TR-4765: Monitor StorageGRID

How to enable StorageGRID in your environment

NetApp
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TR-4765: Monitor StorageGRID

Introduction to StorageGRID monitoring

Learn how to monitor your StorageGRID system by using external applications, such as Splunk.

Effective monitoring of NetApp StorageGRID object-based storage enables administrators to quickly respond to urgent issues and to proactively add resources to handle growing workloads. This report provides general guidance about how to monitor key metrics and how to leverage external monitoring applications. It is meant to supplement the existing Monitoring and Troubleshooting guide.

A NetApp StorageGRID deployment typically consists of multiple sites and many nodes that operate to create a distributed and fault-tolerant object storage system. In a distributed and resilient storage system such as StorageGRID, it is normal for error conditions to exist while the grid continues to operate normally. The challenge for you as an administrator is to understand the threshold at which error conditions (such as nodes down) present a problem that should be immediately addressed versus information that should be analyzed. By analyzing the data that StorageGRID presents, you can understand your workload and make informed decisions, such as when to add more resources.

StorageGRID provides excellent documentation that dives deep into the subject of monitoring. This report assumes that you are familiar with StorageGRID and that you have reviewed the documentation about it. Rather than repeating that information, we refer to the product documentation throughout this guide. StorageGRID product documentation is available online and in PDF format.

The goal of this document is to complement the product documentation and discuss how to monitor your StorageGRID system by using external applications, such as Splunk.

Data sources

To successfully monitor NetApp StorageGRID, it is important to know where to gather data about the health and operations of your StorageGRID system.

- **Web UI and Dashboard.** The StorageGRID Grid Manager presents a top-level view of the information that you as an administrator need to see in a logical presentation. As an administrator, you can also dig deeper into service-level information for troubleshooting and log collections.
- **Audit Logs.** StorageGRID keeps granular audit logs of tenant actions such as PUT, GET, and DELETE. You can also trace the lifecycle of an object from ingest to the application of data management rules.
- **Metrics API.** Underlying the StorageGRID GMI are open APIs, as the UI is API-driven. This approach enables you to extract data by using external monitoring and analysis tools.

Where to find additional information

To learn more about the information that is described in this document, review the following documents and/or websites:

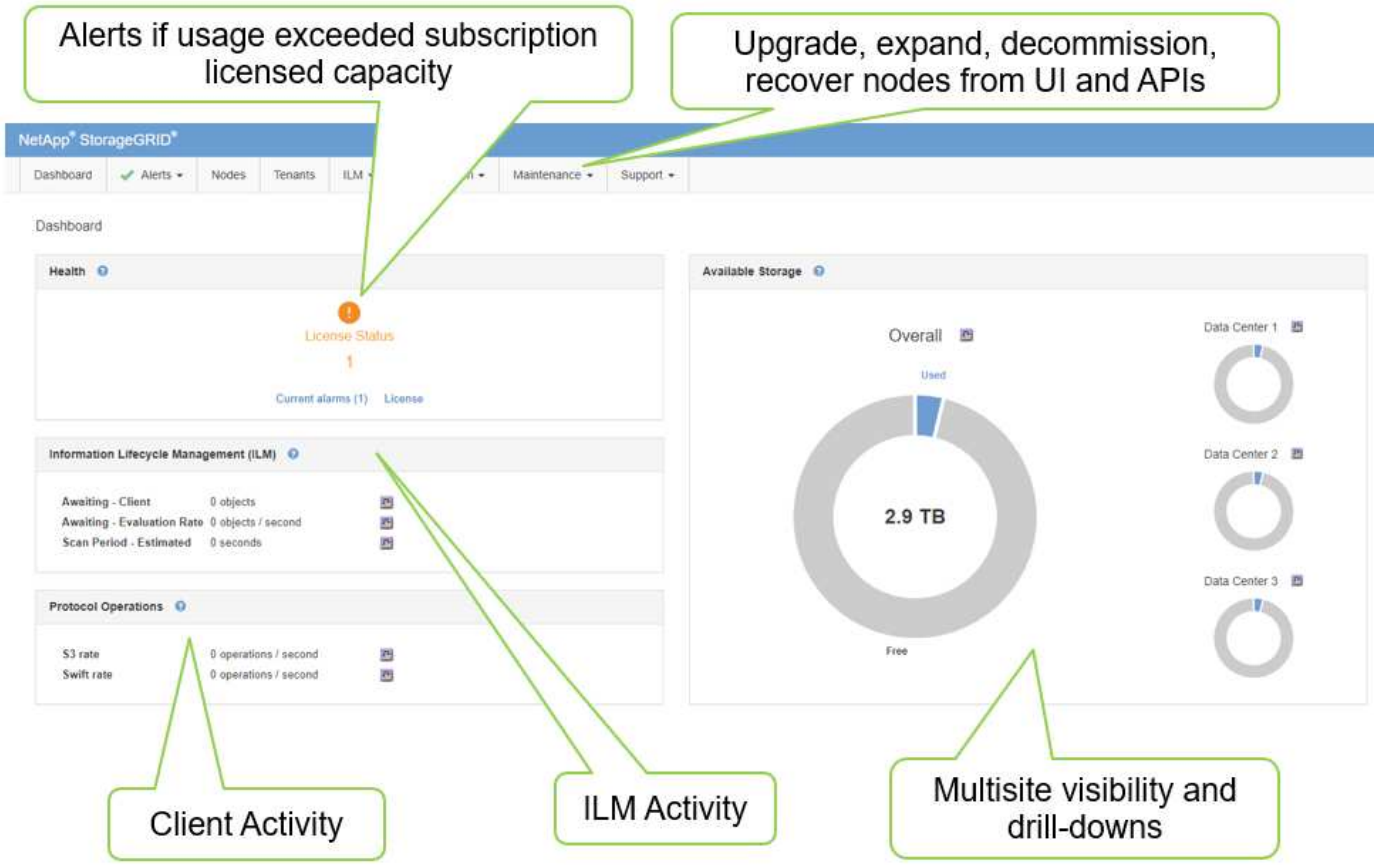
- NetApp StorageGRID Documentation Center
  https://docs.netapp.com/us-en/storagegrid-118/
- NetApp StorageGRID Enablement
  https://docs.netapp.com/us-en/storagegrid-enable/

- StorageGRID Documentation Resources page
  https://www.netapp.com/data-storage/storagegrid/documentation/
- NetApp Product Documentation
  https://www.netapp.com/support-and-training/documentation/
- NetApp StorageGRID App for Splunk
  https://splunkbase.splunk.com/app/3898/#/details

Use the GMI dashboard to monitor StorageGRID

The StorageGrid Grid Management Interface (GMI) dashboard provides a centralized view of the StorageGRID infrastructure, allowing you to oversee the health, performance, and capacity of the entire grid.

Use the GMI dashboard to examine each core component of the grid.



Information that you should monitor regularly

A previous version of this technical report listed the metrics to check periodically versus trends. That information is now included in the Monitoring and Troubleshooting guide.

Monitor storage

A previous version of this technical report listed where to monitor important metrics, such as Object Storage Space, Metadata Space, Network Resources and so on. That information is now included in the Monitoring and Troubleshooting guide.

Use alerts to monitor StorageGRID

Learn how to use the alerts system in StorageGRID to monitor issues, manage custom alerts, and extend alert notifications using SNMP or email.

Alerts provide critical information that allow you to monitor the various events and conditions within your StorageGRID system.

The alerts system is designed to be the primary tool for monitoring any issues that might occur in your StorageGRID system. The alerts system focuses on actionable problems in the system and provides an easy-to-use interface.

We provide a variety of default alerting rules that aim to help monitor and troubleshoot your system. You can further manage alerts by creating custom alerts, editing or disabling default alerts, and silencing alert notifications.

Alerts are also extensible through SNMP or email notification.

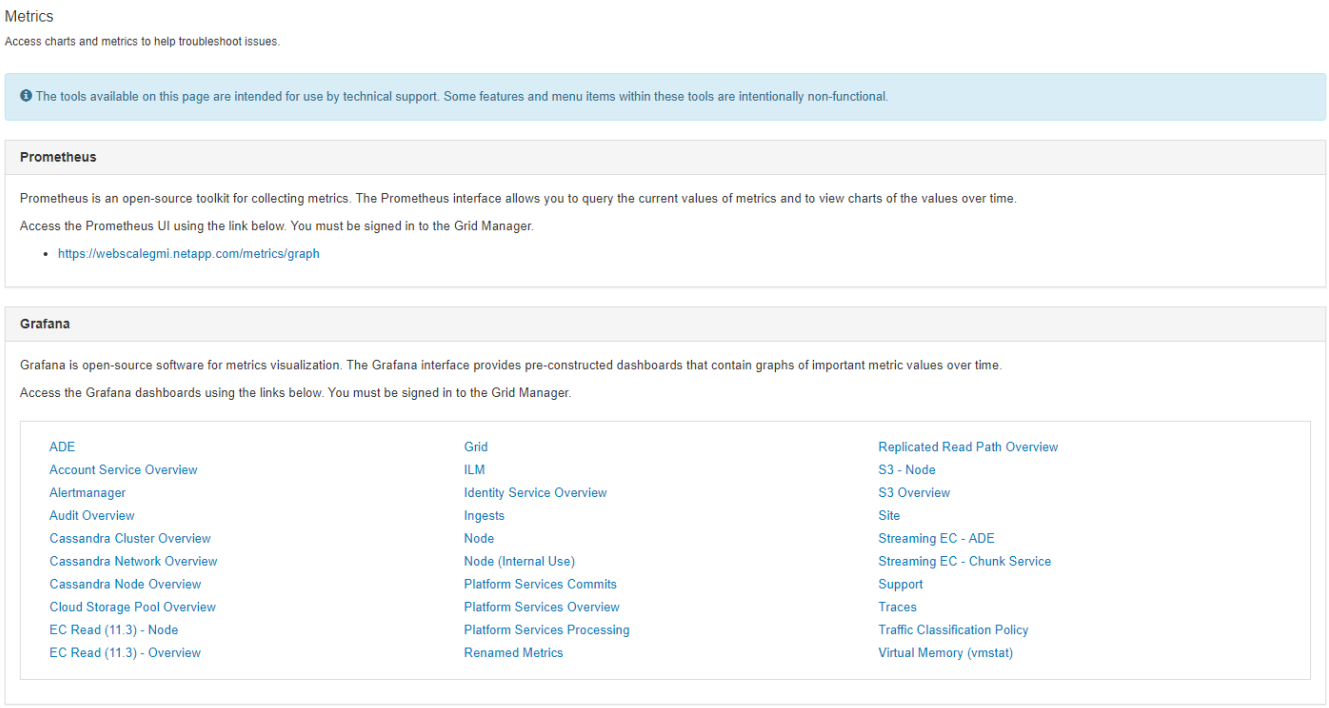
For more information on alerts, see the product documentation available online and in PDF format.

Advanced monitoring in StorageGRID

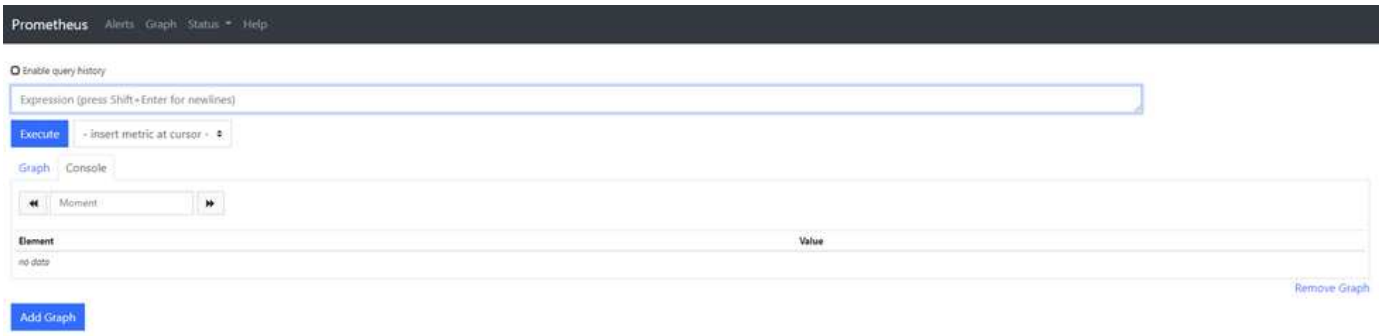
Learn how to access and export metrics to help troubleshoot issues.

View metrics API through a Prometheus query

Prometheus is an open-source software for collecting metrics. To access StorageGRID's embedded Prometheus through the GMI, go to **Support › Metrics**.



Alternatively, you can navigate to the link directly.

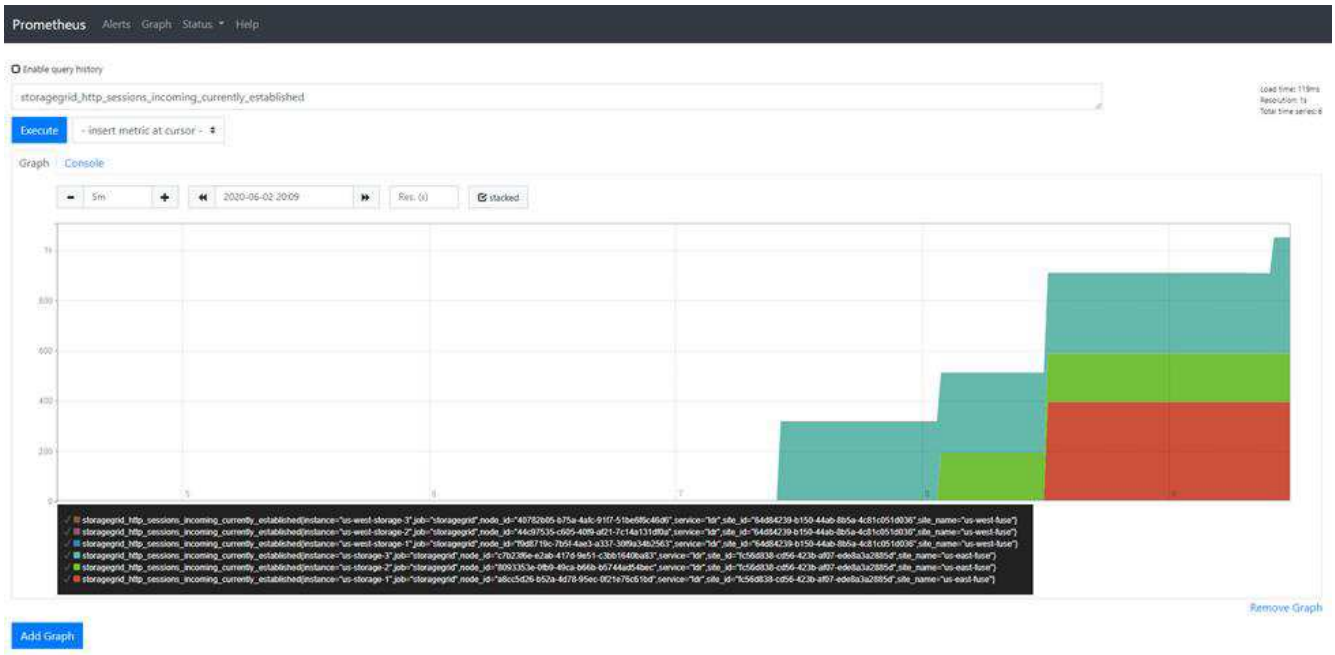


With this view, you can access the Prometheus interface. From there, you can search through available metrics and even experiment with queries.

To make a Prometheus URL query, follow these steps:

Steps

1. Start typing in the query text box. As you type, metrics are listed. For our purposes, only metrics that start with StorageGRID and Node are important.
2. To see the number of HTTP sessions for each node, type `storagegrid_http` and select `storagegrid_http_sessions_incoming_currently_established`. Click Execute and display the information in a graph or console format.



Queries and charts that you build through this URL do not persist. Complex queries consume resources on the admin node. NetApp recommends that you use this view to explore available metrics.

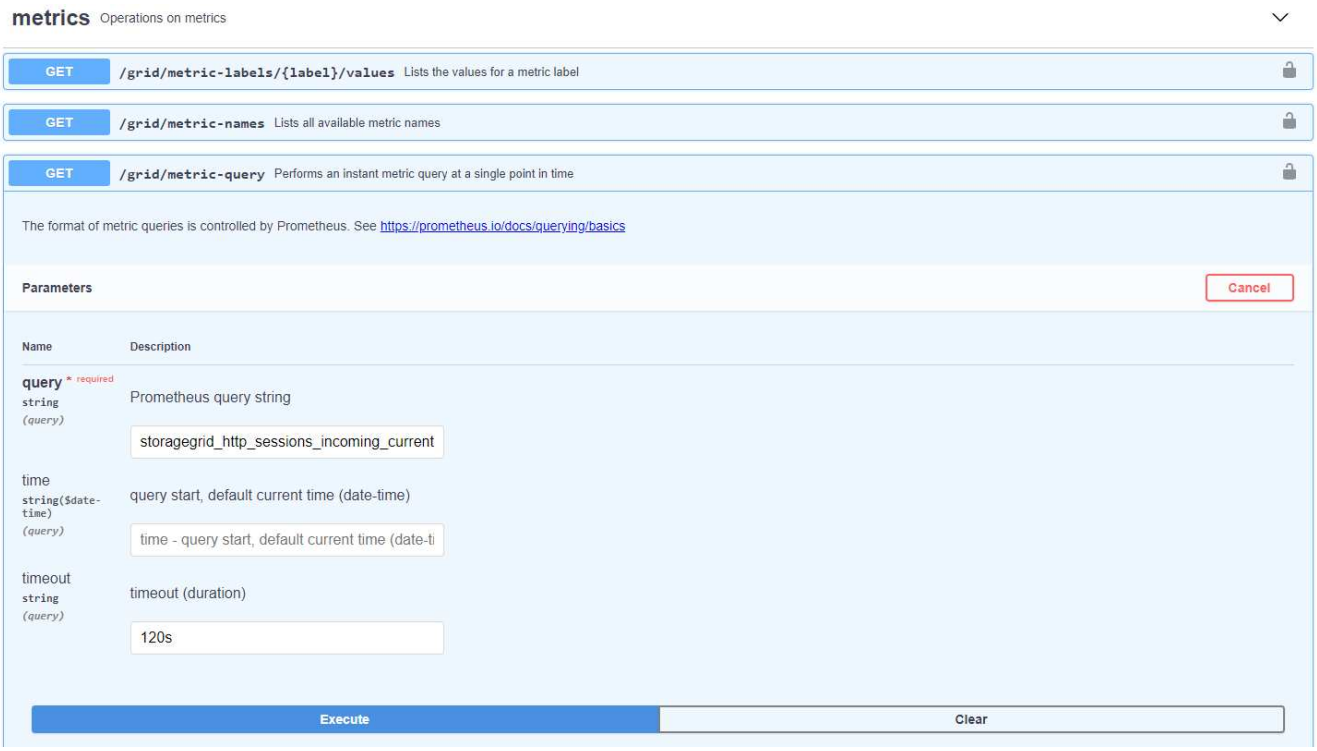
It is not recommended to directly interface to our Prometheus instance because this requires opening additional ports. Accessing metrics through our API is the recommended and secure method.

Export metrics through the API

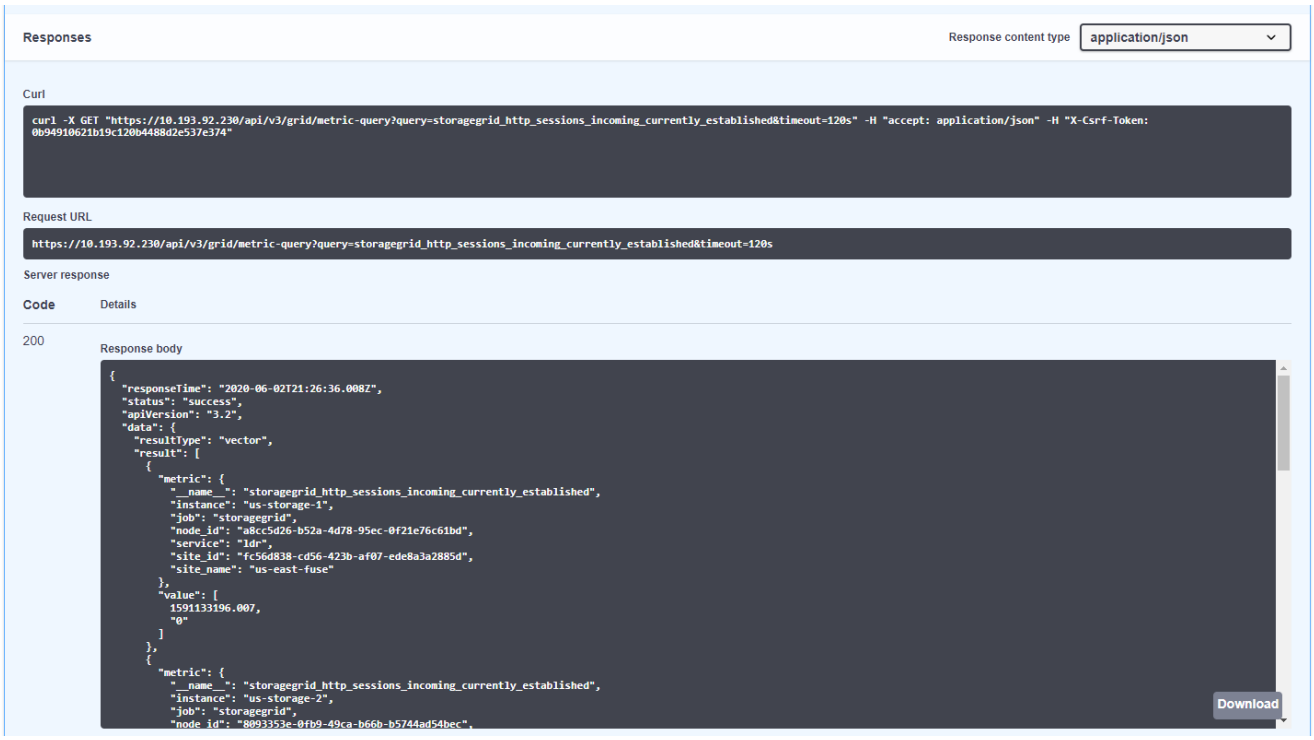
You can also access the same data through the StorageGRID management API.

To export metrics through the API, follow these steps:

1. From the GMI, select **Help › API Documentation**.
2. Scroll down to Metrics and select GET /grid/metric-query.



The response includes the same information that you can obtain through a Prometheus URL query. You can again see the number of HTTP sessions that are currently established on each storage node. You can also download the response in JSON format for readability. The following figure shows sample Prometheus query responses.



The advantage of using the API is that it enables you to perform authenticated queries

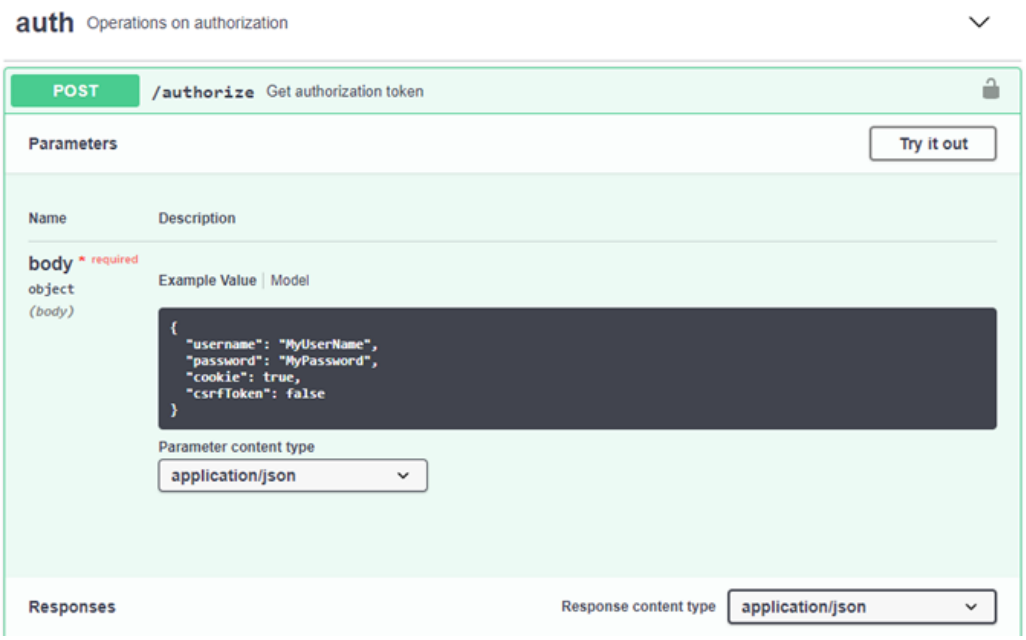
Access metrics using cURL in StorageGRID

Learn how to access metrics through the CLI using cURL.

To perform this operation, you must first obtain an authorization token. To request a token, follow these steps:

Steps

1. From the GMI, select **Help › API Documentation**.
2. Scroll down to Auth to find operations on authorization. The following screenshot shows the parameters for the POST method.



3. Click Try It Out and edit the body with your GMI username and password.
4. Click Execute.
5. Copy the cURL command that is provided in the cURL section and paste it in a terminal window. The command looks like the following:

```
curl -X POST "https:// <Primary_Admin_IP>/api/v3/authorize" -H "accept:
application/json" -H "Content-Type: application/json" -H "X-Csrf-Token:
dc30b080e1ca9bc05ddb81104381d8c8" -d "{ \"username\": \"MyUsername\",
\"password\": \"MyPassword\", \"cookie\": true, \"csrfToken\": false}"
-k
```

If your GMI password contains special characters, remember to use \ to escape special characters. For example, replace ! with \!

6. After you run the preceding cURL command, the output gives you an authorization token like the following example:

```
{"responseTime":"2020-06-
03T00:12:17.031Z","status":"success","apiVersion":"3.2","data":"8a1e528d
-18a7-4283-9a5e-b2e6d731e0b2"}
```

Now you can use the authorization token string to access metrics through cURL. The process to access metrics is similar to the steps in section Advanced monitoring in StorageGRID. However, for demonstration purposes, we show an example with GET /grid/metric-labels/{label}/values selected in the Metrics category.

7. As an example, the following cURL command with the preceding authorization token will list the site names in StorageGRID.

```
curl -X GET "https://10.193.92.230/api/v3/grid/metric-
labels/site_name/values" -H "accept: application/json" -H
"Authorization: Bearer 8a1e528d-18a7-4283-9a5e-b2e6d731e0b2"
```

The cURL command will generate the following output:

```
{"responseTime":"2020-06-
03T00:17:00.844Z","status":"success","apiVersion":"3.2","data":["us-
east-fuse","us-west-fuse"]}
```

View metrics using the Grafana dashboard in StorageGRID

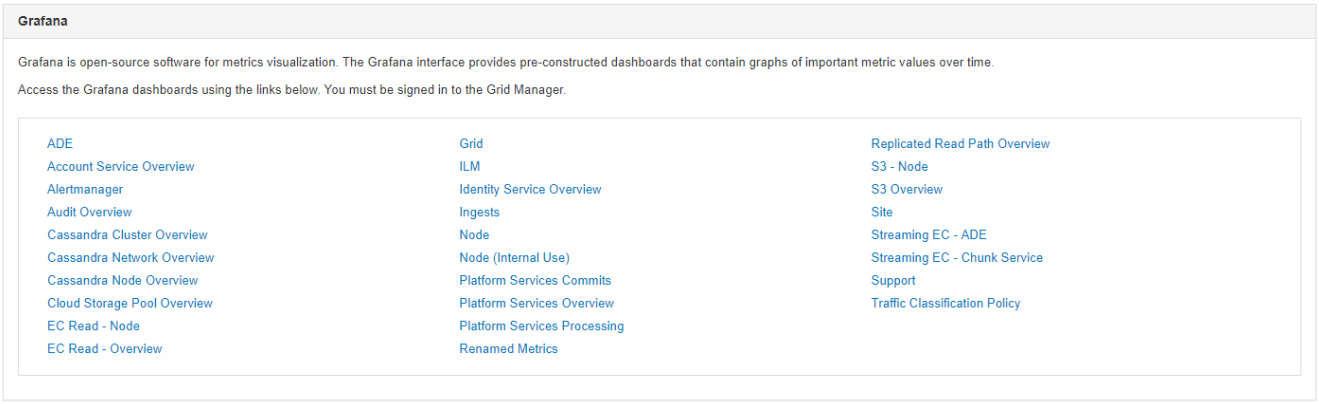
Learn how to use the Grafana interface to visualize and monitor your StorageGRID data.

Grafana is an open-source software for metric visualization. By default, we have preconstructed dashboards that provide useful and powerful information regarding your StorageGRID system.

These preconstructed dashboards are not only useful for monitoring but also for troubleshooting an issue. Some are intended for use by technical support. For example, to view the metrics of a storage node, follow these steps.

Steps

1. From the GMI, **Support › Metrics**.
2. Under the Grafana section, select the Node dashboard.



3. In Grafana, set the hosts to whichever node you want to view metrics on. In this case, a storage node is selected. More information is provided than the following screenshot captures.

Use traffic classification policies in StorageGRID

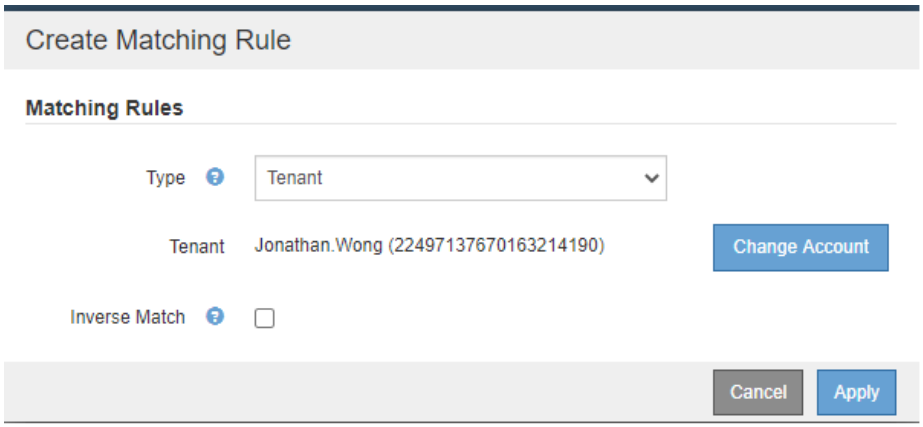
Learn how to set up and configure traffic classification policies to manage and optimize network traffic in StorageGRID.

Traffic Classification Policies provide a method to monitor and/or limit traffic based on a specific tenant, buckets, IP subnets, or load balancer endpoints. Network connectivity and bandwidth are especially important metrics for StorageGRID.

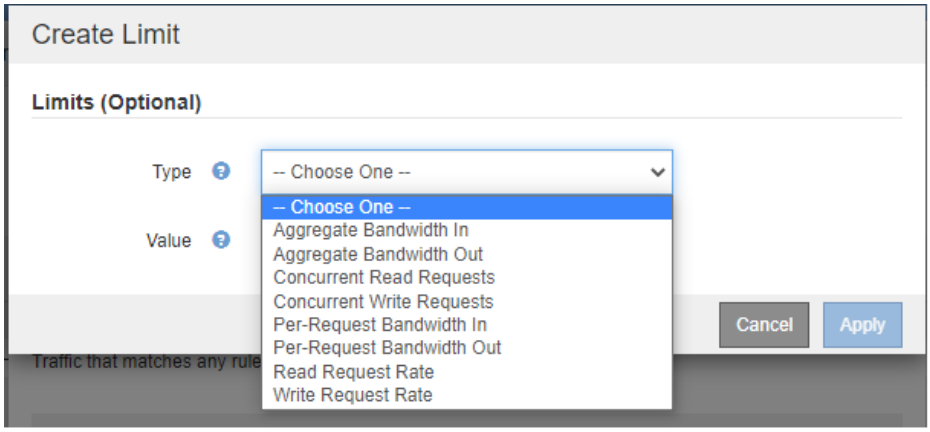
To configure a Traffic Classification Policy, follow these steps:

Steps

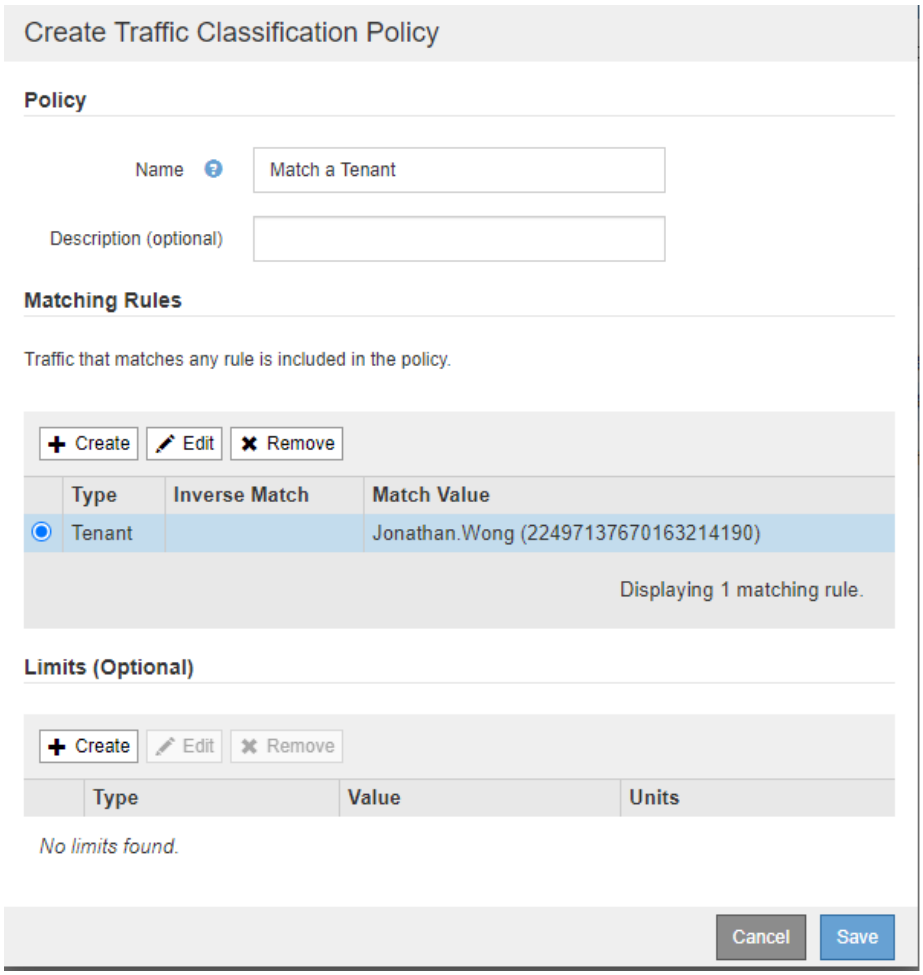
1. On the GMI, navigate to **Configuration › System Settings › Traffic Classification**.
2. Click Create +
3. Enter a name and description for your policy.
4. Create a matching rule.



5. Set a limit (optional).



6. Save your policy



To view the metrics associated to your Traffic Classification Policy, select your policy and click Metrics. A Grafana dashboard is generated displaying information such as Load Balancer Request Traffic and Average Request Duration.

Use audit logs to monitor StorageGRID

Learn how to use the StorageGRID audit log for detailed insights into tenant and grid activity, and how to leverage tools like Splunk for log analysis.

The StorageGRID audit log enables you to collect detailed information about tenant and grid activity. The audit log can be exposed for analytics through NFS. For detailed instructions on how to export the audit log, see the Administrator's Guide.

After the audit has been exported, you can use log analysis tools such as Splunk or Logstash + Elasticsearch to understand tenant activity or to create detailed billing and chargeback reports.

Details about audit messages are included in StorageGRID documentation. See Audit messages.

Use the StorageGRID app for Splunk

Learn about the NetApp StorageGRID app for Splunk that allows you to monitor and analyze your StorageGRID environment within the Splunk platform.

Splunk is a software platform that imports and indexes machine data to provide powerful search and analysis features. The NetApp StorageGRID app is an add-on for Splunk that imports and enriches data leveraged from StorageGRID.

Instructions on how to install, upgrade and configure the StorageGRID add-on can be found here: https://splunkbase.splunk.com/app/3895/#/details

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