HTTP request headers to be included in Client Read and Client Write audit messages. Use an asterisk (*) as a wildcard, or use the escape sequence (*) as a literal asterisk. Click the plus sign to create a list of header name fields.

   Audit protocol headers apply to S3 and Swift requests only.

   When such HTTP headers are found in a request, they are included in the audit message under the field HTRH.

   Audit protocol request headers are logged only if the audit level for **Client Reads** or **Client Writes** is not **Off**.

4. Click **Save**.

Related information

System audit messages

Object storage audit messages

Management audit message

Client read audit messages

Administer StorageGRID

Accessing the audit log file

The audit share contains the active `audit.log` file and any compressed audit log files. For easy access to audit logs, you can configure client access to audit shares for both NFS and CIFS (deprecated). You can also access audit log files directly from the command line of the Admin Node.

What you'll need

- You must have specific access permissions.
- You must have the `Passwords.txt` file.
- You must know the IP address of an Admin Node.

Steps

1. Log in to an Admin Node:
   a. Enter the following command: `ssh admin@primary_Admin_Node_IP`
   b. Enter the password listed in the `Passwords.txt` file.
2. Go to the directory containing the audit log files:

   ```
   cd /var/local/audit/export
   ```

3. View the current or a saved audit log file, as required.

Related information

Administer StorageGRID

Audit log file rotation

Audit logs files are saved to an Admin Node's `/var/local/audit/export` directory. The active audit log files are named `audit.log`.

Once a day, the active `audit.log` file is saved, and a new `audit.log` file is started. The name of the saved file indicates when it was saved, in the format *`yyyy-mm-dd.txt`*. If more than one audit log is created in a single day, the file names use the date the file was saved, appended by a number, in the format *`yyyy-mm-dd.txt.n`*. For example, `2018-04-15.txt` and `2018-04-15.txt.1` are the first and second log files created and saved on 15 April 2018.

After a day, the saved file is compressed and renamed, in the format *`yyyy-mm-dd.txt.gz`*, which preserves the original date. Over time, this results in the consumption of storage allocated for audit logs on the Admin Node. A script monitors the audit log space consumption and deletes log files as necessary to free space in the `/var/local/audit/export` directory. Audit logs are deleted based on the date they were created, with the oldest being deleted first. You can monitor the script's actions in the following file: `/var/local/log/manage-audit.log`.

This example shows the active `audit.log` file, the previous day's file (`2018-04-15.txt`), and the compressed file for the prior day (`2018-04-14.txt.gz`).

```
audit.log
2018-04-15.txt
2018-04-14.txt.gz
```

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