StorageGRID® 11.2

Audit Message Reference

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Contents

Audit message overview

This guide contains 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.

The guide is intended 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

Administering 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.

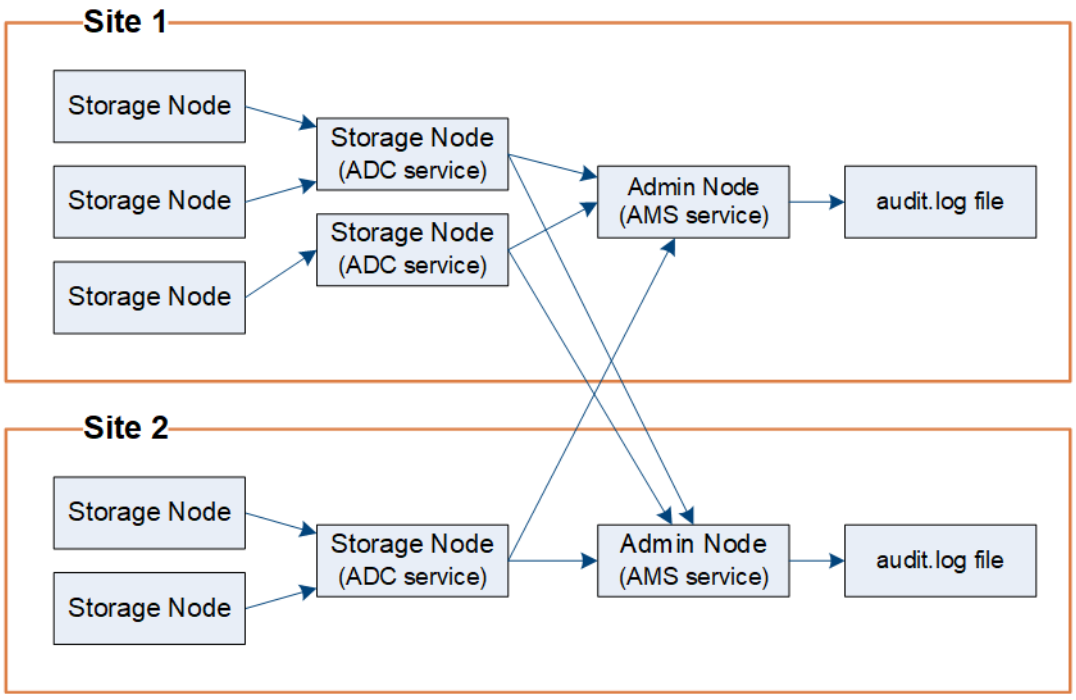
Audit message flow

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.

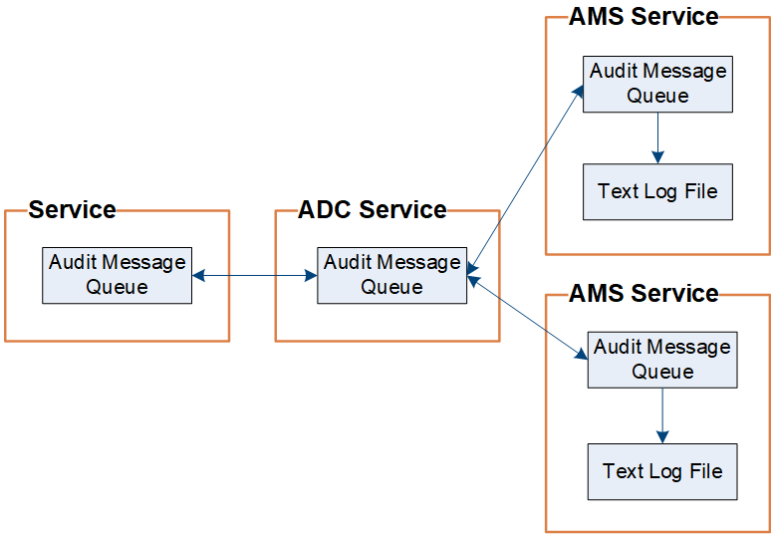
Each Admin Node stores audit messages in text log files; the active log file is named `audit.log`.



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.

  Note: 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.

Audit Messages Queued (AMQS) alarms

To help you monitor the size of audit message queues over time, AMQS alarms are triggered when the number of messages in a Storage Node queue or Admin Node queue reaches the following thresholds:

- Notice: More than 100,000 messages
- Minor: At least 500,000 messages
- Major: At least 2,000,000 messages
- Critical: At least 5,000,000 messages

If an AMQS alarm is triggered, start by checking the load on the system—if there have been a significant number of recent transactions, the alarm should resolve itself over time. In this case, you can ignore the alarm.

If the 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 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.

Related tasks

Changing audit message levels on page 8

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.

Before you begin

- You must be signed in to the Grid Manager using a supported browser.
- You must have specific access permissions. For details, see information about controlling system access with administration user accounts and groups.

About this task

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

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

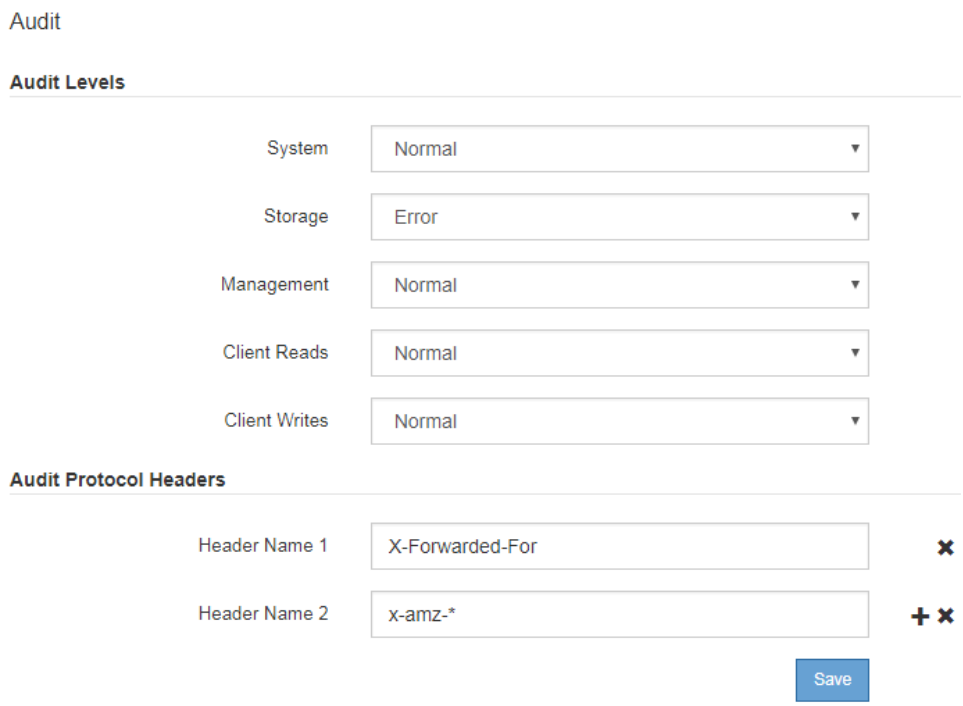
- **System**: By default, this level is set to Normal.
- **Storage**: By default, this level is set to Error.
- **Management**: By default, this level is set to Normal.
- **Client Reads**: By default, this level is set to Normal.
- **Client Writes**: By default, this level is set to Normal.

Note: For new installations starting at 10.3 and beyond, the above defaults are in effect. For upgrades of systems implemented prior to 10.3, the default for all categories is set to Normal.

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

Steps

1. Select **Configuration > 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 this guide 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.

   Note: 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`.

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

4. Click **Save**.

Related references

System audit messages on page 24
Object storage audit messages on page 25
Management audit message on page 27
Client read audit messages on page 26

APCT: Archive Purge from Cloud-Tier on page 28

Related information

Administering 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.

Before you begin

- You must be a StorageGRID administrator with specific access permissions.
- You must have the `Passwords.txt` file. This file is included in the Recovery Package `.zip` 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@`*`Admin_Node_IP`*
   b. Enter the password listed in the `Passwords.txt` file.
   c. Enter the following command to switch to root: `su -`
   d. Enter the password listed in the `Passwords.txt` file.

      When you are logged in as root, the prompt changes from `$` to `#`.
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

Administering 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 `manage-audit.log` file.

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
```

Audit log file and message formats

You need to understand how audit log files and audit messages are formatted before you can use the audit log to gather information about your system and troubleshoot issues.

Audit log file format

The audit log file is found on every Admin Node and contains a collection of individual audit messages.

Each audit message contains the following:

- The Coordinated Universal Time (UTC) of the event that triggered the audit message (ATIM) in ISO 8601 format, followed by a space:
  YYYY-MM-DD`T`*HH:MM:SS.UUUUUU*, where *UUUUUU* are microseconds.
- The audit message itself, enclosed within square brackets and beginning with `AUDT`.

The following example shows three audit messages in an audit log file (line breaks added for readability) These messages were generated when an S3 bucket was created and two objects were added to that bucket.

```
2019-01-02T07:05:13.543798
[AUDT:[RSLT(FC32):SUCS][CNID(UI64):1546329999057953][TIME(UI64):49840]
[SAIP(IPAD):"10.224.0.100"]
[S3AI(CSTR):"40768824500575527493"][SACC(CSTR):"account"]
[S3AK(CSTR):"SGKHXq34lnXydI0LS_grcDtwm5aBwaUX0AE25MqQ0Q=="]
[SUSR(CSTR):"urn:sgws:identity::40768824500575527493:root"]
[SBAI(CSTR):"40768824500575527493"][SBAC(CSTR):"account"]
[S3BK(CSTR):"bucket"][AVER(UI32):10][ATIM(UI64):1546412713543798]
[ATYP(FC32):SPUT][ANID(UI32):12159162][AMID(FC32):S3RQ]
[ATID(UI64):86858685346794195]]

2019-01-02T07:05:14.042987
[AUDT:[RSLT(FC32):SUCS][CNID(UI64):1546330012465604][TIME(UI64):40376]
[SAIP(IPAD):"10.224.0.100"]
[S3AI(CSTR):"40768824500575527493"][SACC(CSTR):"account"]
[S3AK(CSTR):"SGKHXq34lnXydI0LS_grcDtwm5aBwaUX0AE25MqQ0Q=="]
[SUSR(CSTR):"urn:sgws:identity::40768824500575527493:root"]
[SBAI(CSTR):"40768824500575527493"][SBAC(CSTR):"account"]
[S3BK(CSTR):"bucket"][S3KY(CSTR):"key1"][CBID(UI64):0x9FE716BD98E24E4B]
[UUID(CSTR):"941B813B-79FC-4811-AAB2-1A147533AD46"]
[CSIZ(UI64):30720][AVER(UI32):10][ATIM(UI64):1546412714042987]
[ATYP(FC32):SPUT][ANID(UI32):12532418][AMID(FC32):S3RQ]
[ATID(UI64):7188579370809834963]]

2019-01-02T07:05:14.207604
[AUDT:[RSLT(FC32):SUCS][CNID(UI64):1546330025984115][TIME(UI64):70007]
[SAIP(IPAD):"10.224.0.100"]
[S3AI(CSTR):"40768824500575527493"][SACC(CSTR):"account"]
[S3AK(CSTR):"SGKHXq34lnXydI0LS_grcDtwm5aBwaUX0AE25MqQ0Q=="]
[SUSR(CSTR):"urn:sgws:identity::40768824500575527493:root"]
[SBAI(CSTR):"40768824500575527493"][SBAC(CSTR):"account"]
[S3BK(CSTR):"bucket"][S3KY(CSTR):"key2"][CBID(UI64):0x50DCEA1988E6DCEF]
[UUID(CSTR):"0F484E00-8558-4477-AFD4-0A10E797B14B"]
[CSIZ(UI64):30720][AVER(UI32):10][ATIM(UI64):1546412714207604]
[ATYP(FC32):SPUT][ANID(UI32):12792413][AMID(FC32):S3RQ]
[ATID(UI64):17622953450705857540]
```

Audit message format

Audit messages exchanged within the StorageGRID system include standard information common to all messages and specific content describing the event or activity being reported.

The following is an example audit message as it might appear in the `audit.log` file:

```
2014-07-17T03:50:47.484627
[AUDT:[RSLT(FC32):VRGN][AVER(UI32):10][ATIM(UI64):1405569047484627]
[ATYP(FC32):SYSU][ANID(UI32):11627225][AMID(FC32):ARNI][ATID(UI64):
9445736326500603516]]
```

Each audit message contains a string of attribute elements. The entire string is enclosed in brackets (`[ ]`), and each attribute element in the string has the following characteristics:

- Enclosed in brackets `[ ]`
- Introduced by the string `AUDT`, which indicates an audit message
- Without delimiters (no commas or spaces) before or after
- Terminated by a line feed character `\n`

Each element includes an attribute code, a data type, and a value that are reported in this format:

```
[ATTR(type):value][ATTR(type):value]...
[ATTR(type):value]\n
```

The number of attribute elements in the message depends on the event type of the message. The attribute elements are not listed in any particular order.

The following list describes the attribute elements:

- `ATTR` is a four-character code for the attribute being reported. There are some attributes that are common to all audit messages and others that are event-specific.
- `type` is a four-character identifier of the programming data type of the value, such as UI64, FC32, and so on. The type is enclosed in parentheses `( )`.
- `value` is the content of the attribute, typically a numeric or text value. Values always follow a colon (`:`). Values of data type CSTR are surrounded by double quotes `" "`.

Related concepts

Audit messages on page 24
Audit message examples on page 16

Related references

Common elements in audit messages on page 15
Data types on page 13

Data types

Different data types are used to store information in audit messages.

Type	Description
UI32	Unsigned long integer (32 bits); it can store the numbers 0 to 4,294,967,295.

Type	Description
UI64	Unsigned double long integer (64 bits); it can store the numbers 0 to 18,446,744,073,709,551,615.
FC32	Four-character constant; a 32-bit unsigned integer value represented as four ASCII characters such as “ABCD.”
IPAD	Used for IP addresses.
CSTR	A variable-length array of UTF-8 characters. Characters can be escaped with the following conventions: • Backslash is \\. • Carriage return is \r. • Double quotes is \″. • Line feed (new line) is \n. • Characters can be replaced by their hexadecimal equivalents (in the format \xHH, where HH is the hexadecimal value representing the character).

Event-specific data

Each audit message in the audit log records data specific to a system event.

Following the opening `[AUDT:` container that identifies the message itself, the next set of attributes provide information about the event or action described by the audit message. These attributes are highlighted in the following example:

```
2018-12-05T08:24:45.921845 [AUDT:[RSLT(FC32):SUCS]
[TIME(UI64):11454][SAIP(IPAD):"10.224.0.100"]
[S3AI(CSTR):"60025621595611246499"]
[SACC(CSTR):"account"]
[S3AK(CSTR):"SGKH4_Nc8SO1H6w3w0nCOFCGgk__E6dYzKlumRsKJA=="]
[SUSR(CSTR):"urn:sgws:identity::60025621595611246499:root"]
[SBAI(CSTR):"60025621595611246499"][SBAC(CSTR):"account"]
[S3BK(CSTR):"bucket"]
[S3KY(CSTR):"object"][CBID(UI64):0xCC128B9B9E428347]
[UUID(CSTR):"B975D2CE-E4DA-4D14-8A23-1CB4B83F2CD8"][CSIZ(UI64):30720]
[AVER(UI32):10]
[ATIM(UI64):1543998285921845][ATYP(FC32):SHEA][ANID(UI32):12281045]
[AMID(FC32):S3RQ]
[ATID(UI64):15552417629170647261]]
```

The `ATYP` element (underlined in the example) identifies which event generated the message. This example message includes the SHEA message code ([ATYP(FC32):SHEA]), indicating it was generated by a successful S3 HEAD request.

Related concepts

Audit messages on page 24

Related references

Common elements in audit messages on page 15

Common elements in audit messages

All audit messages contain the common elements.

Code	Type	Description
AMID	FC32	Module ID: A four-character identifier of the module ID that generated the message. This indicates the code segment within which the audit message was generated.
ANID	UI32	Node ID: The grid node ID assigned to the service that generated the message. Each service is allocated a unique identifier at the time the StorageGRID system is configured and installed. This ID cannot be changed.
ASES	UI64	Audit Session Identifier: In previous releases, this element indicated the time at which the audit system was initialized after the service started up. This time value was measured in microseconds since the operating system epoch (00:00:00 UTC on 1 January, 1970). **Note:** This element is obsolete and no longer appears in audit messages.
ASQN	UI64	Sequence Count: In previous releases, this counter was incremented for each generated audit message on the grid node (ANID) and reset to zero at service restart. **Note:** This element is obsolete and no longer appears in audit messages.
ATID	UI64	Trace ID: An identifier that is shared by the set of messages that were triggered by a single event.
ATIM	UI64	Timestamp: The time the event was generated that triggered the audit message, measured in microseconds since the operating system epoch (00:00:00 UTC on 1 January, 1970). Note that most available tools for converting the timestamp to local date and time are based on milliseconds. Rounding or truncation of the logged timestamp might be required. The human-readable time that appears at the beginning of the audit message in the `audit.log` file is the ATIM attribute in ISO 8601 format. The date and time are represented as *`YYYY-MMDD`*`T`*`HH:MM:SS.UUUUUU`*, where the `T` is a literal string character indicating the beginning of the time segment of the date. *`UUUUUU`* are microseconds.
ATYP	FC32	Event Type: A four-character identifier of the event being logged. This governs the "payload" content of the message: the attributes that are included.
AVER	UI32	Version: The version of the audit message. As the StorageGRID software evolves, new versions of services might incorporate new features in audit reporting. This field enables backward compatibility in the AMS service to process messages from older versions of services.
RSLT	FC32	Result: The result of event, process, or transaction. If is not relevant for a message, NONE is used rather than SUCS so that the message is not accidently filtered.

Audit message examples

You can find detailed information in each audit message. All audit messages use the same format.

The following is a sample audit message as it might appear in the `audit.log` file:

```
2014-07-17T21:17:58.959669
[AUDT:[RSLT(FC32):SUCS][TIME(UI64):246979][S3AI(CSTR):"bc644d
381a87d6cc216adcd963fb6f95dd25a38aa2cb8c9a358e8c5087a6af5f"][
S3AK(CSTR):"UJXDKKQOXB7YARDS71Q2"][S3BK(CSTR):"s3small1"][S3K
Y(CSTR):"hello1"][CBID(UI64):0x50C4F7AC2BC8EDF7][CSIZ(UI64):0
][AVER(UI32):10][ATIM(UI64):1405631878959669][ATYP(FC32):SPUT
][ANID(UI32):12872812][AMID(FC32):S3RQ][ATID(UI64):1579224144
102530435]]
```

The audit message contains information about the event being recorded, as well as information about the audit message itself.

To identify which event is recorded by the audit message, look for the ATYP attribute (highlighted below):

```
2014-07-17T21:17:58.959669
[AUDT:[RSLT(FC32):SUCS][TIME(UI64):246979][S3AI(CSTR):"bc644d
381a87d6cc216adcd963fb6f95dd25a38aa2cb8c9a358e8c5087a6af5f"][
S3AK(CSTR):"UJXDKKQOXB7YARDS71Q2"][S3BK(CSTR):"s3small1"][S3K
Y(CSTR):"hello1"][CBID(UI64):0x50C4F7AC2BC8EDF7][CSIZ(UI64):0
][AVER(UI32):10][ATIM(UI64):1405631878959669][ATYP(FC32):SP
UT][ANID(UI32):12872812][AMID(FC32):S3RQ][ATID(UI64):1579224
144102530435]]
```

The value of the ATYP attribute is SPUT. SPUT represents an S3 PUT transaction, which logs the ingest of an object to a bucket.

The following audit message also shows the bucket to which the object is associated:

```
2014-07-17T21:17:58.959669
[AUDT:[RSLT(FC32):SUCS][TIME(UI64):246979][S3AI(CSTR):"bc644d
381a87d6cc216adcd963fb6f95dd25a38aa2cb8c9a358e8c5087a6af5f"][
S3AK(CSTR):"UJXDKKQOXB7YARDS71Q2"][S3BK(CSTR):"s3small1"][S3
KY(CSTR):"hello1"][CBID(UI64):0x50C4F7AC2BC8EDF7][CSIZ(UI64):
0][AVER(UI32):10][ATIM(UI64):1405631878959669][ATYP(FC32):SPU
T][ANID(UI32):12872812][AMID(FC32):S3RQ][ATID(UI64):157922414
4102530435]]
```

To discover when the PUT event occurred, note the Universal Coordinated Time (UTC) timestamp at the beginning of the audit message. This value is a human-readable version of the ATIM attribute of the audit message itself:

```
2014-07-17T21:17:58.959669
[AUDT:[RSLT(FC32):SUCS][TIME(UI64):246979][S3AI(CSTR):"bc644d
381a87d6cc216adcd963fb6f95dd25a38aa2cb8c9a358e8c5087a6af5f"][
S3AK(CSTR):"UJXDKKQOXB7YARDS71Q2"][S3BK(CSTR):"s3small1"][S3K
Y(CSTR):"hello1"][CBID(UI64):0x50C4F7AC2BC8EDF7][CSIZ(UI64):0
][AVER(UI32):10][ATIM(UI64):1405631878959669][ATYP(FC32):SP
UT][ANID(UI32):12872812][AMID(FC32):S3RQ][ATID(UI64):15792241
44102530435]]
```

ATIM records the time, in microseconds, since the beginning of the UNIX epoch. In the example, the value `1405631878959669` translates to Thursday, 17-Jul-2014 21:17:59 UTC.

Related concepts

SPUT: S3 PUT on page 48

Related references

Common elements in audit messages on page 15

Audit messages and the object lifecycle

Audit messages are generated each time an object is ingested, retrieved, or deleted. You can identify these transactions in the audit log by locating API-specific (S3 or Swift) audit messages.

Audit messages are linked through identifiers specific to each protocol.

Protocol	Code
Linking S3 operations	S3BK (S3 Bucket) and/or S3KY (S3 Key)
Linking Swift operations	WCON (Swift Container) and/or WOBJ (Swift Object)
Linking internal operations	CBID (Object's Internal Identifier)

Timing of audit messages

Because of factors such as timing differences between grid nodes, object size, and network delays, the order of audit messages generated by the different services can vary from that shown in the examples in this section.

Dual commit ingest and delete operations

Dual commit is the system's default functionality when an object is ingested. Dual commit is designed to prevent the loss of object data if an object's initial storage location fails before the object can be evaluated against the active ILM policy. As soon as an object is ingested, a second copy of that object is created and distributed to a different Storage Node. When the object is matched by an ILM rule in the active policy, StorageGRID determines if the initial, dual-commit copies satisfy the placement instructions in the rule. If they do not, the object is added to the ILM evaluation queue. When the object is re-evaluated, new object copies might need to be made in different locations, and the initial dual-commit copies might need to be deleted.

For more information about dual commit, see information about administering StorageGRID.

Information lifecycle management policy configuration

With the default ILM policy (Baseline 2 Copy Rule v1.0), object data is copied once for a total of two copies. If the ILM policy requires more than two copies, there will be an additional set of CBRE, CBSE, and SCMT messages for each extra copy. For more information about ILM policies, see information about administering StorageGRID.

Archive Nodes

The series of audit messages generated when an Archive Node sends object data to an external archival storage system is similar to that for Storage Nodes except that there is no SCMT (Store Object Commit) message, and the ATCE (Archive Object Store Begin) and ASCE (Archive Object Store End) messages are generated for each archived copy of object data.

The series of audit messages generated when an Archive Node retrieves object data from an external archival storage system is similar to that for Storage Nodes except that the ARCB (Archive Object Retrieve Begin) and ARCE (Archive Object Retrieve End) messages are generated for each retrieved copy of object data.

The series of audit messages generated when an Archive Node deletes object data from an external archival storage system is similar to that for Storage Nodes except that there is no SREM (Object Store Remove) message, and there is an AREM (Archive Object Remove) message for each delete request.

Related information

Administering StorageGRID

Object ingest transactions

You can identify client ingest transactions in the audit log by locating API-specific (S3 or Swift) audit messages.

Not all audit messages generated during an ingest transaction are listed in the following tables. Only the messages required to trace the ingest transaction are included.

S3 ingest audit messages

Code	Name	Description	Trace	See
SPUT	S3 PUT transaction	An S3 PUT ingest transaction has completed successfully.	CBID, S3BK, S3KY	*SPUT: S3 PUT* on page 48
ORLM	Object Rules Met	The ILM policy has been satisfied for this object.	CBID	*ORLM: Object Rules Met* on page 41

Swift ingest audit messages

Code	Name	Description	Trace	See
WPUT	Swift PUT transaction	A Swift PUT ingest transaction has successfully completed.	CBID, WCON, WOBJ	*WPUT: Swift PUT* on page 55
ORLM	Object Rules Met	The ILM policy has been satisfied for this object.	CBID	*ORLM: Object Rules Met* on page 41

Example: S3 object ingest

The series of audit messages below is an example of the audit messages generated and saved to the audit log when an S3 client ingests an object to a Storage Node (LDR service).

In this example, the active ILM policy includes the stock ILM rule, Make 2 Copies.

Note: Not all audit messages generated during a transaction are listed in the example below. Only those related to the S3 ingest transaction (SPUT) are listed.

This example assumes that an S3 bucket has been previously created.

SPUT: S3 PUT

The SPUT message is generated to indicate that an S3 PUT transaction has been issued to create an object in a specific bucket.

```
2017-07-17T21:17:58.959669[AUDT:[RSLT(FC32):SUCS][TIME(UI64):25771]
[SAIP(IPAD):"10.96.112.29"][S3AI(CSTR):"70899244468554783528"]
[SACC(CSTR):"test"]
[S3AK(CSTR):"SGKHyalRU_5cLflqajtaFmxJn946lAWRJfBF33gAOg=="]
[SUSR(CSTR):"urn:sgws:identity::70899244468554783528:root"]
[SBAI(CSTR):"70899244468554783528"][SBAC(CSTR):"test"]
```

```
[S3BK(CSTR):"example"][S3KY(CSTR):"testobject-0-3"][CBID(UI64):
0x8EF52DF8025E63A8][CSIZ(UI64):30720][AVER(UI32):10][ATIM(UI64):
150032627859669][ATYP(FC32):SPUT][ANID(UI32):12086324][AMID(FC32):S3RQ]
[ATID(UI64):14399932238768197038]]
```

ORLM: Object Rules Met

The ORLM message indicates that the ILM policy has been satisfied for this object. The message includes the object's CBID and the name of the ILM rule that was applied.

For replicated objects, the LOCS field includes the LDR node ID and volume ID of the object locations.

```
2017-07-17T21:18:31.230669[AUDT:[CBID(UI64):0x50C4F7AC2BC8EDF7]
[RULE(CSTR):"Make 2 Copies"][STAT(FC32):DONE][CSIZ(UI64):0][SPAR(UI64):0]
[UUID(CSTR):"0B344E18-98ED-4F22-A6C8-A93ED68F8D3F"][LOCS(CSTR):"CLDI
12828634 2148730112, CLDI 12745543 2147552014"][RSLT(FC32):SUCS]
[AVER(UI32):10][ATYP(FC32):ORLM][ATIM(UI64):1500326230669][ATID(UI64):
15494889725796157557][ANID(UI32):13100453][AMID(FC32):BCMS]]
```

For erasure-coded objects, the LOCS field includes the Erasure Coding profile ID and the Erasure Coding group ID

```
2017-02-23T01:52:54.647537 [AUDT:[CBID(UI64):0xFA8ABE5B5001F7E2]
[RULE(CSTR):"EC_2_plus_1"][STAT(FC32):DONE][CSIZ(UI64):10000][SPAR(UI64):
0][UUID(CSTR):"E291E456-D11A-4701-8F51-D2F7CC9AFECA"][LOCS(CSTR):"CLEC 1
A471E45D-A400-47C7-86AC-12E77F229831"][RSLT(FC32):SUCS][AVER(UI32):10]
[ATIM(UI64):1487814774647537][ATYP(FC32):ORLM][ANID(UI32):12355278]
[AMID(FC32):ILMX][ATID(UI64):4168559046473725560]]
```

The PATH field includes S3 bucket and key information or Swift container and object information, depending on which API was used.

```
2018-01-24.txt:2018-01-24T23:33:06.131559 [AUDT:[CBID(UI64):
0x82704DFA4C9674F4][RULE(CSTR):"Make 2 Copies"][STAT(FC32):DONE]
[CSIZ(UI64):3145729][SPAR(UI64):0][UUID(CSTR):"8C1C9CAC-22BB-4880-9115-
CE604F8CE687"][PATH(CSTR):"frisbee_Bucket1/
GridDataTests151683676324774_1_1vf9d"][LOCS(CSTR):"CLDI 12525468, CLDI
12222978"][RSLT(FC32):SUCS][AVER(UI32):10][ATIM(UI64):1516836786131559]
[ATYP(FC32):ORLM][ANID(UI32):12525468][AMID(FC32):OBDI][ATID(UI64):
3448338865383693 36]]
```

Object delete transactions

You can identify object delete transactions in the audit log by locating API-specific (S3 and Swift) audit messages.

Not all audit messages generated during a delete transaction are listed in the following tables. Only messages required to trace the delete transaction are included.

S3 delete audit messages

Code	Name	Description	Trace	See
SDEL	S3 Delete	Request made to delete the object from a bucket.	CBID, S3KY	*SDEL: S3 DELETE* on page 44

Swift delete audit messages

Code	Name	Description	Trace	See
WDEL	Swift Delete	Request made to delete the object from a container, or the container.	CBID, WOBJ	*WDEL: Swift DELETE* on page 53

Example: S3 object deletion

When an S3 client deletes an object from a Storage Node (LDR service), an audit messages is generated and saved to the audit log.

Note: Not all audit messages generated during a transaction are listed in the example below. Only those related to the S3 ingest transaction (SDEL) are listed.

SDEL: S3 Delete

Object deletion begins when the client sends a DELETE Object request to an LDR service. The message contains the bucket from which to delete the object and the object's S3 Key, which is used to identify the object.

```
2017-07-17T21:17:58.959669[AUDT:[RSLT(FC32):SUCS][TIME(UI64):14316]
[SAIP(IPAD):"10.96.112.29"][S3AI(CSTR):"70899244468554783528"]
[SACC(CSTR):"test"]
[S3AK(CSTR):"SGKHyalRU_5cLflqajtaFmxJn946lAWRJfBF33gAOg=="]
[SUSR(CSTR):"urn:sgws:identity::70899244468554783528:root"]
[SBAI(CSTR):"70899244468554783528"][SBAC(CSTR):"test"]
[S3BK(CSTR):"example"][S3KY(CSTR):"testobject-0-7"][CBID(UI64):
0x339F21C5A6964D89][CSIZ(UI64):30720][AVER(UI32):10][ATIM(UI64):
150032627859669][ATYP(FC32):SDEL][ANID(UI32):12086324][AMID(FC32):S3RQ]
[ATID(UI64):4727861330952970593]]
```

Object retrieve transactions

You can identify object retrieve transactions in the audit log by locating API-specific (S3 and Swift) audit messages.

Not all audit messages generated during a retrieve transaction are listed in the following tables. Only messages required to trace the retrieve transaction are included.

S3 retrieval audit messages

Code	Name	Description	Trace	See
SGET	S3 GET	Request made to retrieve an object from a bucket.	CBID, S3BK, S3KY	*SGET: S3 GET* on page 45

Swift retrieval audit messages

Code	Name	Description	Trace	See
WGET	Swift GET	Request made to retrieve an object from a container.	CBID, WCON, WOBJ	*WGET: Swift GET* on page 54

Example: S3 object retrieval

When an S3 client retrieves an object from a Storage Node (LDR service), an audit message is generated and saved to the audit log.

Note that not all audit messages generated during a transaction are listed in the example below. Only those related to the S3 retrieval transaction (SGET) are listed.

SGET: S3 GET

Object retrieval begins when the client sends a GET Object request to an LDR service. The message contains the bucket from which to retrieve the object and the object's S3 Key, which is used to identify the object.

```
2017-09-20T22:53:08.782605 [AUDT:[RSLT(FC32):SUCS][TIME(UI64):47807]
[SAIP(IPAD):"10.96.112.26"][S3AI(CSTR):"43979298178977966408"]
[SACC(CSTR):"s3-account-a"]
[S3AK(CSTR):"SGKHt7GzEcu0yXhFhT_rL5mep4nJt1w75GBh-O_FEw=="]
[SUSR(CSTR):"urn:sgws:identity::43979298178977966408:root"]
[SBAI(CSTR):"43979298178977966408"][SBAC(CSTR):"s3-account-a"]
[S3BK(CSTR):"bucket-anonymous"][S3KY(CSTR):"Hello.txt"][CBID(UI64):
0x83D70C6F1F662B02][CSIZ(UI64):12][AVER(UI32):10][ATIM(UI64):
1505947988782605][ATYP(FC32):SGET][ANID(UI32):12272050][AMID(FC32):S3RQ]
[ATID(UI64):17742374343649889669]]
```

If the bucket policy allows, a client can anonymously retrieve objects, or can retrieve objects from a bucket that is owned by a different tenant account. The audit message contains information about the bucket owner's tenant account so that you can track these anonymous and cross-account requests.

In the following example message, the client sends a GET Object request for an object stored in a bucket that they do not own. The values for SBAI and SBAC record the bucket owner's tenant account ID and name, which differs from the tenant account ID and name of the client recorded in S3AI and SACC.

```
2017-09-20T22:53:15.876415 [AUDT:[RSLT(FC32):SUCS][TIME(UI64):53244]
[SAIP(IPAD):"10.96.112.26"][S3AI(CSTR):"17915054115450519830"]
[SACC(CSTR):"s3-account-b"]
[S3AK(CSTR):"SGKHpoblWlP_kBkqSCbTi754Ls8lBUog67I2LlSiUg=="]
[SUSR(CSTR):"urn:sgws:identity::17915054115450519830:root"]
[SBAI(CSTR):"43979298178977966408"][SBAC(CSTR):"s3-account-a"]
[S3BK(CSTR):"bucket-anonymous"][S3KY(CSTR):"Hello.txt"][CBID(UI64):
0x83D70C6F1F662B02][CSIZ(UI64):12][AVER(UI32):10][ATIM(UI64):
1505947995876415][ATYP(FC32):SGET][ANID(UI32):12272050][AMID(FC32):S3RQ]
[ATID(UI64):6888780247515624902]]
```

Metadata update messages

Audit messages are generated when an S3 client updates an object's metadata.

S3 metadata update audit messages

Code	Name	Description	Trace	See
SUPD	S3 Metadata or Bucket Compliance Updated	Generated when an S3 client updates either of the following: • The metadata for an ingested object. • The compliance settings for a bucket that was created with compliance enabled.	CBID, S3KY, HTRH	*SUPD: S3 Metadata or Bucket Compliance Updated* on page 49

Example: S3 metadata update

The example shows a successful transaction to update the metadata for an existing S3 object.

SUPD: S3 Metadata Update

The S3 client makes a request (HTRH) to update the specified metadata (x-amz-metadata-*) for the S3 object (S3KY).

```
2017-07-11T21:54:03.157462 [AUDT:[RSLT(FC32):SUCS][TIME(UI64):17631]
[SAIP(IPAD):"10.96.100.254"]
[HTRH(CSTR):"{\"accept-encoding\":\"identity\",\"authorization\":\"AWS
LIUF17FGJARQHPY2E761:jul/hnZs/uNY+aVvV0lTSYhEGts=\",\"content-length\":
\"0\",\"date\":\"Tue, 11 Jul 2017 21:54:03 GMT\",\"host\":
\"10.96.99.163:18082\",\"user-agent\":\"aws-cli/1.9.20 Python/2.7.6
Linux/3.13.0-119-generic botocore/1.3.20\",\"x-amz-copy-source\":\"/
testbkt1/testobj1\",\"x-amz-metadata-directive\":\"REPLACE\",\"x-amz-
meta-city\":\"Vancouver\"}"]
[S3AI(CSTR):"20956855414285633225"][SACC(CSTR):"acct1"]
[S3AK(CSTR):"SGKHyyv9ZQqWRbJSQc5vI7mgioJwrdplShE02AUaww=="]
[SUSR(CSTR):"urn:sgws:identity::20956855414285633225:root"]
[SBAI(CSTR):"20956855414285633225"][SBAC(CSTR):"acct1"]
[S3BK(CSTR):"testbkt1"]
[S3KY(CSTR):"testobj1"][CBID(UI64):0xCB1D5C213434DD48][CSIZ(UI64):10]
[AVER(UI32):10]
[ATIM(UI64):1499810043157462][ATYP(FC32):SUPD][ANID(UI32):12258396]
[AMID(FC32):S3RQ]
[ATID(UI64):8987436599021955788]]
```

Audit messages

Detailed descriptions of audit messages returned by the system are listed in the following sections. Each audit message is first listed in a table that groups related messages by the class of activity that the message represents. These groupings are useful both for understanding the types of activities that are audited, and for selecting the desired type of audit message filtering.

The audit messages are also listed alphabetically by their four-character codes. This alphabetic listing enables you to find information about specific messages.

The four-character codes used throughout this chapter are the ATYP values found in the audit messages as shown in the following sample message:

```
2014-07-17T03:50:47.484627
[AUDT:[RSLT(FC32):VRGN][AVER(UI32):10][ATIM(UI64):1405569047484627]
[ATYP(FC32):SYSU][ANID(UI32):11627225][AMID(FC32):ARNI][ATID(UI64):
9445736326500603516]]
```

Related concepts

Audit messages on page 28

Related tasks

Changing audit message levels on page 8

Audit message categories

You should be familiar with the various categories within which audit messages are grouped. These groups are organized based on the class of activity that the message represents.

System audit messages

You should be familiar with audit messages belonging to the system audit category. These are events related to the auditing system itself, grid node states, system-wide task activity (grid tasks), and service backup operations, so that you can address potential issues.

Code	Message title and description	See
ECOC	Corrupt Erasure Coded Data Fragment: Indicates that a corrupt erasure coded data fragment has been detected.	*ECOC: Corrupt Erasure Coded Data Fragment* on page 34
ETAF	Security Authentication Failed: A connection attempt using Transport Layer Security (TLS) failed.	*ETAF: Security Authentication Failed* on page 35
GNRG	GNDS Registration: A service updated or registered information about itself in the StorageGRID system.	*GNRG: GNDS Registration* on page 35
GNUR	GNDS Unregistration: A service contains unregistered information about itself from the StorageGRID system.	*GNUR: GNDS Unregistration* on page 36
GTED	Grid Task Ended: The CMN service finished processing the grid task.	*GTED: Grid Task Ended* on page 36
GTST	Grid Task Started: The CMN service started to process the grid task.	*GTST: Grid Task Started* on page 37

Code	Message title and description	See
GTSU	Grid Task Submitted: A grid task was submitted to the CMN service.	*GTSU: Grid Task Submitted* on page 37
LLST	Location Lost: This is the audit message that is generated when a location is lost.	*LLST: Location Lost* on page 39
OLST	Object Lost: A requested object cannot be located within the StorageGRID system.	*OLST: System Detected Lost Object* on page 41
ORLM	Object Rules Met: Object data is stored as specified by the ILM rules.	*ORLM: Object Rules Met* on page 41
SADD	Security Audit Disable: Audit message logging was turned off.	*SADD: Security Audit Disable* on page 43
SADE	Security Audit Enable: Audit message logging has been restored.	*SADE: Security Audit Enable* on page 43
SVRF	Object Store Verify Fail: A content block failed verification checks.	*SVRF: Object Store Verify Fail* on page 51
SVRU	Object Store Verify Unknown: Unexpected object data detected in the object store.	*SVRU: Object Store Verify Unknown* on page 51
SYSD	Node Stop: A shutdown was requested.	*SYSD: Node Stop* on page 51
SYST	Node Stopping: A service initiated a graceful stop.	*SYST: Node Stopping* on page 52
SYSU	Node Start: A service started; the nature of the previous shutdown is indicated in the message.	*SYSU: Node Start* on page 52
VLST	User Initiated Volume Lost: The `/proc/CMSI/Volume_Lost` command was run.	*VLST: User Initiated Volume Lost* on page 52

Object storage audit messages

You should be familiar with audit messages belonging to the object storage audit category. These are events related to the storage and management of objects within the StorageGRID system. These include object storage and retrievals, grid-node to grid-node transfers, and verifications.

Code	Description	See
APCT	Archive Purge from Cloud-Tier: Archived object data is deleted from an external archival storage system, which connects to the StorageGRID through the S3 API.	*APCT: Archive Purge from Cloud-Tier* on page 28
ARCB	Archive Object Retrieve Begin: The ARC service begins the retrieval of object data from the external archival storage system.	*ARCB: Archive Object Retrieve Begin* on page 28
ARCE	Archive Object Retrieve End: Object data has been retrieved from an external archival storage system, and the ARC service reports the status of the retrieval operation.	*ARCE: Archive Object Retrieve End* on page 28
ARCT	Archive Retrieve from Cloud-Tier: Archived object data is retrieved from an external archival storage system, which connects to the StorageGRID through the S3 API.	*ARCT: Archive Retrieve from Cloud-Tier* on page 29

Code	Description	See
AREM	Archive Object Remove: A content block was successfully or unsuccessfully deleted from the external archival storage system.	*AREM: Archive Object Remove* on page 29
ASCE	Archive Object Store End: A content block has been written to the external archival storage system, and the ARC service reports the status of the write operation.	*ASCE: Archive Object Store End* on page 30
ASCT	Archive Store Cloud-Tier: Object data is stored to an external archival storage system, which connects to the StorageGRID through the S3 API.	*ASCT: Archive Store Cloud-Tier* on page 30
ATCE	Archive Object Store Begin: Writing a content block to an external archival storage has started.	*ATCE: Archive Object Store Begin* on page 31
AVCC	Archive Validate Cloud-Tier Configuration: The account and bucket settings provided were successfully or unsuccessfully validated.	*AVCC: Archive Validate Cloud-Tier Configuration* on page 31
CBSE	Object Send End: The source entity completed a grid-node to grid-node data transfer operation.	*CBSE: Object Send End* on page 34
CBRE	Object Receive End: The destination entity completed a grid-node to grid-node data transfer operation.	*CBRE: Object Receive End* on page 32
SCMT	Object Store Commit: A content block was completely stored and verified, and can now be requested.	*SCMT: Object Store Commit* on page 44
SREM	Object Store Remove: A content block was deleted from a grid node, and can no longer be requested directly.	*SREM: Object Store Remove* on page 49

Client read audit messages

Client read audit messages are logged when an S3 or Swift client application makes a request to retrieve an object.

Code	Description	Used by	See
SGET	S3 GET: Logs a successful transaction to retrieve an object or list the objects in a bucket.	S3 client	*SGET: S3 GET* on page 45
SHEA	S3 HEAD: Logs a successful transaction to check for the existence of an object or bucket.	S3 client	*SHEA: S3 HEAD* on page 46
WGET	Swift GET: Logs a successful transaction to retrieve an object or list the objects in a container.	Swift client	*WGET: Swift GET* on page 54
WHEA	Swift HEAD: Logs a successful transaction to check for the existence of an object or container.	Swift client	*WHEA: Swift HEAD* on page 54

Client write audit messages

Client write audit messages are logged when an S3 or Swift client application makes a request to create or modify an object.

Code	Description	Used by	See
OVWR	Object Overwrite: Logs a transaction to overwrite one object with another object.	S3 clients Swift clients	*OVWR: Object Overwrite* on page 43
SDEL	S3 DELETE: Logs a successful transaction to delete an object or bucket.	S3 client	*SDEL: S3 DELETE* on page 44
SPOS	S3 POST: Logs a successful transaction to restore an object from AWS Glacier storage to a Cloud Storage Pool.	S3 client	*SPOS: S3 POST* on page 47
SPUT	S3 PUT: Logs a successful transaction to create a new object or bucket.	S3 client	*SPUT: S3 PUT* on page 48
SUPD	S3 Metadata or Bucket Compliance Updated: Logs a successful transaction to update the metadata for an existing object or bucket.	S3 client	*SUPD: S3 Metadata or Bucket Compliance Updated* on page 49
WDEL	Swift DELETE: Logs a successful transaction to delete an object or container.	Swift client	*WDEL: Swift DELETE* on page 53
WPUT	Swift PUT: Logs a successful transaction to create a new object or container.	Swift client	*WPUT: Swift PUT* on page 55

Management audit message

The Management category logs user requests to the Management API.

Code	Message title and description	See
MGAU	Management API audit message: A log of user requests.	*MGAU: Management audit message* on page 40

Audit messages

When system events occur, the StorageGRID system generates audit messages and records them in the audit log.

APCT: Archive Purge from Cloud-Tier

This message is generated when archived object data is deleted from an external archival storage system, which connects to the StorageGRID through the S3 API.

Code	Field	Description
CBID	Content Block ID	The unique identifier for the content block that was deleted.
CSIZ	Content Size	The size of the object in bytes. Always returns 0.
RSLT	Result Code	Returns successful (SUCS) or the error reported by the backend.
SUID	Storage Unique Identifier	Unique identifier (UUID) of the cloud-tier from which the object was deleted.

ARCB: Archive Object Retrieve Begin

This message is generated when a request is made to retrieve archived object data and the retrieval process begins. Retrieval requests are processed immediately, but can be reordered to improve efficiency of retrieval from linear media such as tape.

Code	Field	Description
CBID	Content Block ID	The unique identifier of the Content Block to be retrieved from the external archival storage system.
RSLT	Result	Indicates the result of starting the archive retrieval process. Currently defined value is: SUCS: The content request was received and queued for retrieval.

This audit message marks the time of an archive retrieval. It allows you to match the message with a corresponding ARCE end message to determine the duration of archive retrieval, and whether the operation was successful.

ARCE: Archive Object Retrieve End

This message is generated when an attempt by the Archive Node to retrieve object data from an external archival storage system completes. If successful, the message indicates that the requested object data has been completely read from the archive location, and was successfully verified. After the object data has been retrieved and verified, it is delivered to the requesting service.

Code	Field	Description
CBID	Content Block ID	The unique identifier of the Content Block to be retrieved from the external archival storage system.

Code	Field	Description
VLID	Volume Identifier	The identifier of the volume on which the data was archived. If an archive location for the content is not found, a Volume ID of 0 is returned.
RSLT	Retrieval Result	The completion status of the archive retrieval process: • SUCS: successful • VRFL: failed (object verification failure) • ARUN: failed (external archival storage system unavailable) • CANC: failed (retrieval operation canceled) • GERR: failed (general error)

Matching this message with the corresponding ARCB message can indicate the time taken to perform the archive retrieval. This message indicates whether the retrieval was successful, and in the case of failure, the cause of the failure to retrieve the content block.

ARCT: Archive Retrieve from Cloud-Tier

This message is generated when archived object data is retrieved from an external archival storage system, which connects to the StorageGRID through the S3 API.

Code	Field	Description
CBID	Content Block ID	The unique identifier for the content block that was retrieved.
CSIZ	Content Size	The size of the object in bytes. The value is only accurate for successful retrieves.
RSLT	Result Code	Returns successful (SUCS) or the error reported by the backend.
SUID	Storage Unique Identifier	Unique identifier (UUID) of the external archival storage system.
TIME	Time	Total processing time for the request in microseconds.

AREM: Archive Object Remove

The Archive Object Remove audit message indicates that a content block was successfully or unsuccessfully deleted from an Archive Node. If the result is successful, the Archive Node has successfully informed the external archival storage system that StorageGRID has released an object location. Whether the object is removed from the external archive storage system depends on the type of system and its configuration.

Code	Field	Description
CBID	Content Block ID	The unique identifier of the Content Block to be retrieved from the external archival media system.
VLID	Volume Identifier	The identifier of the volume on which the object data was archived.

Code	Field	Description
RSLT	Result	The completion status of the archive removal process: • SUCS: successful • ARUN: failed (external archival storage system unavailable) • GERR: failed (general error)

ASCE: Archive Object Store End

This message indicates that writing a content block to an external archival storage system has ended.

Code	Field	Description
CBID	Content Block Identifier	The identifier of the content block stored on the external archival storage system.
VLID	Volume Identifier	The unique identifier of the archive volume to which the object data is written.
VREN	Verification Enabled	Indicates if verification is performed for content blocks. Currently defined values are: • VENA: verification is enabled • VDSA: verification is disabled
MCLS	Management Class	A string identifying the TSM Management Class to which the content block is assigned if applicable.
RSLT	Result	Indicates the result of the archive process. Currently defined values are: • SUCS: successful (archiving process succeeded) • OFFL: failed (archiving is offline) • VRFL: failed (object verification failed) • ARUN: failed (external archival storage system unavailable) • GERR: failed (general error)

This audit message means that the specified content block has been written to the external archival storage system. If the write fails, the result provides basic troubleshooting information about where the failure occurred. More detailed information about archive failures can be found by examining Archive Node attributes in the StorageGRID system.

ASCT: Archive Store Cloud-Tier

This message is generated when archived object data is stored to an external archival storage system, which connects to StorageGRID through the S3 API.

Code	Field	Description
CBID	Content Block ID	The unique identifier for the content block that was retrieved.
CSIZ	Content Size	The size of the object in bytes.

Code	Field	Description
RSLT	Result Code	Returns successful (SUCS) or the error reported by the backend.
SUID	Storage Unique Identifier	Unique identifier (UUID) of the cloud-tier the content was stored to.
TIME	Time	Total processing time for the request in microseconds.

ATCE: Archive Object Store Begin

This message indicates that writing a content block to an external archival storage has started.

Code	Field	Description
CBID	Content Block ID	The unique identifier of the content block to be archived.
VLID	Volume Identifier	The unique identifier of the volume to which the content block is written. If the operation fails, a volume ID of 0 is returned.
RSLT	Result	Indicates the result of the transfer of the content block. Currently defined values are: • SUCS: success (content block stored successfully) • EXIS: ignored (content block was already stored) • ISFD: failed (insufficient disk space) • STER: failed (error storing the CBID) • OFFL: failed (archiving is offline) • GERR: failed (general error)

AVCC: Archive Validate Cloud-Tier Configuration

This message is generated when the configuration settings are validated for a Cloud Tiering - Simple Storage Service (S3) target type.

Code	Field	Description
RSLT	Result Code	Returns successful (SUCS) or the error reported by the backend.
SUID	Storage Unique Identifier	UUID associated with the external archival storage system being validated.

CBRB: Object Receive Begin

During normal system operations, content blocks are continuously transferred between different nodes as data is accessed, replicated and retained. When transfer of a content block from one node to another is initiated, this message is issued by the destination entity.

Code	Field	Description
CNID	Connection Identifier	The unique identifier of the node-to-node session/connection.
CBID	Content Block Identifier	The unique identifier of the content block being transferred.

Code	Field	Description
CTDR	Transfer Direction	Indicates if the CBID transfer was push-initiated or pull-initiated: PUSH: The transfer operation was requested by the sending entity. PULL: The transfer operation was requested by the receiving entity.
CTSR	Source Entity	The node ID of the source (sender) of the CBID transfer.
CTDS	Destination Entity	The node ID of the destination (receiver) of the CBID transfer.
CTSS	Start Sequence Count	Indicates the first sequence count requested. If successful, the transfer begins from this sequence count.
CTES	Expected End Sequence Count	Indicates the last sequence count requested. If successful, the transfer is considered complete when this sequence count has been received.
RSLT	Transfer Start Status	Status at the time the transfer was started: SUCS: Transfer started successfully.

This audit message means a node-to-node data transfer operation was initiated on a single piece of content, as identified by its Content Block Identifier. The operation requests data from “Start Sequence Count” to “Expected End Sequence Count”. Sending and receiving nodes are identified by their node IDs. This information can be used to track system data flow, and when combined with storage audit messages, to verify replica counts.

CBRE: Object Receive End

When transfer of a content block from one node to another is completed, this message is issued by the destination entity.

Code	Field	Description
CNID	Connection Identifier	The unique identifier of the node-to-node session/connection.
CBID	Content Block Identifier	The unique identifier of the content block being transferred.
CTDR	Transfer Direction	Indicates if the CBID transfer was push-initiated or pull-initiated: PUSH: The transfer operation was requested by the sending entity. PULL: The transfer operation was requested by the receiving entity.
CTSR	Source Entity	The node ID of the source (sender) of the CBID transfer.
CTDS	Destination Entity	The node ID of the destination (receiver) of the CBID transfer.
CTSS	Start Sequence Count	Indicates the sequence count on which the transfer started.
CTAS	Actual End Sequence Count	Indicates the last sequence count successfully transferred. If the Actual End Sequence Count is the same as the Start Sequence Count, and the Transfer Result was not successful, no data was exchanged.

Code	Field	Description
RSLT	Transfer Result	The result of the transfer operation (from the perspective of the sending entity): SUCS: transfer successfully completed; all requested sequence counts were sent. CONL: connection lost during transfer CTMO: connection timed-out during establishment or transfer UNRE: destination node ID unreachable CRPT: transfer ended due to reception of corrupt or invalid data (might indicate tampering)

This audit message means a node-to-node data transfer operation was completed. If the Transfer Result was successful, the operation transferred data from “Start Sequence Count” to “Actual End Sequence Count”. Sending and receiving nodes are identified by their node IDs. This information can be used to track system data flow and to locate, tabulate, and analyze errors. When combined with storage audit messages, it can also be used to verify replica counts.

CBSB: Object Send Begin

During normal system operations, content blocks are continuously transferred between different nodes as data is accessed, replicated and retained. When transfer of a content block from one node to another is initiated, this message is issued by the source entity.

Code	Field	Description
CNID	Connection Identifier	The unique identifier of the node-to-node session/connection.
CBID	Content Block Identifier	The unique identifier of the content block being transferred.
CTDR	Transfer Direction	Indicates if the CBID transfer was push-initiated or pull-initiated: PUSH: The transfer operation was requested by the sending entity. PULL: The transfer operation was requested by the receiving entity.
CTSR	Source Entity	The node ID of the source (sender) of the CBID transfer.
CTDS	Destination Entity	The node ID of the destination (receiver) of the CBID transfer.
CTSS	Start Sequence Count	Indicates the first sequence count requested. If successful, the transfer begins from this sequence count.
CTES	Expected End Sequence Count	Indicates the last sequence count requested. If successful, the transfer is considered complete when this sequence count has been received.
RSLT	Transfer Start Status	Status at the time the transfer was started: SUCS: transfer started successfully.

This audit message means a node-to-node data transfer operation was initiated on a single piece of content, as identified by its Content Block Identifier. The operation requests data from “Start Sequence Count” to “Expected End Sequence Count”. Sending and receiving nodes are identified by their node IDs. This information can be used to track system data flow, and when combined with storage audit messages, to verify replica counts.

CBSE: Object Send End

When transfer of a content block from one node to another is completed, this message is issued by the source entity.

Code	Field	Description
CNID	Connection Identifier	The unique identifier of the node-to-node session/connection.
CBID	Content Block Identifier	The unique identifier of the content block being transferred.
CTDR	Transfer Direction	Indicates if the CBID transfer was push-initiated or pull-initiated: PUSH: The transfer operation was requested by the sending entity. PULL: The transfer operation was requested by the receiving entity.
CTSR	Source Entity	The node ID of the source (sender) of the CBID transfer.
CTDS	Destination Entity	The node ID of the destination (receiver) of the CBID transfer.
CTSS	Start Sequence Count	Indicates the sequence count on which the transfer started.
CTAS	Actual End Sequence Count	Indicates the last sequence count successfully transferred. If the Actual End Sequence Count is the same as the Start Sequence Count, and the Transfer Result was not successful, no data was exchanged.
RSLT	Transfer Result	The result of the transfer operation (from the perspective of the sending entity): SUCS: Transfer successfully completed; all requested sequence counts were sent. CONL: connection lost during transfer CTMO: connection timed-out during establishment or transfer UNRE: destination node ID unreachable CRPT: transfer ended due to reception of corrupt or invalid data (might indicate tampering)

This audit message means a node-to-node data transfer operation was completed. If the Transfer Result was successful, the operation transferred data from “Start Sequence Count” to “Actual End Sequence Count”. Sending and receiving nodes are identified by their node IDs. This information can be used to track system data flow and to locate, tabulate, and analyze errors. When combined with storage audit messages, it can also be used to verify replica counts.

ECOC: Corrupt Erasure Coded Data Fragment

This audit message indicates that the system has detected a corrupt erasure-coded data fragment.

Code	Field	Description
VCCO	VCS ID	The name of the VCS that contains the corrupt chunk.
VLID	Volume ID	The RangeDB Volume that contains the corrupt erasure-coded fragment.
CCID	Chunk ID	The identifier of the corrupt erasure-coded fragment.

Code	Field	Description
RSLT	Result	This field has the value 'NONE'. RSLT is a mandatory message field, but is not relevant for this particular message. 'NONE' is used rather than 'SUCS' so that this message is not filtered.

ETAF: Security Authentication Failed

This message is generated when a connection attempt using Transport Layer Security (TLS) has failed.

Code	Field	Description
CNID	Connection Identifier	The unique system identifier for the TCP/IP connection over which the authentication failed.
RUID	User Identity	A service dependent identifier representing the identity of the remote user.
RSLT	Reason Code	The reason for the failure: SCNI: Secure connection establishment failed. CERM: Certificate was missing. CERT: Certificate was invalid. CERE: Certificate was expired. CERR: Certificate was revoked. CSGN: Certificate signature was invalid. CSGU: Certificate signer was unknown. UCRM: User credentials were missing. UCRI: User credentials were invalid. UCRU: User credentials were disallowed. TOUT: Authentication timed out.

When a connection is established to a secure service that uses TLS, the credentials of the remote entity are verified using the TLS profile and additional logic built into the service. If this authentication fails due to invalid, unexpected, or disallowed certificates or credentials, an audit message is logged. This enables queries for unauthorized access attempts and other security-related connection problems.

The message could result from a remote entity having an incorrect configuration, or from attempts to present invalid or disallowed credentials to the system. This audit message should be monitored to detect attempts to gain unauthorized access to the system.

GNRG: GNDS Registration

The CMN service generates this audit message when a service has updated or registered information about itself in the StorageGRID system.

Code	Field	Description
RSLT	Result	The result of the update request: • SUCS: Successful • SUNV: Service Unavailable • GERR: Other failure
GNID	Node ID	The node ID of the service that initiated the update request.

Code	Field	Description
GNTP	Device Type	The grid node's device type (for example, BLDR for an LDR service).
GNDV	Device Model version	The string identifying the grid node's device model version in the DMDL bundle.
GNGP	Group	The group to which the grid node belongs (in the context of link costs and service-query ranking).
GNIA	IP Address	The grid node's IP address.

This message is generated whenever a grid node updates its entry in the Grid Nodes Bundle.

GNUR: GNDS Unregistration

The CMN service generates this audit message when a service has unregistered information about itself from the StorageGRID system.

Code	Field	Description
RSLT	Result	The result of the update request: • SUCS: Successful • SUNV: Service Unavailable • GERR: Other failure
GNID	Node ID	The node ID of the service that initiated the update request.

GTED: Grid Task Ended

This audit message indicates that the CMN service has finished processing the specified grid task and has moved the task to the Historical table. If the result is SUCS, ABRT, or ROLF, there will be a corresponding Grid Task Started audit message. The other results indicate that processing of this grid task never started.

Code	Field	Description
TSID	Task ID	This field uniquely identifies a generated grid task and allows the grid task to be managed over its lifecycle. **Note:** The Task ID is assigned at the time that a grid task is generated, not the time that it is submitted. It is possible for a given grid task to be submitted multiple times, and in this case the Task ID field is not sufficient to uniquely link the Submitted, Started, and Ended audit messages.

Code	Field	Description
RSLT	Result	The final status result of the grid task: • SUCS: The grid task completed successfully. • ABRT: The grid task was aborted without a rollback error. • ROLF: The grid task was aborted and was unable to complete the rollback process. • CANC: The grid task was canceled by the user before it was started. • EXPR: The grid task expired before it was started. • IVLD: The grid task was invalid. • AUTH: The grid task was unauthorized. • DUPL: The grid task was rejected as a duplicate.

GTST: Grid Task Started

This audit message indicates that the CMN service has started to process the specified grid task. The audit message immediately follows the Grid Task Submitted message for grid tasks initiated by the internal Grid Task Submission service and selected for automatic activation. For grid tasks submitted into the Pending table, this message is generated when the user starts the grid task.

Code	Field	Description
TSID	Task ID	This field uniquely identifies a generated grid task and allows the task to be managed over its lifecycle. **Note:** The Task ID is assigned at the time that a grid task is generated, not the time that it is submitted. It is possible for a given grid task to be submitted multiple times, and in this case the Task ID field is not sufficient to uniquely link the Submitted, Started, and Ended audit messages.
RSLT	Result	The result. This field has only one value: • SUCS: The grid task was started successfully.

GTSU: Grid Task Submitted

This audit message indicates that a grid task has been submitted to the CMN service.

Code	Field	Description
TSID	Task ID	Uniquely identifies a generated grid task and allows the task to be managed over its lifecycle. **Note:** The Task ID is assigned at the time that a grid task is generated, not the time that it is submitted. It is possible for a given grid task to be submitted multiple times, and in this case the Task ID field is not sufficient to uniquely link the Submitted, Started, and Ended audit messages.
TTYP	Task Type	The type of grid task.
TVER	Task Version	A number indicating the version of the grid task.

Code	Field	Description
TDSC	Task Description	A human-readable description of the grid task.
VATS	Valid After Timestamp	The earliest time (UINT64 microseconds from January 1, 1970 - UNIX time) at which the grid task is valid.
VBTS	Valid Before Timestamp	The latest time (UINT64 microseconds from January 1, 1970 - UNIX time) at which the grid task is valid.
TSRC	Source	The source of the task: • TXTB: The grid task was submitted through the StorageGRID system as a signed text block. • GRID: The grid task was submitted through the internal Grid Task Submission Service.
ACTV	Activation Type	The type of activation: • AUTO: The grid task was submitted for automatic activation. • PEND: The grid task was submitted into the pending table. This is the only possibility for the TXTB source.
RSLT	Result	The result of the submission: • SUCS: The grid task was submitted successfully. • FAIL: The task has been moved directly to the historical table.

IDEL: ILM Initiated Delete

This message is generated when ILM starts the process of deleting an object.

The IDEL message is generated in either of these situations:

- **For objects in compliant S3 buckets**: This message is generated when ILM starts the process of auto-deleting an object because its retention period has expired (assuming the auto-delete setting is enabled and legal hold is off).
- **For objects in non-compliant S3 buckets or Swift containers**. This message is generated when ILM starts the process of deleting an object because no placement instructions in the active ILM policy currently apply to the object.

Code	Field	Description
CBID	Content Block Identifier	The CBID of the object.
CMPA	Compliance: Auto delete	For objects in compliant S3 buckets only. 0 (false) or 1 (true), indicating whether a compliant object should be deleted automatically when its retention period ends, unless the bucket is under a legal hold.
CMPL	Compliance: Legal hold	For objects in compliant S3 buckets only. 0 (false) or 1 (true), indicating whether the bucket is currently under a legal hold.
CMPR	Compliance: Retention period	For objects in compliant S3 buckets only. The length of the object's retention period in minutes.

Code	Field	Description
CTME	Compliance: Ingest time	For objects in compliant S3 buckets only. The object's ingest time. You can add the retention period in minutes to this value to determine when the object can be deleted from the bucket.
FSIZ	File size	The size of the object in bytes.
LOCS	Locations	The storage location of object data within the StorageGRID system. The value for LOCS is “” if the object has no locations (for example, it has been deleted). CLEC: for erasure-coded objects, the erasure coding profile ID and the erasure coding group ID that is applied to the object’s data. CLDI: for replicated objects, the LDR node ID and the volume ID of the object's location. CLNL: ARC node ID of the object’s location if the object data is archived.
PATH	S3 Bucket/Key or Swift Container/ Object ID	The S3 bucket name and S3 key name, or the Swift container name and Swift object identifier.
RSLT	Result	The result of the ILM operation. SUCS: The ILM operation was successful.
RULE	Rules Label	• If an object in a compliant S3 bucket is being deleted automatically because its retention period has expired, this field is blank. • If the object is being deleted because there are no more placement instructions that currently apply to the object, this field shows the human-readable label of the last ILM rule that applied to the object.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.

LLST: Location Lost

This message is generated whenever a location for an object copy (replicated or erasure coded) cannot be found.

Code	Field	Description
CBIL	CBID	The affected CBID.
NOID	Source Node ID	The node ID on which the locations were lost.
ECPR	Erasure Coding Profile	For erasure-coded object data. The ID of the Erasure Coding Profile used.
LTYP	Location Type	CLDI (Online): For replicated object data CLEC (Online): For erasure-coded object data CLNL (Nearline): For archived replicated object data
RSLT	Result	Always NONE. RSLT is a mandatory message field, but is not relevant for this message. NONE is used rather than SUCS so that this message is not filtered.

Code	Field	Description
TSRC	Triggering Source	USER: User triggered SYST: System triggered

MGAU: Management audit message

The Management category logs user requests to the Management API. Every request that is not a GET or HEAD request to the API logs a response with the username, IP, and type of request to the API.

Code	Field	Description
MDIP	Destination IP Address	The server (destination) IP address.
MDNA	Domain name	The host domain name.
MPAT	Request PATH	The request path.
MPQP	Request query parameters	The query parameters for the request.
MRBD	Request body	The content of the request body. While the response body is logged by default, the request body is logged in certain cases when the response body is empty. Because the following information is not available in the response body, it is taken from the request body for the following POST methods: • Username and account ID in **POST authorize** • New subnets configuration in **POST /grid/grid-networks/update** • New NTP servers in **POST /grid/ntp-servers/update** • Decommissioned server IDs in **POST /grid/servers/decommission** **Note:** Sensitive information is either deleted (for example, an S3 access key) or masked with asterisks (for example, a password).
MRMD	Request method	The HTTP request method: • POST • PUT • DELETE • PATCH
MRSC	Response code	The response code.
MRSP	Response body	The content of the response (the response body) is logged by default. **Note:** Sensitive information is either deleted (for example, an S3 access key) or masked with asterisks (for example, a password).

Code	Field	Description
MSIP	Source IP address	The client (source) IP address.
MUUN	User URN	The URN (uniform resource name) of the user who sent the request.
RSLT	Result	Returns successful (SUCS) or the error reported by the backend.

OLST: System Detected Lost Object

This message is generated when the DDS service cannot locate any copies of an object within the StorageGRID system.

Code	Field	Description
CBID	Content Block Identifier	The CBID of the lost object.
NOID	Node ID	The last known direct or nearline location of the lost object. It is possible to have no last known location if the location information is not available. It is possible to have just the Node ID without a Volume ID if the volume information is not available.
PATH	S3 Bucket/Key or Swift Container/ Object ID	The S3 bucket name and S3 key name, or the Swift container name and Swift object identifier.
RSLT	Result	This field has the value NONE. RSLT is a mandatory message field, but is not relevant for this message. NONE is used rather than SUCS so that this message is not filtered.
UUID	Universally Unique ID	The identifier of the lost object within the StorageGRID system.
VOLI	Volume ID	The Volume ID of the Storage Node or Archive Node for the last known location of the lost object.

ORLM: Object Rules Met

This message is generated when the object is successfully stored and copied as specified by the ILM rules.

Note: The ORLM message is not generated when an object is successfully stored by the default Make 2 Copies rule if another rule in the policy uses the Object Size advanced filter.

Code	Field	Description
CBID	Content Block Identifier	The CBID of the object.
FSIZ	File size	The size of the object in bytes.

Code	Field	Description
LOCS	Locations	The storage location of object data within the StorageGRID system. The value for LOCS is “” if the object has no locations (for example, it has been deleted). CLEC: for erasure-coded objects, the erasure coding profile ID and the erasure coding group ID that is applied to the object’s data. CLDI: for replicated objects, the LDR node ID and the volume ID of the object's location. CLNL: ARC node ID of the object’s location if the object data is archived.
PATH	S3 Bucket/Key or Swift Container/ Object ID	The S3 bucket name and S3 key name, or the Swift container name and Swift object identifier.
RSLT	Result	The result of the ILM operation. SUCS: The ILM operation was successful.
RULE	Rules Label	The human-readable label given to the ILM rule applied to this object.
SEGC	Container UUID	UUID of the container for the segmented object. This value is available only if the object is segmented.
SGCB	Container CBID	CBID of the container for the segmented object. This value is available only if the object is segmented.
SPAR	Security Partition ID	Always returns zero. This field is deprecated, and will be removed in a future release.
STAT	Status	The status of ILM operation. DONE: ILM operations against the object have completed. DFER: The object has been marked for future ILM re-evaluation. PRGD: The object has been deleted from the StorageGRID system. NLOC: The object data can no longer be found in the StorageGRID system. This status might indicate that all copies of object data are missing or damaged.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.

The ORLM audit message can be issued a number of times for a single object. For instance, it is issued whenever one of the following events take place:

- ILM rules for the object are satisfied forever.
- ILM rules for the object are satisfied for this epoch.
- ILM rules have deleted the object.
- The background verification process detects that a copy of replicated object data is corrupt. The CMS service then preforms an ILM evaluation to replace the corrupt object.

Related references

Object ingest transactions on page 19

Object delete transactions on page 20

OVWR: Object Overwrite

This message is generated when an external (client-requested) operation causes one object to be overwritten by another object.

Code	Field	Description
CBID	Content Block Identifier (new)	The CBID for the new object.
OCBD	Content Block Identifier (previous)	The CBID for the previous object.
UUID	Universally Unique ID (new)	The identifier of the new object within the StorageGRID system.
OUID	Universally Unique ID (previous)	The identifier for the previous object within the StorageGRID system.
PATH	S3 or Swift Object Path	The S3 or Swift object path used for both the previous and new object
RSLT	Result Code	Result of the Object Overwrite transaction. Result is always: SUCS: Successful

SADD: Security Audit Disable

This message indicates that the originating service (node ID) has turned off audit message logging; audit messages are no longer being collected or delivered.

Code	Field	Description
AETM	Enable Method	The method used to disable the audit.
AEUN	User Name	The user name that executed the command to disable audit logging.
RSLT	Result	This field has the value NONE. RSLT is a mandatory message field, but is not relevant for this message. NONE is used rather than SUCS so that this message is not filtered.

The message implies that logging was previously enabled, but has now been disabled. This is typically used only during bulk ingest to improve system performance. Following the bulk activity, auditing is restored (SADE) and the capability to disable auditing is then permanently blocked.

SADE: Security Audit Enable

This message indicates that the originating service (node ID) has restored audit message logging; audit messages are again being collected and delivered.

Code	Field	Description
AETM	Enable Method	The method used to enable the audit.
AEUN	User Name	The user name that executed the command to enable audit logging.
RSLT	Result	This field has the value NONE. RSLT is a mandatory message field, but is not relevant for this message. NONE is used rather than SUCS so that this message is not filtered.

The message implies that logging was previously disabled (SADD), but has now been restored. This is typically only used during bulk ingest to improve system performance. Following the bulk activity, auditing is restored and the capability to disable auditing is then permanently blocked.

SCMT: Object Store Commit

Grid content is not made available or recognized as stored until it has been committed (meaning it has been stored persistently). Persistently stored content has been completely written to disk, and has passed related integrity checks. This message is issued when a content block is committed to storage.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the content block committed to permanent storage.
RSLT	Result Code	Status at the time the object was stored to disk: SUCS: Object successfully stored.

This message means a given content block has been completely stored and verified, and can now be requested. It can be used to track data flow within the system.

SDEL: S3 DELETE

When an S3 client issues a DELETE transaction, a request is made to remove the specified object or bucket. This message is issued by the server if the transaction is successful.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the corresponding content block requested. If the CBID is unknown, this field is set to 0. Operations on buckets do not include this field.
CSIZ	Content Size	The size of the deleted object in bytes. Operations on buckets do not include this field.
DMRK	Delete Marker Version ID	The version ID of the delete marker created when deleting an object from a versioned bucket. Operations on buckets do not include this field.
HTRH	HTTP Request Header	List of logged HTTP request header names and values as selected during configuration.
RSLT	Result Code	Result of the DELETE transaction. Result is always: SUCS: Successful
S3AI	S3 tenant account ID (request sender)	The tenant account ID of the user who sent the request. An empty value indicates anonymous access.
S3AK	S3 Access Key ID (request sender)	The hashed S3 access key ID for the user that sent the request. An empty value indicates anonymous access.
S3BK	S3 Bucket	The S3 bucket name.
S3KY	S3 Key	The S3 key name, not including the bucket name. Operations on buckets do not include this field.
SACC	S3 tenant account name (request sender)	The name of the tenant account for the user who sent the request. Empty for anonymous requests.
SAIP	IP address (request sender)	The IP address of the client application that made the request.

Code	Field	Description
SBAC	S3 tenant account name (bucket owner)	The tenant account name for the bucket owner. Used to identify cross-account or anonymous access.
SBAI	S3 tenant account ID (bucket owner)	The tenant account ID of the owner of the target bucket. Used to identify cross-account or anonymous access.
SUSR	S3 User URN (request sender)	The tenant account ID and the user name of the user making the request. The user can either be a local user or an LDAP user. For example: `urn:sgws:identity::03393893651506583485:root` Empty for anonymous requests.
TIME	Time	Total processing time for the request in microseconds.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.
VSID	Version ID	The version ID of the specific version of an object that was deleted. Operations on buckets and objects in unversioned buckets do not include this field.

SGET: S3 GET

When an S3 client issues a GET transaction, a request is made to retrieve an object or list the objects in a bucket. This message is issued by the server if the transaction is successful.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the corresponding content block requested. If the CBID is unknown, this field is set to 0. Operations on buckets do not include this field.
CSIZ	Content Size	The size of the retrieved object in bytes. Operations on buckets do not include this field.
HTRH	HTTP Request Header	List of logged HTTP request header names and values as selected during configuration.
RANG	Range Read	For range read operations only. Indicates the range of bytes that was read by this request. The value after the slash (/) shows the size of the entire object.
RSLT	Result Code	Result of the GET transaction. Result is always: SUCS: Successful
S3AI	S3 tenant account ID (request sender)	The tenant account ID of the user who sent the request. An empty value indicates anonymous access.
S3AK	S3 Access Key ID (request sender)	The hashed S3 access key ID for the user that sent the request. An empty value indicates anonymous access.
S3BK	S3 Bucket	The S3 bucket name.
S3KY	S3 Key	The S3 key name, not including the bucket name. Operations on buckets do not include this field.
SACC	S3 tenant account name (request sender)	The name of the tenant account for the user who sent the request. Empty for anonymous requests.

Code	Field	Description
SAIP	IP address (request sender)	The IP address of the client application that made the request.
SBAC	S3 tenant account name (bucket owner)	The tenant account name for the bucket owner. Used to identify cross-account or anonymous access.
SBAI	S3 tenant account ID (bucket owner)	The tenant account ID of the owner of the target bucket. Used to identify cross-account or anonymous access.
SUSR	S3 User URN (request sender)	The tenant account ID and the user name of the user making the request. The user can either be a local user or an LDAP user. For example: `urn:sgws:identity::03393893651506583485:root` Empty for anonymous requests.
TIME	Time	Total processing time for the request in microseconds.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.
VSID	Version ID	The version ID of the specific version of an object that was requested. Operations on buckets and objects in unversioned buckets do not include this field.

SHEA: S3 HEAD

When an S3 client issues a HEAD transaction, a request is made to check for the existence of an object or bucket and retrieve the metadata about an object. This message is issued by the server if the transaction is successful.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the corresponding content block requested. If the CBID is unknown, this field is set to 0. Operations on buckets do not include this field.
CSIZ	Content Size	The size of the checked object in bytes. Operations on buckets do not include this field.
HTRH	HTTP Request Header	List of logged HTTP request header names and values as selected during configuration.
RSLT	Result Code	Result of the GET transaction. Result is always: SUCS: Successful
S3AI	S3 tenant account ID (request sender)	The tenant account ID of the user who sent the request. An empty value indicates anonymous access.
S3AK	S3 Access Key ID (request sender)	The hashed S3 access key ID for the user that sent the request. An empty value indicates anonymous access.
S3BK	S3 Bucket	The S3 bucket name.
S3KY	S3 Key	The S3 key name, not including the bucket name. Operations on buckets do not include this field.
SACC	S3 tenant account name (request sender)	The name of the tenant account for the user who sent the request. Empty for anonymous requests.

Code	Field	Description
SAIP	IP address (request sender)	The IP address of the client application that made the request.
SBAC	S3 tenant account name (bucket owner)	The tenant account name for the bucket owner. Used to identify cross-account or anonymous access.
SBAI	S3 tenant account ID (bucket owner)	The tenant account ID of the owner of the target bucket. Used to identify cross-account or anonymous access.
SUSR	S3 User URN (request sender)	The tenant account ID and the user name of the user making the request. The user can either be a local user or an LDAP user. For example: `urn:sgws:identity::03393893651506583485:root` Empty for anonymous requests.
TIME	Time	Total processing time for the request in microseconds.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.
VSID	Version ID	The version ID of the specific version of an object that was requested. Operations on buckets and objects in unversioned buckets do not include this field.

SPOS: S3 POST

When an S3 client issues a POST Object restore request, a request is made to restore an object from AWS Glacier storage to a Cloud Storage Pool. This message is issued by the server if the transaction is successful.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the corresponding content block requested. If the CBID is unknown, this field is set to 0.
CSIZ	Content Size	The size of the retrieved object in bytes.
HTRH	HTTP Request Header	List of logged HTTP request header names and values as selected during configuration.
RRDA	Restore Days	The number of days specified in the POST Object restore request.
RRTI	Restore Tier	The tier specified in the POST Object restore request; `Standard` if Tier was not specified.
RSLT	Result Code	Result of the POST Object restore request. Result is always: SUCS: Successful
S3AI	S3 tenant account ID (request sender)	The tenant account ID of the user who sent the request. An empty value indicates anonymous access.
S3AK	S3 Access Key ID (request sender)	The hashed S3 access key ID for the user that sent the request. An empty value indicates anonymous access.
S3BK	S3 Bucket	The S3 bucket name.
S3KY	S3 Key	The S3 key name, not including the bucket name. Operations on buckets do not include this field.

Code	Field	Description
SACC	S3 tenant account name (request sender)	The name of the tenant account for the user who sent the request. Empty for anonymous requests.
SAIP	IP address (request sender)	The IP address of the client application that made the request.
SBAC	S3 tenant account name (bucket owner)	The tenant account name for the bucket owner. Used to identify cross-account or anonymous access.
SBAI	S3 tenant account ID (bucket owner)	The tenant account ID of the owner of the target bucket. Used to identify cross-account or anonymous access.
SUSR	S3 User URN (request sender)	The tenant account ID and the user name of the user making the request. The user can either be a local user or an LDAP user. For example: `urn:sgws:identity::03393893651506583485:root` Empty for anonymous requests.
TIME	Time	Total processing time for the request in microseconds.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.
VSID	Version ID	The version ID of the specific version of an object that was requested. Operations on buckets and objects in unversioned buckets do not include this field.

SPUT: S3 PUT

When an S3 client issues a PUT transaction, a request is made to create a new object or bucket. This message is issued by the server if the transaction is successful.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the corresponding content block requested. If the CBID is unknown, this field is set to 0. Operations on buckets do not include this field.
CMPS	Compliance Settings	The compliance settings used when creating the bucket, if present in the PUT Bucket request.
CSIZ	Content Size	The size of the retrieved object in bytes. Operations on buckets do not include this field.
HTRH	HTTP Request Header	List of logged HTTP request header names and values as selected during configuration.
RSLT	Result Code	Result of the PUT transaction. Result is always: SUCS: Successful
S3AI	S3 tenant account ID (request sender)	The tenant account ID of the user who sent the request. An empty value indicates anonymous access.
S3AK	S3 Access Key ID (request sender)	The hashed S3 access key ID for the user that sent the request. An empty value indicates anonymous access.
S3BK	S3 Bucket	The S3 bucket name.
S3KY	S3KY	The S3 key name, not including the bucket name. Operations on buckets do not include this field.

Code	Field	Description
SACC	S3 tenant account name (request sender)	The name of the tenant account for the user who sent the request. Empty for anonymous requests.
SAIP	IP address (request sender)	The IP address of the client application that made the request.
SBAC	S3 tenant account name (bucket owner)	The tenant account name for the bucket owner. Used to identify cross-account or anonymous access.
SBAI	S3 tenant account ID (bucket owner)	The tenant account ID of the owner of the target bucket. Used to identify cross-account or anonymous access.
SUSR	S3 User URN (request sender)	The tenant account ID and the user name of the user making the request. The user can either be a local user or an LDAP user. For example: `urn:sgws:identity::03393893651506583485:root` Empty for anonymous requests.
TIME	Time	Total processing time for the request in microseconds.
ULID	Upload ID	Included only in SPUT messages for Complete Multipart Upload operations. Indicates that all parts have been uploaded and assembled.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.
VSID	Version ID	The version ID of a new object created in a versioned bucket. Operations on buckets and objects in unversioned buckets do not include this field.
VSST	Versioning State	The new versioning state of a bucket. Two states are used: "enabled" or "suspended." Operations on objects do not include this field.

SREM: Object Store Remove

This message is issued when content is removed from persistent storage and is no longer accessible through regular APIs.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the content block deleted from permanent storage.
RSLT	Result Code	Indicates the result of the content removal operations. The only defined value is: SUCS: Content removed from persistent storage

This audit message means a given content block has been deleted from a node and can no longer be requested directly. The message can be used to track the flow of deleted content within the system.

SUPD: S3 Metadata or Bucket Compliance Updated

This message is generated by the S3 API in either of two cases: (1) an S3 client updates the metadata for an ingested object, or (2) an S3 client updates the compliance settings for a bucket that was

created with compliance enabled. The message is issued by the server if the metadata update is successful.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the corresponding content block requested. If the CBID is unknown, this field is set to 0. Operations on buckets do not include this field.
CMPS	Compliance Settings	The new compliance settings used to update a compliant bucket.
CNCH	Consistency Control Header	The value of the Consistency-Control HTTP request header, if present in the request, when updating a bucket's compliance settings.
CSIZ	Content Size	The size of the retrieved object in bytes. Operations on buckets do not include this field.
HTRH	HTTP Request Header	List of logged HTTP request header names and values as selected during configuration.
RSLT	Result Code	Result of the GET transaction. Result is always: SUCS: successful
S3AI	S3 tenant account ID (request sender)	The tenant account ID of the user who sent the request. An empty value indicates anonymous access.
S3AK	S3 Access Key ID (request sender)	The hashed S3 access key ID for the user that sent the request. An empty value indicates anonymous access.
S3BK	S3 Bucket	The S3 bucket name.
S3KY	S3 Key	The S3 key name, not including the bucket name. Operations on buckets do not include this field.
SACC	S3 tenant account name (request sender)	The name of the tenant account for the user who sent the request. Empty for anonymous requests.
SAIP	IP address (request sender)	The IP address of the client application that made the request.
SBAC	S3 tenant account name (bucket owner)	The tenant account name for the bucket owner. Used to identify cross-account or anonymous access.
SBAI	S3 tenant account ID (bucket owner)	The tenant account ID of the owner of the target bucket. Used to identify cross-account or anonymous access.
SUSR	S3 User URN (request sender)	The tenant account ID and the user name of the user making the request. The user can either be a local user or an LDAP user. For example: `urn:sgws:identity::03393893651506583485:root` Empty for anonymous requests.
TIME	Time	Total processing time for the request in microseconds.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.
VSID	Version ID	The version ID of the specific version of an object whose metadata was updated. Operations on buckets and objects in unversioned buckets do not include this field.

SVRF: Object Store Verify Fail

This message is issued whenever a content block fails the verification process. Each time replicated object data is read from or written to disk, several verification and integrity checks are performed to ensure the data sent to the requesting user is identical to the data originally ingested into the system. If any of these checks fail, the system automatically quarantines the corrupt replicated object data to prevent it from being retrieved again.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the content block which failed verification.
RSLT	Result Code	Verification failure type: CRCF: Cyclic redundancy check (CRC) failed. HMAC: Hash-based message authentication code (HMAC) check failed. EHSH: Unexpected encrypted content hash. PHSH: Unexpected original content hash. SEQC: Incorrect data sequence on disk. PERR: Invalid structure of disk file. DERR: Disk error. FNAM: Bad file name.

Note: This message should be monitored closely. Content verification failures can indicate attempts to tamper with content or impending hardware failures.

To determine what operation triggered the message, see the value of the AMID (Module ID) field. For example, an SVFY value indicates that the message was generated by the Storage Verifier module, that is, background verification, and STOR indicates that the message was triggered by content retrieval.

SVRU: Object Store Verify Unknown

The LDR service's Storage component continuously scans all copies of replicated object data in the object store. This message is issued when an unknown or unexpected copy of replicated object data is detected in the object store and moved to the quarantine directory.

Code	Field	Description
FPTH	File Path	The file path of the unexpected object copy.
RSLT	Result	This field has the value 'NONE'. RSLT is a mandatory message field, but is not relevant for this message. 'NONE' is used rather than 'SUCS' so that this message is not filtered.

Note: The SVRU: Object Store Verify Unknown audit message should be monitored closely. It means unexpected copies of object data were detected in the object store. This situation should be investigated immediately to determine how theses copies were created, because it can indicate attempts to tamper with content or impending hardware failures.

SYSD: Node Stop

When a service is stopped gracefully, this message is generated to indicate the shutdown was requested. Typically this message is sent only after a subsequent restart, because the audit message

queue is not cleared prior to shutdown. Look for the SYST message, sent at the beginning of the shutdown sequence, if the service has not restarted.

Code	Field	Description
RSLT	Clean Shutdown	The nature of the shutdown: SUCS: System was cleanly shutdown.

The message does not indicate if the host server is being stopped, only the reporting service. The RSLT of a SYSD cannot indicate a “dirty” shutdown, because the message is generated only by “clean” shutdowns.

SYST: Node Stopping

When a service is gracefully stopped, this message is generated to indicate the shutdown was requested and that the service has initiated its shutdown sequence. SYST can be used to determine if the shutdown was requested, before the service is restarted (unlike SYSD, which is typically sent after the service restarts.)

Code	Field	Description
RSLT	Clean Shutdown	The nature of the shutdown: SUCS: System was cleanly shutdown.

The message does not indicate if the host server is being stopped, only the reporting service. The RSLT code of a SYST message cannot indicate a “dirty” shutdown, because the message is generated only by “clean” shutdowns.

SYSU: Node Start

When a service is restarted, this message is generated to indicate if the previous shutdown was clean (commanded) or disorderly (unexpected).

Code	Field	Description
RSLT	Clean Shutdown	The nature of the shutdown: SUCS: System was cleanly shut down. DSDN: System was not cleanly shut down. VRGN: System was started for the first time after server installation (or re-installation).

The message does not indicate if the host server was started, only the reporting service. This message can be used to:

- Detect discontinuity in the audit trail.
- Determine if a service is failing during operation (as the distributed nature of the StorageGRID system can mask these failures). Server Manager restarts a failed service automatically.

VLST: User Initiated Volume Lost

This message is issued whenever the `/proc/CMSI/Volume_Lost` command is run.

Code	Field	Description
VOLL	Volume Identifier Lower	The lower end of the affected volume range or a single volume.

Code	Field	Description
VOLU	Volume Identifier Upper	The upper end of the affected volume range. Equal to VOLL if a single volume.
NOID	Source Node ID	The node ID on which the locations were lost.
LTYP	Location Type	'CLDI' (Online) or 'CLNL' (Nearline). If not specified, defaults to 'CLDI'.
RSLT	Result	Always 'NONE'. RSLT is a mandatory message field, but is not relevant for this message. 'NONE' is used rather than 'SUCS' so that this message is not filtered.

WDEL: Swift DELETE

When a Swift client issues a DELETE transaction, a request is made to remove the specified object or container. This message is issued by the server if the transaction is successful.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the corresponding content block requested. If the CBID is unknown, this field is set to 0. Operations on containers do not include this field.
CSIZ	Content Size	The size of the deleted object in bytes. Operations on containers do not include this field.
HTRH	HTTP Request Header	List of logged HTTP request header names and values as selected during configuration.
RSLT	Result Code	Result of the DELETE transaction. Result is always: SUCS: Successful
SAIP	IP address of requesting client	The IP address of the client application that made the request.
TIME	Time	Total processing time for the request in microseconds.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.
WACC	Swift Account ID	The unique account ID as specified by the StorageGRID system.
WCON	Swift Container	The Swift container name.
WOBJ	Swift Object	The Swift object identifier. Operations on containers do not include this field.
WUSR	Swift Account User	The Swift account username that uniquely identifies the client performing the transaction.

WGET: Swift GET

When a Swift client issues a GET transaction, a request is made to retrieve an object, list the objects in a container, or list the containers in an account. This message is issued by the server if the transaction is successful.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the corresponding content block requested. If the CBID is unknown, this field is set to 0. Operations on accounts and containers do not include this field.
CSIZ	Content Size	The size of the retrieved object in bytes. Operations on accounts and containers do not include this field.
HTRH	HTTP Request Header	List of logged HTTP request header names and values as selected during configuration.
RSLT	Result Code	Result of the GET transaction. Result is always: SUCS: successful
SAIP	IP address of requesting client	The IP address of the client application that made the request.
TIME	Time	Total processing time for the request in microseconds.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.
WACC	Swift Account ID	The unique account ID as specified by the StorageGRID system.
WCON	Swift Container	The Swift container name. Operations on accounts do not include this field.
WOBJ	Swift Object	The Swift object identifier. Operations on accounts and containers do not include this field.
WUSR	Swift Account User	The Swift account username that uniquely identifies the client performing the transaction.

WHEA: Swift HEAD

When a Swift client issues a HEAD transaction, a request is made to check for the existence of an account, container, or object, and retrieve any relevant metadata. This message is issued by the server if the transaction is successful.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the corresponding content block requested. If the CBID is unknown, this field is set to 0. Operations on accounts and containers do not include this field.
CSIZ	Content Size	The size of the retrieved object in bytes. Operations on accounts and containers do not include this field.
HTRH	HTTP Request Header	List of logged HTTP request header names and values as selected during configuration.

Code	Field	Description
RSLT	Result Code	Result of the HEAD transaction. Result is always: SUCS: successful
SAIP	IP address of requesting client	The IP address of the client application that made the request.
TIME	Time	Total processing time for the request in microseconds.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.
WACC	Swift Account ID	The unique account ID as specified by the StorageGRID system.
WCON	Swift Container	The Swift container name. Operations on accounts do not include this field.
WOBJ	Swift Object	The Swift object identifier. Operations on accounts and containers do not include this field.
WUSR	Swift Account User	The Swift account username that uniquely identifies the client performing the transaction.

WPUT: Swift PUT

When a Swift client issues a PUT transaction, a request is made to create a new object or container. This message is issued by the server if the transaction is successful.

Code	Field	Description
CBID	Content Block Identifier	The unique identifier of the corresponding content block requested. If the CBID is unknown, this field is set to 0. Operations on containers do not include this field.
CSIZ	Content Size	The size of the retrieved object in bytes. Operations on containers do not include this field.
HTRH	HTTP Request Header	List of logged HTTP request header names and values as selected during configuration.
RSLT	Result Code	Result of the PUT transaction. Result is always: SUCS: successful
SAIP	IP address of requesting client	The IP address of the client application that made the request.
TIME	Time	Total processing time for the request in microseconds.
UUID	Universally Unique Identifier	The identifier of the object within the StorageGRID system.
WACC	Swift Account ID	The unique account ID as specified by the StorageGRID system.
WCON	Swift Container	The Swift container name.
WOBJ	Swift Object	The Swift object identifier. Operations on containers do not include this field.
WUSR	Swift Account User	The Swift account username that uniquely identifies the client performing the transaction.

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