Gigamon®

Universal Cloud Tap-Container 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
6.5.00	1.0	12/11/2023	The original release of this document with 6.5.00 GA.

Contents

Universal Cloud Tap - Container

Universal Cloud Tap - Container (UCT-C) earlier known as Universal Container Tap (UCT) is a containerized component that provides the network broker features in a containerized form. UCT-C can perform traffic acquisition, basic filtering, and tunneling support. UCT-C is deployed as a Pod in the given worker node where the workloads are running.

The UCT-C is deployed by Kubernetes orchestrator and not by GigaVUE-FM. UCT-C initiates the traffic acquisition process with UCT-C Taps.

Following are the modules implemented in UCT-C:

- **Traffic Acquisition**: UCT-C supports traffic acquisition by replicating the traffic from the worker pods..
- **Filtering Module** - UCT-Cprovides basic filtering based on 5-Tuple. The filtering configuration is pushed by the GigaVUE-FM.
- **Tunneling Modules** - UCT-C supports L2GRE, VXLAN, and TLS-PCAPng tunneling to send the tapped traffic to the GigaVUE V Series Nodes or tools.

This guide provides an overview of Universal Cloud Tap - Container and describes how to install and deploy UCT-C components in your Pods.

Topics:

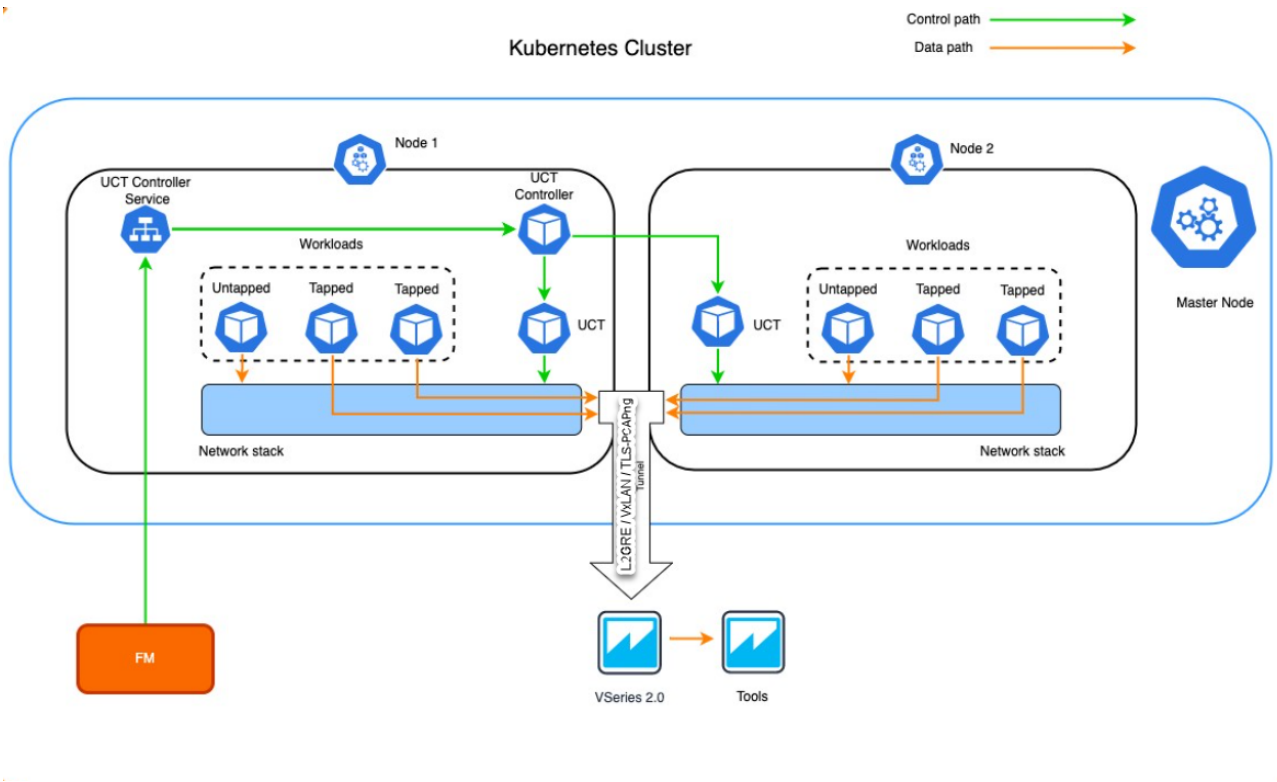
Components of Universal Cloud Tap - Container

The Universal Cloud Tap - Container 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 UCT-C.
- **UCT-C Tap** is the primary UCT-C module that collects the workload traffic, filters the traffic and tunnels the filtered traffic directly to the tools or through the GigaVUE V Series Nodes. UCT-C Tap also sends the traffic policy statistics and heartbeats to UCT-C Controller. UCT-C Tap should run as a **privileged pod**.
- **UCT-C Controller** is the management component of UCT-C to control and communicate with UCT-C Tap. UCT-C Controller collects the data from UCT-C Taps and sends the collected statistics and heartbeats to GigaVUE-FM.

Architecture of Universal Cloud Tap - Container

The following diagram illustrates the architecture of Universal Cloud Tap - Container environment.



1. UCT-Ccontroller registers with GigaVUE-FM.
2. The UCT-C Tap is registered with GigaVUE-FM through the UCT-C Controller
3. GigaVUE-FM deploys the traffic policy on the UCT-Cs.
   Communication of configuration, data, and statistics to and from UCT-C is performed through the UCT-C Controller Service. GigaVUE-FM communicates with the UCT-C Taps through the UCT-C Controller. GigaVUE-FM deploys the traffic policy on UCT-C and receives the statistics from UCT-C tap through UCT-C controller.
4. The filtered network packets are tunneled directly to the Tools or through the GigaVUE V Series nodes running on any supported GigaVUE Cloud Suite on cloud environment.
5. The UCT-C Controller collects the data from UCT-C Taps and sends the collected statistics and heartbeats to GigaVUE-FM.

UCT-C and GigaVUE-FM Interaction

Following are the interactions between UCT-C and GigaVUE-FM:

- UCT-C Registration
- UCT-C Deregistration
- UCT-C Heartbeats
- Monitoring Domain and Traffic Policy

UCT-C Registration

When UCT-C comes up in the Kubernetes environment, UCT-C registers itself with GigaVUE-FM.

Check the network requirements for the registration to be successful. For more information, refer to Network Requirements.

UCT-C only supports IPv4 protocol. For more information, refer to Deploy UCT-C in Kubernetes

UCT-C Deregistration

When UCT-C is terminated normally, UCT-C sends the deregistration message to GigaVUE-FM. If UCT-C goes down abnormally, it will get deregistered when the GigaVUE-FM misses to receive couple of heartbeats.

UCT-C Heartbeats

Periodically, UCT-C sends heartbeats to GigaVUE-FM. By default, the status of UCT-C is marked as **Connected**. The following are the various scenarios where the UCT-C 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**.
- GigaVUE-FM purges disconnected or terminated UCT-C taps after 30 days.

Monitoring Domain and Traffic Policy

You can configure and manage the Monitoring Domains, Connections, Source Inventories, and Traffic Policies of UCT-C in GigaVUE-FM. For more information, refer to Configure UCT-C through GigaVUE-FM

Refer to the GigaVUE API Reference for detailed information on the REST APIs of UCT-C.

- 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.

Get Started with Universal Cloud Tap - Container

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

Refer to the following sections for details:

- Pre-requisities of UCT-C
- Components of Universal Cloud Tap - Container
- License Information
- Network Requirements
- Compute Requirements

Pre-requisities of UCT-C

The following are the pre-requisities of UCT-C:

- Deploy the GigaVUE-FM (FM) on the subnet where Kubernetes cluster is deployed.
- GigaVUE-FM and Kubernetes Cluster should be up and running.
- To work with UCT-C, you must have knowledge in the following platforms:
  - Kubernetes
  - GigaVUE-FM
  - Knowledge to work in any platform such as AWS EKS, Azure AKS, and RedHat OpenShift where the Kubernetes clusters are deployed.

License Information

All the UCT-C Taps deployed in your environment periodically report the statistics to UCT-C Controller. Then the UCT-C Controller periodically reports the collective statistics of UCT-C Taps 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 UCT-C, and tracks the overuse if any.

Volume-based licensing has a service period of 1 month. Service period is the period of time for which the total usage or overage is tracked. There is a grace period for each license that is encoded in the license file. The license effectively provides data allowance for this additional time after the official end time of the license.

For purchasing licenses with the Volume-Based License (VBL) option, contact our Sales. Refer to Contact Sales.

Network Requirements

The following table describes the Kubernetes network requirements for UCT-C to work efficiently.

Direction	Type	Protocol	Port	CIDR	Purpose
Universal Cloud Tap - Container deployed inside Kubernetes worker node					
Outbound	HTTPS	TCP	443	Any IP address	Allows UCT-C Controller to communicate with GigaVUE-FM

Direction	Type	Protocol	Port	CIDR	Purpose
Inbound	HTTPS	TCP	8443 (configurable)	Any IP address	Allows GigaVUE-FM to communicate with UCT-C Controller.
Outbound	HTTPS	TCP	5671	Any IP address	Allows UCT-C controller to send statistics to GigaVUE-FM through Rabbit-MQ port.
Outbound	HTTPS	TCP	42042	Any IP address	Allows UCT-C to send statistics information to UCT-Ccontroller.
Outbound	HTTPS	TCP	4789	Any IP address	VXLAN Default Port

The following table describes the ports that should be opened on GigaVUE-FM::

Direction	Port	Purpose
Inbound	443	GigaVUE-FM REST service port.
Outbound	8443	Allows GigaVUE-FM to communicate with UCT-C Controller.
Inbound	5671	Allows UCT-C to send statistics to GigaVUE-FM through Rabbit-MQ port.

Compute Requirements

The following table describes the minimum compute network requirements for UCT-C.

Compute Instances	vCPU	Memory	Disk Space
Universal Cloud Tap - Container (UCT-C)	1 vCPU	64MB	—
UCT-C Controller	1 vCPU	refer to the following table	—
GigaVUE V Series Node	4 vCPUs	8GB	20GB
GigaVUE V Series Proxy	1 vCPU	1GB	2GB
GigaVUE-FM	4 vCPUs	16GB	41GB

Compute Instances	Memory	Cluster Size
UCT-C Controller	128MB	lesss than 1000 pods
UCT-C Controller	256 MB	2000 pods
UCT-C Controller	1 GB	upto 3000 pods

Kernel and CPU Requirements for Universal Cloud Tap - Container

The kernel requirements for different platforms are as follows:.

- EKS – 5.4
- Native Kubernetes– 5.4, 4.19 (Photon+ OS)

The minimum CPU and RAM requirements for TAP and Controller are as follows:

- UCT-C — 1vcpu and 64Mi
- UCT-C-Controller— 1vcpu and 64Mi

Supported Platforms for UCT-C

The following tables list the different platforms and their Kubernetes version, Container Run-time Interface (CRI), and Container Network Interface (CNI) that are qualified and supported for UCT-C.

NOTE: As an end user, you must have an understanding and knowledge of your container services.

Platform	Kubernetes Version	CRI	CNI
Amazon Elastic Kubernetes Service (EKS)	1.26	Containerd	VPC
Azure Kubernetes Service (AKS)	1.24	Containerd	Azure CNI
VMware Tanzu	1.20	Containerd	Antrea and Calico
Red Hat OpenShift	1.22	CRI-O	OVN
Native Kubernetes	1.24, 1.28	Docker	Flannel, Cilium, and Calico

Configure Universal Cloud Tap - Container

Setting up UCT-C involves the following two steps:

- Deploy UCT-C in Kubernetes
- Configure UCT-C through GigaVUE-FM

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

Create Secret to pull UCT-C image

To create secret, follow these steps:

1. Get the **username/key/password** from support team and encode using the command:

   ```
   echo -n <<user name>>:<<keys>> | base64
   ```

2. Update the keys in the following content and save it as a JSON file:

   ```
   {
   "auths": {
   "https://index.docker.io/v1/": {
   "auth": "<<keys>>"
   }
   }
   }
   ```

3. Create secret using the following command (regcred is used as name of the secret in this doc):

   ```
   kubectl create secret generic <<name of the secret>> --from-
   file=.dockerconfigjson=<<json file path >>
   --type=kubernetes.io/dockerconfigjson -n <<namespace where UCT-C Controller
   and tap will be deployed>>
   ```

Deploy UCT-C in Kubernetes

To fully deploy UCT-C, 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 UCT-C Controller and GigaVUE-FM.
2. Ensure that the firewall rules on Kubernetes nodes are met according to the Network Requirements.
3. YAML files or HELM charts are available as part of the UCT-Cimages. You should untar the UCT-C image to get the readme files.

4. Add the UCT-C 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 UCT-C instances based on your traffic load.
5. Deploy UCT-C Controller and Taps using YAML files or Helm Charts.

Deploy UCT-C Controller and Taps

You can deploy the UCT-C Controller and Taps using the YAML files or the Helm Charts. Refer to the following sections for detailed information.

- Using YAML files
- Using Helm Chart

Using YAML files

Starting from software version 6.4.00, YAML files will be available for each and every release build in the Gigamon software portal. Download the respective UCT-C release build from the repository and untar the **.tgz** file. After you finish untarring the file, you can extract the YAML file and further update the following fields in **uctc-controller.yaml** and **uctc-tap.yaml** file.

> **NOTE:** Contact Technical Support or Contact Sales for information on downloading the respective UCT-C build from the Gigamon software portal.

Deployment of UCT-C Controller

Follow these steps to deploy the UCT-C Controller:

- Use the below command to Unzip and Untar the **.tgz** file:

  ```
  gunzip <name of the UCT-C Controller .tgz file>
  tar -xvf <name of the UCT-C Controller .tar file>
  ```

  After extracting the tar file, navigate to the YAML folder in the newly created **uctc-cntlr-<image version>-<build number>** folder and update the details given in the below steps.
- Provide the created ***secret*** in the following section of the YAML file:

  ```
  imagePullSecrets:
  - name: <secret>
  ```
- Provide the ***FM IP address*** in the following section of the YAML file:

  ```
  command:
  - /uct-controller
  - <FM IP address> (# example: "10.10.10.11")
  - '443'
  - '8443'
  - '0'
  ```

```
- "/etc/gcbcerts"
- "gcb-cert.pem"
- "gcb-pvt-key.pem"
- "gcb-ca-root-cert.pem"
```

- Provide ***UCT-C Cntlr External IP*** and ***Kubernetes Cluster API URL*** in the following section of the YAML file:

```
env:
- name: UCTC_CNTLR_SERVICE_NAME
value: "GIGAMON_UCTC_CNTLR_SERVICE"
- name: UCTC_CNTLR_EXT_IP_DNS
value: <UCTC Cntlr External IP>
# example: "10.10.10.12" or "gigamon.example.com"
- name: K8S_CLUSTER_ENDPOINT
value: <K8s Cluster API URL>
# example: " https://10.10.10.13:6443"
- name: FM_FQDN
value: www.fm.gigamon.com
```

- Update the namespace in the YAML file as required and run the following command:

```
kubectl create -f uctc-controller.yaml
```

  Following the execution of the above command, when UCT-C Controller pod is created successfully, the output (sample) will be as below:

```
gigamon@controller-2:~$kubectl create -f uctc-controller.yaml
service/gigamon-uctc-cntlr-service created
deployment.apps/uctc-cntlr-v1 created
clusterrole.rbac.authorization.k8s.io/pods-list created
clusterrolebinding.rbac.authorization.k8s.io/pods-list created
```

Deployment of UCT-C Tap

Follow these steps to deploy the UCT-C Tap:

- Use the below command to Unzip and Untar the **.tgz** file:

```
gunzip <name of the UCT-C Tap .tgz file>
tar -xvf <name of the UCT-C Tap .tar file>
```

  After extracting the tar file, navigate to the YAML folder in the newly created **uctc-tap-<image version>-<build number>** folder and update the details given in the below steps.

- Feed the created ***secret*** in the below section of YAML file

```
imagePullSecrets:
- name: <secret>
```

- Update the namespace in the below section of YAML file as required. This should be same as the namespace in which UCT-C controller is deployed.

```
- name: UCTC_CNTLR_SVC_DNS
value: gigamon-uctc-cntlr-service.<namespace>.svc.cluster.local
```

- Edit the following **volumeMounts** as per your container Runtime.

```
volumeMounts:
  - name: socket
    mountpath: /var/run/containerd/containerd.sock
volumes:
  - name: socket
    hostpath:
      Path: /var/run/containerd/containerd.sock
```

Below are the socket location for commonly used CRIs,

```
docker - /var/run/docker.sock
containerd - /var/run/containerd/containerd.sock
cri-o - /var/run/crio/crio.sock
```

- Run the following command for deploying UCT-C Tap:

```
kubectl create -f uctc-tap.yaml -n <namespace where UCT-C tap has to be
deployed>
```

Following the execution of the above command, when UCT-C Tap pod is created successfully, the output (sample) will be as below:

```
gigamon@controller-2:~$ kubectl create -f uctc-tap.yaml -n uctc
daemonset.apps/gigamon-uctc created
```

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

Field Values	Description
Port: 443	The UCT-C Controller REST service port number.
Port: 42042	This port must be port 42042. Allows UCT-C to send statistics information to UCT-Ccontroller.
GigaVUE-FM IP	The IP address of the GigaVUE-FM with which your UCT-C is connected.
UCT-C-Cntlr REST SVC Port	The UCT-C Controller REST service port number. This must be opened on your GigaVUE-FM to allow inbound traffic to Kubernetes. This allows GigaVUE-FM to communicate with UCT-C Controller. Example: 8443 (configurable)
FM REST Svc Port	The FM REST service port number. This must be opened on your Kubernetes to allow outbound traffic. This allows UCT-C Controller to communicate with GigaVUE-FM. Example: 443

Field Values	Description
Ports: containerPort: 443 containerPort: 42042	Two ports must be opened. The first container port must be the same as UCT-C-Cntlr REST SVC Port. The second container port must be port 42042. This allows UCT-C to send statistical data to UCT-C controller.
External LB balancer IP	The external load balancer IP/DNS value to allow GigaVUE-FM to communicate with UCT-C Controller within Kubernetes.
K8S cluster end-point	Kubernetes cluster end point for GigaVUE-FM to access the control plane. Example: https://<kubernetesapiserverurl>:6443

Using Helm Chart

Starting from software version 6.4.00, Helm Charts will be available for each and every release build in the Gigamon software portal. Download the respective UCT-C release build from the repository and untar the **.tgz** file. After you finish untarring the file, you can extract the Helm Chart (**uct-cntlr-<version>.tgz** and **uct-tap-<version>.tgz**) and further update the following fields before deployment.

NOTE: Contact Technical Support or Contact Sales for information on downloading the respective UCT-C build from the Gigamon software portal.

Deployment of UCT-C Controller

- Use the below command to Unzip and Untar the **.tgz** file:

  ```
  gunzip <name of the UCT-C Controller .tgz file>
  tar -xvf <name of the UCT-C Controller .tar file>
  ```

  After extracting the tar file, navigate to the Helm folder in the newly created **uctc-cntlr-<image version>-<build number>** folder and update the details given in the below steps.

- Update the **imagePullSecrets**, **namespace**, **GigaVUE-FM IP**, **external load balancer IP** and **Kubernetes API URL** in the following section of the **values.yaml file** present inside the UCT-C-cntlr directory.

  ```
  imagePullSecrets: [{name: regcred}]
  namespace: uct
  fm_ip: "<IP address>"
  # example: :"10.10.10.10"
  ext_load_balancer: "<IP address>"
  # example: :"10.10.10.11"
  k8s_cluster_url: "<url>"
  # example: :"https://10.10.10.12:6443"
  ```

- Run the below command in the location where uctc-cntlr folder is present to bring up UCT-C Controller.

  ```
  helm install uctc-cntlr ./uctc-cntlr -n <Namespace>
  ```

Following the execution of the above command, when UCT-C Controller pod is created successfully, the output (sample) will be as below:

```
gigamon@controller-2:~$ helm install uctc-cntlr ./uctc-cntlr -n uctc
NAME: uctc-cntlr
LAST DEPLOYED: Sat Feb 3 13:11:11 2024
NAMESPACE: uctc
STATUS: deployed
REVISION: 1
TEST SUITE: None
```

Deployment of UCT-C Tap

- Use the below command to Unzip and Untar the **.tgz** file:

  ```
  gunzip <name of the UCT-C Tap .tgz file>
  tar -xvf <name of the UCT-C Tap .tar file>
  ```

  After extracting the tar file, navigate to the Helm folder in the newly created **uctc-tap-<image version>-<build number>** folder and update the details given in the below steps.

- Update the **imagePullSecrets**, **namespace** in the following section of **values.yaml** file present in UCT-C-tap directory. This should be same as the namespace in which UCT-C- Controller is deployed.

  ```
  imagePullSecrets: [{name: regcred}]
  namespace: uct
  ```

- Edit the following **volumeMounts** as per your container Runtime:

  ```
  crisocketvolume:
  mountPath: /var/run/containerd/containerd.sock
  name: socket
  ```

  The socket location for commonly used CRIs are as follows:

  ```
  docker - /var/run/docker.sock
  containerd - /var/run/containerd/containerd.sock
  cri-o - /var/run/crio/crio.sock
  ```

- Run the below command in the location where UCT-C-tap directory is present to bring up UCT-C Tap:

  ```
  helm install uctc-tap ./uctc-tap -n <namespace>
  ```

  Following the execution of the above command, when UCT-C Tap pod is created successfully, the output (sample) will be as below:

  ```
  gigamon@controller-2:~$ helm install uctc-tap ./uctc-tap -n uctc
  NAME: uctc-tap
  LAST DEPLOYED: Sat Feb 3 13:11:14 2024
  NAMESPACE: uctc
  STATUS: deployed
  REVISION: 1
  TEST SUITE: None
  ```

Configure UCT-C through GigaVUE-FM

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

- Launch GigaVUE-FM
- Create Monitoring Domain
- Create Source Selectors
- Create Tunnel Specifications
- Configure Traffic Policy
- Traffic Policy Statistics

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 GigaVUE V Series Node supported cloud environment. For assistance, Contact Technical Support of Gigamon or refer to GigaVUE Cloud Suites for more information on GigaVUE V Series configuration on the supported cloud environments.

Create Monitoring Domain

To create a monitoring domain in GigaVUE-FM:

1. In GigaVUE-FM, on the left navigation pane, select **Inventory > CONTAINER > Universal Cloud Tap - Container > Monitoring Domains**. The **Monitoring Domain** page appears.
2. In the **Monitoring Domain** page, click **New**. The **New Monitoring Domain** wizard appears.

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

Fields	Description
Monitoring Domain Name	Enter a name for the monitoring domain
Connections	
Connection Name	Enter a name for the UCT-C connection
Cluster Name	Enter a name for the cluster
URL	Enter the URL of the API server

   Click ⊕ to add another connection and click ⊖ to remove an existing connection.
4. Click **Save** to create a monitoring domain.

NOTE: If the connecting UCT-C Tap does not send 3 continuous heart beats, it is marked as disconnected and it is shown on the monitoring domain page as per the interval configured in the UCT-C Purge (the default purge interval is 30 days) before the GigaVUE-FM cleans them up.

You can view the monitoring domain created in the list view. The list view shows the following information for UCT-C and controllers:

- Monitoring Domain
- URL
- Connection
- Cluster Name
- Cluster Version
- Controller / TAP
- UCT-C UUID
- Management IP
- Version
- Node Name
- Node Kernel Version
- Status -If you enable Secure Tunnel, its status can be viewed in Monitoring Domain page.
- Discovered Sources

NOTE: You need to refresh pages manually in UCT-C Monitoring Domain and Policy page as the automatic GUI refresh is disbaled.

Use the following buttons to manage your Monitoring Domain:

Button	Description
New	Use to create new connection
Actions	Provides the following options: ▪ **Edit**- Edit the monitoring domain ▪ **Delete Domain** - Delete the monitoring domain
Filter	Filters the monitoring domain based on the following options: ▪ **Connected** ▪ **Pending** ▪ **Disconnected** ▪ **Terminated**

Notes:

- You can click on the **Discovered Sources** link to view the source details. In the Discovered Sources window, you can enable the **Show System Pods** button to view the information related to the system pods that are not monitored.
- Gigamon cannot tap traffic if hostnetworks are set to true in pods.

Create Source Selectors

When setting up a traffic flow, it is important to define the selection criteria for the sources of traffic. Use the Source Selectors page for configuring the sources of the traffic to be monitored.

To configure the Source Selectors:

1. Select **Inventory** > **Resources> Source Selectors**.
2. On the **Source Selectors** page, navigate to the **Container** tab and click **Create**. The **New Source Selector** wizard appears.

3. Enter or select the required information:

Field	Action
Name	Enter a name for the source
Include Filters (Criteria 1) You can select any one of the following options • **All Sources** - Select this option to acquire traffic from all names, all pods and containers within the selected cluster(s). Depending on the size of the cluster(s), volume of traffic may be larger. • **Criteria1**- You must enter the following options:	
Object Property	Select an object property to filter the traffic source.
Operator	Select the operator.
Values	Enter the values for the filter. Values are case-sensitive.
On the Criteria, click ⊕ to add another Object and click ⊖ to remove an existing Object. **Exclude Filters (Criteria 1)** On the Criteria, click ⊕ to add another Object and click ⊖ to remove an existing Object.	
Object Property	Select an object property to filter the traffic source.
Operator	Select any one of the operators: • equals • contains • startswith • endwith
Values	Enter the values for the filter. Values are case-sensitive.

   On the Include or Exclude filters, click ⊕ to add another Criteria and click ⊖ to remove an existing Criteria.

4. Click **Save** to save the filter.

Notes: You can create multiple filter criteria. Within each criterion, you can configure multiple filters.

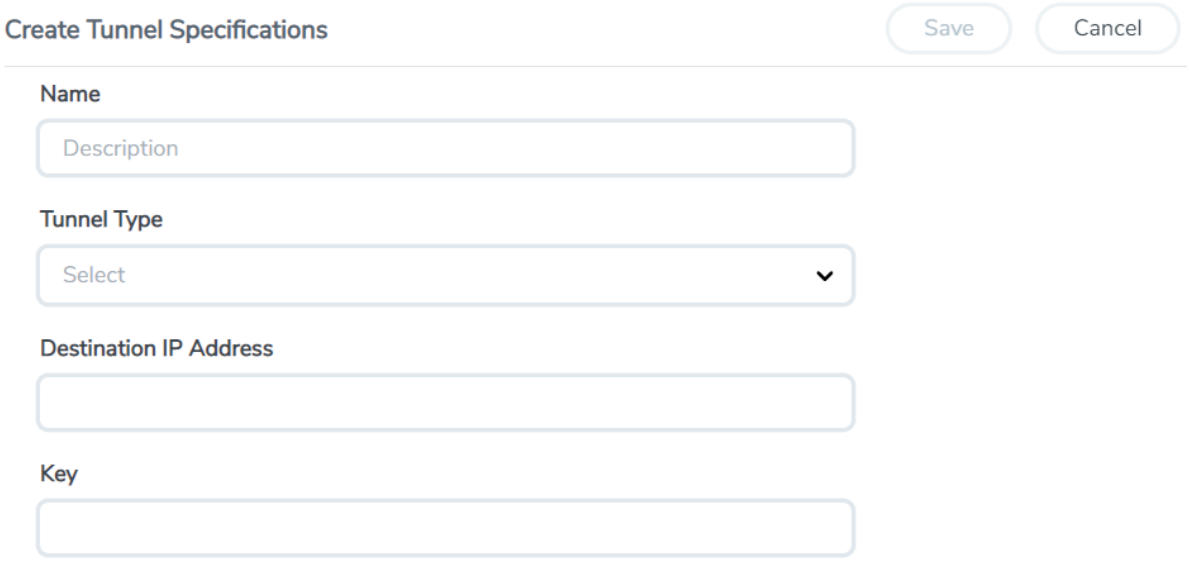
- If you have configured multiple filters in a criterion, then the traffic will be filtered only if all the filter rules are true.
- If you have configured multiple criteria, then the traffic will be filtered even if one of the criteria is true.

Create Tunnel Specifications

A tunnel of type L2GRE, VXLAN, or TLS-PCAPNG,can be created. The tunnel is an egress tunnel. For more information to create a tunnel of type TLS-PCAPNG, refer to Secure Tunnels

To configure the tunnels:

1. Select **Inventory** > **Resources > Tunnel Specifications**.
2. On the **Tunnel Specifications** page, navigate to **Container** tab and click **Create**. The **Create Tunnel Specification** wizard appears.



3. Enter or select the following information:

Field	Description
Name	The name of the tunnel endpoint.
Tunnel Type	Select L2GRE, VXLAN, or TLS-PCAPNG tunnel type to create a tunnel.
Destination IP Address	Enter the IP address of the destination endpoint
Key	Enter a value for the tunnel key

4. Click **Save** to save the configuration.

Configure Traffic Policy

To create a UCT-C Traffic Policy in GigaVUE-FM:

1. From the GigaVUE-FM left navigation pane, select **Traffic > CONTAINER > Universal Cloud Tap - Container**. The **Policies** page appears.
2. In the **Policies** page, click **Create**. You can create a maximum of eight policies per monitoring domain. The Create Policy wizard appears.

3. In the **General** tab, enter or select the required information as described in the following table:

Fields	Description
Policy Name	Enter a name for the Traffic Policy. The name must be unique.
Monitoring Domain	Select an existing monitoring domain. To create a new monitoring domain, refer to Create Monitoring Domain section.
Connections	Select one or more connections for the policy. Once traffic policy is created for monitoring domain, you cannot add or delete connections in a monitoring domain.

4. Switch to the **Source Selectors** tab, select an existing source selector or select **Create New** to create a new source selector, refer to Create Source Selectors section for detailed information. You can configure a maximum of eight source selectors per policy.
5. Switch to the **Rules** tab, enter or select the required information for the **Ingress Rules** and the **Egress Rules** as described in the following table. You must select CA in the Monitoring Domain page to use secure tunnel in rules.

6.

Fields	Description
Rules On the Ingress or Egress rules, click ⊕ to add another rule and click ⊖ to remove an existing rule. You must select CA in the Monitoring Domain page to use secure tunnel in rules.	
Rule Name	Enter a name for the rule. **NOTE:** Rule names ending with __I, __E, __RI, __RE are not recommended as the names are invalid in policy rules.
Enable	Select **On** to enable the filter or select **Off** to disable the filter
Action	Select Pass to allow the packets or select Drop to block the packets based on the filters.
Direction	Select any one of the following directions: • Bi-directional - Taps the traffic in both directions. The maximum number of rules supported per direction is 32. Also, each directional rule will add 2 ingress rules and 2 egress rules. • Ingress- Taps the ingress traffic. • Egress - Taps the egress traffic. • Ingress Pass All - Taps all the ingress traffic. • Egress Pass All - Taps all the egress traffic.
Priority	Enter a priority value to specify the precedence.
Tunnel Specifications	Select an existing tunnel or select **Create New** to create a new tunnel, refer to Create Tunnel Specifications section for detailed information.
Filters On the rule section, click ⊕ to add another filter and click ⊖ to remove an existing filter.	
Filter Type	Select a filter type
Filter Name	Enter a name for the filter
Value	Enter a value for the filter

7. Switch to the **Deploy** tab, click **Deploy** and the selected traffic policy rules get deployed to the required UCT-C taps present on the nodes corresponding to the source pods selected for monitoring.

The Traffic Policy processes the customer workload traffic and UCT-C forwards the traffic to the tunnel destination IP address.

NOTE: When there are two or more policies configured within the same tunnel, you cannot edit the tunnel specifications that are shared in the policies. In such cases, delete all the policies sharing the same tunnel specifications, modify the existing tunnel specifications, and create new policies for the policies that are deleted using the modified tunnel specifications.

Traffic Policy Statistics

Traffic Policy Statistics in the GigaVUE-FM provides the visibility of the policies within a Monitoring Domain and displays the information of the policies and its rules statistics in the dashboard.

Rules are configured in the UCT-C to either forward the traffic to a Tunnel or drop the flow of the traffic.

The activities of the rules are reflected by the statistics counters. The statistics counters show how the policy statistics are directly co-related to the policy and its rules being configured through the GigaVUE-FM.

Viewing Policy Statistics

To view the statistics of the traffic policy configured in the GigaVUE-FM, do the following steps:

1. Go to **Traffic**> **Container** > UCT-C. The **Policies** page appears. In the policy page, you can view various details related to a policy such as **Name**, **Monitoring Domain**, **Connection**, **Status**, etc., For each policy, the value correspond to the aggregate value of UCT-C taps associated with that policy. The fields and the description of the field names are given in the following table:

Table 1:

Field	Description
Name	Name of the Policy
Monitoring Domain	Monitoring Domain associated with the Policy.
Connection	The connection associated with the policy.
Status	Specifies whether the policy deployment is : • Success • Failure • No Target Selected
UCT-C Deployment Details	Specifies the count of successful deployment along with the total number of deployment for a policy.
Ingress packets	Total aggregate value of the ingress packets associated with the policy.

Field	Description
Egress packets	Total aggregate value of the egress packets associated with the policy.
Rx Dropped	Total aggregate value of the ingress packets dropped associated with the policy
Ingress Dropped	Total aggregate value of the ingress packets dropped associated with the policy
Tx Dropped	Total aggregate value of the egress packets dropped associated with the policy.
Egress Dropped	Total aggregate value of the egress packets dropped associated with the policy.
Ingress Bytes	Total aggregate value of the ingress bytes associated with the policy.
Egress Bytes	Total aggregate value of the egress bytes associated with the policy.
Ingress Errors	Total aggregate value of the ingress errors associated with the policy.
Egress Errors	Total aggregate value of the egress errors associated with the policy.

NOTE: Click the Gear icon to add or remove column or columns as per your requirement.

2. Click the **name** of a policy to view the statistics of the policy. The statistics appears on the bottom of the **Policies** page.

You can view the following tabs along with the policy name:

- Source Specifications
- Rules

You can scroll each of the tables to view more columns. The fields and description for the tab that appears when you click the tabs are described in the topics respectively.

Source Specifications

You can view the criteria based on which a pod is selected for tapping.

The fields and descriptions of the source specifications tab are described in the following table:

Table 2:

Tab- Source Specifications	Field	Description
Source Selector		
	Name	Specifies the name of the Source selector.
Include Criteria		
	Criteria Name	Specifies the include criteria for the source selector. Pod that matches the include criteria is part of the source for the given traffic policy.
	Property	Specifies the attributes of the pod. The available attributes are:

Tab- Source Specifications	Field	Description
		service
	Operator	Specifies the operator used in the criteria.
	Value	Specifies the value for the attributes in the criteria.
Exclude Criteria		
	Criteria Name	Specifies the exclude criteria for the source selector. Pod that matches the exclude criteria will be excluded from the source for the given traffic policy.
	Property	Specifies the property in the exclude criteria based on which the pod associated with the source is excluded.
	Operator	Specifies the operator involved in the exclude criteria in tapping the traffic in the pod.
	Value	Specifies the value in the criteria based on which traffic in the pod is excluded.

Rules

You can view the aggregate value of all the rules the policy has been configured for the node in the UCT-C tap present in a cluster. The fields and descriptions of the source specifications tab are described in the following table:

Table 3:

Tab-Rules Rules	Field	Description
Rules		
	Name	Specifies the name of the rules in which the traffic is filtered in the pod
	Tunnel Specifications	Specifies the tunnel details which is associated with the rules to send the traffic out. When you hover over the tunnel specification value, you can view the details of the tunnel in a message box
	Priority	Specifies the priority assigned for the rule.
	Pass/Drop	Specifies whether to pass or drop the rule.
	Filters	Specifies the parameters used in the rule. When you hover over the filter value, you can view the details of the filters in a message box.
	Direction	Specifies the direction of the flow of traffic is ingress, egress, or in

Tab-Rules Rules	Field	Description
		both direction.
	Ingress Packets	Specifies the aggregate value of the ingress packets associated with the rules.
	Egress Packets	Specifies the aggregate value of the egress packets associated with the rules.
	Ingress Dropped	Specifies the aggregate value of the ingress packets dropped associated with the rules.
	Egress Dropped	Specifies the aggregate value of the egress packets dropped associated with the rules.
	Ingress Errors	Specifies the aggregate value of the ingress errors associated with the rules.
	Egress Errors	Specifies the aggregate value of the egress errors associated with the rules.

Precryption™

License: Requires **SecureVUE Plus** license.

Gigamon Precryption™ technology[1] redefines security for virtual, cloud, and containerized applications, delivering plaintext visibility of encrypted communications to the full security stack, without the traditional cost and complexity of decryption.

This section explains about:

- How Gigamon Precryption Technology Works
- Why Gigamon Precryption
- Key Features
- Key Benefits
- Precryption Technology on Single Node
- Precryption Technology on Multi-Node
- Supported Platforms

[1]**Disclaimer**: The Precryption feature allows users to acquire traffic after it has been decrypted. This traffic can be acquired from both virtual machine (VM) and container-based solutions, and is then sent to the V Series product for further processing. The Precryption feature provides an option to use encrypted tunnels for communication between the acquisition (via UCT or G-vTAP) of unencrypted traffic and the traffic processing (at the V Series) which will better safeguard the traffic while in transit. However, if a user does not use the option for encrypted tunnels for communication, decrypted traffic will remain unencrypted while in transit between the point of acquisition and processing.

Please note that this information is subject to change, and we encourage you to stay updated on any modifications or improvements made to this feature.

By using this feature, you acknowledge and accept the current limitations and potential risks associated with the transmission of decrypted traffic.

- Prerequisites

How Gigamon Precryption Technology Works

Precryption technology leverages native Linux functionality to tap, or copy, communications between the application and the encryption library, such as OpenSSL.

In this way, Precryption captures network traffic in plaintext, either before it has been encrypted, or after it has been decrypted. Precryption functionality doesn't interfere with the actual encryption of the message nor its transmission across the network. There's no proxy, no retransmissions, no break-and-inspect. Instead, this plaintext copy is forwarded to the Gigamon Deep Observability Pipeline for further optimization, transformation, replication, and delivery to tools.

Precryption technology is built on GigaVUE® Universal Cloud Tap (UCT) and works across hybrid and multi-cloud environments, including on-prem and virtual platforms. As a bonus, UCT with Precryption technology runs independent of the application, and doesn't have to be baked into the application development lifecycle.

Why Gigamon Precryption

GigaVUE Universal Cloud Tap with Precryption technology is a lightweight, friction-free solution that eliminates blind spots present in modern hybrid cloud infrastructure, providing East-West visibility into virtual, cloud, and container platforms. It delivers unobscured visibility into all encryption types including TLS 1.3, without managing and maintaining decryption keys. IT organizations can now manage compliance, keep private communications private, architect the necessary foundation for Zero Trust, and boost security tool effectiveness by a factor of 5x or more.

Key Features

The following are the key features of this technology:

- Plaintext visibility into communications with modern encryption (TLS 1.3, mTLS, and TLS 1.2 with Perfect Forward Secrecy).
- Plaintext visibility into communications with legacy encryption (TLS 1.2 and earlier).
- Nonintrusive traffic access without agents running inside container workloads.

- Elimination of expensive resource consumption associated with traditional traffic decryption.
- Elimination of key management required by traditional traffic decryption.
- Zero performance impact based on cipher type, strength, or version.
- Support across hybrid and multi-cloud environments, including on-prem, virtual, and container platforms.
- Keep private communications private across the network with plaintext threat activity delivered to security tools.
- Integration with Gigamon Deep Observability Pipeline for the full suite of optimization, transformation, and brokering capabilities.

Key Benefits

The following are the key benefits of this technology:

- Eliminate blind spots for encrypted East-West (lateral) and North-South communications, including traffic that may not cross firewalls.
- Monitor application communications with an independent approach that enhances development team velocity.
- Extend security tools' visibility to all communications, regardless of encryption type.
- Achieve maximum traffic tapping efficiency across virtual environments.
- Leverage a 5–7x performance boost for security tools by consuming unencrypted data.
- Support a Zero Trust architecture founded on deep observability.
- Maintain privacy and compliance adherence associated with decrypted traffic management.

How Gigamon Precryption Technology Works

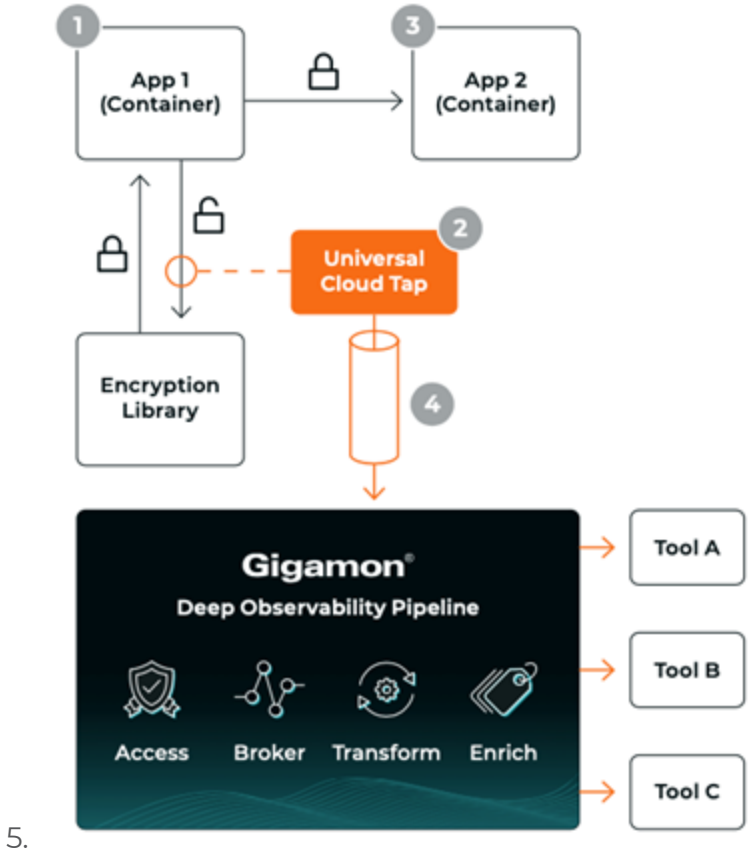
This section explains about how Precryption technology works on single node and multiple node in the following sections:

- Precryption Technology on Single Node
- Precryption Technology on Multi-Node

Precryption Technology on Single Node

1. When any application needs to encrypt a message, it uses an encryption library, such as OpenSSL, to perform the actual encryption.
2. GigaVUE Universal Cloud Tap (UCT), enabled with Precryption technology, gets a copy of this message before it's encrypted on the network.
3. The encrypted message is sent to the receiving application, with unmodified encryption. No proxy, no re- encryption, no retransmissions.

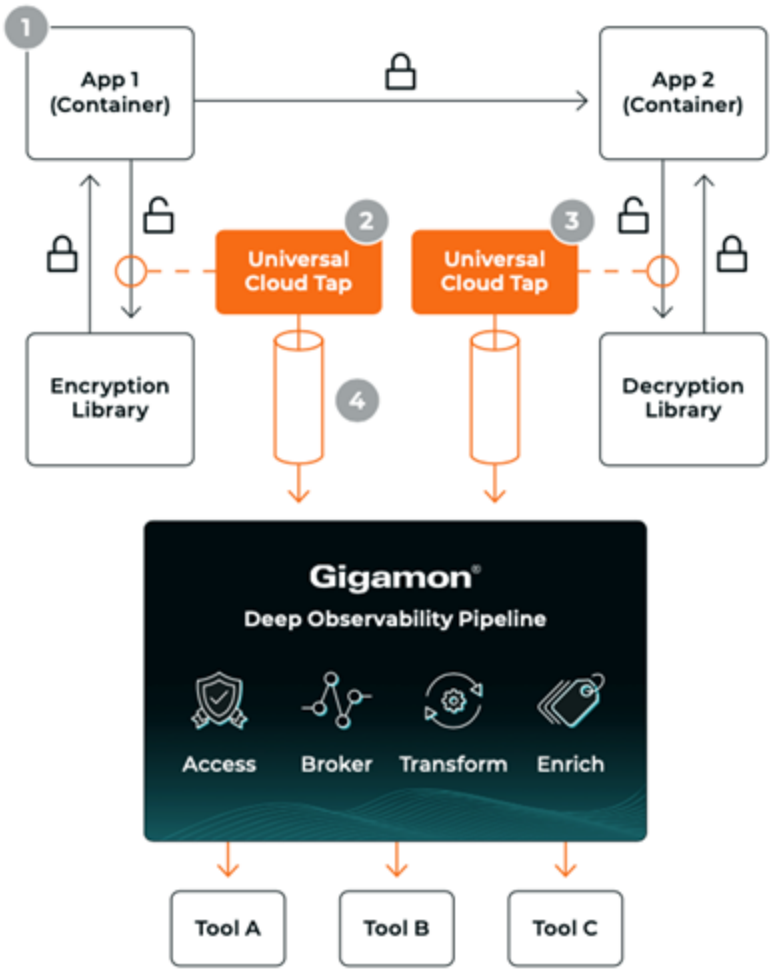
4. GigaVUE UCT creates packet headers as needed, encapsulates in a tunnel, and forwards to GigaVUE V Series in the deep observability pipeline. Gigamon further optimizes, transforms, and delivers data to tools, without need for further decryption

5. 

Precryption Technology on Multi-Node

1. When any application needs to encrypt a message, it uses an encryption library, such as OpenSSL, to perform the actual encryption.
2. GigaVUE Universal Cloud Tap (UCT), enabled with Precryption, gets a copy of this message before it's encrypted on the network.
3. Optionally, GigaVUE UCT enabled with Precryption can also acquire a copy of the message from the server end, after the decryption.
4. GigaVUE UCT creates packet headers as needed, encapsulates in a tunnel, and forwards to V Series in the deep observability pipeline where it is further enriched, transformed, and delivered to tools, without further decryption.

5.



Supported Platforms

VM environments: Precryption™ is supported on the following VM platforms where UCT-V is supported:

Platform Type	Platform
Public Cloud	• AWS • Azure • GCP (via Third Party Orchestration)
Private Cloud	• OpenStack • VMware ESXi (via Third Party Orchestration only) • VMware NSX-T (via Third Party Orchestration only)

Container environments: Precryption™ is supported on the following container platforms where UCT-C is supported:

Platform Type	Platform
Public Cloud	• EKS • AKS
Private Cloud	• OpenShift • Native Kubernetes (VMware)

Prerequisites

Deployment Prerequisites

- OpenSSL version 1.0.2, version 1.1.0, version 1.1.1, and version 3.x
- Protocol version IPv4
- For GigaVUE-FM, to capture the statistics, you must add the port 5671 in the security group
- Port 9900 should be enabled in security group settings on the UCT-V controller to receive the statistics information from UCT-V agent
- For UCT-C, you must add the port 42042 and port 5671 in the security group

License Prerequisite

- Precryption™ requires SecureVUE Plus license.

Supported Kernel Version

Precryption is supported for Kernel Version 5.4 and above for all Linux and Ubuntu Operating Systems. For the Kernel versions below 5.4, refer to the following table:

Kernel Version	Operating System
4.18.0-193.el8.x86_64	RHEL release 8.2 (Ootpa)
4.18.0-240.el8.x86_64	RHEL release 8.3 (Ootpa)
4.18.0-305.76.1.el8_4.x86_64	RHEL release 8.4 (Ootpa)
4.18.0-348.12.2.el8_5.x86_64	RHEL release 8.5 (Ootpa)
4.18.0-372.9.1.el8.x86_64	RHEL release 8.6 (Ootpa)
4.18.0-423.el8.x86_64	RHEL release 8.7 Beta (Ootpa)
4.18.0-477.15.1.el8_8.x86_64	RHEL release 8.8 (Ootpa)
5.3.0-1024-kvm	ubuntu19.10
4.18.0-305.3.1	Rocky Linux 8.4
4.18.0-348	Rocky Linux 8.5
4.18.0-372.9.1	Rocky Linux 8.6
4.18.0-425.10.1	Rocky Linux 8.7

Kernel Version	Operating System
4.18.0-477.10.1	Rocky Linux 8.8
4.18.0-80.el8.x86_64	centos 8.2
4.18.0-240.1.1.el8_3.x86_64	centos 8.3
4.18.0-305.3.1.el8_4.x86_64	centos 8.4
4.18.0-408.el8.x86_64	centos 8.5

Note

- See the Configure Precryption in UCT-V section for details on how to enable Precryption™ in VM environments.
- See the Configure in UCT-Csection for details on how to enable Precryption™ in container environments.
- See how Secure Tunnels feature can enable secure delivery of precrypted data.

Configure in UCT-C

GigaVUE-FM allows you to enable or disable the precryption feature.

To configure the precryption feature in UCT-C, follow these steps:

1. Go to **Traffic** > **CONTAINER** > Universal Cloud Tap - Container. The Policies page appears.

2. In the Policies page, click **Create**.

3. In the **General** tab, enter or select the required information as described in the following table:

Fields	Description
Policy Name	Enter a name for the Traffic Policy. The name must be unique.
Monitoring Domain	Select an existing monitoring domain. To create a new monitoring domain, refer to Create Monitoring Domain section in the UCT configuration guide. Only one Precryption Policy is allowed per Monitoring Domain
Connections	Select one or more connections for the policy. Once traffic policy is created for monitoring domain, you cannot add or delete connections in a monitoring domain.
Precryption Policy	Click the radio button **Yes**, to enable the **Precryption Policy**,

After enabling the Precryption, configure the **Source Selectors,** and the **Rules**. In this release, for Rules, Pass All option is supported.

Rules and Notes

The following are the memory limits to be applied to the UCT-TAP in case of UCT-C.:

- The memory limit changes depending on the numbers of VCPUs in the worker node. For example, if the worker node has 16 VCPUs, then the precryption feature consumes around 1GB of memory ((16 * 64 MB).
- When you deploy secure tunnels, it requires additional (16 *64 MB) memory. Hence, a total memory that you must allocate for the TAP is 1 GB.

The YAML configuration option allows you to choose the amount of buffer size.

Secure Tunnels

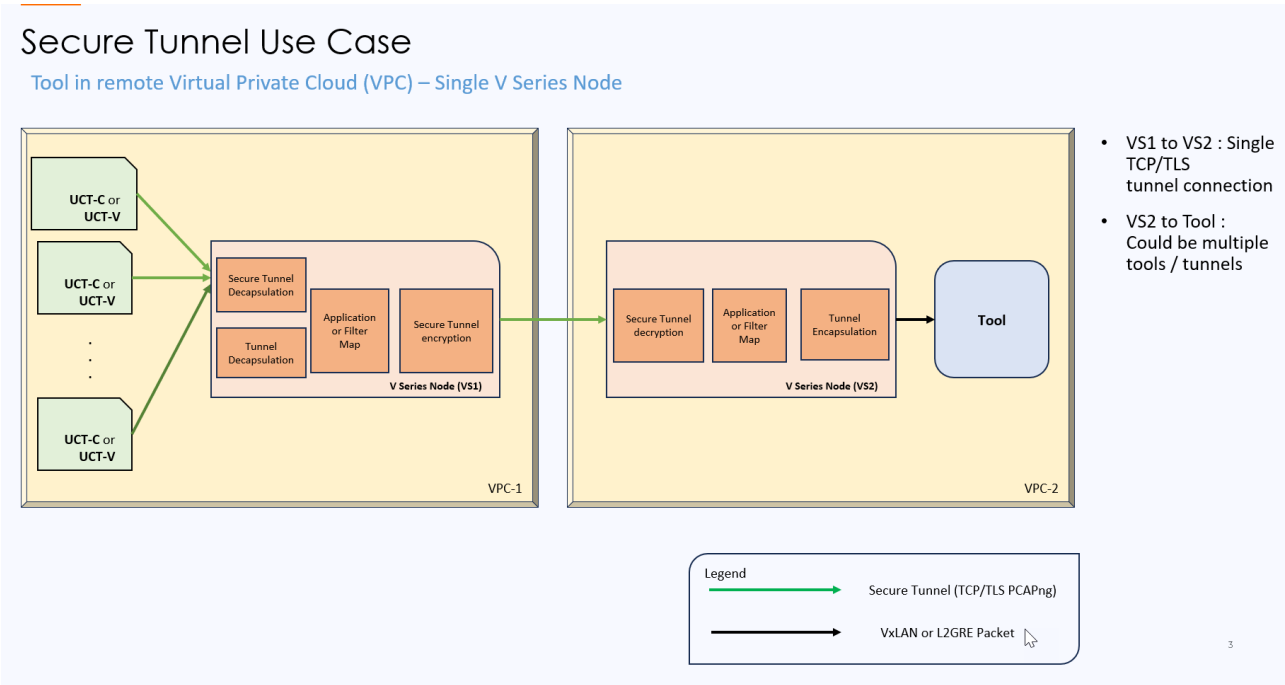
Secure Tunnel securely transfers the cloud captured packets on UCT-V and UCT-C to a GigaVUE V Series Node or Tool (only in case of UCT-C). The data from UCT-V and UCT-C are encapsulated in PCAPng format, and the encrypted data is sent over a TLS connection to a GigaVUE V Series Node.

Secure Tunnel can also transfer the cloud captured packets from a GigaVUE V Series Node to another GigaVUE V Series Node.

In case of GigaVUE V Series Node to GigaVUE V Series node, the traffic from the GigaVUE V Series Node 1 is encapped using PCAPng format and transported to GigaVUE V Series Node 2 where the traffic is decapped. The secure tunnels between V Series Node to V Series Node have multiple uses cases.

The GigaVUE V Series Node decapsulates and processes the packet per the configuration. The decapsulated packet can be sent to the application such as De-duplication, Application Intelligence, Load balancer and to the tool. The Load Balancer on this node can send the packets to multiple V series Nodes, in this case the packets can be encapsulated again and sent over a secure tunnel.

For more information about PCAPng, refer to PCAPng Application.



Supported Platforms

Secure tunnel is supported on:

- OpenStack
- Azure
- AWS
- VMware NSX-T (only for Third Party Orchestration)
- VMware ESXi (only for Third Party Orchestration)
- Nutanix (only for Third Party Orchestration)
- Google Cloud Platform (only for Third Party Orchestration)

For information about how to configure secure tunnels, refer to the section Configure Secure Tunnel.

Configure Secure Tunnel

Secure tunnel can be configured on:

- Precrypted Traffic
- Mirrored Traffic

Precrypted Traffic

You can send the precrypted traffic through secure tunnel. When secure tunnel for precryption is enabled, packets are framed and sent to the TLS socket. PCAPng format is used to send the packet.

When you enable the secure tunnel option for both regular and precryption packets, then two TLS secure tunnel sessions are created.

It is recommended to always enable secure tunnels for precrypted traffic to securely transfer the sensitive information.

For more information about PCAPng, refer to PCAPng Application.

Mirrored Traffic

You can enable the Secure Tunnel for mirrored traffic. By default, Secure Tunnel is disabled.

Refer to the following sections for Secure Tunnel Configuration:

- Configure Secure Tunnel from UCT Container to GigaVUE V Series Node
- Configure Secure Tunnel from GigaVUE Cloud Suite V Series Node 1 to GigaVUE Cloud Suite V Series Node 2

Prerequisites

While creating Secure Tunnel, you must provide the following details:

- SSH key pair
- CA certificate

Configure Secure Tunnel from UCT Container to GigaVUE V Series Node

To configure a secure tunnel in a UCT Container, you must configure one end of the tunnel to the UCT and the other end to a GigaVUE Cloud Suite V Series node. You must configure CA certificates in UCT Container, and the private keys and SSL certificates in the GigaVUE Cloud Suite V Series node. Refer to the following steps for configuration:

<table>
<tr><th>S. No</th><th>Task</th><th>Refer to</th></tr>
<tr><td>1</td><td>Upload a Custom Certificate</td><td>You must upload a CA to UCT Container for establishing a connection with the GigaVUE Cloud Suite V Series node.
To upload the CA using GigaVUE-FM follow the steps given below:
1. Go to Inventory > Resources > Security > CA List.
2. Click New, to add a new Certificate Authority. The Add Certificate Authority page appears.
3. Enter or select the following information.
<table><tr><th>Field</th><th>Action</th></tr><tr><td>Alias</td><td>Alias name of the CA.</td></tr><tr><td>File Upload</td><td>Choose the certificate from the desired location.</td></tr></table>4. Click Save.
For more information, refer to the section Adding Certificate Authority</td></tr>
<tr><td>2.</td><td>Upload a SSL Key</td><td>You must add a SSL key to GigaVUE Cloud Suite V Series node. To add SSL Key, follow the steps in the section SSL Decrypt..</td></tr>
<tr><td>3</td><td>Selecting the SSL Key when you create a monitoring domain and configure the fabric components in GigaVUE-FM.</td><td>To select the SSL Key follow the steps in the section</td></tr>
<tr><td>4</td><td>Selecting the CA certificate when you create a monitoring domain and configuring the fabric components in GigaVUE-FM.</td><td>You should select the added Certificate Authority (CA) in UCT-V Controller. To select the CA certificate, follow the steps in the sectionUCT-C and GigaVUE-FM Interaction</td></tr>
<tr><td>5.</td><td>Creating and adding the secure tunnel when you configure the traffic policy.</td><td>To create and add the secure tunnel while configuring in , in UCT Container refer to the Configure Traffic Policy</td></tr>
</table>

Configure Secure Tunnel from GigaVUE Cloud Suite V Series Node 1 to GigaVUE Cloud Suite V Series Node 2

You can create secure tunnel in the following ways:

- Between GigaVUE Cloud Suite V Series Node 1 to GigaVUE Cloud Suite V Series Node 2
- From GigaVUE Cloud Suite V Series Node 1 to multiple GigaVUE Cloud Suite V Series nodes.

You must have the following details before you start the configuration of secure tunnel from GigaVUE Cloud Suite V Series Node 1 toGigaVUE Cloud Suite V Series Node 2:

- IP address of the tunnel destination endpoint (GigaVUE Cloud Suite V Series Node 2).
- SSH key pair (pem file).

To configure secure tunnel from GigaVUE Cloud Suite V Series Node 1 toGigaVUE Cloud Suite V Series Node 2, refer to the following steps:

<table>
<tr><th>S.No</th><th>Task</th><th>Refer to</th></tr>
<tr><td>1.</td><td>Upload a Custom Authority (CA) Certificate</td><td>You must upload a Custom Certificate to UCT-V Controller for establishing a connection between the GigaVUE Cloud Suite V Series node.

To upload the CA using GigaVUE-FM follow the steps given below:

1. Go to Inventory > Resources > Security > CA List.
2. Click New, to add a new Custom Authority. The Add Custom Authority page appears.
3. Enter or select the following information.
<table><tr><th>Field</th><th>Action</th></tr><tr><td>Alias</td><td>Alias name of the CA.</td></tr><tr><td>File Upload</td><td>Choose the certificate from the desired location.</td></tr></table>4. Click Save.
5. Click Deploy All.

For more information, refer to the section Adding Certificate Authority</td></tr>
<tr><td>2.</td><td>Uploading a SSL Key</td><td>You must add a SSL key to GigaVUE Cloud Suite V Series node. To add SSL Key, follow the steps in the section Upload SSL Keys.</td></tr>
<tr><td>3</td><td>Creating a secure tunnel between UCT-Vand GigaVUE Cloud Suite V Series Node</td><td>You should enable the secure tunnel feature to establish a connection between the UCT-Vand GigaVUE Cloud Suite V Series node 1. To enable the secure tunnel feature follow these steps:
1. In the Edit Monitoring Session page, click Options. The Apply template page appears.
2. Enable the Secure Tunnel button. You can enable secure tunnel for both mirrored and precrypted traffic.</td></tr>
</table>

S. No	Task	Refer to
	1.	
4.	Selecting the added SSL Key while creating a monitoring domain and configuring the fabric components in GigaVUE-FM in GigaVUE Cloud Suite V Series Node 1	You must select the added SSL Key in GigaVUE Cloud Suite V Series Node 1. To select the SSL key, follow the steps in the section Configure GigaVUE Fabric Components in GigaVUE-FM.
5.	Selecting the added CA certificate while creating the monitoring domain	You should select the added Certificate Authority (CA) in UCT-V Controller. To select the CA certificate, follow the steps in the section Configure GigaVUE Fabric Components in GigaVUE-FM. You can also push the CA manually by editing CA in Monitoring Domain page. To edit CA, go to **Monitoring Domain** > **Actions > Edit CA**.

<table>
<tr><th>S.No</th><th>Task</th><th>Refer to</th></tr>
<tr><td>6</td><td>Creating an Egress tunnel from GigaVUE Cloud Suite V Series Node 1 with tunnel type as TLS-PCAPNG while creating the monitoring session.</td><td>
You must create a tunnel for traffic to flow out from GigaVUE Cloud Suite V Series Node 1 with tunnel type as TLS-PCAPNG while creating the monitoring session. Refer to Create a Monitoring Session to know about monitoring session.

To create the egress tunnel, follow these steps:
1. After creating a new monitoring session, or click Actions > Edit on an existing monitoring session, the GigaVUE-FM canvas appears.
2. In the canvas, select New > New Tunnel, drag and drop a new tunnel template to the workspace. The Add Tunnel Spec quick view appears.
3. On the New Tunnel quick view, enter or select the required information as described in the following table:
<table>
<tr><th>Field</th><th>Action</th></tr>
<tr><td>Alias</td><td>The name of the tunnel endpoint.</td></tr>
<tr><td>Description</td><td>The description of the tunnel endpoint.</td></tr>
<tr><td>Type</td><td>Select TLS-PCAPNG for creating egress secure tunnel</td></tr>
<tr><td>Traffic Direction</td><td>Choose Out (Encapsulation) for creating an egress tunnel from the V Series node to the destination. Select or enter the following values:
o MTU- The default value is 1500.
o Time to Live - Enter the value of the time interval till which the session needs to be available. The value ranges from 1 to 255. The default value is 64.
o DSCP - Enter the Differentiated Services Code Point (DSCP) value.
o Flow Label - Enter the Flow Label value.
o Source L4 Port- Enter the Souce L4 Port value
o Destination L4 Port - Enter the Destination L4 Port value.
o Flow Label
o Cipher- Only SHA 256 is supported.
o TLS Version - Select TLS Version1.3.
o Selective Acknowledgments - Choose Enable to receive the acknowledgments.
o Sync Retries - Enter the value for number of times the sync has to be tried. The value ranges from 1 to 6.
o Delay Acknowledgments - Choose Enable to receive the acknowledgments when there is a delay.</td></tr>
<tr><td>IP Version</td><td>The version of the Internet Protocol. Only IPv4 is supported.</td></tr>
<tr><td>Remote Tunnel IP</td><td>Enter the interface IP address of the GigaVUE Cloud Suite V Series Node 2 (Destination IP).</td></tr>
</table>
4. Click Save.
</td></tr>
</table>

S. No	Task	Refer to
7.	Selecting the added SSL Key while creating a monitoring domain and configuring the fabric components in GigaVUE-FM in GigaVUE Cloud Suite V Series Node 2	You must select the added SSL Key in GigaVUE Cloud Suite V Series Node 2. To select the SSL key, follow the steps in the section Configure GigaVUE Fabric Components in GigaVUE-FM.
8	Create an ingress tunnel in the GigaVUE V Series node 2 with tunnel type as TLS-PCAP	You must create a tunnel for traffic to flow out from GigaVUE Cloud Suite V Series Node 2 with tunnel type as TLS-PCAPNG while creating the monitoring session. Refer to Create a Monitoring Session to know about monitoring session. To create the ingress tunnel, follow these steps: **1.** After creating a new monitoring session, or click **Actions** > **Edit** on an existing monitoring session, the GigaVUE-FM canvas appears. **2.** In the canvas, select **New** > **New Tunnel**, drag and drop a new tunnel template to the workspace. The **Add** Tunnel Spec quick view appears. **3.** On the New Tunnel quick view, enter or select the required information as described in the following table:

<table>
<tr><th>S.No</th><th>Task</th><th>Refer to</th></tr>
<tr><td></td><td>NG while creating the monitoring session for GigaVUE V Series node 2.</td><td>
<table>
<tr><th>Field</th><th>Action</th></tr>
<tr><td>Alias</td><td>The name of the tunnel endpoint.</td></tr>
<tr><td>Description</td><td>The description of the tunnel endpoint.</td></tr>
<tr><td>Type</td><td>Select TLS-PCAPNG for creating egress secure tunnel</td></tr>
<tr><td>Traffic Direction</td><td>Choose in (Encapsulation) for creating an egress tunnel from the V Series node to the destination. Select or enter the values as described in Step 6:</td></tr>
<tr><td>IP Version</td><td>The version of the Internet Protocol. Only IPv4 is supported.</td></tr>
<tr><td>Remote Tunnel IP</td><td>Enter the interface IP address of the GigaVUE Cloud Suite V Series Node 1 (Destination IP).</td></tr>
</table>
4. Click Save.
</td></tr>
</table>

Adding Certificate Authority

This section describes how to add Certificate Authority in GigaVUE-FM.

CA List

The Certificate Authority (CA) List page allows you to add the root CA for the devices.

To upload the CA using GigaVUE-FM follow the steps given below:

1. Go to **Inventory > Resources > Security > CA List**.
2. Click **Add**, to add a new Custom Authority. The **Add Certificate Authority** page appears.
3. Enter or select the following information.

Field	Action
Alias	Alias name of the CA.
File Upload	Choose the certificate from the desired location.

4. Click **Save**.

Configure UCT-C Settings

You can configure the following UCT-C settings in GigaVUE-FM:

UCT-C General Settings

In GigaVUE-FM, you can control the number of permitted connections, refresh intervals and purge time intervals of the UCT-C solution. You can specify the purge interval to automatically remove the UCT-Cs that are disconnected for a long duration.

NOTE: GigaVUE-FM generates an alarm for the disconnected UCT-C When three consecutive heartbeats are missed. Refer to "Alarms" topic in the *GigaVUE Administration Guide* for detailed information on Alarms.

To edit the UCT-C general settings:

1. In GigaVUE-FM, navigate to **Inventory > CONTAINER > Universal Cloud Tap - Container > Settings**, the **Settings** page appears with the existing General settings and UCT-C information.
2. On the **Settings** page, on the **General** section, click **Edit**. The Edit General Setting's quick view appears.
3. To exclude the pods from monitoring, provide the source criteria. In **Criteria 1,** from the drop-down list box, select any of the following **Object Property** to exclude them from the monitoring domain, and provide the value for the property selected in the **Value** field:
    - pod name
    - pod ip
    - pod labels
    - node name
    - namespace

    NOTE: By default pods in kube-system namespace, metallb-system

namespace and pod name containing nginx are excluded from monitoring.

4. Edit the required values in the **General Settings** section.

Field	Description
Maximum number of connections allowed	Enter the maximum number of connections allowed in the UCT-C solution
Purge time interval for disconnected UCT-Cs (days)	Enter a value for the purge time interval for the disconnected UCT-Cs in days

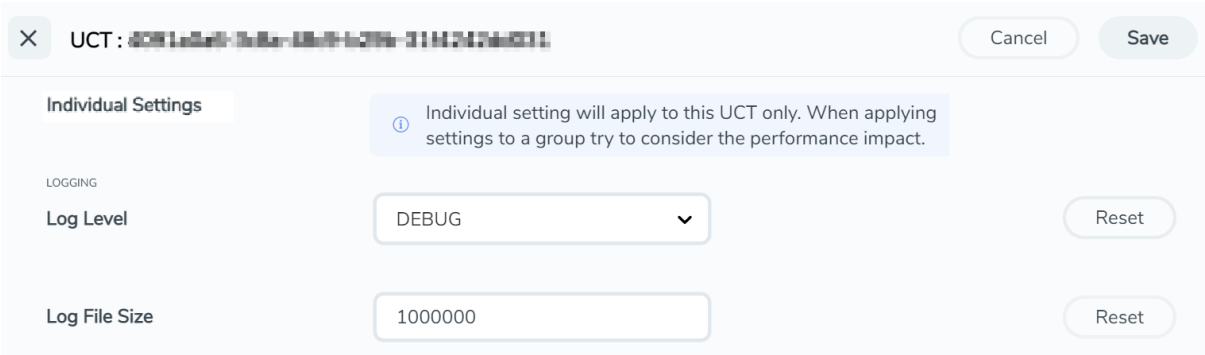
5. Click **Save** to save the updates made on the General Settings.

UCT-C Log Level Settings

In GigaVUE-FM, you can control the level of logs created at each individual UCT-C for troubleshooting. The regular UCT-C log file name format is **uct_tap.log**.

To view or edit the UCT-C log level settings:

1. In GigaVUE-FM, navigate to **Inventory > CONTAINER > Universal Cloud Tap - Container > Settings**, the **Settings** page appears with the existing General settings and UCT-C information.
2. On the **Settings** page, on the **UCT-C** section, on any monitoring domain, click on the UCT-C fabric. The UCT-C setting's quick view appears.



3. Edit the required UCT-C log values in the **LOGGING** section.

Field	Description
Log Level	Select one of the following: • DEBUG—fine-grained log information for application debugging • INFO—coarse-grained log information for highlighting application progress • WARN—log information of potentially harmful situations • ERROR—log information of the error events that allows the application to run continuously • FATAL—log information of very severe error events that presumably lead the application to abort.
Log File Size	Enter a value for the number of lines in the UCT-C log file.

On any of the above fields, click **Reset** to reset the value to default.

Upgrade UCT-C

To upgrade UCT-C, you must perform the following steps:

1. **Upgrade to GigaVUE-FM 6.5.00**: Before upgrading GigaVUE-FM from versions earlier than 6.4.00.03, delete the UCT-C Monitoring Domain, Policy, UCT-C Controller and UCT-CTap, and then upgrade GigaVUE-FM to 6.5.00. To upgrade the GigaVUE-FM in respective cloud platforms, refer to GigaVUE-FM Installation and Upgrade guide.
2. **Upgrade to UCT-C 6.5.00**:To upgrade UCT-C to 6.5.00, you must delete the older versions and deploy UCT-C 6.5.00 version. To deploy UCT-C, refer to Steps to Delete and Redeploy UCT-C. GigaVUE-FM 6.5.00 is compatible only with UCT-C 6.5.00.

Steps to Delete and Redeploy UCT-C

1. Delete the UCT Controller deployment.
   ```
   kubectl get deployment -A
   kubectl delete deployment <uct-controller name> -n <namespace>
   ```

2. Delete the UCT Tap daemonset.
   ```
   kubectl get daemonset -A
   kubectl delete daemonset <uct-tap-name> -n <namespace>
   ```

3. Delete the UCT controller service.
   ```
   kubectl get services -A
   kubectl delete services <uct-cntlr-service-name> -n <namespace>
   ```

4. Deploy the UCT controller/UCT Tap using helm chart or YAML file.
   a. To install using Helm chart:
      ```
      helm install uctc-cntlr uctc-cntlr/
      helm install uctc-tap uctc-tap/
      ```
   b. To install using YAML.
      ```
      kubectl apply -f <uctc_controller_yaml_file>
      kubectl apply -f <uctc_tap_yaml_file>
      ```

5. Delete the ingress rule and redeploy it using YAML to point to the right service (uctc-cntlr-service).

```
kubectl get ingress -A
kubectl delete ingress <uct-cntlr-ingress-name> -n <namespace>
uctc-ingress.yaml
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  annotations:
    kubernetes.io/ingress.class: nginx-uct-ns
    nginx.ingress.kubernetes.io/backend-protocol: HTTPS
    nginx.ingress.kubernetes.io/proxy-connect-timeout: "360000"
    nginx.ingress.kubernetes.io/proxy-read-timeout: "360000"
    nginx.ingress.kubernetes.io/proxy-send-timeout: "360000"
    nginx.ingress.kubernetes.io/rewrite-target: /
    nginx.ingress.kubernetes.io/secure-backends: "false"
    nginx.ingress.kubernetes.io/ssl-passthrough: "true"
  generation: 1
  name: uctc-cntlr-ingress
  namespace: uct-ns
spec:
  rules:
   - http:
      paths:
       - backend:
          service:
            name: uctc-cntlr-service
            port:
             number: 8443
      path: /
      pathType: ImplementationSpecific
   status:
     loadBalancer: {}
     kubectl apply -f <ingress_rule_yaml_file>
```

6. Restart the ngnix controller and backend.

```
kubectl get pods -A
kubectl rollout restart deployment nginx-controller -n <namespace>
kubectl rollout restart deployment nginx-ingress-default-backend -n
<namespace>
```

7. Redeploy the policy.

Debuggability and Troubleshooting

- For analyzing the issues, log into the UCT-C controller /UCT-C tap pod using the following command and verify the logs present pod-data folder.

```
kubectl -it exec <<pod name>> -n <<namespace>> --bash
```

- **503 Service Temporarily Unavailable-** When UCT tap or inventories are not discovered during Monitoring Domain deployment, verify whether **503 Service Temporarily Unavailable (refer the log messages below)** error messages are observed in vmm.log of FM. If the error messages are available, check and update the UCT controller service name or port number (as shown in the **nginx.yaml**) used in ingress resource.

```
nginx.yaml
  apiVersion: networking.k8s.io/v1
  kind: Ingress
  metadata:
  annotations:
   kubernetes.io/ingress.allow-http: "false"
   kubernetes.io/ingress.class: nginx-uct
   nginx.ingress.kubernetes.io/backend-protocol: HTTPS
   nginx.ingress.kubernetes.io/configuration-snippet: proxy_set_header
  Authorization
   $http_authorization;
   nginx.ingress.kubernetes.io/rewrite-target: /
   nginx.ingress.kubernetes.io/secure-backends: "true"
   nginx.ingress.kubernetes.io/ssl-passthrough: "true"
  name: uct-cntlr-ingress
  namespace: uct
  spec:
   rules:
    - http:
       paths:
         - backend:
             service:
               name: gigamon-uctc-cntlr-service
                port:
                  number: 8443
  path: /
  pathType: ImplementationSpecific

  Log-Snippet

  2023-07-26 09:05:12,866 ERROR [kubernetesInventory-7]
  UctRestClientImplV13 - collectInventory : getURL :
  https://10.115.83.95:8443/api/v1.3/inventory/nodes :
  HttpStatusCodeException : 503 Service Temporarily Unavailable:
  "<html><EOL><EOL><head><title>503 Service Temporarily
  Unavailable</title></head><EOL><EOL><body><EOL><EOL><center><h1>503
  Service Temporarily
  Unavailable</h1></center><EOL><EOL><hr><center>nginx</center><EOL><EOL><
  /body><EOL><EOL></html><EOL><EOL>"
  2023-07-26 09:05:12,866 ERROR [Thread-8935] UctRestClientImplV13 -
  updateUctControllerSettings :  HttpStatusCodeException : 503 Service
  Temporarily Unavailable: "<html><EOL><EOL><head><title>503 Service
  Temporarily
  Unavailable</title></head><EOL><EOL><body><EOL><EOL><center><h1>503
  Service Temporarily
  Unavailable</h1></center><EOL><EOL><hr><center>nginx</center><EOL><EOL><
  /body><EOL><EOL></html><EOL><EOL>"
  2023-07-26 09:05:12,866 INFO  [Thread-8935]
  UctKubernetesInvMonitorServiceImpl - updateUctControllerSettings REST API
```

```
call: Status code : 503 SERVICE_UNAVAILABLE
2023-07-26 09:05:12,866 INFO  [kubernetesInventory-7]
UctRestClientImplV13 - collectInventory :  controllerIP : 10.115.83.95
controllerPort : 8443
2023-07-26 09:05:12,866 ERROR [Thread-8935]
UctKubernetesInvMonitorServiceImpl - updateUctControllerSettings REST API
call failed: Connection ID b067e0dc-272f-4f45-afea-c676ae89fa37 : Uct
controller 73d5c0cf-ffc2-4688-8e1c-17f2cb7d0ad4 Status code : 503
SERVICE_UNAVAILABLE Response <html>
<head><title>503 Service Temporarily Unavailable</title></head>
<body>
<center><h1>503 Service Temporarily Unavailable</h1></center>
<hr><center>nginx</center>
</body>
</html>
```

- UCT-C controller not discovered by GigaVUE-FM - When UCT-Ccontroller is not discovered by GigaVUE-FM, check the following:
  - Kubernetes cluster URL is updated properly in the yaml file
  - Mismatch in the Kubernetes cluster URL in Monitoring Domain
- UCT-C tap not discovered by GigaVUE-FM- When UCT-C tap is not discovered by GigaVUE-FM, verify whether the namespace in uctc-tap yaml file (as shown in the following uctc-tap.yaml) is same as that of UCT-C controller yaml file.

  uct-tap.yaml

  ```
  # Value need to match me        tadata used for gcb-cntlr
  #  value: "<UCT-CNTLR-SVC-NAME.UCT-CNTLR-NAMESPACE>.svc.cluster.local"
  - name: UCTC_CNTLR_SVC_DNS
  value: gigamon-uctc-cntlr-service.<<namespace>>.svc.cluster.local  ===>
  This should be same as that of the namespace in which uctc-controller is
  deployed.
  ```

- **Modify External Load Balancer IP of UCT-C Controller**: You need to update the External Load Balancer IP in Controller YAML or HELM chart, and redeploy UCT-C Controller.

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 VÜE 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
DID YOU KNOW? 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 **Edit > Advanced Search** from the menu. This opens an interface that allows you to select a directory and search across all PDFs in a folder.
Hardware 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
GigaVUE-HC1 Hardware Installation Guide
GigaVUE-HC2 Hardware Installation Guide
GigaVUE-HC3 Hardware Installation Guide
GigaVUE-HC1-Plus Hardware Installation Guide
GigaVUE-HCT Hardware Installation Guide
GigaVUE-TA25 Hardware Installation Guide

GigaVUE Cloud Suite 6.5 Hardware and Software Guides
GigaVUE-TA25E Hardware Installation Guide
GigaVUE-TA100 Hardware Installation Guide
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 (ESXi)
GigaVUE Cloud Suite Deployment Guide - VMware (NSX-T)

GigaVUE Cloud Suite 6.5 Hardware and Software Guides
GigaVUE Cloud Suite Deployment Guide - Third Party Orchestration
GigaVUE Cloud Suite Deployment Guide Universal Cloud Tap - Container
Gigamon Containerized Broker Deployment Guide
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

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		
About You	**Your Name**	
	Your Role	
	Your Company	

For Online Topics	**Online doc link**	*(URL for where the issue is)*
	Topic Heading	*(if it's a long topic, please provide the heading of the section where the issue is)*
For PDF Topics	**Document Title**	*(shown on the cover page or in page header)*
	Product Version	*(shown on the cover page)*
	Document Version	*(shown on the cover page)*
	Chapter Heading	*(shown in footer)*
	PDF page #	*(shown in footer)*
How can we improve?	**Describe the issue**	*Describe the error or issue in the documentation.* *(If it helps, attach an image to show the issue.)*
	How can we improve the content? **Be as specific as possible.**	
	Any other comments?	

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.

Contact Sales

Use the following information to contact Gigamon channel partner or Gigamon sales representatives:

Telephone: +1.408.831.4025

Sales: inside.sales@gigamon.com

Partners: www.gigamon.com/partners.html

Premium Support

Email Gigamon at 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

Questions? Contact our Community team at community@gigamon.com.

Glossary

D

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

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)