Alerts and alarms

StorageGRID 11.8

NetApp
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Alerts and alarms

Manage alerts and alarms: Overview

The StorageGRID alert system is designed to inform you about operational issues that require your attention. The legacy alarm system is deprecated.

Alert system

The alert system is designed to be your primary tool for monitoring any issues that might occur in your StorageGRID system. The alert system provides an easy-to-use interface for detecting, evaluating, and resolving issues.

Alerts are triggered at specific severity levels when alert rule conditions evaluate as true. When an alert is triggered, the following actions occur:

- An alert severity icon is shown on the dashboard in the Grid Manager, and the count of Current Alerts is incremented.
- The alert is shown on the **NODES** summary page and on the **NODES** > ***node*** > **Overview** tab.
- An email notification is sent, assuming you have configured an SMTP server and provided email addresses for the recipients.
- An Simple Network Management Protocol (SNMP) notification is sent, assuming you have configured the StorageGRID SNMP agent.

Legacy alarm system

Like alerts, alarms are triggered at specific severity levels when attributes reach defined threshold values. However, unlike alerts, many alarms are triggered for events that you can safely ignore, which might result in an excessive number of email or SNMP notifications.

> The alarm system is deprecated and will be removed in a future release. If you are still using legacy alarms, you should fully transition to the alert system as soon as possible.

When an alarm is triggered, the following actions occur:

- The alarm appears on the **SUPPORT** > **Alarms (legacy)** > **Current alarms** page.
- An email notification is sent, assuming you have configured an SMTP server and configured one or more mailing lists.
- An SNMP notification might be sent, assuming you have configured the StorageGRID SNMP agent. (SNMP notifications aren't sent for all alarms or alarm severities.)

Compare alerts and alarms

There are several similarities between the alert system and the legacy alarm system, but the alert system offers significant benefits and is easier to use.

Refer to the following table to learn how to perform similar operations.

	Alerts	Alarms (legacy system)
How do I see which alerts or alarms are active?	• Select the **Current alerts** link on the dashboard. • Select the alert on the **NODES** > **Overview** page. • Select **ALERTS** > **Current**. View current alerts	Select **SUPPORT** > **Alarms (legacy)** > **Current alarms**. Manage alarms (legacy system)
What causes an alert or an alarm to be triggered?	Alerts are triggered when a Prometheus expression in an alert rule evaluates as true for the specific trigger condition and duration. View alert rules	Alarms are triggered when a StorageGRID attribute reaches a threshold value. Manage alarms (legacy system)
If an alert or alarm is triggered, how do I resolve the underlying problem?	The recommended actions for an alert are included in email notifications and are available from the Alerts pages in the Grid Manager. As required, additional information is provided in the StorageGRID documentation. Alerts reference	You can learn about an alarm by selecting the attribute name, or you can search for an alarm code in the StorageGRID documentation. Alarms reference (legacy system)
Where can I see a list of alerts or alarms that have been resolved?	Select **ALERTS** > **Resolved**. View current and resolved alerts	Select **SUPPORT** > **Alarms (legacy)** > **Historical alarms**. Manage alarms (legacy system)
Where do I manage the settings?	Select **ALERTS** > **Rules**. Manage alerts	Select **SUPPORT**. Then, use the options in the **Alarms (legacy)** section of the menu. Manage alarms (legacy system)

	Alerts	Alarms (legacy system)
What user group permissions do I need?	• Anyone who can sign in to the Grid Manager can view current and resolved alerts. • You must have the Manage alerts permission to manage silences, alert notifications, and alert rules. Administer StorageGRID	• Anyone who can sign in to the Grid Manager can view legacy alarms. • You must have the Acknowledge alarms permission to acknowledge alarms. • You must have both the Grid topology page configuration and Other grid configuration permissions to manage global alarms and email notifications. Administer StorageGRID
How do I manage email notifications?	Select **ALERTS** > **Email setup**. **Note:** Because alarms and alerts are independent systems, the email setup used for alarm and AutoSupport notifications is not used for alert notifications. However, you can use the same mail server for all notifications. Set up email notifications for alerts	Select **SUPPORT** > **Alarms (legacy)** > **Legacy email setup**. Manage alarms (legacy system)
How do I manage SNMP notifications?	Select **CONFIGURATION** > **Monitoring** > **SNMP agent**. Use SNMP monitoring	*Not supported*
How do I control who receives notifications?	1. Select **ALERTS** > **Email setup**. 2. In the **Recipients** section, enter an email address for each email list or person who should receive an email when an alert occurs. Set up email notifications for alerts	1. Select **SUPPORT** > **Alarms (legacy)** > **Legacy email setup**. 2. Creating a mailing list. 3. Select **Notifications**. 4. Select the mailing list. Manage alarms (legacy system)
Which Admin Nodes send notifications?	A single Admin Node (the preferred sender). What is an Admin Node?	A single Admin Node (the preferred sender). What is an Admin Node?

	Alerts	Alarms (legacy system)
How do I suppress some notifications?	1. Select **ALERTS** > **Silences**. 2. Select the alert rule you want to silence. 3. Specify a duration for the silence. 4. Select the severity of alert you want to silence. 5. Select to apply the silence to the entire grid, a single site, or a single node. **Note**: If you have enabled the SNMP agent, silences also suppress SNMP traps and informs. Silence alert notifications	1. Select **SUPPORT** > **Alarms (legacy)** > **Legacy email setup**. 2. Select **Notifications**. 3. Select a mailing list, and select **Suppress**. Manage alarms (legacy system)
How do I suppress all notifications?	Select **ALERTS** > **Silences**.Then, select **All rules**. **Note**: If you have enabled the SNMP agent, silences also suppress SNMP traps and informs. Silence alert notifications	*Not supported*
How do I customize the conditions and triggers?	1. Select **ALERTS** > **Rules**. 2. Select a default rule to edit, or select **Create custom rule**. Edit alert rules Create custom alert rules	1. Select **SUPPORT** > **Alarms (legacy)** > **Global alarms**. 2. Create a Global Custom alarm to override a Default alarm or to monitor an attribute that does not have a Default alarm. Manage alarms (legacy system)
How do I disable an individual alert or alarm?	1. Select **ALERTS** > **Rules**. 2. Select the rule, and select **Edit rule**. 3. Clear the **Enabled** checkbox. Disable alert rules	1. Select **SUPPORT** > **Alarms (legacy)** > **Global alarms**. 2. Select the rule, and select the Edit icon. 3. Clear the **Enabled** checkbox. Manage alarms (legacy system)

Manage alerts

Manage alerts: overview

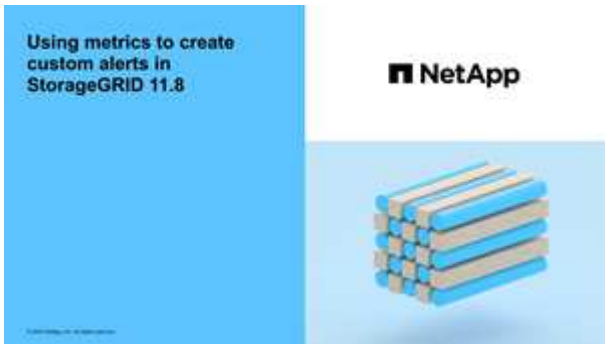
The alert system provides an easy-to-use interface for detecting, evaluating, and resolving the issues that can occur during StorageGRID operation.

You can create custom alerts, edit or disable alerts, and manage alert notifications.

To learn more:

- Review the video: Video: Alerts overview for StorageGRID 11.8

- Review the video: Video: Using metrics to create custom alerts in StorageGRID 11.8



- See the Alerts reference.

View alert rules

Alert rules define the conditions that trigger specific alerts. StorageGRID includes a set of default alert rules, which you can use as is or modify, or you can create custom alert rules.

You can view the list of all default and custom alert rules to learn which conditions will trigger each alert and to see whether any alerts are disabled.

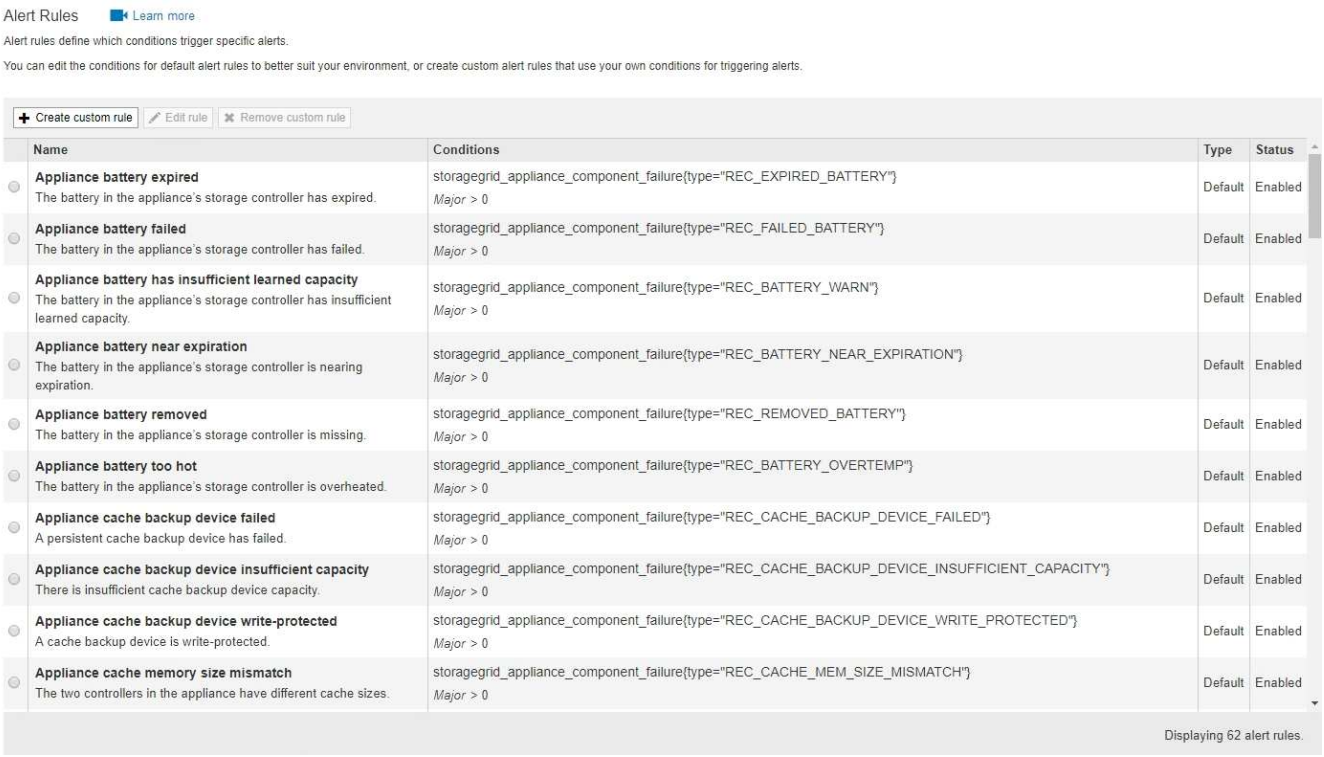
Before you begin

- You are signed in to the Grid Manager using a supported web browser.
- You have the Manage alerts or Root access permission.
- Optionally, you have watched the video: Video: Alerts overview for StorageGRID 11.8

Steps

1. Select **ALERTS** > **Rules**.

   The Alert Rules page appears.



2. Review the information in the alert rules table:

Column header	Description
Name	The unique name and description of the alert rule. Custom alert rules are listed first, followed by default alert rules. The alert rule name is the subject for email notifications.

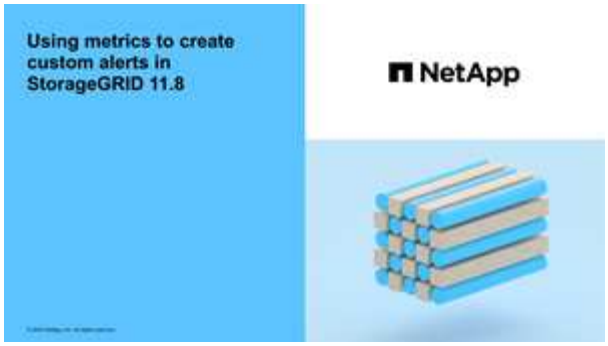
Column header	Description
Conditions	The Prometheus expressions that determine when this alert is triggered. An alert can be triggered at one or more of the following severity levels, but a condition for each severity is not required. • **Critical** : An abnormal condition exists that has stopped the normal operations of a StorageGRID node or service. You must address the underlying issue immediately. Service disruption and loss of data might result if the issue is not resolved. • **Major** : An abnormal condition exists that is either affecting current operations or approaching the threshold for a critical alert. You should investigate major alerts and address any underlying issues to ensure that the abnormal condition does not stop the normal operation of a StorageGRID node or service. • **Minor** : The system is operating normally, but an abnormal condition exists that could affect the system's ability to operate if it continues. You should monitor and resolve minor alerts that don't clear on their own to ensure they don't result in a more serious problem.
Type	The type of alert rule: • **Default**: An alert rule provided with the system. You can disable a default alert rule or edit the conditions and duration for a default alert rule. You can't remove a default alert rule. • **Default***: A default alert rule that includes an edited condition or duration. As required, you can easily revert a modified condition back to the original default. • **Custom**: An alert rule that you created. You can disable, edit, and remove custom alert rules.
Status	Whether this alert rule is currently enabled or disabled. The conditions for disabled alert rules aren't evaluated, so no alerts are triggered.

Create custom alert rules

You can create custom alert rules to define your own conditions for triggering alerts.

Before you begin

- You are signed in to the Grid Manager using a supported web browser.
- You have the Manage alerts or Root access permission.
- You are familiar with the commonly used Prometheus metrics.
- You understand the syntax of Prometheus queries.
- Optionally, you have watched the video: Video: Using metrics to create custom alerts in StorageGRID 11.8.



About this task

StorageGRID does not validate custom alerts. If you decide to create custom alert rules, follow these general guidelines:

- Look at the conditions for the default alert rules, and use them as examples for your custom alert rules.
- If you define more than one condition for an alert rule, use the same expression for all conditions. Then, change the threshold value for each condition.
- Carefully check each condition for typos and logic errors.
- Use only the metrics listed in the Grid Management API.
- When testing an expression using the Grid Management API, be aware that a "successful" response might be an empty response body (no alert triggered). To see if the alert is actually triggered, you can temporarily set a threshold to a value you expect to be true currently.

  For example, to test the expression `node_memory_MemTotal_bytes < 24000000000`, first execute `node_memory_MemTotal_bytes >= 0` and ensure you get the expected results (all nodes return a value). Then, change the operator and the threshold back to the intended values and execute again. No results indicate there are no current alerts for this expression.

- Don’t assume a custom alert is working unless you have validated that the alert is triggered when expected.

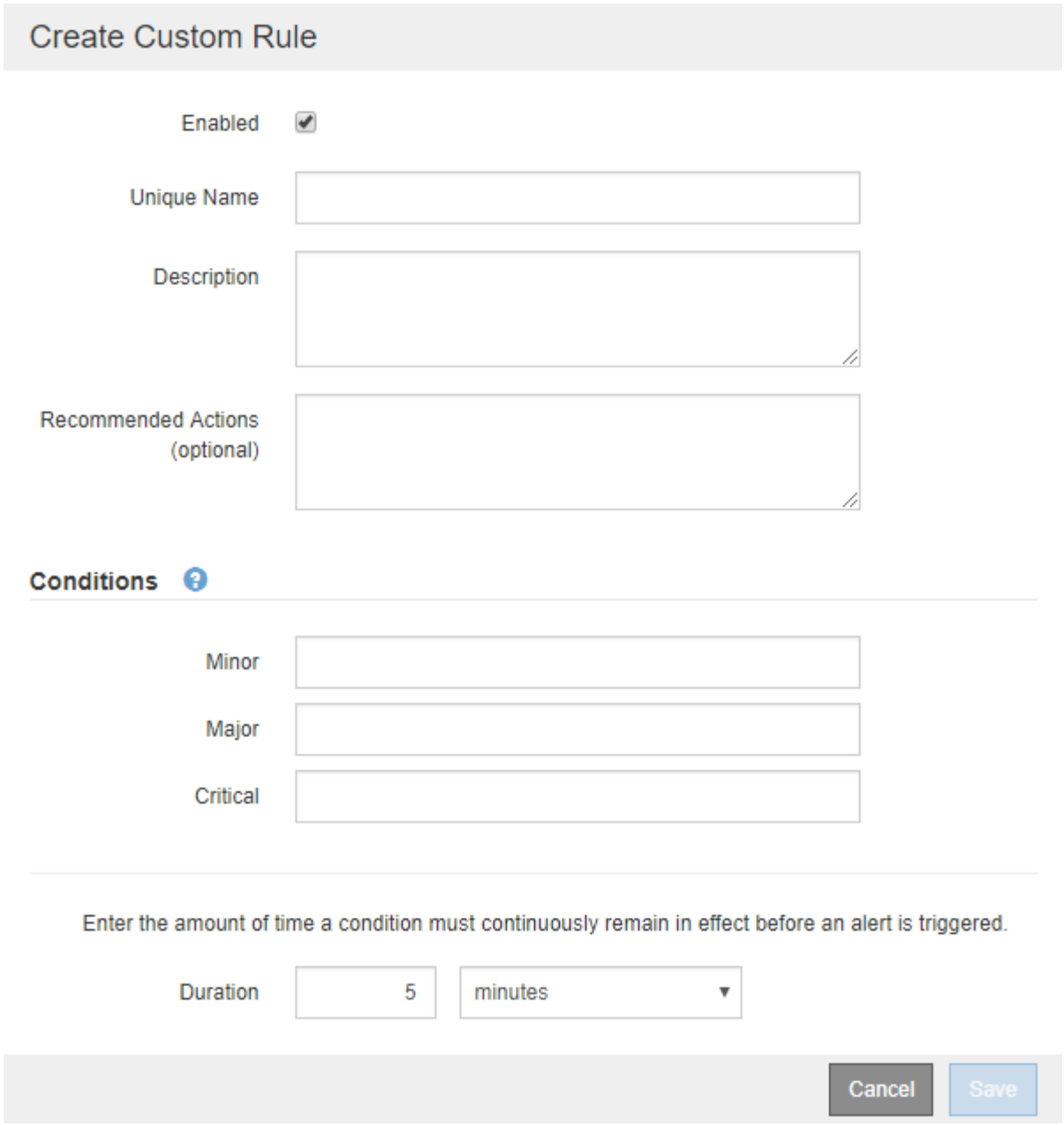
Steps

1. Select **ALERTS** > **Rules**.

   The Alert Rules page appears.

2. Select **Create custom rule**.

   The Create Custom Rule dialog box appears.



3. Select or clear the **Enabled** checkbox to determine if this alert rule is currently enabled.

   If an alert rule is disabled, its expressions aren't evaluated and no alerts are triggered.

4. Enter the following information:

Field	Description
Unique Name	A unique name for this rule. The alert rule name is shown on the Alerts page and is also the subject for email notifications. Names for alert rules can be between 1 and 64 characters.
Description	A description of the problem that is occurring. The description is the alert message shown on the Alerts page and in email notifications. Descriptions for alert rules can be between 1 and 128 characters.

Field	Description
Recommended Actions	Optionally, the recommended actions to take when this alert is triggered. Enter recommended actions as plain text (no formatting codes). Recommended actions for alert rules can be between 0 and 1,024 characters.

5. In the Conditions section, enter a Prometheus expression for one or more of the alert severity levels.

   A basic expression is usually of the form:

   ```
   [metric] [operator] [value]
   ```

   Expressions can be any length, but appear on a single line in the user interface. At least one expression is required.

   This expression causes an alert to be triggered if the amount of installed RAM for a node is less than 24,000,000,000 bytes (24 GB).

   ```
   node_memory_MemTotal_bytes < 24000000000
   ```

   To see available metrics and to test Prometheus expressions, select the help icon and follow the link to the Metrics section of the Grid Management API.

6. In the **Duration** field, enter the amount of time a condition must continuously remain in effect before the alert is triggered, and select a unit of time.

   To trigger an alert immediately when a condition becomes true, enter **0**. Increase this value to prevent temporary conditions from triggering alerts.

   The default is 5 minutes.

7. Select **Save**.

   The dialog box closes, and the new custom alert rule appears in the Alert Rules table.

Edit alert rules

You can edit an alert rule to change the trigger conditions, For a custom alert rule, you can also update the rule name, description, and recommended actions.

Before you begin

- You are signed in to the Grid Manager using a supported web browser.
- You have the Manage alerts or Root access permission.

About this task

When you edit a default alert rule, you can change the conditions for minor, major, and critical alerts; and the duration. When you edit a custom alert rule, you can also edit the rule's name, description, and recommended actions.

Be careful when deciding to edit an alert rule. If you change trigger values, you might not detect an underlying problem until it prevents a critical operation from completing.

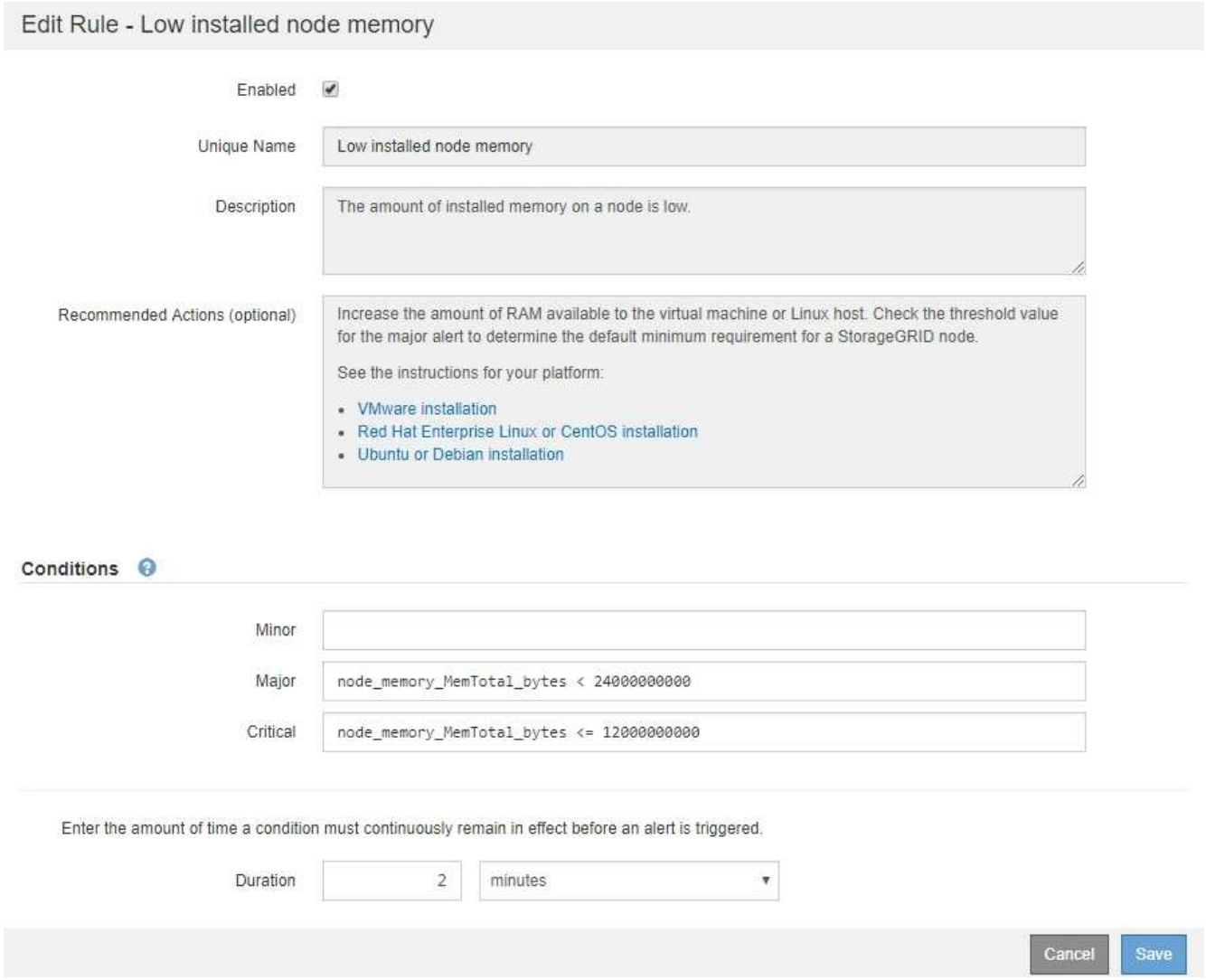
Steps

1. Select **ALERTS** > **Rules**.

   The Alert Rules page appears.

2. Select the radio button for the alert rule you want to edit.
3. Select **Edit rule**.

   The Edit Rule dialog box appears. This example shows a default alert rule—the Unique Name, Description, and Recommended Actions fields are disabled and can't be edited.



4. Select or clear the **Enabled** checkbox to determine if this alert rule is currently enabled.

   If an alert rule is disabled, its expressions aren't evaluated and no alerts are triggered.

   If you disable the alert rule for a current alert, you must wait a few minutes for the alert to no longer appear as an active alert.

In general, disabling a default alert rule is not recommended. If an alert rule is disabled, you might not detect an underlying problem until it prevents a critical operation from completing.

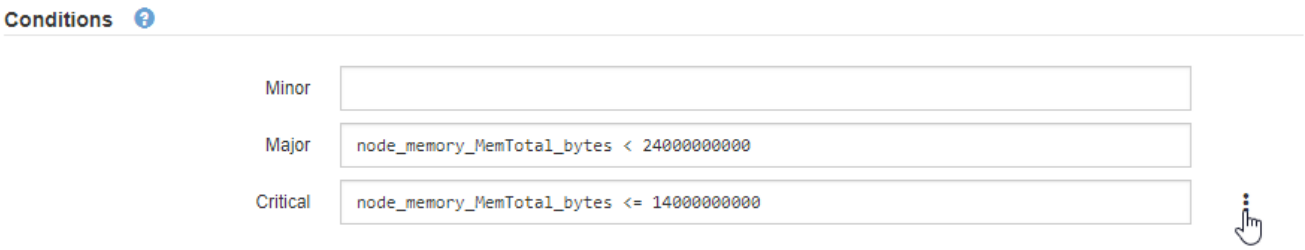
5. For custom alert rules, update the following information as required.

You can't edit this information for default alert rules.

Field	Description
Unique Name	A unique name for this rule. The alert rule name is shown on the Alerts page and is also the subject for email notifications. Names for alert rules can be between 1 and 64 characters.
Description	A description of the problem that is occurring. The description is the alert message shown on the Alerts page and in email notifications. Descriptions for alert rules can be between 1 and 128 characters.
Recommended Actions	Optionally, the recommended actions to take when this alert is triggered. Enter recommended actions as plain text (no formatting codes). Recommended actions for alert rules can be between 0 and 1,024 characters.

6. In the Conditions section, enter or update the Prometheus expression for one or more of the alert severity levels.

If you want to restore a condition for an edited default alert rule back to its original value, select the three dots to the right of the modified condition.



If you update the conditions for a current alert, your changes might not be implemented until the previous condition is resolved. The next time one of the conditions for the rule is met, the alert will reflect the updated values.

A basic expression is usually of the form:

```
[metric] [operator] [value]
```

Expressions can be any length, but appear on a single line in the user interface. At least one expression is required.

This expression causes an alert to be triggered if the amount of installed RAM for a node is less than 24,000,000,000 bytes (24 GB).

```
node_memory_MemTotal_bytes < 24000000000
```

7. In the **Duration** field, enter the amount of time a condition must continuously remain in effect before the alert is triggered, and select the unit of time.

   To trigger an alert immediately when a condition becomes true, enter **0**. Increase this value to prevent temporary conditions from triggering alerts.

   The default is 5 minutes.

8. Select **Save**.

   If you edited a default alert rule, **Default*** appears in the Type column. If you disabled a default or custom alert rule, **Disabled** appears in the **Status** column.

Disable alert rules

You can change the enabled/disabled state for a default or custom alert rule.

Before you begin

- You are signed in to the Grid Manager using a supported web browser.
- You have the Manage alerts or Root access permission.

About this task

When an alert rule is disabled, its expressions aren't evaluated and no alerts are triggered.

> In general, disabling a default alert rule is not recommended. If an alert rule is disabled, you might not detect an underlying problem until it prevents a critical operation from completing.

Steps

1. Select **ALERTS** > **Rules**.

   The Alert Rules page appears.

2. Select the radio button for the alert rule you want to disable or enable.
3. Select **Edit rule**.

   The Edit Rule dialog box appears.

4. Select or clear the **Enabled** checkbox to determine if this alert rule is currently enabled.

   If an alert rule is disabled, its expressions aren't evaluated and no alerts are triggered.

   > If you disable the alert rule for a current alert, you must wait a few minutes for the alert to no longer display as an active alert.

5. Select **Save**.

   Disabled appears in the **Status** column.

Remove custom alert rules

You can remove a custom alert rule if you no longer want to use it.

Before you begin

- You are signed in to the Grid Manager using a supported web browser.
- You have the Manage alerts or Root access permission.

Steps

1. Select **ALERTS** > **Rules**.

   The Alert Rules page appears.

2. Select the radio button for the custom alert rule you want to remove.

   You can't remove a default alert rule.

3. Select **Remove custom rule**.

   A confirmation dialog box appears.

4. Select **OK** to remove the alert rule.

   Any active instances of the alert will be resolved within 10 minutes.

Manage alert notifications

Set up SNMP notifications for alerts

If you want StorageGRID to send SNMP notifications when alerts occur, you must enable the StorageGRID SNMP agent and configure one or more trap destinations.

You can use the **CONFIGURATION** > **Monitoring** > **SNMP agent** option in the Grid Manager or the SNMP endpoints for the Grid Management API to enable and configure the StorageGRID SNMP agent. The SNMP agent supports all three versions of the SNMP protocol.

To learn how to configure the SNMP agent, see Use SNMP monitoring.

After you configure the StorageGRID SNMP agent, two types of event-driven notifications can be sent:

- Traps are notifications sent by the SNMP agent that don't require acknowledgment by the management system. Traps serve to notify the management system that something has happened within StorageGRID, such as an alert being triggered. Traps are supported in all three versions of SNMP.
- Informs are similar to traps, but they require acknowledgment by the management system. If the SNMP agent does not receive an acknowledgment within a certain amount of time, it resends the inform until an acknowledgment is received or the maximum retry value has been reached. Informs are supported in SNMPv2c and SNMPv3.

Trap and inform notifications are sent when a default or custom alert is triggered at any severity level. To suppress SNMP notifications for an alert, you must configure a silence for the alert. See Silence alert notifications.

If your StorageGRID deployment includes multiple Admin Nodes, the primary Admin Node is the preferred

sender for alert notifications, AutoSupport packages, SNMP traps and informs, and legacy alarm notifications. If the primary Admin Node becomes unavailable, notifications are temporarily sent by other Admin Nodes. See What is an Admin Node?.

Set up email notifications for alerts

If you want email notifications to be sent when alerts occur, you must provide information about your SMTP server. You must also enter email addresses for the recipients of alert notifications.

Before you begin

- You are signed in to the Grid Manager using a supported web browser.
- You have the Manage alerts or Root access permission.

About this task

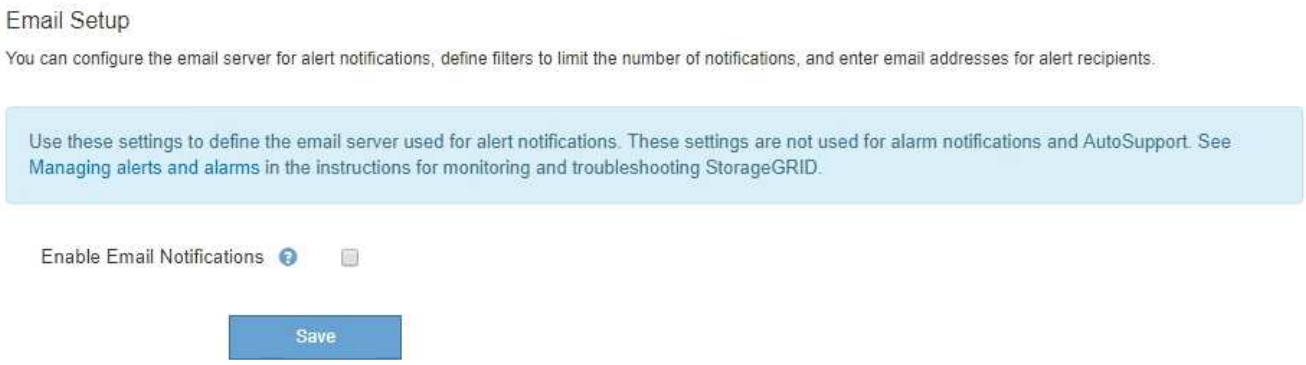
Because alarms and alerts are independent systems, the email setup used for alert notifications is not used for alarm notifications and AutoSupport packages. However, you can use the same email server for all notifications.

If your StorageGRID deployment includes multiple Admin Nodes, the primary Admin Node is the preferred sender for alert notifications, AutoSupport packages, SNMP traps and informs, and legacy alarm notifications. If the primary Admin Node becomes unavailable, notifications are temporarily sent by other Admin Nodes. See What is an Admin Node?.

Steps

1. Select **ALERTS** > **Email setup**.

   The Email Setup page appears.



2. Select the **Enable Email Notifications** checkbox to indicate that you want notification emails to be sent when alerts reach configured thresholds.

   The Email (SMTP) Server, Transport Layer Security (TLS), Email Addresses, and Filters sections appear.

3. In the Email (SMTP) Server section, enter the information StorageGRID needs to access your SMTP server.

   If your SMTP server requires authentication, you must provide both a username and a password.

Field	Enter
Mail Server	The fully qualified domain name (FQDN) or IP address of the SMTP server.
Port	The port used to access the SMTP server. Must be between 1 and 65535.
Username (optional)	If your SMTP server requires authentication, enter the username to authenticate with.
Password (optional)	If your SMTP server requires authentication, enter the password to authenticate with.

4. In the Email Addresses section, enter email addresses for the sender and for each recipient.

   a. For the **Sender Email Address**, specify a valid email address to use as the From address for alert notifications.

      For example: `storagegrid-alerts@example.com`

   b. In the Recipients section, enter an email address for each email list or person who should receive an email when an alert occurs.

      Select the plus icon ➕ to add recipients.

5. If Transport Layer Security (TLS) is required for communications with the SMTP server, select **Require TLS** in the Transport Layer Security (TLS) section.

   a. In the **CA Certificate** field, provide the CA certificate that will be used to verify the identify of the SMTP server.

You can copy and paste the contents into this field, or select **Browse** and select the file.

You must provide a single file that contains the certificates from each intermediate issuing certificate authority (CA). The file should contain each of the PEM-encoded CA certificate files, concatenated in certificate chain order.

b. Select the **Send Client Certificate** checkbox if your SMTP email server requires email senders to provide client certificates for authentication.

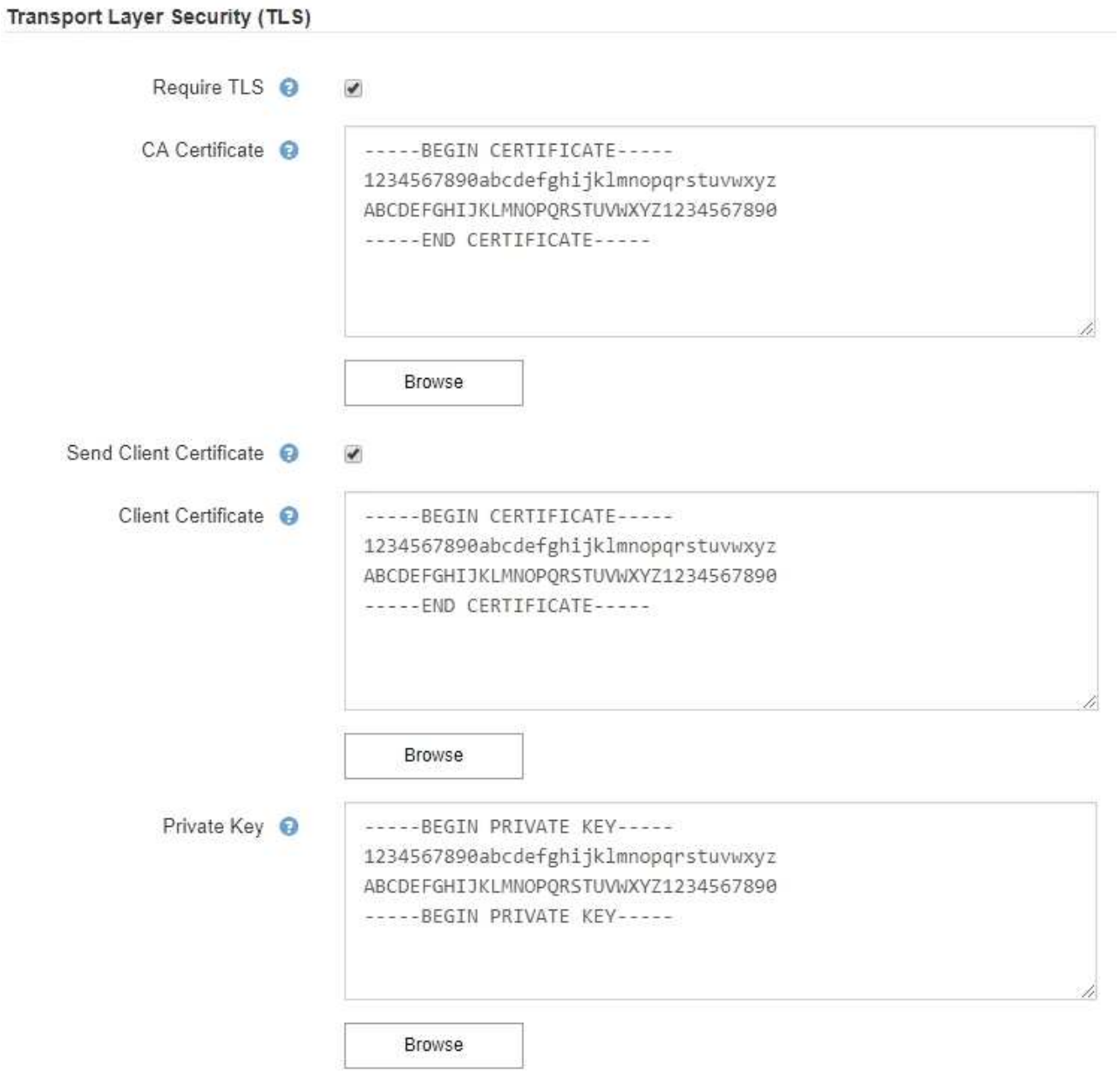
c. In the **Client Certificate** field, provide the PEM-encoded client certificate to send to the SMTP server.

You can copy and paste the contents into this field, or select **Browse** and select the file.

d. In the **Private Key** field, enter the private key for the client certificate in unencrypted PEM encoding.

You can copy and paste the contents into this field, or select **Browse** and select the file.

If you need to edit the email setup, select the pencil icon to update this field.



6. In the Filters section, select which alert severity levels should result in email notifications, unless the rule for a specific alert has been silenced.

Severity	Description
Minor, major, critical	An email notification is sent when the minor, major, or critical condition for an alert rule is met.
Major, critical	An email notification is sent when the major or critical condition for an alert rule is met. Notifications aren't sent for minor alerts.
Critical only	An email notification is sent only when the critical condition for an alert rule is met. Notifications aren't sent for minor or major alerts.

7. When you are ready to test your email settings, perform these steps:
   a. Select **Send Test Email**.

      A confirmation message appears, indicating that a test email was sent.

   b. Check the inboxes of all email recipients and confirm that a test email was received.

      If the email is not received within a few minutes or if the **Email notification failure** alert is triggered, check your settings and try again.

   c. Sign in to any other Admin Nodes and send a test email to verify connectivity from all sites.

      When you test alert notifications, you must sign in to every Admin Node to verify connectivity. This is in contrast to testing AutoSupport packages and legacy alarm notifications, where all Admin Nodes send the test email.

8. Select **Save**.

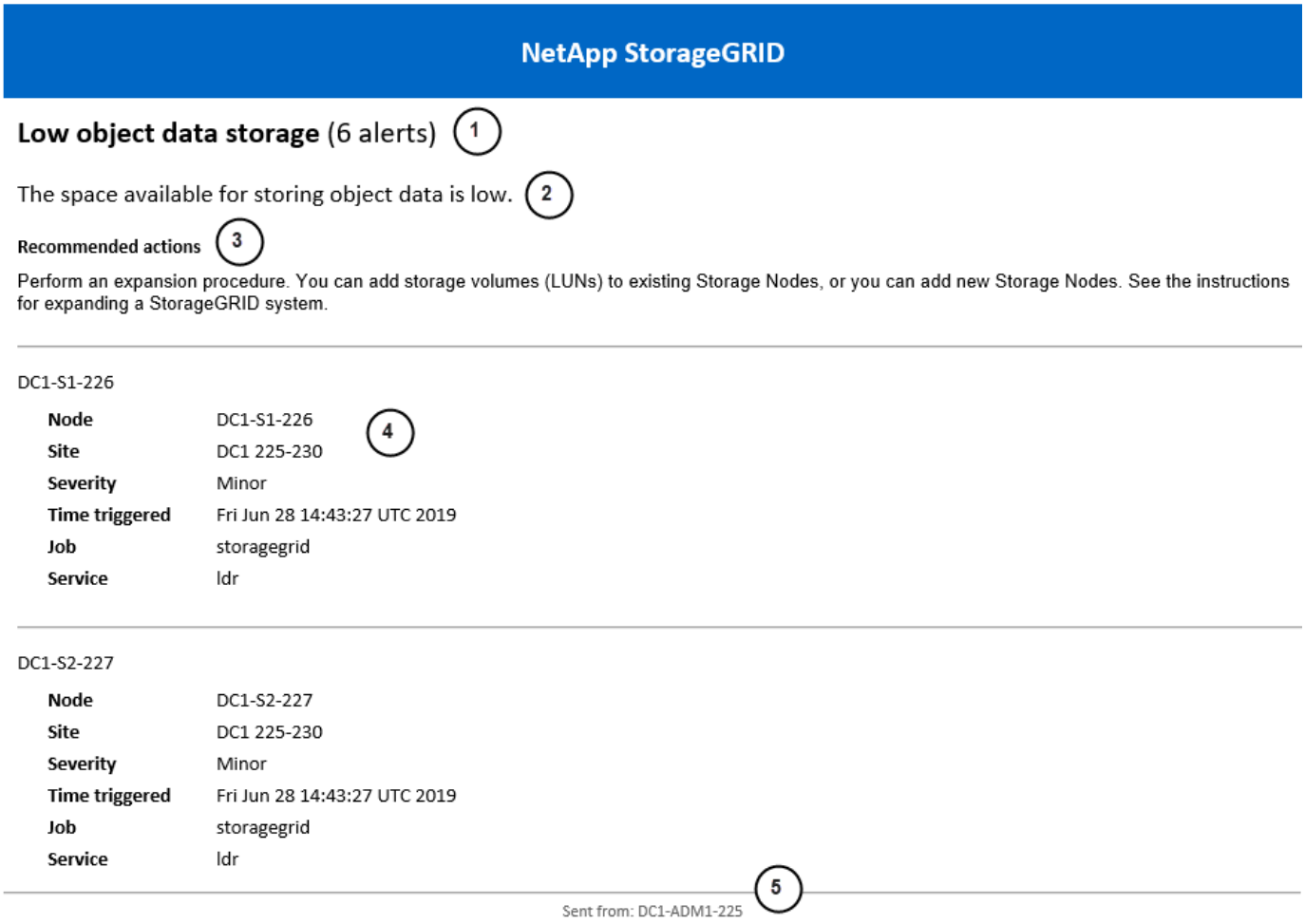
   Sending a test email does not save your settings. You must select **Save**.

   The email settings are saved.

Information included in alert email notifications

After you configure the SMTP email server, email notifications are sent to the designated recipients when an alert is triggered, unless the alert rule is suppressed by a silence. See Silence alert notifications.

Email notifications include the following information:



Callout	Description
1	The name of the alert, followed by the number of active instances of this alert.
2	The description of the alert.
3	Any recommended actions for the alert.
4	Details about each active instance of the alert, including the node and site affected, the alert severity, the UTC time when the alert rule was triggered, and the name of the affected job and service.
5	The hostname of the Admin Node that sent the notification.

How alerts are grouped

To prevent an excessive number of email notifications from being sent when alerts are triggered, StorageGRID attempts to group multiple alerts in the same notification.

Refer to the following table for examples of how StorageGRID groups multiple alerts in email notifications.

Behavior	Example
Each alert notification applies only to alerts that have the same name. If two alerts with different names are triggered at the same time, two email notifications are sent.	• Alert A is triggered on two nodes at the same time. Only one notification is sent. • Alert A is triggered on node 1, and Alert B is triggered on node 2 at the same time. Two notifications are sent—one for each alert.
For a specific alert on a specific node, if the thresholds are reached for more than one severity, a notification is sent only for the most severe alert.	• Alert A is triggered and the minor, major, and critical alert thresholds are reached. One notification is sent for the critical alert.
The first time an alert is triggered, StorageGRID waits 2 minutes before sending a notification. If other alerts with the same name are triggered during that time, StorageGRID groups all of the alerts in the initial notification.	1. Alert A is triggered on node 1 at 08:00. No notification is sent. 2. Alert A is triggered on node 2 at 08:01. No notification is sent. 3. At 08:02, a notification is sent to report both instances of the alert.
If an another alert with the same name is triggered, StorageGRID waits 10 minutes before sending a new notification. The new notification reports all active alerts (current alerts that have not been silenced), even if they were reported previously.	1. Alert A is triggered on node 1 at 08:00. A notification is sent at 08:02. 2. Alert A is triggered on node 2 at 08:05. A second notification is sent at 08:15 (10 minutes later). Both nodes are reported.
If there are multiple current alerts with the same name and one of those alerts is resolved, a new notification is not sent if the alert reoccurs on the node for which the alert was resolved.	1. Alert A is triggered for node 1. A notification is sent. 2. Alert A is triggered for node 2. A second notification is sent. 3. Alert A is resolved for node 2, but it remains active for node 1. 4. Alert A is triggered again for node 2. No new notification is sent because the alert is still active for node 1.
StorageGRID continues to send email notifications once every 7 days until all instances of the alert are resolved or the alert rule is silenced.	1. Alert A is triggered for node 1 on March 8. A notification is sent. 2. Alert A is not resolved or silenced. Additional notifications are sent on March 15, March 22, March 29, and so on.

Troubleshoot alert email notifications

If the **Email notification failure** alert is triggered or you are unable to receive the test alert email notification, follow these steps to resolve the issue.

Before you begin

- You are signed in to the Grid Manager using a supported web browser.
- You have the Manage alerts or Root access permission.

Steps

1. Verify your settings.
   a. Select **ALERTS** > **Email setup**.
   b. Verify that the Email (SMTP) Server settings are correct.
   c. Verify that you have specified valid email addresses for the recipients.
2. Check your spam filter, and make sure that the email was not sent to a junk folder.
3. Ask your email administrator to confirm that emails from the sender address aren't being blocked.
4. Collect a log file for the Admin Node, and then contact technical support.

   Technical support can use the information in the logs to help determine what went wrong. For example, the prometheus.log file might show an error when connecting to the server you specified.

   See Collect log files and system data.

Silence alert notifications

Optionally, you can configure silences to temporarily suppress alert notifications.

Before you begin

- You are signed in to the Grid Manager using a supported web browser.
- You have the Manage alerts or Root access permission.

About this task

You can silence alert rules on the entire grid, a single site, or a single node and for one or more severities. Each silence suppresses all notifications for a single alert rule or for all alert rules.

If you have enabled the SNMP agent, silences also suppress SNMP traps and informs.

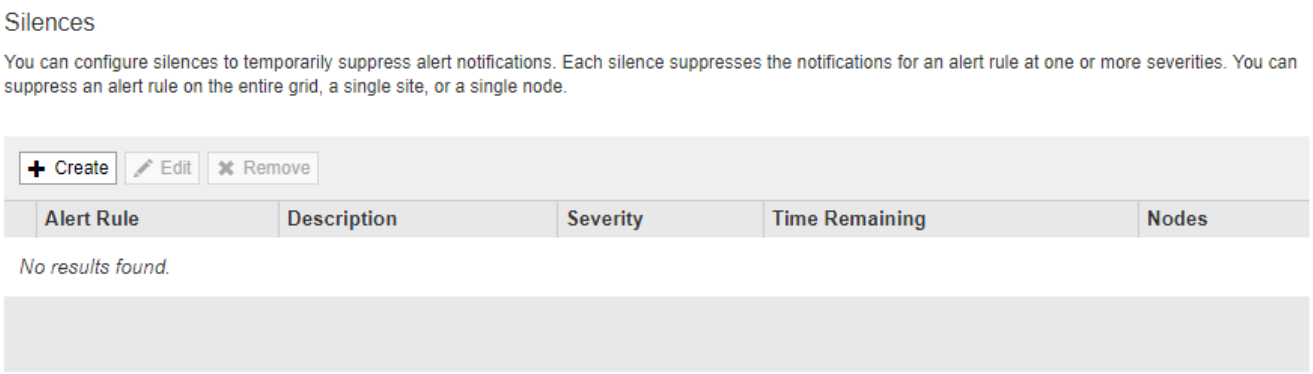
Be careful when deciding to silence an alert rule. If you silence an alert, you might not detect an underlying problem until it prevents a critical operation from completing.

Because alarms and alerts are independent systems, you can't use this functionality to suppress alarm notifications.

Steps

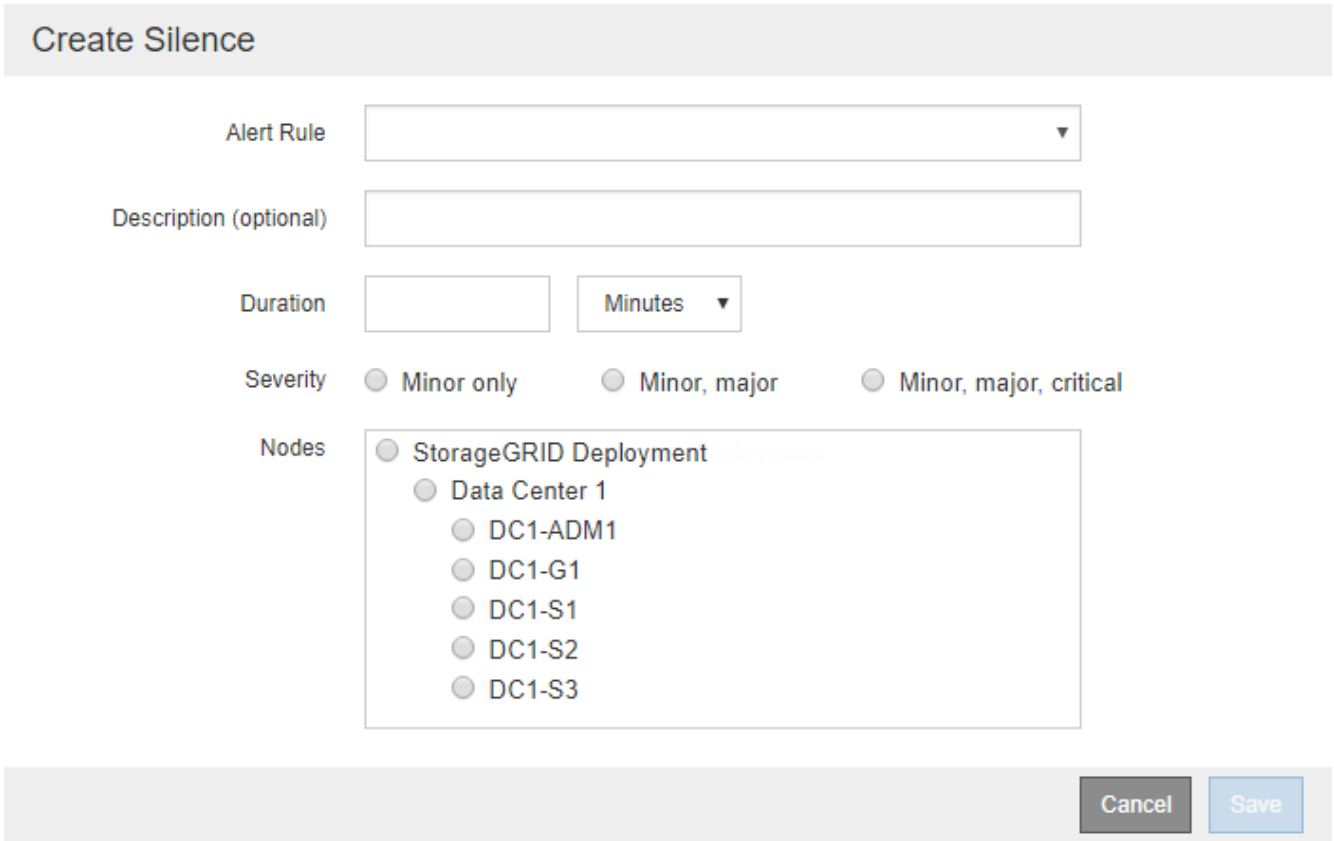
1. Select **ALERTS** > **Silences**.

   The Silences page appears.



2. Select **Create**.

   The Create Silence dialog box appears.



3. Select or enter the following information:

Field	Description
Alert Rule	The name of the alert rule you want to silence. You can select any default or custom alert rule, even if the alert rule is disabled. **Note:** Select **All rules** if you want to silence all alert rules using the criteria specified in this dialog box.
Description	Optionally, a description of the silence. For example, describe the purpose of this silence.

Field	Description
Duration	How long you want this silence to remain in effect, in minutes, hours, or days. A silence can be in effect from 5 minutes to 1,825 days (5 years). **Note:** You should not silence an alert rule for an extended amount of time. If an alert rule is silenced, you might not detect an underlying problem until it prevents a critical operation from completing. However, you might need to use an extended silence if an alert is triggered by a specific, intentional configuration, such as might be the case for the **Services appliance link down** alerts and the **Storage appliance link down** alerts.
Severity	Which alert severity or severities should be silenced. If the alert is triggered at one of the selected severities, no notifications are sent.
Nodes	Which node or nodes you want this silence to apply to. You can suppress an alert rule or all rules on the entire grid, a single site, or a single node. If you select the entire grid, the silence applies to all sites and all nodes. If you select a site, the silence applies only to the nodes at that site. **Note:** You can’t select more than one node or more than one site for each silence. You must create additional silences if you want to suppress the same alert rule on more than one node or more than one site at one time.

4. Select **Save**.
5. If you want to modify or end a silence before it expires, you can edit or remove it.

Option	Description
Edit a silence	a. Select **ALERTS** > **Silences**. b. From the table, select the radio button for the silence you want to edit. c. Select **Edit**. d. Change the description, the amount of time remaining, the selected severities, or the affected node. e. Select **Save**.
Remove a silence	a. Select **ALERTS** > **Silences**. b. From the table, select the radio button for the silence you want to remove. c. Select **Remove**. d. Select **OK** to confirm you want to remove this silence. **Note**: Notifications will now be sent when this alert is triggered (unless suppressed by another silence). If this alert is currently triggered, it might take few minutes for email or SNMP notifications to be sent and for the Alerts page to update.

Related information

- Configure the SNMP agent

Alerts reference

This reference lists the default alerts that appear in the Grid Manager. Recommended actions are in the alert message you receive.

As required, you can create custom alert rules to fit your system management approach.

Some of the default alerts use Prometheus metrics.

Appliance alerts

Alert name	Description
Appliance battery expired	The battery in the appliance's storage controller has expired.
Appliance battery failed	The battery in the appliance's storage controller has failed.
Appliance battery has insufficient learned capacity	The battery in the appliance's storage controller has insufficient learned capacity.
Appliance battery near expiration	The battery in the appliance's storage controller is nearing expiration.
Appliance battery removed	The battery in the appliance's storage controller is missing.
Appliance battery too hot	The battery in the appliance's storage controller is overheated.
Appliance BMC communication error	Communication with the baseboard management controller (BMC) has been lost.
Appliance cache backup device failed	A persistent cache backup device has failed.
Appliance cache backup device insufficient capacity	There is insufficient cache backup device capacity.
Appliance cache backup device write-protected	A cache backup device is write-protected.
Appliance cache memory size mismatch	The two controllers in the appliance have different cache sizes.
Appliance compute controller chassis temperature too high	The temperature of the compute controller in a StorageGRID appliance has exceeded a nominal threshold.

Alert name	Description
Appliance compute controller CPU temperature too high	The temperature of the CPU in the compute controller in a StorageGRID appliance has exceeded a nominal threshold.
Appliance compute controller needs attention	A hardware fault has been detected in the compute controller of a StorageGRID appliance.
Appliance compute controller power supply A has a problem	Power supply A in the compute controller has a problem.
Appliance compute controller power supply B has a problem	Power supply B in the compute controller has a problem.
Appliance compute hardware monitor service stalled	The service that monitors storage hardware status has stalled.
Appliance DAS drive exceeding limit for data written per day	An excessive amount of data is being written to a drive each day, which might void its warranty.
Appliance DAS drive fault detected	A problem was detected with a direct-attached storage (DAS) drive in the appliance.
Appliance DAS drive locator light on	The drive locator light for one or more direct-attached storage (DAS) drives in an appliance Storage Node is on.
Appliance DAS drive rebuilding	A direct-attached storage (DAS) drive is rebuilding. This is expected if it was recently replaced or removed/reinserted.
Appliance fan fault detected	A problem with a fan unit in the appliance was detected.
Appliance Fibre Channel fault detected	A Fibre Channel link problem has been detected between the appliance storage controller and compute controller
Appliance Fibre Channel HBA port failure	A Fibre Channel HBA port is failing or has failed.
Appliance flash cache drives non-optimal	The drives used for the SSD cache are non-optimal.
Appliance interconnect/battery canister removed	The interconnect/battery canister is missing.
Appliance LACP port missing	A port on a StorageGRID appliance is not participating in the LACP bond.

Alert name	Description
Appliance NIC fault detected	A problem with a network interface card (NIC) in the appliance was detected.
Appliance overall power supply degraded	The power of a StorageGRID appliance has deviated from the recommended operating voltage.
Appliance SSD critical warning	An appliance SSD is reporting a critical warning.
Appliance storage controller A failure	Storage controller A in a StorageGRID appliance has failed.
Appliance storage controller B failure	Storage controller B in a StorageGRID appliance has failed.
Appliance storage controller drive failure	One or more drives in a StorageGRID appliance has failed or is not optimal.
Appliance storage controller hardware issue	SANtricity software is reporting "Needs attention" for a component in a StorageGRID appliance.
Appliance storage controller power supply A failure	Power supply A in a StorageGRID appliance has deviated from the recommended operating voltage.
Appliance storage controller power supply B failure	Power supply B in a StorageGRID appliance has deviated from the recommended operating voltage.
Appliance storage hardware monitor service stalled	The service that monitors storage hardware status has stalled.
Appliance storage shelves degraded	The status of one of the components in the storage shelf for a storage appliance is degraded.
Appliance temperature exceeded	The nominal or maximum temperature for the appliance’s storage controller has been exceeded.
Appliance temperature sensor removed	A temperature sensor has been removed.
Appliance UEFI secure boot error	An appliance has not been booted securely.
Disk I/O is very slow	Very slow disk I/O may be impacting grid performance.
Storage appliance fan fault detected	A problem with a fan unit in the storage controller for an appliance was detected.

Alert name	Description
Storage appliance storage connectivity degraded	There is a problem with one or more connections between the compute controller and storage controller.
Storage device inaccessible	A storage device cannot be accessed.

Audit and syslog alerts

Alert name	Description
Audit logs are being added to the in-memory queue	Node cannot send logs to the local syslog server and the in-memory queue is filling up.
External syslog server forwarding error	Node cannot forward logs to the external syslog server.
Large audit queue	The disk queue for audit messages is full. If this condition is not addressed, S3 or Swift operations might fail.
Logs are being added to the on-disk queue	Node cannot forward logs to the external syslog server and the on-disk queue is filling up.

Bucket alerts

Alert name	Description
FabricPool bucket has unsupported bucket consistency setting	A FabricPool bucket uses the Available or Strong-site consistency level, which is not supported.

Cassandra alerts

Alert name	Description
Cassandra auto-compactor error	The Cassandra auto-compactor has experienced an error.
Cassandra auto-compactor metrics out of date	The metrics that describe the Cassandra auto-compactor are out of date.
Cassandra communication error	The nodes that run the Cassandra service are having trouble communicating with each other.
Cassandra compactions overloaded	The Cassandra compaction process is overloaded.
Cassandra oversize write error	An internal StorageGRID process sent a write request to Cassandra that was too large.

Alert name	Description
Cassandra repair metrics out of date	The metrics that describe Cassandra repair jobs are out of date.
Cassandra repair progress slow	The progress of Cassandra database repairs is slow.
Cassandra repair service not available	The Cassandra repair service is not available.
Cassandra table corruption	Cassandra has detected table corruption. Cassandra automatically restarts if it detects table corruption.

Cloud Storage Pool alerts

Alert name	Description
Cloud Storage Pool connectivity error	The health check for Cloud Storage Pools detected one or more new errors.

Cross-grid replication alerts

Alert name	Description
Cross-grid replication permanent failure	A cross-grid replication error occurred that requires user intervention to resolve.
Cross-grid replication resources unavailable	Cross-grid replication requests are pending because a resource is unavailable.

DHCP alerts

Alert name	Description
DHCP lease expired	The DHCP lease on a network interface has expired.
DHCP lease expiring soon	The DHCP lease on a network interface is expiring soon.
DHCP server unavailable	The DHCP server is unavailable.

Debug and trace alerts

Alert name	Description
Debug performance impact	When debug mode is enabled, system performance might be negatively impacted.

Alert name	Description
Trace configuration enabled	When trace configuration is enabled, system performance might be negatively impacted.

Email and AutoSupport alerts

Alert name	Description
AutoSupport message failed to send	The most recent AutoSupport message failed to send.
Email notification failure	The email notification for an alert could not be sent.

Erasure coding (EC) alerts

Alert name	Description
EC rebalance failure	The EC rebalance procedure has failed or has been stopped.
EC repair failure	A repair job for EC data has failed or has been stopped.
EC repair stalled	A repair job for EC data has stalled.

Expiration of certificates alerts

Alert name	Description
Admin Proxy CA certificate expiration	One or more certificates in the admin proxy server CA bundle is about to expire.
Expiration of client certificate	One or more client certificates are about to expire.
Expiration of global server certificate for S3 and Swift	The global server certificate for S3 and Swift is about to expire.
Expiration of load balancer endpoint certificate	One or more load balancer endpoint certificates are about to expire.
Expiration of server certificate for Management interface	The server certificate used for the management interface is about to expire.
External syslog CA certificate expiration	The certificate authority (CA) certificate used to sign the external syslog server certificate is about to expire.

Alert name	Description
External syslog client certificate expiration	The client certificate for an external syslog server is about to expire.
External syslog server certificate expiration	The server certificate presented by the external syslog server is about to expire.

Grid Network alerts

Alert name	Description
Grid Network MTU mismatch	The MTU setting for the Grid Network interface (eth0) differs significantly across nodes in the grid.

Grid federation alerts

Alert name	Description
Expiration of grid federation certificate	One or more grid federation certificates are about to expire.
Grid federation connection failure	The grid federation connection between the local and remote grid is not working.

High usage or high latency alerts

Alert name	Description
High Java heap use	A high percentage of Java heap space is being used.
High latency for metadata queries	The average time for Cassandra metadata queries is too long.

Identity federation alerts

Alert name	Description
Identity federation synchronization failure	Unable to synchronize federated groups and users from the identity source.
Identity federation synchronization failure for a tenant	Unable to synchronize federated groups and users from the identity source configured by a tenant.

Information lifecycle management (ILM) alerts

Alert name	Description
ILM placement unachievable	A placement instruction in an ILM rule cannot be achieved for certain objects.
ILM scan period too long	The time required to scan, evaluate, and apply ILM to objects is too long.
ILM scan rate low	The ILM scan rate is set to less than 100 objects/second.

Key management server (KMS) alerts

Alert name	Description
KMS CA certificate expiration	The certificate authority (CA) certificate used to sign the key management server (KMS) certificate is about to expire.
KMS client certificate expiration	The client certificate for a key management server is about to expire
KMS configuration failed to load	The configuration for the key management server exists but failed to load.
KMS connectivity error	An appliance node could not connect to the key management server for its site.
KMS encryption key name not found	The configured key management server does not have an encryption key that matches the name provided.
KMS encryption key rotation failed	All appliance volumes were successfully decrypted, but one or more volumes could not rotate to the latest key.
KMS is not configured	No key management server exists for this site.
KMS key failed to decrypt an appliance volume	One or more volumes on an appliance with node encryption enabled could not be decrypted with the current KMS key.
KMS server certificate expiration	The server certificate used by the key management server (KMS) is about to expire.

Local clock offset alerts

Alert name	Description
Local clock large time offset	The offset between local clock and Network Time Protocol (NTP) time is too large.

Low memory or low space alerts

Alert name	Description
Low audit log disk capacity	The space available for audit logs is low. If this condition is not addressed, S3 or Swift operations might fail.
Low available node memory	The amount of RAM available on a node is low.
Low free space for storage pool	The space available for storing object data in the Storage Node is low.
Low installed node memory	The amount of installed memory on a node is low.
Low metadata storage	The space available for storing object metadata is low.
Low metrics disk capacity	The space available for the metrics database is low.
Low object data storage	The space available for storing object data is low.
Low read-only watermark override	The Storage Volume Soft Read-Only Watermark Override is less than the minimum optimized watermark for a Storage Node.
Low root disk capacity	The space available on the root disk is low.
Low system data capacity	The space available for /var/local is low. If this condition is not addressed, S3 or Swift operations might fail.
Low tmp directory free space	The space available in the /tmp directory is low.

Node or node network alerts

Alert name	Description
Admin Network receive usage	The receive usage on the Admin Network is high.
Admin Network transmit usage	The transmit usage on the Admin Network is high.
Firewall configuration failure	Failed to apply firewall configuration.
Management interface endpoints in fallback mode	All management interface endpoints have been falling back to the default ports for too long.
Node network connectivity error	Errors have occurred while transferring data between nodes.
Node network reception frame error	A high percentage of the network frames received by a node had errors.

Alert name	Description
Node not in sync with NTP server	The node is not in sync with the network time protocol (NTP) server.
Node not locked with NTP server	The node is not locked to a network time protocol (NTP) server.
Non-appliance node network down	One or more network devices are down or disconnected.
Services appliance link down on Admin Network	The appliance interface to the Admin Network (eth1) is down or disconnected.
Services appliance link down on Admin Network port 1	The Admin Network port 1 on the appliance is down or disconnected.
Services appliance link down on Client Network	The appliance interface to the Client Network (eth2) is down or disconnected.
Services appliance link down on network port 1	Network port 1 on the appliance is down or disconnected.
Services appliance link down on network port 2	Network port 2 on the appliance is down or disconnected.
Services appliance link down on network port 3	Network port 3 on the appliance is down or disconnected.
Services appliance link down on network port 4	Network port 4 on the appliance is down or disconnected.
Storage appliance link down on Admin Network	The appliance interface to the Admin Network (eth1) is down or disconnected.
Storage appliance link down on Admin Network port 1	The Admin Network port 1 on the appliance is down or disconnected.
Storage appliance link down on Client Network	The appliance interface to the Client Network (eth2) is down or disconnected.
Storage appliance link down on network port 1	Network port 1 on the appliance is down or disconnected.
Storage appliance link down on network port 2	Network port 2 on the appliance is down or disconnected.
Storage appliance link down on network port 3	Network port 3 on the appliance is down or disconnected.

Alert name	Description
Storage appliance link down on network port 4	Network port 4 on the appliance is down or disconnected.
Storage Node not in desired storage state	The LDR service on a Storage Node cannot transition to the desired state because of an internal error or volume related issue
TCP connection usage	The number of TCP connections on this node is approaching the maximum number that can be tracked.
Unable to communicate with node	One or more services are unresponsive, or the node cannot be reached.
Unexpected node reboot	A node rebooted unexpectedly within the last 24 hours.

Object alerts

Alert name	Description
Object existence check failed	The object existence check job has failed.
Object existence check stalled	The object existence check job has stalled.
Objects lost	One or more objects have been lost from the grid.
S3 PUT object size too large	A client is attempting a PUT Object operation that exceeds S3 size limits.
Unidentified corrupt object detected	A file was found in replicated object storage that could not be identified as a replicated object.

Platform services alerts

Alert name	Description
Platform Services pending request capacity low	The number of Platform Services pending requests is approaching capacity.
Platform services unavailable	Too few Storage Nodes with the RSM service are running or available at a site.

Storage volume alerts

Alert name	Description
Storage volume needs attention	A storage volume is offline and needs attention.

Alert name	Description
Storage volume needs to be restored	A storage volume has been recovered and needs to be restored.
Storage volume offline	A storage volume has been offline for more than 5 minutes, possibly because the node rebooted during the volume formatting step.
Volume Restoration failed to start replicated data repair	Replicated data repair for a repaired volume couldn't be started automatically.

StorageGRID services alerts

Alert name	Description
nginx service using backup configuration	The configuration of the nginx service is invalid. The previous configuration is now being used.
nginx-gw service using backup configuration	The configuration of the nginx-gw service is invalid. The previous configuration is now being used.
Reboot required to disable FIPS	The security policy does not require FIPS mode, but the NetApp Cryptographic Security Module is enabled.
Reboot required to enable FIPS	The security policy requires FIPS mode, but the NetApp Cryptographic Security Module is disabled.
SSH service using backup configuration	The configuration of the SSH service is invalid. The previous configuration is now being used.

Tenant alerts

Alert name	Description
Tenant quota usage high	A high percentage of quota space is being used. This rule is disabled by default because it might cause too many notifications.

Commonly used Prometheus metrics

Refer to this list of commonly used Prometheus metrics to better understand conditions in the default alert rules or to construct the conditions for custom alert rules.

You can also obtain a complete list of all metrics.

For details on the syntax of Prometheus queries, see Querying Prometheus.

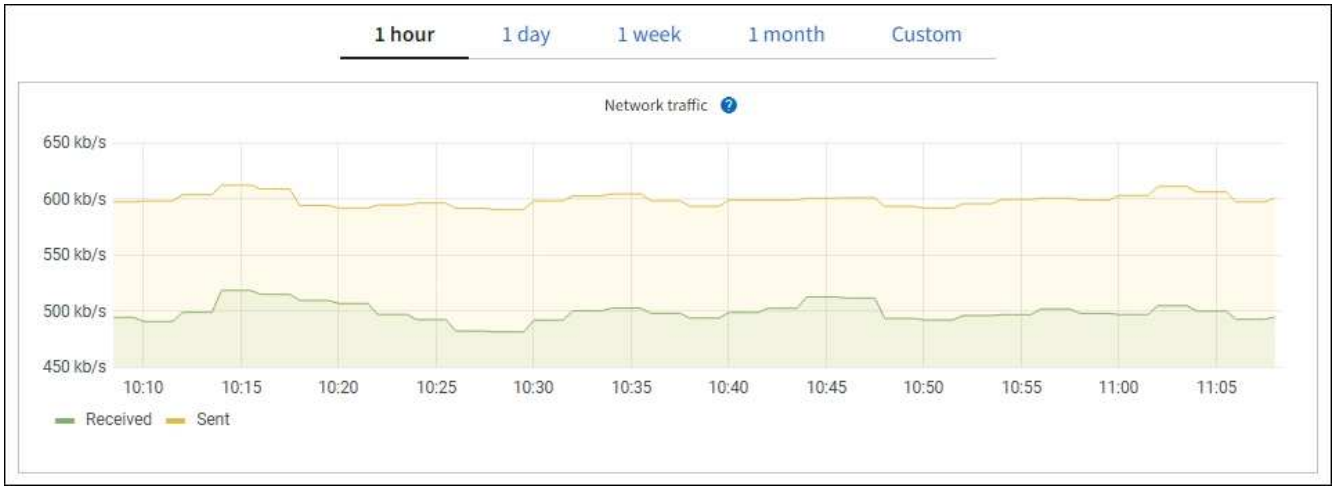
What are Prometheus metrics?

Prometheus metrics are time series measurements. The Prometheus service on Admin Nodes collects these metrics from the services on all nodes. Metrics are stored on each Admin Node until the space reserved for Prometheus data is full. When the `/var/local/mysql_ibdata/` volume reaches capacity, the oldest metrics are deleted first.

Where are Prometheus metrics used?

The metrics collected by Prometheus are used in several places in the Grid Manager:

- **Nodes page**: The graphs and charts on the tabs available from the Nodes page use the Grafana visualization tool to display the time-series metrics collected by Prometheus. Grafana displays time-series data in graph and chart formats, while Prometheus serves as the backend data source.



- **Alerts**: Alerts are triggered at specific severity levels when alert rule conditions that use Prometheus metrics evaluate as true.
- **Grid Management API**: You can use Prometheus metrics in custom alert rules or with external automation tools to monitor your StorageGRID system. A complete list of Prometheus metrics is available from the Grid Management API. (From the top of the Grid Manager, select the help icon and select **API documentation** > **metrics**.) While more than a thousand metrics are available, only a relatively small number are required to monitor the most critical StorageGRID operations.

> Metrics that include *private* in their names are intended for internal use only and are subject to change between StorageGRID releases without notice.

- The **SUPPORT** > **Tools** > **Diagnostics** page and the **SUPPORT** > **Tools** > **Metrics** page: These pages, which are primarily intended for use by technical support, provide several tools and charts that use the values of Prometheus metrics.

> Some features and menu items within the Metrics page are intentionally non-functional and are subject to change.

List of most common metrics

The following list contains the most commonly used Prometheus metrics.

Metrics that include *private* in their names are for internal use only and are subject to change without notice between StorageGRID releases.

alertmanager_notifications_failed_total

The total number of failed alert notifications.

node_filesystem_avail_bytes

The amount of file system space available to non-root users in bytes.

node_memory_MemAvailable_bytes

Memory information field MemAvailable_bytes.

node_network_carrier

Carrier value of `/sys/class/net/iface`.

node_network_receive_errs_total

Network device statistic `receive_errs`.

node_network_transmit_errs_total

Network device statistic `transmit_errs`.

storagegrid_administratively_down

The node is not connected to the grid for an expected reason. For example, the node, or services on the node, has been gracefully shut down, the node is rebooting, or the software is being upgraded.

storagegrid_appliance_compute_controller_hardware_status

The status of the compute controller hardware in an appliance.

storagegrid_appliance_failed_disks

For the storage controller in an appliance, the number of drives that aren't optimal.

storagegrid_appliance_storage_controller_hardware_status

The overall status of the storage controller hardware in an appliance.

storagegrid_content_buckets_and_containers

The total number of S3 buckets and Swift containers known by this Storage Node.

storagegrid_content_objects

The total number of S3 and Swift data objects known by this Storage Node. Count is valid only for data objects created by client applications that interface with the system through S3 or Swift.

storagegrid_content_objects_lost

The total number of objects this service detects as missing from the StorageGRID system. Action should be taken to determine the cause of the loss and if recovery is possible.

Troubleshoot lost and missing object data

storagegrid_http_sessions_incoming_attempted

The total number of HTTP sessions that have been attempted to a Storage Node.

storagegrid_http_sessions_incoming_currently_established

The number of HTTP sessions that are currently active (open) on the Storage Node.

storagegrid_http_sessions_incoming_failed

The total number of HTTP sessions that failed to complete successfully, either due to a malformed HTTP request or a failure while processing an operation.

storagegrid_http_sessions_incoming_successful

The total number of HTTP sessions that have completed successfully.

storagegrid_ilm_awaiting_background_objects

The total number of objects on this node awaiting ILM evaluation from the scan.

storagegrid_ilm_awaiting_client_evaluation_objects_per_second

The current rate at which objects are evaluated against the ILM policy on this node.

storagegrid_ilm_awaiting_client_objects

The total number of objects on this node awaiting ILM evaluation from client operations (for example, ingest).

storagegrid_ilm_awaiting_total_objects

The total number of objects awaiting ILM evaluation.

storagegrid_ilm_scan_objects_per_second

The rate at which objects owned by this node are scanned and queued for ILM.

storagegrid_ilm_scan_period_estimated_minutes

The estimated time to complete a full ILM scan on this node.

Note: A full scan does not guarantee that ILM has been applied to all objects owned by this node.

storagegrid_load_balancer_endpoint_cert_expiry_time

The expiration time of the load balancer endpoint certificate in seconds since the epoch.

storagegrid_metadata_queries_average_latency_milliseconds

The average time required to run a query against the metadata store through this service.

storagegrid_network_received_bytes

The total amount of data received since installation.

storagegrid_network_transmitted_bytes

The total amount of data sent since installation.

storagegrid_node_cpu_utilization_percentage

The percentage of available CPU time currently being used by this service. Indicates how busy the service is. The amount of available CPU time depends on the number of CPUs for the server.

storagegrid_ntp_chosen_time_source_offset_milliseconds

Systematic offset of time provided by a chosen time source. Offset is introduced when the delay to reach a time source is not equal to the time required for the time source to reach the NTP client.

storagegrid_ntp_locked

The node is not locked to a Network Time Protocol (NTP) server.

storagegrid_s3_data_transfers_bytes_ingested

The total amount of data ingested from S3 clients to this Storage Node since the attribute was last reset.

storagegrid_s3_data_transfers_bytes_retrieved

The total amount of data retrieved by S3 clients from this Storage Node since the attribute was last reset.

storagegrid_s3_operations_failed

The total number of failed S3 operations (HTTP status codes 4xx and 5xx), excluding those caused by S3 authorization failure.

storagegrid_s3_operations_successful

The total number of successful S3 operations (HTTP status code 2xx).

storagegrid_s3_operations_unauthorized

The total number of failed S3 operations that are the result of an authorization failure.

storagegrid_servercertificate_management_interface_cert_expiry_days

The number of days before the Management Interface certificate expires.

storagegrid_servercertificate_storage_api_endpoints_cert_expiry_days

The number of days before the Object Storage API certificate expires.

storagegrid_service_cpu_seconds

The cumulative amount of time that the CPU has been used by this service since installation.

storagegrid_service_memory_usage_bytes

The amount of memory (RAM) currently in use by this service. This value is identical to that displayed by the Linux top utility as RES.

storagegrid_service_network_received_bytes

The total amount of data received by this service since installation.

storagegrid_service_network_transmitted_bytes

The total amount of data sent by this service.

storagegrid_service_restarts

The total number of times the service has been restarted.

storagegrid_service_runtime_seconds

The total amount of time that the service has been running since installation.

storagegrid_service_uptime_seconds

The total amount of time the service has been running since it was last restarted.

storagegrid_storage_state_current

The current state of the storage services. Attribute values are:

- 10 = Offline

- 15 = Maintenance
- 20 = Read-only
- 30 = Online

storagegrid_storage_status

The current status of the storage services. Attribute values are:

- 0 = No Errors
- 10 = In Transition
- 20 = Insufficient Free Space
- 30 = Volume(s) Unavailable
- 40 = Error

storagegrid_storage_utilization_data_bytes

An estimate of the total size of replicated and erasure-coded object data on the Storage Node.

storagegrid_storage_utilization_metadata_allowed_bytes

The total space on volume 0 of each Storage Node that is allowed for object metadata. This value is always less than the actual space reserved for metadata on a node, because a portion of the reserved space is required for essential database operations (such as compaction and repair) and future hardware and software upgrades.The allowed space for object metadata controls overall object capacity.

storagegrid_storage_utilization_metadata_bytes

The amount of object metadata on storage volume 0, in bytes.

storagegrid_storage_utilization_total_space_bytes

The total amount of storage space allocated to all object stores.

storagegrid_storage_utilization_usable_space_bytes

The total amount of object storage space remaining. Calculated by adding together the amount of available space for all object stores on the Storage Node.

storagegrid_swift_data_transfers_bytes_ingested

The total amount of data ingested from Swift clients to this Storage Node since the attribute was last reset.

storagegrid_swift_data_transfers_bytes_retrieved

The total amount of data retrieved by Swift clients from this Storage Node since the attribute was last reset.

storagegrid_swift_operations_failed

The total number of failed Swift operations (HTTP status codes 4xx and 5xx), excluding those caused by Swift authorization failure.

storagegrid_swift_operations_successful

The total number of successful Swift operations (HTTP status code 2xx).

storagegrid_swift_operations_unauthorized

The total number of failed Swift operations that are the result of an authorization failure (HTTP status codes 401, 403, 405).

storagegrid_tenant_usage_data_bytes

The logical size of all objects for the tenant.

storagegrid_tenant_usage_object_count

The number of objects for the tenant.

storagegrid_tenant_usage_quota_bytes

The maximum amount of logical space available for the tenant's objects. If a quota metric is not provided, an unlimited amount of space is available.

Get a list of all metrics

To obtain the complete list of metrics, use the Grid Management API.

1. From the top of the Grid Manager, select the help icon and select **API documentation**.
2. Locate the **metrics** operations.
3. Execute the `GET /grid/metric-names` operation.
4. Download the results.

Manage alarms (legacy system)

Manage alarms (legacy system)

The StorageGRID alarm system is the legacy system used to identify trouble spots that sometimes occur during normal operation.

While the legacy alarm system continues to be supported, the alert system offers significant benefits and is easier to use.

Alarm classes (legacy system)

A legacy alarm can belong to one of two mutually exclusive alarm classes.

- Default alarms are provided with each StorageGRID system and can't be modified. However, you can disable Default alarms or override them by defining Global Custom alarms.
- Global Custom alarms monitor the status of all services of a given type in the StorageGRID system. You can create a Global Custom alarm to override a Default alarm. You can also create a new Global Custom alarm. This can be useful for monitoring any customized conditions of your StorageGRID system.

Alarm triggering logic (legacy system)

A legacy alarm is triggered when a StorageGRID attribute reaches a threshold value that evaluates to true against a combination of alarm class (Default or Global Custom) and alarm severity level.

Icon	Color	Alarm severity	Meaning
	Yellow	Notice	The node is connected to the grid, but an unusual condition exists that does not affect normal operations.

Icon	Color	Alarm severity	Meaning
	Light Orange	Minor	The node is connected to the grid, but an abnormal condition exists that could affect operation in the future. You should investigate to prevent escalation.
	Dark Orange	Major	The node is connected to the grid, but an abnormal condition exists that currently affects operation. This requires prompt attention to prevent escalation.
	Red	Critical	The node is connected to the grid, but an abnormal condition exists that has stopped normal operations. You should address the issue immediately.

The alarm severity and corresponding threshold value can be set for every numerical attribute. The NMS service on each Admin Node continuously monitors current attribute values against configured thresholds. When an alarm is triggered, a notification is sent to all designated personnel.

Note that a severity level of Normal does not trigger an alarm.

Attribute values are evaluated against the list of enabled alarms defined for that attribute. The list of alarms is checked in the following order to find the first alarm class with a defined and enabled alarm for the attribute:

1. Global Custom alarms with alarm severities from Critical down to Notice.
2. Default alarms with alarm severities from Critical down to Notice.

After an enabled alarm for an attribute is found in the higher alarm class, the NMS service only evaluates within that class. The NMS service will not evaluate against the other lower priority classes. That is, if there is an enabled Global Custom alarm for an attribute, the NMS service only evaluates the attribute value against Global Custom alarms. Default alarms aren't evaluated. Thus, an enabled Default alarm for an attribute can meet the criteria needed to trigger an alarm, but it will not be triggered because a Global Custom alarm (that does not meet the specified criteria) for the same attribute is enabled. No alarm is triggered and no notification is sent.

Alarm triggering example

You can use this example to understand how Global Custom alarms and Default alarms are triggered.

For the following example, an attribute has a Global Custom alarm and a Default alarm defined and enabled as shown in the following table.

	Global Custom alarm threshold (enabled)	Default alarm threshold (enabled)
Notice	>= 1500	>= 1000
Minor	>= 15,000	>= 1000
Major	>=150,000	>= 250,000

If the attribute is evaluated when its value is 1000, no alarm is triggered and no notification is sent.

The Global Custom alarm takes precedence over the Default alarm. A value of 1000 does not reach the threshold value of any severity level for the Global Custom alarm. As a result, the alarm level is evaluated to be Normal.

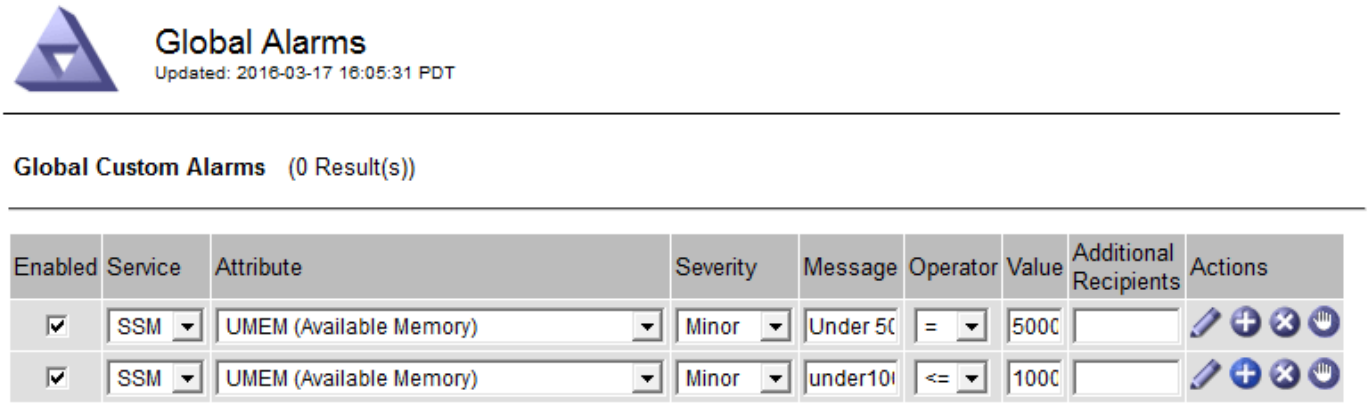
After the above scenario, if the Global Custom alarm is disabled, nothing changes. The attribute value must be reevaluated before a new alarm level is triggered.

With the Global Custom alarm disabled, when the attribute value is reevaluated, the attribute value is evaluated against the threshold values for the Default alarm. The alarm level triggers a Notice level alarm and an email notification is sent to the designated personnel.

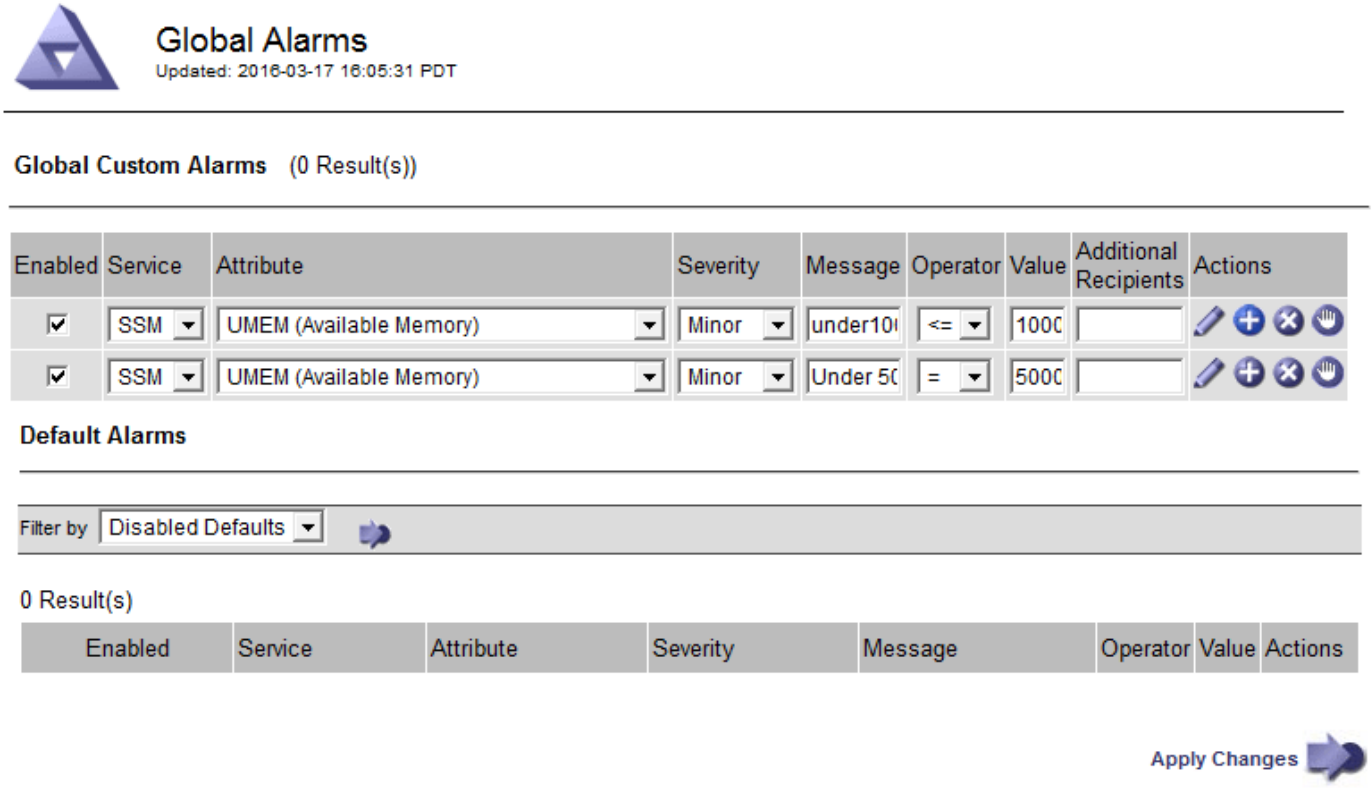
Alarms of same severity

If two Global Custom alarms for the same attribute have the same severity, the alarms are evaluated with a "top down" priority.

For instance, if UMEM drops to 50MB, the first alarm is triggered (= 50000000), but not the one below it (<=100000000).



If the order is reversed, when UMEM drops to 100MB, the first alarm (<=100000000) is triggered, but not the one below it (= 50000000).



Notifications

A notification reports the occurrence of an alarm or the change of state for a service. Alarm notifications can be sent in email or using SNMP.

To avoid multiple alarms and notifications being sent when an alarm threshold value is reached, the alarm severity is checked against the current alarm severity for the attribute. If there is no change, then no further action is taken. This means that as the NMS service continues to monitor the system, it will only raise an alarm and send notifications the first time it notices an alarm condition for an attribute. If a new value threshold for the attribute is reached and detected, the alarm severity changes and a new notification is sent. Alarms are cleared when conditions return to the Normal level.

The trigger value shown in the notification of an alarm state is rounded to three decimal places. Therefore, an attribute value of 1.9999 triggers an alarm whose threshold is less than (<) 2.0, although the alarm notification shows the trigger value as 2.0.

New services

As new services are added through the addition of new grid nodes or sites, they inherit Default alarms and Global Custom alarms.

Alarms and tables

Alarm attributes displayed in tables can be disabled at the system level. Alarms can't be disabled for individual rows in a table.

For example, the following table shows two critical Entries Available (VMFI) alarms. (Select **SUPPORT** > **Tools** > **Grid topology**. Then, select ***Storage Node*** > **SSM** > **Resources**.)

You can disable the VMFI alarm so that the Critical level VMFI alarm is not triggered (both currently Critical alarms would appear in the table as green); however, you can't disable a single alarm in a table row so that

one VMFI alarm displays as a Critical level alarm while the other remains green.

Volumes

Mount Point	Device	Status	Size	Space Available	Total Entries	Entries Available	Write Cache
/	sda1	Online	10.6 GB	7.46 GB	655,360	559,263	Enabled
/var/local	sda3	Online	63.4 GB	59.4 GB	3,932,160	3,931,842	Unknown
/var/local/rangedb/0	sdb	Online	53.4 GB	53.4 GB	52,428,800	52,427,856	Enabled
/var/local/rangedb/1	sdc	Online	53.4 GB	53.4 GB	52,428,800	52,427,848	Enabled
/var/local/rangedb/2	sdd	Online	53.4 GB	53.4 GB	52,428,800	52,427,856	Enabled

Acknowledge current alarms (legacy system)

Legacy alarms are triggered when system attributes reach alarm threshold values. Optionally, if you want to reduce or clear the list of legacy alarms, you can acknowledge the alarms.

Before you begin

- You must be signed in to the Grid Manager using a supported web browser.
- You must have the Acknowledge alarms permission.

About this task

Because the legacy alarm system continues to be supported, the list of legacy alarms on the Current Alarms page is increased whenever a new alarm occurs. You can typically ignore the alarms (because alerts provide a better view of the system), or you can acknowledge the alarms.

> Optionally, when you have completely transitioned to the alert system, you can disable each legacy alarm to prevent it from being triggered and added to the count of legacy alarms.

When you acknowledge an alarm, it is no longer listed on the Current Alarms page in the Grid Manager, unless the alarm is triggered at the next severity level or it is resolved and occurs again.

> While the legacy alarm system continues to be supported, the alert system offers significant benefits and is easier to use.

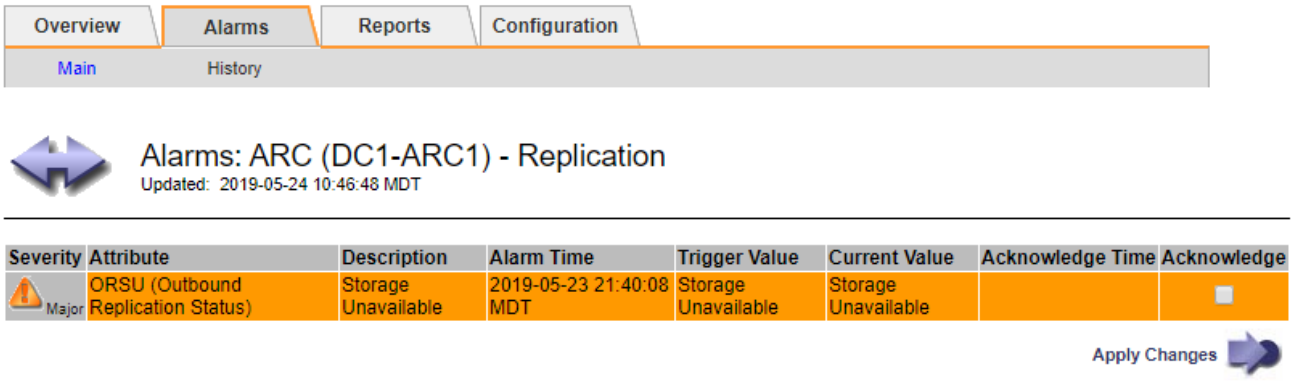
Steps

1. Select **SUPPORT** > **Alarms (legacy)** > **Current alarms**.

2. Select the service name in the table.

   The Alarms tab for the selected service appears (**SUPPORT** > **Tools** > **Grid topology** > ***Grid Node*** >

Service > **Alarms**).



3. Select the **Acknowledge** checkbox for the alarm, and click **Apply Changes**.

   The alarm no longer appears on the dashboard or the Current Alarms page.

   When you acknowledge an alarm, the acknowledgment is not copied to other Admin Nodes. For this reason, if you view the dashboard from another Admin Node, you might continue to see the active alarm.

4. As required, view acknowledged alarms.
   a. Select **SUPPORT** > **Alarms (legacy)** > **Current alarms**.
   b. Select **Show Acknowledged Alarms**.

      Any acknowledged alarms are shown.

View Default alarms (legacy system)

You can view the list of all Default legacy alarms.

Before you begin

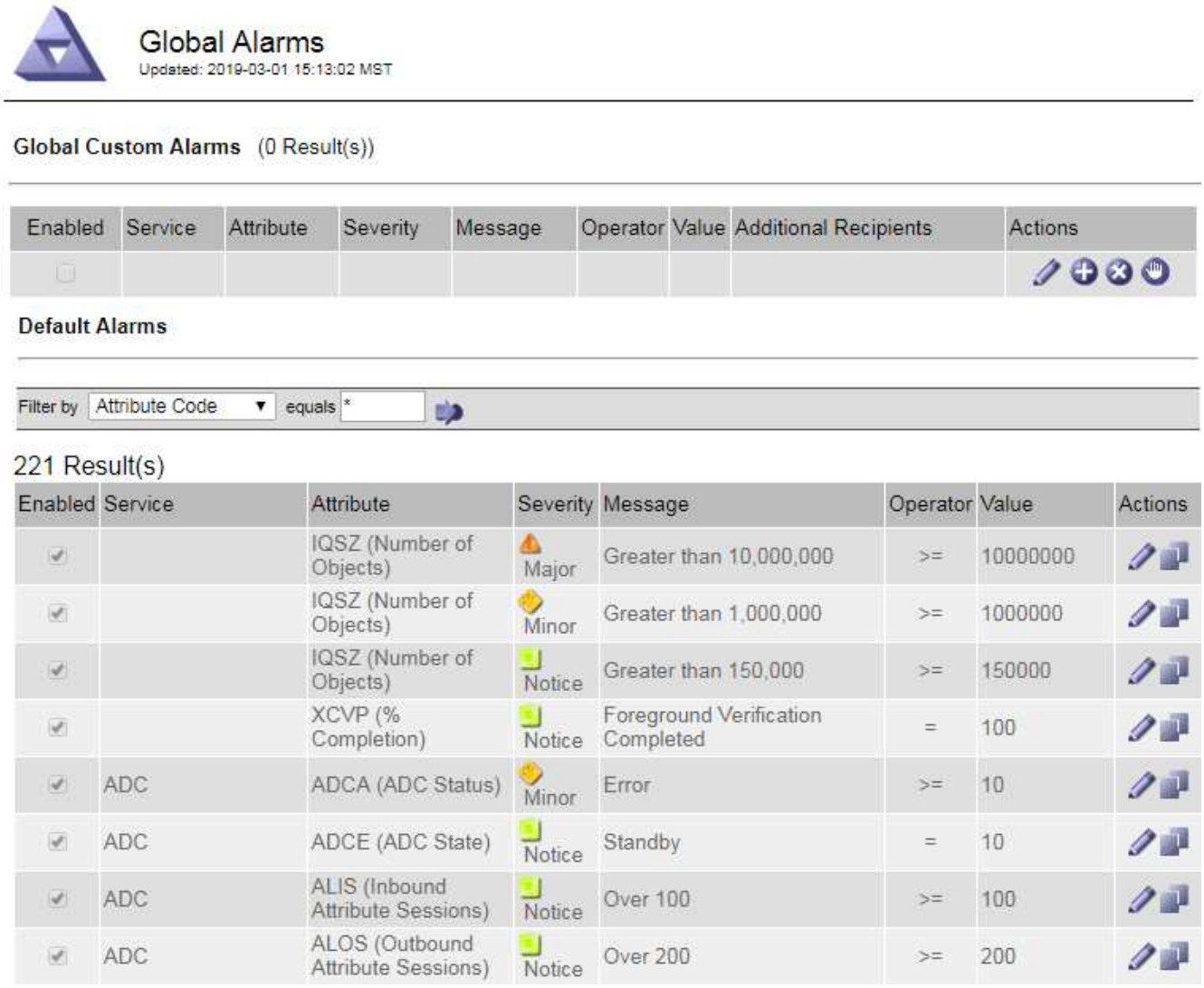
- You must be signed in to the Grid Manager using a supported web browser.
- You have specific access permissions.

While the legacy alarm system continues to be supported, the alert system offers significant benefits and is easier to use.

Steps

1. Select **SUPPORT** > **Alarms (legacy)** > **Global alarms**.
2. For Filter by, select **Attribute Code** or **Attribute Name**.
3. For equals, enter an asterisk: *
4. Click the arrow or press **Enter**.

   All Default alarms are listed.



Review historical alarms and alarm frequency (legacy system)

When troubleshooting an issue, you can review how often a legacy alarm was triggered in the past.

Before you begin

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

> While the legacy alarm system continues to be supported, the alert system offers significant benefits and is easier to use.

Steps

1. Follow these steps to get a list of all alarms triggered over a period of time.
   a. Select **SUPPORT** > **Alarms (legacy)** > **Historical alarms**.
   b. Do one of the following:
      - Click one of the time periods.
      - Enter a custom range, and click **Custom Query**.
2. Follow these steps to find out how often alarms have been triggered for a particular attribute.
   a. Select **SUPPORT** > **Tools** > **Grid topology**.
   b. Select ***grid node*** > ***service or component*** > **Alarms** > **History**.
   c. Select the attribute from the list.
   d. Do one of the following:
      - Click one of the time periods.
      - Enter a custom range, and click **Custom Query**.

      The alarms are listed in reverse chronological order.
   e. To return to the alarms history request form, click **History**.

Create Global Custom alarms (legacy system)

You might have used Global Custom alarms for the legacy system to address specific monitoring requirements. Global Custom alarms might have alarm levels that override Default alarms, or they might monitor attributes that don't have a Default alarm.

Before you begin

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

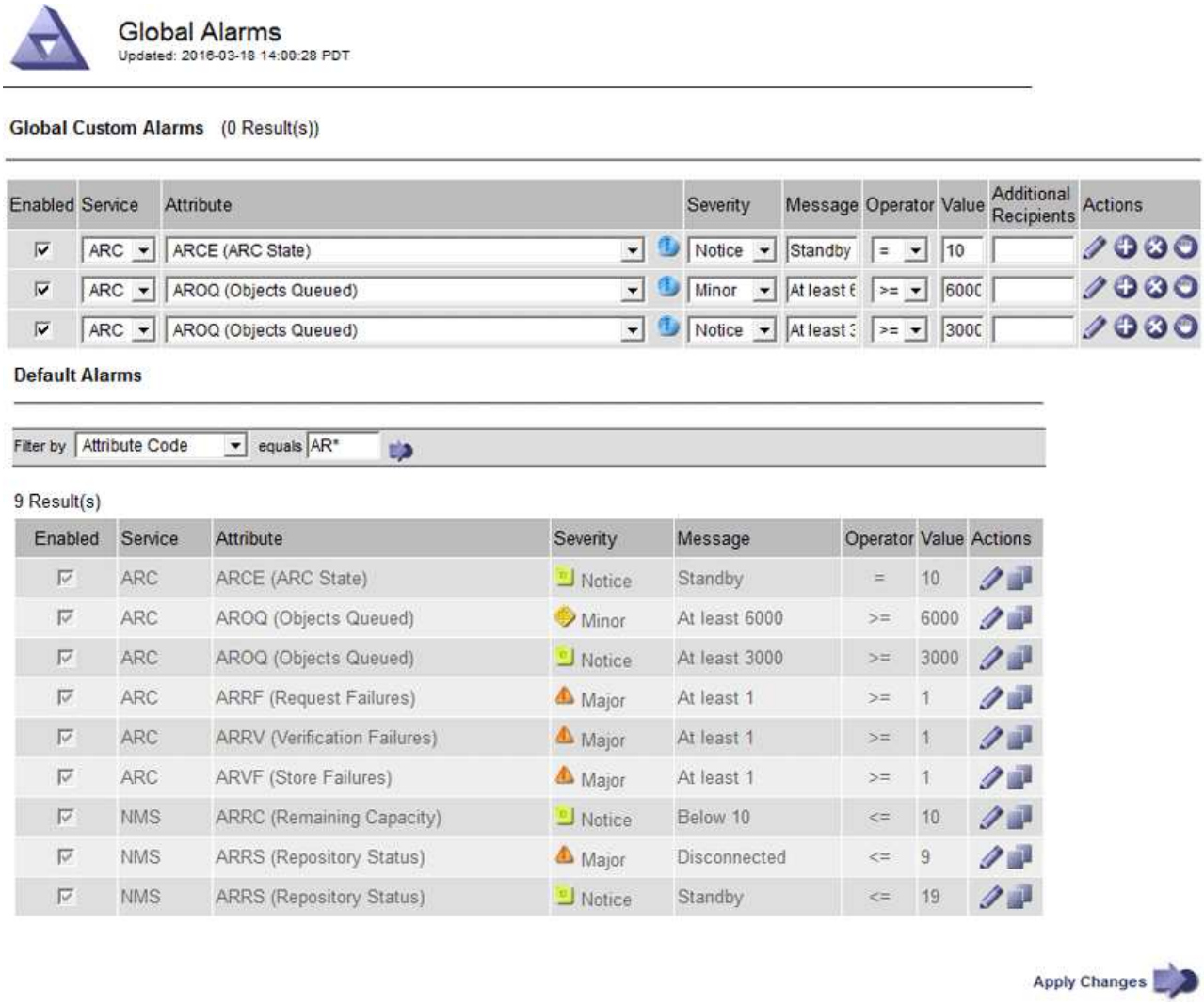
> While the legacy alarm system continues to be supported, the alert system offers significant benefits and is easier to use.

Global Custom alarms override Default alarms. You should not change Default alarm values unless absolutely necessary. By changing Default alarms, you run the risk of concealing problems that might otherwise trigger an alarm.

> Be careful if you change alarm settings. For example, if you increase the threshold value for an alarm, you might not detect an underlying problem. Discuss your proposed changes with technical support before changing an alarm setting.

Steps

1. Select **SUPPORT** > **Alarms (legacy)** > **Global alarms**.
2. Add a new row to the Global Custom alarms table:
   - To add a new alarm, click **Edit** (if this is the first entry) or **Insert**.



- To modify a Default alarm, search for the Default alarm.
  i. Under Filter by, select either **Attribute Code** or **Attribute Name**.
  ii. Type a search string.

  Specify four characters or use wildcards (for example, A??? or AB*). Asterisks (*) represent multiple characters, and question marks (?) represent a single character.

  iii. Click the arrow , or press **Enter**.
  iv. In the list of results, click **Copy** next to the alarm you want to modify.

  The Default alarm is copied to the Global Custom alarms table.

3. Make any necessary changes to the Global Custom alarms settings:

Heading	Description
Enabled	Select or clear the checkbox to enable or disable the alarm.

Heading	Description
Attribute	Select the name and code of the attribute being monitored from the list of all attributes applicable to the selected service or component. To display information about the attribute, click **Info** next to the attribute's name.
Severity	The icon and text indicating the level of the alarm.
Message	The reason for the alarm (connection lost, storage space below 10%, and so on).
Operator	Operators for testing the current attribute value against the Value threshold: • = equals • > greater than • < less than • >= greater than or equal to • <= less than or equal to • ≠ not equal to
Value	The alarm's threshold value used to test against the attribute's actual value using the operator. The entry can be a single number, a range of numbers specified with a colon (1:3), or a comma-delineated list of numbers and ranges.
Additional Recipients	A supplementary list of email addresses to be notified when the alarm is triggered. This is in addition to the mailing list configured on the **Alarms** > **Email Setup** page. Lists are comma delineated. **Note:** Mailing lists require SMTP server setup to operate. Before adding mailing lists, confirm that SMTP is configured. Notifications for Custom alarms can override notifications from Global Custom or Default alarms.
Actions	Control buttons to: Edit a row + Insert a row + Delete a row + Drag a row up or down + Copy a row

4. Click **Apply Changes**.

Disable alarms (legacy system)

The alarms in the legacy alarm system are enabled by default, but you can disable alarms that aren't required. You can also disable the legacy alarms after you have completely transitioned to the new alert system.

> While the legacy alarm system continues to be supported, the alert system offers significant benefits and is easier to use.

Disable a Default alarm (legacy system)

You can disable one of the legacy Default alarms for the entire system.

Before you begin

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

About this task

Disabling an alarm for an attribute that currently has an alarm triggered does not clear the current alarm. The alarm will be disabled the next time the attribute crosses the alarm threshold, or you can clear the triggered alarm.

> Don't disable any of the legacy alarms until you have completely transitioned to the new alert system. Otherwise, you might not detect an underlying problem until it has prevented a critical operation from completing.

Steps

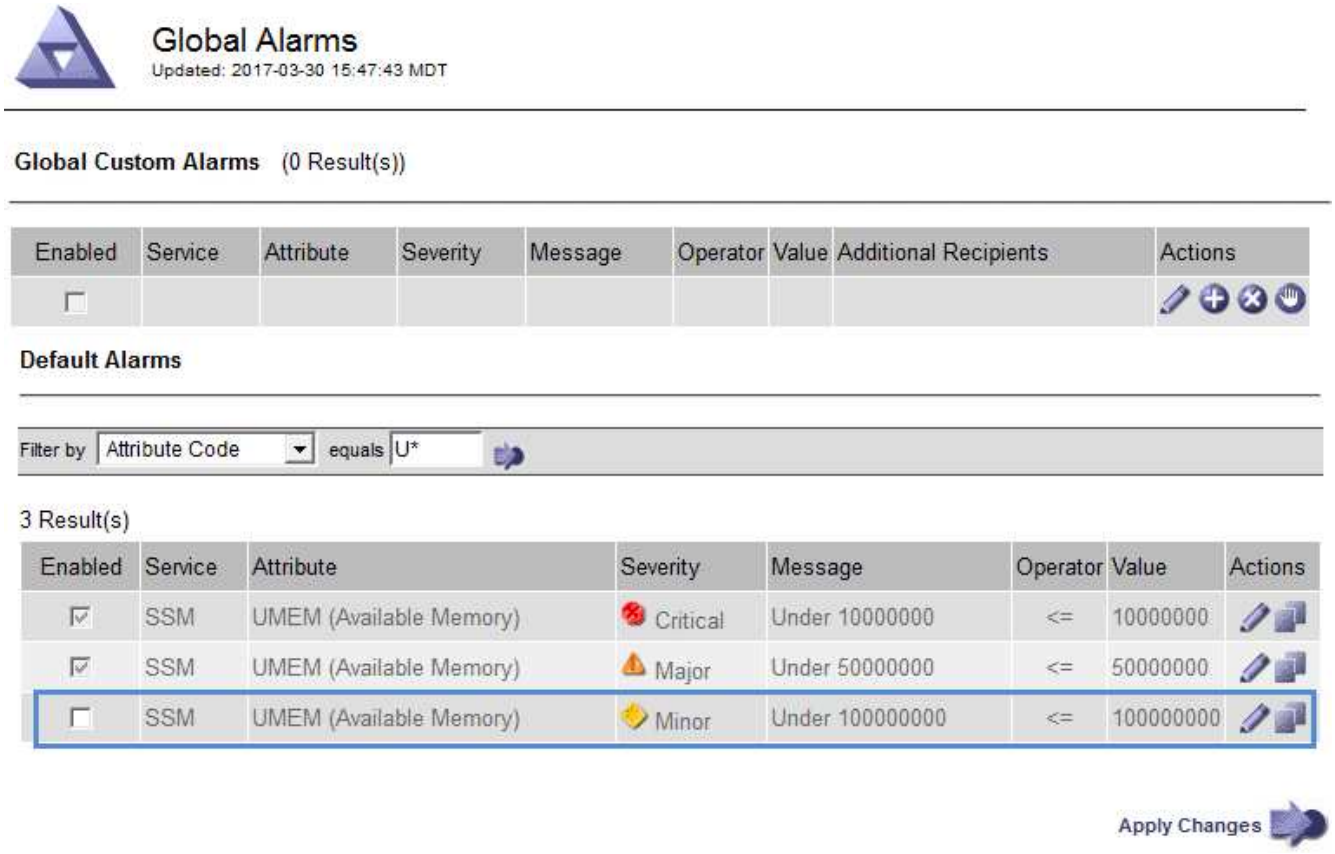
1. Select **SUPPORT** > **Alarms (legacy)** > **Global alarms**.
2. Search for the Default alarm to disable.
   a. In the Default Alarms section, select **Filter by** > **Attribute Code** or **Attribute Name**.
   b. Type a search string.

      Specify four characters or use wildcards (for example, A??? or AB*). Asterisks (*) represent multiple characters, and question marks (?) represent a single character.

   c. Click the arrow, or press **Enter**.

      > Selecting **Disabled Defaults** displays a list of all currently disabled Default alarms.

3. From the search results table, click the Edit icon for the alarm you want to disable.



The **Enabled** checkbox for the selected alarm becomes active.

4. Clear the **Enabled** checkbox.
5. Click **Apply Changes**.

   The Default alarm is disabled.

Disable Global Custom alarms (legacy system)

You can disable a legacy Global Custom alarm for the entire system.

Before you begin

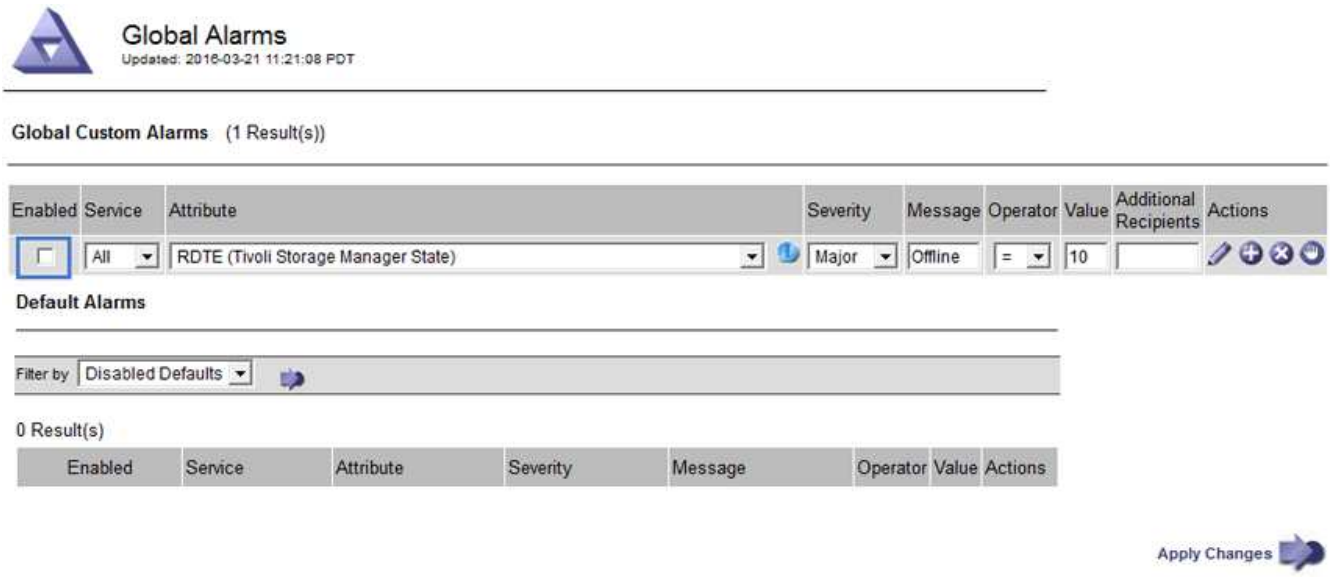
- You must be signed in to the Grid Manager using a supported web browser.
- You have specific access permissions.

About this task

Disabling an alarm for an attribute that currently has an alarm triggered does not clear the current alarm. The alarm will be disabled the next time the attribute crosses the alarm threshold, or you can clear the triggered alarm.

Steps

1. Select **SUPPORT** > **Alarms (legacy)** > **Global alarms**.
2. In the Global Custom Alarms table, click **Edit** next to the alarm you want to disable.
3. Clear the **Enabled** checkbox.



4. Click **Apply Changes**.

   The Global Custom alarm is disabled.

Clear triggered alarms (legacy system)

If a legacy alarm is triggered, you can clear it instead of acknowledging it.

Before you begin

- You must have the `Passwords.txt` file.

Disabling an alarm for an attribute that currently has an alarm triggered against it does not clear the alarm. The alarm will be disabled the next time the attribute changes. You can acknowledge the alarm or, if you want to immediately clear the alarm rather than wait for the attribute value to change (resulting in a change to the alarm state), you can clear the triggered alarm. You might find this helpful if you want to clear an alarm immediately against an attribute whose value does not change often (for example, state attributes).

1. Disable the alarm.
2. Log in to the primary Admin Node:
   a. Enter the following command: *`ssh admin@primary_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 `#`.
3. Restart the NMS service: `service nms restart`
4. Log out of the Admin Node: `exit`

   The alarm is cleared.

Configure notifications for alarms (legacy system)

StorageGRID system can automatically send email and SNMP notifications when an alarm is triggered or a service state changes.

By default, alarm email notifications aren't sent. For email notifications, you must configure the email server and specify the email recipients. For SNMP notifications, you must configure the SNMP agent.

Types of alarm notifications (legacy system)

When a legacy alarm is triggered, the StorageGRID system sends out two types of alarm notifications: severity level and service state.

Severity level notifications

An alarm email notification is sent when a legacy alarm is triggered at a selected severity level:

- Notice
- Minor
- Major
- Critical

A mailing list receives all notifications related to the alarm for the selected severity. A notification is also sent when the alarm leaves the alarm level — either by being resolved or by entering a different alarm severity level.

Service state notifications

A service state notification is sent when a service (for example, the LDR service or NMS service) enters the selected service state and when it leaves the selected service state. Service state notifications are send when a service enters or leaves ones of the following service states:

- Unknown
- Administratively Down

A mailing list receives all notifications related to changes in the selected state.

Configure email server settings for alarms (legacy system)

If you want StorageGRID to send email notifications when a legacy alarm is triggered, you must specify the SMTP mail server settings. The StorageGRID system only sends email; it can't receive email.

Before you begin

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

About this task

Use these settings to define the SMTP server used for legacy alarm email notifications and AutoSupport email messages. These settings aren't used for alert notifications.

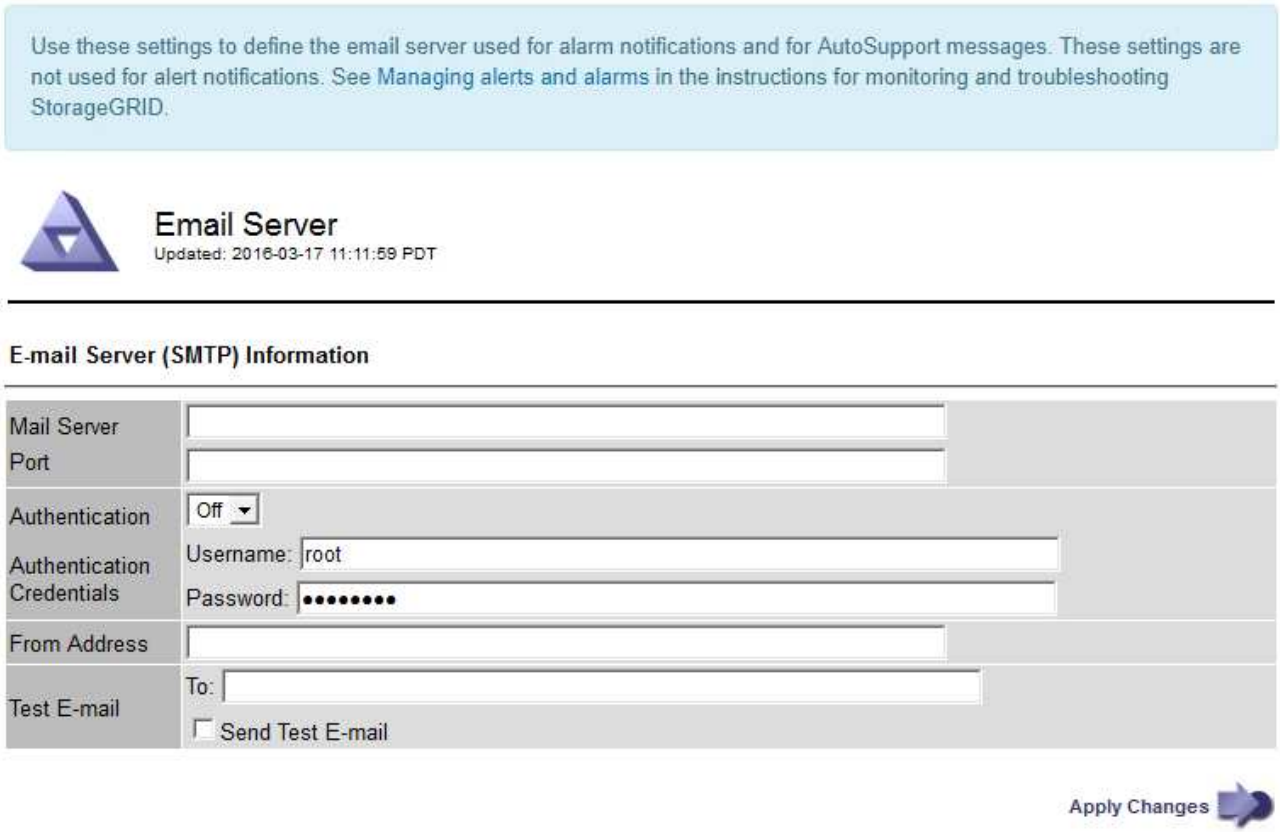
> If you use SMTP as the protocol for AutoSupport packages, you might have already configured an SMTP mail server. The same SMTP server is used for alarm email notifications, so you can skip this procedure. See the instructions for administering StorageGRID.

SMTP is the only protocol supported for sending email.

Steps

1. Select **SUPPORT** > **Alarms (legacy)** > **Legacy email setup**.
2. From the Email menu, select **Server**.

   The Email Server page appears. This page is also used to configure the email server for AutoSupport packages.



3. Add the following SMTP mail server settings:

Item	Description
Mail Server	IP address of the SMTP mail server. You can enter a hostname rather than an IP address if you have previously configured DNS settings on the Admin Node.
Port	Port number to access the SMTP mail server.
Authentication	Allows for the authentication of the SMTP mail server. By default, authentication is Off.
Authentication Credentials	Username and password of the SMTP mail server. If Authentication is set to On, a username and password to access the SMTP mail server must be provided.

4. Under **From Address**, enter a valid email address that the SMTP server will recognize as the sending email address. This is the official email address from which the email message is sent.
5. Optionally, send a test email to confirm that your SMTP mail server settings are correct.
   a. In the **Test E-mail** > **To** box, add one or more addresses that you can access.

      You can enter a single email address or a comma-delineated list of email addresses. Because the NMS service does not confirm success or failure when a test email is sent, you must be able to check the test recipient's inbox.

   b. Select **Send Test E-mail**.
6. Click **Apply Changes**.

   The SMTP mail server settings are saved. If you entered information for a test email, that email is sent. Test emails are sent to the mail server immediately and aren't sent through the notifications queue. In a system with multiple Admin Nodes, each Admin Node sends an email. Receipt of the test email confirms that your SMTP mail server settings are correct and that the NMS service is successfully connecting to the mail server. A connection problem between the NMS service and the mail server triggers the legacy MINS (NMS Notification Status) alarm at the Minor severity level.

Create alarm email templates (legacy system)

Email templates let you customize the header, footer, and subject line of a legacy alarm email notification. You can use email templates to send unique notifications that contain the same body text to different mailing lists.

Before you begin

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

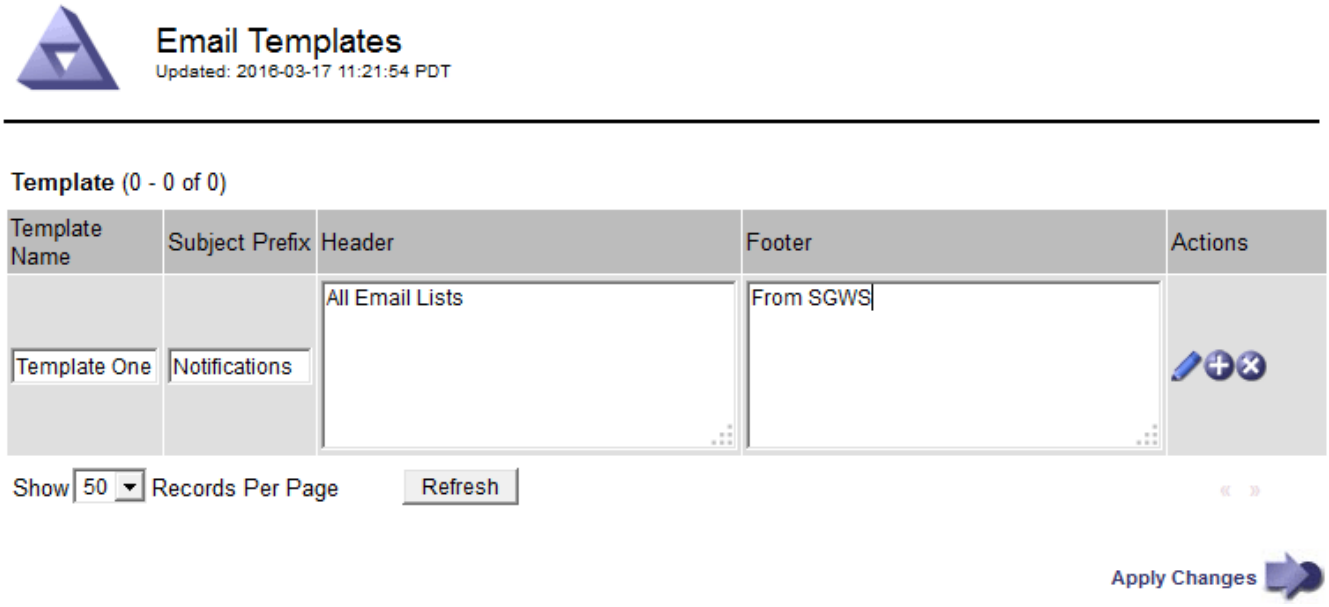
About this task

Use these settings to define the email templates used for legacy alarm notifications. These settings aren't used for alert notifications.

Different mailing lists might require different contact information. Templates don't include the body text of the email message.

Steps

1. Select **SUPPORT** > **Alarms (legacy)** > **Legacy email setup**.
2. From the Email menu, select **Templates**.
3. Click **Edit** (or **Insert** if this is not the first template).



4. In the new row add the following:

Item	Description
Template Name	Unique name used to identify the template. Template names can't be duplicated.
Subject Prefix	Optional. Prefix that will appear at the beginning of an email's subject line. Prefixes can be used to easily configure email filters and organize notifications.
Header	Optional. Header text that appears at the beginning of the email message body. Header text can be used to preface the content of the email message with information such as company name and address.
Footer	Optional. Footer text that appears at the end of the email message body. Footer text can be used to close the email message with reminder information such as a contact phone number or a link to a web site.

5. Click **Apply Changes**.

   A new template for notifications is added.

Create mailing lists for alarm notifications (legacy system)

Mailing lists let you notify recipients when a legacy alarm is triggered or when a service state changes. You must create at least one mailing list before any alarm email notifications can be sent. To send a notification to a single recipient, create a mailing list with one email address.

Before you begin

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

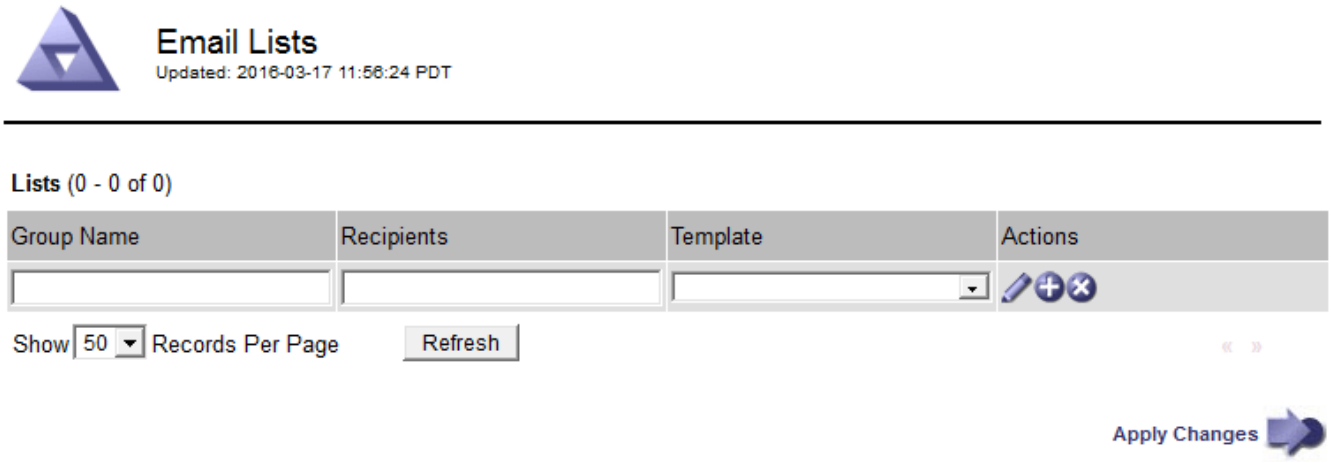
- If you want to specify an email template for the mailing list (custom header, footer, and subject line), you must have already created the template.

About this task

Use these settings to define the mailing lists used for legacy alarm email notifications. These settings aren't used for alert notifications.

Steps

1. Select **SUPPORT** > **Alarms (legacy)** > **Legacy email setup**.
2. From the Email menu, select **Lists**.
3. Click **Edit** (or *Insert* if this is not the first mailing list).



4. In the new row, add the following:

Item	Description
Group Name	Unique name used to identify the mailing list. Mailing list names can't be duplicated. **Note:** If you change the name of a mailing list, the change is not propagated to the other locations that use the mailing list name. You must manually update all configured notifications to use the new mailing list name.
Recipients	Single email address, a previously configured mailing list, or a comma-delineated list of email addresses and mailing lists to which notifications will be sent. **Note:** If an email address belongs to multiple mailing lists, only one email notification is sent when a notification triggering event occurs.
Template	Optionally, select an email template to add a unique header, footer, and subject line to notifications sent to all recipients of this mailing list.

5. Click **Apply Changes**.

   A new mailing list is created.

Configure email notifications for alarms (legacy system)

To receive email notifications for the legacy alarm system, recipients must be a member of a mailing list and that list must be added to the Notifications page. Notifications are configured to send email to recipients only when an alarm with a specified severity level is triggered or when a service state changes. Thus, recipients only receive the notifications they need to receive.

Before you begin

- You must be signed in to the Grid Manager using a supported web browser.
- You have specific access permissions.
- You must have configured an email list.

About this task

Use these settings to configure notifications for legacy alarms. These settings aren't used for alert notifications.

If an email address (or list) belongs to multiple mailing lists, only one email notification is sent when a notification triggering event occurs. For example, one group of administrators within your organization can be configured to receive notifications for all alarms regardless of severity. Another group might only require notifications for alarms with a severity of critical. You can belong to both lists. If a critical alarm is triggered, you receive only one notification.

Steps

1. Select **SUPPORT** > **Alarms (legacy)** > **Legacy email setup**.
2. From the Email menu, select **Notifications**.
3. Click *Edit*  (or *Insert*  if this is not the first notification).
4. Under E-mail List, select the mailing list.
5. Select one or more alarm severity levels and service states.
6. Click **Apply Changes**.

   Notifications will be sent to the mailing list when alarms with the selected alarm severity level or service state are triggered or changed.

Suppress alarm notifications for a mailing list (legacy system)

You can suppress alarm notifications for a mailing list when you no longer want the mailing list to receive notifications about alarms. For example, you might want to suppress notifications about legacy alarms after you have transitioned to using alert email notifications.

Before you begin

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

Use these settings to suppress email notifications for the legacy alarm system. These settings don't apply to alert email notifications.

> While the legacy alarm system continues to be supported, the alert system offers significant benefits and is easier to use.

Steps

1. Select **SUPPORT** > **Alarms (legacy)** > **Legacy email setup**.
2. From the Email menu, select **Notifications**.
3. Click **Edit** next to the mailing list for which you want to suppress notifications.
4. Under Suppress, select the checkbox next to the mailing list you want to suppress, or select **Suppress** at the top of the column to suppress all mailing lists.
5. Click **Apply Changes**.

   Legacy alarm notifications are suppressed for the selected mailing lists.

View legacy alarms

Alarms (legacy system) are triggered when system attributes reach alarm threshold values. You can view the currently active alarms from the Current Alarms page.

While the legacy alarm system continues to be supported, the alert system offers significant benefits and is easier to use.

Before you begin

- You must be signed in to the Grid Manager using a supported web browser.

Steps

1. Select **SUPPORT** > **Alarms (legacy)** > **Current alarms**.

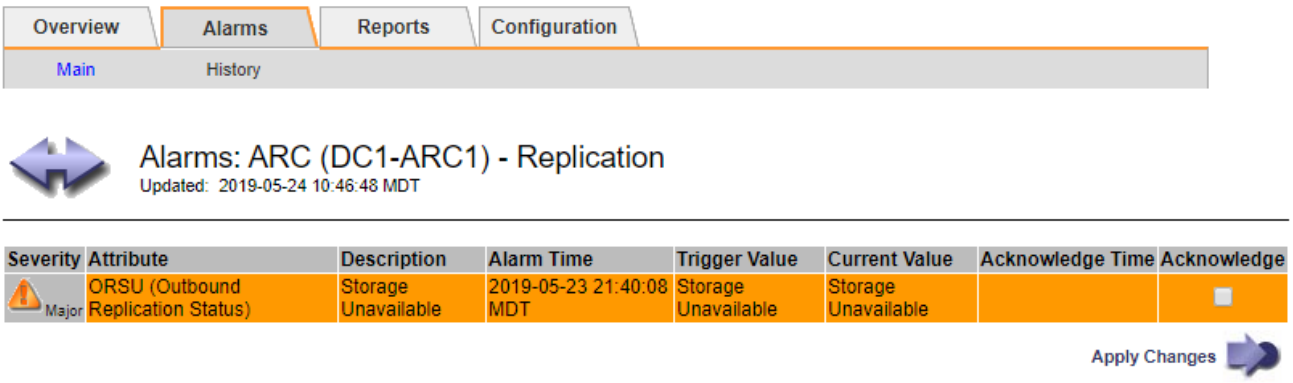
The alarm icon indicates the severity of each alarm, as follows:

Icon	Color	Alarm severity	Meaning
	Yellow	Notice	The node is connected to the grid, but an unusual condition exists that does not affect normal operations.
	Light Orange	Minor	The node is connected to the grid, but an abnormal condition exists that could affect operation in the future. You should investigate to prevent escalation.

Icon	Color	Alarm severity	Meaning
	Dark Orange	Major	The node is connected to the grid, but an abnormal condition exists that currently affects operation. This requires prompt attention to prevent escalation.
	Red	Critical	The node is connected to the grid, but an abnormal condition exists that has stopped normal operations. You should address the issue immediately.

2. To learn about the attribute that caused the alarm to be triggered, right click the attribute name in the table.
3. To view additional details about an alarm, click the service name in the table.

   The Alarms tab for the selected service appears (**SUPPORT** > **Tools** > **Grid topology** > ***Grid Node*** > ***Service*** > **Alarms**).



4. If you want to clear the count of current alarms, you can optionally do the following:
   - Acknowledge the alarm. An acknowledged alarm is no longer included in the count of legacy alarms unless it is triggered at the next severity level or it is resolved and occurs again.
   - Disable a particular Default alarm or Global Custom alarm for the entire system to prevent it from being triggered again.

Related information

Alarms reference (legacy system)

Acknowledge current alarms (legacy system)

Disable alarms (legacy system)

Alarms reference (legacy system)

The following table lists all of the legacy Default alarms. If an alarm is triggered, you can look up the alarm code in this table to find the recommended actions.

While the legacy alarm system continues to be supported, the alert system offers significant benefits and is easier to use.

Code	Name	Service	Recommended action
ABRL	Available Attribute Relays	BADC, BAMS, BARC, BCLB, BCMN, BLDR, BNMS, BSSM, BDDS	Restore connectivity to a service (an ADC service) running an Attribute Relay Service as soon as possible. If there are no connected attribute relays, the grid node can't report attribute values to the NMS service. Thus, the NMS service can no longer monitor the status of the service, or update attributes for the service. If the problem persists, contact technical support.
ACMS	Available Metadata Services	BARC, BLDR, BCMN	An alarm is triggered when an LDR or ARC service loses connection to a DDS service. If this occurs, ingest or retrieve transactions can't be processed. If the unavailability of DDS services is only a brief transient issue, transactions can be delayed. Check and restore connections to a DDS service to clear this alarm and return the service to full functionality.
ACTS	Cloud Tiering Service Status	ARC	Only available for Archive Nodes with a Target Type of Cloud Tiering - Simple Storage Service (S3). If the ACTS attribute for the Archive Node is set to Read-Only Enabled or Read-Write Disabled, you must set the attribute to Read-Write Enabled. If a major alarm is triggered due to an authentication failure, verify the credentials associated with destination bucket and update values, if necessary. If a major alarm is triggered due to any other reason, contact technical support.
ADCA	ADC Status	ADC	If an alarm is triggered, select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **ADC** > **Overview** > **Main** and **ADC** > **Alarms** > **Main** to determine the cause of the alarm. If the problem persists, contact technical support.
ADCE	ADC State	ADC	If the value of ADC State is Standby, continue monitoring the service and if the problem persists, contact technical support. If the value of ADC State is Offline, restart the service. If the problem persists, contact technical support.

Code	Name	Service	Recommended action
AITE	Retrieve State	BARC	Only available for Archive Node's with a Target Type of Tivoli Storage Manager (TSM). If the value of Retrieve State is Waiting for Target, check the TSM middleware server and ensure that it is operating correctly. If the Archive Node has just been added to the StorageGRID system, ensure that the Archive Node's connection to the targeted external archival storage system is configured correctly. If the value of Archive Retrieve State is Offline, attempt to update the state to Online. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **ARC** > **Retrieve** > **Configuration** > **Main**, select **Archive Retrieve State** > **Online**, and click **Apply Changes**. If the problem persists, contact technical support.
AITU	Retrieve Status	BARC	If the value of Retrieve Status is Target Error, check the targeted external archival storage system for errors. If the value of Archive Retrieve Status is Session Lost, check the targeted external archival storage system to ensure it is online and operating correctly. Check the network connection with the target. If the value of Archive Retrieve Status is Unknown Error, contact technical support.
ALIS	Inbound Attribute Sessions	ADC	If the number of inbound attribute sessions on an attribute relay grows too large, it can be an indication that the StorageGRID system has become unbalanced. Under normal conditions, attribute sessions should be evenly distributed amongst ADC services. An imbalance can lead to performance issues. If the problem persists, contact technical support.
ALOS	Outbound Attribute Sessions	ADC	The ADC service has a high number of attribute sessions, and is becoming overloaded. If this alarm is triggered, contact technical support.

Code	Name	Service	Recommended action
ALUR	Unreachable Attribute Repositories	ADC	Check network connectivity with the NMS service to ensure that the service can contact the attribute repository. If this alarm is triggered and network connectivity is good, contact technical support.
AMQS	Audit Messages Queued	BADC, BAMS, BARC, BCLB, BCMN, BLDR, BNMS, BDDS	If audit messages can't be immediately forwarded to an audit relay or repository, the messages are stored in a disk queue. If the disk queue becomes full, outages can occur. To allow you to respond in time to prevent an outage, AMQS alarms are triggered when the number of messages in the disk 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, check the load on the system—if there have been a significant number of 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 Configure audit messages and log destinations.
AOTE	Store State	BARC	Only available for Archive Node's with a Target Type of Tivoli Storage Manager (TSM). If the value of Store State is Waiting for Target, check the external archival storage system and ensure that it is operating correctly. If the Archive Node has just been added to the StorageGRID system, ensure that the Archive Node's connection to the targeted external archival storage system is configured correctly. If the value of Store State is Offline, check the value of Store Status. Correct any problems before moving the Store State back to Online.

Code	Name	Service	Recommended action
AOTU	Store Status	BARC	If the value of Store Status is Session Lost check that the external archival storage system is connected and online. If the value of Target Error, check the external archival storage system for errors. If the value of Store Status is Unknown Error, contact technical support.
APMS	Storage Multipath Connectivity	SSM	If the multipath state alarm appears as "Degraded" (select **SUPPORT** > **Tools** > **Grid topology**, then select ***site*** > ***grid node*** > **SSM** > **Events**), do the following: 1. Plug in or replace the cable that does not display any indicator lights. 2. Wait one to five minutes. Don’t unplug the other cable until at least five minutes after you plug in the first one. Unplugging too early can cause the root volume to become read-only, which requires that the hardware be restarted. 3. Return to the **SSM** > **Resources** page, and verify that the "Degraded" Multipath status has changed to "Nominal" in the Storage Hardware section.
ARCE	ARC State	ARC	The ARC service has a state of Standby until all ARC components (Replication, Store, Retrieve, Target) have started. It then transitions to Online. If the value of ARC State does not transition from Standby to Online, check the status of the ARC components. If the value of ARC State is Offline, restart the service. If the problem persists, contact technical support.
AROQ	Objects Queued	ARC	This alarm can be triggered if the removable storage device is running slowly due to problems with the targeted external archival storage system, or if it encounters multiple read errors. Check the external archival storage system for errors, and ensure that it is operating correctly. In some cases, this error can occur as a result of a high rate of data requests. Monitor the number of objects queued as system activity declines.

Code	Name	Service	Recommended action
ARRF	Request Failures	ARC	If a retrieval from the targeted external archival storage system fails, the Archive Node retries the retrieval as the failure can be due to a transient issue. However, if the object data is corrupt or has been marked as being permanently unavailable, the retrieval does not fail. Instead, the Archive Node continuously retries the retrieval and the value for Request Failures continues to increase. This alarm can indicate that the storage media holding the requested data is corrupt. Check the external archival storage system to further diagnose the problem. If you determine that the object data is no longer in the archive, the object will have to be removed from the StorageGRID system. For more information, contact technical support. Once the problem that triggered this alarm is addressed, reset the failures count. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **ARC** > **Retrieve** > **Configuration** > **Main**, select **Reset Request Failure Count** and click **Apply Changes**.
ARRV	Verification Failures	ARC	To diagnose and correct this problem, contact technical support. After the problem that triggered this alarm is addressed, reset the failures count. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **ARC** > **Retrieve** > **Configuration** > **Main**, select **Reset Verification Failure Count** and click **Apply Changes**.
ARVF	Store Failures	ARC	This alarm can occur as a result of errors with the targeted external archival storage system. Check the external archival storage system for errors, and ensure that it is operating correctly. Once the problem that triggered this alarm is addressed, reset the failures count. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **ARC** > **Retrieve** > **Configuration** > **Main**, select **Reset Store Failure Count**, and click **Apply Changes**.

Code	Name	Service	Recommended action
ASXP	Audit Shares	AMS	An alarm is triggered if the value of Audit Shares is Unknown. This alarm can indicate a problem with the installation or configuration of the Admin Node. If the problem persists, contact technical support.
AUMA	AMS Status	AMS	If the value of AMS Status is DB Connectivity Error, restart the grid node. If the problem persists, contact technical support.
AUME	AMS State	AMS	If the value of AMS State is Standby, continue monitoring the StorageGRID system. If the problem persists, contact technical support. If the value of AMS State is Offline, restart the service. If the problem persists, contact technical support.
AUXS	Audit Export Status	AMS	If an alarm is triggered, correct the underlying problem, and then restart the AMS service. If the problem persists, contact technical support.
BADD	Storage Controller Failed Drive Count	SSM	This alarm is triggered when one or more drives in a StorageGRID appliance has failed or is not optimal. Replace the drives as required.
BASF	Available Object Identifiers	CMN	When a StorageGRID system is provisioned, the CMN service is allocated a fixed number of object identifiers. This alarm is triggered when the StorageGRID system begins to exhaust its supply of object identifiers. To allocate more identifiers, contact technical support.

Code	Name	Service	Recommended action
BASS	Identifier Block Allocation Status	CMN	By default, an alarm is triggered when object identifiers can't be allocated because ADC quorum can't be reached. Identifier block allocation on the CMN service requires a quorum (50% + 1) of the ADC services to be online and connected. If quorum is unavailable, the CMN service is unable to allocate new identifier blocks until ADC quorum is reestablished. If ADC quorum is lost, there is generally no immediate impact on the StorageGRID system (clients can still ingest and retrieve content), as approximately one month's supply of identifiers are cached elsewhere in the grid; however, if the condition continues, the StorageGRID system will lose the ability to ingest new content. If an alarm is triggered, investigate the reason for the loss of ADC quorum (for example, it can be a network or Storage Node failure) and take corrective action. If the problem persists, contact technical support.
BRDT	Compute Controller Chassis Temperature	SSM	An alarm is triggered if the temperature of the compute controller in a StorageGRID appliance exceeds a nominal threshold. Check hardware components and environmental issues for overheated condition. If necessary, replace the component.
BTOF	Offset	BADC, BLDR, BNMS, BAMS, BCLB, BCMN, BARC	An alarm is triggered if the service time (seconds) differs significantly from the operating system time. Under normal conditions, the service should resynchronize itself. If the service time drifts too far from the operating system time, system operations can be affected. Confirm that the StorageGRID system's time source is correct. If the problem persists, contact technical support.
BTSE	Clock State	BADC, BLDR, BNMS, BAMS, BCLB, BCMN, BARC	An alarm is triggered if the service's time is not synchronized with the time tracked by the operating system. Under normal conditions, the service should resynchronize itself. If the time drifts too far from operating system time, system operations can be affected. Confirm that the StorageGRID system's time source is correct. If the problem persists, contact technical support.

Code	Name	Service	Recommended action
CAHP	Java Heap Usage Percent	DDS	An alarm is triggered if Java is unable to perform garbage collection at a rate that allows enough heap space for the system to properly function. An alarm might indicate a user workload that exceeds the resources available across the system for the DDS metadata store. Check the ILM Activity in the dashboard, or select **SUPPORT** > **Tools** > **Grid topology**, then select ***site*** > ***grid node*** > **DDS** > **Resources** > **Overview** > **Main**. If the problem persists, contact technical support.
CASA	Data Store Status	DDS	An alarm is raised if the Cassandra metadata store becomes unavailable. Check the status of Cassandra: 1. At the Storage Node, log in as admin and `su` to root using the password listed in the Passwords.txt file. 2. Enter: `service cassandra status` 3. If Cassandra is not running, restart it: `service cassandra restart` This alarm might also indicate that the metadata store (Cassandra database) for a Storage Node requires rebuilding. See information about troubleshooting the Services: Status - Cassandra (SVST) alarm in Troubleshoot metadata issues. If the problem persists, contact technical support.
CASE	Data Store State	DDS	This alarm is triggered during installation or expansion to indicate a new data store is joining the grid.
CCNA	Compute Hardware	SSM	This alarm is triggered if the status of the compute controller hardware in a StorageGRID appliance is Needs Attention.

Code	Name	Service	Recommended action
CDLP	Metadata Used Space (Percent)	DDS	This alarm is triggered when the Metadata Effective Space (CEMS) reaches 70% full (minor alarm), 90% full (major alarm), and 100% full (critical alarm). If this alarm reaches the 90% threshold, a warning appears on the dashboard in the Grid Manager. You must perform an expansion procedure to add new Storage Nodes as soon as possible. See Expand a grid. If this alarm reaches the 100% threshold, you must stop ingesting objects and add Storage Nodes immediately. Cassandra requires a certain amount of space to perform essential operations such as compaction and repair. These operations will be impacted if object metadata uses more than 100% of the allowed space. Undesirable results can occur. **Note**: Contact technical support if you are unable to add Storage Nodes. After new Storage Nodes are added, the system automatically rebalances object metadata across all Storage Nodes, and the alarm clears. Also see information about troubleshooting the Low metadata storage alert in Troubleshoot metadata issues. If the problem persists, contact technical support.
CMNA	CMN Status	CMN	If the value of CMN Status is Error, select **SUPPORT** > **Tools** > **Grid topology**, then select ***site*** > ***grid node*** > **CMN** > **Overview** > **Main** and **CMN** > **Alarms** > **Main** to determine the cause of the error and to troubleshoot the problem. An alarm is triggered and the value of CMN Status is No Online CMN during a hardware refresh of the primary Admin Node when the CMNs are switched (the value of the old CMN State is Standby and the new is Online). If the problem persists, contact technical support.
CPRC	Remaining Capacity	NMS	An alarm is triggered if the remaining capacity (number of available connections that can be opened to the NMS database) falls below the configured alarm severity. If an alarm is triggered, contact technical support.

Code	Name	Service	Recommended action
CPSA	Compute Controller Power Supply A	SSM	An alarm is triggered if there is an issue with power supply A in the compute controller for a StorageGRID appliance. If necessary, replace the component.
CPSB	Compute Controller Power Supply B	SSM	An alarm is triggered if there is an issue with power supply B in the compute controller for a StorageGRID appliance. If necessary, replace the component.
CPUT	Compute Controller CPU Temperature	SSM	An alarm is triggered if the temperature of the CPU in the compute controller in a StorageGRID appliance exceeds a nominal threshold. If the Storage Node is a StorageGRID appliance, the StorageGRID system indicates that the controller needs attention. Check hardware components and environment issues for overheated condition. If necessary, replace the component.
DNST	DNS Status	SSM	After installation completes, a DNST alarm is triggered in the SSM service. After the DNS is configured and the new server information reaches all grid nodes, the alarm is canceled.
ECCD	Corrupt Fragments Detected	LDR	An alarm is triggered when the background verification process detects a corrupt erasure-coded fragment. If a corrupt fragment is detected, an attempt is made to rebuild the fragment. Reset the Corrupt Fragments Detected and Copies Lost attributes to zero and monitor them to see if counts go up again. If counts do go up, there might be a problem with the Storage Node's underlying storage. A copy of erasure-coded object data is not considered missing until such time that the number of lost or corrupt fragments breaches the erasure code's fault tolerance; therefore, it is possible to have corrupt fragment and to still be able to retrieve the object. If the problem persists, contact technical support.

Code	Name	Service	Recommended action
ECST	Verification Status	LDR	This alarm indicates the current status of the background verification process for erasure-coded object data on this Storage Node. A major alarm is triggered if there is an error in the background verification process.
FOPN	Open File Descriptors	BADC, BAMS, BARC, BCLB, BCMN, BLDR, BNMS, BSSM, BDDS	FOPN can become large during peak activity. If it does not diminish during periods of slow activity, contact technical support.
HSTE	HTTP State	BLDR	See recommended actions for HSTU.
HSTU	HTTP Status	BLDR	HSTE and HSTU are related to HTTP for all LDR traffic, including S3, Swift, and other internal StorageGRID traffic. An alarm indicates that one of the following situations has occurred: • HTTP has been taken offline manually. • The Auto-Start HTTP attribute has been disabled. • The LDR service is shutting down. The Auto-Start HTTP attribute is enabled by default. If this setting is changed, HTTP could remain offline after a restart. If necessary, wait for the LDR service to restart. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***Storage Node*** > **LDR** > **Configuration**. If HTTP is offline, place it online. Verify that the Auto-Start HTTP attribute is enabled. If HTTP remains offline, contact technical support.
HTAS	Auto-Start HTTP	LDR	Specifies whether to start HTTP services automatically on start-up. This is a user-specified configuration option.
IRSU	Inbound Replication Status	BLDR, BARC	An alarm indicates that inbound replication has been disabled. Confirm configuration settings: Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **LDR** > **Replication** > **Configuration** > **Main**.

Code	Name	Service	Recommended action
LATA	Average Latency	NMS	Check for connectivity issues. Check system activity to confirm that there is an increase in system activity. An increase in system activity will result in an increase to attribute data activity. This increased activity will result in a delay to the processing of attribute data. This can be normal system activity and will subside. Check for multiple alarms. An increase in average latency times can be indicated by an excessive number of triggered alarms. If the problem persists, contact technical support.
LDRE	LDR State	LDR	If the value of LDR State is Standby, continue monitoring the situation and if the problem persists, contact technical support. If the value of LDR State is Offline, restart the service. If the problem persists, contact technical support.
LOST	Lost Objects	DDS, LDR	Triggered when the StorageGRID system fails to retrieve a copy of the requested object from anywhere in the system. Before a LOST (Lost Objects) alarm is triggered, the system attempts to retrieve and replace a missing object from elsewhere in the system. Lost objects represent a loss of data. The Lost Objects attribute is incremented whenever the number of locations for an object drops to zero without the DDS service purposely purging the content to satisfy the ILM policy. Investigate LOST (LOST Object) alarms immediately. If the problem persists, contact technical support. Troubleshoot lost and missing object data
MCEP	Management Interface Certificate Expiry	CMN	Triggered when the certificate used for accessing the management interface is about to expire. 1. From the Grid Manager, select **CONFIGURATION** > **Security** > **Certificates**. 2. On the **Global** tab, select **Management interface certificate**. 3. Upload a new management interface certificate.

Code	Name	Service	Recommended action
MINQ	E-mail Notifications Queued	NMS	Check the network connections of the servers hosting the NMS service and the external mail server. Also confirm that the email server configuration is correct. Configure email server settings for alarms (legacy system)
MINS	E-mail Notifications Status	BNMS	A minor alarm is triggered if the NMS service is unable to connect to the mail server. Check the network connections of the servers hosting the NMS service and the external mail server. Also confirm that the email server configuration is correct. Configure email server settings for alarms (legacy system)
MISS	NMS Interface Engine Status	BNMS	An alarm is triggered if the NMS interface engine on the Admin Node that gathers and generates interface content is disconnected from the system. Check Server Manager to determine if the server individual application is down.
NANG	Network Auto Negotiate Setting	SSM	Check the network adapter configuration. The setting must match preferences of your network routers and switches. An incorrect setting can have a severe impact on system performance.
NDUP	Network Duplex Setting	SSM	Check the network adapter configuration. The setting must match preferences of your network routers and switches. An incorrect setting can have a severe impact on system performance.
NLNK	Network Link Detect	SSM	Check the network cable connections on the port and at the switch. Check the network router, switch, and adapter configurations. Restart the server. If the problem persists, contact technical support.

Code	Name	Service	Recommended action
NRER	Receive Errors	SSM	The following can be causes of NRER alarms: • Forward error correction (FEC) mismatch • Switch port and NIC MTU mismatch • High link error rates • NIC ring buffer overrun See information about troubleshooting the Network Receive Error (NRER) alarm in Troubleshoot network, hardware, and platform issues.
NRLY	Available Audit Relays	BADC, BARC, BCLB, BCMN, BLDR, BNMS, BDDS	If audit relays aren't connected to ADC services, audit events can't be reported. They are queued and unavailable to users until the connection is restored. Restore connectivity to an ADC service as soon as possible. If the problem persists, contact technical support.
NSCA	NMS Status	NMS	If the value of NMS Status is DB Connectivity Error, restart the service. If the problem persists, contact technical support.
NSCE	NMS State	NMS	If the value of NMS State is Standby, continue monitoring and if the problem persists, contact technical support. If the value of NMS State is Offline, restart the service. If the problem persists, contact technical support.
NSPD	Speed	SSM	This can be caused by network connectivity or driver compatibility issues. If the problem persists, contact technical support.

Code	Name	Service	Recommended action
NTBR	Free Tablespace	NMS	If an alarm is triggered, check how fast database usage has been changing. A sudden drop (as opposed to a gradual change over time) indicates an error condition. If the problem persists, contact technical support. Adjusting the alarm threshold allows you to proactively manage when additional storage needs to be allocated. If the available space reaches a low threshold (see alarm threshold), contact technical support to change the database allocation.
NTER	Transmit Errors	SSM	These errors can clear without being manually reset. If they don't clear, check network hardware. Check that the adapter hardware and driver are correctly installed and configured to work with your network routers and switches. When the underlying problem is resolved, reset the counter. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **SSM** > **Resources** > **Configuration** > **Main**, select **Reset Transmit Error Count**, and click **Apply Changes**.
NTFQ	NTP Frequency Offset	SSM	If the frequency offset exceeds the configured threshold, there is likely a hardware problem with the local clock. If the problem persists, contact technical support to arrange a replacement.
NTLK	NTP Lock	SSM	If the NTP daemon is not locked to an external time source, check network connectivity to the designated external time sources, their availability, and their stability.
NTOF	NTP Time Offset	SSM	If the time offset exceeds the configured threshold, there is likely a hardware problem with the oscillator of the local clock. If the problem persists, contact technical support to arrange a replacement.
NTSJ	Chosen Time Source Jitter	SSM	This value indicates the reliability and stability of the time source that NTP on the local server is using as its reference. If an alarm is triggered, it can be an indication that the time source's oscillator is defective, or that there is a problem with the WAN link to the time source.

Code	Name	Service	Recommended action
NTSU	NTP Status	SSM	If the value of NTP Status is Not Running, contact technical support.
OPST	Overall Power Status	SSM	An alarm is triggered if the power of a StorageGRID appliance deviates from the recommended operating voltage. Check the status of Power Supply A or B to determine which power supply is operating abnormally. If necessary, replace the power supply.
OQRT	Objects Quarantined	LDR	After the objects are automatically restored by the StorageGRID system, the quarantined objects can be removed from the quarantine directory. 1. Select **SUPPORT** > **Tools** > **Grid topology**. 2. Select **site** > **Storage Node** > **LDR** > **Verification** > **Configuration** > **Main**. 3. Select **Delete Quarantined Objects**. 4. Click **Apply Changes**. The quarantined objects are removed, and the count is reset to zero.
ORSU	Outbound Replication Status	BLDR, BARC	An alarm indicates that outbound replication is not possible: storage is in a state where objects can't be retrieved. An alarm is triggered if outbound replication is disabled manually. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **LDR** > **Replication** > **Configuration**. An alarm is triggered if the LDR service is unavailable for replication. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **LDR** > **Storage**.
OSLF	Shelf Status	SSM	An alarm is triggered if the status of one of the components in the storage shelf for a storage appliance is degraded. Storage shelf components include the IOMs, fans, power supplies, and drive drawers.If this alarm is triggered, see the maintenance instructions for your appliance.

Code	Name	Service	Recommended action
PMEM	Service Memory Usage (Percent)	BADC, BAMS, BARC, BCLB, BCMN, BLDR, BNMS, BSSM, BDDS	Can have a value of Over Y% RAM, where Y represents the percentage of memory being used by the server. Figures under 80% are normal. Over 90% is considered a problem. If memory usage is high for a single service, monitor the situation and investigate. If the problem persists, contact technical support.
PSAS	Power Supply A Status	SSM	An alarm is triggered if power supply A in a StorageGRID appliance deviates from the recommended operating voltage. If necessary, replace power supply A.
PSBS	Power Supply B Status	SSM	An alarm is triggered if power supply B in a StorageGRID appliance deviates from the recommended operating voltage. If necessary, replace the power supply B.
RDTE	Tivoli Storage Manager State	BARC	Only available for Archive Nodes with a Target Type of Tivoli Storage Manager (TSM). If the value of Tivoli Storage Manager State is Offline, check Tivoli Storage Manager Status and resolve any problems. Bring the component back online. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **ARC** > **Target** > **Configuration** > **Main**, select **Tivoli Storage Manager State** > **Online**, and click **Apply Changes**.

Code	Name	Service	Recommended action
RDTU	Tivoli Storage Manager Status	BARC	Only available for Archive Nodes with a Target Type of Tivoli Storage Manager (TSM). If the value of Tivoli Storage Manager Status is Configuration Error and the Archive Node has just been added to the StorageGRID system, ensure that the TSM middleware server is correctly configured. If the value of Tivoli Storage Manager Status is Connection Failure, or Connection Failure, Retrying, check the network configuration on the TSM middleware server, and the network connection between the TSM middleware server and the StorageGRID system. If the value of Tivoli Storage Manager Status is Authentication Failure, or Authentication Failure, Reconnecting, the StorageGRID system can connect to the TSM middleware server, but can't authenticate the connection. Check that the TSM middleware server is configured with the correct user, password, and permissions, and restart the service. If the value of Tivoli Storage Manager Status is Session Failure, an established session has been lost unexpectedly. Check the network connection between the TSM middleware server and the StorageGRID system. Check the middleware server for errors. If the value of Tivoli Storage Manager Status is Unknown Error, contact technical support.
RIRF	Inbound Replications — Failed	BLDR, BARC	An Inbound Replications — Failed alarm can occur during periods of high load or temporary network disruptions. After system activity reduces, this alarm should clear. If the count of failed replications continues to increase, look for network problems and verify that the source and destination LDR and ARC services are online and available. To reset the count, select **SUPPORT** > **Tools** > **Grid topology**, then select ***site*** > ***grid node*** > **LDR** > **Replication** > **Configuration** > **Main**. Select **Reset Inbound Replication Failure Count**, and click **Apply Changes**.

Code	Name	Service	Recommended action
RIRQ	Inbound Replications — Queued	BLDR, BARC	Alarms can occur during periods of high load or temporary network disruption. After system activity reduces, this alarm should clear. If the count for queued replications continues to increase, look for network problems and verify that the source and destination LDR and ARC services are online and available.
RORQ	Outbound Replications — Queued	BLDR, BARC	The outbound replication queue contains object data being copied to satisfy ILM rules and objects requested by clients. An alarm can occur as a result of a system overload. Wait to see if the alarm clears when system activity declines. If the alarm recurs, add capacity by adding Storage Nodes.
SAVP	Total Usable Space (Percent)	LDR	If usable space reaches a low threshold, options include expanding the StorageGRID system or move object data to archive through an Archive Node.
SCAS	Status	CMN	If the value of Status for the active grid task is Error, look up the grid task message. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **CMN** > **Grid Tasks** > **Overview** > **Main**. The grid task message displays information about the error (for example, "check failed on node 12130011"). After you have investigated and corrected the problem, restart the grid task. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **CMN** > **Grid Tasks** > **Configuration** > **Main**, and select **Actions** > **Run**. If the value of Status for a grid task being stopped is Error, retry ending the grid task. If the problem persists, contact technical support.
SCEP	Storage API Service Endpoints Certificate Expiry	CMN	Triggered when the certificate used for accessing storage API endpoints is about to expire. 1. Select **CONFIGURATION** > **Security** > **Certificates**. 2. On the **Global** tab, select **S3 and Swift API certificate**. 3. Upload a new S3 and Swift API certificate.

Code	Name	Service	Recommended action
SCHR	Status	CMN	If the value of Status for the historical grid task is Aborted, investigate the reason and run the task again if required. If the problem persists, contact technical support.
SCSA	Storage Controller A	SSM	An alarm is triggered if there is an issue with storage controller A in a StorageGRID appliance. If necessary, replace the component.
SCSB	Storage Controller B	SSM	An alarm is triggered if there is an issue with storage controller B in a StorageGRID appliance. If necessary, replace the component. Some appliance models don’t have a storage controller B.
SHLH	Health	LDR	If the value of Health for an object store is Error, check and correct: • problems with the volume being mounted • file system errors
SLSA	CPU Load Average	SSM	The higher the value the busier the system. If the CPU Load Average persists at a high value, the number of transactions in the system should be investigated to determine whether this is due to heavy load at the time. View a chart of the CPU load average: Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **SSM** > **Resources** > **Reports** > **Charts**. If the load on the system is not heavy and the problem persists, contact technical support.
SMST	Log Monitor State	SSM	If the value of Log Monitor State is not Connected for a persistent period of time, contact technical support.

Code	Name	Service	Recommended action
SMTT	Total Events	SSM	If the value of Total Events is greater than zero, check if there are known events (such as network failures) that can be the cause. Unless these errors have been cleared (that is, the count has been reset to 0), Total Events alarms can be triggered. When an issue is resolved, reset the counter to clear the alarm. Select **NODES** > ***site*** > ***grid node*** > **Events** > **Reset event counts**. To reset event counts, you must have the Grid topology page configuration permission. If the value of Total Events is zero, or the number increases and the problem persists, contact technical support.
SNST	Status	CMN	An alarm indicates that there is a problem storing the grid task bundles. If the value of Status is Checkpoint Error or Quorum Not Reached, confirm that a majority of ADC services are connected to the StorageGRID system (50 percent plus one) and then wait a few minutes. If the problem persists, contact technical support.
SOSS	Storage Operating System Status	SSM	An alarm is triggered if SANtricity OS indicates that there is a "Needs attention" issue with a component in a StorageGRID appliance. Select **NODES**. Then select **appliance Storage Node** > **Hardware**. Scroll down to view the status of each component. In SANtricity OS, check other appliance components to isolate the issue.
SSMA	SSM Status	SSM	If the value of SSM Status is Error, select **SUPPORT** > **Tools** > **Grid topology**, then select ***site*** > ***grid node*** > **SSM** > **Overview** > **Main** and **SSM** > **Overview** > **Alarms** to determine the cause of the alarm. If the problem persists, contact technical support.
SSME	SSM State	SSM	If the value of SSM State is Standby, continue monitoring, and if the problem persists, contact technical support. If the value of SSM State is Offline, restart the service. If the problem persists, contact technical support.

Code	Name	Service	Recommended action
SSTS	Storage Status	BLDR	If the value of Storage Status is Insufficient Usable Space, there is no more available storage on the Storage Node and data ingests are redirected to other available Storage Node. Retrieval requests can continue to be delivered from this grid node. Additional storage should be added. It is not impacting end user functionality, but the alarm persists until additional storage is added. If the value of Storage Status is Volume(s) Unavailable, a part of the storage is unavailable. Storage and retrieval from these volumes is not possible. Check the volume's Health for more information: Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **LDR** > **Storage** > **Overview** > **Main**. The volume's Health is listed under Object Stores. If the value of Storage Status is Error, contact technical support. Troubleshoot the Storage Status (SSTS) alarm

Code	Name	Service	Recommended action
SVST	Status	SSM	This alarm clears when other alarms related to a non-running service are resolved. Track the source service alarms to restore operation. Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **SSM** > **Services** > **Overview** > **Main**. When the status of a service is shown as Not Running, its state is Administratively Down. The service's status can be listed as Not Running for the following reasons: • The service has been manually stopped (`/etc/init.d/<service\> stop`). • There is an issue with the MySQL database and Server Manager shuts down the MI service. • A grid node has been added, but not started. • During installation, a grid node has not yet connected to the Admin Node. If a service is listed as Not Running, restart the service (`/etc/init.d/<service\> restart`). This alarm might also indicate that the metadata store (Cassandra database) for a Storage Node requires rebuilding. If the problem persists, contact technical support. Troubleshoot the Services: Status - Cassandra (SVST) alarm
TMEM	Installed Memory	SSM	Nodes running with less than 24 GiB of installed memory can lead to performance problems and system instability. The amount of memory installed on the system should be increased to at least 24 GiB.
TPOP	Pending Operations	ADC	A queue of messages can indicate that the ADC service is overloaded. Too few ADC services can be connected to the StorageGRID system. In a large deployment, the ADC service can require adding computational resources, or the system can require additional ADC services.
UMEM	Available Memory	SSM	If the available RAM gets low, determine whether this is a hardware or software issue. If it is not a hardware issue, or if available memory falls below 50 MB (the default alarm threshold), contact technical support.

Code	Name	Service	Recommended action
VMFI	Entries Available	SSM	This is an indication that additional storage is required. Contact technical support.
VMFR	Space Available	SSM	If the value of Space Available gets too low (see alarm thresholds), it needs to be investigated as to whether there are log files growing out of proportion, or objects taking up too much disk space (see alarm thresholds) that need to be reduced or deleted. If the problem persists, contact technical support.
VMST	Status	SSM	An alarm is triggered if the value of Status for the mounted volume is Unknown. A value of Unknown or Offline can indicate that the volume can’t be mounted or accessed due to a problem with the underlying storage device.
VPRI	Verification Priority	BLDR, BARC	By default, the value of Verification Priority is Adaptive. If Verification Priority is set to High, an alarm is triggered because storage verification can slow normal operations of the service.
VSTU	Object Verification Status	BLDR	Select **SUPPORT** > **Tools** > **Grid topology**. Then select ***site*** > ***grid node*** > **LDR** > **Storage** > **Overview** > **Main**. Check the operating system for any signs of block-device or file system errors. If the value of Object Verification Status is Unknown Error, it usually indicates a low-level file system or hardware problem (I/O error) that prevents the Storage Verification task from accessing stored content. Contact technical support.
XAMS	Unreachable Audit Repositories	BADC, BARC, BCLB, BCMN, BLDR, BNMS	Check network connectivity to the server hosting the Admin Node. If the problem persists, contact technical support.

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