Monitoring metrics in the Cloudera Operational Database with Grafana (Preview)

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Contents

Background

Cloudera Operational Database (COD) provides a pre-defined solution to visualize the COD metrics comprehensively. COD uses Grafana to store and visualize the metrics. You can seamlessly access all the COD metrics using this Grafana solution.

Grafana deployment for COD aims to provide the following benefits.

- *Enables access restriction to Cloudera Manager*: You can obtain necessary information and perform the required operations through the COD API, CLI, or UI while maintaining appropriate access restrictions to Cloudera Manager for other operations.
- *Utilizes ready-made dashboards with advanced widgets*: COD utilizes the pre-built dashboards that Grafana offers, to visualize and monitor the performance of various components.
- *Integrates external metrics sources*: COD allows you to incorporate metrics from external sources such as S3 storage. This integration provides a comprehensive view of COD, which helps to understand COD performance problems more effectively.

Consider the following aspects while enabling Grafana for COD.

- *Grafana server upgrade*: COD focuses on utilizing the existing version to meet the requirements and the upgrade of the Grafana server is not within the scope of this solution.
- *Manual dashboard updates*: You must explicitly download the updated dashboards from the Cloudera Public repository. This allows flexibility and ensures that you have the latest dashboard versions whenever necessary.
- *Operating System support*: The existing solution works on Red Hat, CentOS, RHEL, and Fedora OS because of an RPM-based installation. That is why COD does not allow you to install Grafana with custom images having different OS.
- *Data Lake metrics support*: COD does not include the Data Lake metrics in this solution. Only individual COD (Data Hub) metrics appear in the Grafana dashboard.
- *HA Knox support*: Currently, COD only supports a single Gateway host with a single Knox Gateway.
- *Foursquare plugin support*: The Cloudera Manager foursquare datasource plugin does not support sending alerts. That is why alerts cannot be created on HBase, HDFS, and ZooKeeper dashboard panels.

Enabling Grafana dashboard in COD

Learn how to enable the Grafana URL to visualize the Cloudera Operational Database (COD) metrics.

Before you begin

- You must whitelist the Cloudera archive URL so that the necessary RPM packages for Grafana can be installed in the instances.
- You must whitelist the Cloudera repository so that the dashboards are created automatically.
- You must whitelist the Grafana RPM packages URL so that Grafana can be installed in the instances.
- You must whitelist the Google API storage URL so that the Cloudera Manager fousquare plugin can be installed.
- You must attach the following policy for CloudWatch plugin under cdp-infra2-logs-role (or the role with which the ec2 instances are created) to enable the Amazon S3 metrics inthe Grafana dashboard. To attach a policy under the **cdp-infra2-logs-rolee**, see Create a cross-account IAM role.

```
{
    "Version": "2012-10-17",

    "Statement": [

      {
        "Sid": "AllowReadingMetricsFromCloudWatch",
         "Effect": "Allow",
          "Action": [
              "cloudwatch:DescribeAlarmsForMetric",
              "cloudwatch:DescribeAlarmHistory",
                "cloudwatch:DescribeAlarms",
                "cloudwatch:ListMetrics",
```

```
            "cloudwatch:GetMetricStatistics",
            "cloudwatch:GetMetricData",
            "cloudwatch:GetInsightRuleReport"
        ],
      "Resource": "*"
},

{
      "Sid": "AllowReadingLogsFromCloudWatch",
       "Effect": "Allow",
        "Action": [
        "logs:DescribeLogGroups",
        "logs:GetLogGroupFields",
        "logs:StartQuery",
        "logs:StopQuery",
        "logs:GetQueryResults",
        "logs:GetLogEvents"
         ],
         "Resource": "*"
   },

{
  "Sid": "AllowReadingTagsInstancesRegionsFromEC2",
    "Effect": "Allow",
    "Action": [
```

```
            "ec2:DescribeTags",
            "ec2:DescribeInstances",
            "ec2:DescribeRegions"
             ],
              "Resource": "*"
        },


        {
           "Sid": "AllowReadingResourcesForTags",
           "Effect": "Allow",
           "Action": "tag:GetResources",
           "Resource": "*"
        },
        {
          "Sid": "AllowReadingAcrossAccounts",
          "Effect": "Allow",
          "Action": [
            "oam:ListSinks",
            "oam:ListAttachedLinks"
            ],
             "Resource": "*"
        }
      ]


    }
```

- You must also create a CloudWatch metrics configuration to enable the Amazon S3 metrics in the Grafana dashboard. See the steps mentioned under Using the S3 console in Creating a CloudWatch metrics configuration for all the objects in your bucket.

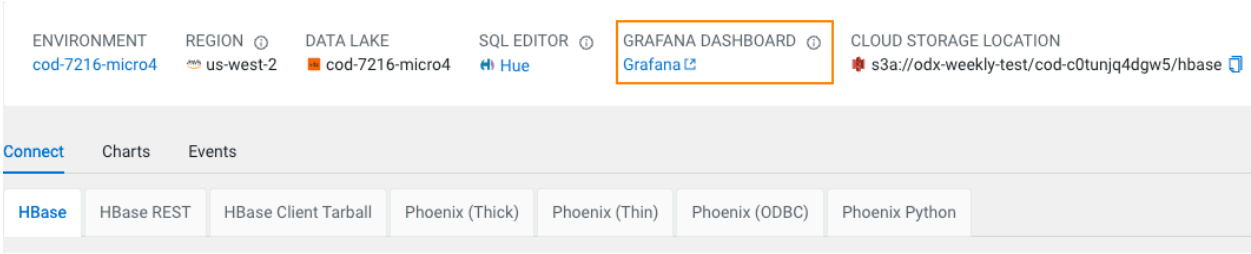
Steps

1. Log in to the CDP CLI command tool.
2. Run the following command.
   cdp opdb create-database --environment <environment_name> --database <database_name> --enable-grafana
   For example,

```
cdp opdb create-database --environment-name cod-7216-micro10
--database-name odx2408 --enable-grafana
```

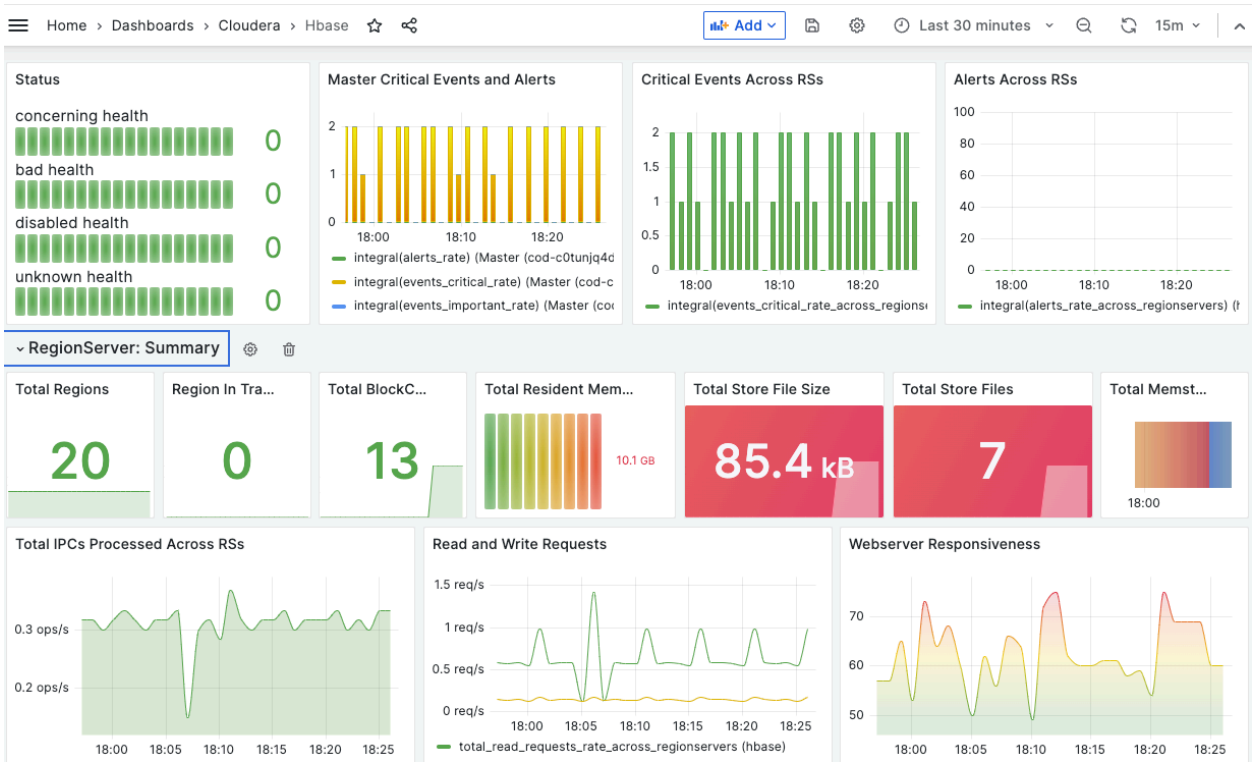
Result

On successfully executing the command, the Grafana URL is added under the GRAFANA DASHBOARD option inside the COD database as shown in the following figure.



When you click on the Grafana URL, it takes you to the Grafana dashboard.

Here is an example of the HBase dashboard using Grafana.



Related information

- CDP CLI Beta

Enabling Grafana dashboard for an existing COD database

Learn how to enable the Grafana URL to visualize the Cloudera Operational Database (COD) metrics for an existing COD database.

Before you begin

- You must whitelist the Cloudera archive URL so that the necessary RPM packages for Grafana can be installed in the instances.
- You must whitelist the Cloudera repository so that the dashboards are created automatically.

- You must whitelist the Grafana RPM packages URL so that Grafana can be installed in the instances.
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      {
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         "Effect": "Allow",
          "Action": [
              "cloudwatch:DescribeAlarmsForMetric",
              "cloudwatch:DescribeAlarmHistory",
                "cloudwatch:DescribeAlarms",
                "cloudwatch:ListMetrics",
                "cloudwatch:GetMetricStatistics",
                "cloudwatch:GetMetricData",
                "cloudwatch:GetInsightRuleReport"
            ],
          "Resource": "*"
      },
```

```
{
     "Sid": "AllowReadingLogsFromCloudWatch",
      "Effect": "Allow",
       "Action": [
       "logs:DescribeLogGroups",
       "logs:GetLogGroupFields",
       "logs:StartQuery",
       "logs:StopQuery",
       "logs:GetQueryResults",
       "logs:GetLogEvents"
        ],
        "Resource": "*"
   },

{
  "Sid": "AllowReadingTagsInstancesRegionsFromEC2",
    "Effect": "Allow",
    "Action": [
    "ec2:DescribeTags",
    "ec2:DescribeInstances",
    "ec2:DescribeRegions"
     ],
      "Resource": "*"
},
```

```
        {
           "Sid": "AllowReadingResourcesForTags",
           "Effect": "Allow",
           "Action": "tag:GetResources",
           "Resource": "*"
        },
        {
          "Sid": "AllowReadingAcrossAccounts",
          "Effect": "Allow",
          "Action": [
            "oam:ListSinks",
            "oam:ListAttachedLinks"
            ],
             "Resource": "*"
        }
    ]

}
```

- You must also create a CloudWatch metrics configuration to enable the Amazon S3 metrics in Grafana dashboard. See the steps mentioned under Using the S3 console in Creating a CloudWatch metrics configuration for all the objects in your bucket.

Steps

1. Go to the Cloudera repository and copy these files (*grafana-install-configure-v2.sh* and *configure-knox-for-grafana.sh*) to the gateway node of the COD cluster.

If you are using CDH version 7.2.15, download *configure-knox-for-grafana7215.sh* file. Following is an example command.

```
scp -i ~/.ssh/odx-developers.pem
./grafana-install-configure-v2.sh cloudbreak@10.1.1.1:

scp -i ~/.ssh/odx-developers.pem ./configure-knox-for-grafana.sh
cloudbreak@10.1.1.1:
```

2. Connect to the gateway node.
   Following is an example command.

```
ssh -i ~/.ssh/odx-developers.pem cloudbreak@10.8.2.5
```

3. Get the root permission for the folder where you copied the script files.
   Following is an example command.

```
sudo -i cd /home/cloudbreak/
```

4. Set the owner permission for the script files so that it can run successfully.

```
chown root:root *
```

5. Run the Grafana installation script.
   Following is an example command.

```
./grafana-install-configure-v2.sh
```

Result of step

```
extracted string: cod--186yjxqvwcwoh

Failed to set locale, defaulting to C

Loaded plugins: fastestmirror, versionlock
```

```
Determining fastest mirrors

epel/x86_64/metalink
|  27 kB  00:00:00

* base: download.cf.centos.org

* centos-sclo-rh: download.cf.centos.org

* centos-sclo-sclo: download.cf.centos.org

* epel: ftp-osl.osuosl.org

* extras: download.cf.centos.org

* updates: download.cf.centos.org

  base
| 3.6 kB  00:00:00

  cdp-infra-tools
| 2.9 kB  00:00:00

  centos-sclo-rh
| 3.0 kB  00:00:00



…



Created symlink from
/etc/systemd/system/multi-user.target.wants/grafana-server.servic
e to /usr/lib/systemd/system/grafana-server.service.
```

If the command is successful, you must see the symlink created message.

6. Check the Grafana service status using the systemctl command.

```
systemctl status grafana-server.service
```

Result of step

```
grafana-server.service - Grafana instance

Loaded: loaded (/usr/lib/systemd/system/grafana-server.service;
enabled; vendor preset: disabled)

Active: active (running) since Tue 2023-08-22 10:51:08 UTC; 16s
ago

Docs: http://docs.grafana.org

Main PID: 25273 (grafana)

CGroup: /system.slice/grafana-server.service

└─25273 /usr/share/grafana/bin/grafana server
--config=/etc/grafana/grafana.ini
--pidfile=/var/run/grafana/grafana-server.pid --packaging=rpm
cfg:default.paths.logs=/var/log/gr…
```

7. Run the Knox configuration script.
   Following is an example command.

   ```
   ./configure-knox-for-grafana.sh
   ```

   If you are using CDH version 7.2.15, use the following command `./configure-knox-for-grafana7215.sh.`

   Result of step

   ```
   Installing knox service configs for grafana

   Adding GRAFANA service in the cdp-proxy topology

   Adding GRAFANA service in the cdp-proxy topology in the active
   directory
   ```

8. Restart the Knox service using Cloudera Manager.

Result

The following is a sample Grafana dashboard URL.

`https://<GATEWAY-FQDN>/grafanacod/dashboards`

You can obtain the value of <GATEWAY-FQDN> from COD DATAHUB > Nodes > Gateway. In the listed table, you can find the FQDN column. For example, `https://cod--186yjxqvwcwoh-gateway0.cod-7216.xcu2-8y8x.dev.cldr.work/grafanacod/dashboards`.

Related information

- CDP CLI Beta

Importing a Grafana dashboard

Know how to import an existing Grafana dashboard into your COD environment.

Before you begin

- You must whitelist the Cloudera archive URL so that the necessary RPM packages for Grafana can be installed in the instances.
- You must whitelist the Cloudera repository so that the dashboards are created automatically.

Steps

1. Download the dashboard JSON files (for example, *S3.json*) in your local computer from the Cloudera repository.
2. Open your Grafana portal and go to the Dashboard page.
3. Choose your folder where you want to install the dashboards (for example, *Cloudera*).
4. Click **New > Import** from the drop-down menu.
5. Upload the dashboard JSON file which you had downloaded earlier.

   Result of step

   After uploading the file you can see that the dashboard is created in your chosen folder.

6. Select the dashboard to see the graphs.