TREND MICRO™

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TippingPoint™ Virtual Threat Protection System (vTPS)

Deployment Guide

Virtual security appliance for threat prevention and network enforcement services in a cloud environment.

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TippingPoint Virtual Threat Protection System Deployment Guide

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About this guide

The Virtual Threat Protection System (vTPS) is a software appliance designed to provide the same level of functionality available from the TippingPoint Threat Protection System (TPS), but virtually rather than physically.

This version of the vTPS supports the majority of features that are included with the corresponding version of physical TPS devices. For a complete breakdown of the differences between the virtual device and the physical device, refer to the *Virtual Threat Protection System Functional Differences Addendum*.

This guide describes the configuration differences and other special considerations for deploying a TPS in a virtual environment.

This section covers the following topics:

- *Target audience* on page 1
- *Related documentation* on page 1
- *Conventions* on page 2
- *Product support* on page 3

Target audience

This guide is intended for security network administrators and specialists who are responsible for monitoring, managing, and improving system security. The audience for this material is expected to be familiar with the TippingPoint security systems and associated devices.

Users should be familiar with the following concepts:

- Basic networking
- Network security
- Routing
- Virtualization

Related documentation

A complete set of documentation for this product is available online at the Threat Management Center (TMC): *https://tmc.tippingpoint.com*. The product document set generally includes conceptual and deployment information, installation and user guides, CLI command references, safety and compliance information, and release notes.

Conventions

This information uses the following conventions.

Typefaces

The following typographic conventions for structuring information are used.

Convention	Element
Bold font	- Key names - Text typed into a GUI element, such as into a box - GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes. Example: Click **OK** to accept.
Italics font	Text emphasis, important terms, variables, and publication titles
`Monospace font`	- File and directory names - System output - Code - Text typed at the command-line
`Monospace, italic font`	- Code variables - Command-line variables
`Monospace, bold font`	Emphasis of file and directory names, system output, code, and text typed at the command line

Messages

Messages are special text that is emphasized by font, format, and icons.

⚠**Warning!** Alerts you to potential danger of bodily harm or other potential harmful consequences.

△**Caution:** Provides information to help minimize risk, for example, when a failure to follow directions could result in damage to equipment or loss of data.

Note: Provides additional information to explain a concept or complete a task.

Important: Provides significant information or specific instructions.

Tip: Provides helpful hints and shortcuts, such as suggestions about how to perform a task more easily or more efficiently.

Product support

Information for you to contact product support is available on the TMC at *https://tmc.tippingpoint.com*.

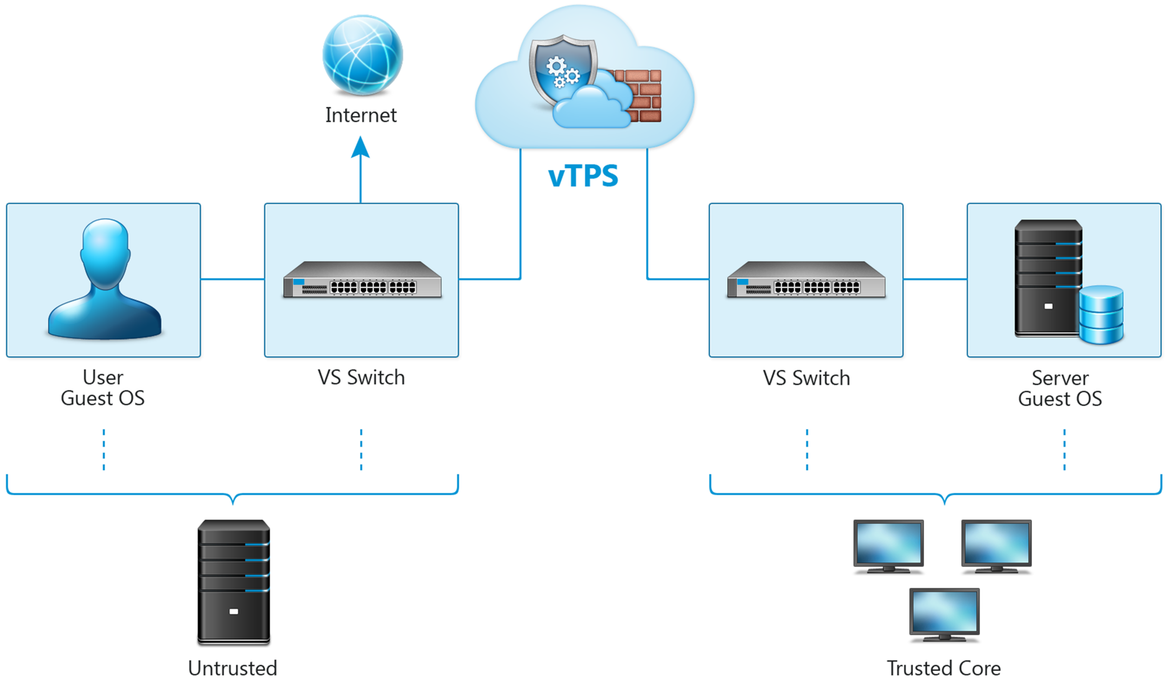
Deployment overview

This guide provides configuration steps to deploy a TippingPoint Virtual Threat Protection System (vTPS) in either a VMware or kernel-based virtual machine (KVM) environment. The vTPS is a software appliance designed to give you the same level of functionality available in the TippingPoint TPS, but virtually rather than physically. Just as with a TPS device, the vTPS protects your network with the Threat Suppression Engine (TSE) by scanning, detecting, and responding to network traffic according to the filters, action sets, and global settings you maintain on the vTPS. You can share the same policies across virtual and physical deployments, and you can centralize the management of your deployments with a Security Management System (SMS) or a virtual SMS (vSMS).

The few differences between vTPS and TPS functionality—for example, command line interface (CLI) operations that control hardware LEDs, and other functions specific to a physical device—are listed and described in the *vTPS Functional Differences Addendum* available online at the Threat Management Center (TMC): *https://tmc.tippingpoint.com*.

The following illustration shows an example of a basic hypothetical deployment. This version of the vTPS must be configured between L2 broadcast domains (VLANs or switches).

Figure 1. Basic vTPS deployment



After you deploy the vTPS, you can access the appliance by using the Local Security Manager (LSM) web interface or your SMS. For more information, see the TPS product documentation on the TMC (*https://tmc.tippingpoint.com*).

Normal image versus Performance image

The TippingPoint vTPS device can be deployed using a Normal image or a Performance image. Performance image offers an increased capacity for vCPUs and threading.

Normal image:

- Supports a minimum of two and a maximum of three (default) vCPUs
- Allocates 8 GB memory
- 16 GB disk space.
- Has an inspection capacity of 100 Mbps (default); up to 1 Gbps (upgrade license required)
- Runs the engine in *N*-thread mode, where *N* is 1 or 2 depending on how many vCPUs are reserved for the vTPS operating system. One vCPU must always be reserved for the operating system. For example, the default three vCPUs allows for two engine threads.
- Available for download from the TMC at *https://tmc.tippingpoint.com* (**Releases > Software > TPS > vTPS VM**):
  - For VMware, download `vTPS_vmw_5.0.0_xxxx.zip`
  - For KVM, download `vTPS_kvm_5.0.0_xxxx.tar.gz`

Performance image:

- Requires six vCPUs (default)
- Allocates 16 GB memory
- 16 GB disk space.
- Has an inspection capacity of 100 Mbps (default); up to 1 Gbps (upgrade license required)
- Runs its engine in multi-queue mode. One vCPU must always be reserved for the operating system.
- Available for download from the TMC at *https://tmc.tippingpoint.com* (**Releases > Software > TPS > vTPS VM**):
  - For VMware, download `vTPS_vmw_performance_5.0.0_xxxx.zip`
  - For KVM, download `vTPS_kvm_performance_5.0.0_xxxx.tar.gz`

Use the `show version` command to display which operational image, Normal or Performance, your vTPS device is running.

For information on upgrading from Normal image to Performance image, see *Configure the vTPS for SSL Inspection* on page 6.

Configure the vTPS for SSL Inspection

You can change a Normal operational image to a Performance operational image by redeploying your vTPS and redistributing your profiles using the SMS. With the Performance image, you can enable in-line, real-time threat protection for inbound IPv4 traffic that is SSL-encrypted.

To redeploy the vTPS:

1. From the TMC, download and uncompress the Performance package for your hypervisor. For more information, see *Normal image versus Performance image* on page 5.
2. Deploy the Performance image package on the vTPS.

   Note: A complete redeployment is required, including running the out-of-box experience (OBE) wizard and installing the certificate.

   For more information, refer to *Install and deploy vTPS by using VMware ESXi* on page 8 and *Install and deploy vTPS by using KVM* on page 14.

Install and configure the vTPS

This topic provides steps to configure your vTPS. This release supports the following configuration options:

- *General requirements* on page 7
- *Install and deploy vTPS by using VMware ESXi* on page 8
- *Install and deploy vTPS by using KVM* on page 14
- *Install and deploy by using OpenStack HEAT template for vTPS* on page 21

Note: All virtual machines (VMs) on a shared host compete for resources. When a hypervisor becomes overloaded with too many VMs or with VMs that are resource-intensive, a system boot can potentially slow down to the point of failure. To prevent delays or timeout errors in the boot process, watch for deviations in system performance and reallocate the appropriate resources as necessary.

For more information on configuring security policy for your virtual appliance, refer to your SMS and LSM documentation on the TMC (*https://tmc.tippingpoint.com*).

General requirements

To deploy a vTPS in any software environment, the following system specifications are required:

- **Memory (RAM)** – 8 GB (Normal image), 16 GB (Performance image)
- **Number of cores:**
  - Normal image – supports configurations of either two cores (meets general performance requirements) or three cores (for enhanced performance; upgrading to three cores after installation requires a shutdown, configuration change, and reboot)
  - Performance image – requires six CPU cores
- **Disk space** – 16.2 GB

  Note: Both thin and thick provisioning are supported, but for optimum performance, use thick provisioning.

- **CPU** – Host CPU must support the SSSE3 instruction set. Tested CPU configurations:
  - Intel Xeon CPU E5-2697v2
  - Intel Xeon CPU E5-2690
  - Intel Xeon CPU E5-2683v3
  - Intel Xeon CPU X5670
  - Intel Xeon CPU X5650

Note: For users with an SSL license who are deploying the Performance image, Intel Xeon CPUs based on Ivy Bridge or newer (for example, E5-2697v2 and E5-2683v3) are recommended for their support of hardware random number generation (RDRAND instruction). In order for the VM to incorporate the CPU features, additional hypervisor configuration might be necessary:

- For VMWare, adjust the EVC mode to `Ivy Bridge` or newer as necessary. For more information, see the *VMWare Knowledge Base*.
- For Red Hat, set the guest CPU to `host-passthrough`, `Haswell`, or newer. For more information, see the *Red Hat Enterprise Linux 7 Virtualization Deployment and Administration Guide*.

Install and deploy vTPS by using VMware ESXi

This topic provides steps to configure the vTPS for startup by using the vCenter application. The information includes:

- *VMware ESXi requirements* on page 8
- *Configure the vTPS on VMware* on page 9
- *Start your vTPS* on page 13
- *Upgrade to Standard Mode* on page 14

VMware ESXi requirements

The vTPS supports the following system and software environment for a VMware ESXi deployment:

- **ESXi Hypervisor version**:
    - Version 5.5 (Patch 3116895)
    - Version 6.0 (Patch 5572656)

      Note: When you deploy the vTPS on the vSphere Hypervisor (ESXi 6.0), always install the latest Update 3 (U3) to prevent IPv6 packet drops.
    - Version 6.5

    Note: Install all updates on your hypervisor hosts before deploying virtual devices in your ESXi environment.
- **Networking requirements**:
    - Three vNICs — one for management and two for data. Both vSwitches and distributed vSwitches (dvSwitches) are supported.
    - The two data vNICs must be configured in promiscuous mode. Ensure that any Forged Transmits and MAC Address Changes are set to ACCEPT in order for network packets to get forwarded.

Configure the vTPS on VMware

To configure vTPS on VMware:

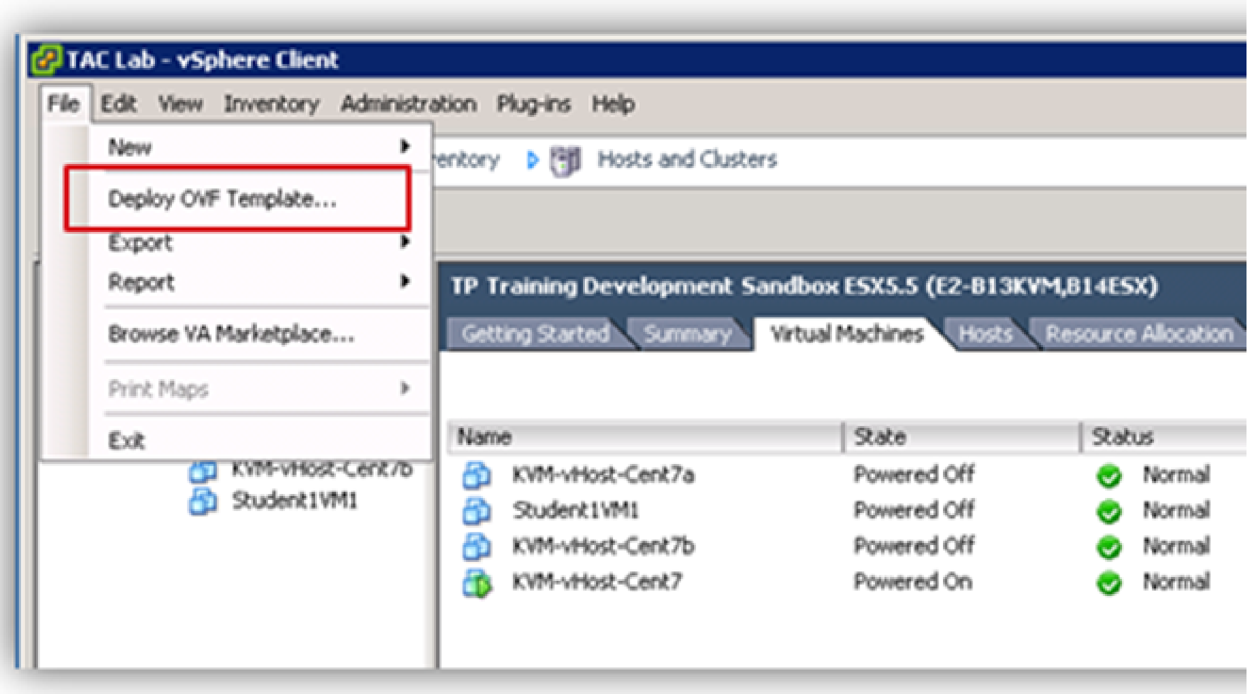
1. Create three virtual switches on the ESXi host—one for the management port and two for the data ports, and ensure that the three vNICs are connected to the correct virtual switches.

   See the VMware content at the *VMware vSphere Documentation Center*.

   > **Note:** In order for the vTPS to function properly, be sure you create the ports, map them to their correct interfaces, and enable them in promiscuous mode. By default, ESXi attempts to attach all the adapters to the virtual switch that was created first. Ensure that any Forged Transmits and MAC Address Changes are set to ACCEPT for network packets to get forwarded. You must configure the VLAN ID field to `All(4095)` for data port virtual switches if you intend to use VLANs for data ports.

2. Copy the vTPS OVA package to your system.
3. From vSphere, open the package and launch the **Deploy OVF Template** wizard.

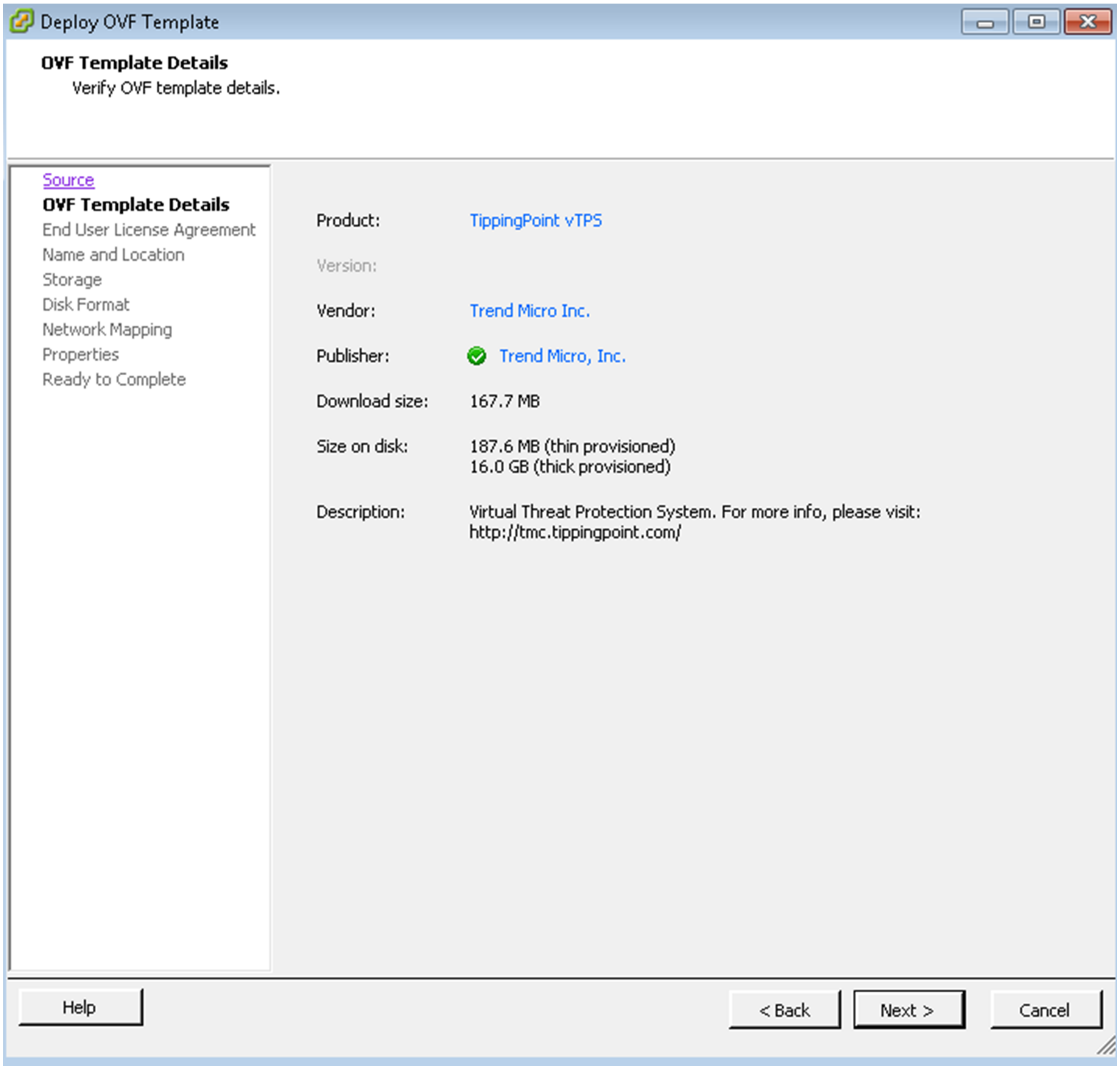
   Figure 2. Deploy OVF Template wizard



Name	State	Status
KVM-vHost-Cent7a	Powered Off	Normal
Student1VM1	Powered Off	Normal
KVM-vHost-Cent7b	Powered Off	Normal
KVM-vHost-Cent7	Powered On	Normal

   The initial OVF Template Details screen of the wizard displays information that includes the product name, version, vendor, and publisher. Ensure that the publisher information is correct before proceeding further. When you are satisfied you have opened the correct package, click **Next**.

Figure 3. Deploy OVF Template wizard Details screen



OVF Template Details

Verify OVF template details.

Product: TippingPoint vTPS

Version:

Vendor: Trend Micro Inc.

Publisher: ✓ Trend Micro, Inc.

Download size: 167.7 MB

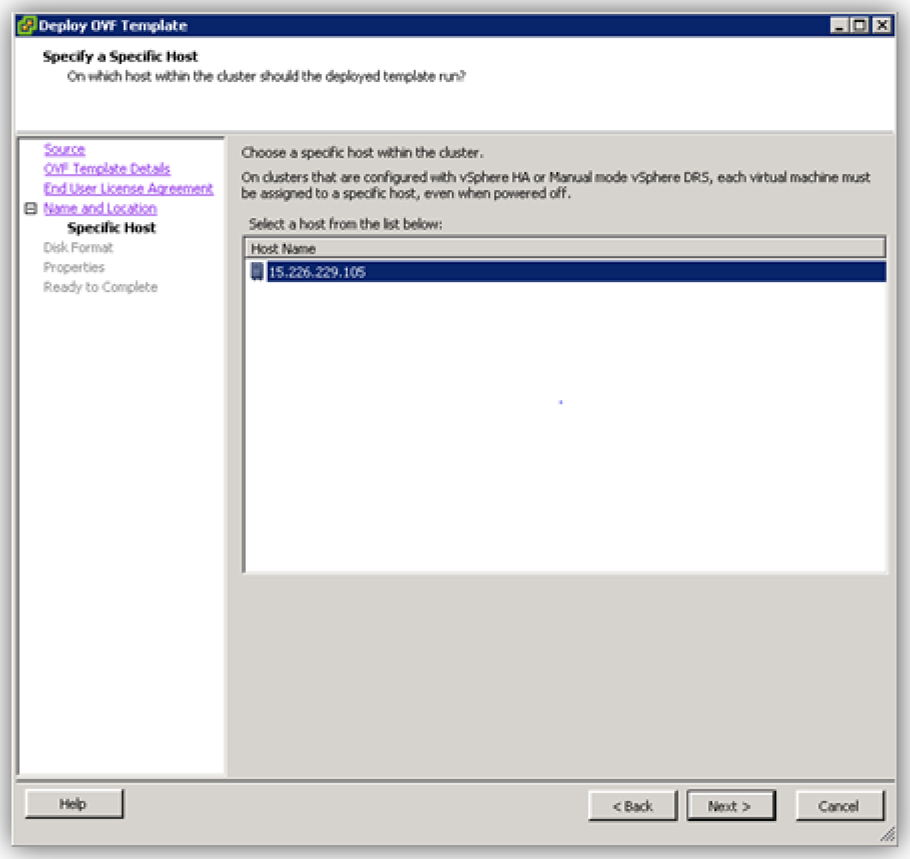
Size on disk: 187.6 MB (thin provisioned)
16.0 GB (thick provisioned)

Description: Virtual Threat Protection System. For more info, please visit:
http://tmc.tippingpoint.com/

4. Click **Accept** to accept the End User License Agreement (EULA), and then click **Next**.
5. On the Name and Location screen, you can rename and choose a specific install location for the VM instance, or you can accept the default name and location.

   Click **Next**.
6. Select the host that you want on the Host / Cluster screen, and then click **Next**.

Figure 4. Assign a host



Deploy OVF Template

Specify a Specific Host

On which host within the cluster should the deployed template run?

Choose a specific host within the cluster.

On clusters that are configured with vSphere HA or Manual mode vSphere DRS, each virtual machine must be assigned to a specific host, even when powered off.

Select a host from the list below:

Host Name
15.226.229.105

7. Select a storage location if you are prompted. Consider also assigning a dedicated resource group for a vTPS instance.

8. On the Disk Format screen, you can select the format in which to store the virtual disks. Select your preference and click **Next** to continue.

   Note: Both thin and thick provisioning is supported. For optimum performance, use thick provisioning.

9. On the Network Mapping screen, configure the three network options.

   The first interface you provide is your management port. Ensure that this is accessible on your management network. Then select networks for the two data ports according to your virtual switch/port configuration. Click **Next**.

   Important: Ensure that you correctly map your network adapters so that you can access your vTPS device by using the LSM, CLI, and SMS.

10. If you are using a vSphere client to deploy directly on a host, you can configure the vTPS parameters only after the vTPS is booted using the out-of-box experience (OBE) interface on the console. If you are using a vCenter server to deploy, you are prompted by the Properties screen to configure the parameter values:

- IP address
- Netmask value
- Default Gateway
- IPv6 Address (optional)
- IPv6 Prefix Length (optional)
- IPv6 Default Gateway (optional)
- Hostname (required)
- Host location (optional)
- IP address of DNS servers (optional)—You can add up to two addresses

  Note: The VMware deployment screen supports setting up only an IPv4 IP address. If you want to set up an IPv6 address, you must first install the vTPS with IPv4 by using the OBE interface on the console. Configure an IPv6 address after the device is booted.

- DNS Domain Name (optional)
- Security Level
- Username—The SuperUser user name
- Password for the SuperUser
- Console—Default and recommended value is `vga`; if you specify `serial` as the console, refer to *Configuring a serial console* on page 45 to configure it

  Note: The vTPS supports only one console type. After you initially select the console type, you would have to redeploy the vTPS to change the console type.

- SSH Public Key for the superuser account (this field is optional)
- Certificate URL (optional)—Your vTPS attempts to get the file from the URL and install the device certificate to convert the vTPS from Trial Mode to Standard Mode; you can complete this task another time, if needed, by using the SMS or LSM

When you have entered values for all the properties, click **Next**.

Note: Any properties that you do not assign a value to remain unassigned.

11. Verify that all the properties have been correctly set for your deployment in the Ready to Complete screen.
12. Click **Finish**.

The initial boot displays your deployment progress and any messages with the VGA console, even if you previously selected `serial` as the console. The interface will prompt you to provide values for any deployment questions you previously skipped.

After the OBE boot completes:

- If you provided a certificate URL during the deployment, the vTPS automatically downloads the certificate and reboots to activate it.
- If you selected to use the serial console, the vTPS automatically reboots. All messages from this next boot are displayed with the serial console.
- If neither of the preceding bullets apply, a login prompt is displayed. You can now access the device using the console, SSH, LSM, or SMS.

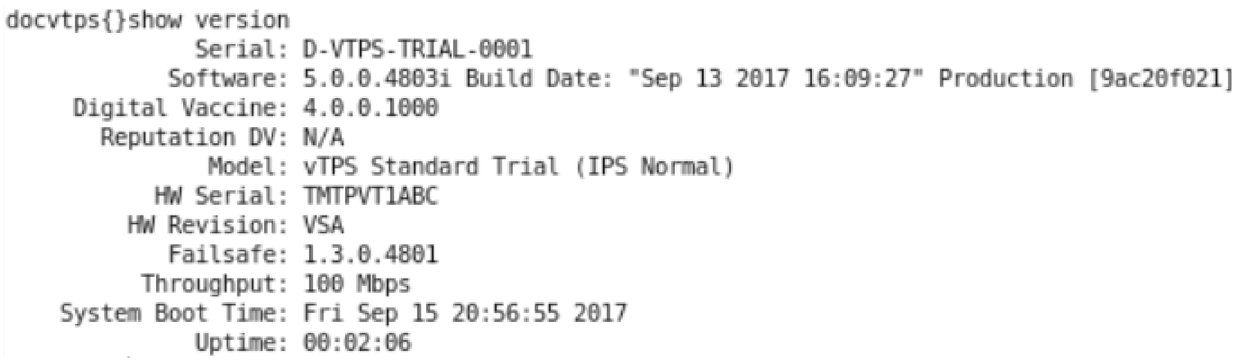
Start your vTPS

Follow these steps to complete the initial deployment:

1. In vCenter, right-click your new VM and select **Power > Power on** from the menu.
2. If you did not use vCenter to provide network settings, you can access the vCenter VGA console for the vTPS to configure those settings.

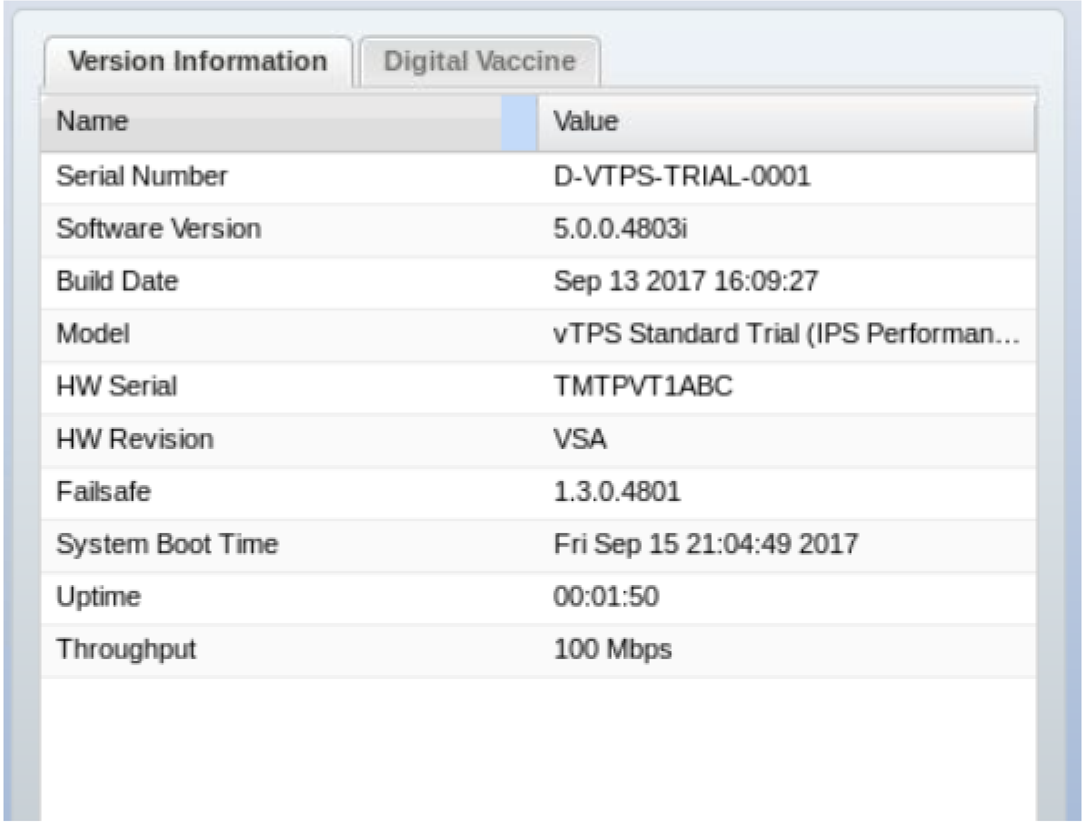
If you did not use vCenter to provide license key information in the preceding step, the vTPS boots in Trial Mode by default. *Figure 5* on page 13 indicates from the CLI that you are in Trial Mode. *Figure 6* on page 14 indicates from the LSM that you are in Trial Mode.

Figure 5. Trial Mode (Normal image) – CLI



```
docvtps{}show version
              Serial: D-VTPS-TRIAL-0001
            Software: 5.0.0.4803i Build Date: "Sep 13 2017 16:09:27" Production [9ac20f021]
     Digital Vaccine: 4.0.0.1000
       Reputation DV: N/A
               Model: vTPS Standard Trial (IPS Normal)
           HW Serial: TMTPVT1ABC
         HW Revision: VSA
            Failsafe: 1.3.0.4801
          Throughput: 100 Mbps
    System Boot Time: Fri Sep 15 20:56:55 2017
              Uptime: 00:02:06
```

Figure 6. Trial Mode (Performance image) – LSM



Name	Value
Serial Number	D-VTPS-TRIAL-0001
Software Version	5.0.0.4803i
Build Date	Sep 13 2017 16:09:27
Model	vTPS Standard Trial (IPS Performan...
HW Serial	TMTPVT1ABC
HW Revision	VSA
Failsafe	1.3.0.4801
System Boot Time	Fri Sep 15 21:04:49 2017
Uptime	00:01:50
Throughput	100 Mbps

Upgrade to Standard Mode

If you did not provide a certificate URL during deployment, upgrade to Standard Mode. For information, see *Upgrade from vTPS Trial to vTPS Standard* on page 39.

If you did provide a certificate URL during deployment, activation of the certificate occurs automatically.

Install and deploy vTPS by using KVM

This topic provides steps to configure the vTPS for startup by using a kernel-based virtual machine (KVM). The information includes:

- *KVM requirements* on page 15
- *Obtain software licensing and certificates* on page 15
- *Deploy a Normal image vTPS on KVM* on page 15
- *Automating vTPS installation on KVM* on page 19
- *Upgrade to Standard Mode* on page 21

KVM requirements

A KVM deployment of the vTPS that uses the following specifications has been verified:

- **Software environments** – Ensure you have the following minimum requirements:

  > **Note:** vTPS installation has been verified with RHEL version 7.1 KVM hosts. A three-core configuration requires the following minimum software package versions:

  - libvirt version 1.1.0
  - Quick Emulator (QEMU) version 1.5.3
  - virt-install version 1.1.0

- **Networking requirements** – Three bridge interfaces—one for management and two for data.

  Ensure that the bridges used for the data ports can forward all Layer 2 frames to the vTPS. To do this, use the **brctl** shell utility to configure the bridges to disable address learning by setting `setageing` to `0`:

  ```
  # brctl setageing data-A 0
  # brctl setageing data-B 0
  ```

  To prevent this setting from being overwritten by a reboot, add the `AGEING=0` parameter to the bridge's `/etc/sysconfig/network-scripts` configuration.

  > **Note:** Disabling address learning ensures that bridges properly forward all Layer 2 frames to the vTPS. Otherwise, especially in cases where a single data port sees both sides of the network connection (such as in an IDS mode), the bridge is prevented from sending the frames to the vTPS by the default address learning mode.

- **Console access** – Default and recommended console is a graphical UI, such as virt-manager, virt-viewer, vncviewer, or other VNC client. To configure the serial console, refer to *Configuring a serial console* on page 45.

  > **Note:** The vTPS supports only one console type. After you initially select the console type, you cannot change it later.

Obtain software licensing and certificates

For information, see *Upgrade from vTPS Trial to vTPS Standard* on page 39.

Deploy a Normal image vTPS on KVM

To install a Normal image vTPS on KVM:

1. Copy the vTPS tar package to your system.

2. Extract the package with the `tar --sparse -zxvf vTPS_kvm_x.x.x_xxxxx.tar.gz` command.
3. Change permissions for the QEMU user to allow access to the file with the `chmod` command: `chmod a +rwx system_disk.raw`
4. Use the `virt-install` command to deploy the vTPS package according to your RHEL version: To deploy vTPS on RHEL version 7. 1 in the libvirt 1.1.0 environment, use the `virt-install` command as follows.

   Note: RHEL 7.1 deployment supports two options: 1 fast path or 2 fast paths. To configure one fast path, specify `cores=2` and `driver_queues=1`. For 2 fast paths, specify `cores=3` and `driver_queues=2`.

   ```
   virt-install \
   --name=<name of your VM> --ram=<specify ram size{for 8GB specify 8192}>
   --vcpus sockets=1,cores=3 \
   --boot hd --disk path=<path of your system_disk.raw file>
   --network bridge=<management bridge>,model=e1000 \
   --network bridge=<data bridge 1>,model=virtio,driver_queues=2 \
   --network bridge=<data bridge 2>,model=virtio,driver_queues=2 \
   --graphics vnc,port=59<xy>,listen=<ip_of_kvm_host> \
   --virt-type=kvm --cpu qemu64,+ssse3,-svm \
   --force --wait -1
   ```

   Note: The `--wait` option keeps your program running on the shell. After you have installed the vTPS Software License Key and the vTPS is running, you can type Control-C to return to the prompt. The preceding commands create a vTPS VM with the name <name of your VM>. To manage or access the VM, you can use the `virsh` CLI.

   To access the open console of the VM, use `vncviwer` or `virt-viewer` after setting the DISPLAY environment variable as follows:

   `vncviewer <ip_of_kvm_host>:59<xy>` (the <port value> you supplied for the `graphics` field of the `virt-install` command)

   or

   ```
   virt-viewer --connect qemu+ssh://root@ip_of_kvm_host/system
   $VM_NAME
   ```

   The vTPS normal image deployment is complete.

Deploy a Performance image vTPS on KVM

To install a Performance image vTPS on KVM:

1. Copy the vTPS tar package to your system.

2. Extract the package with the `tar --sparse -zxvf vTPS_performance_kvm_x.x.x_xxxxx.tar.gz` command.
3. Change permissions for the QEMU user to allow access to the file with the `chmod` command: `chmod a+rwx system_disk.raw`
4. Use the `virt-install` command to deploy the vTPS package according to your RHEL version: To deploy vTPS on RHEL version 7. 1 in the libvirt 1.1.0 environment, use the `virt-install` command as follows.

   Note: RHEL 7.1 deployment supports two options: 1 fast path or 2 fast paths. For either configuration, specify `cores=6` and `driver_queues=6`.

   ```
   virt-install \
   --name=<name of your VM> --ram=<specify ram size{for 16GB specify 16384}>
   --vcpus sockets=1,cores=6 \
   --boot hd --disk path=<path of your system_disk.raw file>
   --network bridge=<management bridge>,model=e1000 \
   --network bridge=<data bridge 1>,model=virtio,driver_queues=6 \
   --network bridge=<data bridge 2>,model=virtio,driver_queues=6 \
   --graphics vnc,port=59<xy>,listen=<ip_of_kvm_host> \
   --virt-type=kvm --cpu qemu64,+ssse3,-svm \
   --force --wait -1
   ```

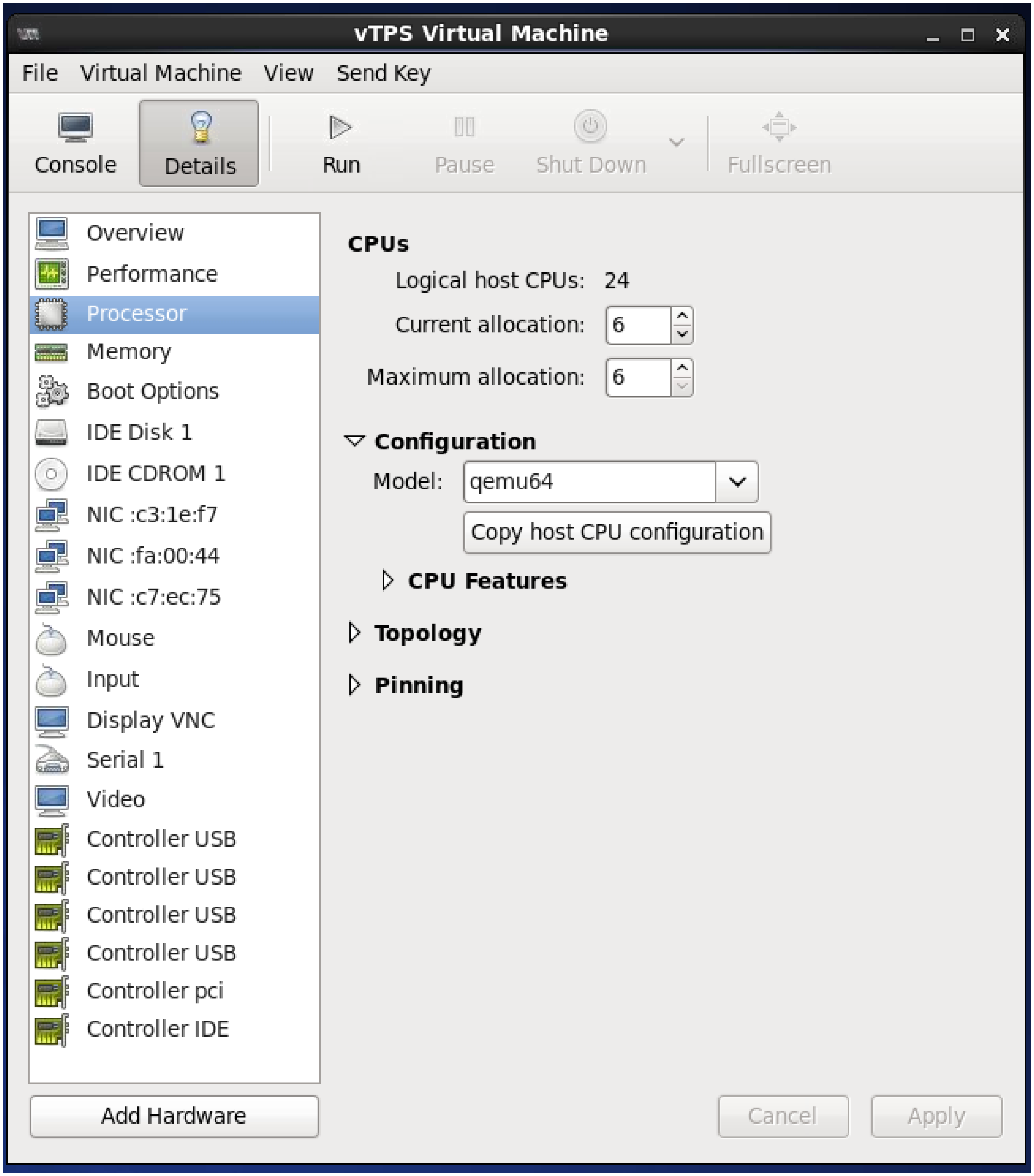
   Important:

   The `--cpu` option must be specified as `qemu64` when running the `virt-install` command. If another CPU is specified, the `vtps-env.txt` file will be ignored. However, users with an SSL license who are deploying the Performance image should use Intel Xeon CPUs based on Ivy Bridge or newer (for example, E5-2697v2 and E5-2683v3) for their support of hardware random number generation (RDRAND instruction). In order for the VM to incorporate the CPU features, additional configuration might be necessary.

   After running the preceding `virt-install` command, shut down the VM. Use `virt-manager` to adjust the CPU parameter to `host`, `Westmere`, `Haswell`, or newer:

   a. Select **Processor** from the list of hardware.
   b. Toggle the **Configuration** triangle and select the appropriate processor model.
   c. Either pick a CPU type manually from the list or click **Copy Host CPU Configuration** for the best CPU to match with this host.
   d. Click **Apply**.

   Figure 7. Adust the host CPU using virt-manager



CPUs

Logical host CPUs: 24

Current allocation: 6

Maximum allocation: 6

Configuration

Model: qemu64

You can also accomplish this task by using `virsh edit VM-NAME` to edit the VM XML file. For more information on this option, refer to the KVM and libvirt documentation at *https://libvirt.org/formatdomain.html#elementsCPU*.

Note: The `--wait` option keeps your program running on the shell. After you have installed the vTPS Software License Key and the vTPS is running, you can type Control-C to return to the prompt.

The preceding commands create a vTPS VM with the name <name of your VM>. To manage or access the VM, you can use the `virsh` CLI.

To access the open console of the VM, use `vncviwer` or `virt-viewer` after setting the DISPLAY environment variable as follows:

`vncviewer <ip_of_kvm_host>:59<xy>` (the <port value> you supplied for the `graphics` field of the `virt-install` command)

or

```
virt-viewer --connect qemu+ssh://root@ip_of_kvm_host/system
$VM_NAME
```

The vTPS performance image deployment is complete.

Automating vTPS installation on KVM

1. Install `genisoimage` with the `yum install genisoimage` command on an RHEL system.
2. Copy the vTPS tar package to your system.
3. Extract the package with the `tar --sparse -zxvf vTPS_kvm_x.x.x_xxxxx.tar.gz` command.
4. To configure the vTPS parameters from the KVM command line, create a text file named `vtps-env.txt` **(Note: the file *must* be named this)** with this format:

```
com_tippingpoint_IP = <Management IP address of vTPS>
com_tippingpoint_Netmask = <Subnet Mask>
com_tippingpoint_Gateway = <IP Address of Gateway>
com_tippingpoint_Username = <username>
com_tippingpoint_Password = <Password>
com_tippingpoint_DNS = <IP Address of DNS>
com_tippingpoint_DNS2 = <IP Address of DNS2> (optional)
com_tippingpoint_Security_Level = <none/low/medium/high>
com_tippingpoint_VSSH_Public_Key = SSH KEY (optional)
com_tippingpoint_Cert_URL = <Device Certificate URL> (optional)
com_tippingpoint_Console = serial  (optional; for serial consoles only)
```

For example, your file might look like the following sample:

```
com_tippingpoint_IP = 10.11.12.134
com_tippingpoint_Netmask = 255.255.255.0
com_tippingpoint_Gateway = 10.11.12.1
com_tippingpoint_Username = superuser
com_tippingpoint_Password = password
com_tippingpoint_DNS = 15.16.17.18
com_tippingpoint_DNS2 = 0.0.0.0
com_tippingpoint_Security_Level = None
com_tippingpoint_VSSH_Public_Key = SSH KEY
com_tippingpoint_Cert_URL = http://15.16.17.18/certificate.txt
```

5. From the KVM command line, generate an ISO image of the `vtps-env.txt` file with the `genisoimage -r -o vtps_test_metadata.iso vtps-env.txt` command.

   Executing this command generates the following output:

   ```
   root@vtps-kvm06:/# genisoimage -r -o vtps_test_metadata.iso vtps-env.txt
   I: -input-charset not specified, using utf-8 (detected in locale settings)
   Total translation table size: 0
   Total rockridge attributes bytes: 252
   Total directory bytes: 0
   Path table size(bytes): 10
   Max brk space used 0
   176 extents written (0 MB)
   root@vtps-kvm06:/#
   ```

   Note: The exact output varies depending on the input to the `vtps-env.txt` file.

6. Change permissions for the QEMU user to allow access to the file with the `chmod` command:

   ```
   chmod a+rwx system_disk.raw
   chmod a+rwx vtps_test_metadata.iso
   ```

7. Set the following environment variables to the displayed values:

   ◦ `VM_NAME=$VM_NAME`

   ◦ `RAM_SIZE=8192 #8388608 #8GB : 1GB = 1048576`

   ◦ `SYSTEM_DISK_PATH=<location of the image files>/system_disk.raw`

   ◦ `CDROM_IMAGE=<location of the iso file>/vtps_test_metadata.iso`

8. Use the `virt-install` command to deploy the vTPS package according to your RHEL version:

   - If you are using RHEL version 7.1, attach the generated ISO image (as if it were a CD-ROM) and the bootloader, and deploy the vTPS package in the libvirt 1.1.0 environment with the `virt-install` command.

     Note: RHEL 7.1 deployment supports two options: 1 fast path or 2 fast paths. To configure one fast path for a Normal image, specify `cores=2` and `driver_queues=1`. For 2 fast paths, specify `cores=3` and `driver_queues=2`. For a Performance image, always specify `cores=6` and `driver_queues=6`. The following example shows 2 fast paths for a Normal image.

     ```
     virt-install \
     --name=$VM_NAME --ram=$RAM_SIZE --vcpus sockets=1,cores=3 \
     --boot hd --disk path=$SYSTEM_DISK_PATH
     --cdrom=$CDROM_IMAGE \
     --network bridge=<management bridge>,model=e1000 \
     --network bridge=<data bridge 1>,model=virtio,driver_queues=2 \
     --network bridge=<data bridge 2>,model=virtio,driver_queues=2 \
     --graphics vnc,port=59<xy>,listen=<ip_of_kvm_host> \
     --virt-type=kvm --cpu qemu64,+ssse3,-svm \
     --force --wait -1
     ```

Note: The `--wait` option keeps your program running on the shell. After you have installed the vTPS Software License Key and the vTPS is running, you can type Control-C to return to the prompt.

The preceding commands create a vTPS VM with the name <name of your VM>. To manage or access the VM, you can use the `virsh` CLI.

To access the open console of the VM, use `vncviwer` or `virt-viewer` after setting the DISPLAY environment variable as follows:

`vncviewer <ip_of_kvm_host>:59<xy>` (the <port value> you supplied for the `graphics` field of the `virt-install` command)

or

```
virt-viewer --connect qemu+ssh://root@ip_of_kvm_host/system
$VM_NAME
```

The vTPS deployment is complete.

Upgrade to Standard Mode

If you did not provide a certificate URL during deployment, upgrade to Standard Mode. For information, see *Upgrade from vTPS Trial to vTPS Standard* on page 39.

If you did provide a certificate URL during deployment, activation of the certificate occurs automatically.

Install and deploy by using OpenStack HEAT template for vTPS

A HEAT template can be used to describe the vTPS infrastructure.

Note: The instructions in this section describe a GUI deployment of a TippingPoint vTPS that uses the OpenStack Liberty release. If you use a different release or customization of OpenStack components, you might see small variations in the procedure.

vTPS emulation requirements

The OpenStack HEAT template requires the following emulation configuration:

1. Processor emulator – ssse3 eabled
2. Disk driver – ide
3. Support for virtio on all three interfaces (management port and two data ports)

vTPS functional requirements

The OpenStack HEAT template requires the following functional configuration:

1. Hypervisor – kvm
2. Virtual processors – 2 or 3 (Normal image), 6 (Performance image)
3. RAM – 8 GB (Normal image), 16 GB (Performance image)
4. Disk image – 1 (system disk required, 16 GB total size)
5. Configuration drive – optional

Deploy the TippingPoint vTPS on OpenStack

To prepare for deployment:

- Ensure the Qemu processor type has the ssse3 flag enabled. To enable the flag in compute mode, edit the `nova.conf` file.
- Add the following lines to the [libvirt] section of the `/etc/nova/nova.conf` or `/etc/nova/nova-compute.conf` file:

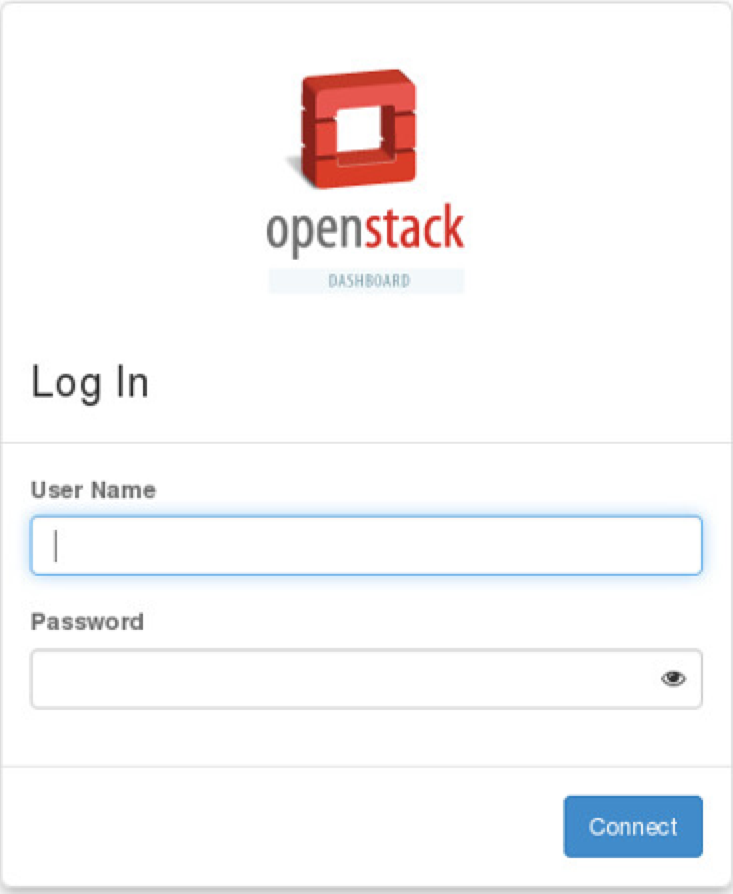
  ```
  [libvirt]
  virt_type = kvm
  cpu_mode = passthrough
  disk_prefix = hd
  ```

- After saving your modifications, restart any of the following available nova services that run on your server:
  - openstack-nova-api
  - openstack-nova-cert
  - openstack-nova-consoleauth
  - openstack-nova-scheduler
  - openstack-nova-conductor
  - openstack-nova-novncproxy

Enter the context of your task here (optional).

1. Log in to the OpenStack GUI (Horizon).

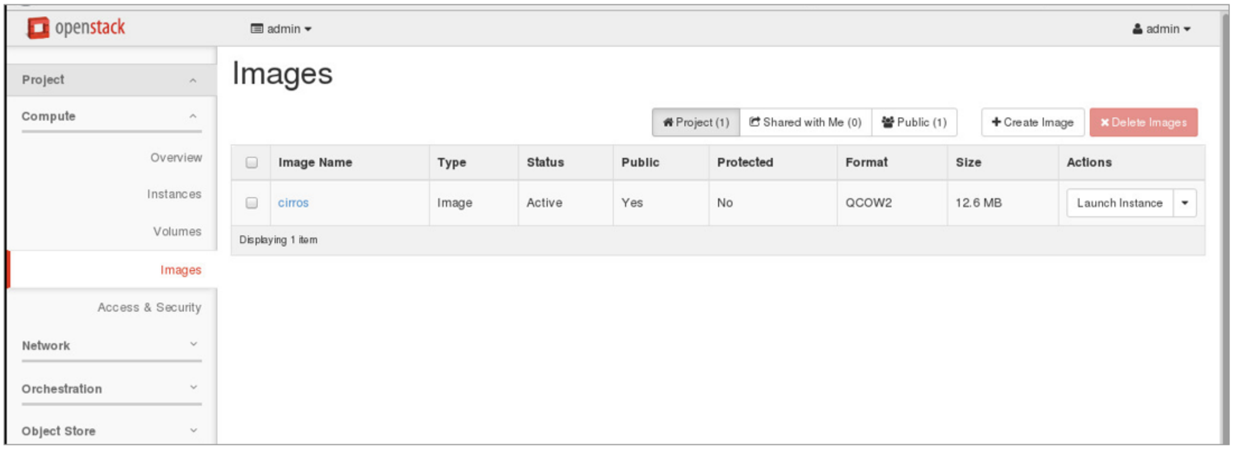
Figure 8. OpenStack Log In screen



2. Add vTPS images to Horizon.

   a. To place raw system and user vTPS images in an accessible location, upload them by selecting **Compute > Images** and then clicking the **Create Image** button.

   Figure 9. Compute images screen



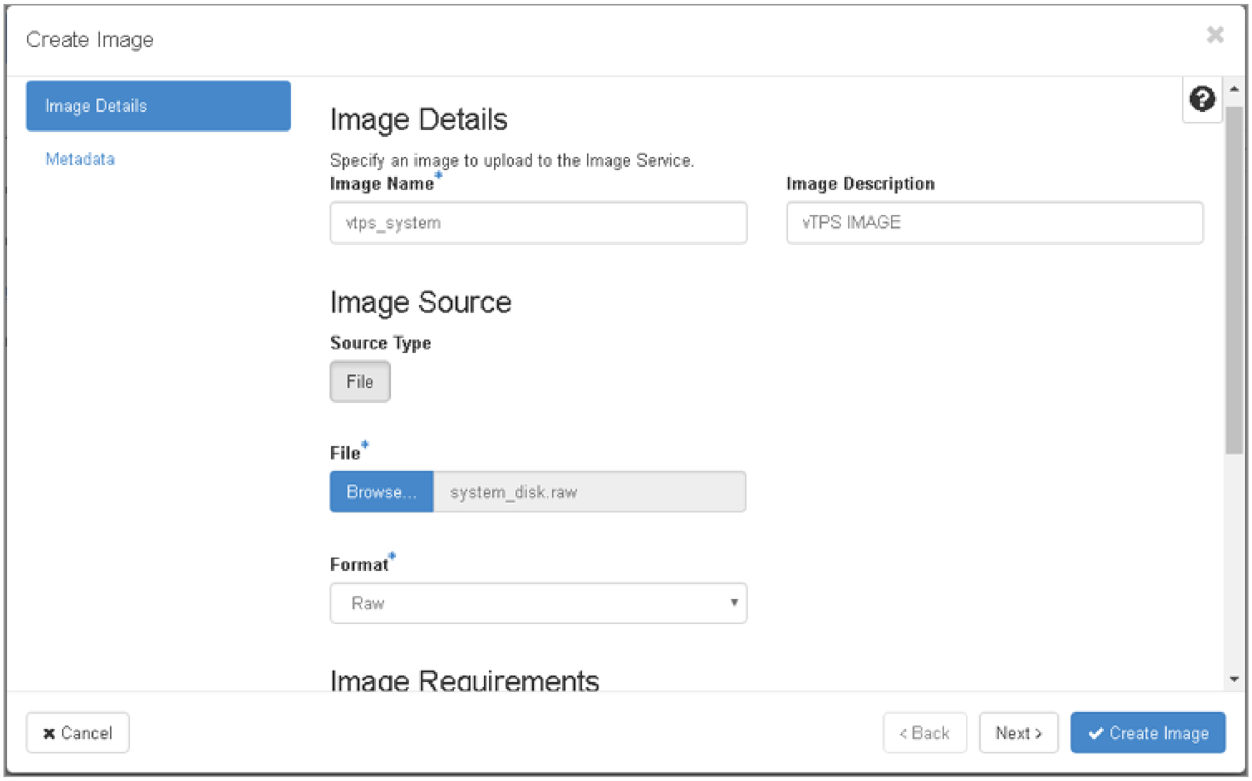
Images

	Image Name	Type	Status	Public	Protected	Format	Size	Actions
□	cirros	Image	Active	Yes	No	QCOW2	12.6 MB	Launch Instance

Displaying 1 item

b. In the Create Image screen, fill in the details for the system disk and select the vTPS system disk image.

Figure 10. Create Image details screen



Create Image

Image Details

Specify an image to upload to the Image Service.

Image Name*: vtps_system

Image Description: vTPS IMAGE

Image Source

Source Type: File

File*: system_disk.raw

Format*: Raw

Image Requirements

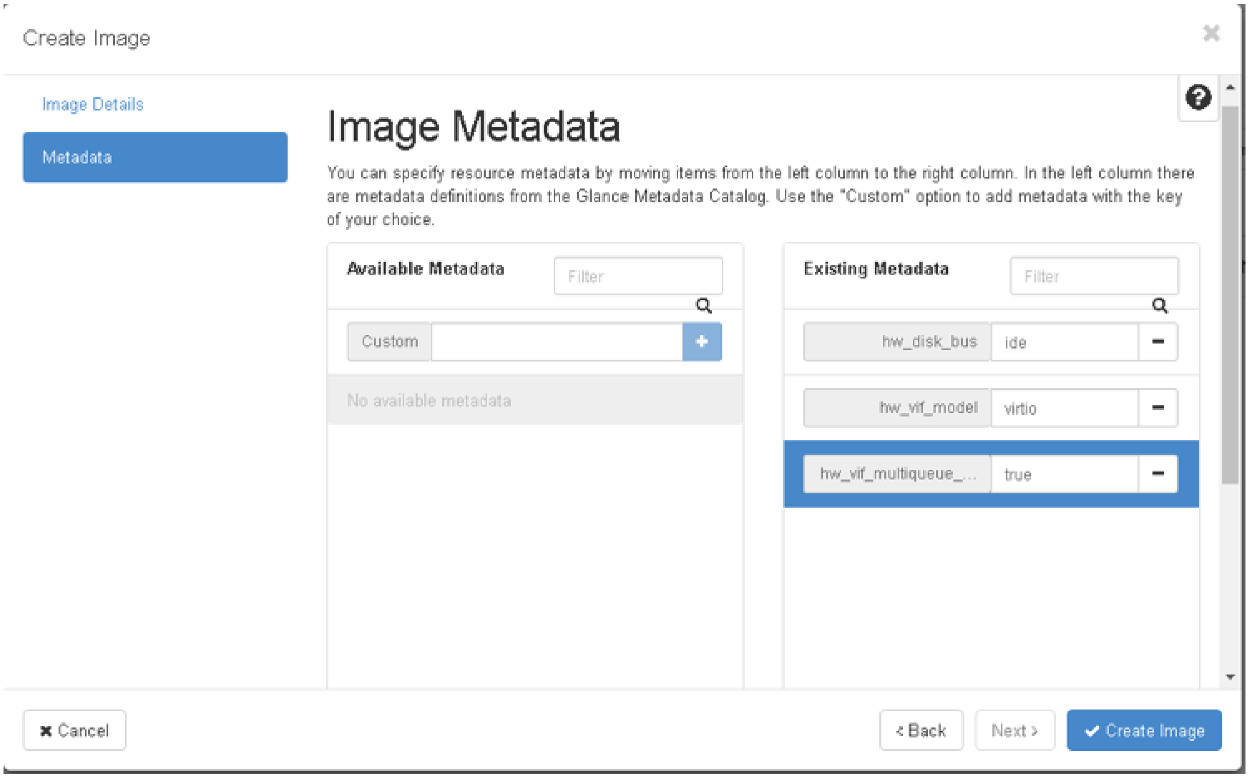
c. Click the **Create Image** button.

d. Click **Metadata** to update the image metadata.

To update the Existing Metadata for the system disk, type `hw_disk_bus` in the **Custom** field of the Available Metadata column and then click on the **+** button to add the value to the Existing

Metadata column. Repeat this step to add virtio as the `hw_vif_model` value and `true` for the `hw_vif_multiqueue` value (required for a 3-core image). Click **Create Image**.

Figure 11. Image Metadata screen



Create Image

Image Details

Metadata

Image Metadata

You can specify resource metadata by moving items from the left column to the right column. In the left column there are metadata definitions from the Glance Metadata Catalog. Use the "Custom" option to add metadata with the key of your choice.

Available Metadata

Custom

No available metadata

Existing Metadata

hw_disk_bus	ide
hw_vif_model	virtio
hw_vif_multiqueue_...	true

e. As the image uploads, you can monitor the status.

Figure 12. Image uploading status

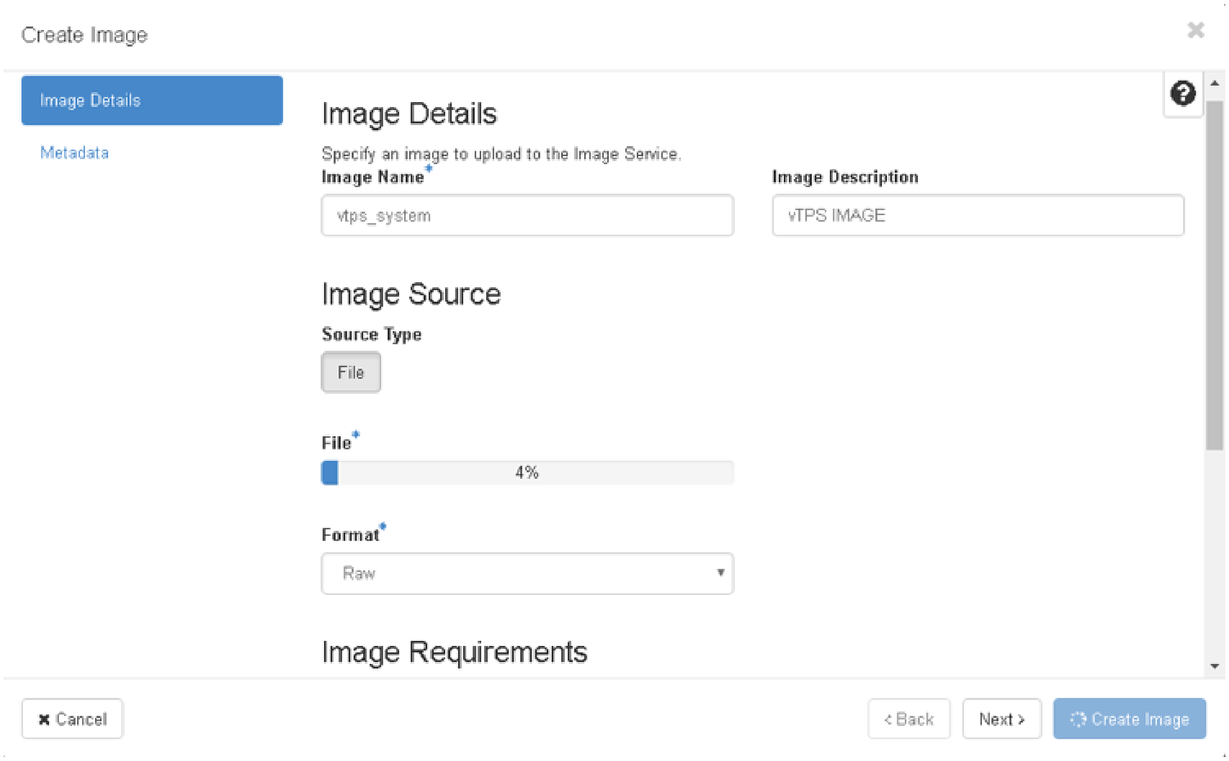


Image Details

Specify an image to upload to the Image Service.

Image Name*: vtps_system

Image Description: vTPS IMAGE

Image Source

Source Type: File

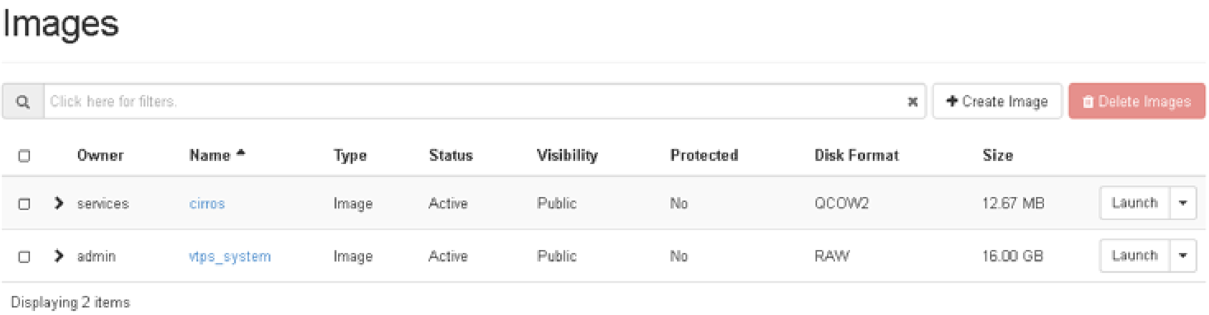
File*: 4%

Format*: Raw

Image Requirements

After the images are added, you can view them by selecting **Compute > Images**.

Figure 13. Compute Images screen showing uploaded images



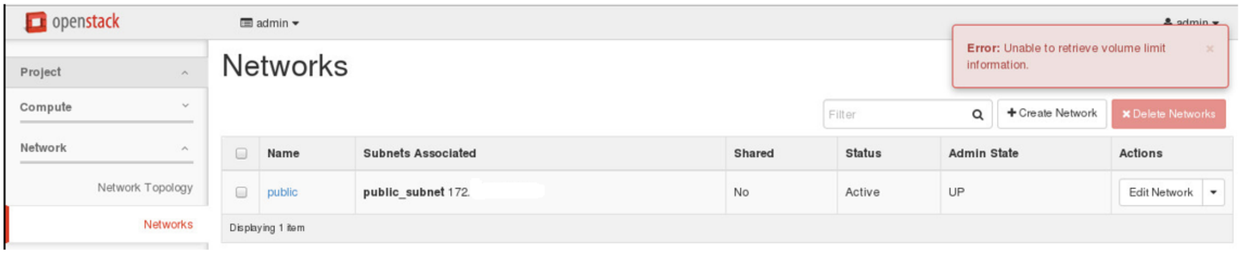
☐	Owner	Name ▲	Type	Status	Visibility	Protected	Disk Format	Size	
☐	› services	cirros	Image	Active	Public	No	QCOW2	12.67 MB	Launch ▾
☐	› admin	vtps_system	Image	Active	Public	No	RAW	16.00 GB	Launch ▾

Displaying 2 items

3. Select **Network > Networks** and click **Create Network** to create two data networks for data traffic.

   Note: The public subnet for the management network should already exist.

Figure 14. Networks screen



openstack admin ▾ admin ▾

Project ˄

Compute ˅

Network ˄

Network Topology

Networks

Networks

Error: Unable to retrieve volume limit information. ×

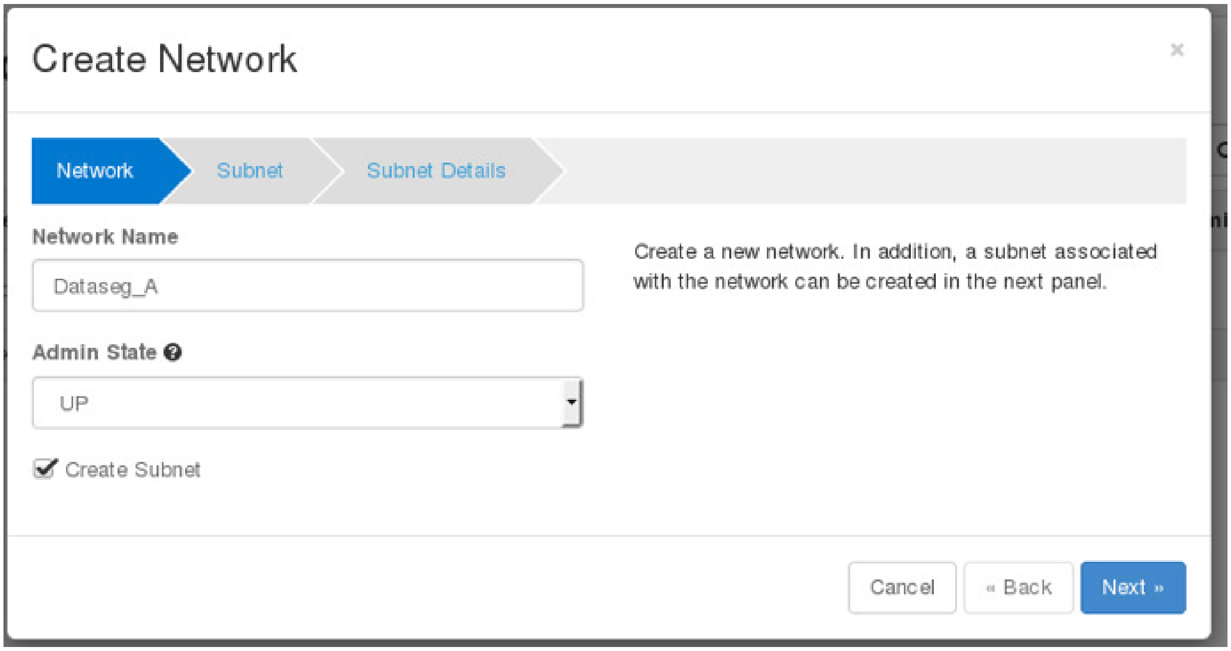
Filter 🔍 + Create Network ✖ Delete Networks

□	Name	Subnets Associated	Shared	Status	Admin State	Actions
□	public	**public_subnet** 172.[redacted]	No	Active	UP	Edit Network ▾

Displaying 1 item

a. In the Create Network dialog, provide the details for the first network data port and click **Next**.

Figure 15. Create Network screen



Create Network

×

Network | Subnet | Subnet Details

Network Name: Dataseg_A

Admin State: UP

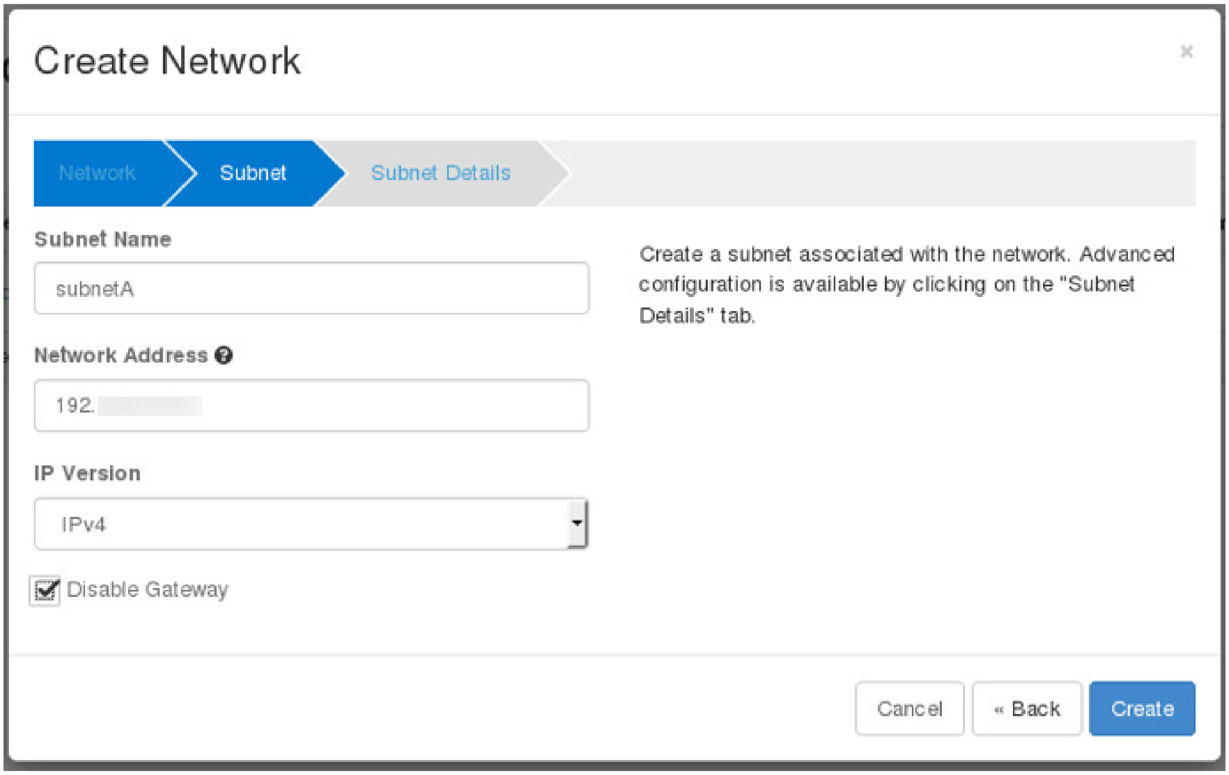
☑ Create Subnet

Create a new network. In addition, a subnet associated with the network can be created in the next panel.

Cancel « Back Next »

Provide details of the first network data port's subnet and click **Create**.

Figure 16. Create Network Subnet screen



Create Network

×

Subnet Name

subnetA

Network Address

192.[redacted]

IP Version

IPv4

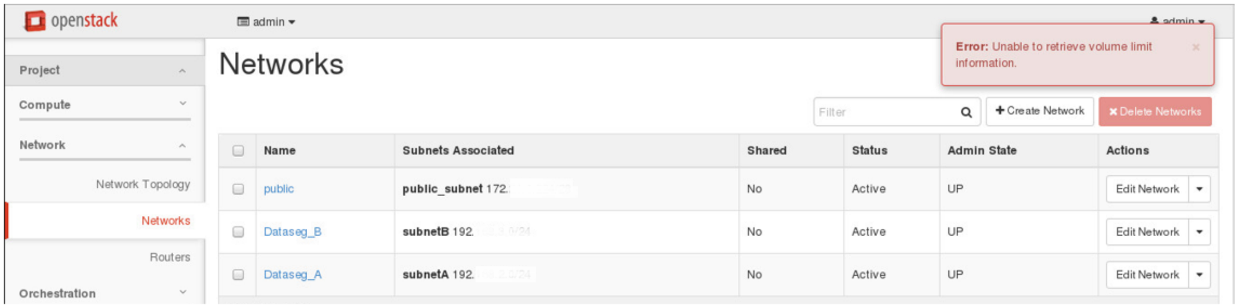
☑ Disable Gateway

Create a subnet associated with the network. Advanced configuration is available by clicking on the "Subnet Details" tab.

b. Repeat the preceding substeps accordingly to specify details for the second data port and subnet.

c. You can view the created networks by clicking **Network > Networks**.

Figure 17. Networks screen



Networks

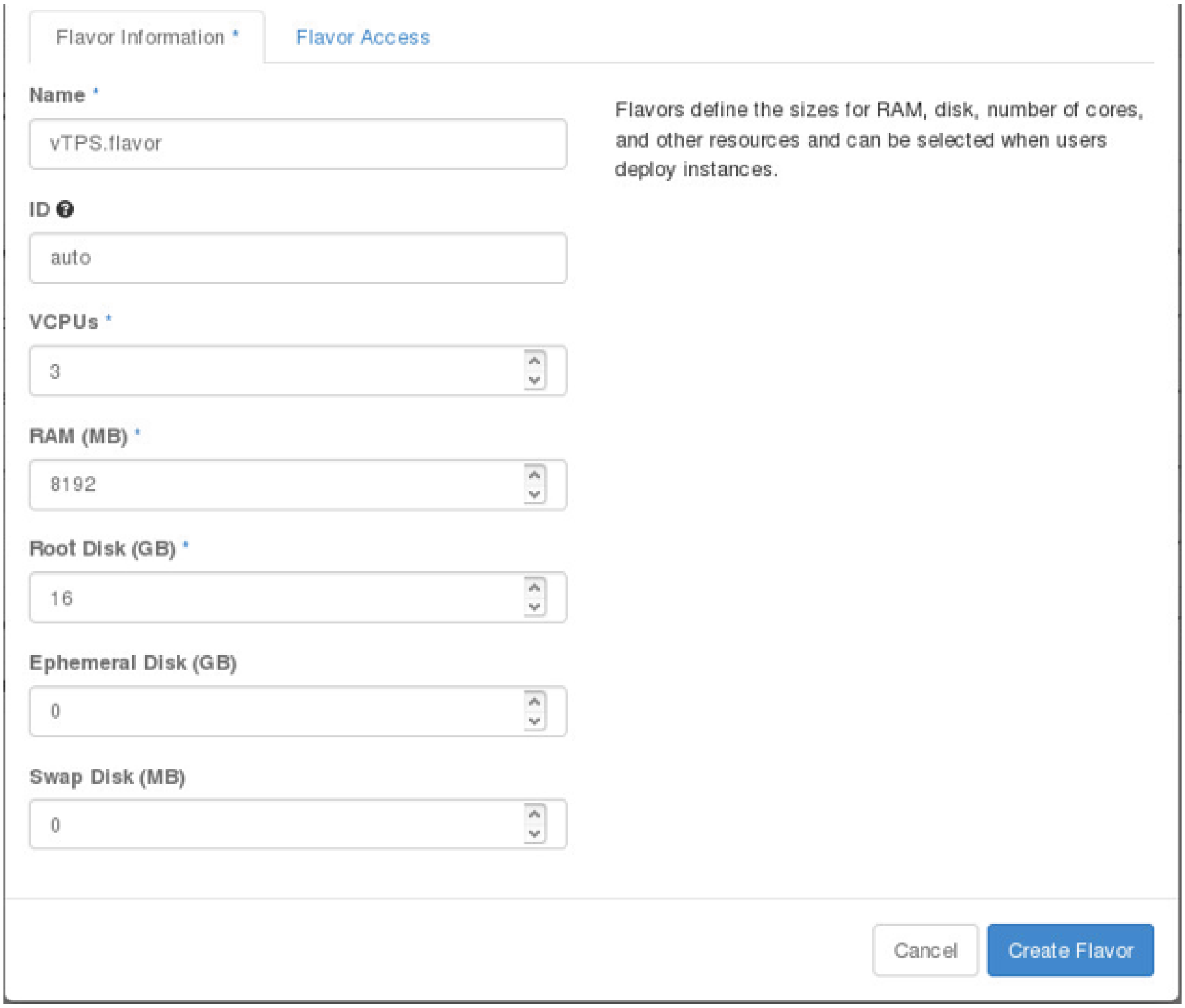
Error: Unable to retrieve volume limit information.

□	Name	Subnets Associated	Shared	Status	Admin State	Actions
□	public	**public_subnet** 172.[redacted]	No	Active	UP	Edit Network ▾
□	Dataseg_B	**subnetB** 192.[redacted]	No	Active	UP	Edit Network ▾
□	Dataseg_A	**subnetA** 192.[redacted]	No	Active	UP	Edit Network ▾

4. Select **Admin > System > Flavors** to create a vTPS flavor.

a. In the Flavor Information tab of the Create Flavor dialog, specify the details for the flavor.

Figure 18. Flavor Information screen



Name *

vTPS.flavor

Flavors define the sizes for RAM, disk, number of cores, and other resources and can be selected when users deploy instances.

ID

auto

VCPUs *

3

RAM (MB) *

8192

Root Disk (GB) *

16

Ephemeral Disk (GB)

0

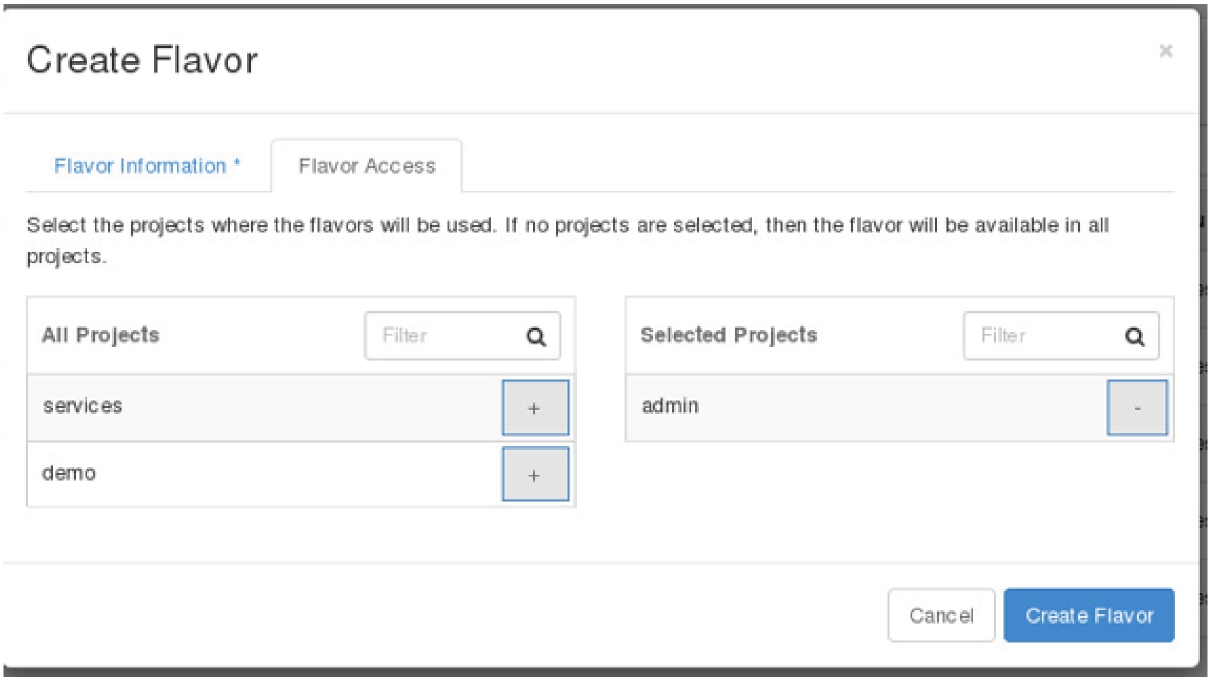
Swap Disk (MB)

0

b. In the Flavor Access tab of the Create Flavor dialog, specify the access privileges for the flavor according to the needs of your project.

For example, the following configuration provides the admin project access to the flavor.

Figure 19. Flavor configuration example



Create Flavor

Select the projects where the flavors will be used. If no projects are selected, then the flavor will be available in all projects.

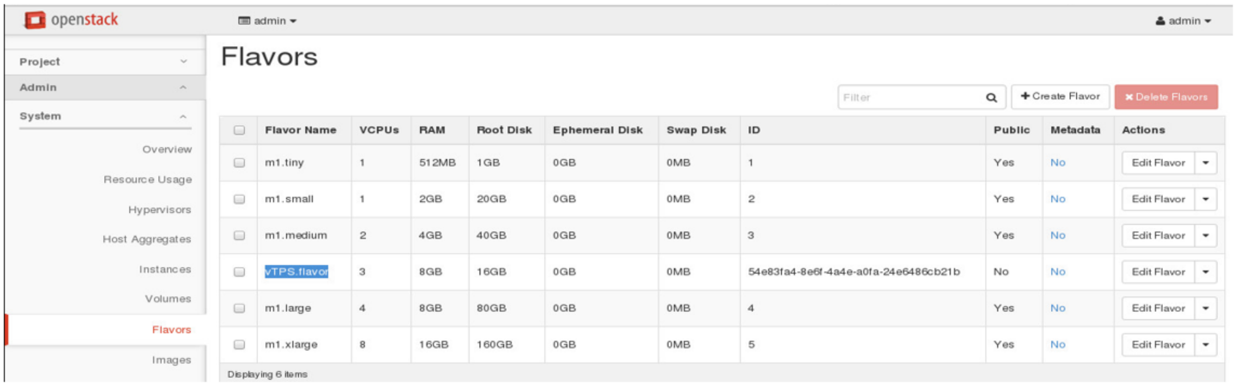
All Projects	
services	+
demo	+

Selected Projects	
admin	-

c. After you specify all details of the flavor, click **Create Flavor**.

d. You can view the flavor by clicking **System > Flavors**.

Figure 20. Flavors screen



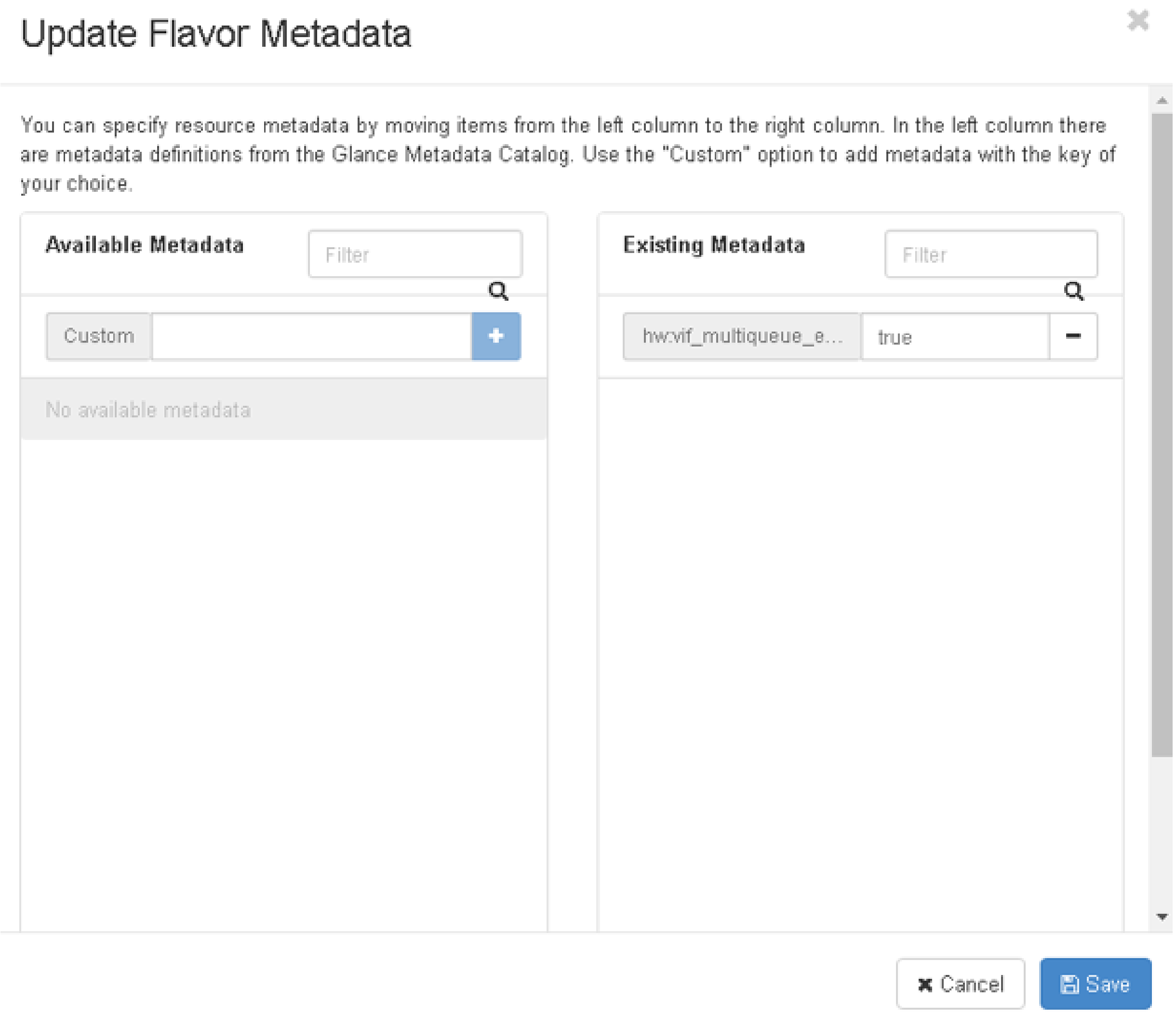
Flavors

□	Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	ID	Public	Metadata	Actions
□	m1.tiny	1	512MB	1GB	0GB	0MB	1	Yes	No	Edit Flavor
□	m1.small	1	2GB	20GB	0GB	0MB	2	Yes	No	Edit Flavor
□	m1.medium	2	4GB	40GB	0GB	0MB	3	Yes	No	Edit Flavor
□	vTPS.flavor	3	8GB	16GB	0GB	0MB	54e83fa4-8e6f-4a4e-a0fa-24e6486cb21b	No	No	Edit Flavor
□	m1.large	4	8GB	80GB	0GB	0MB	4	Yes	No	Edit Flavor
□	m1.xlarge	8	16GB	160GB	0GB	0MB	5	Yes	No	Edit Flavor

Displaying 6 items

e. Click the down arrow next to **Edit Flavor** to set the `hw:vif_multiqueue_enabled` metadata as `True` for the flavor. This update is necessary for 3-core images.

Figure 21. Update Flavor Metadata screen



Update Flavor Metadata

You can specify resource metadata by moving items from the left column to the right column. In the left column there are metadata definitions from the Glance Metadata Catalog. Use the "Custom" option to add metadata with the key of your choice.

hw:vif_multiqueue_e... true

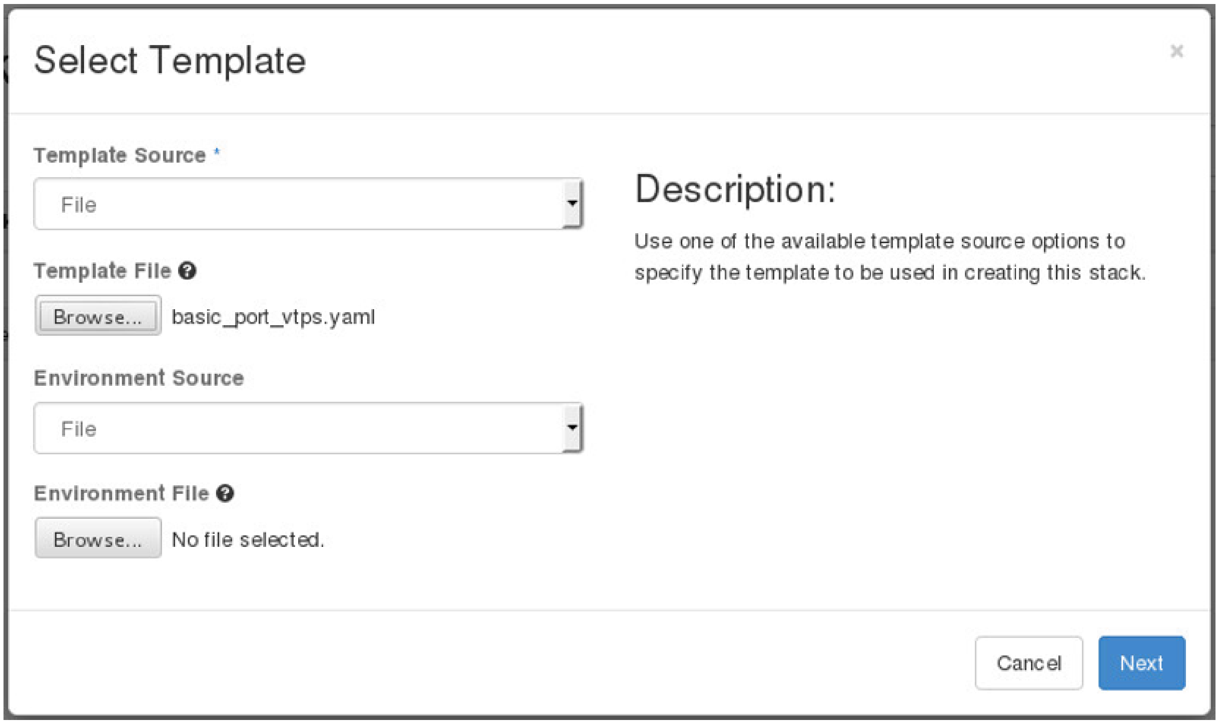
f. Click **Save**.

5. Before creating the stack, ensure your vTPS yml template file is in an accessible location on your system.

6. Select **Orchestration > Stacks** and click **Launch Stack** to launch the vTPS stack.

   a. In the Select Template dialog, specify the yml template file and click **Next**.

   Figure 22. Select Template screen for your stack



Select Template

Template Source *

File

Template File

basic_port_vtps.yaml

Environment Source

File

Environment File

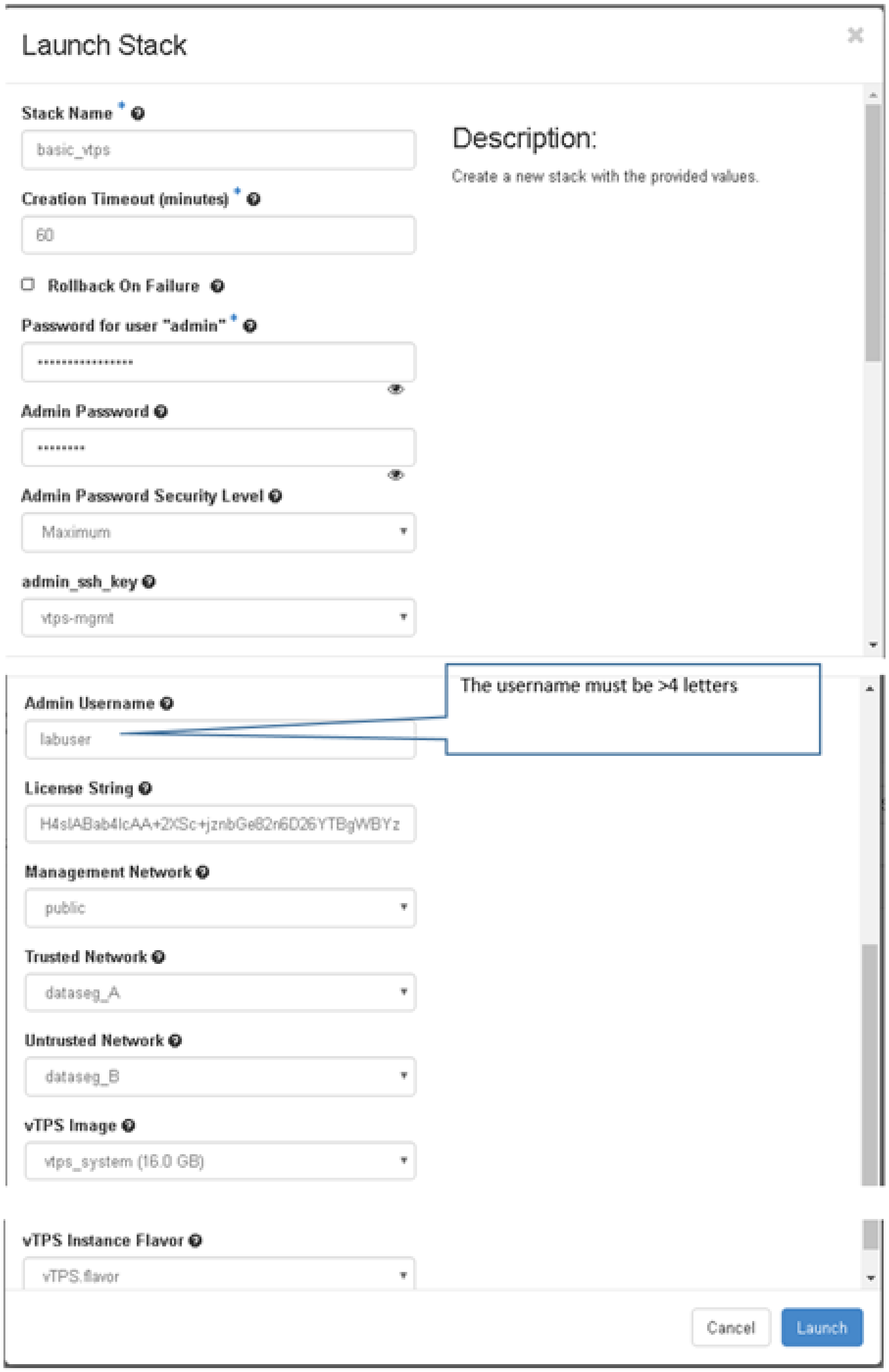
No file selected.

Description:

Use one of the available template source options to specify the template to be used in creating this stack.

b. Specify the details for the stack, including appropriate values for the network, image, and flavor, and click **Launch**.

Figure 23. Launch stack screen



Launch Stack

Stack Name *: basic_vtps

Creation Timeout (minutes) *: 60

□ Rollback On Failure

Password for user "admin" *: ••••••••••••••••

Admin Password: ••••••••

Admin Password Security Level: Maximum

admin_ssh_key: vtps-mgmt

Admin Username: labuser

The username must be >4 letters

License String: H4sIABab4lcAA+2XSc+jznbGe82n6D26YTBgWBYz

Management Network: public

Trusted Network: dataseg_A

Untrusted Network: dataseg_B

vTPS Image: vtps_system (16.0 GB)

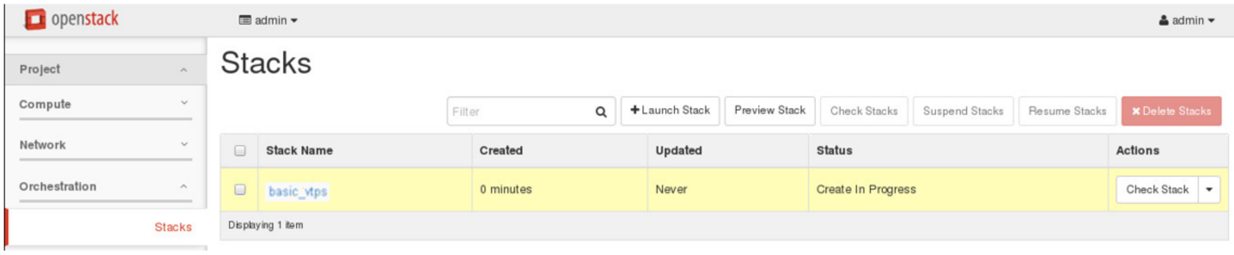
vTPS Instance Flavor: vTPS.flavor

Description:

Create a new stack with the provided values.

c. Confirm the creation status of the stack by selecting **Orchestration > Stacks**.

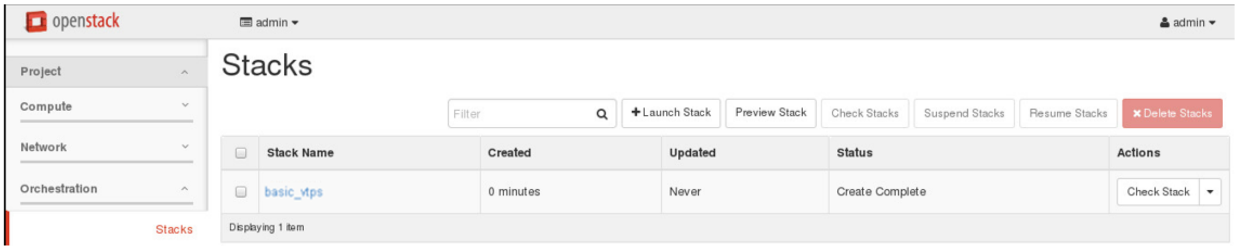
Figure 24. Stacks screen



Stacks

☐	Stack Name	Created	Updated	Status	Actions
☐	basic_vtps	0 minutes	Never	Create In Progress	Check Stack

Displaying 1 item



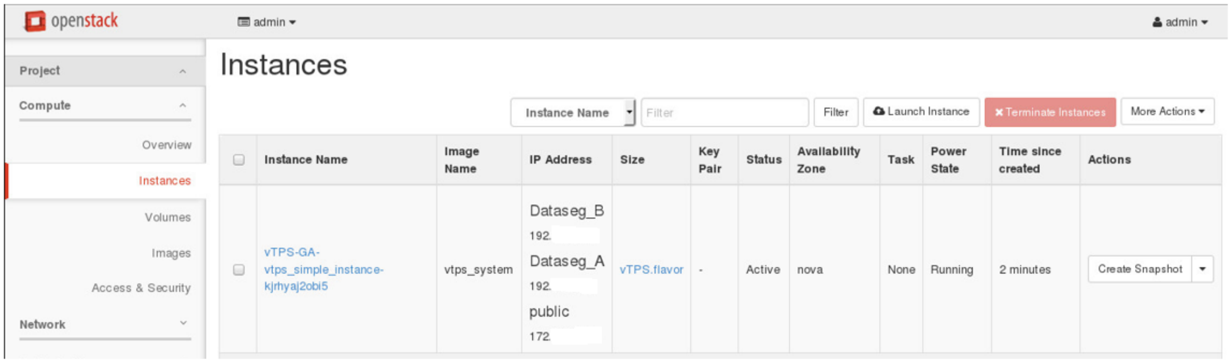
Stacks

☐	Stack Name	Created	Updated	Status	Actions
☐	basic_vtps	0 minutes	Never	Create Complete	Check Stack

Displaying 1 item

7. Select **Compute > Instances** and select the vTPS instance so you can connect to it.

Figure 25. Instances screen

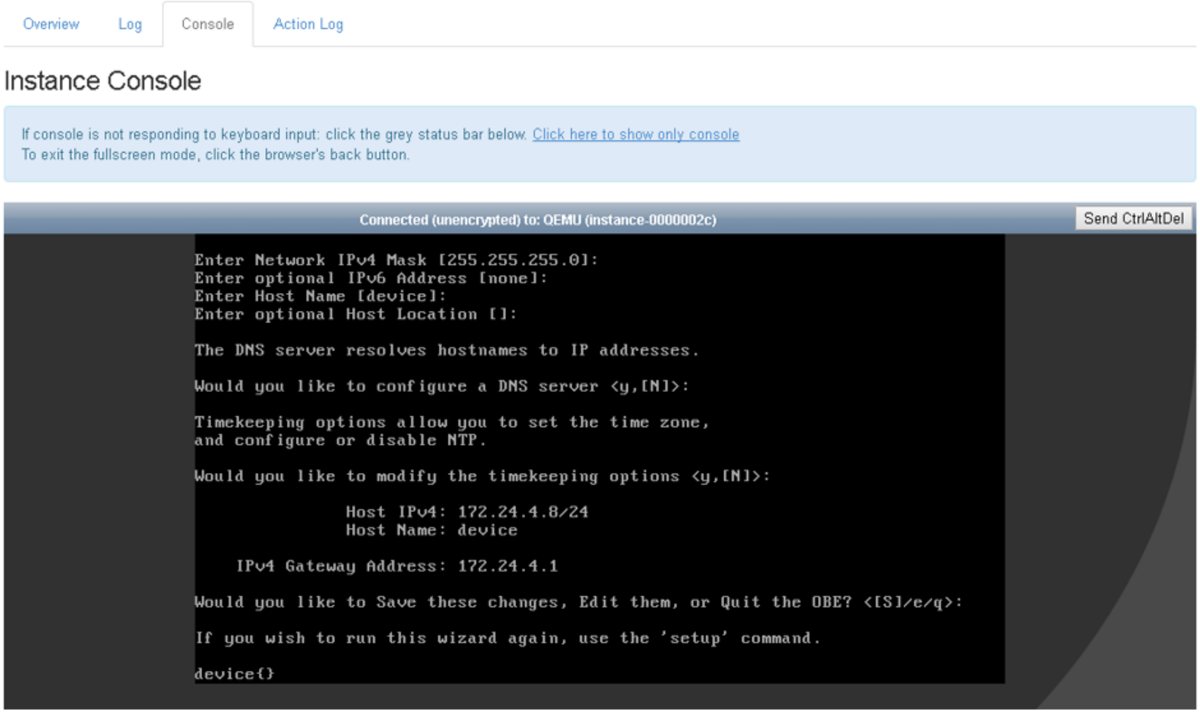


Instances

☐	Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
☐	vTPS-GA-vtps_simple_instance-kjrhyaj2obi5	vtps_system	Dataseg_B 192. Dataseg_A 192. public 172.	vTPS.flavor	-	Active	nova	None	Running	2 minutes	Create Snapshot

8. Click on the Console tab to access the vTPS console and begin the OBE configuration.

Figure 26. Instance Console screen


Overview
Log
Console
Action Log
Instance Console
If console is not responding to keyboard input: click the grey status bar below. Click here to show only console
To exit the fullscreen mode, click the browser's back button.
Connected (unencrypted) to: QEMU (instance-0000002c)
Send CtrlAltDel

```
Enter Network IPv4 Mask [255.255.255.0]:
Enter optional IPv6 Address [none]:
Enter Host Name [device]:
Enter optional Host Location []:

The DNS server resolves hostnames to IP addresses.

Would you like to configure a DNS server <y,[N]>:

Timekeeping options allow you to set the time zone,
and configure or disable NTP.

Would you like to modify the timekeeping options <y,[N]>:

               Host IPv4: 172.24.4.8/24
               Host Name: device

    IPv4 Gateway Address: 172.24.4.1

Would you like to Save these changes, Edit them, or Quit the OBE? <[S]/e/q>:

If you wish to run this wizard again, use the 'setup' command.

device{}
```

Based on how you configured your yml file, the OBE wizard runs automatically, including a reboot to retrieve the OBE parameters and another reboot to install the device certificate.

Template sample

To access a sample HEAT template file, untar the vTPS Tar package and open the `basic_port_vtps.yaml` template file. The following template shows values for a sample Normal image environment only. In an actual deployment, values will vary according to each environment.

```
heat_template_version: 2015-10-15
description: Simple vtps instance with 1 mgmt port and 2 data ports. It will use
2/3 (Normal) or 6 (Performance) VCPU and 8 GB (Normal) or 16 GB (Performance)
memory. The template will require the user to use the fixed IP address for
the management port. The flavor should be based on the compute host capability.
Refer to the deployment guide.
parameters:
  vtps_image_id:
    type: string
    label: vTPS Image
    description: Image to be used for vTPS instance
    constraints:
      - custom_constraint: glance.image
        description: Select the Glance image
  vtps_instance_type:
    type: string
    label: vTPS Instance Flavor
    description: Type of instance (flavor) to be used for vTPS
    constraints:
      - custom_constraint: nova.flavor
        description: Select the Nova flavor
  private_net_vtps_mgmt:
    type: string
    label: Management Network
    description: ID of network into which vTPS is deployed
    constraints:
      - custom_constraint: neutron.network
        description: Select the Management network
  private_net_vtps_untrust:
    type: string
    label: Untrusted Network
    description: ID of network into which vtps data port 1A is deployed
    constraints:
      - custom_constraint: neutron.network
        description: Select the untrusted network
  private_net_vtps_trust:
    type: string
    label: Trusted Network
    description: ID of network into which vtps data port 1B is deployed
    constraints:
      - custom_constraint: neutron.network
        description: Select the trusted network
  admin_username:
    type: string
    label: Admin Username
    description: default admin user name.
    default:
  admin_password_security_level:
    type: string
    label: Admin Password Security Level
    description: the security level for the password for the admin user
    default: None
    constraints:
      - allowed_values:
        - None
        - Low
        - Medium
        - High
  admin_password:
    type: string
    label: Admin Password
    description: Password for the admin user
    default:
    hidden: true
  admin_ssh_key:
     type: string
     description: SSH key pair for admin account
     constraints:
      - custom_constraint: nova.keypair
     description: Must name a public key (pair) known to Nova
  instance_license:
    type: string
    label: License String
    description: vTPS instance license certificate
    default:
resources:
  vtps_mgmt_port:
    type: OS::Neutron::Port
    properties:
      network: { get_param: private_net_vtps_mgmt }
  vtps_data_port_A:
    type: OS::Neutron::Port
    properties:
      network: { get_param: private_net_vtps_untrust }
  vtps_data_port_B:
    type: OS::Neutron::Port
    properties:
      network: { get_param: private_net_vtps_trust }
  vtps_instance:
    type: OS::Nova::Server
    depends_on: [ vtps_mgmt_port, vtps_data_port_A, vtps_data_port_B ]
    properties:
      key_name: { get_param: admin_ssh_key }
      image: { get_param: vtps_image_id }
      flavor: { get_param: vtps_instance_type }
      networks:
        - port: { get_resource: vtps_mgmt_port  }
        - port: { get_resource: vtps_data_port_A  }
        - port: { get_resource: vtps_data_port_B  }
      config_drive: "true"
      user_data_format: RAW
      user_data:
        str_replace:
          template: |
            com_tippingpoint_IP = __instance_mgmt_IP__
            com_tippingpoint_Gateway = __instance_Gateway__
            com_tippingpoint_Security_Level = __admin_level__
            com_tippingpoint_Username = __admin_username__
            com_tippingpoint_Password = __admin_password__
            com_tippingpoint_VSSH_Public_Key = __admin_ssh_key__
            com_tippingpoint_Cert_License = __instance_license__
          params:
            __instance_mgmt_IP__:
                 list_join:
                      - ''
                      - - {get_attr: [vtps_mgmt_port, fixed_ips, 0, ip_address]}
                        - '/'
                        - {str_split: ['/', {get_attr: [vtps_mgmt_port,
                                       subnets, 0, cidr]}, 1]}
            __instance_Gateway__: { get_attr: [vtps_mgmt_port, subnets, 0,
                                               gateway_ip] }
            __admin_level__: { get_param: admin_password_security_level }
            __admin_username__: { get_param: admin_username }
            __admin_password__: { get_param: admin_password }
            __admin_ssh_key__: { get_param: admin_ssh_key }
            __instance_license__: { get_param: instance_license }
outputs:
  vtps_instance_name:
    description: Name of the instance
    value: { get_attr: [vtps_instance, name] }
  vtps_instance_id:
    description: ID of the instance
    value: { get_resource: vtps_instance }
  mgmt_ip:
    description: IP with CIDR for the vtps mgmt network.
    value:
        list_join:
          - ''
          - - {get_attr: [vtps_mgmt_port, fixed_ips, 0, ip_address]}
            - '/'
            - {str_split: ['/', {get_attr: [vtps_mgmt_port, subnets, 0, cidr]}, 1]}
```

Upgrade from vTPS Trial to vTPS Standard

To upgrade your vTPS from Trial Mode to vTPS Standard Mode, install the license entitlement package and the license certificate package. You can purchase a license through your regular sales channel.

The vTPS device remains in Trial Mode until a valid certificate is installed. The Trial Mode vTPS comes with limited feature capabilities. After a certificate is installed, the vTPS device deploys in Standard Mode, and the capabilities purchased with the license package are activated.

When the vTPS device upgrades to Standard Mode, you can install your DV package.

The following information describes how to install the license entitlement package, create, download, and install the license certificate package, and install your DV package:

- *Install your license entitlement package* on page 39
- *Create and download vTPS device license certificates* on page 39
  - *To install the vTPS license certificate using the LSM* on page 40
  - *To install the vTPS license certificate using the SMS* on page 41
- *Install a Digital Vaccine package* on page 42

Install your license entitlement package

Note: If your vTPS is managed by an SMS, you can configure the SMS to automatically retrieve and distribute the most current license entitlement package. See the *SMS User Guide* for more information.

You can retrieve your license entitlement package from the TMC (**My Account > TippingPoint License Package**).

For information on installing your license entitlement package, refer to your LSM and SMS documentation.

Create and download vTPS device license certificates

Use the following information to create a vTPS license certificate using the license manager. The license certificate package assigns a purchased inspection throughput license to a vTPS device. After you create a vTPS license certificate, install the certificate on the vTPS.

To create a vTPS device license certificate

1. Open the license manager.

   To access the license manager, go to the TMC, and navigate to **My Account** > **License Manager**.

2. From the License Management page of the license manager, click **Create vTPS Licenses**.

The **Create vTPS Licenses** dialog opens.

3. (Optional) If you want to add SSL inspection to a vTPS device, but SSL is disabled, apply for SSL compliance.

   There are four states of SSL compliancy; Unknown, Pending, Compliant, and Non-Compliant. Before SSL is enabled, the SSL compliancy state is set at Unknown.

   Complete the following steps to apply for SSL compliance:

   a. Next to **Your SSL is disabled**, click **Apply Now**.
   b. Fill out the Apply for SSL Compliance page.
   c. Click **Apply**.

      After you click **Apply**, the SSL compliance state changes to Pending. When the application process is completed, the state will either change to Compliant if SSL is approved or Non-Compliant if SSL is not approved.

      If you are SSL Compliant, SSL inspection is enabled on all of your vTPS devices.

4. Under **Action**, select the number of vTPS certificates that you want to create.
5. Click **Create**.

After the vTPS certificate is created, use the SMS or LSM to install the certificate to a vTPS device.

Important: If you do not use an SMS or if your SMS is not connected to the TMC, you must manually download and install the vTPS certificate package. After you download the vTPS certificate package, you can manually install the package from the SMS or LSM.

To download the vTPS certificate package

1. In the license manager, click **Download Cert**.
2. Select **vTPS Cert** from the drop down options.

   The vTPS Certificate Package page displays on the TMC.

3. Click **Download**.
4. Accept the EULA Agreement.
5. Save the vTPS certificate file to a local folder.

To install the vTPS license certificate using the LSM

Complete the following steps to install a vTPS license certificate on a vTPS device using the LSM.

1. Download the vTPS license certificate package from the license manager.
2. Log in to the LSM on your vTPS device.
3. Select **System > System, DV, License**.

4. On the System Software, Digital Vaccine, Certificate and Licenses page, click **Install Certificate**.
5. In the dialog screen that is displayed, browse to the location where you saved the vTPS license certificate package and click **Install**.
6. After the license certificate package is installed, click **OK** to reboot your device.

The device starts up in Standard Mode.

To install the vTPS license certificate using the SMS

Complete the following steps to install a vTPS certificate on a vTPS device using the SMS.

1. Ensure that the vTPS device is managed by the SMS.
2. In the SMS client, navigate to the Devices workspace.
3. Right-click on the appropriate vTPS device in **All Devices**, and then click **Edit** > **Install Certificate...**.

   The **vTPS License Installation Wizard** is displayed.

4. Select an available vTPS certificate from the drop-down list to install on your vTPS device.

   The certificates are grouped by type (speed, capabilities, expiration date) and quantity. After you select a certificate, the certificate ID is displayed.

5. Select one of the following options:

   - **Download from TMC** — The SMS automatically downloads the selected certificate from the TMC. The SMS must be connected to the TMC to use this option.
   - **Import file** — Import a locally saved certificate file to the SMS. If you select this option, you must first manually create and download the appropriate certificate file from the license manager.

6. After you select either **Download from TMC** or **Import file**, click **Next**.

   - If you selected **Download from TMC**, and if the certificate file successfully downloads, the **Certificate Validated** page appears. Proceed to step 9.

     Note: If the automatic download from the TMC fails, the **Manual Certificate Import** page appears with an error message. Retry the automatic TMC download or click **Next** to import the certificate file manually.

   - If you selected **Import file**, the **Import Certificate File** page appears. Proceed to step 7.

7. On the **Import Certificate File** page, click **Browse**.
8. Select the appropriate certificate file that you created and downloaded in the license manager, and then click **Import**.

   Note: If you select the incorrect certificate file, the **Certificate Validation Failed** page appears. Click **Previous** to go back to the **Import Certificate File** page, and then upload a different certificate file.

When the certificate file successfully imports, the **Certificate Validated** page appears.

9. On the **Certificate Validated** page, click **Finish**.

   The SMS installs the license certificate package on the vTPS device. You can view the progress of the installation on the **Distribute to Device** dialog.

The vTPS device automatically reboots after the license certificate successfully installs on the device. When the reboot sequence completes, the new license certificate capabilities activate on the vTPS device.

Install a Digital Vaccine package

Note: If your vTPS is being managed by an SMS, you can configure the SMS to automatically retrieve and distribute the most current DV package each week. See the *SMS User Guide* for more information.

While in Trial Mode, your vTPS has a base DV installed with a limited number of security filters that cannot be changed. After you upgrade your device to Standard Mode, you can then install a full DV package.

For information on installing your DV package, refer to your LSM and SMS documentation.

Troubleshooting tips

Before contacting support, check to see if your issues are addressed in the following troubleshooting tips.

Difficulty logging in to the vTPS LSM

Resolution: Be sure to correctly map your network adapters so that you can access your vTPS device by using the LSM and CLI: **vTPS > Getting Started > Edit Virtual Machine settings > Hardware > Network Adapter**.

Configuring a distributed switch environment in promiscuous mode

Resolution: A vTPS must be configured in promiscuous (port-mirroring) mode. If a vTPS is connected to a distributed switch, ensure that any Forged Transmits and MAC Address Changes are set to ACCEPT so that network packets can be forwarded to each host in the port group.

Resolution: Although the vTPS does not support VMware vMotion, you can emulate a vMotion configuration by connecting two or more different hosts with two or more vTPS devices that are actively connected to the distributed vSwitch. The vTPS that is connected to the active VM acts as an IPS, and the vTPS that is not connected to the VM acts as an IDS. If you connect your SMS to both vTPS instances, any blocks and alerts will also be received by the SMS.

CPU usage always displays as 100% in hypervisor

Resolution: To see the actual CPU usage, enter the `show health cpu` command for the device.

Resolution: To manage the CPU usage, create a resource pool in the vSphere Web Client. For more information, refer to *Manage Resource Pools*.

Errors after Suspend and Resume operation

Resolution: HEALTH-ALERT errors generated after a Suspend and Resume operation can be ignored.

Examining OpenStack HEAT template events

Resolution: Use the `heat event-list <name of stack>` command to see a list of events.

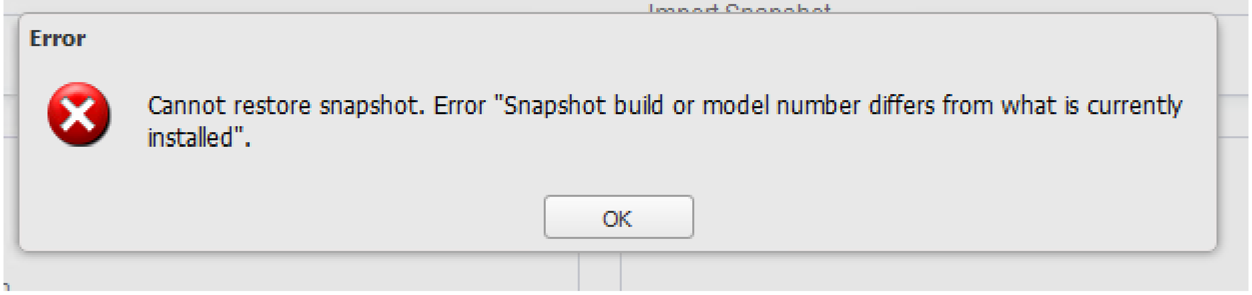
Resetting OBE parameters after a factory reset

Resolution: A factory reset does not reset the initial deployment parameter values—including IP address, username, and password. To change these values, you must deploy a new vTPS.

Snapshot cannot be restored

Resolution: Only vTPS to vTPS snapshots are supported. Restoring snapshots from other TippingPoint devices is not supported. Attempts will fail with the following error.

Figure 27. Snapshot error



Cannot restore snapshot. Error "Snapshot build or model number differs from what is currently installed".

Time synchronization issues in KVM environment

Resolution: If after an extended Suspend and Resume operation the device time does not sync with the server time, shut down and restart the system.

Verifying OpenStack HEAT template properties

Resolution: Use the virsh utility to dump the template xml file and examine your property settings, including the cpu count, the disk adapter type, and the network adapters:

```
localuser@vTPS-Helion1:~/heat_templates$ virsh
Welcome to virsh, the virtualization interactive terminal.
Type:  'help' for help with commands
       'quit' to quit
virsh #
virsh # list --all
 Id    Name                           State
----------------------------------------------------
 3     instance-00000002              running
virsh # dumpxml instance-00000002
  <cpu mode='custom' match='exact'>
    <model fallback='allow'>Conroe</model>
    <topology sockets='3' cores='1' threads='1'/>
  </cpu>
    <emulator>/usr/bin/kvm-spice</emulator>
    <disk type='file' device='disk'>
      <driver name='qemu' type='qcow2' cache='none'/>
      <source file=
'/opt/stack/data/nova/instances/56a5d809-5df5-435d-a665-24885891fff6/disk'/>
      <target dev='hda' bus='ide'/>
      <alias name='ide0-0-0'/>
      <address type='drive' controller='0' bus='0' target='0' unit='0'/>
    </disk>
    <interface type='bridge'>
      <mac address='fa:16:3e:c0:b9:8a'/>
      <source bridge='qbr4edb826d-6d'/>
      <target dev='tap4edb826d-6d'/>
      <model type='virtio'/>
      <alias name='net0'/>
      <address type='pci' domain='0x0000' bus='0x00' slot='0x03' function='0x0'/>
    </interface>
    <interface type='bridge'>
      <mac address='fa:16:3e:d8:1e:be'/>
      <source bridge='qbr37a85eb2-d0'/>
      <target dev='tap37a85eb2-d0'/>
      <model type='virtio'/>
      <alias name='net1'/>
      <address type='pci' domain='0x0000' bus='0x00' slot='0x04' function='0x0'/>
    </interface>
    <interface type='bridge'>
      <mac address='fa:16:3e:7a:1f:90'/>
      <source bridge='qbre8d767e5-f9'/>
      <target dev='tape8d767e5-f9'/>
      <model type='virtio'/>
      <alias name='net2'/>
      <address type='pci' domain='0x0000' bus='0x00' slot='0x05' function='0x0'/>
    </interface>
```

vTPS device experiencing data port performance problems

Example: `ID HEALTHCHECKD Device is still experiencing performance problems (loss=<xx>%, threshold=<x>%). 0 alerts not logged.`

Resolution: Make sure three standard vSwitches or distributed vSwitches are properly configured on the ESXi or vCenter with multiple port groups for data and vTPS management traffic.

Resolution: Avoid large iptable entries. Larger iptable entries can reduce vTPS performance as much as 20 percent in a KVM deployment.

Resolution: Make sure port groups are enabled in promiscuous mode. Ensure that any Forged Transmits and MAC Address Changes are set to ACCEPT in order for network packets to get forwarded.

Resolution: Confirm each vTPS is configured with its own data port group. Using the same vSwitches across multiple vTPS devices can cause performance issues.

Configuring a serial console

ESXi Resolution: If you specified a serial console for your VM, add a serial port by editing the properties of the VM:

1. Right-click your new VM and click **Add**.
2. Select **Serial port** and click then **Next**.
3. Select **Connect via Network** and click then **Next**.
4. Select **Server** and provide a port for the Port URI (for example, `telnet://:1239`).
5. Click **Next**, and then click **Finish**.
6. Reboot the vTPS device. Before the console completes the change from VGA to Serial, the device reboots a second time automatically.
7. Enter the following command from a Linux shell to access the serial console:

```
telnet <esxi host> <port number>
```

For example:

```
telnet esxi01 1239
```

KVM Resolution: Follow the procedure in *Automating vTPS installation on KVM* on page 19. Specify the `com_tippingpoint_Console = serial` option in the `vtps-env.txt` file.

After the serial console is specified, enter the following to access the console from the KVM host:

```
virsh console <VM_NAME>
```

KVM also supports several alternative serial console modes, including TCP, UDP, and UNIX. For these options, use `virt-manager` to delete the existing serial device and add a different type. For more information, refer to the virtualization administrative guides for KVM or RedHat.

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