Tenable Enclave Security 1.10.x User Guide

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Welcome to Tenable Enclave Security

Tenable Enclave Security is a private container platform that you can use to deploy on-prem Tenable products.

- **Products** - These are the Tenable products that you can deploy in Tenable Enclave Security.
  - Security Center in Tenable Enclave Security
  - Tenable Container Security in Tenable Enclave Security
- **Utilities** - These are the tools available in Tenable Enclave Security to analyze the data collected by Tenable Security Center or Tenable Container Security.
  - Reporting

> **Note:** Tenable Log Correlation Engine Event Analysis is not supported in Tenable Enclave Security.

See the following pages for information about installing and using Tenable Enclave Security. For sizing requirements, see Tenable Enclave Security System Requirements.

Before Installation

Tenable Enclave Security System Requirements

License Requirements

Prepare a Kubernetes Cluster

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Back Up and Restore Tenable Enclave Security

Considerations

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Back Up and Restore Tenable Container Security

Before Installation

System Requirements

See Tenable Enclave Security System Requirements for minimum hardware, software, and cloud requirements, including supported Kubernetes environments.

Get a Tenable Enclave Security License

Before you obtain a Tenable Enclave Security license, you must know the namespace and cluster ID for the Kubernetes environment where you plan to install Tenable Enclave Security. For instructions on how to get a Tenable Enclave Security license, see Licenses.

For license requirements, see License Requirements.

Prepare a Kubernetes Cluster

For details on how to create a new cluster or prepare an existing cluster, see Prepare a Kubernetes Cluster.

Tenable Enclave Security System Requirements

Supported Kubernetes Environments

- **Kubernetes versions:** 1.30 and later (within the 1.x release line) in any of the following environments:
  - Standalone Kubernetes
  - Amazon Elastic Kubernetes Service (EKS)
  - AzureKubernetes Service (AKS)
  - GoogleKubernetes Engine (GKE)
- **Helm versions:** 3.11 and later
- **OpenShift versions:** 4.17 and later

Compatible Tenable Product Versions

The following table shows which versions of Security Center and Tenable Container Security are compatible with Tenable Enclave Security.

Tenable Enclave Security Version	Compatible Tenable Product Version

Cloud Requirements

For requirements specific to Tenable Security Center and Tenable Container Security, see the following topics:

- Tenable Container Security System Requirements
- Tenable Security Center System Requirements

Tenable strongly recommends using high-performance disks when you deploy Tenable Enclave Security in a Kubernetes cluster. Tenable Enclave Security is a disk-intensive application and using disks with high read/write speeds (for example, SSDs or NVMe SSDs) results in the best performance. The requirements in the following tables are based on AWS M5 or better processor specifications. Using slower processors, like those found in AWS M5a instances, will impact performance for your Tenable Enclave Security deployment.

Requirements When Running Basic Network Scans + Local Checks

# of Hosts Managed by Tenable Enclave Security	CPU	Memory	Disk Space used for Vulnerability Trending
1 to 2,500 active IPs	8000 m	32 GiB	90 days: 125 GB 180 days: 250 GB
2,501 to 10,000 active IPs	16000 m	64 GiB	90 days: 450 GB 180 days: 900 GB
10,001 to 25,000 active IPs	32000 m	128 GiB	90 days: 2.4 TB 180 days: 5 TB
25,001 to 50,000 active IPs	48000 m	192 GiB	90 days: 4.5 TB 180 days: 9 TB

Requirements When Running Basic Network Scans + Local Checks + 1 Configuration Audit

# of Hosts Managed by Tenable Enclave Security	CPU	Memory	Disk Space used for Vulnerability Trending
1 to 2,500 active IPs	16000 m	64 GiB	90 days: 225 GB

# of Hosts Managed by Tenable Enclave Security	CPU	Memory	Disk Space used for Vulnerability Trending
			180 days: 450 GB
2,501 to 10,000 active IPs	32000 m	128 GiB	90 days: 900 GB 180 days: 1.8 TB
10,001 to 25,000 active IPs	32000 m	128 GiB	90 days: 4.5 TB 180 days: 9 TB
25,001 to 50,000 active IPs	48000 m	192 GiB	90 days: 9 TB 180 days: 18 TB

Tenable Container Security in Tenable Enclave Security System Requirements

This page describes the system requirements for Tenable Container Security services, Tenable Container Security agents, and self-hosted and cloud databases.

Requirements for Tenable Container Security Services

Service Name	# of Assets Managed by Tenable Container Security	CPU per pod	Memory per pod
tes-consec-ui	1 to 25,000 images	2 cores	2 GiB
tes-consec-api	1 to 25,000 images	2 cores	3 GiB
tes-consec-tvdl	1 to 25,000 images	2 cores	6 GiB
tes-consec-policy	1 to 25,000 images	2 cores	2 GiB

Service Name	# of Assets Managed by Tenable Container Security	CPU per pod	Memory per pod
tes-consec-scan	1 to 25,000 images	2 cores	5 GiB
tes-exposure-response	1 to 25,000 images	2 cores	2 GiB
tes-platform-ui	1 to 25,000 images	2 cores	4 GiB

Tenable Container Security Agent Requirements

Caution: Do not run other scanners, such as Tenable Nessus, Tenable One Web App Scanning, or other vulnerability assessment tools, on the same instance. These tools are CPU and memory intensive and can cause resource contention. To handle multiple scans concurrently, deploy separate scanner instances rather than sharing resources.

Resource	Recommendation
CPU **Note:** This is a fixed requirement. You must provide additional cores only if you run multiple scanners in parallel.	4 cores
Memory (RAM)	8 GB minimum *-or-*

Resource	Recommendation
	equal to the largest uncompressed layer
Storage **Note:** This requirement accounts for the scanner, temporary layers, and other essential files.	50 GB minimum *-or-* Total compressed image size + uncompressed size of the largest layer **Note:** The agent downloads and temporarily extracts image layers under `/tmp/tes-consec/` on the host running the scan. If you mount dedicated storage, target `/tmp/tes-consec/` or the partition containing `/tmp`. All compressed layers remain on disk for the duration of the scan. Layers are decompressed one at a time and cleaned up before the next begins, so the extra headroom only needs to cover the single largest layer's uncompressed size. For example, an image with 1.5 GB of total compressed layers where the largest layer decompresses to 800 MB requires approximately 2.3 GB free on `/tmp/tes-consec/`.

Database Changes in Tenable Container Security 1.6

Beginning in version 1.6, Tenable Container Security uses the database only and does not provision Persistent Volume Claims (PVC). When you upgrade to version 1.6, your existing data will be migrated from the PVC to the database.

The following are considerations for upgrading to Tenable Container Security 1.6:

- If the migration succeeds, the existing PVC will be deleted after 30 days.
- If the migration fails, the PVC will be deleted after 60 days. The data on the PVC will be recreated in the database when you run your first full scan after upgrading.
- There is no impact to Tenable Container Security features if the migration fails. The first full scan may run slower.
- Tenable Container Security 1.6 does not support database restore from database backups of previous Tenable Container Security versions.

Note: Tenable does not recommend doing a helm rollback to a previous Tenable Container Security release after upgrading to version 1.6. This can cause data drift, as previous versions use PVCs for scan data storage.

Self-Hosted Database Requirements

A self-hosted database is a database that you install and manage on your physical server or virtual machine. For example, PostgreSQL on a local server.

Requirements for Tenable Container Security self-hosted database

# of Assets Managed by Tenable Container Security	CPU	Memory	Disk Space
1 to 1,000 images	2000 m	16 GiB	10 GB
1,001 to 5,000 images	4000 m	32 GiB	15 GB
5,001 to 25,000 images	8000 m	64 GiB	20 GB

Cloud Database Requirements

A cloud database is a database service that is hosted and managed on a cloud platform. For example, AWS, Azure, or GCloud.

Requirements for Tenable Container Security database in AWS

# of Assets Managed by Tenable Container Security	Managed DB Instance Type	Compute Instance Type (Self-Managed)	CPU Cores	Memory	Storage
1 to 1,000 images	db.m6g.xlarge	db.m6g.xlarge	4	16 GiB	10 GB

# of Assets Managed by Tenable Container Security	Managed DB Instance Type	Compute Instance Type (Self-Managed)	CPU Cores	Memory	Storage
1,001 to 5,000 images	db.m6g.2xlarge	m6g.2xlarge	8	32 GiB	15 GB
5,001 to 25,000 images	db.m6g.4xlarge	m6g.4xlarge	16	64 GiB	20 GB

Requirements for Tenable Container Security database in Azure for PostgreSQL flexible servers

# of Assets Managed by Tenable Container Security	Managed DB Instance Type	Compute Instance Type (Self-Managed)	CPU Cores	Memory	Storage
1 to 1,000 images	E2s_ v3/E2ds_v4	D4s_v3	4	16 GiB	10 GB
1,001 to 5,000 images	E4s_ v3/E4ds_v4	D16s_v3	8	32 GiB	15 GB
5,001 to 25,000 images	E8s_ v3/E8ds_v4	D32s_v3	16	64 GiB	20 GB

Requirements for Tenable Container Security database in GCloud

# of Assets Managed by Tenable Container Security	Managed DB Instance Type	Compute Instance Type (Self-Managed)	CPU Cores	Memory	Storage
1 to 1,000 images	4 vCPU, 16GB	t2a-standard-4	4	16 GiB	10 GB
1,001 to 5,000 images	8 vCPU, 32GB	t2a-standard-8	8	32 GiB	15 GB
5,001 to 25,000 images	16 vCPU, 64GB	t2a-standard-16	16	64 GiB	20 GB

Security Center in Tenable Enclave Security System Requirements

> **Note:** If you migrate from a Tenable Security Center on-premises deployment to a Tenable Enclave Security deployment, you must use an external PostgreSQL server. Before you migrate, the Tenable Security Center on-premises deployment must use the same external PostgreSQL server that you plan to use after the migration.

External PostgreSQL Requirements

You can install Tenable Security Center configured to work with a PostgreSQL instance managed by you. PostgreSQL is required for certain features. For more information about connecting a PostgreSQL database, see Connect an External PostgreSQL Server.

This is a required configuration if you have more than 100K hosts. It is also recommended that `wal_segment_size` is set to be at least 64MB.

If you set up your PostgreSQL instance in a cloud environment, the following are guidelines for choosing your instance size. Note that the disk space in the following table is only for PostgreSQL data, and does not include any other OS or other dependencies you have.

# of Hosts Managed by Tenable Security Center	AWS	Azure	Google Cloud Platform (GCP)	Minimum Disk Space Required for PostgreSQL Data
1 to 2,500 active IPs	m6g.xlarge	D4s_v3	t2a-standard-4	20 GB
2,501 to 10,000 active IPs	m6g.2xlarge	D16s_v3	t2a-standard-8	50 GB
10,001 to 25,000 active IPs	m6g.4xlarge	D32s_v3	t2a-standard-16	100 GB
25,001 to 100,000 active IPs	m6g.8xlarge	D48s_v3	t2a-standard-32	400GB
100,001 to 250,000 active IPs	m6g.16xlarge	D64s_v3	t2a-standard-48	1 TB

License Requirements

For instructions on how to download the Tenable Enclave Security license key, see Download License Key in the *Tenable Account Management guide*.

This topic breaks down the licensing process for Tenable Enclave Security. It also explains how assets are counted, lists add-on components you can purchase, and describes what happens during license overages or expirations.

Important! To purchase Tenable products, contact your Tenable Representative.

Licensing Tenable Enclave Security

To use Tenable Enclave Security, you purchase licenses based on your organizational needs and environmental details. Tenable Enclave Security assigns those licenses to your *assets*, which are assessed hosts from **Tenable Container Security** or **Tenable Security Center**.

> **Note**: Tenable offers simplified pricing to managed security service providers (MSSPs). To learn more, contact your Tenable representative.

Tenable Enclave Security Products

The following table lists Tenable Enclave Security products that require licenses, along with the asset type licensed.

Product	Asset Type
Tenable Security Center	Assessed hosts from Tenable Security Center or imported from other Tenable products.
Tenable Container Security	Unique `image:tag` combinations assessed by Tenable Container Security. For more information, contact your Tenable representative.

Reclaiming Licenses

When you purchase Tenable licenses, your total license count is static for the length of your contract unless you purchase more licenses. However, Tenable Enclave Security products reclaim licenses under some conditions–and then reassign them to new assets in the same product so that you do not run out of licenses.

The following table explains how each Tenable Enclave Security product reclaims licenses.

Exceeding the License Limit

To allow for usage spikes due to hardware refreshes, sudden environment growth, or unanticipated threats, you can temporarily exceed your license limits in Tenable Enclave Security:

- **Tenable Security Center** - You can temporarily exceed your licensed IP address count by 10%. If you exceed this number, Tenable Security Center is disabled.
- **Tenable Container Security** - You can temporarily exceed your licensed IP address count by 10%. If you exceed this number, Tenable Container Security is disabled.

Tenable Enclave Security generates a warning in the user interface when you approach or exceed the license limit.

When the license is locked, Tenable Enclave Security changes product tile visibility in the interface:

- Tenable Enclave Security hides the Security Center tile for non-administrator users because Security Center does not allow scan imports when the license is locked.
- The Tenable Container Security tile remains visible because Tenable Container Security continues to allow deployment assessment scans for existing images.

> **Tip**: Improper scan hygiene or product misconfigurations can cause scan overages, which result in inflated asset counts. To learn more, see Scan Best Practices.

Expired Licenses

The Tenable Enclave Security licenses you purchase are valid for the length of your contract. 30 days before your license expires, a warning appears in the user interface. During this renewal period, work with your Tenable representative to add or remove products or change your license count.

When the license expires, Tenable Enclave Security hides the Tenable Container Security tile.

After your license expires, you can no longer sign in to the Tenable platform.

License and Blade Statuses

Tenable Enclave Security uses a platform licensing service to manage and report the license state across all blades. The following tables describe the statuses you may see in the Tenable Enclave Security user interface or licensing API.

License Statuses

The following table describes the possible statuses for your overall Tenable Enclave Security license.

Status	Description
Valid	The license is within its expiration date and all licensed blades are operational.
Exceeded	You have exceeded your licensed asset count. Tenable Enclave Security generates a warning in the user interface. If the overage continues, functionality is progressively reduced. For more information, see Exceeding the License Limit.
Locked	The license enforcement ID (cluster ID or namespace ID) does not match the current deployment. No blades are accessible until the license is re-applied with the correct ID.
Expired	The license expiration date has passed. You can no longer sign in to Tenable Enclave Security. Contact your Tenable representative to renew.

Blade Statuses

Each blade has its own independent status within the platform licensing service. The following table describes the possible statuses for each blade.

Status	Description
Valid	The blade is licensed and fully operational.
Exceeded	You have exceeded the licensed asset count for this blade. Functionality is progressively reduced the longer the overage continues. For more information, see Exceeding the License Limit.
Locked	The blade's license enforcement ID does not match the current deployment. The blade is inaccessible until the license is corrected.
Expired	The blade's license has passed its expiration date. The blade tile is hidden from the dashboard, and API requests to the blade return a `403 Forbidden` error. Contact your Tenable representative to renew.

Note: If you navigate directly to a blade URL while that blade's status is **Locked** or **Expired**, Tenable Enclave Security redirects you to the dashboard.

Prepare a Kubernetes Cluster

To determine whether your existing Kubernetes cluster meets the requirements for use with Tenable Enclave Security, see Tenable Enclave Security System Requirements.

Before you begin

- Configure a routable URL or external gateway.
- Determine whether to create a new Kubernetes or use an existing cluster.

Configure a Kubernetes cluster

1. Create a new Kubernetes cluster. For instructions on how to create a new cluster, see the Kubernetes documentation.

   -or-

Use an existing cluster. To determine whether your existing cluster meets the requirements for your Tenable Enclave Security deployment, see Tenable Enclave Security System Requirements.

2. Install Traefik Custom Resource Definitions (CRDs).

   Note: This step is a one-time, cluster-wide procedure. If the Traefik CRDs are already installed on your cluster, skip this section.

   a. Check whether the Traefik CRDs are already installed on your cluster:

   ```
   kubectl get crd ingressroutes.traefik.io
   ```

   b. If the cluster does not contain the CRDs, run the following command to install them:

   ```
   kubectl apply -f
   https://raw.githubusercontent.com/traefik/traefik/v3.6/docs/content/reference/dynamic-
   configuration/kubernetes-crd-definition-v1.yml
   ```

   c. Run the following command to verify the installation:

   ```
   kubectl get crd | grep traefik
   ```

   The system lists the following CRDs if the installation is successful:

   - `ingressroutes.traefik.io`
   - `ingressroutetcps.traefik.io`
   - `middlewares.traefik.io`
   - `serverstransports.traefik.io`
   - `tlsoptions.traefik.io`

3. Define a default storage class on the cluster. For instructions on how to change the default storage class, see the Kubernetes documentation.

4. Install `cert-manager` in your Kubernetes cluster. For instructions on how to install cert-manager, see the cert-manager documentation.

> **Note:** if you want to use your own certificates, contact your Tenable Support representative.

5. Install `cert-manager-csi-installer` in your Kubernetes cluster.

   > **Note:** Tenable Enclave Security recommends using the cert-manager CSI driver for provisioning certificates used by its services for mTLS. However, if the CSI driver cannot be installed on your cluster, you can disable the cert-manager CSI driver.

6. Configure the Tenable Container Security database. This database contains the data visible in the Tenable Container Security UI, including vulnerabilities, images, packages, and layers.

   Tenable recommends you use a managed PostgreSQL database service (for example, RDS, AWS, or GCP). If you want to host the database yourself, see the Kubegres documentation.

   > PostgreSQL compatible versions

   - PostgreSQL 14.x
   - PostgreSQL 15.x
   - PostgreSQL 16.x (preferred)
   - PostgreSQL 17.x

7. Create a Kubernetes secret named `tes-pg-secrets` to identify characteristics about the database.

   > **Note:** The `namespace` referenced in this step is created during the Install Tenable Enclave Security procedure. If you did not create the namespace, you can create it now by running the `kubectl create namespace <namespace>` command, or you can return to this step after you complete the namespace creation in the installation procedure.

   ```
   kubectl apply --namespace tenable-enclave-security -f tes-pg-secrets.yaml
   ```

   > **Note:** Supported SSL modes include `prefer`, `require`, and `verify-ca`. The default SSL mode for Tenable Enclave Security services is `prefer`.

   The following is an example `tes-pg-secrets.yaml`:

```
apiVersion: v1
kind: Secret
type: Opaque
metadata:
  name: tes-pg-secrets
data:
  # All values below must be base64 encoded strings
  pg_host: # Hostname and optional port (e.g., db.example.com or db.example.com:5432)
  pg_user: # Admin username (must have CREATEDB and CREATEROLE permissions)
  pg_pass: # Password for the pg_user
  pg_ro_host: # Hostname for read-only replica (defaults to pg_host if not applicable)
  pg_ssl_mode: # Optional: SSL level. Use 'prefer' (default), 'require', or 'verify-ca'
  pg_ca_cert: # Required if pg_ssl_mode=verify-ca. The CA certificate content.
```

Note: To encode `pg_ssl_mode` correctly on Linux or macOS, use: `echo -n "verify-ca" | base64` If you omit the `-n` flag, the encoded string will include a hidden "newline" character, which will cause the database driver to reject the SSL mode.

Tenable Enclave Security Helm Charts

Tenable Enclave Security leverages the Helm open-source package manager. When you install, configure, or upgrade Tenable Enclave Security, use this Helm Chart.

To download the Helm Chart for Tenable Enclave Security, go to https://github.com/tenable/helm-charts.

Helm Chart

Helm Chart	Description
tes-operator	Configures the namespace, persistent volume claim, and StatefulSet Pods to pull images from container registries.

`Values.yaml` Configuration

For a complete list of Helm Chart options, see https://github.com/tenable/helm-charts/tree/main/charts/tes-operator.

External PostgreSQL with Tenable Enclave Security

> **Note:** When reviewing external PostgreSQL documentation, ensure that you use the appropriate documentation version for the PostgreSQL version you deployed.

Requirements

Tenable Enclave Security requires a customer-managed PostgreSQL instance. This instance can reside within the same Kubernetes cluster as the Tenable Enclave Security deployment or be hosted externally, provided the services within the Kubernetes cluster have network access to the database instance.

Required Privileges for the Bootstrap User

To complete this setup, the database user must have the following permissions:

- **CREATEDB:** Allows the user to create service-specific databases.
- **CREATEROLE:** Allows the user to create distinct user accounts for those services and set passwords for them.

Required PostgreSQL extensions

- **PGCRYPTO**
- **PG_TRGM**

Functional Overview

Bootstrap User and Permissions

The PostgreSQL user credential you provide via the `tes-pg-secrets` secret acts as a bootstrap administrator. This user must have **CREATEDB** and **CREATEROLE** privileges.

Purpose of the Bootstrap User

Tenable Enclave Security consists of multiple microservices, such as the Tenable Enclave Security operator, Tenable Security Center, and Tenable Container Security.

Instead of sharing one set of credentials across all services, the installation process uses the credentials in `tes-pg-secrets` to automatically orchestrate a secure, isolated environment:

- **Dynamic Provisioning:** Upon deployment, a database initialization (DB init) job runs for each logical function. The bootstrap user accesses the database instance.
- **Dedicated Databases:** The process creates a separate, dedicated database for each microservice that requires PostgreSQL access. To maintain security best practices, services do not share databases.
- **Unique Service Credentials:** The process generates a unique application user role and a unique password for each service.
- **Least Privilege Access:** Once configured, individual services use these restricted credentials to operate, not the administrative credentials found in the secret.

Responsibility Matrix

When you use an external PostgreSQL server with Tenable Enclave Security, you are responsible for the following:

- Installing and configuring PostgreSQL.
- Backing up PostgreSQL.
- Securing PostgreSQL.
- Patching and upgrading PostgreSQL.
- Maintaining network connectivity to PostgreSQL from the Kubernetes cluster (for example, firewall rules and security groups).

Tenable is responsible for:

- The databases and structures created by Tenable Enclave Security services within PostgreSQL.

  > **Caution:** Do not directly access or modify any databases created by Tenable Enclave Security services. Unauthorized modifications can compromise data integrity and functionality.

- Data integrity and database-level configuration.

> **Note:** PostgreSQL database names use the namespace where you installed Tenable Enclave Security as a prefix.

Installation

You can use any currently supported version of PostgreSQL. Supported versions include:

- PostgreSQL 14.x
- PostgreSQL 15.x
- PostgreSQL 16.x (preferred)
- PostgreSQL 17.x

Tenable follows the PostgreSQL lifecycle and removes support after the final release of a major version. For example, Tenable will not support PostgreSQL 14.x after November 2026.

Review the PostgreSQL documentation for installation instructions. You can use a managed instance of PostgreSQL from a cloud vendor if the instance meets the requirements listed in this document.

> **Note:** If you use an external PostgreSQL database and you uninstall Tenable Enclave Security, the associated PostgreSQL database remains. Contact your database administrator to remove the database and ensure you maintain any required backups.

Configuration

See the System Requirements for specific requirements.

Security

Tenable recommends that you implement a PostgreSQL security baseline if you host your own PostgreSQL instance. Examples include the Center for Internet Security (CIS) PostgreSQL Benchmark or the Crunchy Data PostgreSQL Security Technical Implementation Guide (STIG).

Tenable does not provide support for implementing these benchmarks. Certain configurations may impact Tenable Enclave Security performance or functionality.

Implementation of security benchmarks may require you to add external extensions to PostgreSQL, such as `pgaudit` and `pgcrypto`. Tenable does not provide support or documentation for the installation or configuration of these extensions.

Patching and Upgrades

> **Note:** You must shut down Tenable Security Center before you patch or upgrade PostgreSQL.

Tenable recommends that you:

- Monitor PostgreSQL security updates and apply relevant security patches after testing.
- Back up your Tenable Enclave Security databases before you patch or upgrade PostgreSQL.

Install Tenable Enclave Security

This topic describes how to install Tenable Enclave Security in a Kubernetes cluster. To update an existing Tenable Enclave Security deployment, see Update Tenable Enclave Security.

- Install Tenable Enclave Security
- Install Tenable Enclave Security in an air-gapped environment
- Install Tenable Enclave Security using OpenShift

Before You Begin

- You must have a Kubernetes cluster in a supported Kubernetes environment. For more information, see Supported Kubernetes Environments and Prepare a Kubernetes Cluster.
- Download the kubectl binaries. For more information, see the Kubernetes documentation.

- Update your kubeconfig file to allow kubectl to communicate with the Kubernetes cluster.
- Download the Helm binaries. For more information, see the Helm documentation.

Install Tenable Enclave Security

1. Create a Kubernetes cluster or configure an existing Kubernetes cluster that meets the system requirements for Tenable Enclave Security.
2. In the Kubernetes cluster where you want to install Tenable Enclave Security, create a namespace using the following command:

   ```
   kubectl create namespace tenable-enclave-security
   ```

   In this example, the namespace is *tenable-enclave-security*. You can use a namespace of your choice, just make sure you use the same namespace every time you install or upgrade Tenable Enclave Security.
3. Obtain the namespace ID for the namespace created in step 2:

   ```
   kubectl get namespace tenable-enclave-security --output jsonpath='{.metadata.uid}'
   ```

   Tip: You can disable cluster roles for Tenable Enclave Security using the helm option Tenable Enclave Security Helm Charts.
4. Obtain a Tenable Enclave Security license file and save it to your local environment.
5. Add your license to the namespace that you created in step 2 using the following command:

   ```
   kubectl --namespace tenable-enclave-security create secret generic tes-license --from-
   file=license=directory/license.key
   ```
6. Add the Tenable Helm Charts repository with the following command:

   ```
   helm repo add tenable https://charts.tenable.com
   ```
7. Update the repository:

```
helm repo update
```

8. Install the Helm Chart or upgrade an existing Helm Chart.

   Note: The values in these steps are based on a setup with 10,000 active IP addresses. For minimum requirements for your environment, see Tenable Enclave Security System Requirements.

   a. Create a `values.yaml` file with parameters sized to your deployment. The following is an example `values.yaml`:

   ```
   tes:
     blades:
       securitycenter:
         resources:
           limits:
             cpu: 32000m
             memory: 128Gi
           requests:
             cpu: 32000m
             memory: 128Gi
         persistentVolumeClaim:
           size: 5000Gi
   ```

   Note: If you create a custom `values.yaml` file, ensure you use the same file every time you upgrade. Otherwise, Tenable uses default values that may not match your configuration. For more information, see Values.yaml Configuration.

   b. To install the Helm Chart, run the following command:

   ```
   helm install tes-operator --namespace tenable-enclave-security -f values.yaml tenable/tes-operator
   ```

9. Push the updated Tenable Enclave Security license file using the following commands:

a.
```
kubectl --namespace tenable-enclave-security delete secret tes-license
```

b.
```
kubectl --namespace tenable-enclave-security create secret generic tes-license --from-file=license=directory/license.key
```

10. Access Tenable Enclave Security via the URL that you defined in Prepare a Kubernetes Cluster.

Install Tenable Enclave Security in an air-gapped environment

1. Obtain the Helm Charts and publish them locally.
   a. Add the Tenable Helm Charts repository with the following command:

   ```
   helm repo add tenable https://charts.tenable.com
   ```

   b. Update the repository:

   ```
   helm repo update
   ```

2. Contact your Tenable support representative for a list of required container images and tags for your version of Tenable Enclave Security, and add the container images and tags to your internal image registry.

   > (Optional) Use the following script to download tes-operator and all required container images.

   ```
   #!/usr/bin/env bash

   TEMP_DIR=$(mktemp -d)
   ARCHIVE="tes-offline.tar.gz"

   cleanup() {
       rm -rf "$TEMP_DIR"
   }
   ```

```
trap cleanup EXIT

helm repo add tenable https://charts.tenable.com
helm repo add jetstack https://charts.jetstack.io

helm pull tenable/tes-operator --untar --untardir "$TEMP_DIR"
helm pull jetstack/cert-manager --untar --untardir "$TEMP_DIR"

manifest_images=()

while IFS= read -r line || [[ -n "$line" ]]; do
    if [[ -n "$line" && ! "$line" =~ ^# ]]; then
        manifest_images+=("$line")
    fi
done < "$TEMP_DIR/tes-operator/image-manifest.txt"

for IMAGE in "${manifest_images[@]}"; do
  IMAGE_ARCHIVE="$TEMP_DIR/$(echo "$IMAGE" | sed 's/[/:]/_/g').tar"

  echo "Downloading Docker image: $IMAGE"
  (export DOCKER_CLI_HINTS=false; docker pull "$IMAGE")
  echo "Saving Image $IMAGE to $IMAGE_ARCHIVE"
  docker save -o "$IMAGE_ARCHIVE" "$IMAGE"
  printf "\n"
done

tar -czf "$ARCHIVE" -C "$TEMP_DIR" .

echo "TES offline bundle created successfully. Output archive: $ARCHIVE"
```

3. Obtain a new license if needed. For more information, see License Tenable Enclave Security Offline.
4. Install the Helm Chart or upgrade an existing Helm Chart.

> **Note:** The values in these steps are based on a setup with 10,000 active IP addresses. For minimum requirements for your environment, see Tenable Enclave Security System Requirements.

   a. Create a `values.yaml` file with your private registry information. The following is an example `values.yaml` for an air-gapped deployment:

```
operator:
  image:
    registry: some-private-registry.example.com # private image registry hostname
    imagePullSecret: registrypullsecret # private image registry access secret, if needed

tes:
  blades:
    securitycenter:
      resources:
        limits:
          cpu: 32000m
          memory: 128Gi
        requests:
          cpu: 32000m
          memory: 128Gi
      persistentVolumeClaim:
        size: 5000Gi
```

Note: If you create a custom `values.yaml` file, ensure you use the same file every time you upgrade. Otherwise, Tenable uses default values that may not match your configuration. For more information, see Values.yaml Configuration.

b. To install the Helm Chart, run the following command:

```
helm install tes-operator --create-namespace --namespace tenable-enclave-security -f values.yaml tenable/tes-operator
```

5. Update the repository:

```
helm repo update
```

6. Upgrade the Tenable Enclave Security operator using the following command:

```
helm upgrade tes-operator --create-namespace --namespace tenable-enclave-security -f values.yaml tenable/tes-operator
```

7. Add your license to the namespace using the following command:

```
kubectl --namespace tenable-enclave-security create secret generic tes-license --from-file=license=directory/license.key
```

8. Access Tenable Enclave Security via the URL that you defined in Prepare a Kubernetes Cluster.

Install Tenable Enclave Security using OpenShift

Note: Tenable Enclave Security does not support Network File System (NFS) storage types. If you use NFS persistent storage on the platform where you run Tenable Enclave Security, then Tenable Enclave Security may crash or become unstable.

1. Create an OpenShift cluster that meets the system requirements for Tenable Enclave Security.
2. In the OpenShift cluster where you want to install Tenable Enclave Security, create a namespace using the following command:

   ```
   kubectl create namespace tenable-enclave-security
   ```

   In this example, the namespace is *tenable-enclave-security*. You can use a namespace of your choice, just make sure you use the same namespace every time you install or upgrade Tenable Enclave Security.
3. Label the namespace, cert manager, Container Storage Interface (CSI) driver, and persistent CSI driver with a pod security standard of `baseline` or higher using the following commands:

   ```
   kubectl label csidriver csi.cert-manager.io  security.openshift.io/csi-ephemeral-volume-profile=baseline

   kubectl label ns tenable-enclave-security pod-security.kubernetes.io/enforce=baseline
   ```

   If you do not want to label the CSI driver, use the `privileged` namespace pod security standard:

```
kubectl label ns tenable-enclave-security pod-security.kubernetes.io/enforce=privileged
```

4. Get the cluster ID using the following command:

```
kubectl get namespace kube-system --output jsonpath={.metadata.uid}
```

5. Obtain a Tenable Enclave Security license file and save it to your local environment.
6. Add your license to the namespace that you created in step 2 using the following command

```
kubectl --namespace tenable-enclave-security create secret generic tes-license --from-
file=license=directory/license.key
```

7. Add the Tenable Helm Charts repository with the following command:

```
helm repo add tenable https://charts.tenable.com
```

8. Update the repository:

```
helm repo update
```

9. Install the Helm Chart or upgrade an existing Helm Chart.

> **Note:** The values in these steps are based on a setup with 10,000 active IP addresses. For minimum requirements for your environment, see Tenable Enclave Security System Requirements.

   a. Create a `values.yaml` file with parameters sized to your deployment. The following is an example `values.yaml`:

```
tes:
  blades:
    securitycenter:
      resources:
```

```
          limits:
            cpu: 32000m
            memory: 128Gi
          requests:
            cpu: 32000m
            memory: 128Gi
        persistentVolumeClaim:
          size: 5000Gi
```

> **Note:** If you create a custom `values.yaml` file, ensure you use the same file every time you upgrade. Otherwise, Tenable uses default values that may not match your configuration. For more information, see Values.yaml Configuration.

b. To install the Helm Chart, run the following command:

```
helm upgrade --install tes-operator --namespace tenable-enclave-security -f values.yaml
tenable/tes-operator
```

10. Push the updated Tenable Enclave Security license file using the following commands:

a.
```
kubectl --namespace tenable-enclave-security delete secret tes-license
```

b.
```
kubectl --namespace tenable-enclave-security create secret generic tes-license --from-
file=license=directory/license.key
```

What to do next

- Configure Tenable Enclave Security using the setup steps in the UI. For more information, see Configure Tenable Enclave Security.

Update Tenable Enclave Security

This topic describes how to update an existing Tenable Enclave Security deployment. To install Tenable Enclave Security for the first time, see Install Tenable Enclave Security.

Update Tenable Enclave Security

1. Obtain a Tenable Enclave Security license file and save it to your local environment.
2. Update the repository:

```
helm repo update
```

3. To update the Helm Chart, run the following command:
4. If your update includes new licensed products, push your license to the namespace using the following command:

```
kubectl --namespace tenable-enclave-security create secret generic tes-license --from-file=license=directory/license.key
```

5. Access Tenable Enclave Security via the URL that you defined in Prepare a Kubernetes Cluster.

Update the Apache Configuration File

Tenable Enclave Security uses a dedicated Apache configuration file, `mpm-tes.conf`, to manage the `MaxRequestWorkers` setting. This setting controls the maximum number of simultaneous requests Apache handles and should be tuned to match the size of your deployment.

Tenable Enclave Security uses higher `MaxRequestWorkers` values than a standalone Tenable Security Center deployment to account for increased internal service-to-service communication introduced in the Tenable Security Center 6.9 microservice architecture.

> **Note:** If you previously customized `mpm.conf` in a Tenable Security Center environment, apply those same customizations to `mpm-tes.conf` in your Tenable Enclave Security environment.

To update `MaxRequestWorkers`:

1. Open `mpm-tes.conf` in a text editor.
2. Locate the `MaxRequestWorkers` directive.

3. Set the value based on the number of active IPs in your deployment, using the following table:

Active IPs	Recommended MaxRequestWorkers
Fewer than 10,000	39
10,000 - 25,000	77
25,001-100,000	154
100,001 or more	307

4. Save the file and restart Apache.

Configure Tenable Enclave Security

When you access the Tenable Enclave Security user interface for the first time, the **Setup** page appears. On the **Setup** page, you'll create your Super Administrator user account, set up your first organization, and create a Security Manager user account.

Before you begin:

- Install Tenable Enclave Security

Configure Tenable Enclave Security:

1. In a web browser, access Tenable Enclave Security at the URL that you defined in Prepare a Kubernetes Cluster.
2. Set up your Super Administrator user account, and click **Next**.

> Super Administrator options

Option	Description
First Name	The first name for the user.
Last Name	The last name for the user.
User Name	The username for the Super Administrator account.
Password	The unique password for the Super Administrator account.
Confirm Password	The same password you entered in the **Password** box.

3. Set up an organization, and click **Next**.

   For more information about organizations, see Organizations.

   Organization options

Option	Description	Default
General		
Name	The name for the organization.	--
Description	A description for the organization.	--
Address	The address for the organization.	--
City	The city for the organization.	--
State	The city for the organization.	--
Phone	The phone number for the organization.	--
Password Expiration		

Option	Description	Default
Enable Password Expiration	When enabled, the user's password will expire after the number of days specified in the **Expiration Days** box. The user will receive daily password expiration notifications at login, starting 14 days before the password expires. After the password expires, the user must change their password at the next login. When disabled, the user's password expiration settings will default to the organization settings.	disabled
Expiration Days	The number of days before the user's password expires. You can enter a number between 1 and 365.	--
Tenable Container Security		
Scanner Key Expiration	The number of days before the user's scanner key expires.	90
Scanning		
Distribution Method	The scan distribution mode you want to use for this organization: • **Automatic Distribution Only** - The scanner chooses one or more scan zones to run the scan. Organizational users cannot choose a scan zone when configuring a scan.	Automatic Distribution Only

Option	Description	Default
	• **Locked Zone** - The scanner uses the scan zone(s) you specify to run the scan. Organizational users cannot modify the scan zone when configuring a scan. • **Selectable Zones** - The scanner allows organizational users to select a scan zone when configuring a scan. This mode allows organizational users to use scanners to run internal and external vulnerability scans and analyze the vulnerability stance from a new perspective. For example, an organizational user can choose an external scanner to see the attack surface from an external attacker's perspective.	
Scan Zones	One or more scan zones for the organization. Scan zones are areas of your network that you want to target in an active scan, associating an IP address or range of IP addresses with one or more scanners in your deployment. For more information about scan zones, see	--
Allow for Automatic Distribution	Enable or disable this option to specify whether you want the scanner to select one or more scan zones automatically if an organizational user does not specify a scan zone when configuring a scan.	disabled

Option	Description	Default
	• When enabled, the scanner chooses one or more scan zones that you specify in the **Restricted Scan Ranges** setting. • When disabled, the scanner requires the organizational user to specify a scan zone when configuring a scan.	
Restricted Scan Ranges	The IP address ranges you do not want users in this organization to scan.	--
Analysis		
Accessible LCEs	The Tenable Log Correlation Engines that you want this organization to have access to. You can search for the Tenable Log Correlation Engines by name or scroll through the list.	--
Accessible Repositories	The repositories that you want this organization to have access to. You can search for the repositories by name or scroll through the list.	--
Accessible Agent Capable Scanners	The Tenable Nessus scanners (with Tenable Agents enabled) that you want this organization to have access to. Select one or more of the available scanners to allow the organization to import Tenable Agent results from the selected scanner.	--
Accessible LDAP Scanners	The LDAP servers that you want this organization to have access to. An organization must have access	--

Option	Description	Default
	to an LDAP server to perform LDAP authentication on user accounts within that organization, and to configure LDAP query assets. **Note:** If you revoke access to an LDAP server, users in the organization cannot authenticate and LDAP query assets cannot run.	
Custom Analysis Links		
Link Name	A name for the custom analysis link. You can use custom analysis links to reference additional data external to Tenable Enclave Security.	--
URL	The custom analysis link URL that will appear in the host vulnerability details. For example, `http://example.com/index.htm?ip=%ip%`.The *%ip%* reference is a variable that inserts the IP address of the current host into the specified URI.	--
Vulnerability Weights		
Vulnerability Weights	The vulnerability weighting to apply to vulnerabilities with the specified criticality: • **Low** - The vulnerability weighting to apply to Low criticality vulnerabilities for scoring purposes. (Default: 1)	Medium

Option	Description	Default
	• **Medium** - The vulnerability weighting to apply to Medium criticality vulnerabilities for scoring purposes. (Default: 3) • **High** - The vulnerability weighting to apply to High criticality vulnerabilities for scoring purposes. (Default: 10) • **Critical** - The vulnerability weighting to apply to Critical criticality vulnerabilities for scoring purposes. (Default: 40)	
Vulnerability Scoring System		
Scoring System	The scoring system the scanner uses to assess the severity of vulnerabilities: **CVSS v2** or **CVSS v3**. **Note:** Changing the Scoring System while the scanner is running certain operations, such as preparing reports or dashboard data, results in data using mixed CVSS v2 and CVSS v3 scores. **Note:** Changing the Scoring System does not impact historical dashboard trend data. For example, if you change the Scoring System from CVSS v2 to CVSS v3, dashboard trend data before the change displays CVSS v2 scores while dashboard trend data after the change displays CVSS v3 scores.	CVSS v2

4. Configure a Security Manager account, and click **Finish**.

Security Manager Options

Option	Description	Default
Configure Product Access		
Role	The role for the user.	Security Manager
Organization	The organization that the user belongs to.	--
General		
First Name	The first name for the user.	--
Last Name	The last name for the user.	--
Type	The authentication type for the user account: • **Tenable (TNS)** • **Lightweight Directory Access Protocol (LDAP)** • **Security Assertion Markup Language (SAML)** You must configure an LDAP server or SAML authentication in order to select **LDAP** or **SAML** from the **Type** drop-down box.	TNS
User Name	The username for the user account. The username is case-sensitive.	--
Password	The password for the user account. **Tip:** Tenable recommends using passwords that meet stringent length and complexity requirements.	--
Confirm	The same password you entered in the **Password**	--

Option	Description	Default
Password	box.	
User Must Change Password	When enabled, the user must change their password when they log in for the first time.	disabled
Time Zone	The time zone for the user.	
Scan Result Default Timeframe	The default **Completion Time** filter applied when the user accesses or refreshes the scan results.	
Cached Fetching	When enabled, Tenable Enclave Security caches plugin policy information and performs plugin policy downloads once per page load.	
Password Expiration		
Enable Password Expiration	When enabled, the user's password will expire after the number of days specified in the **Expiration Days** box. The user will receive daily password expiration notifications at login, starting 14 days before the password expires. After the password expires, the user must change their password at the next login. When disabled, the user's password expiration settings will default to the organization settings.	disabled
Expiration Days	The number of days before the user's password expires. You can enter a number between 1 and 365.	--

Configure Customer Certificates for Tenable Enclave Security

Use this procedure to configure your own TLS certificates for Tenable Enclave Security instead of the auto-generated defaults.

Before you begin

- You must have a private key (`.key` file) and a signed certificate from your CA (`.crt` or `.pem` file).
- The certificate must include Subject Alternative Names (SAN) matching your Tenable Enclave Security domain (for example, `*.yourdomain.com`).
- You must have access to the Tenable Enclave Security Kubernetes namespace.

To configure customer certificates for Tenable Enclave Security:

1. Run the following command to create a Kubernetes secret with your certificate and key:

```
kubectl create secret tls <secret-name> \
  --cert=customer.crt \
  --key=customer.key \
  -n <tes-namespace>
```

2. Update your Tenable Enclave Security site file or `values.yaml` override file:

```
tes:
  blades:
    traefik:
      certificates:
        external:
          enabled: false
          secretName: <secret-name>
```

3. Run the following command to deploy or update Tenable Enclave Security with the updated configuration:

```
helm upgrade tes-operator <chart-path> -n <namespace> -f <site-file>.yaml
```

4. Confirm that IngressRoutes are using your certificate:

```
kubectl get ingressroute -n <namespace> -o jsonpath='{range .items[*]}{.metadata.name}{"\t"}
{.spec.tls.secretName}{"\n"}{end}'
```

Certificate Authentication

In Tenable Enclave Security, you can configure SSL client certificate authentication to allow users to log in to the interface using a certificate (such as a smart card, PIV, or CAC) instead of a standard username and password. Certificate-based authentication provides a higher level of security than passwords by requiring physical or digital tokens.

SSL Client Certificate Authentication

Tenable Enclave Security supports certificate authentication for users via integrated Tenable Enclave Security components. You can configure the system to require a certificate, make it optional, or use it for specific organizational requirements.

Before you begin

- Confirm you have a valid Certificate Authority (CA) that has signed the user certificates.
- Ensure the CA certificate is trusted by your Tenable Enclave Security deployment.
- Confirm that users have an existing account in Tenable Security Center that matches the Common Name (CN) or Subject Alternative Name (SAN) of their certificate.
- Authentication processes are handled by the main Tenable Security Center pod. Ensure your cluster meets the Tenable Enclave Security System Requirements to maintain authentication performance.

To configure certificate authentication for Tenable Enclave Security:

1. Access your Kubernetes cluster via the CLI.
2. Locate the Tenable Security Center pod:

```
kubectl get pods -n <your-namespace>
```

3. Open a shell to the pod:

```
kubectl exec -it <sc-pod-name> -n <your-namespace> -- /bin/bash
```

4. Open the `/opt/sc/support/conf/sslverify.conf` file in a text editor.
5. Edit the `SSLVerifyClient` setting using one of the following values:
    - `none`: (Default) The system does not accept SSL certificates for authentication.
    - `require`: The system requires a valid SSL certificate for all user logins.
    - `optional`: The system accepts a certificate but does not require it. If a certificate is not presented, users can log in with a username and password.
6. (Optional) Edit the `SSLVerifyDepth` setting to specify the length of the certificate chain the system should accept.
    - `0`: Accepts self-signed certificates.
    - `1`: Accepts certificates signed by a known CA but no intermediate certificates.
    - `2`: Accepts a certificate chain with up to one intermediate certificate.
7. Save the file and exit the pod.
8. Restart the Tenable Security Center service or delete the pod to trigger a restart and apply the changes:

```
kubectl delete pod <sc-pod-name> -n <your-namespace>
```

Container Security Scanner Certificate Configuration

When Tenable Enclave Security is configured with certificate-based authentication, or when your registry uses a custom certificate, the Tenable Container Security scanner requires additional certificate configuration to complete the mutual TLS (mTLS) handshake. You can provide certificate files using command-line flags or environment variables.

Configure a Certificate for Tenable Enclave Security Authentication

If Tenable Enclave Security uses certificate-based authentication, the Tenable Container Security scanner cannot complete the mTLS handshake because it does not provide a client certificate by default. Provide the certificate and key using one of the following methods.

Before you begin

- Confirm you have a valid certificate and private key that are trusted by your Tenable Enclave Security deployment.

Command-line flags

- `--tes-cert`: Path to the Tenable Enclave Security certificate.
- `--tes-key`: Path to the private key.

Example:

```
./consec run --tes-cert /etc/certs/certificate.pem --tes-key /etc/certs/key.pem
```

Environment variables

- `TES_CERT_PATH`: Path to the TLS certificate.
- `TES_KEY_PATH`: Path to the corresponding private key.

Example:

```
export TES_CERT_PATH=/etc/certs/certificate.pem
export TES_KEY_PATH=/etc/certs/key.pem
./consec run
```

Configure a CA Certificate for a Custom Registry

If your registry uses a custom certificate, the Tenable Container Security scanner cannot verify it against a known authority. Provide the CA certificate using one of the following methods.

Command-line flag

- `--registry-cacert`: Path to the CA certificate.

Example:

```
./consec run --registry-cacert /etc/certs/ca.crt
```

Environment variable

- `REGISTRY_CACERT_PATH`: Path to the CA certificate.

Example:

```
export REGISTRY_CACERT_PATH=/etc/certs/ca.crt
./consec run
```

Deployment Assessment Scanner Certificate Configuration

When Tenable Enclave Security is configured with certificate-based authentication, or when your registry uses a custom certificate, the deployment assessment scanner requires additional configuration. You provide certificate files as part of the `helm upgrade` command.

Configure a Certificate for Tenable Enclave Security Authentication

If Tenable Enclave Security uses certificate-based authentication, the `tes-deployment-assessment` service cannot complete the mTLS handshake because it does not provide a client certificate by default. Add the following flags to the existing `helm upgrade` command described in Install the Deployment Assessment Agent.

```
--set-file clientCerts.tes.cert=<path/to/certificate.pem>
--set-file clientCerts.tes.key=<path/to/key.pem>
```

Example:

```
helm upgrade --install tes-deployment-assessment \
  -n tes-deployment-assessment \
  -f values.yaml \
  -f {cluster_name}.yaml \
  --set-file clientCerts.tes.cert=<path/to/certificate.pem> \
  --set-file clientCerts.tes.key=<path/to/key.pem> \
  tenable/tes-deployment-assessment
```

Configure a CA Certificate for a Custom Registry

If your registry uses a custom certificate, the `tes-deployment-assessment` service cannot verify it against a known authority. Add the following flag to the existing `helm upgrade` command described in Install the Deployment Assessment Agent.

```
--set-file clientCerts.registry.caCert=<path/to/ca.crt>
```

Example:

```
helm upgrade --install tes-deployment-assessment \
  -n tes-deployment-assessment \
  -f values.yaml \
  -f {cluster_name}.yaml \
  --set-file clientCerts.registry.caCert=<path/to/ca.crt> \
  tenable/tes-deployment-assessment
```

Rotate Certificates in an Existing Deployment

Use the following procedure to update certificates in an existing deployment and restart the pods to apply the changes.

Before you begin

- Confirm you have installed or upgraded to the latest Helm charts and configured the certificates previously.

To rotate certificates in an existing deployment assessment deployment:

1. Run the following command with the updated certificate paths:

```
helm upgrade tes-deployment-assessment tes-deployment-assessment \
  -n tes-deployment-assessment \
  --reuse-values \
  --set-file clientCerts.tes.cert=<path/to/certificate.pem> \
  --set-file clientCerts.tes.key=<path/to/key.pem> \
  --set-file clientCerts.registry.caCert=<path/to/ca.crt>
```

2. Restart the pods to apply the changes:

```
kubectl rollout restart deployment tes-deployment-assessment -n tes-deployment-assessment
```

Back Up and Restore Tenable Enclave Security

> **Note:** These steps apply to Tenable Enclave Security 1.7 and later. For versions 1.6 and earlier, contact Tenable Support for assistance.

To back up and restore Tenable Enclave Security, you must save and restore the following components:

- **Disk (Persistent Volume Claim, or PVC)**
  - Tenable Security Center: The disk affects all Tenable Security Center functionality and access to Tenable Container Security in Tenable Enclave Security.
- **PostgreSQL**
  - Tenable Security Center: PostgreSQL affects all Tenable Security Center functionality.
  - Tenable Container Security: PostgreSQL affects all Tenable Container Security functionality.

Considerations

- You must scale down the services while performing the backup and restore to prevent data drift.
- The freshly installed version must exactly match the version used when the backup was created.
- You must re-download Tenable Container Security Agents from the Tenable Container Security UI after the restored instance is running. This ensures the Tenable Container Security Agent knows the location of the running Tenable Enclave Security instance.
- You must re-install Tenable Container Security Deployment Assessment Agents using the updated configurations downloaded from the Tenable Container Security UI after the restored instance is running. This ensures the Deployment Assessment Agent knows the location of the running Tenable Enclave Security instance.
- Tenable Enclave Security must be installed in a namespace with the same name as the previous instance to function effectively, as the database table name and disk paths use the namespace name.
- Tenable Enclave Security must point to the same database as the backed-up instance to render previously scanned data. If the database instance is different, you must restore the data from the previous database instance to maintain the same database name, tables, users, and permissions.
- You must perform the PostgreSQL backup and restore directly. For general guidance and recommendations, see External PostgreSQL with Tenable Security Center in the *Tenable Security Center user guide*.

For instructions on how to back up and restore data in Tenable Enclave Security, see the following pages:

Back Up and Restore Tenable Security Center

Tenable recommends performing regular backups of your Tenable Security Center in Tenable Enclave Security data and configurations to ensure you can recover your environment in the event

of hardware failure or data loss. By maintaining current backups, you can quickly restore your vulnerability management operations and minimize downtime.

Important Considerations

- You must perform a restore on the exact version used for the backup. A version mismatch might not cause immediate errors, but it can lead to application issues later.
- The namespace you use during a restore must be the same as the original deployment. Database names are templated based on the namespace; therefore, using a different namespace results in mismatched database names.
- Stopping Tenable Security Center inside the container causes the Kubernetes liveness probe to fail, triggering an automatic pod restart once the failure threshold is reached. To prevent interruptions during backup and restore operations, you must temporarily disable the liveness probe before stopping Tenable Security Center.

Back up Tenable Security Center in Tenable Enclave Security

Back up a Tenable Security Center in Tenable Enclave Security deployment:

1. Scale `sc-job-manager` to 0 replicas:

```
kubectl scale deployment sc-job-manager -n tenable-enclave-security --replicas=0
```

2. Stop Tenable Security Center and all running processes:

> **Note:** These commands stop all jobs, including scans, running on Tenable Security Center.

   a. Disable the liveness probe to prevent Kubernetes from restarting the pod while Tenable Security Center is stopped:

```
NS=tenable-enclave-security

IDX=$(kubectl get statefulset tenable-security-center -n $NS -o jsonpath='{range
```

```
.spec.template.spec.containers[*]}{.name}{"\n"}{end}' | grep -n '^sc-runtime-container$' |
cut -d: -f1 | awk '{print $1-1}')

kubectl patch statefulset tenable-security-center -n $NS --type=json -p="[{\"op\":
\"remove\", \"path\": \"/spec/template/spec/containers/${IDX}/livenessProbe\"}]"
```

b. Log in to the Kubernetes runtime container:

```
kubectl exec -it tenable-security-center-0 -n tenable-enclave-security -- /bin/sh
```

c. Stop Tenable Security Center:

```
/scbase/SC.sh stop
```

d. View all running processes:

```
ps -fu tns
```

e. If any processes are listed, run the following commands to stop them:

```
killall -u tns
killall httpd
```

f. If necessary, repeat step e to confirm all processes are stopped.

3. Create a backup `.tar` file:

```
tar -Ppzcf /opt/sc_backup.tar.gz /opt/sc
```

> **Note:** The `.tar` file switches are case-sensitive.

Tenable Security Center creates the `sc_backup.tar.gz` backup file in the `/opt/sc` directory.

4. Exit the container:

```
exit
```

5. Copy the backup file to your local working directory by running the following command from your local shell:

```
kubectl cp tenable-enclave-security/tenable-security-center-0:/opt/sc_backup.tar.gz -c sc-runtime-container sc_backup.tar.gz
```

> **Note:** Ensure your local directory has enough space for the backup file.

Tenable Security Center is backed up to your local directory.

6. Log in to the Kubernetes runtime container again:

```
kubectl exec -it tenable-security-center-0 -n tenable-enclave-security -- /bin/sh
```

7. Remove the backup file from the `/opt` directory:

```
rm /opt/sc_backup.tar.gz
```

8. Exit the container:

```
exit
```

9. Depending on your next steps, scale down or restart Tenable Security Center:

> **Note:** Do not leave Tenable Security Center stopped inside the pod without performing one of the actions described in this step.

- If you are planning an immediate restore, scale the `tenable-security-center` StatefulSet to `0` to terminate the pod and prevent Kubernetes from restarting it:

```
kubectl scale statefulset tenable-security-center -n tenable-enclave-security --replicas=0
```

> **Caution:** Back up your PostgreSQL database before restoring.

- If this is a periodic backup and you are not restoring now, scale `sc-job-manager` back to 1 replica:

  ```
  kubectl scale deployment sc-job-manager -n tenable-enclave-security --replicas=1
  ```

  Then restart the `tes-operator` pod to restore the liveness probe and restart the Tenable Security Center StatefulSet:

  ```
  kubectl delete po -n tenable-enclave-security <tes-operator-pod>
  ```

Back Up PostgreSQL Database

After you complete the Tenable Security Center backup, back up the PostgreSQL database connected to the instance before you restart Tenable Security Center or proceed with a restore. For steps, see the PostgreSQL backup documentation.

Restore Tenable Security Center in Tenable Enclave Security

Before you begin

- Uninstall the existing Helm chart and delete the Tenable Security Center database secret:

  ```
  helm uninstall -n tenable-enclave-security tes-operator tes
  kubectl delete secret -n tenable-enclave-security sc-secrets
  ```

- Perform a fresh install of Tenable Security Center using the steps in Install Tenable Enclave Security.

  Caution: The freshly installed version must exactly match the version used when the backup was created.

To restore Tenable Security Center from a backup file:

1. Scale `sc-job-manager` to 0 replicas:

```
kubectl scale deployment sc-job-manager -n tenable-enclave-security --replicas=0
```

2. Stop Tenable Security Center and all running processes:

   a. Disable the liveness probe to prevent Kubernetes from restarting the pod while Tenable Security Center is stopped:

```
NS=tenable-enclave-security

IDX=$(kubectl get statefulset tenable-security-center -n $NS -o jsonpath='{range
.spec.template.spec.containers[*]}{.name}{"\n"}{end}' | grep -n '^sc-runtime-container$' |
cut -d: -f1 | awk '{print $1-1}')

kubectl patch statefulset tenable-security-center -n $NS --type=json -p="[{\"op\":
\"remove\", \"path\": \"/spec/template/spec/containers/${IDX}/livenessProbe\"}]"
```

   b. Log in to the Kubernetes runtime container:

```
kubectl exec -it tenable-security-center-0 -n tenable-enclave-security -- /bin/sh
```

   c. Stop Tenable Security Center:

```
/scbase/SC.sh stop
```

   d. View all running processes:

```
ps -fu tns
```

   e. If any processes are listed, run the following commands to stop them:

```
killall -u tns
killall httpd
```

> **Note:** These commands stop all jobs (including scans) running on Tenable Security Center.

f. If necessary, repeat step e to confirm all processes are stopped.

3. Exit the container:

```
exit
```

4. Confirm that `sc_backup.tar.gz` is present in your local working directory.

5. Copy the backup file into the container by running the following command from your local shell:

```
kubectl cp sc_backup.tar.gz tenable-enclave-security/tenable-security-center-0:/opt/sc_backup.tar.gz
-c sc-runtime-container
```

6. Log in to the Kubernetes runtime container:

```
kubectl exec -it tenable-security-center-0 -n tenable-enclave-security -- /bin/sh
```

7. Restore Tenable Security Center from the backup file:

```
tar -Pxvf /opt/sc_backup.tar.gz
```

8. Remove the backup file from the `/opt` directory:

```
rm /opt/sc_backup.tar.gz
```

9. Exit the container:

```
exit
```

10. Update `.pgvars` with the new PostgreSQL password.

The restored backup overwrites `.pgvars` with the old PostgreSQL password from the source instance. The freshly installed instance has a new password — update `SC_PG_PASSWORD` in `/opt/sc/.pgvars` to reflect this before starting Tenable Security Center.

Retrieve the new PostgreSQL password from the Kubernetes secrets in the deployment namespace (see Credential reference), then update the file:

```
# Get the new Postgres password from the sc-secrets Kubernetes secret
NEW_PG_PASSWORD=$(kubectl get secret sc-secrets -n tenable-enclave-security -o jsonpath='{.data.SC_
DB_PASSWORD}' | base64 -d)

# Update .pgvars inside the SC pod
kubectl exec tenable-security-center-0 -n tenable-enclave-security -c sc-runtime-container -- sed -i
"s/^export SC_PG_PASSWORD=.*/export SC_PG_PASSWORD=${NEW_PG_PASSWORD}/" /opt/sc/.pgvars

# Verify
kubectl exec tenable-security-center-0 -n tenable-enclave-security -c sc-runtime-container -- grep
"^export SC_PG_PASSWORD=" /opt/sc/.pgvars
```

11. Scale the `tenable-security-center` StatefulSet to `0` to terminate the pod while the PostgreSQL restore completes:

```
kubectl scale statefulset tenable-security-center -n tenable-enclave-security --replicas=0
```

Restore PostgreSQL Database

After you restore the Tenable Security Center files and scale down the pods, restore the PostgreSQL database before restarting Tenable Security Center.

- **Always restore using the DB superuser, not the application user**

  The application DB user does not have superuser privileges. Running `pg_restore` as the app user fails when replaying `SET ROLE` statements used to reassign object ownership. Always use the database superuser for the restore. The superuser credentials (host, port, username, password) are stored in the Kubernetes secrets in the deployment namespace.

- **Do not use `--no-owner` or `--no-privileges` flags**

Omit these flags so that `pg_restore` replays object ownership (`ALTER ... OWNER TO`) and privilege grants (`GRANT`) exactly as they were in the source database. Using these flags silently drops ownership assignments and access controls, which can cause application errors after the restore.

- **The application user does not need manual setup after restore**

  If the application DB user pre-existed on the database instance (that is, the restore process did not drop it), it retains its existing password and privileges. You do not need to run `CREATE USER`, `ALTER USER`, or `GRANT` manually. Verify connectivity using the application user credentials available in the Kubernetes secrets and ConfigMaps in the deployment namespace.

- **Credential reference**

Credential	Kubernetes Resource	Key
DB host & port	`tes-pg-secrets` (Secret)	`pg_host`
Superuser username	`tes-pg-secrets` (Secret)	`pg_user`
Superuser password	`tes-pg-secrets` (Secret)	`pg_pass`
App DB username	`sc-config-map` (ConfigMap)	`TES_SC_USER`
App DB name	`sc-config-map` (ConfigMap)	`TES_SC_DB_NAME`
App DB password	`sc-secrets` (Secret)	`SC_DB_PASSWORD`

Restart Tenable Security Center

After you complete the PostgreSQL restore, scale `sc-job-manager` and the `tenable-security-center` StatefulSet back to `1`:

```
kubectl scale deployment sc-job-manager -n tenable-enclave-security --replicas=1
kubectl scale statefulset tenable-security-center -n tenable-enclave-security --replicas=1
```

Tenable Security Center starts automatically as the pod comes up.

Back Up and Restore Tenable Container Security

> **Note:** These steps apply to Tenable Enclave Security 1.7 and later. For versions 1.6 and earlier, contact Tenable Support for assistance.

In Tenable Enclave Security 1.6 and later, Tenable Container Security state is stored entirely in PostgreSQL. There is no disk (PVC) data to back up. For versions prior to Tenable Enclave Security 1.6, contact Tenable Support.

Important Considerations

- These commands stop all Tenable Container Security and platform pods on the system. Plan for downtime accordingly.
- You must perform a restore on the exact version of Tenable Enclave Security used for the backup.
- The namespace you use during a restore must be the same as the original deployment. Database names are templated based on the namespace. Using a different namespace results in mismatched database names.
- You must re-download Tenable Container Security Agents from the Tenable Container Security UI after the restored instance is running. This ensures the Tenable Container Security Agent knows the location of the running Tenable Enclave Security instance.
- You must re-install Tenable Container Security Deployment Assessment Agents using the updated configurations downloaded from the Tenable Container Security UI after the restored instance is running.

Back Up Tenable Container Security in Tenable Enclave Security

To back up Tenable Container Security:

1. Scale down all Tenable Container Security and platform pods to prevent data drift during the backup:

```
kubectl scale deploy -n tenable-enclave-security -l blade=container-security --replicas=0
kubectl scale deploy -n tenable-enclave-security -l blade=platform --replicas=0
```

2. Back up the PostgreSQL database. For steps, see the PostgreSQL backup documentation.
3. Scale the pods back up to resume normal operation:

```
kubectl scale deploy -n tenable-enclave-security -l blade=container-security --replicas=1
kubectl scale deploy -n tenable-enclave-security -l blade=platform --replicas=1
```

> **Note:** If you are planning an immediate restore, do not perform this step. Proceed to the restore procedure below instead.

Restore Tenable Container Security in Tenable Enclave Security

Before you begin

- Uninstall the existing Helm Chart:

```
helm uninstall -n tenable-enclave-security tes-operator tes
kubectl delete secret -n tenable-enclave-security sc-secrets
```

- Perform a fresh installation of Tenable Enclave Security using the steps in Install Tenable Enclave Security.

> **Caution:** The freshly installed version must exactly match the version used when the backup was created.

To restore Tenable Container Security:

1. Scale down all Tenable Container Security and platform pods:

```
kubectl scale deploy -n tenable-enclave-security -l blade=container-security --replicas=0
kubectl scale deploy -n tenable-enclave-security -l blade=platform --replicas=0
```

2. Restore the PostgreSQL database using one of the following methods:
   - Restore the PostgreSQL backup to the database instance that the new Tenable Enclave Security installation connects to, or
   - Point the new Tenable Enclave Security installation to the existing database that already contains the backed-up data.

   For steps, see the PostgreSQL restore documentation.
3. Scale the pods back up to bring Tenable Container Security online:

```
kubectl scale deploy -n tenable-enclave-security -l blade=container-security --replicas=1
kubectl scale deploy -n tenable-enclave-security -l blade=platform --replicas=1
```

4. Re-register agents after the restored instance is running:
   a. Re-download Tenable Container Security Agents from the Tenable Container Security UI.
   b. Re-install Tenable Container Security Deployment Assessment Agents using the updated configurations downloaded from the Tenable Container Security UI.

Settings and Information

To view your Tenable Enclave Security settings, in the top navigation, click ⚙ **Settings & Information**.

For more information, see the following topics:

- Access Control
  - Users
  - Roles
  - Groups
  - Organizations
- Authentication
  - LDAP Authentication
  - SAML Authentication
- System Logs
- Licenses
  - License Status and Product Tile Visibility
  - Download Tenable Enclave Security License Key
  - License Tenable Enclave Security Online
  - License Tenable Enclave Security Offline
- Configuration
  - Edit Plugin and Feed Settings and Schedules
  - Configure Plugin Text Translation

API Key Authentication

Diagnostics

Job Queue

Publishing Sites

Access Control

To view your users, user roles, groups, and organizations, in the top navigation bar, click ⚙ **Settings & Information** > **Access Control**.

For more information, see the following topics:

Users

Roles

Groups

Organizations

Users

To view a list of your Tenable Enclave Security users, in the top navigation bar, click ⚙ **Settings & Information** > **Access Control**.

On the **Users** page, you can view your user accounts, add new user accounts, manage user accounts, and delete user accounts.

For information about configuring LDAP and SAML authentication, see Authentication.

Roles

To view your user roles, in the top navigation bar, click **Settings & Information** > **Access Control**, then click the **Roles** tab.

This page describes the roles that you can assign to users in Tenable Enclave Security.

Role	Description
Super Administrator	Super Administrator users have the system-provided Super Administrator role and do not belong to any organization. You can create Super Administrator users when you configure Tenable Enclave Security.
Organizational Users - Users that belong to an organization.	
Security Manager	The Security Manager role has full access to all actions at the organization level. A Security Manager has the ability to create new groups and manage existing ones. A Security Manager can also define how users interact with other groups.\n\nThe ability to manage other users and their objects can be configured using group permissions on the Access tab of User add/edit. This includes viewing and stopping running scans and reports. The Security Manager role also includes the Exposure Response Manager permission. Exposure Response Managers can edit and delete shared combinations in Tenable Container Security.
Auditor	The Auditor role can access summary information to perform third-party audits. An Auditor can view dashboards, reports, and logs, but cannot perform scans or create tickets.
Credential Manager	The Credential Manager role can be used specifically for handling credentials. A Credential Manager can create and share credentials without revealing the contents of the credential. This can be used by someone outside the security team to keep scanning credentials up to

Role	Description
	date.
Executive	The Executive role is for users who are interested in a high-level overview of their security posture and risk profile. Executives would most likely browse dashboards and review reports, but would not be concerned with monitoring running scans or managing users. Executives would also be able to assign tasks to other users using the ticketing interface.
Security Analyst	The Security Analyst role has permissions to perform all actions at the Organizational level except managing groups and users. A Security Analyst is most likely an advanced user who can be trusted with some system-related tasks such as setting freeze windows or updating plugins. The Security Manager role also includes the Exposure Response Manager permission. Exposure Response Managers can edit and delete shared combinations in Tenable Container Security.
Vulnerability Analyst	The Vulnerability Analyst role can perform basic tasks within the application. A Vulnerability Analyst is allowed to view security data, perform scans, share objects, view logs, and work with tickets.
Custom Role	A custom role that you create by enabling or disabling individual permissions.

Groups

To view the **Groups** table, in the top navigation bar, click **Settings & Information** > **Access Control**, then click the **Groups** tab.

User groups are a way to group rights to objects within an organization, and then quickly assign these rights to one or more users. A user's group membership determines their access to security data. When a user creates various objects such as reports, scan policies, dashboards, and other

similar items, these objects are automatically shared among the group members if the group permissions allow view and control.

Group Options

Option	Description
General tab	
Name	The name for the group.
Description	A description for the group (e.g., **security team at the central office** or **executives on the east coast**).
Viewable Hosts	The IP addresses and agent IDs that are viewable by the group. The selection is made by all defined assets or the selection of one or more asset lists.
Repositories	The repositories you want to share with the group.
Tenable Log Correlation Engines	The Tenable Log Correlation Engines you want to assign to the group.
Tenable Container Security Resources	The Tenable Container Security images you want to be available to users in the group.
Sample Content	When enabled, Tenable provides sample content objects to users in the group: • sample dashboards (**Executive 7 Day**, **Executive Summary**, and **Vulnerability Overview**)

Option	Description
	• sample reports (**Critical and Exploitable Vulnerabilities**, **Monthly Executive**, and **Remediation Instructions by Host**) • sample ARCs (**CCC 1: Maintain an Inventory of Software and Hardware**, **CCC 2: Remove Vulnerabilities and Misconfigurations**, **CCC 3: Deploy a Secure Network**, **CCC 4: Authorize Users**, and **CCC 5: Search for Malware and Intruders**) • sample assets required for the sample ARCs After enabling **Sample Content**, you must add a new user to the group before all users in the group can access the sample content. **Note:** If a user in a group deletes a sample content object, the object is deleted for all other users in that group. **Note:** If you move a sample content object owner (e.g., move the first user in group A to group B), Tenable Enclave Security: 1. Assigns their dashboards and ARCs to a new sample content object owner in group A. Tenable Enclave Security does not reassign reports or assets. 2. Recreates their dashboards, ARCs, and assets required for ARCs in group B. Tenable Enclave Security does not recreate reports.
Share to Group tab	
Available Objects	The list of available objects to be shared with the group on creation or edit in a bulk operation.

Organizations

Required User Role: Administrator

To view your organizations, in the top navigation bar, click **Settings & Information** > **Access Control**, then click the **Organizations** tab.

An *organization* is a set of distinct users and groups and the resources (for example, scanners, repositories, and LDAP servers) they have available to them.

The organization is managed primarily by the administrator users and security manager users. The administrator user creates the organization and creates, assigns, and maintains the security manager user account. The security manager user (or any organizational user with appropriate permissions) creates other users within the organization. Groups allow you to manage users and share permissions to resources and objects among the group.

Multiple organizations can share the same repositories, and the vulnerability data associated with the overlapping ranges is shared between each organization. Conversely, organizations can be configured with their own discrete repositories to facilitate situations where data must be kept confidential between different organizational units.

Creation of an organization is a multi-step process. After you create an organization, Tenable Enclave Security prompts you to create the initial security manager user.

To view the users in an organization, filter by the organization on the Users page.

Organization Options

Option	Description
General	
Name	(Required) The organization name.
Description	A description for the organization.
Contact Information	The relevant contact information for the organization including address, city, state, country, and phone number.

Option	Description
Password Expiration	
Enable Password Expiration	When enabled, passwords for users in the organization will expire after the number of days specified in the **Expiration Days** box.
Expiration Days	The number of days before the user's password expires. You can enter a number between 1 and 365. The user will receive daily password expiration notifications at login, starting 14 days before the password expires. After the password expires, the user must change their password at the next login.
Tenable Container Security	
Scanner Key Expiration	The number of days before the user's scanner key expires.
Container Security Resources	The Tenable Container Security images you want to be available to users in the group.
Scanning	
Distribution Method	The scan distribution mode you want to use for this organization: • **Automatic Distribution Only**: Tenable Enclave Security chooses one or more scan zones to run the scan. Organizational users cannot choose a scan zone when configuring a scan. Tenable Enclave Security distributes targets for scans based on your configured scan zone ranges. This

Option	Description
	facilitates optimal scanning and is useful if an organization has devices placed behind a firewall or NAT device or has conflicting RFC 1918 non-internet-routable address spaces. • **Locked Zone**: Tenable Enclave Security uses the one **Available Zone** you specify to run the scan. Organizational users cannot modify the scan zone when configuring a scan. • **Selectable Zones**: Tenable Enclave Security allows organizational users to select a scan zone when configuring a scan. This mode allows organizational users to use scanners to run internal and external vulnerability scans and analyze the vulnerability stance from a new perspective. For example, an organizational user can choose an external scanner to see the attack surface from an external attacker's perspective.
Available Zones	One or more scan zones that you want organizational users to have access to when configuring scans.
Allow for Automatic Distribution	Enable or disable this option to specify whether you want Tenable Enclave Security to select one or more scan zones automatically if an organizational user does not specify a scan zone when configuring a scan. • When enabled, Tenable Enclave Security chooses one or more scan zones as specified by your **Restrict to Selected Zones** setting.

Option	Description
	• When disabled, Tenable Enclave Security requires the organizational user to specify a scan zone when configuring a scan.
Restrict to Selected Zones	If **Allow for Automatic Distribution** is enabled, enable or disable this option to specify the zones you want Tenable Enclave Security to choose from when automatically distributing zones. • When enabled, Tenable Enclave Security chooses from the **Available Zones** shared with the organization. • When disabled, Tenable Enclave Security chooses from all zones on Tenable Enclave Security.
Restricted Scan Ranges	The IP address ranges you do not want users in this organization to scan.
Analysis	
Accessible Repositories	The repositories that you want this organization to have access to. You can search for the repositories by name or scroll through the list.
Accessible LCEs	The Tenable Log Correlation Engines that you want this organization to have access to. You can search for the Tenable Log Correlation Engines by name or scroll through the list.
Accessible Agent Capable Scanners	The Tenable Nessus scanners (with Tenable Agents enabled) that you want this organization to have access to. Select one or more of the available scanners to allow the organization to import Tenable Agent results from the selected scanner.

Option	Description
Accessible LDAP Servers	The LDAP servers that you want this organization to have access to. An organization must have access to an LDAP server to perform LDAP authentication on user accounts within that organization, and to configure LDAP query assets. **Note:** If you revoke access to an LDAP server, users in the organization cannot authenticate and LDAP query assets cannot run.
Custom Analysis Links	
A list of custom analysis links provided to users within the host vulnerability details when analyzing data outside of Tenable Enclave Security is desired. Click **Add Custom Link** to create a new option to type the link name and URL to look up additional data external to Tenable Enclave Security. For example: *http://example.com/index.htm?ip=%ip%* The *%ip%* reference is a variable that inserts the IP address of the current host into the specified URI.	
Vulnerability Weights	
Low	The vulnerability weighting to apply to **Low** criticality vulnerabilities for scoring purposes. (Default: 1)
Medium	The vulnerability weighting to apply to **Medium** criticality vulnerabilities for scoring purposes. (Default: 3)
High	The vulnerability weighting to apply to **High** criticality vulnerabilities for scoring purposes. (Default: 10)
Critical	The vulnerability weighting to apply to **Critical** criticality

Option	Description
	vulnerabilities for scoring purposes. (Default: 40)
Vulnerability Scoring System	
Scoring System	The scoring system Tenable Enclave Security uses to assess the severity of vulnerabilities: **CVSS v2** or **CVSS v3**. **Note:** Changing the **Scoring System** while Tenable Enclave Security is running certain operations, such as preparing reports or dashboard data, results in data using mixed CVSS v2 and CVSS v3 scores. **Note:** Changing the **Scoring System** does not impact historical dashboard trend data. For example, if you change the **Scoring System** from **CVSS v2** to **CVSS v3**, dashboard trend data before the change displays CVSS v2 scores while dashboard trend data after the change displays CVSS v3 scores.
Reporting	
Publishing Sites	You can configure publishing sites as targets to send report results to a properly configured web server or a Defense Information Systems Agency (DISA) Continuous Monitoring and Risk Scoring (CMRS) site. For more information, see Publishing Sites.

Authentication

To view your LDAP and SAML configurations, in the top navigation, click **Settings & Information** > **Authentication**.

For more information, see the following topics:

LDAP Authentication

SAML Authentication

LDAP Authentication

Adding LDAP servers allows you to use one or more external LDAP servers for Tenable Enclave Security user account authentication. LDAP authentication enhances the security of Tenable Enclave Security by inheriting password complexity requirements from environments mandated by security policy.

After you configure an LDAP server, create Tenable Enclave Security user accounts for each LDAP user you want to grant access.

Then, users with LDAP-authenticated accounts can log in to Tenable Enclave Security using the **Sign In Using Identity Provider** button.

> **Note:** Tenable Enclave Security does not support Microsoft Active Directory Lightweight Directory Services (AD LDS) servers for LDAP authentication.

> **Note:** Tenable Enclave Security cannot retrieve more than one page of LDAP results. If Tenable Enclave Security asset list or user authentication queries are not retrieving all expected results, consider modifying your LDAP pagination control settings to increase the results per page.

SAML Authentication

You can configure SAML authentication so that Tenable Enclave Security users can use identity provider-initiated single sign-on (SSO) when logging in to Tenable Enclave Security. Tenable Enclave Security supports SAML 2.0-based authentication (for example, Okta, OneLogin, Microsoft ADFS, or Shibboleth 2.0).

After you configure SAML authentication, create Tenable Enclave Security user accounts for each SAML user you want to grant access.

Then, users with SAML-authenticated accounts can log in to Tenable Enclave Security using the **Sign In Using Identity Provider** button.

System Logs

To view your system logs, in the top navigation, click **Settings & Information** > **System Logs**.

Tenable Enclave Security logs contain detailed information about functionality to troubleshoot unusual system or user activity. You can use the system logs for debugging and maintaining an audit trail of users who access Tenable Enclave Security or perform basic functions (for example, changing passwords).

Licenses

The **Licenses** page displays your license details and expiration. For information about licensing in Tenable Enclave Security, see License Requirements.

When you obtain a license for Tenable Enclave Security, you will receive an activation code.

Your activation code:

- is a one-time code, unless your license or subscription changes, at which point Tenable issues you a new activation code.
- must be used with the Tenable Enclave Security installation within 24 hours.
- cannot be shared between Tenable Enclave Security deployments.
- is not case-sensitive.
- is required to manage Tenable Enclave Security offline.

License Status and Product Tile Visibility

When your Tenable Enclave Security license enters a locked or expired state, product tile availability changes:

- **License exceeded (locked)** – Tenable Enclave Security hides the Security Center tile for non-administrator users because Security Center does not allow scan imports when the license is locked. The Tenable Container Security tile remains visible because Tenable Container Security continues to allow deployment assessment scans for existing images.
- **License expired** – Tenable Enclave Security hides the Tenable Container Security tile.

Download Tenable Enclave Security License Key

For instructions on how to download the Tenable Enclave Security license key, see Download License Key in the *Tenable Account Management guide*.

License Tenable Enclave Security Online

When you obtain your license, upload the license file to the Tenable Enclave Security user interface.

To upload a license file to Tenable Enclave Security:

1. Log in to Tenable Enclave Security via the user interface with an administrator user account.
2. In the top navigation, click ⚙ **Settings & Information** > **Licenses**.

   The **License Configuration** page appears.
3. Click the **License file** box.

   -or-

   Click **Upload**.

   A file explorer window appears.
4. In the file explorer window, select your license file.

   Your Tenable Enclave Security license is uploaded.

License Tenable Enclave Security Offline

If you want to register an offline Tenable Enclave Security deployment with a license, use the following procedure.

To manage Tenable Enclave Security offline, you need two computers: the Tenable Enclave Security deployment, which is not connected to the internet, and another computer that is connected to the internet.

To register an offline Tenable Enclave Security server's license:

1. Download and copy the license file on a system *with* internet access. Then, download and copy the license to the offline system running Tenable Enclave Security.
2. Register your license on the offline system running Tenable Enclave Security.

Configuration

Required User Role: Administrator

To view your configuration settings, in the top navigation, click ⚙ **Settings & Information** > **Miscellaneous** > **Configuration**.

Mail

The **Mail Configuration** page displays SMTP settings for all email-related Tenable Enclave Security functions. Click the **Test SMTP Settings** button to validate the settings.

Option	Description	Default
Host	The SMTP server host.	--
Port	The SMTP server port.	--
Authentication Method	The authentication method Tenable Enclave Security uses to connect to the SMTP server: • **None** - Tenable Enclave Security does not authenticate the connection.	--

Option	Description	Default
	• **Login** - Tenable Enclave Security secures the connection with login authentication. • **Plain** - Tenable Enclave Security secures the connection with plain (username/password) authentication. • **CRAM-SHA1** - Tenable Enclave Security secures the connection with CRAM-SHA1 authentication. • **CRAM-MD5** - Tenable Enclave Security secures the connection with CRAM-SHA1 authentication.	
Username	The username that Tenable Enclave Security uses to authenticate to the SMTP server. **Note:** Type the **Username** in a format supported by your SMTP server (for example, *username@domain.com* or *domain\username*).	--
Password	The password that Tenable Enclave Security uses to authenticate to the SMTP server.	--
Encryption	The email encryption type: • **None** - Tenable Enclave Security does not encrypt the email. • **TLS** - Tenable Enclave Security forces TLS encryption for the email. • **SSL** - Tenable Enclave Security forces SSL encryption for the email. • **TLS, if available** - Tenable Enclave Security uses	--

Option	Description	Default
	TLS encryption if the receiving server is compatible.	
Return Address	The email address that appear as the sender in the scan results email. **Note:** Use a valid return email address for this option. If this option is empty or the email server requires emails from valid accounts, the email server cannot send the email.	--
Verify Peer	When enabled, Tenable Enclave Security requests peer verification for SMTP servers using SSL or TLS connections.	disabled
Verify Peer Name	When enabled, Tenable Enclave Security requests peer name verification for SMTP servers using SSL or TLS connections.	disabled
Allow Self Signed Certificates	When enabled, Tenable Enclave Security allows connections to the SMTP server using self-signed SSL certificates.	enabled

Miscellaneous

The **Miscellaneous Configuration** page displays options for the web proxy and syslog forwarding.

Web Proxy

Use these settings to configure a web proxy.

Option	Description	Default
Host	The host URL (proxy hostname or IP address) of the web proxy server. The hostname used must resolve properly from the Tenable Enclave Security host.	--
Port	The port of the web proxy server.	--
Authentication Type	The authentication type Tenable Enclave Security uses to connect to the web proxy server. Select one of the following: • **Basic** - Tenable Enclave Security uses basic authentication, which encodes the username and password with Base64. • **NTLM** - Tenable Enclave Security uses NTLM authentication.	--
Username	The username that Tenable Enclave Security uses to authenticate to the web proxy server.	--
Password	The password that Tenable Enclave Security uses to authenticate to the web proxy server.	--

Syslog

Use these settings to allow Tenable Enclave Security to send administrative log events to the local syslog service.

Option	Description	Default
Enable Forwarding	Enables log forwarding options.	disabled
Facility	Type the facility you want to receive the log messages.	*LOG_USER*
Severity	Specifies which syslog message levels you want to forward: **Informational**, **Warning**, or **Critical**.	Informational

License

The **License Configuration** page displays your license details, usage, and expiration dates. For information about licensing in Tenable Enclave Security, see Licenses.

Plugins / Feed

The **Plugins/Feed Configuration** page displays the Plugin Detail Locale for Tenable Enclave Security and the feed and plugin update schedules.

Plugin Detail Locale

The local language plugin feature allows you to display portions of plugin data in local languages. When available, translated text displays on all pages where plugin details appear.

Select **Default** to display plugin data in English.

Note: Tenable Enclave Security cannot translate text within custom files. Upload a translated **Active Plugins.**`xml` file to display the file content in a local language.

For more information, see Configure Plugin Text Translation.

Schedules

Tenable Enclave Security automatically updates Tenable Enclave Security feeds, active plugins, passive plugins, and event plugins. If you upload a custom feed or plugin file, the system merges the custom file data with the data contained in the associated automatically updating feed or plugin.

You can upload `tar.gz` files with a maximum size of 1500 MB.

Update	Description
Tenable Security Center Feed	Retrieves the latest Tenable Security Center feed from Tenable. This feed includes data for general use, including templates (for example, dashboards, ARCs, reports, policies, assets, and audit files), template-required objects, some general plugin information, and updated VPR values.
Active Plugins	Retrieves the latest active plugins feed (for Tenable Nessus and Tenable One Vulnerability Management scanners) from Tenable. Tenable Security Center pushes the feed to Tenable Nessus and Tenable One Vulnerability Management scanners.
Passive Plugins	Retrieves the latest passive plugins feed from Tenable. Tenable Security Center pushes the feed to Tenable Network Monitor instances.
Event Plugins	Retrieves the latest event plugins feed from Tenable. Tenable Security Center uses the feed locally with Tenable Log Correlation Engine data but does not push the feed to Tenable Log Correlation Engine; Tenable Log Correlation Engine retrieves the feed directly from Tenable.
WAS Plugins	Retrieves the latest Tenable One Web App Scanning plugins from Tenable. Tenable Security Center pushes the feed to Tenable One Web App Scanning instances.
TVDL Plugins	Retrieves the latest Tenable Container Security plugins from Tenable.

For more information, see Edit Plugin and Feed Settings and Schedules.

Security

Use the Security section to define the Tenable Enclave Security user interface login parameters and options for account logins. You can also configure banners, headers, and classification headers and footers.

Option	Description	Default
Session Timeout	The web session timeout in minutes.	*60*
Maximum Login Attempts	The maximum number of user login attempts Tenable Enclave Security allows before locking out the account. To disable this feature, set the value to *0*.	*20*
Minimum Password Length	This setting defines the minimum number of characters for passwords of accounts created using the local TNS authentication access.	*3*
Password Complexity	When enabled, user passwords must be at least 4 characters long and contain at least one of each of the following: • An uppercase letter • A lowercase letter • A numerical character • A special character **Note:** After you enable **Password Complexity**, Tenable Enclave Security prompts all users to reset their passwords the next time they log in to Tenable Enclave Security.	disabled

Option	Description	Default
	Note: If you enable **Password Complexity** and set the **Minimum Password Length** to a value greater than 4, Tenable Enclave Security enforces the longer password requirement.	
Startup Banner Text	Type the text banner that appears before to the login interface.	--
User Text	Adds custom text to the bottom of the user profile menu. You can use the text to identify a company, group, or other organizational information (maximum 128 characters).	--
Classification Type	Adds a header and footer banner to Tenable Enclave Security to indicate the classification of the data accessible via the software. The options are **None**, **Custom, Unclassified**, **Confidential**, **Secret**, **Top Secret**, and **Top Secret - No Foreign**. If you select **Custom**, the following options appear: • **Custom Text** - Type the text that you want to appear in the banner (maximum 128 characters). • **Text Color** - Select the text color for the banner. • **Background Color** - Select the background color for the banner. **Note:** Custom banners in reports are supported only for Arial Regular font. **Note:** If you set **Classification Type** to an option other than **None**, users can only see the plain report styles. The	None

Option	Description	Default
	Tenable report styles do not support the classification banners.	
Allow API Keys	When enabled, allows users to generate API keys as an authentication method for Tenable Enclave Security API requests. For more information, see Enable API Key Authentication.	disabled
Allow Session Management	When enabled, allows administrators to set a session limit for all users.	disabled
Session Limit	Specifies the maximum number of sessions a user can have open at once. If you log in and the session limit has already been reached, Tenable Enclave Security notifies you that the oldest session with that username will be logged out automatically. You can cancel the login or proceed with the login and end the oldest session. **Note:** This behavior is different for Common Access Cards (CAC) logins. Tenable Enclave Security does not check active sessions for CAC authentication.	*7*
Disable Inactive Users	When enabled, Tenable Enclave Security disables user accounts after a set period of inactivity. You cannot use a disabled user account to log in to Tenable Enclave Security, but other users can use and manage objects owned by the disabled user account.	disabled
Days Users	When you enable **Disable Inactive Users**, specify the	*90*

Option	Description	Default
Remain Enabled	number of inactive days you want to allow before automatically disabling a user account.	
Login Notifications	Sends notifications for each successful and failed login.	

Edit Plugin and Feed Settings and Schedules

> **Required User Role:** Administrator

For more information, see Configuration.

To view and edit plugin and feed settings and schedules:

1. Log in to Tenable Enclave Security via the user interface.
2. In the top navigation, click ⚙ **Settings & Information** > **Miscellaneous** > **Configuration**.

   The **Configuration** page appears.
3. Click the **Plugins/Feed** tile.

   The **Plugins/Feed Configuration** page appears.
4. View the **Plugin Detail Locale** section to see the local language configured for Tenable Enclave Security.
5. Expand the **Schedules** section to show the settings for the plugin feed schedules. For more information about plugin feed schedules, see Schedules.
   a. If you want to update a plugin or feed on demand, click **Update**. You cannot update feeds with invalid activation codes.
      - If there is an update available, the **Update** link will be active.
      - If your plugins or feed are already up to date, the **Update** link will be inactive.
   b. If you want to download the plugins, click **Offline Download Link**.

c. If you want to upload a custom feed file, click **Choose File**.

d. Click **Submit**.

Tenable Enclave Security saves your configuration.

Configure Plugin Text Translation

> **Required User Role:** Administrator

For more information, see Configuration.

To configure plugin text translation:

1. Log in to Tenable Enclave Security via the user interface.
2. In the top navigation, click **Settings & Information** > **Miscellaneous** > **Configuration**.

   The **Configuration** page appears.
3. Click the **Plugins/Feed** tile.

   The **Plugins/Feed Configuration** page appears.
4. If you want plugin text to display in a local language, select a language from the **Locale List** box.
5. Click **Apply**.

   Tenable Enclave Security saves your configuration.
6. In the **Schedules** section, in the **Active Plugins** row, click **Update**.

   Tenable Enclave Security updates active plugins to obtain available translations.

API Key Authentication

You can enable API key authentication to allow users to use API keys as an authentication method for Tenable Enclave Security API requests. Without API keys, users must use the `/token` endpoint to log in to the Tenable Enclave Security API and establish a token for subsequent requests.

Tenable Enclave Security attributes actions performed with API keys to the user account associated with the API keys. You can only perform actions allowed by the privileges granted to the user account associated with the API keys.

You can enable the **Allow API Keys** toggle in your Security Settings to allow users to perform API key authentication. Then, users can generate API keys for themselves or for other users. API keys include an access key and secret key that must be used together for API key authentication. For more information, see Enable API Key Authentication and Generate API Keys.

Deleting API keys prevents users from authenticating Tenable Enclave Security API requests with the deleted keys. For more information, see Delete API Keys.

Enable API Key Authentication

You can enable API key authentication to allow users to use API keys as an authentication method for Tenable Enclave Security API requests. For more information, see API Key Authentication.

To allow users to authenticate to the Tenable Enclave Security API using API keys:

1. Log in to Tenable Enclave Security via the user interface.
2. In the top navigation, click **Settings & Information** > **Miscellaneous** > **Configuration**.

   The **Configuration** page appears.
3. Click the **Security** tile.

   The **Security Configuration** page appears.
4. In the **Authentication Settings** section, enable **Allow API Keys**.
5. Click **Submit**.

   Tenable Enclave Security saves your configuration.

What to do next:

- Generate API keys for a user, as described in Generate API Keys.

Generate API Keys

API keys allow you to authenticate as a specific user for Tenable Enclave Security API requests. Administrators can generate API keys for any user account. Other roles can generate API keys for user accounts with the same role. For more information, see API Key Authentication.

Note: If you generate API keys for a user that already has API keys, the old keys will be replaced. If you delete existing keys or generate new API keys for a user, Tenable Enclave Security deauthorizes API requests attempted with the old keys.

Before you begin:

- Enable API keys to allow users to perform API key authentication, as described in Enable API Key Authentication.

To generate API keys:

1. Log in to Tenable Enclave Security via the user interface.
2. In the top navigation, click **Settings & Information** > **Access Control** > **Users**.

   The **Users** page appears.
3. Right-click the row for the user for which you want to generate an API key, and click **Generate API Key**.

   -or-

   Select the check box for the user for which you want to generate an API key, and click **API Keys** > **Generate API Key**.

   A confirmation window appears.
4. Click **Generate**.

   The **Your API Key** window appears, displaying the access key and secret key for the user.
5. Save the API keys in a safe location.

   Note: You cannot view API secret keys in the Tenable Enclave Security interface after initial generation. If you lose your existing secret key, you must generate new API keys.

Delete API Keys

After you delete a user's API keys, the deleted keys cannot be used for authentication in Tenable Enclave Security API requests. To generate new API keys for a user, see Generate API Keys. For more information, see API Key Authentication.

To delete API keys:

1. Log in to Tenable Enclave Security via the user interface.
2. Click **Users** > **Users**.

   The **Users** page appears.
3. Right-click the row for the user for which you want to delete API keys, and click **Delete API Key**.

   -or-

   Select the check box for the user for which you want to delete API keys, and click **API Keys** > **Delete API Key**.

   A confirmation window appears.
4. Click **Delete**.

   The system deletes the API keys.

Diagnostics

This page displays and creates information that assists in troubleshooting issues that may arise while using Tenable Enclave Security.

To view your diagnostics settings, in the top navigation, click **Settings & Information** > **Miscellaneous** > **Diagnostics**.

System Status

You can use this section to view the current status of system functions.

System Function	Description
Correct Java Version	Indicates whether the minimum version of Java required to support Tenable Enclave Security functionality is installed.
Sufficient Disk Space	Indicates whether you have enough disk space to support Tenable Enclave Security functionality. A red X indicates the disk is at 95% capacity or higher. For more information, see Tenable Enclave Security System Requirements.
Correct RPM Package Installed	Indicates whether you have the correct Tenable Enclave Security RPM installed for your operating system. For more information, see Tenable Enclave Security System Requirements.
Debugging	Indicates whether debugging is enabled. You may experience performance and storage issues if you leave debugging enabled for extended periods of time. For more information, see Debugging Logs.
Migration Errors	Indicates whether an error occurred during a recent Tenable Enclave Security update.
PHP Integrity Errors	Indicates whether any PHP files have been modified from the original version included in the Tenable Enclave Security RPM.

Diagnostics File

You can use this section to generate a diagnostics file for troubleshooting with Tenable Support.

Debugging Logs

You can use this section to enable or disable debugging logs for troubleshooting with Tenable Support.

> **Note:** Tenable does not recommend leaving debugging enabled on Tenable Enclave Security after you send the log files to Tenable Support. You may experience performance and storage issues if you leave debugging enabled for extended periods of time.

Download Debugging Logs

You can use this section to download your debugging logs for troubleshooting with Tenable Support.

Job Queue

To view your job queue, in the top navigation, click ⚙ **Settings & Information** > **Miscellaneous** > **Job Queue**.

The job queue displays a list of Tenable Enclave Security events for review.

To view details for a job, click the row for the job.

If the job is running, you can right-click the row for the job and click **Kill** to stop the process. Avoid killing a job unless absolutely necessary, as killing a job may have undesirable effects on other Tenable Enclave Security processes.

Publishing Sites

To view your publishing sites, in the top navigation, click ⚙ **Settings & Information** > **Miscellaneous** > **Publishing Sites**.

You can configure publishing sites as targets to send report results to a properly configured web server or a Defense Information Systems Agency (DISA) Continuous Monitoring and Risk Scoring (CMRS) site.

Option	Description
Name	Type a name for the publishing site.
Description	Type a description of the publishing site.
Type	The method Tenable Enclave Security uses to publish to the site.
URI	The target address to send the report to when completed.
Use Proxy	When enabled, the publishing site leverages the web proxy defined in the Web Proxy settings.
Authentication	There are two methods of authentication available: **SSL Certificate** and **Password**.
Username	If you select **Password** as the **Authentication** method, the username to authenticate to the target publishing server.
Password	If you select **Password** as the **Authentication** method, the password to authenticate to the target publishing server.
Certificate	If you selected **SSL Certificate** as the **Authentication** method, the certificate you want to use for authentication.
Organizations	Select the organization(s) that are allowed to publish to the configured site.
Verify Host	When enabled, Tenable Enclave Security verifies that the target address specified in the **URI** option matches the CommonName (CN) in the SSL certificate from the target publishing server.

Security Center in Tenable Enclave Security

To access Security Center in Tenable Enclave Security, in the top navigation bar, click **Workspaces** > **Security Center**.

For Security Center CPU, memory, and disk space requirements, see Security Center in Tenable Enclave Security System Requirements.

For instructions on how to perform tasks in Tenable Security Center, see the Tenable Security Center user guide.

> **Note:** Security Center in Tenable Enclave Security does not support Tenable Log Correlation Engine.

Tenable Container Security in Tenable Enclave Security

To access Tenable Container Security in Tenable Enclave Security, in the top navigation bar, click **Workspaces** > Tenable Container Security.

For Tenable Container Security CPU, memory, and database requirements, see Tenable Container Security in Tenable Enclave Security System Requirements.

For instructions on how to perform tasks in Tenable Container Security, see the Tenable Container Security user guide.

Reporting

To view the **Reports** page, in the top navigation bar, click **Workspaces** > **Reporting**. You can run four reports simultaneously in Tenable Enclave Security.

For more information about reporting, see Reports in the *Tenable Security Center user guide*.

Additional Resources

The topics in this section offer guidance in areas related to Tenable Enclave Security.

Tenable Enclave Security Troubleshooting and FAQs

Check Container Logs and Pod Status for Security Center

Upgrade Issues

License Issues

Delete high-priority PriorityClass

Access Tenable Security Center Backend

Tenable Enclave Security Troubleshooting and FAQs

Check Container Logs and Pod Status for Security Center

Check the install container logs

Run the following command to check the install container logs:

```
kubectl logs -c sc-install-container tenable-security-center-0 -n tenable
```

If successful, the output looks like this:

```
Security Center install proceeding...
Verifying...                        ########################################
Preparing...                        ########################################
.
.
```

```
Security Center install container complete, ready for runtime container.
```

Check the runtime container logs

Run the following command to check the runtime container logs:

```
kubectl logs -c sc-runtime-container tenable-security-center-0 -n tenable
```

If successful, the output looks like this:

```
Replacing System RPM database with persistent backup
Checking for SecurityCenter upgrade in progress:
Checking for active migration:
Installing software updates if availableStarting SecurityCenter services: [  OK  ]
```

Check the pod status

Run the following command to check the pod status:

```
kubectl get all -n tenable
```

If successful, the output looks like this:

```
NAME                              READY     STATUS    RESTARTS    AGE
pod/tenable-security-center-0     1/1       Running   0           4h4m

NAME                 TYPE           CLUSTER-IP      EXTERNAL-IP
        PORT(S)          AGE
service/tenable-sc   LoadBalancer   172.00.00.000   k8s-tenable-security-
center.amazonaws.com   443:12345/TCP   4h4m

NAME                                    READY   AGE
```

```
statefulset.apps/tenable-security-center   1/1     4h4m
```

Note: This output is an example of an AWS environment. Your output may vary depending on your AWS and IP ranges, but the Status should be *Running*.

Upgrade Issues

Fix "another operation is in progress" Error During Upgrade

If the new pod does not appear and the **`tes-operator`** logs display the following message when you update the Tenable Enclave Security version:

```
2025/06/25 16:02:02 another operation (install/upgrade/rollback) is in progress
```

This can occur when some of the Helm Charts did not upgrade correctly. To fix the issue, roll back the **`tes`** sub-chart with the following steps:

1. List the charts with the following command:

   ```
   helm list -n tenable-enclave-security -a
   ```

2. If the tes chart is stuck in a pending upgrade, roll back the chart with the following command:

   ```
   helm rollback -n tenable-enclave-security tes
   ```

Security Center pod fails to start after upgrade with "Error starting Jobd.php"

When you upgrade Tenable Enclave Security, the Security Center pod may fail to start and log the following error:

```
Error starting Jobd.php[FAILED]
```

To resolve this issue, complete the following steps:

1. Open a shell session inside the Tenable Security Center pod:

```
kubectl exec -it -c sc-runtime-container tenable-security-center-0 -n <namespace> -- /bin/sh
```

2. Create the `force-upgrade` flag file:

```
touch /opt/sc/.forceUpgrade
```

3. Exit the shell and delete the pod to trigger a restart:

```
kubectl delete pod tenable-security-center-0 -n <namespace>
```

Kubernetes restarts the pod automatically. The upgrade process resumes and the error does not recur.

License Issues

tes-operator logs displaying invalid license error

If the **`tes-operator`** logs display the following error when interpreting the license:

```
2025/07/09 03:29:29 Signature for license is valid.
Interpreting license in key format.
Invalid license:  unexpected end of JSON input
```

This can occur when the license secret is not applied correctly. Refer to step 5 in the Tenable Enclave Security install instructions to ensure that you are applying the license correctly with the expected key.

New license is applied correctly, but not taking effect

Tenable Enclave Security watches for license updates, but if you correctly updated the license in the secret and the license is not taking effect, you can force the operator to pick up the new license by restarting the operator.

1. Get the **`tes-operator`** pod name with the following command:

   ```
   kubectl get po -n tenable-enclave-security
   ```

2. Delete the tes-operator pod with the following command:

   ```
   kubectl delete po -n tenable-enclave-security tes-operator-XXXX
   ```

Delete `high-priority` PriorityClass

Starting in Tenable Enclave Security version 1.9, scan and TVDL pods no longer use the `high-priority` PriorityClass that was introduced in version 1.6. The PriorityClass has no effect on your deployment, but you can remove it to clean up unused cluster resources.

To delete the `high-priority` PriorityClass:

1. Confirm the PriorityClass exists:

   ```
   kubectl get priorityclass high-priority
   ```

2. Run the following command to verify it is the correct PriorityClass by checking its description:

   ```
   kubectl get priorityclass high-priority -o yaml | grep -A 2 description
   ```

   The output must include the following phrase: `Scan and TVDL services to reduce eviction`

3. Delete the PriorityClass:

```
kubectl delete priorityclass high-priority
```

4. Run the following command to confirm the system removed the PriorityClass:

   ```
   kubectl get priorityclass
   ```

   The `high-priority` PriorityClass no longer appears in the list.

Access Tenable Security Center Backend

You may need to access the Tenable Security Center Kubernetes runtime container for advanced troubleshooting or to perform maintenance tasks that require command line acess. This includes manually starting, stopping, or restarting services, executing backup and restore operations, or collecting log files or configuration data.

To log in to the Kubernetes runtime container, use the following command:

```
kubectl exec -it -n tenable tenable-security-center-0 -c sc-runtime-container  -- /bin/bash
```