

Cisco NFVIS ThousandEyes Support

Table 1: Feature History

Feature Name	Release Information	Description
Cisco NFVIS ThousandEyes Support	Cisco NFVIS Release 4.15.2	This feature adds support to deploy and operate Cisco ThousandEyes as a container using Cisco NFVIS. Download the NFVIS ThousandEyes agent container image from ThousandEyes, and deploy the ThousandEyes container to leverage ThousandEyes related technologies within Cisco NFVIS. This feature also adds support for ThousandEyes Docker Container Upgrade using the NFVIS VM Lifecycle Workflow. It also introduces support for using new NFVIS-specific Docker images provided by ThousandEyes.
Cisco NFVIS ThousandEyes Support	Cisco NFVIS Release 4.15.3	This feature allows upgrading the NFVIS ThousandEyes agent container image directly from the Cisco NFVIS web portal. You can choose from registered images or upgrade to new images.

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Information About Cisco NFVIS ThousandEyes Support

Starting from Cisco NFVIS Release 4.15.2, Cisco NFVIS supports Cisco ThousandEyes to provide a pre-integrated solution that allows deploying ThousandEyes Enterprise Agents as a container on Cisco NFVIS. This enables running ThousandEyes network monitoring and testing capabilities directly on your Cisco NFVIS infrastructure. The feature provides visibility into the performance of the underlying network infrastructure.

Cisco NFVIS also supports ThousandEyes Docker Container Upgrade using existing VM lifecycle workflow. The VM lifecycle allows seamless image updates on the existing ThousandEyes Container deployment. Additionally, ThousandEyes has released NFVIS specific Docker container images with install type as NFVIS. You must specify the nfvis.docker ThousandEyes container image download URL in the update deployment request. NFVIS will then download the image and complete the upgrade of existing container to the specified image.

Benefits of Cisco NFVIS ThousandEyes Support

- Gain end-to-end visibility into the performance of your network infrastructure, including cloud providers, WAN links, and internal data center networks within Cisco NFVIS providing end-to-end visibility into network performance.
- Reduce mean time to resolution (MTTR) for network issues, improve network reliability, and optimize application performance.

Prerequisities For Cisco NFVIS ThousandEyes Support

- Ensure that the minimum software version for Cisco NFVIS devices is Cisco NFVIS Release 4.15.2.
- Ensure that your devices are meeting the minimum hardware requirements. For more information on the minimum hardware requirements see, Enterprise Agent System Requirements in the ThousandEyes documentation.
- Configure nameservers on your Cisco NFVIS devices to enable the download of the ThousandEyes Docker image from downloads.thousandeyes.com.

Restrictions For Cisco NFVIS ThousandEyes Support

- Starting with Cisco NFVIS Release 4.15.2, use the ThousandEyes Enterprise Agent Docker images recommended by the ThousandEyes dashboard install page.
- Deployment of ThousandEyes on Cisco NFVIS is only supported as a Docker container, not as a Virtual Machine .

Deploy ThousandEyes on Cisco NFVIS

ThousandEyes can be installed using the NFVIS web interface. Alternatively, you can use the command-line option found in the ThousandEyes documentation for installation.

Deploy ThousandEyes Container from NFVIS Web Interface

Download the latest **ThousandEyes** container image file from **Add New Enterprise Agent** dialog.

Upload the **ThousandEyes** container image file to the Cisco NFVIS and register the image. For more information on uploading and registering the image files see, Uploading VM Images to an NFVIS Server and Registering NFVIS Container Image.

Use the following steps to deploy ThousandEyes VM:

1. In Cisco NFVIS portal, click **Configuration** > **Deploy**.
2. In the **Select VM or Container** menu, click **TE** and the ThousandEyes node is displayed inside the topology.
3. Configure the following fields in the **VM Details** window.

Field	Description
VM Name	Enter the container's name.
Image	Choose the registered **thousandeyes.docker** image from the drop-down or click + button to add a new image.
Profile	Choose the profile for the ThousandEyes agent from the drop-down or click the + button to add a new profile. For more information, see Enterprise Agent System Requirements for agent without browser-bot version.
Group Name	(Optional) Choose a group name from the drop-down list.
Deployment Disk	Choose a deployment disk from the drop-down. **Note** Do not choose NFS Store as a deployment disk from the drop-down.
Add Bootstrap Config	Add bootstrap config data in the explanded **Add Bootstrap Config** pane. Check the **Is External File Path** check box if your bootstrap file path is from an external source.
Add Config Options	Add the additional configuration in the expanded **Add Config Options** pane. Choose the **Config Option Name**, Enter the **Config Option Value** after = in the pre-populated config option value. For example, TEAGENT_INET=4
Add Volume	Volume required to enable ThousandEyes on Cisco NFVIS are pre-populated with the minimum required volume. You can add or remove volumes based on your requirement.

Field	Description
Remove Volume	You can remove volumes based on your requirement.
Exclude Disks from Export	Not supported by ThousandEyes.

4. Click **Deploy**.

Upgrade ThousandEyes Agent Container from NFVIS Web Interface

Starting from Cisco NFVIS Release 4.15.3, you can upgrade the NFVIS ThousandEyes agent container image directly from the Cisco NFVIS web portal. Use the **Upgrade** icon to perform the upgrade from the **Manage Deployments** page.

Registered Image

Follow these steps to upgrade a registered image using the NFVIS web interface:

1. From Cisco NFVIS portal, click **Configuration** > **Virtual Machine** > **Manage**.
2. Click the **Upgrade** icon.
3. Choose the image from a drop-down list, displays all previously registered images.
4. Click **Submit** to upgrade your existing configuration to the selected image.

New Image

Follow these steps to upgrade using a new image from the NFVIS web interface:

1. From Cisco NFVIS portal, click **Configuration** > **Virtual Machine** > **Manage**.
2. Click the **Upgrade** icon.
3. Click **New Image**.
4. Choose a protocol.

Field	Description
HTTPS	The server path is prefilled. Enter the image name.
Docker	The repository name is prefilled. Enter the tag name of the Docker image.

5. Click **Submit** to register your new image.

Deploy ThousandEyes Container on NFVIS Using CLI Configs

Execute the following steps to deploy ThousandEyes Container on NFVIS using the CLI:

1. Register the ThousandEyes Docker Image

Note The URL in **src** is provided by **Add New Enterprise Agent dialog**.

```
vm_lifecycle images image thousandeyes-enterprise-agent-0.33.0
 src
https://downloads.thousandeyes.com/enterprise-agent/thousandeyes-enterprise-agent-0.33.0-nfvis.docker

 locator vim_id container
 properties property vnf_type
  value THOUSANDEYES
 !
!
```

2. Configure Resource Details as a Flavor

```
vm_lifecycle flavors flavor thousandeyes-flavor vcpus 2 memory_mb 1024 root_disk_mb 20480
!
```

3. Deploy the ThousandEyes Agent Container

```
vm_lifecycle tenants tenant admin
 deployments deployment TE_DEMO
  vm_group TE_DEMO
   vim_vm_name  TE_DEMO
   locator vim_id container
   image       thousandeyes-enterprise-agent-0.33.0
   flavor      thousandeyes-flavor
   bootup_time -1
   config_data configuration bootstrap_config
    data            "{ \"env_variables\" : { \"TEAGENT_ACCOUNT_TOKEN\" :
\"${TEAGENT_ACCOUNT_TOKEN}\", \"TEAGENT_INET\" : \"${TEAGENT_INET}\"} }"
    template_engine VELOCITY
    variable TEAGENT_ACCOUNT_TOKEN
     val [ 53rettywagbuouhw06hu65767rtyuyyui ]
    !
    variable TEAGENT_INET
     val [ 4 ]
   !
  !
 !
```

4. Commit the configuration.

Upgrade ThousandEyes Agent Container Using the CLI

To upgrade the ThousandEyes agent container using CLI configurations, you have two main options:

Option 1: Register and Update the Image

1. Register the New Docker Image

   Use the following command to register the newer version of the ThousandEyes agent Docker image:

```
vm_lifecycle images image thousandeyes-enterprise-agent-0.34.0
 src
https://downloads.thousandeyes.com/enterprise-agent/thousandeyes-enterprise-agent-0.34.0-nfvis.docker

 locator vim_id container
 properties property vnf_type
  value THOUSANDEYES
 !
!
```

2. Update the Container Deployment Configuration

   Update the existing container deployment to use the newly registered image:

```
vm_lifecycle tenants tenant admin
 deployments deployment TE_DEMO
  vm_group TE_DEMO
   vim_vm_name  TE_DEMO
   locator vim_id container
   image       thousandeyes-enterprise-agent-0.34.0
 !
```

3. Commit the configuration.

   NFVIS will handle downloading the image and upgrading the container.

Option 2: Direct Image URL Update

You can skip the image registration step by directly providing the ThousandEyes agent container image URL. NFVIS will automatically download the image, register it with Docker, and upgrade the container to the specified image.

```
vm_lifecycle tenants tenant admin
 deployments deployment TE_DEMO
  vm_group TE_DEMO
   vim_vm_name  TE_DEMO
   locator vim_id container
   image
https://downloads.thousandeyes.com/enterprise-agent/thousandeyes-enterprise-agent-0.34.0-nfvis.docker

 !
```

Proxy Configuration

If your NFVIS is behind a proxy, ensure to configure these proxy settings. For more information, see Configuring an Enterprise Agent to Use a Proxy Server for other ThousandEyes Agent environment variables.

1. Image Registration with Proxy

```
vm_lifecycle images image thousandeyes-enterprise-agent-0.34.0
 src
https://downloads.thousandeyes.com/enterprise-agent/thousandeyes-enterprise-agent-0.34.0-nfvis.docker

 locator vim_id container
 properties property vnf_type
  value THOUSANDEYES
 !
 properties property http_proxy
  value [ http://proxy.com ]
 !
 properties property https_proxy
  value [ http://proxy.com ]
 !
 properties property no_proxy
  value [ .cisco.com,10.1.1.1 ]
 !
!
```

2. Deployment Configuration with Proxy

```
vm_lifecycle tenants tenant admin
 deployments deployment TE_DEMO
  vm_group TE_DEMO
   vim_vm_name  TE_DEMO
```

```
   locator vim_id container
   image       thousandeyes-enterprise-agent-0.33.0
   flavor      thousandeyes-flavor1
   bootup_time -1
   config_data configuration bootstrap_config
    data            "{ \"env_variables\" : { \"TEAGENT_ACCOUNT_TOKEN\" :
\"${TEAGENT_ACCOUNT_TOKEN}\", \"TEAGENT_INET\" : \"${TEAGENT_INET}\", \"http_proxy\" :
\"${http_proxy}\", \"https_proxy\" : \"${https_proxy}\", \"no_proxy\" : \"${no_proxy}\"}
 }"
    template_engine VELOCITY
    variable TEAGENT_ACCOUNT_TOKEN
     val [ your token goes here ]
    !
    variable TEAGENT_INET
     val [ 4 ]
    !
    variable http_proxy
     val [ http://proxy.com:80/ ]
    !
    variable https_proxy
     val [ http://proxy.com:80/ ]
    !
    variable no_proxy
     val [ .cisco.com,10.1.1.1 ]
    !
  !
 !
```

Deploy ThousandEyes Container on NFVIS Using NETCONF

These NETCONF payloads are examples that can be sent to NFVIS via a NETCONF client to manage the lifecycle of the Cisco ThousandEyes Container



Note Ensure you merge these payloads into the existing configuration to avoid deleting other configurations. Refer to your NETCONF client documentation for merging procedures.

Image Registration

1. From Docker Hub

```
<?xml version="1.0"?>
<vm_lifecycle xmlns="http://www.cisco.com/nfvis/vm_lifecycle">
  <images>
    <image>
      <name>te_latest</name>
      <src>docker://thousandeyes/enterprise-agent:latest-agent</src>
      <credentials>
        <username>${DOCKER_USERNAME_HERE}</username> <!--Credentials are optional-->
        <password>${DOCKER_PAT}</password>
      </credentials>
      <properties>
        <property>
         <name>http_proxy</name> <!--Proxies are optional and depend on your topology-->

          <value>http://example.com:80/</value>
        </property>
        <property>
          <name>https_proxy</name>
          <value>http://example.com:80/</value>
        </property>
```

```
        <property>
          <name>vnf_type</name>
          <value>THOUSANDEYES</value>
        </property>
      </properties>
      <locator>
        <vim_id>container</vim_id>
      </locator>
    </image>
  </images>
</vm_lifecycle>
```

2. From ThousandEyes Webserver

```
<?xml version="1.0"?>
<vm_lifecycle xmlns="http://www.cisco.com/nfvis/vm_lifecycle">
  <images>
    <image>
      <name>te_latest</name>

<src>https://downloads.thousandeyes.com/enterprise-agent/thousandeyes-enterprise-agent-0.34.0-nfvis.docker</src>

      <properties>
        <property>
         <name>http_proxy</name> <!--Proxies are optional and depend on your topology-->

          <value>http://example.com:80/</value>
        </property>
        <property>
          <name>https_proxy</name>
          <value>http://example.com:80/</value>
        </property>
        <property>
          <name>vnf_type</name>
          <value>THOUSANDEYES</value>
        </property>
      </properties>
      <locator>
        <vim_id>container</vim_id>
      </locator>
    </image>
  </images>
</vm_lifecycle>
```

Flavor Registration

```
<?xml version="1.0"?>
<vm_lifecycle xmlns="http://www.cisco.com/nfvis/vm_lifecycle">
  <flavors>
    <flavor>
      <name>TE</name>
      <vcpus>2</vcpus>
      <memory_mb>1024</memory_mb>
      <root_disk_mb>8192</root_disk_mb>
    </flavor>
  </flavors>
</vm_lifecycle>
```

Deployment

```
<?xml version="1.0" encoding="UTF-8"?>
<vm_lifecycle xmlns="http://www.cisco.com/nfvis/vm_lifecycle">
  <tenants>
    <tenant>
      <name>admin</name>
```

```
      <deployments>
        <deployment>
          <name>te_nfvis</name>
          <vm_group>
            <name>te_nfvis</name>
            <image>te_latest</image>
            <flavor>TE</flavor>
            <bootup_time>-1</bootup_time>
            <config_data>
              <configuration>
                <dst>bootstrap_config</dst>
                <data>{
    "env_variables" : {
        "TEAGENT_ACCOUNT_TOKEN" : "${TEAGENT_ACCOUNT_TOKEN}",
        "TEAGENT_INET" : "${TEAGENT_INET}",
        "http_proxy" : "${http_proxy}",
        "https_proxy" : "${https_proxy}",
        "no_proxy" : "${no_proxy}"
    }
}</data>
                 <variable>
                    <name>TEAGENT_INET</name>
                    <val>4</val>
                </variable>
                <variable>
                    <name>TEAGENT_ACCOUNT_TOKEN</name>
                    <val>53rettywagbuouhw06hu65767rtyuyyui</val>
                </variable>
                <variable>
                    <name>https_proxy</name>
                    <val>http://example.com:80/</val>
                </variable>
                <variable>
                    <name>http_proxy</name>
                    <val>http://example.com:80/</val>
                </variable>
                <variable>
                    <name>no_proxy</name>
                    <val>.example.com,1.2.3.4</val>
                </variable>
              </configuration>
            </config_data>
          </vm_group>
        </deployment>
      </deployments>
    </tenant>
  </tenants>
</vm_lifecycle>
```

ThousandEyes Container Deployment Upgrade on NFVIS Using NETCONF

```
<?xml version="1.0" encoding="UTF-8"?>
<vm_lifecycle xmlns="http://www.cisco.com/nfvis/vm_lifecycle">
  <tenants>
    <tenant>
      <name>admin</name>
      <deployments>
        <deployment>
          <name>te_nfvis</name> <!--The deployment name and vm_group name MUST match the
existing deployment that you wish to upgrade-->
          <vm_group>
            <name>te_nfvis</name>

<image>https://downloads.thousandeyes.com/enterprise-agent/thousandeyes-enterprise-agent-0.35.0-nfvis.docker</image>
```

```
 <!--Only image tag needs to be updated with URL or docker tag pointing to the new TE
image-->
          </vm_group>
        </deployment>
      </deployments>
    </tenant>
  </tenants>
</vm_lifecycle>
```

ThousandEyes Container Deployment on NFVIS Using RESTCONF

The following are sample RESTCONF payloads that can be sent to NFVIS using `curl` or an equivalent client to manage the lifecycle of the Cisco ThousandEyes Container:

Image Registration

1. From Docker Hub

```
curl -k -v -u admin:Cisco123# -X POST
'https://172.29.91.33/restconf/data/vmlc:vm_lifecycle/images' \
--header 'Content-Type: application/yang-data+xml' \
--data '<image>
        <name>thousandeyes-enterprise-agent-0.34.0</name>
        <src>docker://thousandeyes/enterprise-agent:0.34.0-agent</src>
    <locator>
        <vim_id>container</vim_id>
    </locator>
    <properties>
        <property>
            <name>vnf_type</name>
            <value>THOUSANDEYES</value>
        </property>
        <property>
            <name>https_proxy</name> <!--Proxies are optional and depend on your
topology-->
            <value>http://proxy.com:80/</value>
        </property>
        <property>
            <name>no_proxy</name>
            <value>.cisco.com,10.1.1.1</value>
        </property>
    </properties>
</image>'
```

2. From ThousandEyes Webserver

```
curl -k -v -u admin:password -X POST
'https://nfvis_host_ip/restconf/data/vmlc:vm_lifecycle/images' \
--header 'Content-Type: application/yang-data+xml' \
--data '<image>
        <name>thousandeyes-enterprise-agent-0.34.0</name>

<src>https://downloads.thousandeyes.com/enterprise-agent/thousandeyes-enterprise-agent-0.33.0-nfvis.docker</src>

    <locator>
        <vim_id>container</vim_id>
    </locator>
    <properties>
        <property>
            <name>vnf_type</name>
            <value>THOUSANDEYES</value>
        </property>
        <property>
            <name>https_proxy</name> <!--Proxies are optional and depend on your
```

```
    topology-->
                <value>http://proxy.com:80/</value>
            </property>
            <property>
                <name>no_proxy</name>
                <value>.cisco.com,10.1.1.1</value>
            </property>
        </properties>
    </image>'
```

Flavor Creation

```
curl -k -v -u admin:password -X POST
'https://nfvis_host_ip/restconf/data/vmlc:vm_lifecycle/flavors' \
--header 'Content-Type: application/yang-data+xml' \
--data '<flavor>
    <name>thousandeyes-flavor</name>
    <vcpus>2</vcpus>
    <memory_mb>1024</memory_mb>
    <root_disk_mb>20480</root_disk_mb>
</flavor>'
```

ThousandEyes Agent Container Deployment

```
curl -k -v -u admin:password -X POST
'https://<nfvis_host_ip>/restconf/data/vmlc:vm_lifecycle/tenants/tenant=admin/deployments'
 \
--header 'Content-Type: application/yang-data+xml' \
--data '<deployment>
          <name>TE_DEMO</name>
          <vm_group>
            <name>TE_DEMO</name>
            <vim_vm_name>TE_DEMO</vim_vm_name>
            <locator>
              <vim_id>container</vim_id>
            </locator>
            <image>thousandeyes-enterprise-agent-0.33.0</image>
            <flavor>thousandeyes-flavor</flavor>
            <bootup_time>-1</bootup_time>
            <config_data>
              <configuration>
              <dst>bootstrap_config</dst>
              <data>{ "env_variables" : { "TEAGENT_ACCOUNT_TOKEN" :
"${TEAGENT_ACCOUNT_TOKEN}", "TEAGENT_INET" : "${TEAGENT_INET}" } }</data>
              <template_engine>VELOCITY</template_engine>
              <variable>
                <name>TEAGENT_ACCOUNT_TOKEN</name>
                <val>53rettywagbuouhw06hu65767rtyuyyui</val>
              </variable>
              <variable>
                <name>TEAGENT_INET</name>
                <val>4</val>
              </variable>
              </configuration>
            </config_data>
          </vm_group>
        </deployment>
     '
```

ThousandEyes Container Deployment Upgrade on NFVIS Using RESTCONF

To upgrade the existing ThousandEyes container deployment with a newer container image, you need to update the deployment configuration with the new image details. Here's a sample RESTCONF command using a Docker Hub image:

```
curl -k -v -u admin:password -X PUT
'https://<nfvis_host_ip>/restconf/data/vmlc:vm_lifecycle/tenants/tenant=admin/deployments/deployment=TE_DEMO/vm_group=TE_DEMO/image'
 \
--header 'Content-Type: application/yang-data+xml' \
--data '<image>docker://thousandeyes/enterprise-agent:0.34.0-agent</image>'
```



Note If an upgrade fails due to issues such as an image download error, verification failure, or any other problem, the container will continue running with the old image. However, the NFVIS configuration will reflect the latest settings. This behavior is similar to how VM deployment updates are handled.

Access ThousandEyes Using Cisco NFVIS

ThousandEyes **Enterprise Agents** displays the status of the Enterprise Agents deployed in Cisco NFVIS. For more information see, ThousandEyes Documentation.