



# Gigamon Containerized Broker Deployment Guide

**GigaVUE Cloud Suite**

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# Change Notes

When a document is updated, the document version number on the cover page will indicate a new version and will provide a link to this Change Notes table, which will describe the updates.

Product Version	Document Version	Date Updated	Change Notes
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# Gigamon Containerized Broker

Gigamon Containerized Broker (GCB) is a containerized component that provides the network broker features in a containerized form. GCB can perform traffic acquisition, aggregation, basic filtering, replication, and tunneling with encryption support. GCB can be deployed in its own Pod as a Kubernetes service where your workloads are running. There are various components based on multiple scenarios and requirements that the GCB receives the traffic from.

This guide provides an overview of Gigamon Containerized Broker and describes how to install and deploy GCB components in your Pods.

Topics:

- [About Gigamon Containerized Broker](#)
- [GCB and GigaVUE-FM Interaction](#)
- [GCB for Service Mesh and HTTPS/2 Support with Metadata](#)
- [GCB for Cloud Object Storage](#)

For Universal Cloud Tap - Container (UCT-C) related information, refer to Universal Cloud Tap - Container Guide.

# About Gigamon Containerized Broker

The Gigamon Containerized Broker (GCB) is a containerized component that provides the network broker features in a containerized form. The GCB is deployed by Kubernetes orchestrator and not by GigaVUE-FM.

Following are the modules implemented in GCB:

- **Traffic Acquisition using CNI Modules:** GCB supports traffic acquisition by reading the traffic from the Container Network Interface (CNI) modules like AWS ENI, Calico, and Flannel. During initialization, GCB receives the configuration information from the Gigamon's YAML file. Kubernetes CNI (Container Network Interface) supports any combination of ingress, egress, and management process. Following the specifications defined in the YAML file, GCB configures itself on your worker node to acquire traffic.

**NOTE:** After GCB registration, you cannot change the number of CNI, and CNI types. If required, a new GCB instance configured and registered.

- **Traffic Aggregation** - When GCB is running in its own Pod, GCB itself serves as a traffic aggregator.
- **Filtering Module** - GCB allows basic filtering, forwarding policy, and enrichment. GCB's filtering can be passed from the YAML file, and it is based upon the protocol. The filters and rules are pushed to GCB from GigaVUE-FM and can be modified while the GCB is running.
- **Tunneling Modules** - GCB supports L2GRE and VXLAN tunneling modules.
- **Encryption Module** - GCB maintains the required certificates to support TLS and HTTPS encryption.

# GCB and GigaVUE-FM Interaction

Following are the interactions between GCB and GigaVUE-FM:

- [GCB Registration](#)
- [GCB Deregistration](#)
- [GCB Heartbeats](#)
- [GCB Statistics](#)
- [Monitoring Domain and Traffic Policy](#)

## GCB Registration

When GCB comes up in the Kubernetes environment, GCB registers itself with GigaVUE-FM. When GigaVUE-FM is unreachable, GCB tries to connect with five retries of increasing time periods. If the GigaVUE-FM is unreachable even after the retries, Kubernetes deployment of GCB fails. GCB only supports IPv4 protocol.

## GCB Deregistration

When GCB is terminated normally, GCB sends the deregistration message to GigaVUE-FM. If GCB goes down abnormally, it might not get deregistered. The GCB Pods associated to a GCB node might then get moved to the other GCB node. Similarly, if a GCB goes down, the feeding UCT Containers are moved to the other GCB, and the GigaVUE-FM does not store information of the GCB Pod.

## GCB Heartbeats

Periodically, GCB sends heartbeats to GigaVUE-FM. By default, the status of GCB is marked as **Connected**. The following are the various scenarios where the GCB status changes:

- If 3 consecutive heartbeats are missed, GigaVUE-FM marks the status as **Disconnected**.
- If 2 consecutive heartbeats are missed, GigaVUE-FM marks the status as **Pending**.
- If GigaVUE-FM does not receive GCB heartbeats for 30 days, then GigaVUE-FM removes the GCB, considering it as stale.

STATUS SUMMARY: GIGAMON CONTAINERIZED BROKERS						
UUID	IP Address	Status	Up Time	Down Time	Deregistered	
12831ad5-5280-4c79-a971-b8c30035b2d6	10.0.144.106	Disconnected	7:25:00	72:45:56	No	
1fd06f08-5d89-4add-9d28-b17516c86391	10.0.144.81	Connected	16:22:00	0:00:00	No	



## GCB Statistics

GCB sends traffic statistics and associated GCB Pods to GigaVUE-FM. The highest traffic and lowest traffic widgets in GigaVUE-FM dashboard shows the details of 10 highest and 10 lowest GCB traffic statistics.

GCB continues to send the statistics even when there is no traffic flowing. The GCB statistics are not stored in cache even when GigaVUE-FM is not reachable by GCB at that instant of time.

LOWEST TRAFFIC: GIGAMON CONTAINERIZED BROKERS		
		1 Day
UUID	IP Address	Rx (Mbps)
ab2f601e-7c13-461d-a11e-29a19f2291dd	10.0.144.45	48.3

HIGHEST TRAFFIC: GIGAMON CONTAINERIZED BROKERS		
		1 Day
UUID	IP Address	Rx (Mbps)
ab2f601e-7c13-461d-a11e-29a19f2291dd	10.0.144.45	48.3

## Monitoring Domain and Traffic Policy

You can configure and manage the Monitoring Domains, Traffic Policies, Connections, Metadata fields, and Source Inventories of GCB in GigaVUE-FM. Refer to the *GigaVUE-FM REST API Reference* for detailed information on the REST APIs of GCB.



- A Traffic Policy is a combination of Rules and Tunnels.
- A rule contains specific filtering criteria that the packets must match. The filtering criteria lets you determine the target instances and the (egress or ingress) direction of tapping the network traffic.
- A tunnel is a communication path in which the traffic matching the filtered criteria is routed to the destination. The tunnel supports ipv4 and ipv6 addresses.

## GCB and GigaVUE-FM High Availability

Gigamon Containerized Broker (GCB) supports the GigaVUE-FM High Availability (FMHA) feature.

For GCB to make use of high availability feature of GigaVUE-FM, you must configure the FQDN (Fully Qualified Domain Name) of the GigaVUE-FM.

In a standalone GigaVUE-FM, the GCB uses the FQDN name of the GigaVUE-FM (if configured). If the FQDN is not configured or if the GCB fails to resolve to an IP address., it uses the legacy method of using the configured IP address.

### For example:

GCB Controller YAML file:

```
env:  
  - name: GCB_CNTLRL_EXT_IP_DNS  
    value: "10.xxx.xx.xx" (IP address of the DNS server - external to the  
    Kubernetes cluster)  
  - name: FM_FQDN  
    value: "fm.myorg.com" (FMs FQDN that is used for DNS lookups)
```

**NOTE:** The FQDN represents a standalone GigaVUE-FM or a FMHA cluster comprised of multiple GigaVUE-FMs. IP addresses (either IPv4, IPv6, or both) for all GigaVUE-FMs (one or more) represented by the FQDN will be returned.

For more details on the GigaVUE-FM High Availability configuration, refer to the *GigaVUE Administration Guide* guide.

## GCB Traffic Health Monitoring

GigaVUE-FM monitors the traffic health of GCB by monitoring the following:

- Configuration Health
- Traffic Health
- Resource Utilization Health
- Connectivity Health

In GigaVUE-FM, you can view alarms, manage one or more alarms, filter alarms, drill down to alarm source, etc. While configuring, GigaVUE-FM allows to set the threshold conditions so that alarms are raised by the GCB node when those threshold conditions are met.

## Configure Alarms in GCB

You can configure alarms in GCB, after registering it with GigaVUE-FM. To register refer to [GCB Registration](#).

To configure Alarms in GCB, follow the given steps:

1. Go to **Inventory** > **Container** > **Gigamon Containerized Broker** > **Settings** drop-down list box.
2. In the **Settings** drop-down list box select **Settings**.
3. Click the **GCB UUID**, and then click **Thresholds** near the GCB UUID to configure the thresholds for monitoring the following health:
  - **Configuration Health**
    - To configure the thresholds for monitoring the configuration health, expand **Configuration Health** and configure the parameters as described in the table.
  - **Traffic Health**
    - To configure the thresholds for monitoring the traffic health, expand **Data Transmission** and configure the parameters as described in the table.
  - **Resource Health**
    - To configure the thresholds for monitoring the traffic health, expand **Invalid RxData** and configure the parameters as described in the table.
  - **Connectivity Health**
    - To configure the thresholds for monitoring the traffic health, expand **Transaction Logging** and configure the parameters as described in the table.

### Configuration Health

To monitor the configuration health, you can configure the thresholds for the following:

S. No.	Name	Monitors	Description	Trigger Value Type	Trigger Value Range	Minimum - Maximum Timer Interval	Default Trigger Value	Default time	Conditions	Severity	Status
1	ServiceIdTableMiss	Either of source or destination table does not exist, or both the tables does not exist.	Alarms are raised when the user fails to upload any one of src / dst table or both ServiceIdTableMiss.	Integer	1-10	300-6000	1	300 sec	above	Critical	ON
2	SvcIdLookupMiss	Entry lookup miss in svc-id table	Alarms are raised when service ID lookup fails for incoming traffic SvcIdLookupMiss.	Integer	10-5000	300-6000	1000	300 sec	above	Major	ON
3	GCBLogfileTruncated	Indicates the logging file truncation (Notification)	Alarms are raised when gcb http pod log is rotated and fresh logging starts GCBLogfileTruncated .	Integer	1-10	300-6000	5	300 sec	above		ON

## Traffic Health

To monitor the traffic health, you can configure the thresholds for the following:

S. No.	Name	Monitors	Description	Trigger Value Type	Trigger Value Range	Minimum - Maximum Time Interval	Default Trigger Value	Default time	Conditions	Severity	Status
1	TransmitErrors	Errors in transmitting packets out through tunnel.	Alarms are raised when tx errors are observed in the http pod TransmitErrors.	Integer	10-100	60-600	100	60 sec	above	Major	ON
2	TransactionLoggingErrors	Transaction Logging failures	Alarms are raised when transaction logging to the designated file fails TransactionLoggingErrors.	Integer	10-100	60-600	100	60 sec	above	Major	OFF
3	PacketReorderTimeouts	Packet reordering triggered timeout or transaction packet discards	Alarms are raised when reordering of the incoming packet is not successful/completed in the defined time interval PacketReorderTimeouts	Integer	1-100	60-600	1	60 sec	above	Major	OFF

## Resource Health

To monitor the resource health, you can configure the thresholds for the following:

S. No.	Name	Monitors	Trigger Value Type	Description	Trigger Value Range	Minimum - Maximum Time Interval	Default Trigger Value	Default time	Conditions	Severity	Status
1	InvalidPostDataReceived	Missing the POST data or Invalid Binary data or wrong pcap files	Integer	Alarms are raised when invalid post data is received by the pod InvalidPostDataReceived.	1-10	60-600	10	300 sec	above	Major	ON

## Connectivity Health

To monitor the connectivity health, you can configure the thresholds for the following:

S. No.	Name	Monitors	Description	Trigger Value Type	Trigger Value Range	Minimum - Maximum Timer Interval	Default Trigger Value	Default time	Conditions	Severity	Status
1	PcapperConnectionFailure	Datapath connection failure	Alarms are raised when connectivity fails between pcapper and http service pcapper connection	Integer	1-10	60-300	3	60 sec	equal	Critical	ON
2	Controller2FM Connectivity	GigaVUE-FM reachability issues from GCB-Controller		Integer	1-10		3	300 sec	equal	Critical	OFF
3	GCB2Controller Connectivity	Controller unreachable from GCB		Integer	1-10		3	300 sec	equal	Critical	OFF

The YAML updates are as follows:

```
- name: GCB_ALARM_GROUP_NAME
```

```
value: "alarm group name"  
# 0 - disabled, 1 - enabled  
- name: GCB_ALARM_HMON_SUPPORTED  
value: '0'
```

For more information about Alarms, refer to Alarms section in the GigaVUE Administration Guide.

## GCB Diameter Traffic Processing

This feature allows Gigamon Containerized Broker (GCB) to process Service Based Interface Application (SBI) and Diameter traffic from the Pcapper.

GigaVUE-FM also supports a new traffic type parameter with SBI or Diameter values. With the introduction of Diameter Traffic, there are independent traffic policies for SBI Traffic and Diameter Traffic. Each monitoring domain now supports two traffic policies. You can configure one traffic policy with metadata filter rules for SBI traffic and another with metadata filter rules for Diameter Traffic.

You can enable or disable the following features (as shown in the table) for SBI and Diameter traffic:

Features	SBI	Diameter
Reorder packets	Supported	Supported
Transaction Logging	Supported	Supported
Service Identification	Supported	Supported

To configure Diameter Traffic Processing, refer to [Configuration of GCB Diameter Traffic Processing](#)

This section also describes about:

- [Service Identification](#)
- [Pod Status](#)
- [Upgrade](#)



## Service Identification

In GigaVUE-FM, you can enable or disable service identification for SBI and Diameter Traffic for GCB.

## Pod Status

GigaVUE-FM supports a new pod status called Terminated. The status and the conditions are explained in the following table:

Status	Condition
Terminated	GCB de-register with GigaVUE-FM.
Pending	GCB lost heartbeat with GigaVUE-FM for more than 10 minutes, but less than 15 minutes.
Disconnected	GCB lost heartbeat with GigaVUE-FM for more than 15 minutes..
Connected	If GCB is not in the status mentioned in the previous rows, then GigaVUE-FM set it as connected.

## Upgrade

You must upgrade both GCB controller and GCB HTTP pod to same version. It is not recommended to use different controller and GCB versions.

## Configuration of GCB Diameter Traffic Processing

This section provides information regarding the following:

- [Configure Traffic Policy](#)
- [Configure GCB Settings](#)

### Configure Traffic Policy

To create a Traffic Policy in GigaVUE-FM:

1. From the GigaVUE-FM left navigation pane, select **Traffic > CONTAINER > Gigamon Containerized Broker**. The Traffic Policy page appears.
2. In the **Traffic Policy** page, click **Create**. The Tunnels and Rules wizard appears.
3. In the **Tunnels** tab. Enter or select the required information as described in the following table:

Fields	Description
Tunnel Name	Name of the tunnel.
Remote IP Address	IP Address of the Tunnel.
Tunnel Type	Select L2GRE or VXLAN as the tunnel type.
Tunnel Key	Enter a value for the tunnel key.
Destination Port	If the tunnel type is VXLAN, enter the tunnel destination port number.

4. Switch to **Rules** tab. Enter or select the required information as described in the following table:

Fields	Description
<b>Policy</b>	
Policy Name	Enter a name for the policy. The Policies with the same name are allowed when the traffic source for one policy is SBI and another policy is Diameter. In such cases, Traffic Type helps to differentiate between SBI and Diameter traffic.
Connection	Select a connection for the policy.
Connection Type	Select any one of the following connection types: <ul style="list-style-type: none"> <li>● SBI - to create rules for the Service Based Interface (SBI) Application traffic.</li> <li>● Diameter - to create rules for the Diameter traffic.</li> </ul>
<b>Rules</b>	
Name	Enter a name for the Rule.
Destination Name	Select a tunnel destination.
Pass	Select Pass to allow the packets.
Click <b>ADD FILTER</b> to add filters for the rule.	
Type	Select any one of the types from the following: <ul style="list-style-type: none"> <li>● F5 Metadata - Provide a Metadata field name and value, when you select this option. For fields, which are part of request-metadata and answer-metadata, should be entered with a "." notation. For example: answer-metadata.error , etc.</li> <li>● Kubernetes - Provide a value for the service, when you select this option.</li> </ul> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>NOTE:</b> For Diameter Traffic, Kubernetes filter type is not supported.</p> </div>
Filter Value	Enter a value for the filter type.

5. Click **Create**. The new Traffic Policy deploys itself in GCB.

The Traffic Policy processes the traffic and forwards the traffic to the tunnel destination IP address.

## Rules and Notes

- A minimum of 3 CPUs must be allocated for each GCB instance for better performance.

# Configure GCB Settings

You can configure and edit the following GCB settings in GigaVUE-FM:

- [General Settings](#)
- [SBI Settings](#)
- [Diameter Settings](#)

## General Settings

In the General Settings, you can view the following details in a list view:

- Monitoring Domain
- Connection GCB UUID
- IP Address
- Group- For GCB, use a different group name while registering GCB HTTP pod.
- Status - In the General settings, you can also specify the purge interval to automatically remove the settings that are disconnected for a long duration.

To view or edit the general settings:

1. In GigaVUE-FM, navigate to **Inventory > CONTAINER > Gigamon Container Broker Settings > Settings**, the Settings page appears. From the **Settings** page, on the **General** section, you can view details of the monitoring domain that are configured in GCB.
2. Click a GCB UUID, and the wizard provides a split view of the following details :
  - General Settings
  - SBI
  - Diameter Settings
  - Thresholds
3. Click on the **General Settings**, and click **Edit** to edit/view the following individual settings:
  - Log level
  - Log File Size
  - PCAP File Generation
  - Number of PCAP files generated

4. . Click **Save** to save the changes made on the General Settings.

**NOTE:** To apply all the settings to the members of Group, enable the **Unify All Settings** check box.

## SBI Settings

1. In GigaVUE-FM, navigate to **Inventory > CONTAINER > Gigamon Container Broker Settings > Settings**, the Settings page appears. From the **Settings** page, on the **General** section, you can view details of the monitoring domain that are configured in GCB.
2. Click a **GCB UUID**, and the wizard provides a split view of the following details :
  - o General Settings
  - o SBI
  - o Diameter Settings
  - o Thresholds
3. Click on the **SBI**, and click **Edit** to edit/view the following Individual and Group settings.

Individual Settings	Group Settings
<ul style="list-style-type: none"> <li>● SBI transaction Logging</li> <li>● Write SBI Transaction Log to a file</li> <li>● Write SBI Transaction Log to stdout</li> <li>● SBI Transaction Log Format</li> <li>● SBI Transaction Log File Size</li> </ul>	<ul style="list-style-type: none"> <li>● Enable/Disable packet reordering functionality.</li> <li>● Use Sequence number for packet reordering.</li> <li>● Use timestamp for packet reordering.</li> <li>● Packet reordering timeout in milliseconds.</li> <li>● Maximum number of requests stored in queue.</li> <li>● Packet reordering drop policy.</li> <li>● SBI Service Translation enable/disable.</li> </ul>

4. Click **Save** to changes made on the SBI Settings.

## Diameter Settings

1. In GigaVUE-FM, navigate to **Inventory > CONTAINER > Gigamon Container Broker Settings > Settings**, the Settings page appears. From the **Settings** page, on the General section, you can view the details of the monitoring domain that are configured in GCB.
2. Click a **GCB UUID**, and the wizard provides a split view of the following details: General Settings
  - o SBI
  - o Diameter Settings
  - o Thresholds
3. Click on the **Diameter** and click **Edit** to edit/view the following Individual and Group settings.

Individual Settings	Group Settings
<ul style="list-style-type: none"><li>● Diameter transaction Logging</li><li>● Write Diameter Transaction Log to a file</li><li>● Write Diameter Transaction Log to stdout</li><li>● Diameter Transaction Log Format</li><li>● Diameter Transaction Log File Size</li></ul>	<ul style="list-style-type: none"><li>● Enable/Disable packet reordering functionality.</li><li>● Use timestamp for packet reordering.</li><li>● Packet reordering timeout in milliseconds.</li><li>● Maximum number of requests stored in queue.</li><li>● Packet reordering drop policy.</li><li>● SBI Service Translation enable/disable.</li></ul>

4. Click **Save** to changes made on the Diameter Settings.

# GCB for Service Mesh and HTTPS/2 Support with Metadata

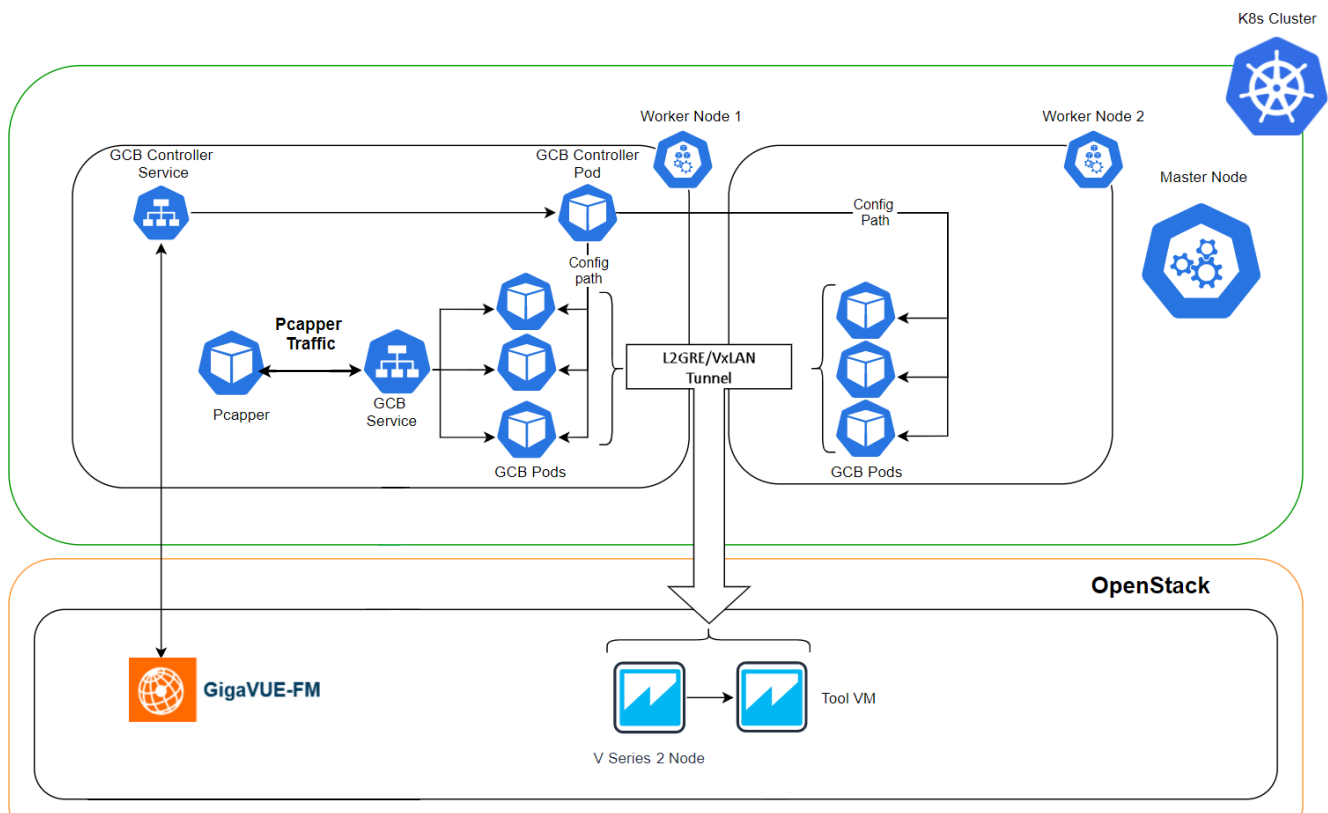
This guide provides an overview of Gigamon Containerized Broker for service mesh and HTTPS/2 support with metadata and describes how to install and deploy GCB components.

Refer to the following topics for details:

- [Architecture of GCB for Service Mesh and HTTPS/2 Support with Metadata](#)
- [Get Started with GCB for Service Mesh and HTTPS/2 Support with Metadata](#)
- [Configure GCB for Service Mesh and HTTPS/2 Support with Metadata](#)
- [Configure GCB Settings](#)

## Architecture of GCB for Service Mesh and HTTPS/2 Support with Metadata

The following diagram illustrates the architecture of Gigamon Containerized Broker for service mesh and HTTPS/2 support with metadata environment.



1. The GCB Controller is registered with GigaVUE-FM and the traffic policy is deployed on the GCBs.
2. Communication of configuration, data, and statistics to and from GCB is performed through the GCB Controller Service. GigaVUE-FM communicates with the GCB Pods through the GCB Controller.
3. Each GCB Pod is registered with GigaVUE-FM and the traffic policy is deployed on the GCBs.
4. The Pcapper collects the network traffic and sends the HTTP packets to GCB Controller.
5. In the GCB service, the received HTTP packets are load balanced across the available GCB Pods.
6. GCB Pods filters the packets based on the metadata.
7. The filtered HTTP packets from GCB Pods are tunneled directly to the Tools or through the GigaVUE V Series nodes on OpenStack environment. Refer to the *GigaVUE Cloud Suite for OpenStack Configuration Guide* for more information on the GigaVUE V Series configuration on OpenStack environment.
8. GCB Controller collects the data from GCB Pods and sends the collected statistics and heartbeats to GigaVUE-FM.

# Get Started with GCB for Service Mesh and HTTPS/2 Support with Metadata

This section describes how to initiate GCB and GigaVUE-FM deployment with the required licenses and network requisites.

Refer to the following sections for details:

- [Components of GCB for Service Mesh and HTTPS/2 Support with Metadata](#)
- [License Information](#)
- [Network requirements](#)

## Components of GCB for Service Mesh and HTTPS/2 Support with Metadata

The Gigamon Containerized Broker for service mesh and HTTPS/2 support with metadata works with the following components:

- **GigaVUE® Fabric Manager (GigaVUE-FM)** is a web-based fabric management and orchestration interface that provides a single pane of glass visibility, management, and orchestration of both the physical and virtual traffic that form the GCB.
- **GCB Pod** is the primary GCB module that receives the data from Pcapper, filters the traffic and tunnels the filtered traffic directly to the tools or through the V Series nodes. GCB Pod also sends the statistics and heartbeats to GCB Controller.
- **GCB Controller** is the management component of GCB to control and communicate with GCB Pods. GCB Controller collects the heartbeats and stats from GCB Pods and sends the collected statistics and heartbeats to GigaVUE-FM.

## License Information

All the GCB Pods deployed in your environment periodically report the statistics to GCB Controller. Then the GCB Controller periodically reports the collective statistics of GCB Pods to GigaVUE-FM for Volume-Based Licensing.

In the Volume-Based Licensing scheme, a license entitles specific applications on your devices to use a specified amount of total data volume over the term of the license. The distribution of the license to individual nodes or devices becomes irrelevant for Gigamon's accounting purpose. GigaVUE-FM tracks the total amount of data processed by the GCB, and tracks the overuse if any.



## Network Requirements

The following table describes the Kubernetes network requirements for GCB to work efficiently.

Direction	Type	Protocol	Port	CIDR	Purpose
<b>Gigamon Containerized Broker</b> deployed inside Kubernetes worker node					
Outbound	HTTPS	TCP	443	Any IP address	Allows GCB Controller to communicate with GigaVUE-FM
Inbound	HTTPS	TCP	8443 (configurable)	Any IP address	Allows GigaVUE-FM to communicate with GCB Controller.
Outbound	HTTPS	TCP	42042	Any IP address	Allows GCB to communicate with GigaVUE-FM to send statistics data.

## Configure GCB for Service Mesh and HTTPS/2 Support with Metadata

Setting up GCB for Service Mesh and HTTPS/2 Support with Metadata involves the following two steps:

- [Deploy GCB in Kubernetes](#)
- [Configure GCB for Service Mesh and HTTPS/2 Support with Metadata through GigaVUE-FM](#)



The Red Hat supported base images of the GCB applications are built on the top of Red Hat Universal Base Image or Red Hat Enterprise Linux Image. The GCB images are **Red Hat Certified** for Red Hat OpenShift platform.

### Deploy GCB in Kubernetes

**NOTE:** GigaVUE-FM can manage the latest and the old versions of GCBs together concurrently.

To fully deploy GCB, the following steps are required to be completed:

1. Implement external access to the Kubernetes environment (e.g., ingress, external public IPs, load balancers) to allow communication between GCB and GigaVUE-FM.

2. Ensure that the firewall rules on Kubernetes nodes are met according to the [Network Requirements](#).
3. Add the GCB images to a private Docker registry or ensure that the files can be pulled from the Docker Hub registry. You can spin up or spin down the GCB instances based on your traffic load.
4. Deploy GCB Controller Service and Pods using [Deploy GCB Controller Service and Pods using YAML files](#) or [Deploy GCB Controller Service and Pods using Helm Chart](#).
5. Deploy GCB HTTP Service and Pods using [Deploy GCB HTTP Service and Pods using YAML files](#) or [Deploy GCB HTTP Service and Pods](#).

Refer to the following topics for GCB Controller and HTTP services and Pods:

- [Deploy GCB Controller Service](#)
- [Deploy GCB HTTP Service and Pods](#)

**NOTE:** To upgrade the GCB solution, deploy the latest version of GCB Controller and then deploy the latest version of GCB HTTP by following the same procedure mentioned above.

## Deploy GCB Controller Service and Pods

You can deploy the GCB Controller Service and Pods using the YAML files or the Helm Charts. Refer to the following sections for detailed information.

- [Deploy GCB Controller Service and Pods using YAML files](#)
- [Deploy GCB Controller Service and Pods using Helm Chart](#)

### Deploy GCB Controller Service and Pods using YAML files

#### Deploy GCB Controller Service

Follow the instructions below to deploy GCB Controller Service in your Kubernetes environment using YAML file:

**NOTE:** [Contact Technical Support](#) or [Contact Sales](#) for the GCB images and YAML files.

1. In your Kubernetes orchestrator, edit the GCB Controller image name, commands, and other required information into your YAML file. The following is sample data from the YAML file. Edit your YAML file based on the sample given below. Do not copy and paste this content into your YAML file:

```

apiVersion: v1
kind: Service
metadata:
  name: gigamon-gcb-cntlr-service
  labels:
    app: gcb-cntlr
    service: gigamon-gcb-cntlr-service
    # change the namespace to match your namespace
  namespace: default
spec:
  ports:
    - port: 8443
      protocol: TCP
      name: gcb-rest
      targetPort: 8443
    - port: 42042
      protocol: TCP
      name: gcb-stats
      targetPort: 42042
  selector:
    app: gcb-cntlr

```

The following table gives a description of all the field values in the YAML file that are updated:

Field Values	Description
Port: 8443	The GCB Controller REST service port number.
Port: 42042	This port must be port 42042. This allows GigaVUE-FM to communicate with GCB to send statistical data.

2. Using the YAML file, Kubernetes creates the GCB Controller Service.

### Deploy GCB Controller Pods

Follow the instructions below to deploy GCB Controller Service in your Kubernetes environment using YAML file:

**NOTE:** [Contact Technical Support](#) or [Contact Sales](#) for the GCB images and YAML files.

1. In your Kubernetes orchestrator, edit the GCB Controller image name, commands, and other required information into your YAML file. The following is sample data from the YAML file. Edit your YAML file based on the sample given below. Do not copy and paste this content into your YAML file:

```

name: gcb-cntlr
image: gigamon/gcb-cntlr:cntlr-<version>
command:
- # /gcb-cntlr
- # <FM IP>
- # <FM REST Svc Port>
- # <GCB-Cntlr REST SVC Port>
- # <mTLS Mode: 1 (ON) | 0 (OFF)>
- # <Cert Path>
- # <Cert file>
- # <Pvt Key>
- # <CA-Root>
imagePullPolicy: Always
ports:
- containerPort: 8443
- containerPort: 42042
env:
# Service name. Should match name specified in metadata section.
- name: GCB_CNTLR_SERVICE_NAME
  value: "GIGAMON_GCB_CNTLR_SERVICE"
# External LB balancer IP, for controller (FM) to connect to gcb-cntlr
- name: GCB_CNTLR_EXT_IP_DNS
  value: "<external IP for GigaVUE-FM to reach GCB CNTLR>"
# K8S cluster end-point
- name: K8S_CLUSTER_ENDPOINT
  value: "https://<kubernetesapiserverurl>:6443"
# Namespace of pod
- name: GCB_CNTLR_POD_NAMESPACE
  valueFrom:
    fieldRef:
      fieldPath: metadata.namespace

```

The following table gives a description of all the field values in the YAML file that are changed or updated:

Field Values	Description
/gcb-cntlr (image name)	GCB Controller image name and version. Make sure to use the latest image version.
GigaVUE-FM IP	The IP address of the GigaVUE-FM with which your GCB is connected.
FM REST Svc Port	The FM REST service port number. This must be opened on your Kubernetes to allow outbound traffic. This allows GCB Controller to communicate with GigaVUE-FM. Example: 443
GCB-Cntlr REST SVC Port	The GCB Controller REST service port number. This must be opened on your GigaVUE-FM to allow inbound traffic to Kubernetes. This allows

Field Values	Description
	GigaVUE-FM to communicate with GCB Controller. Example: 8443
mTLS Mode: 1(ON)   0(OFF)	To specify if mTLS mode between GigaVUE-FM and GCB controller should be On or Off. Values are: <ul style="list-style-type: none"> <li>• 1 - ON</li> <li>• 0 - OFF</li> </ul>
Cert Path	Path of the certificate file. Example: /etc/gcbcerts
Cert file	Name of the certificate file. Example: gcb-cert.pem
Pvt Key	Name of the private key. Example: gcb-pvt-key.pem
CA-Root	Name of the CA root certificate. Example: gcb-ca-root-cert.pem
Ports: <ul style="list-style-type: none"> <li>• containerPort: 8443</li> <li>• containerPort: 42042</li> </ul>	Two ports must be opened. The first container port must be the same as GCB-Cntrl REST SVC Port. The second container port must be port 42042. This allows GigaVUE-FM to communicate with GCB to send statistics data.
External LB balancer IP	The external load balancer IP/DNS value to allow GigaVUE-FM to communication with GCB Controller within Kubernetes. The GigaVUE-FM IP entry may change when you upgrade or redeploy.
K8S cluster end-point	Kubernetes cluster end point for GigaVUE-FM to access the control plane. Example: https://<kubernetesapiserverurl>:6443

**NOTE:** Volume Mount is optional for the cases when there is no mTLS authentication. You should enter your volume mount path and a name for the volume mount. For detailed information, refer to the respective YAML files.

- Using the YAML file, Kubernetes automatically downloads the defined GCB Controller Pods and deploys it to the Kubernetes worker node.

### Deploy GCB Controller Service and Pods using Helm Chart

Follow the instructions below to deploy GCB Controller Service and Pods in your Kubernetes environment using Helm Chart:

**NOTE:** [Contact Technical Support](#) or [Contact Sales](#) for the GCB images and Helm Charts (**gcb-cntrl-<version>.tgz** and **gcb-http-<version>.tgz**).

1. On your Kubernetes orchestrator, extract the received GCB Controller (service and Pod) **.tgz** package.

```
$ tar -xvf gcb-cntlr-<version>.tgz
```

2. After extraction, navigate to the gcb-cntlr folder and edit the **values.yaml** file as per your environment. Refer to [Deploy GCB Controller Service](#) and [Deploy GCB Controller Pods](#) for detailed information.

3. From the extracted gcb-cntlr folder, install the GCB Controller Helm Chart using the following command:

```
$ helm install <Name for the GCB Controller> <Extracted folder path>
```

Example: \$ helm install gcb-cntlr gcb-cntlr/

4. Using the Helm file, Kubernetes creates the GCB Controller Service, automatically downloads the defined GCB Controller Pods and deploys it to the Kubernetes worker node.

## Deploy GCB HTTP Service and Pods

You can deploy the GCB HTTP Service and Pods using the YAML files or the Helm Charts. Refer to the following sections for detailed information.

- [Deploy GCB HTTP Service and Pods using YAML files](#)
- [Deploy GCB HTTP Service and Pods](#)

### Deploy GCB HTTP Service and Pods using YAML files

## Deploy GCB HTTP Service

Follow the below instructions to deploy GCB HTTP service in your Kubernetes environment using YAML file:

**NOTE:** Contact [Contact Technical Support](#) or [Contact Sales](#) for the GCB images and YAML files.

1. In your Kubernetes orchestrator, edit the GCB Controller image name, commands, and other required information into your YAML file. The following is sample data from the your YAML file. Edit your YAML file based on the sample given below. Do not copy and paste this content in your YAML file:

```

apiVersion: v1
kind: Service
metadata:
  name: gcb-http-service
  labels:
    app: gcb-http
    service: gcb-http-service
    # change the namespace to match your namespace
  namespace: default
spec:
  ports:
    - port: 9443
      name: https
  selector:
    app: gcb-http

```

The following table gives a description of all the field values in the YAML file that is updated:

Field Value	Description
9443	The GCB Controller REST service port number. This must be opened on your GigaVUE-FM to allow inbound traffic to Kubernetes.

2. Using the YAML file, Kubernetes creates the defined GCB HTTP service.

## Deploy GCB HTTP Pods

Follow the instructions below to deploy GCB HTTP Pods in your Kubernetes environment using YAML file:

**NOTE:** Contact [Contact Technical Support](#) or [Contact Sales](#) for the GCB images and YAML files.

1. In your Kubernetes orchestrator, edit the GCBHTTP Pod image name, commands, and other required information in a YAML file. The following is sample data from the YAML file. Edit your YAML file based on the sample given below. Do not copy and paste this content into your YAML file:

```

name: gcb-http
command:
- # /gcb-http
- # PORT for RX
- # mTLS-Flag(T/F)
- # CERT_FILE
- # KEY_FILE
- # CA_CERT_FILE
- # CA_VERIFY(T/F)
- # default destination ip (if not configured from GigaVUE-FM)
- # (1=> default, 0=> rule)
- # (1=> L2GRE, 3=> VXLAN)
image: gigamon/gcb-http:<version>
imagePullPolicy: Always
env:
- name: GCB_DEBUG_MODE
  value: "0x031A2F14"
- name: GCB_REORDER_GROUP # This is a mandatory field
  value: "group_6_0_00" # Group name must be unique
- name: GCB_SERVICE_NAME
  value: "GIGAMON_GCB_HTTP2_SERVICE"
- name: GCB_CNTLRL_SVC_DNS
  #value: "<GCB-CNTLR-SVC-NAME.GCB-CNTLR-NAMESPACE>.svc.cluster.local"
  value: "gigamon-gcb-cntlr-service.default.svc.cluster.local"
- name: GCB_CNTLRL_REST_SVC_PORT
  # port used to receive configuration from FM
  value: '8443'
- name: GCB_POD_NAMESPACE
valueFrom:
fieldRef:
fieldPath: metadata.namespace

```

The following table gives a description of all the field values in the YAML file that are changed or updated:

Field Value	Description
PORT for RX	HTTP port number for ingress traffic Example: 9443
mTLS-Flag (True/False)	Enable or disable mTLS between Pcappper and GCB.
CERT_FILE	SSL/TLS certificates Example: server-certificate-chain.pem
KEY_FILE	Private key for the certificate Example: server-private-key.pem
CA_CERT_FILE	CA root certificate



Field Value	Description
	Example: ca-root-crt-chain.crt
CA_VERIFY (True/False)	Enable or disable verification of the certificate files.
default destination ip	Default Destination IP (if not being configured from FM)
(1=> default, 0=> rule)	(0/1) Enter 1 to use the default destination IP, or enter 0 to use the rules configured by GigaVUE-FM
(1=> L2GRE, 3=> VXLAN)	(1/3) Enter 1 to use the L2GRE tunnel type, or enter 3 to use the VXLAN tunnel type.
gigamon/gcb-http:<version>	GCB Controller image name and version. Make sure to use the latest image version.
GCB_DEBUG_MODE	The hex value for GCB debugging. This value must be in the <b>0xdd [aaaa][b][c]</b> format, where: <ul style="list-style-type: none"> <li>• aaaa is a hex value for the number of pcap messages to maintain before rollover</li> <li>• b is 0 = do not create pcap or 1 = create pcap</li> <li>• c is level. Level with 1 =fatal, 2 =error, 3 =info, 4 =debug</li> <li>• dd is the log file size multiplier <ul style="list-style-type: none"> <li>• dd = 0 1 - means default log file size (approx. 100,000 lines)</li> <li>• dd = 08 - means 8 * default log file size (approx. 8*100,0000 lines)</li> <li>• dd = FF = 255 - means (255*100,000 lines)</li> </ul> </li> </ul>
GCB_CNTLR_SVC_DNS	GCB Controller Service Number. This value must match the metadata used for GCB Controller. Example: gigamon-gcb-cntlr-service.default.svc.cluster.local
GCB_CNTLR_REST_SVC_PORT	The GCB Controller REST service port number. This must be opened on your GigaVUE-FM to allow inbound traffic to Kubernetes.

- Using the YAML file, Kubernetes automatically downloads and deploys the defined GCB HTTP Pods.

### Deploy GCB HTTP Service and Pods using Helm Chart

Follow the instructions below to deploy GCB HTTP Service and Pods in your Kubernetes environment using Helm Chart:

**NOTE:** [Contact Technical Support](#) or [Contact Sales](#) for the GCB images and Helm Charts (**gcb-cntlr-<version>.tgz** and **gcb-http-<version>.tgz**).

1. On your Kubernetes orchestrator, extract the received GCB HTTP (service and Pod) **.tgz** package.

```
$ tar -xvf gcb-http-<version>.tgz
```

2. After extraction, navigate to the gcb-http folder and edit the **values.yaml** file as per your environment. Refer to [Deploy GCB HTTP Service](#) and [Deploy GCB HTTP Pods](#) for detailed information.
3. From the extracted gcb-http folder, install the GCB HTTP Helm Chart using the following command:

```
$ helm install <Name for the GCB HTTP> <Extracted folder path>
```

Example: **\$ helm install gcb-http gcb-http/**

4. Using the Helm file, Kubernetes creates the GCB HTTP Service, automatically downloads the defined GCB HTTP Pods and deploys it to the Kubernetes worker node.

## Configure GCB for Service Mesh and HTTPS/2 Support with Metadata through GigaVUE-FM

This section describes how to configure GCB through GigaVUE-FM GUI. Refer to the following section for details.

- [Launch GigaVUE-FM](#)
- [Create Metadata Field Names](#)
- [Create Monitoring Domain](#)
- [Configure Service Identification](#)
- [Configure Traffic Policy](#)

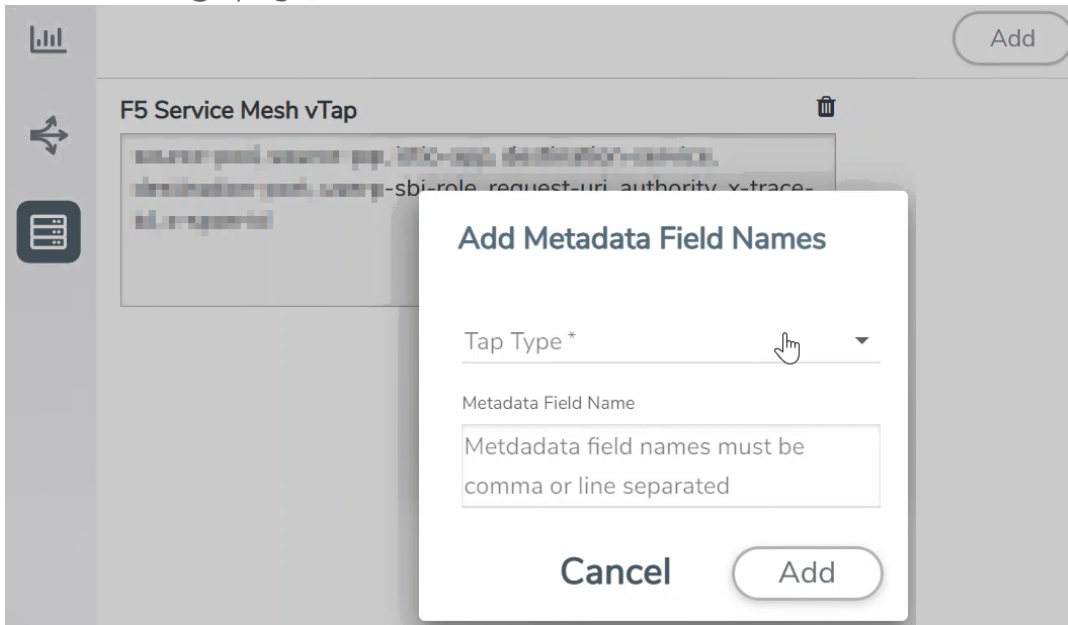
### Launch GigaVUE-FM

The recent GigaVUE-FM image files can be downloaded from [Gigamon Customer Portal](#). After fetching the image, upload and launch GigaVUE-FM on your OpenStack environment. For assistance, [Contact Technical Support](#) of Gigamon or refer to the *GigaVUE Cloud Suite Deployment Guide - OpenStack* for more information on GigaVUE V Series configuration on OpenStack environment.

### Create Metadata Field Names

To create metadata field names in GigaVUE-FM:

1. In GigaVUE-FM, on the left navigation pane, select **Inventory > CONTAINER > Gigamon Containerized Broker > Settings**. The **Settings** page appears.
2. In the **Settings** page, click **Add**. The **Add Metadata Field Names** wizard appears.



3. Select the **Tap type** as **F5 Service Mesh vTAP** and enter the **Metadata Field Names**.
4. Click **Add**. The newly added metadata field names appear on the **Settings** page.

## Create Monitoring Domain

To create a monitoring domain in GigaVUE-FM:

1. In GigaVUE-FM, on the left navigation pane, select **Inventory > CONTAINER > Gigamon Containerized Broker > Monitoring Domain**. The **Monitoring Domain** page appears.

- In the Monitoring Domain page, click **New**. The Monitoring Domain Configuration wizard appears.

- Enter or select the required information as described in the following table,

Fields	Description
Monitoring Domain	Enter a name for the monitoring domain
Alias	Enter a name for the GCB connection
Authentication Type	Select Token as the authentication type
API Server URL	Enter the URL of the API server
Tapping Type	Select <b>F5 Service Mesh vTap</b> as the Tapping Type

- Click **Save** to create a monitoring domain.

## Configure Service Identification

In the Service mesh and HTTP/s supported platform, the GCB receives packets to be monitored in the form of HTTPS/2 requests. On receiving the HTTPS/2 request from Pcapper, GCB applies the rules configured in GigaVUE-FM and forwards the filtered traffic to GigaVUE V Series Nodes deployed on the OpenStack platform through L2GRE or VXLAN tunnels.

In a Kubernetes environment, the IP addresses associated with pods and services are temporary and can change regularly. For the external tools, these changing IP addresses are difficult to consistently correlate incoming data to the services and the sources related to that data. The same IP addresses may also exist in multiple Kubernetes clusters adding difficulty in identifying the true source of the monitored traffic. To correlate these temporary and same IP addresses, the GigaVUE-FM and GCB use information supplied in the .csv text files to map the temporary IP addresses to IPv6 addresses that the external tools can consistently use.

The CSV file must contain a header row with two columns. The first column is for the Metadata value and the second column is for the IPv6 address. The metadata value specified in the header row and the values in the first column of the CSV file must match the [Metadata Field Names](#).

source-pod-namespace,ip Address	
re9DCVYvQGUEVXe-y-or-x-001,	2607:f160:e299:8a42:78ee:b821:66e4:41c2
re9DCVYvQGUEVXe-y-or-x-002,	2607:f160:9f99:46bc:4e17:dfc:e48a:e02
re9DCVYvQGUEVXe-y-or-x-003,	2607:f160:7ce0:38e1:40c0:5533:a55c:b3f5
re9DCVYvQGUEVXe-y-or-x-004,	2607:f160:2028:8696:8e60:2795:c223:9e2d

↓ Metadata value
↓ IPv6 address

**NOTE:** The length of the metadata value in first column of the non-header row must be less than or equal to 255 and the number of non-header entries (rows) must be less than **4096**. Service ID feature will not work if metadata fields for Service ID mapping are greater than 255 bytes.

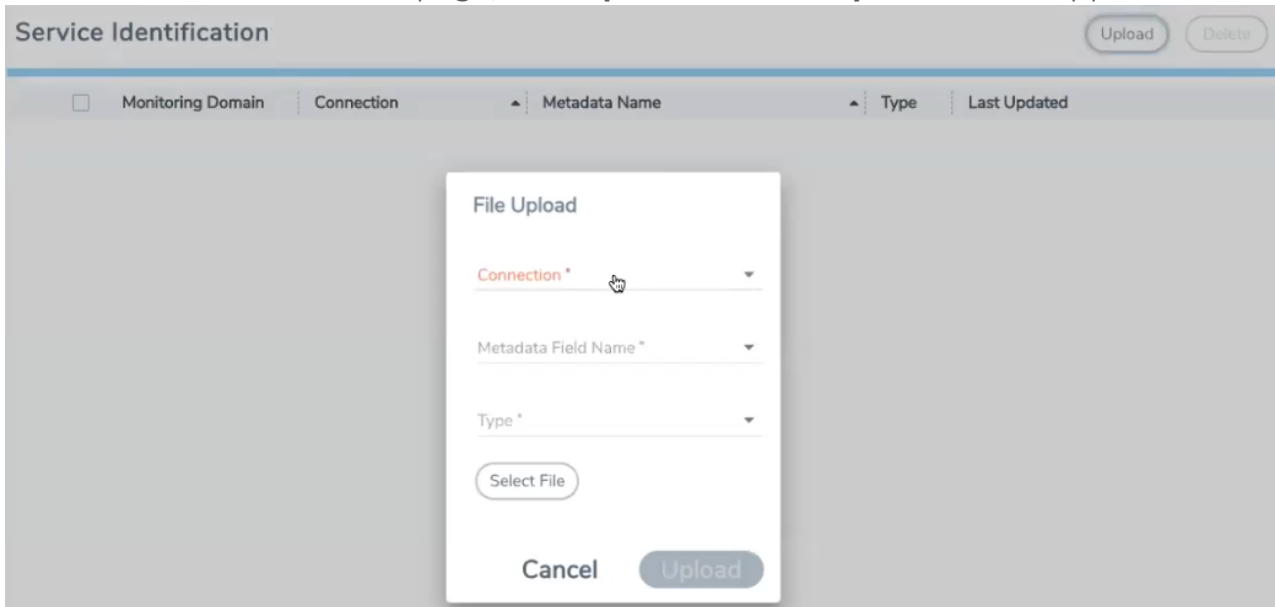
The Service Mesh and HTTPS/2 supported platform must provide the following CSV files:

- a **src-ip-mapping.csv** file to translate the temporary source IP (IPv4) address to an external IPv6 address.
- a **dest-ip-mapping.csv** file to translate the temporary destination IP (IPv4) address to an external IPv6 address.

To upload the mapping CSV files to GigaVUE-FM:

1. After creating a Monitoring Domain, in GigaVUE-FM, from the left navigation pane, select **Inventory > CONTAINER > Gigamon Containerized Broker > Service Identification**. The **Service Identification** page appears.

2. In the Service Identification page, click **Upload**. The **File Upload** wizard appears.



3. Enter or select the required information as described in the following table:

Fields	Description
Connection	Select an existing monitoring domain
Metadata Field Name	<p>Select a Metadata field to search in the CSV file.</p> <ul style="list-style-type: none"> <li>• If the value for the metadata field matches the content of the received packets, then GCB use the mapping tables to convert the ephemeral IPv4 addresses to external IPv6 addresses and replaces the incoming IPv4 header with an IPv6 header, before forwarding the packets to the Tools or V Series nodes.</li> <li>• If the value for the metadata field doesn't match the content of the received packets, then the GCB forwards the packets without translation.</li> </ul>
Type	<p>Select an IP address type from the following:</p> <ul style="list-style-type: none"> <li>● SRC - Source IP</li> <li>● DST - Destination IP</li> </ul>
Select (CSV) File	Select an IP mapping CSV file to upload to GigaVUE-FM.

- Click **Upload** to upload the selected CSV file for the monitoring domain.

**NOTE:** You must upload a source and a destination IP mapping CSV file for the IP translation.

Once the CSV file is uploaded successfully, GigaVUE-FM displays the status of the uploaded file. If no error is found in the meta-data, then the status is displayed as **Ok**. However, if there is any error in the meta data or processing, then the error message is displayed under the **Status** column. Click on the error message to get detailed information about the error.

<input type="checkbox"/>	Monitoring Domain	Connection	Metadata Name	Type	Last Updated	Status
<input checked="" type="checkbox"/>	default					
<input checked="" type="checkbox"/>		conn				
<input checked="" type="checkbox"/>			authority			
<input type="checkbox"/>				DST	2021-10-27 08:45:28	<span style="color: green;">✔ Ok</span>
<input type="checkbox"/>			source-pod-namespace			
<input type="checkbox"/>				SRC	2021-10-27 08:46:29	<span style="color: red;">❌ Skipped Entries</span>

Go to page: 1 of 1 Total Records: 6

#### Skipped Entries

Metadata	External IP	Error
default	1234567	Invalid IP address value 1234567 in line : 3.
gcnamespace	2601d88e15678	Duplicate metadata value gcnamespace in line : 5.

Types of Error messages:


- Skipped Entries:** This error message is displayed:
  - If the metadata value is blank or more than 127 characters.
  - If the IP address is invalid.
  - If there are more than 4096 entries in the file excluding the header. In this case, only the first 4096 entries will be sent to GCB and the rest would be skipped.
  - If the uploaded CSV file contains two or more identical entries, or two or more entries with the same meta data values. In this case only the first entry will be sent to GCB and the rest would be skipped.
- GCB:** This error message is displayed due to processing errors or a failure.

## Configure Traffic Policy

To create a Traffic Policy in GigaVUE-FM:

1. From the GigaVUE-FM left navigation pane, select **Traffic > CONTAINER > Gigamon Containerized Broker**. The **Traffic Policy** page appears.
2. In the **Traffic Policy** page, click **Create**. The Create Tunnels and Rules wizard appears.
3. In the **Tunnels** tab, enter or select the required information as described in the following table:

**Tunnels**   **Rules**

TUNNEL 1   Tunnel Name\*   Remote IP Address\*   Tunnel Type\*   Tunnel Key\*   Destination Port\*   

---

Cancel   **Create**

Fields	Description
Tunnel Name	Enter a name for the Tunnel.
Remote IP Address	Enter an IP Address for the Tunnel.
Tunnel Type	Select L2GRE or VXLAN as the tunnel type.
Tunnel Key	Enter a value for the tunnel key.
Destination Port	If the tunnel type is VXLAN, enter the tunnel destination port number.



4. Switch to **Rules** tab, and enter or select the required information as described in the following table:

**Tunnels**   **Rules**

**Policy**

Policy Name \*

Connection \*

---

**Rules**

+ -

**RULE 1**   Name \*   Destination Name \*    Pass    Drop   ADD FILTER

rule1  

**FILTER 1**   Type   Metadata Field   Value \*   + -

F5 Metadata  

Cancel   **Create**

Fields	Description
<b>Policy</b>	
Policy Name	Enter a name for the policy.
Connection	Select a connection for the policy.
<b>Rules</b>	
Name	Enter a name for the Rule.
Destination Name	Select a tunnel destination.
Pass/Drop	Select Pass to allow the packets or select Drop to block the packets based on the filters.
Click <b>ADD FILTER</b> to add filters for the rule.	
Type	Select the type as F5 Metadata.
Metadata Field	Select a Metadata field name.
Filter value	Enter a value for the filter type.

5. Click **Create** and this new Traffic Policy deploys itself in the GCB.

The Traffic Policy processes the Pcapper traffic and forwards the traffic to the tunnel destination IP address.

## Configure GCB Settings

You can configure the following settings in GigaVUE-FM:

- [GCB General Settings](#)
- [GCB Individual Settings](#)
- [GCB Group Settings](#)

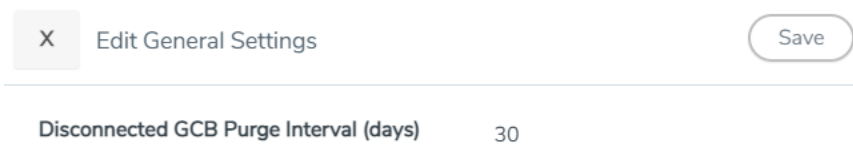
### GCB General Settings

In the GCB General Settings, you can specify the purge interval to automatically remove the GCBs that are disconnected for a long duration.

**NOTE:** GigaVUE-FM generates an alarm for the disconnected GCB when the GCB heartbeats are not received for more than 15 minutes. Refer to "Alarms" topic in the *GigaVUE Administration Guide* for detailed information on Alarms.

To view or edit the GCB general settings:

1. In GigaVUE-FM, navigate to **Inventory > CONTAINER > Gigamon Containerized Broker > Settings**, the **Settings** page appears.
2. From the **Settings** page, on the **General** section, click **Edit**. The **Edit General Settings** quick view appears.



X Edit General Settings Save

Disconnected GCB Purge Interval (days) 30

3. Enter the number of days to retain the disconnected GCB and after this duration the disconnected GCB will be removed.
4. Click **Save** to changes made on the General Settings.

### GCB Individual Settings

#### GCB Log Level Settings

In GigaVUE-FM, you can control the level of logs created at each individual GCB for troubleshooting. The regular GCB log file name format is **gcb\_http2.log**.

To view or edit the GCB log level settings:

1. In GigaVUE-FM, navigate to **Inventory > CONTAINER > Gigamon Containerized Broker > Settings**, the **Settings** page appears.
2. From the **Settings** page, select a GCB to view or edit the GCB log configuration.
3. Select **Edit** to edit the required GCB log values in the **Individual Settings** section.

GCB UUID: ██████████ ██████████ ██████████ ██████████ Cancel Save

**Individual Settings**

Individual setting will apply to this GCB only. When applying settings to a group try to consider the performance impact.

Log Level (*DEBUG)	ERROR	Reset	Apply to Group
Log File Size (*300000)	100001	Reset	Apply to Group
PCAP File Generation (*Yes)	<input type="checkbox"/> No	Reset	Apply to Group
Number of PCAP Files Generated (*30)	30	Reset	Apply to Group

Field	Description
<b>Log Level</b>	Select one of the following: <ul style="list-style-type: none"> <li>• <b>DEBUG</b>—fine-grained log information for application debugging</li> <li>• <b>INFO</b>—coarse-grained log information for highlighting application progress</li> <li>• <b>WARN</b>—log information of potentially harmful situations</li> <li>• <b>ERROR</b>—log information of the error events that allows the application to run continuously</li> <li>• <b>FATAL</b>—log information of very severe error events that presumably lead the application to abort.</li> </ul>
<b>Log File Size</b>	Enter a value for the number of lines in the GCB log file.
<b>PCAP File Generation</b>	Select <b>Yes</b> to generate the PCAP file and select <b>No</b> to continue without the PCAP file.
<b>Number of PCAP Files Generated</b>	Enter a value for the number of PCAP files to be generated and stored on the GCB.

On any of the above fields,

- click **Reset** to reset the value to default.
- click **Apply to Group** to apply the value to all the members of the group

### GCB Transaction Logging Settings

The GCB considers an HTTPS POST message from Pcappper to GCB as a transaction. The Transaction Logging feature collects data from the transaction to aid in troubleshooting problems such as dropped packets, or no traffic at tools. For each transaction, GCB creates a transaction record. The transaction record is logged to a transaction log file in the GCB pod or into the Kubernetes logging stdout stream.

The transaction log consists of various items like transaction index, transaction time, source, and destination details extracted from the data sources like GCB system time, Pcappper metadata field, and Pcappper transaction. Each pod can have a maximum of ten log files.

The GCB transaction log file name format is **gcb\_trans\_<YYYY-MM-DD\_hh-mm-ss>.<csv | json>**, and the file is located on each GCB Pod in the **/pod-data** directory.

To view or edit the transaction log settings:

1. In GigaVUE-FM, navigate to **Inventory > CONTAINER > Gigamon Containerized Broker > Settings**, the **Settings** page appears.
2. From the **Settings** page, select a GCB to view or edit the GCB transaction log settings.
3. Select **Edit** to edit the required GCB transaction log values in the **Individual Settings** section.

Transaction Logging (*Yes)	<input checked="" type="checkbox"/> Yes	Reset	Apply to Group
Write Transaction Log to a File (*Yes)	<input checked="" type="checkbox"/> Yes	Reset	Apply to Group
Write Transaction Log to stdout (*No)	<input type="checkbox"/> No	Reset	Apply to Group
Transaction Log Format (*CSV)	CSV	Reset	Apply to Group
Transaction Log File Size (MB) (*1000)	10	Reset	Apply to Group
Unify All Settings	<input type="checkbox"/> Apply all of the settings above to members of Default_Group		

Field	Description
<b>Transaction Logging</b>	Select <b>Yes</b> to enable the transaction logs generation or select <b>No</b> to disable the transaction logs generation.
<b>Write Transaction Log to a File</b>	Select <b>Yes</b> to save the generated transaction logs to a file on your GCB HTTPS Pods or select <b>No</b> to continue without saving the logs to a file.
<b>Write Transaction Log to stdout</b>	Select <b>Yes</b> to save the generated transaction logs to your Kubernetes logging standard output stream or select <b>No</b> to continue without saving the logs to your Kubernetes stdout. Refer to <a href="#">Kubernetes Logging Architecture</a> for detailed information on Kubernetes stdout.
<b>Transaction Log Format</b>	Select <b>CSV</b> or <b>JSON</b> as the transaction log file format.
<b>Transaction Log File Size (MB)</b>	Enter a value between 1 MB to 4095 MB for the transaction log file size. A new log file is created whenever the log file reaches the specified file size.
<b>Unify All Settings</b>	Enable the Unify All Settings option to apply all the log settings to the members of the group.

On any of the above fields,

- click **Reset** to reset the value to default.
- click **Apply to Group** to apply the value to all the members of the group

## GCB Group Settings

GCB Group settings allow you to configure group settings such as packet reordering settings to multiple GCBs present in a group. It allows you to create a group consisting of multiple GCBs with the same settings. You can change one or more group settings for a GCB group, and the changes are applied to all the GCBs in the group. You can create many GCB groups, but the group name should be different.

### GCB Packet Reordering Settings

When the GCB receives HTTPS POST request from Pcapper, it extracts the headers, metadata, and packets from the message. After extraction, GCB applies the traffic policy and service identification and forwards packets to the destination.

In some cases, a single request may not have the complete transaction, or the request may have packets that are out of order. The GCB packet reordering functionality fixes these out of order packets and makes a complete transaction for tool effectiveness. When the GCB receives a request from Pcapper, GCB checks for complete transaction using a combination of metadata fields and the flow of the extracted messages.

GCB stores the request in a queue with a time stamp and waits until the transaction is complete. When the queue reaches the maximum storage limit, then GCB drops the oldest or the most recent request based on the selected policy.

To view or edit the GCB packet reordering settings:

1. In GigaVUE-FM, navigate to **Inventory > CONTAINER > Gigamon Containerized Broker > Settings**, the **Settings** page appears.
2. From the **Settings** page, select a GCB to view or edit the GCB packet reordering settings.

3. Select **Edit** to edit the required GCB packet reordering values in the **Group Settings** section.

Group Settings: Default\_Group

*Group setting will apply to all members of this group.*

Enable/disable packet reordering functionality (*Yes)	<input checked="" type="checkbox"/> Yes	Reset
Use sequence number for packet reordering (*Yes)	<input checked="" type="checkbox"/> Yes	Reset
Use timestamp for packet reordering (*Yes)	<input checked="" type="checkbox"/> Yes	Reset
Packet reordering timeout in milliseconds (*10000)	10000	Reset
Maximum number of requests stored in queue (*5000)	5000	Reset
Packet reordering drop policy (*Drop oldest)	Drop oldest	Reset

Field	Description
<b>Enable/disable packet reordering functionality</b>	Select <b>Yes</b> to enable the packet reordering functionality or select <b>No</b> to disable the packet reordering functionality.
<b>Use sequence number for packet reordering</b>	Select <b>Yes</b> to use sequencing numbers for packet reordering or select <b>No</b> to reorder packets based on timestamps.
<b>Use timestamp for packet reordering</b>	Select <b>Yes</b> to use time stamps for packet reordering or select <b>No</b> to continue without using time stamps for the packet reordering.
<b>Packet reordering timeout in milliseconds</b>	Enter a value between 10000 to 3600000 milliseconds for the packet reordering timeout. Packet reordering timeout in the duration, the GCB waits for the pending packets to complete the transaction, and after this timeout, all the related packets are dropped.
<b>Maximum number of requests stored in queue</b>	Enter a value between 1000 to 100000 requests for the maximum number of requests that can be stored in the queue.
<b>Packet reordering drop policy</b>	Select <b>Drop most recent</b> to drop the most recent packets when the queue is overloaded or select <b>Drop oldest</b> to drop the old packets when the queue is overloaded.

# GCB for Cloud Object Storage

This chapter provides an overview of Gigamon Containerized Broker for cloud object storage and describes how to install and deploy UCT Containers in your Pods.

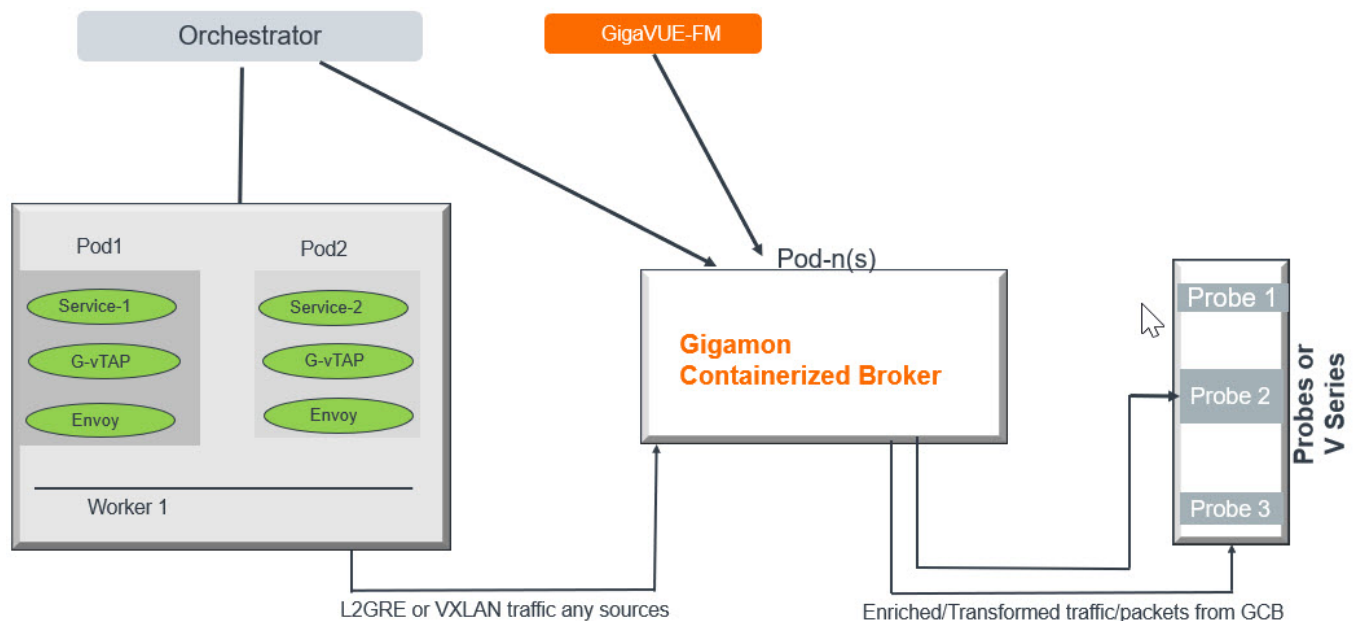
Topics:

- [Architecture of GCB for Cloud Object Storage](#)
- [Get Started with GCB for Cloud Object Storage](#)
- [Configure GCB for Cloud Object Storage](#)
- [View GCB statistics in GigaVUE-FM](#)

# Architecture of GCB for Cloud Object Storage

## GCB with GigaVUE-FM deployment

With GCB in its own Pod, you can choose an orchestrator (other than GigaVUE-FM) like K8S to spin up/down the GCB pods.



During GCB initialization, the GCB Controller tries to connect with the GigaVUE-FM IP that you provided in the YAML file. GigaVUE-FM has a server certificate and GCB has a client certificate, so that GigaVUE-FM and GCB can identify the connection and traffic flow. GigaVUE-FM does not control the GCB spin up/down. The GCB parameter definition and deployment is performed through Kubernetes orchestrator and not by GigaVUE-FM.

## Get Started with GCB for Cloud Object Storage

This section describes how to initiate GCB deployment with the required licenses and network requisites.

Refer to the following sections for details:

- [Components of GCB for Cloud Object Storage](#)
- [License Information](#)
- [Network Requirements](#)



## Components of GCB for Cloud Object Storage

The Gigamon Containerized Broker for cloud object storage works with the following components:

- **GigaVUE® Fabric Manager (GigaVUE-FM)** is a web-based fabric management and orchestration interface that provides a single pane of glass visibility, management, and orchestration of both the physical and virtual traffic that form the GCB.
- **UCT Container** is the Traffic Acquisition Component of Gigamon's Network Visibility Offering. It receives mirrored traffic from various Networking Infrastructures and overlays (VXLAN) them to Gigamon Containerized Broker.
- **GCB Controller** is the management component of GCB that controls the registration and deregistration with GigaVUE-FM. GCB Controller also sends the collected statistics of GCB and UCT Container to GigaVUE-FM.
- **GCB S3** is the storage service component of GCB that collects the mirrored packets from GCB Controller, converts to PCAP file and uploads it into Amazon S3.

## License Information

All the UCT Container instances connected to GCB periodically report the statistics to GCB. Then the GCB periodically reports the collective statistics of UCT Containers and its own statistics to GigaVUE-FM for Volume-Based Licensing. GigaVUE-FM adds the required licensing tags into the Elasticsearch.

In the Volume-Based Licensing scheme, a license entitles specific applications on your devices to use a specified amount of total data volume over the term of the license. The distribution of the license to individual nodes or devices becomes irrelevant for Gigamon's accounting purpose. GigaVUE-FM tracks the total amount of data processed by the various licensed applications and provides visibility into the actual amount of data, each licensed application is using on each node, and tracks the overuse if any.

## Network Requirements

A security group defines the virtual firewall rules for your instance to control inbound and outbound traffic. When you launch GigaVUE-FM, Gigamon Containerized Broker, and UCT Containers in your project, you add rules that control the inbound traffic to instances, and a separate set of rules that control the outbound traffic.

It is recommended to create a separate security group for each component using the rules and port numbers.

Direction	Type	Protocol	Port	CIDR	Purpose
<b>Gigamon Containerized Broker</b> deployed inside EKS worker node					
Inbound	HTTPS	TCP	443	Any IP address	Allows GCB Controller to communicate with GigaVUE-FM

## Configure GCB for Cloud Object Storage

This section describes how to configure GCB in your environment. Refer to the following section for details.

- [Launch GigaVUE-FM](#)
- [Launch Gigamon Containerized Broker](#)
- [Store Traffic Data in S3 Bucket](#)

### Launch GigaVUE-FM

The recent GigaVUE-FM image files can be downloaded from [Gigamon Customer Portal](#). After fetching the image, upload and launch GigaVUE-FM inside or outside your VPC. For assistance, [Contact Technical Support](#) of Gigamon.

### Launch Gigamon Containerized Broker

Follow the instructions below to deploy GCB in your node:

1. In your Kubernetes orchestrator, enter the GCB Controller and GCB S3 image name, commands and the required information in a YAML file. Following is the example data to be entered into your YAML file:

```

image: gigamon/gcb-s3:<version>
- command:
- gcb-s3
- <pkt_filter_type(ip|tcp|udp)>
- <i_iface: eth0, eth1>
- <s3_bucket_name>(Ex: gcb_s3_bucket)
- <s3_region>(Ex: us-east-2>)
- <AWS Account-ID>
- <max_pkt_per_pcap>
- <idle_timeout (in sec)>
- <stats_active (0/1)>
- <gcm port>
- <stats_interval(in sec)>
- <filtering rule>
- <gcb vxlan port>

image: gigamon/gcb-cntlr:<version>
- command:
- /gcb-cntlr
- <GigaVUE-FM IP>
- <PORT ID for GCB controller to communicate with GigaVUE-FM>

```

2. Using the YAML file, Kubernetes automatically downloads the defined GCB Controller and GCB S3. Then both are deployed in a new Pod.
3. Connect the deployed UCT Containers to the GCB installed in the same node.
4. Register GCB with the GigaVUE-FM launched inside or outside your VPC.

Once the GCB is registered with GigaVUE-FM, the GCB starts to collect the traffic from the UCT Containers and periodically sends the heartbeats and statistics to GigaVUE-FM. For more information on GCB and GigaVUE-FM interaction, refer to [GCB and GigaVUE-FM Interaction](#)

## Store Traffic Data in S3 Bucket

By default, the traffic information from GCB is saved into Amazon S3 bucket. All the parameters of the S3 bucket are defined in the yaml files.

The following are the S3 bucket parameters defined in yaml file:

Parameter	Description
<b>s3_bucket_name</b>	Name of the Amazon S3 bucket
<b>s3_region</b>	AWS region (Example: us-east-2>)
<b>AWS Account-ID</b>	ID of AWS user account
<b>max_pkt_per_pcap</b>	Maximum packets required to create a PCAP file
<b>idle_timeout (in sec)</b>	Idle time limit to create PCAP file without waiting to collect the maximum packets defined.

Follow the instructions below to store the traffic data from GCB to your Amazon S3 bucket.

1. Save the traffic data from the GCB as a PCAP file with the Server-Side Encryption technology.
2. Transfer and save the encrypted PCAP files to your Amazon S3 bucket.

**NOTE:** Naming convention of the PCAP file and the folder in S3 bucket are as follows:

- PCAP file name: **<AWS Account ID>\_pod\_<Pod IP>\_YYYY\_MM\_DD\_HH\_mm\_ss\_<milliseconds>.pcap**
- S3 folder name: **[S3 bucket name]/account\_id/MM-DD-YYYY/[file-name]/**

## View GCB statistics in GigaVUE-FM

You can view the traffic information of GCB in GigaVUE-FM as the collective traffic from UCT Containers and GCB are periodically transferred to GigaVUE-FM.

GigaVUE-FM dashboard displays the GCB statistics in the following widgets:

- Status Summary
- Lowest Traffic
- Highest Traffic

To view the GCB statistics in GigaVUE-FM:

1. On the top navigation bar, click **Dashboard**.
2. In the left navigation pane of the Dashboard page, click **Physical & Virtual**.
3. Click **Add Widget** and select Status Summary, Lowest Traffic, and Highest Traffic widgets. The widgets display the GCB status summary, lowest and highest traffic.

The screenshot shows the GigaVUE-FM dashboard interface. The top navigation bar includes 'Dashboards', 'Traffic', and 'Inventory'. The main content area is titled 'Profile: GCB' and shows the date 'Aug 6, 2020 11:12:46'. There are three main widgets displayed:

- STATUS SUMMARY: GIGAMON CONTAINERIZED BROKERS**: A table with columns: UUID, IP Address, Status, Up Time, Down Time, and Deregistered.
 

UUID	IP Address	Status	Up Time	Down Time	Deregistered
12831ad5-5280-4c79-a971-b8c30035b2d6	10.0.144.108	Disconnected	7:25:00	72:45:56	No
1fd06f08-5d89-4add-9d28-b17516c86391	10.0.144.81	Connected	16:22:00	0:00:00	No
- LOWEST TRAFFIC: GIGAMON CONTAINERIZED BROKERS**: A table with columns: UUID, IP Address, and Rx (Mbps). The time range is set to '1 Day'.
 

UUID	IP Address	Rx (Mbps)
ab2f601e-7c13-461d-a11e-29a19f2291dd	10.0.144.45	48.3
- HIGHEST TRAFFIC: GIGAMON CONTAINERIZED BROKERS**: A table with columns: UUID, IP Address, and Rx (Mbps). The time range is set to '1 Day'.
 

UUID	IP Address	Rx (Mbps)
ab2f601e-7c13-461d-a11e-29a19f2291dd	10.0.144.45	48.3

# Additional Sources of Information

This appendix provides additional sources of information. Refer to the following sections for details:

- [Documentation](#)
- [Documentation Feedback](#)
- [Contact Technical Support](#)
- [Contact Sales](#)
- [The VUE Community](#)

## Documentation

This table lists all the guides provided for GigaVUE Cloud Suite software and hardware. The first row provides an All-Documents Zip file that contains all the guides in the set for the release.

**NOTE:** In the online documentation, view [What's New](#) to access quick links to topics for each of the new features in this Release; view [Documentation Downloads](#) to download all PDFs.

Table 1: Documentation Set for Gigamon Products

GigaVUE Cloud Suite 6.5 Hardware and Software Guides
<b>DID YOU KNOW?</b> If you keep all PDFs for a release in common folder, you can easily search across the doc set by opening one of the files in Acrobat and choosing <b>Edit &gt; Advanced Search</b> from the menu. This opens an interface that allows you to select a directory and search across all PDFs in a folder.
<b>Hardware</b> how to unpack, assemble, rack-mount, connect, and initially configure ports the respective GigaVUE Cloud Suite devices; reference information and specifications for the respective GigaVUE Cloud Suite devices
<b>GigaVUE-HC1 Hardware Installation Guide</b>
<b>GigaVUE-HC2 Hardware Installation Guide</b>
<b>GigaVUE-HC3 Hardware Installation Guide</b>
<b>GigaVUE-HC1-Plus Hardware Installation Guide</b>
<b>GigaVUE-TA25 Hardware Installation Guide</b>
<b>GigaVUE-TA25E Hardware Installation Guide</b>
<b>GigaVUE-TA100 Hardware Installation Guide</b>

## GigaVUE Cloud Suite 6.5 Hardware and Software Guides

**GigaVUE-TA200 Hardware Installation Guide**

**GigaVUE-TA200E Hardware Installation Guide**

**GigaVUE-TA400 Hardware Installation Guide**

**GigaVUE-OS Installation Guide for DELL S4112F-ON**

**G-TAP A Series 2 Installation Guide**

**GigaVUE M Series Hardware Installation Guide**

**GigaVUE-FM Hardware Appliance Guide for GFM-HW1-FM010 and and GFM-HW1-FM001-HW**

### Software Installation and Upgrade Guides

**GigaVUE-FM Installation, Migration, and Upgrade Guide**

**GigaVUE-OS Upgrade Guide**

**GigaVUE V Series Migration Guide**

### Fabric Management and Administration Guides

**GigaVUE Administration Guide**

covers both GigaVUE-OS and GigaVUE-FM

**GigaVUE Fabric Management Guide**

how to install, deploy, and operate GigaVUE-FM; how to configure GigaSMART operations; covers both GigaVUE-FM and GigaVUE-OS features

### Cloud Guides

how to configure the GigaVUE Cloud Suite components and set up traffic monitoring sessions for the cloud platforms

**GigaVUE V Series Applications Guide**

**GigaVUE V Series Quick Start Guide**

**GigaVUE Cloud Suite Deployment Guide - AWS**

**GigaVUE Cloud Suite Deployment Guide - Azure**

**GigaVUE Cloud Suite Deployment Guide - OpenStack**

**GigaVUE Cloud Suite Deployment Guide - Nutanix**

**GigaVUE Cloud Suite Deployment Guide - VMware**

**GigaVUE Cloud Suite Deployment Guide - Third Party Orchestration**

**Universal Cloud Tap - Container Deployment Guide**

**Gigamon Containerized Broker Deployment Guide**

## GigaVUE Cloud Suite 6.5 Hardware and Software Guides

### GigaVUE Cloud Suite for Nutanix Guide—GigaVUE-VM Guide

GigaVUE Cloud Suite Deployment Guide - AWS Secret Regions

### Reference Guides

#### GigaVUE-OS CLI Reference Guide

library of GigaVUE-OS CLI (Command Line Interface) commands used to configure and operate GigaVUE HC Series and TA Series devices

#### GigaVUE-OS Security Hardening Guide

#### GigaVUE Firewall and Security Guide

#### GigaVUE Licensing Guide

#### GigaVUE-OS Cabling Quick Reference Guide

guidelines for the different types of cables used to connect Gigamon devices

#### GigaVUE-OS Compatibility and Interoperability Matrix

compatibility information and interoperability requirements for Gigamon devices

#### GigaVUE-FM REST API Reference in GigaVUE-FM User's Guide

samples uses of the GigaVUE-FM Application Program Interfaces (APIs)

### Release Notes

#### GigaVUE-OS, GigaVUE-FM, GigaVUE-VM, G-TAP A Series, and GigaVUE Cloud Suite Release Notes

new features, resolved issues, and known issues in this release ;  
important notes regarding installing and upgrading to this release

**NOTE:** Release Notes are not included in the online documentation.

**NOTE:** Registered Customers can log in to [My Gigamon](#) to download the Software and Release Notes from the Software & Docs page on to [My Gigamon](#). Refer to [How to Download Software and Release Notes from My Gigamon](#).

### In-Product Help

#### GigaVUE-FM Online Help

how to install, deploy, and operate GigaVUE-FM.

## How to Download Software and Release Notes from My Gigamon

Registered Customers can download software and corresponding Release Notes documents from the **Software & Release Notes** page on to [My Gigamon](#). Use the My Gigamon Software & Docs page to download:

- Gigamon Software installation and upgrade images,
- Release Notes for Gigamon Software, or
- Older versions of PDFs (pre-v5.7).

**To download release-specific software, release notes, or older PDFs:**

1. Log in to [My Gigamon](#)
2. Click on the **Software & Release Notes** link.
3. Use the **Product** and **Release** filters to find documentation for the current release. For example, select Product: "GigaVUE-FM" and Release: "5.6," enter "pdf" in the search box, and then click **GO** to view all PDF documentation for GigaVUE-FM 5.6.xx.

**NOTE:** My Gigamon is available to registered customers only. Newer documentation PDFs, with the exception of release notes, are all available through the publicly available online documentation.

## Documentation Feedback

We are continuously improving our documentation to make it more accessible while maintaining accuracy and ease of use. Your feedback helps us to improve. To provide feedback and report issues in our documentation, send an email to: [documentationfeedback@gigamon.com](mailto:documentationfeedback@gigamon.com)

Please provide the following information in the email to help us identify and resolve the issue. Copy and paste this form into your email, complete it as able, and send. We will respond as soon as possible.

Documentation Feedback Form		
<b>About You</b>	<b>Your Name</b>	
	<b>Your Role</b>	
	<b>Your Company</b>	
<b>For Online Topics</b>	<b>Online doc link</b>	<i>(URL for where the issue is)</i>
	<b>Topic Heading</b>	<i>(if it's a long topic, please provide the heading of the section where the issue is)</i>



<b>For PDF Topics</b>	<b>Document Title</b>	<i>(shown on the cover page or in page header )</i>
	<b>Product Version</b>	<i>(shown on the cover page)</i>
	<b>Document Version</b>	<i>(shown on the cover page)</i>
	<b>Chapter Heading</b>	<i>(shown in footer)</i>
	<b>PDF page #</b>	<i>(shown in footer)</i>
<b>How can we improve?</b>	<b>Describe the issue</b>	<i>Describe the error or issue in the documentation. (If it helps, attach an image to show the issue.)</i>
	<b>How can we improve the content?</b> <b>Be as specific as possible.</b>	
	<b>Any other comments?</b>	

## Contact Technical Support

For information about Technical Support: Go to **Settings**  > **Support** > **Contact Support** in GigaVUE-FM.

You can also refer to <https://www.gigamon.com/support-and-services/contact-support> for Technical Support hours and contact information.

Email Technical Support at [support@gigamon.com](mailto:support@gigamon.com).

## Contact Sales

Use the following information to Gigamon channel partner or Gigamon sales representatives.

**Telephone:** +1.408.831.4025

**Sales:** [inside.sales@gigamon.com](mailto:inside.sales@gigamon.com)

**Partners:** [www.gigamon.com/partners.html](http://www.gigamon.com/partners.html)

## Premium Support

Email Gigamon at [inside.sales@gigamon.com](mailto:inside.sales@gigamon.com) for information on purchasing 24x7 Premium Support. Premium Support entitles you to round-the-clock phone support with a dedicated Support Engineer every day of the week.

## The VÜE Community

The **VÜE Community** is a technical site where Gigamon users, partners, security and network professionals and Gigamon employees come together to share knowledge and expertise, ask questions, build their network and learn about best practices for Gigamon products.

Visit the VÜE site to:

- Find knowledge base articles and documentation
- Ask and answer questions and learn best practices from other members.
- Join special-interest groups to have focused collaboration around a technology, use-case, vertical market or beta release
- Take online learning lessons and tutorials to broaden your knowledge of Gigamon products.
- Open support tickets (Customers only)
- Download the latest product updates and documentation (Customers only)

The VÜE Community is a great way to get answers fast, learn from experts and collaborate directly with other members around your areas of interest.

**Register today at** [community.gigamon.com](http://community.gigamon.com)

**Questions?** Contact our Community team at [community@gigamon.com](mailto:community@gigamon.com).

# Glossary

## D

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### decrypt list

need to decrypt (formerly blacklist)

### decryptlist

need to decrypt - CLI Command (formerly blacklist)

### drop list

selective forwarding - drop (formerly blacklist)

## F

---

### forward list

selective forwarding - forward (formerly whitelist)

## L

---

### leader

leader in clustering node relationship (formerly master)

## M

---

### member node

follower in clustering node relationship (formerly slave or non-master)

## N

---

### no-decrypt list

no need to decrypt (formerly whitelist)

**nodecryptlist**

no need to decrypt- CLI Command (formerly whitelist)

**P**

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**primary source**

root timing; transmits sync info to clocks in its network segment (formerly grandmaster)

**R**

---

**receiver**

follower in a bidirectional clock relationship (formerly slave)

**S**

---

**source**

leader in a bidirectional clock relationship (formerly master)