



**Lighthouse 5.2.0**

**User Guide**

Revision 1.0.0

2018-04-05

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## 1. Lighthouse Terminology

Terms used to define Lighthouse elements and concepts are listed below.

| Term                      | Definition   |
|---------------------------|--|
| <b>Enrollment</b>         | Connecting a node to Lighthouse  |
| <b>Enrollment Bundle</b>  | Used to assign a number of tags to a set of nodes when they are enrolled. During enrollment, the bundle is specified using its name, and a bundle-specific enrollment token.   |
| <b>Enrolled Node</b>      | Node that has been connected to Lighthouse and is ready for use.   |
| <b>Enrollment Token</b>   | A password that authorizes the node with Lighthouse. Used when performing Node-based, or ZTP enrollment.   |
| <b>Lighthouse Ironman</b> | Refers to the 5.1 and later releases of Lighthouse. Rewritten from the ground up, it provides a solid basis for accessing, managing and monitoring Opegear console servers.  |
| <b>Lighthouse VPN</b>     | The OpenVPN based connections that the Lighthouse instance has with the nodes it is managing   |
| <b>Managed Device</b>     | A device that is managed via a node through a serial, USB, or network connection.  |
| <b>Node</b>               | A device that can be enrolled with Lighthouse, allowing it to be accessed, managed, and monitored. Currently, Opegear console servers are supported on a standard license, with support for other vendors Console Servers available as an add-on.            |
| <b>Pending Node</b>       | A node that has been connected to Lighthouse and has been configured with a VPN Tunnel, but which has not yet been approved for access, monitoring, or management. The approval operation can be automated by configuring Lighthouse to auto- approve nodes. |
| <b>Role</b>               | A set of access rights for a particular group. Three roles are defined within Lighthouse Ironman: Lighthouse Administrator, Node Administrator, and Node User.   |
| <b>Smart Group</b>        | Dynamic filter used to search for particular nodes, or for defining the access rights of a group of users. Smart Groups use node properties, as well as tags defined by users.   |
| <b>Tag</b>                | User-defined attribute and value that is assigned to one or more nodes. Tags are used when creating Smart Groups for filtering views or access to nodes.   |

## 2. Lighthouse overview

### 2.1 Lighthouse VM 5.2.0 host requirements

- Lighthouse deploys as an application running in a Linux-based virtual machine(VM). The Lighthouse binary is available in both open (for VM managers such as Boxes, KVM, and VirtualBox), Vmware and Hyper-V specific Virtual Machine formats.
- To run a Lighthouse VM, your host computer must be able to run a VM manager and at least one full 64-bit Linux-based virtual machine.
- To host Lighthouse, the VM needs to be configured to support:
  - 10GB SCSI disk.
  - 1 x network interface card, preferably paravirtualised (virtio, vmxnet3), Realtek rtl8139, or Intel e1000 are also supported, bridged.
  - VGA console for initial setup.

To dimension CPU and RAM resources, follow these guidelines:

CPU and RAM utilization increase with the number of enrolled nodes.

For small deployments (less than 100 nodes), allocate:

- 2 x 64-bit CPU cores.
- 4GB RAM.

For medium deployments (between 100 and 600 nodes), allocate:

- 4 x 64-bit CPU cores.
- 8GB RAM.

For large deployments (between 600 and 1200 nodes), allocate:

- 4 x 64-bit CPU cores.
- 16GB RAM.

For very large deployments (more than 1200 nodes), allocate:

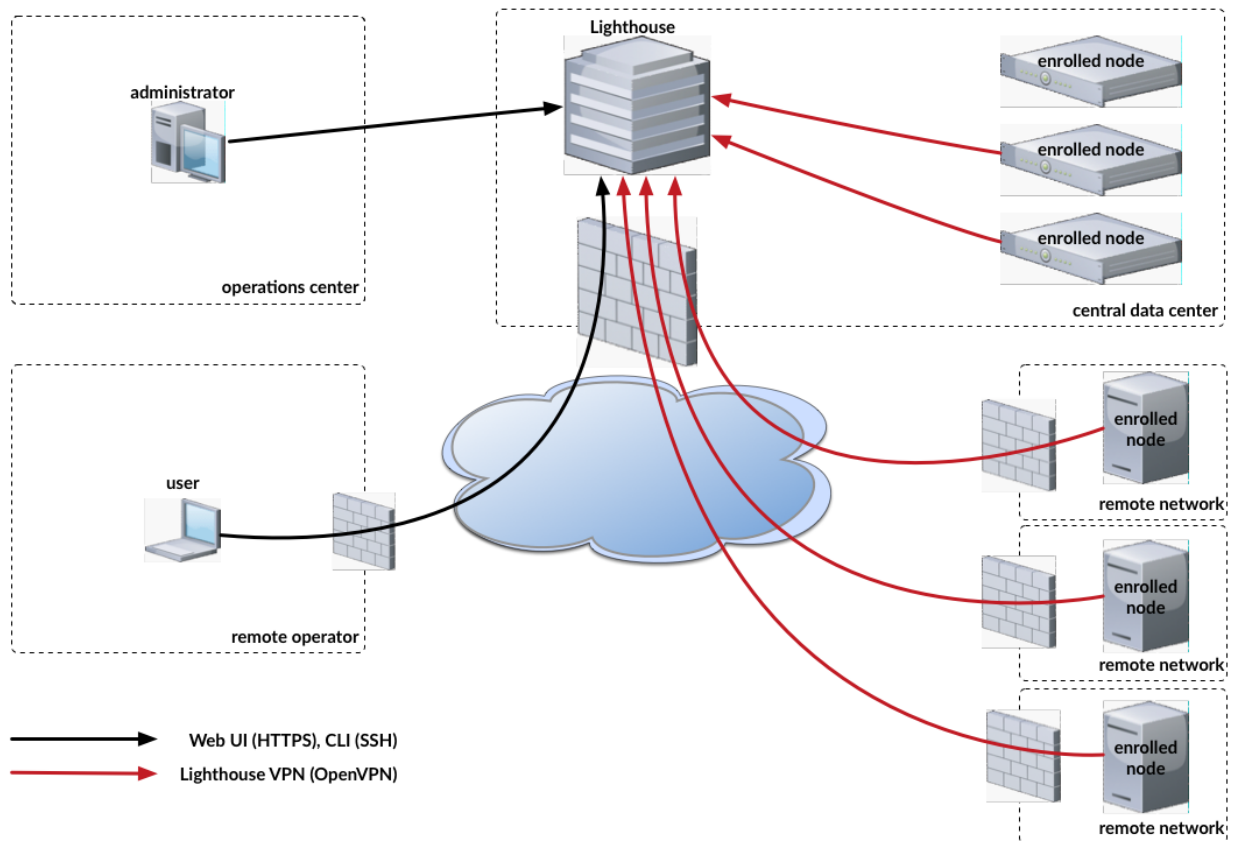
- 8 x 64-bit CPU cores.
- 32GB RAM.

For large and very large deployments, please contact us for guidance on your deployment options, including low and zero-touch enrollment. The performance and limitations are dependent on network deployment.

### 2.2 Lighthouse architecture

Lighthouse provides a platform for centrally accessing, managing, and monitoring Opengear console servers.

Console servers connect to a central Lighthouse instance over an OpenVPN tunnel, and are accessed, managed, and monitored via services transported over the VPN tunnel. In Lighthouse terminology, the console server is referred to as the node.



### 2.2.1 Lighthouse to Node interactions

For management and monitoring operations, Lighthouse queries and pushes data to and from a REST API on the node.

When a node is initially enrolled in Lighthouse, Lighthouse generates an X.509 certificate. This certificate authenticates the OpenVPN tunnel and provides the node access to the Lighthouse REST API. The node also imports a Certificate Authority from Lighthouse and uses that to allow Lighthouse access to the node's REST API. Lighthouse also provides a public SSH key to the node, which allows Lighthouse to access the node's serial ports via SSH.

For serial access, a node's serial port subsystem is connected to via SSH. Users can also access the node's Web UI, which is reverse-proxied through the VPN tunnel.

### 2.2.2 User to Lighthouse interactions

Users interact with Lighthouse via an Ember.js JavaScript application, which communicates with Lighthouse via a REST API. This REST API can integrate Lighthouse into other systems. Documentation for this API is available to allow for direct customer use.

Lighthouse 5.2.0 has three REST API versions, v1, v1.1 and v2. Some of the endpoints in v1 and v1.1 have been deprecated, meaning the functionality and expected request body may be different. In general, it is advised to prefer the latest version of the REST API (v2) as this ensures the latest functionality is available.



### 2.2.3 Node organization and filtering

To help search, organize, and filter access to nodes, Lighthouse uses **Smart Groups** which allow node properties and user-supplied **tags**, consisting of a name and value, to be compiled into a search expression. These search expressions can be saved and used to filter the various lists of nodes in the Web UI, for example when selecting a serial port to connect to or to connect to the node's Web UI. They can also be used for selecting the nodes that a particular group of users will be able to access.

To help locate managed devices, Lighthouse includes **Managed Device Filtering** which allows users to search for port labels on a node. This search can be saved and applied on the **Manage > Managed Devices > Console Gateway** page.

## 3. Lighthouse VM installation

### 3.1 Lighthouse VM components

Lighthouse VM 5.2.0 is available in several formats:

- An Open Volume Format file – `lighthouse-5.2.0-ovf.zip` – inside a PKZip archive. This is for use with virtual machine managers such as KVM and Virtual Box.
- A VMware configuration file – `lighthouse-5.2.0-vmx.zip` – inside a PKZip archive. This is for use with virtual machine managers from VMware.
- A raw (.hdd) file, `lighthouse-5.2.0-raw.hdd.xz`. This file has been compressed with `xz` and is for use with hosting services such as ElasticHosts.
- An Open Virtual Appliance file – `lighthouse-5.2.0.ova`. This is for use with virtual machine managers such as VM and Virtual Box as well as for use with virtual machine managers from VMware.
- A Hyper-V configuration file with Powershell script – `lighthouse-5.2.0-hyperv.zip` – inside a PKZip archive. This is for use in Microsoft Hyper-V deployment.
- An upgrade file, `lighthouse-5.2.0.1h_upg`.

### 3.2 VMWare vSphere 6.0 via the VMWare vSphere 6.0 client on Windows

This procedure assumes VMWare vSphere 6.0 is installed and running on available hardware. You must have access to a Windows computer on which the VMWare vSphere 6.0 client is installed and that this installed client application can connect to and manage the VMWare Sphere 6.0 instance. Finally, you need a copy of the Lighthouse 5.2.0 binary in Open Volume Format, the `.ovf` file, either copied to the Windows computer running the VMWare vSphere 6.0 client or available via a URL.

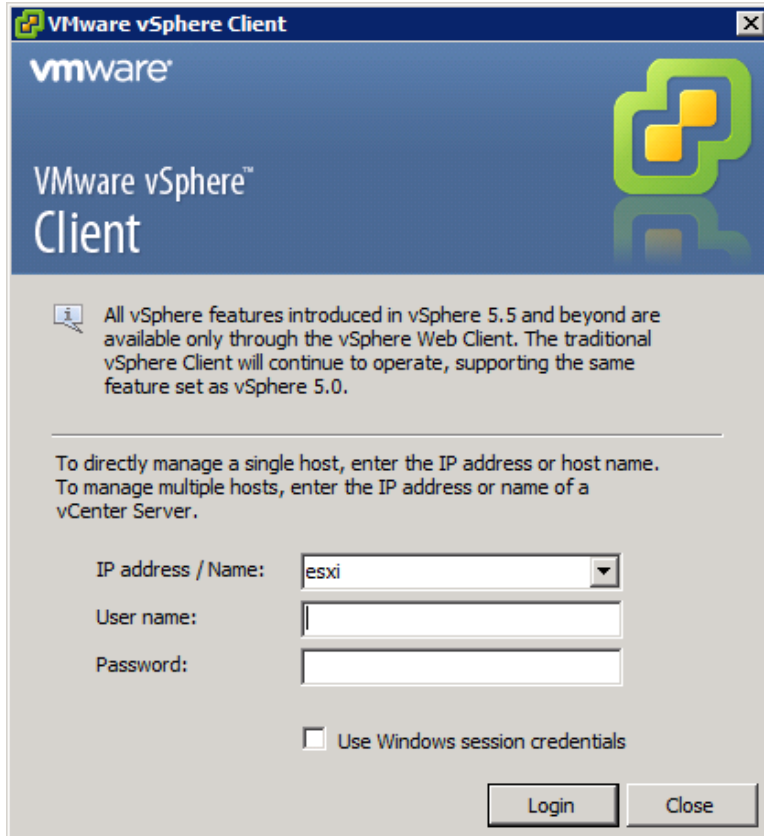
This procedure was tested using the VMware Sphere Client 6.0 running on Windows 7 Enterprise SP 1.

#### 3.2.1 Launch the vSphere Client and connect to a vSphere instance.

1. Launch the VMware vSphere Client. The simplest way is to use the **Start Menu** shortcut added during installation.

**Start > All Programs > VMware > VMware vSphere Client**

The VMware vSphere Client opens a login window.



2. Select the IP address or name of the VMware vSphere instance where you want to install Lighthouse 5.2.0 from the **IP address/Name** drop-down list.
3. Enter the **User name** and **Password** required to gain management privileges to the selected VMware vSphere instance.
4. Click **Login** or press **Return**.

The login window displays progress text in the bottom left corner:

*Connecting*

*Loading inventory*

*Loading main form*

*Displaying main form*

The **vSphere main form** window opens.

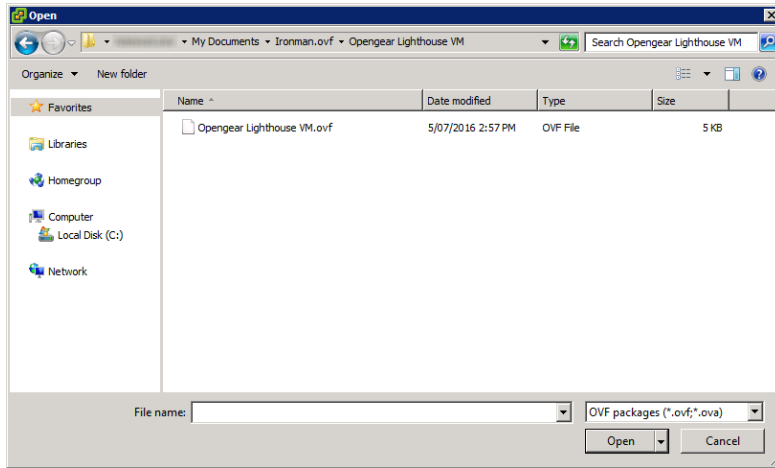
### 3.2.2 Import the Lighthouse 5.2.0 VM Open Volume Format (.ovf) image

1. From the vSphere Client menu bar, choose **File > Deploy OVF Template**.  
The **Deploy OVF Template** window appears, with the first stage, **Source**, pre-selected.
2. If the file `Opengear Lighthouse VM.ovf` is on a remote computer via a URL, enter this URL in the **Deploy from a file or URL** field. Otherwise, click **Browse**. An **Open** dialog appears.

Navigate to the directory containing the file `Opengear Lighthouse VM.ovf`.

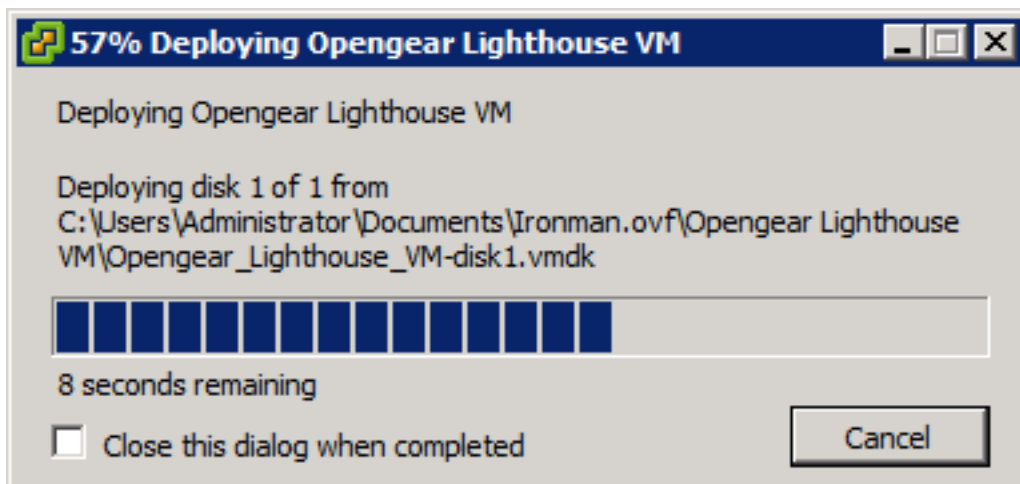
In the following screenshot, the file is located at

C:\Users\%USERNAME%\My Documents\Ironman.ovf\Opengear Lighthouse VM\.

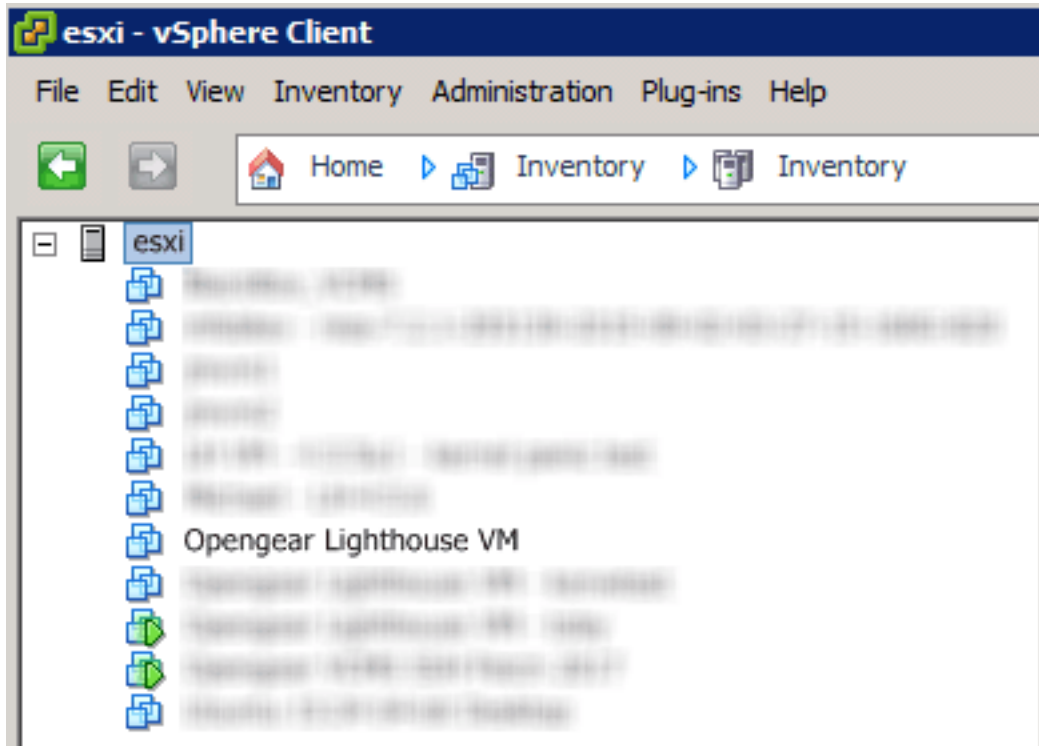


Select `Opengear Lighthouse VM.ovf` and click **Open**.

3. The **Deploy OVF Template** window opens again, with the `Opengear Lighthouse VM.ovf` file listed in the **Deploy from a file or URL** combo-box. Click **Next**.
4. The **OVF Template Details** stage appears, showing basic information about the Lighthouse VM encapsulated by the `.ovf` file. Click **Next**.
5. The **Name and Location** screen appears with the **Name** field pre-populated and pre-selected. The default name is **Opengear Lighthouse VM**. To change this, enter a new name. Click **Next**.
6. The **Disk Format** screen displays which data-store the Lighthouse VM's virtual disk uses, how much free space the virtual disk has available and which provisioning scheme is being used. Click **Next**.
7. The **Network Mapping** screen shows which destination or inventory network the Lighthouse VM's virtual network is mapped to. Click **Next**.
8. The **Ready to Complete** screen appears, listing the basic properties of the about-to-be-deployed virtual machine. If you wish to power-up the new virtual machine immediately after deployment, select the **Power on after deployment** checkbox. Click **Finish**.
9. The **Deploying Opengear Lighthouse VM** progress dialog appears.



- Once deployment has finished the **Deployment Completed Successfully** alert appears. Click **Close**. The new virtual machine is now deployed and appears in the inventory list.



### 3.2.3 Launch the Opengear Lighthouse 5.2.0 virtual machine

The vSphere Client provides several ways of launching a Virtual Machine hosted on a vSphere instance. Begin by selecting the Opengear Lighthouse VM from the vSphere Client's inventory list. The selected VM can then be launched by doing one of the following:

1. Select **Inventory > Virtual Machine > Power > Power On**.
2. Press **Ctrl-B**.
3. Click the **Power** on the virtual machine link in the **Basic Tasks** section of the **Getting Started** tab. This option requires the **Getting Started** tab be front-most. If it is not already the front-most tab, make it active by clicking it.

Select **Inventory > Virtual Machine > Open Console** and then:

- Click **Power On** in the console tool bar, or
- Choose **VM > Power > Power On** from the console menu bar, or
- Press **Ctrl-B**.

**NOTE:** Only the last option above results in the running virtual machine being accessible from within the vSphere Client. The first three boot the Lighthouse VM and get it running headless.

### 3.2.4 Access the console of a running but headless Opengear Lighthouse instance

If direct interaction with a running but headless \*Opengear Lighthouse VM\* is required, open a console window.

Select the running Opengear Lighthouse VM in the vSphere Client's inventory list, then do one of the following:

- Select **Inventory > Virtual Machine > Open Console** or
- Right-click and select **Open Console** from the contextual menu that appears.

**NOTE:** A Lighthouse VM is currently running a bash shell with no other interactive options. As a result, when the vSphere Client opens its console window, the Lighthouse VM will capture the mouse pointer, making it unavailable for use by any other window. Press **CTRL+ALT** to release the pointer.

### 3.3 VMware Workstation Player on Windows as host

Follow these steps when VMware Workstation Player is installed on the host Windows machine. VMware-ready virtual machine files are stored in `C:\Users\%USERNAME%\Virtual Machines\`. This is the location selected by default by VMware Workstation Player. If another location is preferred, adjust this procedure as required.

Prepare the Lighthouse VM file for import into VMware Workstation Player.

1. Move the `lighthouse-5.2.0-vmx.zip` archive to `C:\Users\%USERNAME%\Virtual Machines\`.
2. Right-click the `lighthouse-5.2.0-vmx.zip` archive and select **Extract all** from the contextual menu.
3. A **Select a Destination and Extract Files** dialog will open. By default, the location is the same folder as the archive is in: `C:\Users\%USERNAME%\Virtual Machines\`. Leave this as the destination folder.
4. Uncheck the **Show extracted files when complete** checkbox and then click **Extract**.
5. A folder called `ironman` will be created inside `C:\Users\%USERNAME%\Virtual Machines\`.

Import the Opengear Lighthouse VM file into VMware Workstation Player.

1. Launch VMware Workstation Player.
2. Click **Open a Virtual Machine**.
3. Navigate to `C:\Users\%USERNAME%\Virtual Machines\ironman\`.

VMware Workstation Player points to *Libraries > Documents* and includes `C:\Users\%USERNAME%\My Documents\`.

Assuming this is the case, double-click `Virtual Machines` and then double-click `Ironman`.

4. If only one file – `Ironman` – is visible, double-click it to add the Lighthouse 5.2.0 virtual machine to the VMware Workstation 12 Player virtual machines list. If more than one file appears, double-click `Ironman.vmx`.
5. The Lighthouse virtual machine is added to the VMware Workstation 12 Player virtual machines list.
6. With **Opengear Lighthouse VM** selected in the VMware Workstation 12 Player virtual machine list, click **Play virtual machine** to boot Lighthouse.

### 3.4 VMware Workstation Pro on Windows as host

This procedure assumes VMware Workstation Pro is already installed on the host Windows machine and that VMware-ready virtual machine files are stored in `C:\Users\%USERNAME%\Virtual Machines\`. If another location is preferred, adjust the steps as needed.

Prepare the Opengear Lighthouse VM file for import into VMware Workstation Pro.

1. Move the `lighthouse-5.2.0-vmx.zip` archive to `C:\Users\%USERNAME%\Virtual Machines\`.
2. Right-click the `lighthouse-5.2.0-vmx.zip` archive and select **Extract all** from the contextual menu.
3. A **Select a Destination and Extract Files** dialog opens. The location is the same folder as the PKZip archive is in: `C:\Users\%USERNAME%\Virtual Machines\`. Leave this as the destination folder.
4. Uncheck the **Show extracted files when complete** checkbox and then click **Extract**.
5. A folder called **ironman** will be created inside `C:\Users\%USERNAME%\Virtual Machines\`.

Import the Opengear Lighthouse VM file into VMware Workstation Pro.

1. Click **Open a Virtual Machine**.
2. Navigate to `C:\Users\%USERNAME%\Virtual Machines\ironman\`.
3. VMware Workstation Pro points to **Libraries > Documents** and this library includes `C:\Users\%USERNAME%\My Documents\`. Double-click `Virtual Machines` and then double-click `Ironman`.
4. If only one file – `Ironman` – appears, double-click it to add the Lighthouse 5.2.0 virtual machine to the VMware Workstation Pro virtual machines list. If more than one file appears, double-click `Ironman.vmx`.
5. The Lighthouse 5.2.0 virtual machine is added to the VMware Workstation Pro virtual machines list.
6. With the **Opengear Lighthouse VM** selected in the **My Computer** listing and the subsequent **Opengear Lighthouse VM** tab open, click **Power on this virtual machine** to boot Lighthouse.

### 3.5 VMware Workstation Player or Pro on Fedora Workstation as host

VMware Workstation Player 12 cannot be installed on Fedora 25 without substantial reconfiguration of a base Fedora Workstation setup. Moreover, the reconfiguration leaves Fedora Workstation in a state that is entirely unsupported by any external entity.

Once appropriately reconfigured, it seems likely that Lighthouse 5.2.0 will run in VMware Workstation Player 12 on Fedora Workstation. At this stage Opengear does not support this particular combination of host operating system and virtual machine manager.

### 3.6 Local deployment on Hyper-V running on Windows 10/Windows Server 2016

This procedure assumes Hyper-V is already installed on a Windows 10/Windows Server 2016 host machine. This procedure also assumes the required Zip archive, `ironman-hyperv.zip` is in `C:\Users\%USERNAME%\Downloads`.

1. Unzip `ironman-hyperv.zip`.
2. Navigate to the extracted folder. Make sure `ironman.vhd` and `lighthouse_virtual_machine_registration.ps1` are in the folder.
3. Right-click and choose **Run with Powershell** to execute the Powershell script.
4. Leave the host name empty when prompted to deploy Lighthouse to local machine.
5. Launch Hyper-V Manager. Lighthouse should be registered as a new VM image under Virtual Machine.
6. Select **Lighthouse** from the list and click **Start** in the **Action Panel** to boot Opengear Lighthouse.

### 3.7 Remote Hyper-V deployment with pre-authenticated user

In this scenario, the user who performs Lighthouse deployment does not have local access to Hyper-V installed on Windows 2016. However, user has access to a Windows 10 which can manage the Hyper-V server remotely.

This procedure assumes Hyper-V is installed on Windows Server 2016 host machine. Windows 10 is already configured to manage Hyper-V on Windows Server 2016. **Windows 10 and Windows Server 2016 must have the same user (same password) created.** It is assumed the user who performs the deployment has permission to both execute the Powershell script and deploy the image on Hyper-V. This procedure also assumes the required Zip archive `ironman-hyperv.zip` is in `C:\Users\%USERNAME%\Downloads`.

1. Login to Windows 10 with the user mentioned above.
2. Unzip `ironman-hyperv.zip`
3. Navigate to the extracted folder. Make sure `ironman.vhd` and `lighthouse_virtual_machine_registration.ps1` are in the folder.
4. Right-click and choose **Run with Powershell** to execute the Powershell script.
5. Enter the fully qualified domain name for Windows Server 2016 when prompted to deploy Lighthouse to the remotely-managed Windows Server 2016 machine.
6. Launch Hyper-V Manager. Lighthouse should be registered as a new VM image under Virtual Machine for Windows Server 2016.
7. Select **Lighthouse** from the list and click **Start** in the **Action Panel** to boot Opengear Lighthouse.

### 3.8 Remote Hyper-V deployment with different user

In this scenario, the user who performs Lighthouse deployment does not have local access to Hyper-V installed on Windows Server 2016. However, user has access to Windows 10 which can manage the Hyper-V server remotely. It is assumed the user who performs the deployment has permission to both



execute the Powershell script and deploy the image on Hyper-V. This procedure assumes Hyper-V is installed on Windows Server 2016 host machine. Windows 10 is already configured to manage Hyper-V on Windows Server 2016. This procedure also assumes the required Zip archive, `ironmam-hyperv.zip`, is in `C:\Users\%USERNAME%\Downloads`.

1. Login to windows 10 with a user who does not exist on Windows Server 2016.
2. Unzip `ironman-hyperv.zip`.
3. Navigate to the extracted folder. Make sure `ironman.vhd` and `lighthouse_virtual_machine_registration.ps1` are in the folder.
4. Right-click and choose **Run with Powershell** to execute the Powershell script.
5. Enter the fully qualified domain name for Windows Server 2016 when prompted to deploy Lighthouse to remotely-managed Windows Server 2016 machine.
6. Enter the user details created on Windows Server 2016 which has permission to deploy Hyper-V.
7. Launch Hyper-V Manager. Lighthouse should be registered as a new VM image under Virtual Machine for Windows Server 2016.
8. Select **Lighthouse** from the list and click **Start** in the **Action Panel** to boot Opendgear Lighthouse.

### 3.9 VirtualBox on Windows as host

**NOTE:** If you have a Skylake processor, we recommend that you **do not** use VirtualBox.

**NOTE:** We recommend that VirtualBox users customize their instances and change their network cards to one other than e1000. We also suggest virtio for better performance.

This procedure assumes VirtualBox is already installed on the host machine. This procedure also assumes the required PKZip archive, `lighthouse-5.2.0-ovf.zip` is in `C:\Users\%USERNAME%\Downloads`.

1. Unzip `ironman-ovf`. It may appear as `lighthouse-5.2.0-ovf.zip` depending on your Windows Explorer preference settings).
2. Right-click the `ironman-ovf` archive and select **Extract all** from the contextual menu.
3. The **Select a Destination and Extract Files** dialog opens. The destination is `C:\Users\%USERNAME%\Downloads\Ironman-ovf`.
4. Uncheck the **Show extracted files when complete** checkbox and edit the destination by removing `Ironman-ovf` from the path.
5. Click **Extract**.
6. A folder called `ironman-ovf` is created inside `C:\Users\%USERNAME%\Downloads\`.
7. Launch VirtualBox.
8. The **Oracle VM VirtualBox Manager** window appears.
9. Choose **File > Import Appliance**.
10. The **Appliance to import** dialog opens.
11. Click **Expert Mode**.
12. The **Appliance to import** dialog changes from **Guided Mode** to **Expert Mode**.
13. Click the icon of a folder with an upward pointing arrow superimposed. This icon is to the far right of the **Appliance to import** field.
14. The **Open File** dialog appears with `C:\Users\%USERNAME%\Documents` as the current folder.

15. Navigate to `C:\Users\%USERNAME%\Downloads\Ironman.ovf\Opengear Lighthouse VM\`.
16. Select the file `Opengear Lighthouse VM` and click **Open**.
17. Double-click the text **vm** in the **Name** row and **Configuration** column to make it editable.
18. Type **Opengear Lighthouse VM** and press **Enter**.
19. Click **Import**.
20. A new virtual machine, called **Opengear Lighthouse VM** is added to the list of virtual machines available to Virtual Box.
21. Select **Opengear Lighthouse VM** from the list.
22. Choose **Machine > Settings**. (Alternatively, click the **Settings** icon in the **VirtualBox Manager** toolbar, or press `Control+S`.)
23. The **Opengear Lighthouse VM – Settings** dialog appears.
24. Click the **System** option in the list of options running down the left-hand side of the dialog.
25. The dialog shows the **System** options available as three tabs: **Motherboard**, **Processor**, and **Acceleration**. Depending on the underlying hardware platform, **Acceleration** may be greyed-out and unavailable. The **Motherboard** tab is preselected.
26. In the **Motherboard** tab, select the **Hardware Clock in UTC Time** checkbox.
27. Click **OK** or press `Return`.
28. Select **Opengear Lighthouse VM** from the list and click **Start** in the **Oracle VM VirtualBox Manager** toolbar to boot Lighthouse. Double-clicking **Opengear Lighthouse VM** in the list also boots Lighthouse.

**NOTE:** Selecting the **Hardware Clock in UTC Time** checkbox is necessary because Lighthouse expects the hardware clock to be set to UTC, not local time. Unlike other Virtual Machine Managers, Virtual Box both exposes this option as a user-adjustable setting and does not set it to UTC by default.

### 3.10 VirtualBox on macOS as host

VirtualBox should already be installed on the host macOS machine. This procedure also assumes the required PKZip archive, `lighthouse-5.2.0-ovf.zip` is in `~/Downloads`.

1. Unzip `lighthouse-5.2.0-ovf.zip`.

This creates a folder — `Ironman-ovf` — in `~/Downloads` that contains the following files and folders:

```
Ironman-ovf
├── Opengear Lighthouse VM
│   ├── Opengear Lighthouse VM.ovf
│   └── Opengear_Lighthouse_VM-disk1.vmdk
```

2. Launch Virtual Box.  
The **Oracle VM VirtualBox Manager** window appears.
3. Choose **File > Import Appliance** or press `Command+I`.
4. The **Appliance to import** dialog sheet slides down from the **Oracle VM VirtualBox Manager** toolbar.

5. Click **Expert Mode**.  
The **Appliance to import** dialog sheet changes from **Guided Mode** to **Expert Mode**.
6. Click the icon of a folder with an upward pointing arrow superimposed. This icon is to the far-right of the **Appliance to import** field.
7. The **Open File** dialog sheet slides down from the **Oracle VM VirtualBox Manager** toolbar. This sheet opens with `~/Documents` as the current folder.
8. Navigate to `~/Downloads/Ironman.ovf/Opengear Lighthouse VM/`.
9. Select `Opengear Lighthouse VM` and click **Open**. (Depending on your Finder Preferences settings, the file may present as `Opengear Lighthouse VM.ovf`.)
10. Double-click the text **vm** in the **Name** row and **Configuration** column to make it editable.
11. Type **Opengear Lighthouse VM** and hit Return.
12. Click **Import**.  
A new virtual machine, called **Opengear Lighthouse VM** is added to the list of virtual machines.
13. Select **Opengear Lighthouse VM** from the list.
14. Choose **Machine > Settings**. Or click the **Settings** icon in the VirtualBox Manager toolbar. The **Opengear Lighthouse VM – Settings** dialog appears.
15. Click the **System** option in the dialog's toolbar.
16. The dialog shows the **System** options available as three tabs: **Motherboard**, **Processor**, and **Acceleration**. (Depending on the underlying hardware platform, **Acceleration** may be greyed-out and unavailable). The **Motherboard** tab is preselected.
17. In the **Motherboard** tab, select the **Hardware Clock in UTC Time** checkbox.
18. Click **OK** or press Return.
19. Select **Opengear Lighthouse VM** from the list and click **Start** in the **Oracle VM VirtualBox Manager** toolbar to boot Lighthouse. (Double-clicking **Opengear Lighthouse VM** in the list also boots Lighthouse.)

**NOTE:** Selecting the **Hardware Clock in UTC Time** checkbox is necessary because Lighthouse expects the hardware clock to be set to UTC, not local time. Unlike other Virtual Machine Managers, Virtual Box both exposes this option as a user-adjustable setting and does not set it to UTC by default.

**NOTE:** By default, VirtualBox stores virtual machines in `~/VirtualBox VMs`. If this is the first virtual machine setup by VirtualBox, it will create the `VirtualBox VMs` folder in the current user's home-directory and create a folder – `Opengear Lighthouse VM` – inside the `VirtualBox VMs` folder. The `Opengear Lighthouse VM` folder contains the files and folders which make up Lighthouse when run under Virtual Box.

### 3.11 VirtualBox on Ubuntu as host

Before beginning, make certain that VirtualBox and all required support files are installed on the host machine and the PKZip archive, `lighthouse-5.2.0-ovf.zip` is in `~/Downloads`.

1. Unzip `lighthouse-5.2.0-ovf.zip`.

This creates a folder – `Ironman-ovf` – in `~/Downloads` that contains the following files and folders:

`Ironman-ovf`

```

└─ Opegear Lighthouse VM
   └─ Opegear Lighthouse VM.ovf
      └─ Opegear_Lighthouse_VM-disk1.vmdk

```

2. Launch Virtual Box.
3. The **Oracle VM VirtualBox Manager** window appears.
4. Choose **File > Import Appliance**.
5. The **Appliance to import** dialog opens.
6. Click **Expert Mode**.
7. The **Appliance to import** dialog changes from **Guided Mode** to **Expert Mode**.
8. Click the icon of a folder with an upward pointing arrow superimposed. This icon is to the far right of the **Appliance to import** field.
9. A file-navigation dialog, **Please choose a virtual appliance to import**, opens with `~/Documents` as the current folder.
10. Navigate to `~/Downloads/Ironman.ovf/Opegear Lighthouse VM/`.
11. Select `Opegear Lighthouse VM.ovf` and click **Open**.
12. Double-click the text **vm** in the **Name** row and **Configuration** column to make it editable.
13. Type **Opegear Lighthouse VM** and hit Return.
14. Click **Import**.
15. A new virtual machine, called **Opegear Lighthouse VM** is added to the list of virtual machines available to Virtual Box.
16. Select **Opegear Lighthouse VM** from the list and click **Start** in the **Oracle VM VirtualBox Manager** toolbar to boot Lighthouse. Double-clicking **Opegear Lighthouse VM** in the list also boots Lighthouse.

**NOTE:** VirtualBox stores virtual machines in `~/VirtualBox VMs`. If this is the first virtual machine setup by VirtualBox it will create the `VirtualBox VMs` folder in the current user's home-directory and create a further folder – `Opegear Lighthouse VM` – inside the `VirtualBox VMs` folder. Inside `Opegear Lighthouse VM` are the files and folders which make up Lighthouse when run under Virtual Box.

### 3.12 VirtualBox on Fedora Workstation as host

Before beginning, make certain that VirtualBox and all required support files are already installed on the host machine and the PKZip archive, `lighthouse-5.2.0-ovf.zip` is in `~/Downloads`.

1. Unzip `lighthouse-5.2.0-ovf.zip`. This creates a folder – `Ironman.ovf` – in `~/Downloads` that contains the following files and folders:

```

Ironman.ovf
└─ Opegear Lighthouse VM
   └─ Opegear Lighthouse VM.ovf
      └─ Opegear_Lighthouse_VM-disk1.vmdk

```

2. Launch Virtual Box.  
The **Oracle VM VirtualBox Manager** window appears.
3. Choose **File > Import Appliance** or press Control-I.  
The **Appliance to import** dialog opens.

4. Click **Expert Mode**.  
The **Appliance to import** dialog changes from *Guided Mode* to *Expert Mode*.
5. Click the icon of a folder with an upward pointing arrow superimposed. This icon is to the far right of the **Appliance to import** field.  
The **Open File** dialog opens with `~/Documents` as the current folder.
6. Navigate to `~/Downloads/Ironman.ovf/Opengear Lighthouse VM/`.
7. Select `Opengear Lighthouse VM` and click **Open**.
8. Double-click the text `vm` in the **Name** row and **Configuration** column to make it editable.
9. Type **Opengear Lighthouse VM** and hit Return.
10. Click **Import**.  
A new virtual machine, called **Opengear Lighthouse VM** is added to the list of virtual machines available to Virtual Box.
11. Select **Opengear Lighthouse VM** from the list and click **Start** in the **Oracle VM VirtualBox Manager** toolbar to boot Lighthouse. Double-clicking **Opengear Lighthouse VM** in the list also boots Lighthouse.

**NOTE:** VirtualBox stores virtual machines in `~/VirtualBox VMs`. If this is the first virtual machine setup by VirtualBox, it will create the `VirtualBox VMs` folder in the current user's home-directory and create a further folder – `Opengear Lighthouse VM` – inside the `VirtualBox VMs` folder. Inside `Opengear Lighthouse VM` are the files and folders which make up Lighthouse when run under Virtual Box.

### 3.13 Virtual Machine Manager (KVM) on Ubuntu as host

Virtual Machine Manager and all required support files should be installed on the host machine and the `.xz` archive, `lighthouse-5.2.0-raw.hdd.xz` is in `~/Downloads`.

1. Expand `lighthouse-5.2.0-raw.hdd.xz`. This extracts `lighthouse-5.2.0-raw.hdd` in `~/Downloads`.
2. Launch **Virtual Machine Manager**.
3. Click **New** at the top left of the **Virtual Machine Manager** window (or choose **File > New Virtual Machine**). The **Source Selection** window opens.
4. Click **Select a file**. A **Select a device or ISO file** dialog slides into view.
5. Navigate to `~/Downloads/`.
6. Select the file `lighthouse-5.2.0-raw.hdd` and click **Open** in the top right-hand corner of the dialog. A **Review** window opens providing basic information about the virtual machine or box, as Boxes calls them, to be created.
7. Click **Create** in the top right corner of the **Review** window.
8. A new virtual machine instance, **Opengear\_Lighthouse\_VM-disk1**, is created and presented in the **Boxes** window.
9. To rename the virtual machine instance, right-click on the machine instance and choose **Properties** from the contextual menu that appears. Click anywhere in the **Name** field to select and edit the name. Click the close box to save the changes.

### 3.14 Boxes on Fedora Workstation as host

Boxes and all required support files should be installed on the host machine and `lighthouse-5.2.0-ovf.zip` is in `~/Downloads`.

1. Unzip `lighthouse-5.2.0-ovf.zip`. This creates a folder – `Ironman.ovf` – in `~/Downloads` that contains the following files and folders:

```
Ironman.ovf
├── Opendgear Lighthouse VM
│   ├── Opendgear Lighthouse VM.ovf
│   └── Opendgear_Lighthouse_VM-disk1.vmdk
```

2. Launch **Boxes**.
3. Click **New** in the **Boxes** window title bar. The **Source Selection** window opens.
4. Click **Select a file**. A **Select a device or ISO file** dialog opens.
5. Navigate to `~/Downloads/Ironman.ovf/Opendgear Lighthouse VM/`.
6. Select the file `Opendgear_Lighthouse_VM-disk1.vmdk` and click **Open** in the top right-hand corner of the dialog. A **Review** window opens providing basic information about the virtual machine (or 'box', as Boxes calls them) to be created
7. Click **Create** in the top right corner of the **Review** window.
8. A new virtual machine instance, **Opendgear\_Lighthouse\_VM-disk1** is created and presented in the **Boxes** window.
9. To rename the virtual machine instance, right-click on the machine instance and choose **Properties** from the contextual menu that appears. Click anywhere in the **Name** field to select and edit the name. Click **Close** to save the changes.

### 3.15 Boxes on CentOS as host

CentOS should be installed, complete with the Gnome desktop environment as the host operating system. CentOS includes the full complement of KVM-centric virtualization tools including the GUI-based virtualization management tools **Boxes** and **virt-manager** and the shell-based virtualization management tool **virsh**.

This procedure assumes **Boxes** is used to setup and manage the Lighthouse VM.

Finally, this procedure assumes the required PKZip archive, `lighthouse-5.2.0-ovf.zip` is in `~/Downloads`.

1. Unzip `lighthouse-5.2.0-ovf.zip`.

This creates a folder – `Ironman.ovf` – in `~/Downloads` that contains the following files and folders:

```
Ironman.ovf
├── Opendgear Lighthouse VM
│   └── Opendgear Lighthouse VM.ovf
```

└─ Opengear\_Lighthouse\_VM-disk1.vmdk

2. Launch Boxes
3. Click **New** in the Boxes title bar.
4. Navigate to `~/Downloads/Ironman.ovf/Opengear Lighthouse VM/`
5. Select **Opengear Lighthouse VM** and click **Open**. A new virtual machine, called **Opengear LighthouseVM** is added to the list of virtual machines available to Boxes.

## 4. First boot of the Lighthouse VM

During boot, two screens open.

1. The first notes the VM is **Booting to latest installed image**.

The selected image is *Lighthouse Root 1*. Two other images are available: *Lighthouse Root 1* and *Memtest86+*. Do not change the boot image the VM boots from.

2. The second screen prompts you to **Select Lighthouse boot mode** and displays four options:

- Graphics console boot
- Graphics console recovery mode
- Serial console boot
- Serial console recovery mode

3. **Graphics console boot** is pre-selected and should not be changed.

4. After the first boot has completed a message appears:

```
Welcome to Ironman. This is software version:  
5.2.0
```

5. The final procedure in the initial setup appears:

```
To complete initial setup, please set a new root password.  
Press ENTER to continue.
```

6. After pressing **Enter**, a prompt appears:

```
Enter new root password:
```

7. Enter a strong, high-entropy password and press **Enter**.

8. The confirm prompt appears:

```
Confirm given password
```

9. Re-enter the password and press **Enter**.

10. Multiple configuration notices present ending with a login prompt:

```
opengear-lighthouse login:
```

11. Enter `root` (the only user able to login at this point) and press **Enter**.

12. A password prompt appears:

```
Password:
```

13. Enter the newly-set password and press **Enter**.

14. A standard **bash** shell prompt appears.



```
root@opengear-lighthouse:~#
```

## 5. Initial system configuration

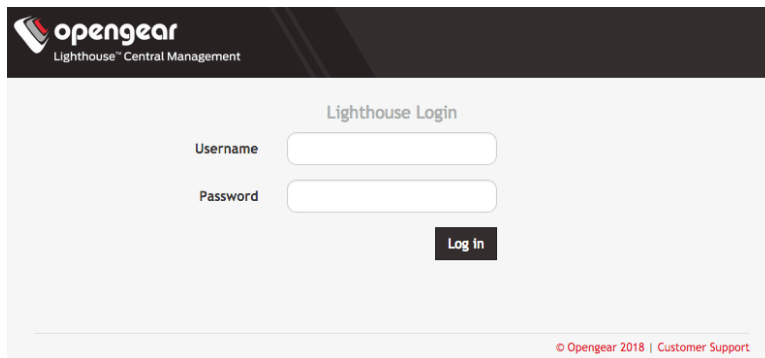
### 5.1 Loading Lighthouse

When the Lighthouse VM is booted and running, it is addressable at either of two IP addresses:

- The fixed address, 192.168.0.1, or
- The address it is assigned by any DHCP server it finds.

Open a new browser window or tab and enter:

1. `https://192.168.0.1/` or `https://[DHCP-supplied address]/` in the address bar
2. Press **Return**. The Lighthouse Login page loads.



### 5.2 Login to Lighthouse

To login to Lighthouse:

1. Enter a **username** in the **Username** field.
2. Enter the password in the **Password** field.
3. Click **Log In** or press **Enter**. The **Dashboard** loads.
4. Click **System** right top icon to see Current user.

The screenshot shows the OpenGear Lighthouse Central Management interface. The top navigation bar includes 'Add Node', 'Help', 'System', and 'Log out'. The left sidebar has 'MONITOR' selected, with sub-options for 'MANAGE', 'CONFIGURE NODES', and 'SETTINGS'. The main dashboard area is titled 'Dashboard' and features:

- Enrolled Nodes Table:**

| Name                              | Status                                     | Actions       |
|-----------------------------------|--|---------------|
| eng-dc-pod-1.bne.oob.opengear.com | Connected: last status change 10 hours ago | Access Web UI |
| eng-dc-pod-2.bne.oob.opengear.com | Connected: last status change 10 hours ago | Access Web UI |
| eng-dc-pod-3.bne.oob.opengear.com | Connected: last status change 10 hours ago | Access Web UI |
| eng-dc-pod-4.bne.oob.opengear.com | Connected: last status change 10 hours ago | Access Web UI |
- Current Status:** A green circle indicates 'Connected (33)' nodes.
- Licensing Information:** Shows 'Number of Installed Licenses: 1'.
- Details Popover:** A dropdown menu shows system information: 'Current version: 5.2.0', 'REST API version: v2.0', 'Hostname: lighthouse', and 'Current user: root'.

**NOTE:** The appearance of the Dashboard, the Sidebar, and other Lighthouse pages, will depend on the privileges assigned to the logged-in user. In this guide, screenshots represent what the **root** user sees. Users with different privileges will see filtered views of available nodes, users, groups, tags and Smart Groups and will have different privileges regards creating and changing settings within Lighthouse. For example, users other than root can edit their own account settings but cannot edit other user's accounts. A user may also be restricted to what they can do with enrolled nodes or what new nodes they can enroll.

### 5.3 Setting the Lighthouse hostname

To set the hostname for a running Lighthouse instance:

1. Select **Settings > System > Administration**.
2. Edit the **Hostname** field as required.

The screenshot shows the 'Administration' page in the Lighthouse interface. The 'Settings' section is expanded, displaying the following configuration options:

- Hostname:** A text input field containing 'lighthouse'.
- SSH Port:** A text input field containing '22'.
- External Network Addresses:** A table with columns for 'Order', 'Address', 'API Port (default: 443)', and 'VPN Port (default: 1194)'. One address is listed: '192.168.254.33'.
- Apply:** A button at the bottom right of the settings section.

3. Click **Apply**.

### 5.4 Adding external IP addresses manually (optional)

Adding a Lighthouse instance's external IP address or addresses to a Lighthouse instance's configuration is an optional step.

To add a single external address:

1. Select **Settings > System > Administration**.

The screenshot shows the 'Administration' settings page in the OpenGear Lighthouse Central Management interface. The 'Settings' section is expanded, and the 'External Network Addresses' table is visible. The table has the following structure:

| Order | Address        | API Port<br>(default: 443) | VPN Port<br>(default: 1194) |     |
|-------|----------------|----------------------------|-----------------------------|-----|
| ↓     | 192.168.254.33 | 443                        | 1194                        | -   |
| ↑     |                | 443                        | 1194                        | - + |

External IP addresses or DNS names of the system.

2. In the **Address** field of the **External Network Addresses** section, enter an IP address.
3. (Optional step) Change the API Port, VPN Port or both, if the ports used on the entered IP address are different from the default (443 and 1194, respectively).
4. Click **Apply**.

To manually add further external addresses to a Lighthouse instance's configuration:

1. Click the **+** button.  
A second row appears in the **External Network Addresses** section.
2. In the newly presented **Address** field, enter an IP address.
3. (Optional step) Change the API Port, VPN Port or both, if the ports used on the entered IP address are different from the default (443 and 1194, respectively).
4. Add further IP addresses as required by repeating the steps above.
5. Click **Apply**.

To change the order in which manually-added IP addresses are sent to remote nodes:

1. Click the up and down arrows in the **Order** column to change the order in which the IP addresses are listed.  
The presented order reflects the order in which these addresses are sent out.
2. Click **Apply**.

If external IP addresses are manually added to a Lighthouse configuration, these addresses are sent to a remote node during enrollment. If no external IP address is manually added to a Lighthouse configuration, default external IP addresses are used.

The external IP addresses are sent to a remote node during enrollment in the following order:

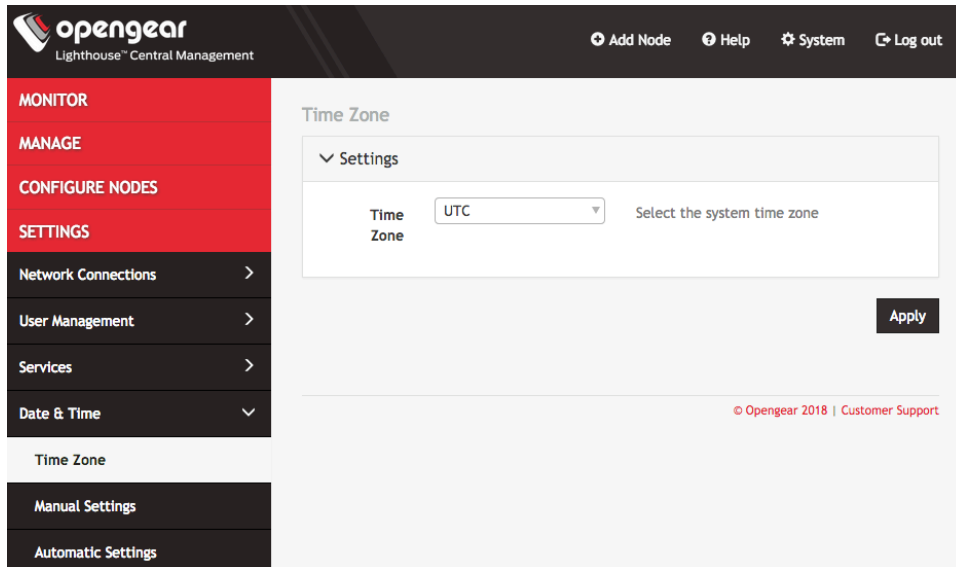
1. net1:dhcp
2. net1:static

3. The IP address connected to the default gateway.

## 5.5 Setting the Lighthouse internal clock

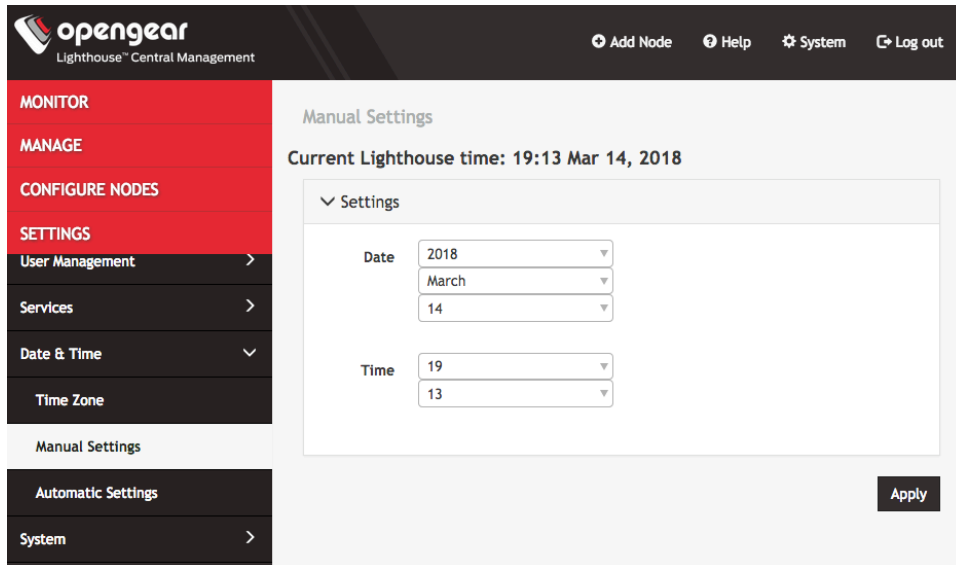
To set the time zone:

1. Select **Settings > Date & Time > Time Zone**.
2. Select the Lighthouse instance's time-zone from the **Time Zone** dropdown list.
3. Click **Apply**.



To set the correct time and date, either

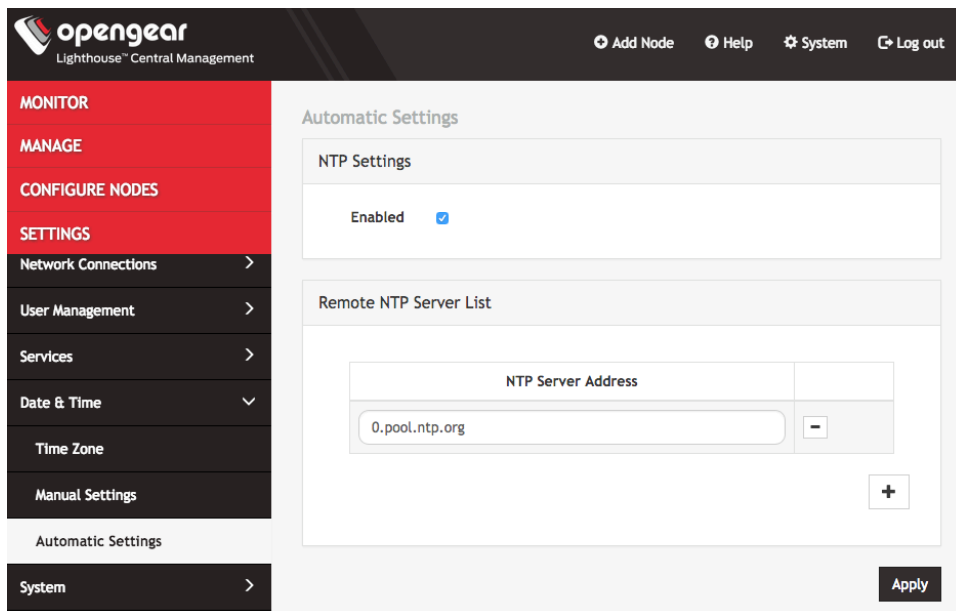
1. Select **Settings > Date & Time > Manual Settings**.
2. Enter the current **Date** and **Time**.
3. Click **Apply**.



The screenshot shows the OpenGear Lighthouse Central Management interface. The top navigation bar includes 'Add Node', 'Help', 'System', and 'Log out'. The left sidebar is expanded to 'SETTINGS' and 'Date & Time'. The main content area displays 'Manual Settings' with a dropdown for 'Settings'. Below this, there are two sections: 'Date' with dropdowns for '2018', 'March', and '14', and 'Time' with dropdowns for '19' and '13'. An 'Apply' button is located at the bottom right of the settings area.

or

1. Select **Settings > Date & Time > Automatic Settings**.
2. Click the **Enabled** checkbox.
3. Enter a working NTP Server address in the **NTP Server Address** field.
4. Click **Apply**.



The screenshot shows the OpenGear Lighthouse Central Management interface. The top navigation bar includes 'Add Node', 'Help', 'System', and 'Log out'. The left sidebar is expanded to 'SETTINGS' and 'Automatic Settings'. The main content area displays 'Automatic Settings' with a section for 'NTP Settings' where 'Enabled' is checked. Below this, there is a 'Remote NTP Server List' section with a table containing one entry: '0.pool.ntp.org'. An 'Apply' button is located at the bottom right of the settings area.

## 5.6 Examine or modify the Lighthouse SSL certificate

Lighthouse ships with a private SSL Certificate that encrypts communications between it and your browser.

To examine this certificate, or generate a new Certificate Signing Request select **Settings > Services > HTTPS Certificate**. The details of the **Current SSL Certificate** appear.

The screenshot shows the OpenGear Lighthouse Central Management interface. On the left is a navigation menu with categories: MONITOR, MANAGE, CONFIGURE NODES, and SETTINGS. Under SETTINGS, there are links for Network Connections, User Management, Services, and Session Settings. The main content area is titled 'HTTPS Certificate' and contains two sections:

- Current SSL Certificate:** A table showing details for the current certificate.
 

|                     |                         |  |
|---------------------|-------------------------|--|
| Common Name         | default                 | The full canonical name for this device                  |
| Organizational Unit |                         | The group overseeing this device                         |
| Organization        |                         | The name of the organization to which the device belongs |
| Locality/City       |                         | The city where the organization is located               |
| State/Province      |                         | The state or province where the organization is located  |
| Country             | US                      | The country where the organization is located            |
| Email               |                         | The email address of a contact person for this device    |
| Key Length (bits)   | 2048                    | Length of generated key in bits                          |
| Issue Date          | Jan 7 01:28:35 2018 GMT | The date at which the certificate becomes valid          |
| Expiry Date         | Jan 8 01:28:35 2019 GMT | The date at which the certificate ceases to be valid     |
- Certificate Signing Request:** A form for generating a new CSR.
 

|                     |   |  |
|---------------------|---|--|
| Common Name         | <input type="text"/>                                    | The full canonical name for this device                  |
| Organizational Unit | <input type="text"/>                                    | The group overseeing this device                         |
| Organization        | <input type="text"/>                                    | The name of the organization to which the device belongs |
| Locality/City       | <input type="text"/>                                    | The city where the organization is located               |
| State/Province      | <input type="text"/>                                    | The state or province where the organization is located  |
| Country             | <input type="text" value="United Arab Emirates"/>       | The country where the organization is located            |
| Email               | <input type="text"/>                                    | The email address of a contact person for this device    |
| Key Length (bits)   | <input type="text" value="2048"/>                       | Length of generated key in bits                          |
| Challenge Password  | <input type="text"/>                                    | An optional (dependent on CA) password                   |
| Confirm Password    | <input type="text"/>                                    | Confirmation of the challenge password                   |
| Private Key File    | <input type="text" value="Choose File"/> No file chosen | A private key to use when generating the CSR (optional)  |

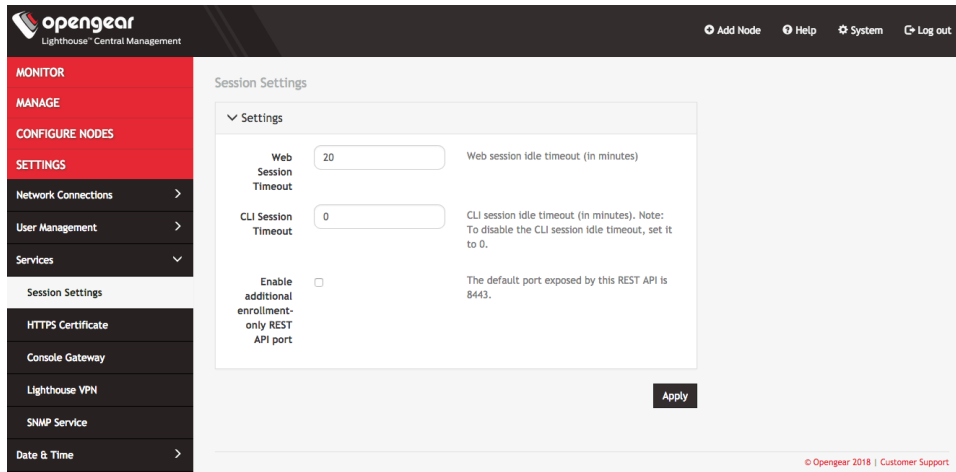
An 'Apply' button is located at the bottom right of the form.

Below this listing is a **Certificate Signing Request** form, which can be used to generate a new SSL certificate.

## 5.7 Examine or modify Lighthouse Session Settings

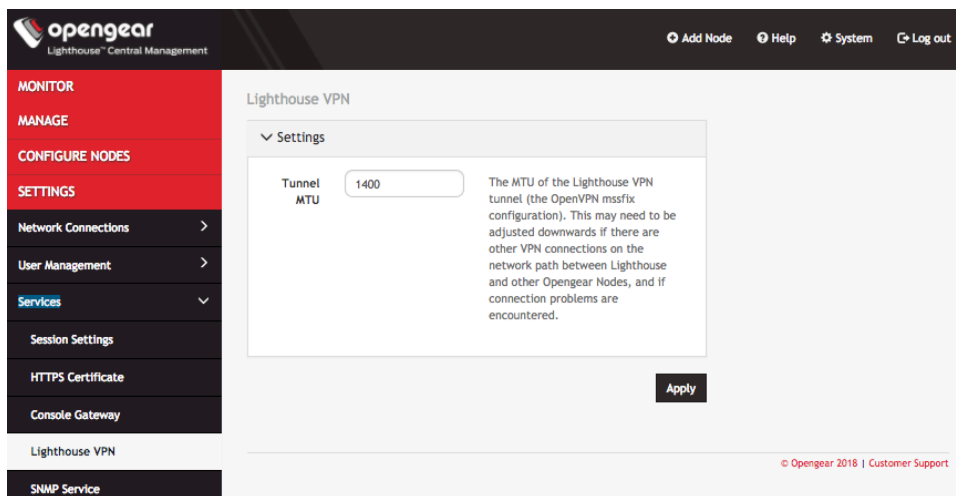
To modify Web and CLI session settings select **Settings > Services > Session Settings**.

- **Web Session Timeout:** This value can be set from 1 to 1440 minutes.
- **CLI Session Timeout:** This value can be set from 1 to 1440 minutes. You can also set it to 0 to disable the timeout. Changes will take effect the next time a user logs in via the CLI.
- **Enable additional enrollment-only REST API port:** This port defaults to 8443. When this option is enabled, only /nodes endpoint is accessible via port 8443(GET/POST/PUT) and all other endpoints return a *404 Not Found* error. Enabling this API allows users who are using NAT for the Lighthouse to expose an external port publicly only for nodes that are attempting to enroll to the Lighthouse, and not for the other functionality available from the REST API. After this option is disabled, all endpoints should be accessible as per normal usage.



## 5.8 Examine or change the MTU of the Lighthouse VPN tunnel

The MTU setting can be configured for traffic that is travelling through the Lighthouse VPN in an attempt to solve MTU path discovery problems. To examine the MTU of the Lighthouse VPN tunnel, or to modify it, select **Settings > Services > Lighthouse VPN**. Allowed values are between 1280 and 1500.



## 5.9 Enable or modify SNMP Service

SNMP settings can be configured through the Lighthouse VPN. Select **Settings > Services > SNMP Service**. It is accessible only by users assigned to the **Lighthouse Administrator** role.

Lighthouse supports both v1/v2 and v3 SNMP, and you can have either or both running at the same time. The SNMP service is not enabled by default and will only start once it has been configured correctly. If the user does not provide an engineID, the auto-generated ID coming out of snmpd will be displayed. Only standard enterprise MIBs can be used currently, Lighthouse Health statistics (load/uptime/memory usage, etc.) can be retrieved.

opengear  
Lighthouse Central Management

MONITOR  
MANAGE  
CONFIGURE NODES  
SETTINGS  
Network Connections >  
User Management >  
Services >  
Session Settings  
HTTPS Certificate  
Console Gateway  
Lighthouse VPN  
SNMP Service  
Date & Time >  
System >

SNMP Service

Settings

Enable  Enable the SNMP service.

TCP/IP Protocol  The TCP/IP protocol to serve.

Location  System Location.

Contact  System Contact.

SNMP Version  v1/v2c  
 v3

SNMP v1 & v2c

Read-Only Community  The read-only community.

Read-Write Community  The read-write community.

SNMP v3

Engine ID  Override the automatically generated SNMPv3 Engine. Note: If not specified, an Engine ID will be automatically generated using Network Interface details.

Security Level  The SNMPv3 Security Level. 'Authentication and Encryption' is recommended.

Read Only Username  The SNMPv3 read-only security name. Mandatory for SNMPv3.

Authentication Protocol  The SNMPv3 authentication protocol.

Authentication Password  The SNMPv3 user's authentication password.

Confirm Password  Confirm the SNMPv3 user's authentication password.

Privacy Protocol  The SNMPv3 encryption protocol.

Privacy Password  The SNMPv3 encryption password.

Confirm Password  Confirm the SNMPv3 encryption password.

Apply

To enable SNMP Service,

1. Select the **Enable** checkbox.
2. Choose from the **v1/v2c** and **v3** checkboxes.
3. Fill in the appropriate information for the SNMP versions.
4. Click **Apply**.

## 5.10 Network connections

To see the network connections available to Lighthouse, select **Settings > Network Connections > Network Interfaces**

opengear  
Lighthouse Central Management

Add Node Help System Log out

MONITOR  
MANAGE  
CONFIGURE NODES  
SETTINGS  
Network Connections >  
Network Interfaces  
User Management >  
Services >  
Date & Time >  
System >

Network Interfaces

| Name           | Type     | Details               | Status              | Actions |
|----------------|----------|-----------------------|---------------------|---------|
| default-conn-1 | Ethernet | Static - 192.168.0.1  | Enabled and running | Edit    |
| default-conn-2 | Ethernet | DHCP - 192.168.254.33 | Enabled and running | Edit    |

Apply

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This displays only two connections: static and DHCP interfaces.

If you log in to the Lighthouse VM and run **ifconfig**, the two connections listed correspond to the following returned interfaces:

- *default-static* is `net1:static`.
- *default-DHCP* is `net1:dhcp`.

To edit a given network interface:

1. Select **Settings > Network Connections > Network Interfaces**
2. Click **Edit** in the **Actions** section of the network interface to be modified.
3. Make the desired changes.
4. Click **Apply**.

The screenshot shows the OpenGear Lighthouse Central Management interface. The left sidebar contains navigation options: MONITOR, MANAGE, CONFIGURE NODES, SETTINGS, Network Connections (selected), Network Interfaces, User Management, Services, Date & Time, and System. The main content area displays the configuration for 'default-conn-1'. A yellow warning banner states 'Editing these settings may break connectivity'. The configuration is organized into sections: Status (Running), Common Settings (Enabled checked, Description: Default static network connec), IPv4 Settings (Configuration Method: Static assignment, IP Address: 192.168.0.1, Subnet Mask: 255.255.255.0, Gateway, Primary DNS, Secondary DNS), and Media Settings. At the bottom right, there are 'Cancel' and 'Apply' buttons.

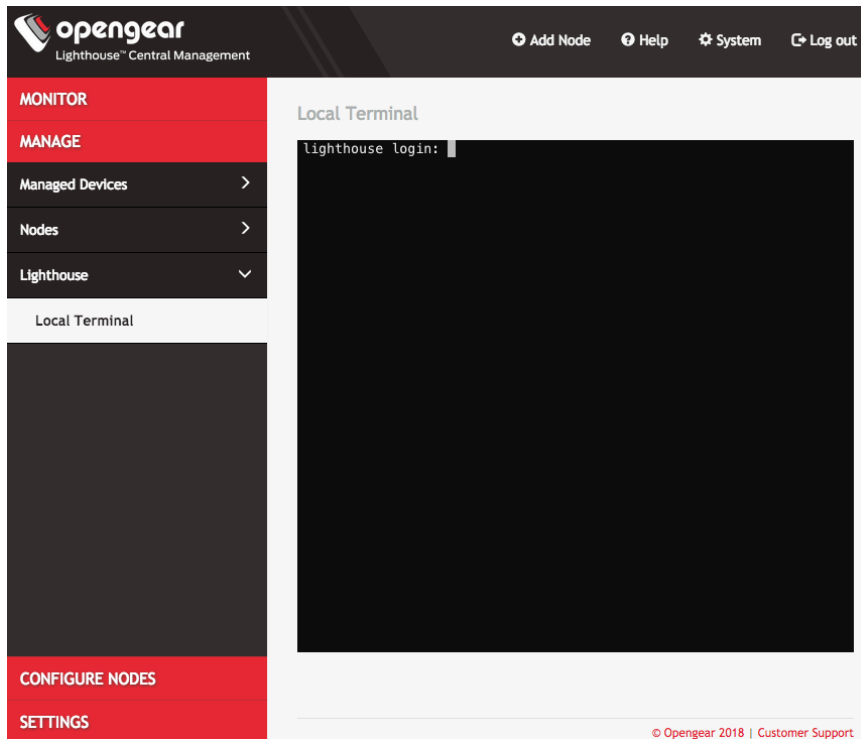
**NOTE:** Don't change the configuration method. Instead, disable the interface you don't want to use by unchecking the **Enabled** checkbox. If **default-static** and **default-DHCP** are changed to the same configuration method (i.e. both are set to **Static assignment** or both are set to **DHCP**) neither interface will work.

## 6. Shut down or restart Lighthouse

### 6.1 Shut down a running Lighthouse instance

To shut down a running Lighthouse instance:

1. Select **Manage > Lighthouse > Local Terminal**



2. At the **Local Terminal** login prompt enter a username with administrative privileges (e.g. **root**).
3. At the **Password:** prompt, enter that account's password. A **Last login** date and time for that account are returned to `STD OUT` and a shell prompt for the newly logged in user appears.
4. Enter the command `shutdown now` and press **Return**. The virtual machine shuts down.

### 6.2 Restarting a running Lighthouse instance

To restart a running Lighthouse instance, follow the first three steps of the *Shutting down a running Lighthouse instance* procedure above. At the shell prompt, enter one of these commands and press **Return**:

- `reboot`
- `shutdown -r now`

The Lighthouse virtual machine shuts down and reboots.

## 7. Using Lighthouse

After Lighthouse has been installed and configured, a small set of nodes should be enrolled, and a set of tags and smart groups should be created, that will allow nodes access to be filtered to the correct subset of users.

Once these nodes are installed, access to the Node's Web UI and serial ports should be tested.

This section covers:

1. Licensing third-party nodes before enrollment
2. Enrolling nodes
3. Creating Smart Groups
4. Accessing the node's Web UI
5. Accessing the node's serial ports via Console Gateway

### 7.1 Licensing third-party nodes before enrollment

Lighthouse 5.2.0 includes support for managing third-party remote nodes.

Support for third-party remote nodes is not built-in to a new Lighthouse instance, however: it is added via a license.

A license is an encrypted, RFC 7519-compliant, JSON web token that contains key-value pairs describing the features and entitlements of a given third-party remote node. Licenses are distributed by Opengear and will be available as encrypted ASCII strings sent by e-mail via a fulfillment procedure.

Before enrolling a third-party remote node, its corresponding license must be added to Lighthouse as follows:

#### 7.1.1 Adding a license using the Lighthouse UI

1. Select **Settings > System > Licensing**
2. Click the **+** button.



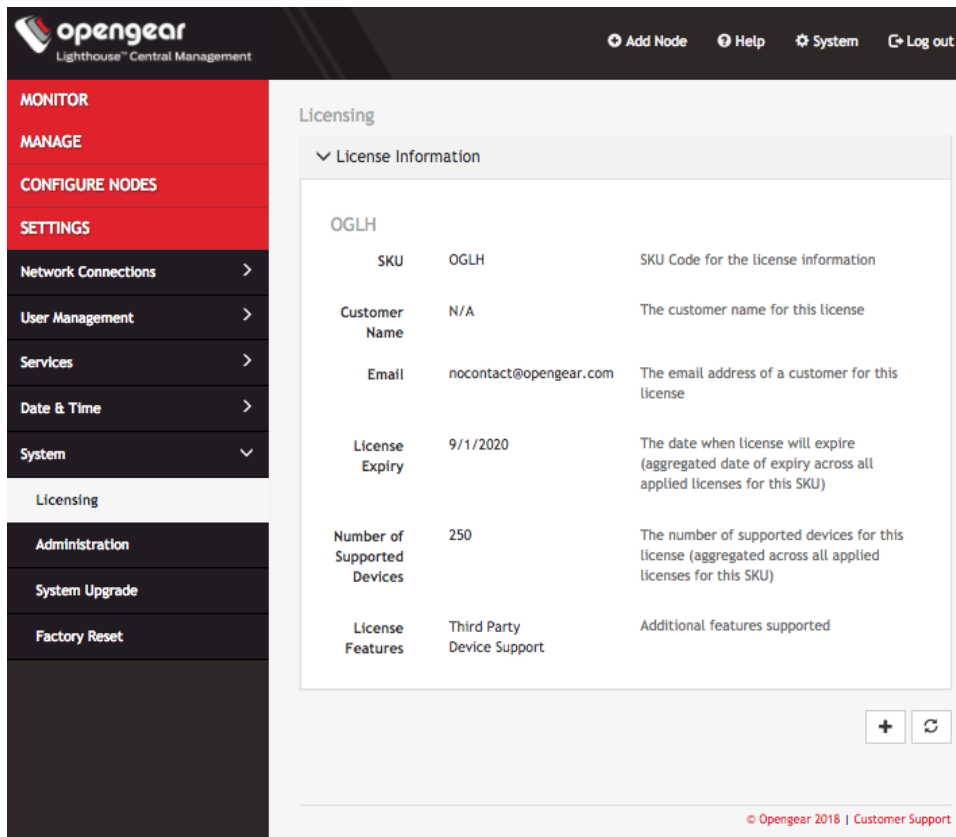
The image shows a dialog box titled "New License". On the left side, there is a label "License body" next to a large, empty rectangular text input area. The dialog box has a light gray header and a white body.

Cancel Apply

- 3. Paste the encrypted license text string into the **License body** text box.
- 4. Click **Apply**.

### 7.1.2 Showing installed licenses in the Lighthouse UI

To see all installed licenses, select **Settings > System > Licensing**.



The screenshot shows the Lighthouse Central Management interface. The top navigation bar includes the "opengear" logo and links for "Add Node", "Help", "System", and "Log out". A left sidebar contains menu items: "MONITOR", "MANAGE", "CONFIGURE NODES", "SETTINGS", "Network Connections", "User Management", "Services", "Date & Time", and "System". The "System" menu is expanded, showing "Licensing" as the selected option. The main content area is titled "Licensing" and displays "License Information" for SKU "OGLH".

| Field                       | Value                      | Description  |
|-----------------------------|----------------------------|--|
| SKU                         | OGLH                       | SKU Code for the license information   |
| Customer Name               | N/A                        | The customer name for this license   |
| Email                       | nocontact@opengear.com     | The email address of a customer for this license   |
| License Expiry              | 9/1/2020                   | The date when license will expire (aggregated date of expiry across all applied licenses for this SKU) |
| Number of Supported Devices | 250                        | The number of supported devices for this license (aggregated across all applied licenses for this SKU) |
| License Features            | Third Party Device Support | Additional features supported  |

At the bottom right of the table area, there are two buttons: a plus sign (+) and a refresh icon (circular arrow). The footer of the page reads "© Opengear 2018 | Customer Support".

Installed licenses are also shown on the Lighthouse dashboard at **Monitor > Dashboard**.

The screenshot shows the OpenGear Lighthouse Central Management Dashboard. The top navigation bar includes 'Add Node', 'Help', 'System', and 'Log out'. The main content area is divided into three sections:

- Enrolled Nodes:** A table listing nodes with columns for Name, Status, and Actions. The nodes are all in a 'Connected' state, with the last status change 6 days ago. Each row has 'Access' and 'Web UI' links.
- Current Node Status:** A large green circle indicating 'Connected (33)' nodes.
- Licensing Information:** A summary of license details:
  - Number of Installed Licenses: 1
  - Number of Supported Devices: 33 / 250
  - Expiry Date: 9/1/2020
  - Status: In Compliance
  - Enabled Features: Third Party Device Support

The dashboard also displays messages when:

- The number of nodes supported by a license has been reached or exceeded.
- The maintenance period of a license has expired.

### 7.1.3 Showing installed licenses via the Local Terminal

`oglicdump` is a shell-based tool that writes the current licensing status of a Lighthouse instance to STD OUT (or, using the `-o` switch, a file).

For example:

```
# oglicdump
{
  "OGLH": {
    "contact": {
      "email": "nocontact@opengear.com",
      "name": "N/A",
      "phone": "N/A"
    },
    "features": {
      "additional": {
        "thirdpartynodes": "1"
      },
      "maintenance": 1599004800,
      "nodes": 250
    }
  }
}
```

If no licenses are installed, **oglicdump** returns the following:

```
# oglicdump
```

No data found

## 7.2 Enrolling nodes

### 7.2.1 Enrollment overview

Enrolling nodes is the process of connecting nodes to Lighthouse to make them available for access, monitoring, and management. Enrollment can be performed via:

- The Lighthouse Web UI
- The Node Web UI
- ZTP
- USB key

Credentials must be provided to authenticate either the Lighthouse during enrollment via the Lighthouse WebUI, or the node during the other enrollment scenarios.

The Lighthouse VPN uses certificate-authenticated OpenVPN tunnels between Lighthouse and remote nodes. These tunnels rely on the time being synchronized between the Lighthouse instance and the console server or other remote node. During enrollment, if a remote node is not relying on an NTP server to set its time, it inspects the **HTTP Date** header sent by Lighthouse and sets its local time to match that of the Lighthouse instance.

If a remote node is relying on an NTP server to set its own time, it still checks the **HTTP Date** header sent by Lighthouse to affect the time synchronization but does not set its local time to that of the Lighthouse instance.

When enrolling via Lighthouse, an administration username and password for the node must be provided. When enrolling via the node, an enrollment **token** must be provided. A default enrollment token can be set on the **Configure Nodes > Enrollment Settings** page, and individual tokens set per enrollment bundle.

Enrollment is a two-step process:

1. Once enrollment starts, nodes receive their enrollment package, and establish a VPN connection to Lighthouse.
2. The node is now in the **Pending** state and needs to be **Approved** before the node is available for access, management, or monitoring.

**NOTE:** This second step can be skipped by selecting the **Auto-approve node** checkbox when configuring an enrollment bundle.

### 7.2.2 Enrollment bundles

An enrollment bundle is a downloadable file that stores provisioning information, allowing for bulk enrollment and manipulation of remote nodes.

Applying an enrollment bundle during enrollment allows tags to be associated with nodes when they're first enrolled, rather than manually assigning tags after the nodes are enrolled.

This is useful for larger roll-outs where there will be many nodes deployed with a similar configuration and responsibilities. If relevant Smart Groups and tags have been set up, newly enrolled nodes will be immediately visible for the relevant users to configure and use.

Associating templates with an enrollment bundle allows to run a set of templates on a node, after it has been enrolled. Any template currently defined on the Lighthouse can be added to an enrollment bundle, and each bundle supports any number of templates.

### 7.2.3 Creating an enrollment bundle

An enrollment bundle file, `manifest.og`, contains a series of field-value pairs that an unconfigured device can use to configure itself.

Options that can be set in `manifest.og` include new firmware, custom configuration scripts, OPG config files, and Lighthouse enrollment details.

By default, `manifest.og` includes the following field-value pairs (with example values):

```
address=192.168.88.20
api_port=4443
bundle=bne-dc
password=secret
```

Custom field-value pairs can be added manually. The field names are potential field names for a real-world, customized file, but the values following each field name are examples:

```
script=configure_ports.sh
image=acm7000-3.16.6.image
external_endpoints=192.168.1.2:4444,192.168.1.3:4445
```

A `manifest.og` file can be created in a Lighthouse instance as follows:

1. Select **Configure Nodes > Enrollment Bundles**

2. Click the **+** button. The **Enrollment Bundle Details** dialog appears.

3. Enter a **Name** and **Authentication Token** for the bundle in the respective fields.
4. Select the number of **Tags** and **Values** to apply to any nodes that enroll using this enrollment bundle.
5. (Optional) Select the **Auto-approve node** checkbox.

When this is checked, a device configured using this enrollment bundle is not placed in pending mode during the enrollment process. Instead, it is automatically approved for enrollment after it has been identified.



With the enrollment bundle named, use the **Enrollment Bundle Node Tags** to populate it with the desired name-value pairs:

1. Select a field name from the left-most drop-down menu.
2. Select or enter a value from the right-most drop-down menu.
3. Click the **+** button to add a new pair of drop-down menus.
4. Select another field name and select or enter another value.
5. Repeat until all desired name-value pairs are displayed.
6. Click **Apply**.

With the enrollment bundle named, use the **Templates** to populate it with the desired list of templates to be applied post-enrollment:

1. Click the **+** button to add a new pair of drop-down menus.
2. Select a value from the **Template Type** menu. The selected template type will filter the available names to those templates that are of that type. Note that to apply script templates, nodes need to be running firmware version 4.1.1 or later.
3. Select a value from the **Template Name** menu.
4. Repeat until all desired type-name pairs are displayed.
5. Click **Apply**.
6. The templates in the table can be reordered using the arrow buttons in the far-left column of the table and are executed in the order they appear. The order buttons appear if there is more than one template in the table.

Template push operations will stop from continuing if one template fails.

#### 7.2.4 Enrollment via Lighthouse Web UI

1. Select the **Add Node** shortcut in the top menu bar to bring up the new enrollment dialog.
2. Select the **Product** type from the **Product** drop-down menu.
3. Available options in the **Product** drop-down menu are:
  - An Opengear device
  - A generic third-party device
  - An Avocent ACS6000
  - An Avocent ACS8000
  - An Avocent ACS Classic
  - A Cisco 2900 Series

The screenshot shows the 'New Enrollment' form with the 'Product' dropdown menu open. The dropdown menu lists the following options: 'An Opengear device' (selected), 'A generic third party device', 'An Avocent ACS6000', 'An Avocent ACS8000', 'An Avocent ACS Classic', and 'A Cisco 2900 Series'. The form fields are: Product (dropdown), Network Address (text input), Username (text input), Password (text input), and Auto-approve node (checkbox, checked). The 'Apply' button is highlighted.

Cancel Apply

**NOTE:** Enrolling an Avocent ACS6000, an Avocent ACS8000, an Avocent ACS Classic, or a Cisco 2900 Series requires the device's license to have been added as per the *Licensing third-party nodes before enrollment* procedure above. If an appropriate license has not been added to Lighthouse, the procedure will return a **No licenses have been applied** error and the node will not be added to Lighthouse.

4. Enter the **Name**, **Network Address**, **Username**, and **Password** of the node being enrolled. The **Username** and **Password** fields are for the login credentials required by the remote node being enrolled, **not** the login credentials used to login to the Lighthouse instance.

The screenshot shows the 'New Enrollment' form with the 'Product' dropdown menu closed. The form fields are: Product (dropdown, showing 'An Opengear device'), Network Address (text input), Username (text input), Password (text input), and Auto-approve node (checkbox, checked). The 'Apply' button is highlighted.

Cancel Apply

**NOTE:** Lighthouse populates the node name field with the hostname of the enrolled node rather than a user provided value. It is no longer possible for users to specify a custom name, except when enrolling third party nodes. Console servers with firmware 4.1.1 and higher provide their hostname in the node information, with pre-4.1 nodes instead just having their node id used as the name. Nodes enrolled prior to upgrading to 5.2.0 have their names switched to the new standard if the node is running 4.1.1 firmware but will retain their old name if older firmware is still installed.

5. To enroll a generic third-party device, there are three more required fields: **Connection Method**; **Base Protocol Port**; and **Port Count**.

**NOTE:** The following procedure assumes the third-party device's license has been added as per the *Licensing third-party nodes before enrollment* procedure above. If an appropriate license has

not been added to Lighthouse, the procedure will return a **No licenses have been applied** error and the node will not be added to Lighthouse.

### New Enrollment

|                    |   |  |
|--------------------|---|--|
| Product            | <input type="text" value="A generic third party device"/> | The type of device to enroll   |
| Name               | <input type="text"/>                                      | Brief name for this node   |
| Network Address    | <input type="text"/>                                      | Current network address for this node  |
| Connection Method  | <input type="text" value="SSH"/>                          | The protocol used to connect to serial ports   |
| Username           | <input type="text"/>                                      | Username for a node user with access to all serial ports                             |
| Password           | <input type="text"/>                                      | Password for a node user with access to all serial ports                             |
| Auto-approve node  | <input checked="" type="checkbox"/>                       | Automatically approve enrollment after identification                                |
| Base Protocol Port | <input type="text" value="3000"/>                         | The base number from which network ports for individual serial ports will be derived |
| Port Count         | <input type="text" value="4"/>                            | The number of serial ports on the target device (maximum 400)                        |

### Serial Port Labels

|              |                                     |
|--------------|-------------------------------------|
| Port Label 1 | <input type="text" value="Port 1"/> |
| Port Label 2 | <input type="text" value="Port 2"/> |
| Port Label 3 | <input type="text" value="Port 3"/> |
| Port Label 4 | <input type="text" value="Port 4"/> |

6. Choose **SSH** or **Telnet** from the **Connection Method** drop-down menu, as appropriate for the connection method supported by the third-party device.
7. Enter a base number in the **Base Protocol Port**. By default, this is set to 3000. The Base Protocol Port number is the starting port number from which the third-party device's individual serial port network port numbers will be derived.
8. Enter the number of serial ports the third-party device has in the **Port Count** field. Below the **Port Count** field is a **Serial Port Labels** section. Whatever number is entered in the **Port Count** field, the **Port Label x** fields in this section will update to match this number in real-time.
9. Optionally, edit the labels used to identify each serial port in the **Serial Port Labels** section.
10. Click **Apply**.

Once enrolled, the console server's details are automatically removed from the **Pending Nodes** page and automatically added to the **Configure Nodes > Node Enrollment > Enrolled Nodes** page.

The screenshot shows the 'Enrolled Nodes' page in the OpenGear Lighthouse Central Management interface. The page has a dark sidebar on the left with navigation options: MONITOR, MANAGE, CONFIGURE NODES, Node Enrollment, Enrolled Nodes, Pending Nodes, Enrollment Settings, Enrollment Bundles, Edit Tags, Edit Smart Groups, Edit Managed Device Filters, and Configuration Templating. The main content area is titled 'Enrolled Nodes' and includes a 'Filtering' section with 'Smart Group Filtering' and 'Free Text Search' options. Below this is a table with the following data:

| Name                               | Status   | Description  | Actions                  |
|------------------------------------|--|--|--------------------------|
| eng-dc-pod-1F.bne.oob.opengear.com | Connection Status: Connected; last status change 1 day ago<br>Configuration Template Run Status: Success | Model: ACW7008-2<br>Firmware Version: 4.1.1u1<br>Enrollment Bundle: bne-dc<br>Management VPN Address: 192.168.128.32<br>NET1 MAC address: 00:00:ff:ff:00:1f<br>Network: 10.50.0.31<br>Serial Number: 000000000000001 | [Grid Icon] [Close Icon] |
| eng-dc-pod-2D.bne.oob.opengear.com | Connection Status: Connected; last status change 1 day ago<br>Configuration Template Run Status: Success | Model: ACW7008-2<br>Firmware Version: 4.1.1u1<br>Enrollment Bundle: bne-dc<br>Management VPN Address: 192.168.128.33<br>NET1 MAC address: 00:00:ff:ff:00:20<br>Network: 10.50.0.32<br>Serial Number: 000000000000001 | [Grid Icon] [Close Icon] |

At the bottom of the table, there is a pagination control showing '1 2 3 4' and a 'Unenroll Selected' button. The footer of the page reads '© Opengear 2018 | Customer Support'.

**NOTE:** As of Lighthouse 5.1.0, third-party devices are added to the config server but not enrolled.

## 7.2.5 Enrollment via Node Web UI

If the Node is situated behind a firewall, Lighthouse will not be able to initiate an enrollment: it will need to be triggered from the Node Web UI.

1. Log into the Node Web UI.
2. Select **Serial & Network > Lighthouse**.
3. Enter the **Server Address**, the **Enrollment Bundle** (if a specific bundle is being used), and the **Enrollment Token** (either the global token or the bundle-specific token).
4. Select **Apply Settings**. The enrollment process begins.

## 7.2.6 Mass Enrollment using ZTP

For mass node enrollments using ZTP, three new custom DHCP fields are handled by ZTP scripts.

These fields contain the **URL**, **Bundle Name** and **Enrollment Password** used in an enrollment which is kicked off immediately after all other ZTP handling is completed. If a reboot is required because of a config file being provided the enrollment will start after the reboot. Otherwise it happens immediately.

Here is a sample configuration file for the ISC DHCP Server:

```
option space opengear code width 1 length width 1;
option opengear.config-url code 1 = text;
option opengear.firmware-url code 2 = text;
option opengear.enroll-url code 3 = text;
option opengear.enroll-bundle code 4 = text;
option opengear.enroll-password code 5 = text;

class "opengear-config-over-dhcp-test" {
```

```
match if option vendor-class-identifier ~~ "^Opengear/";
vendor-option-space opengear;
option opengear.config-url "http://192.168.88.1/config.xml";
option opengear.enroll-url "192.168.88.20";
option opengear.enroll-bundle "";
option opengear.enroll-password "default";
}
```

**NOTE:** The maximum amount of data allowable as DHCP options is 1200 bytes, including all overhead inherent in the structuring of this data. Individual options are limited to 255 characters.

### 7.2.7 Enrollment via USB drive

USB Enrollment enables the configuration of a device using a manifest file copied to a USB drive and inserted into the unconfigured device before it first boots.

Once created (see *Creating an enrollment bundle* above), `manifest.og` files can be downloaded from a Lighthouse instance as follows:

1. Select **Configure Nodes > Node Enrollment > Enrollment Bundles**. A list of existing **Enrollment Bundles** appears.
2. In the **Actions** column of the particular bundle you want to use, click the **download** button, a downward arrow in a circle.
3. Depending on your browser's configuration, a `manifest.og` file will either be downloaded to your local system, probably to `~/Downloads` or `C:\Users\%USERNAME%\Downloads\` or your browser will present a dialog asking you to specify where download should be copied.

To enroll via USB drive:

4. Copy `manifest.og` to the root directory on a USB drive.
5. Plug the USB drive into an unconfigured and powered-down console server.
6. Power the console server up.

On first boot, the device looks for a file — `manifest.og` — on any USB drives attached to the device and configures the device based on their contents.

## 7.3 The Enrolled Nodes page

The screenshot displays the 'Enrolled Nodes' page in the Lighthouse 5.2 interface. The page is divided into a sidebar on the left and a main content area. The sidebar contains navigation options: MONITOR, MANAGE, CONFIGURE NODES, Node Enrollment (selected), Pending Nodes, Enrollment Settings, Enrollment Bundles, Edit Tags, Edit Smart Groups, Edit Managed Device Filters, and Configuration Templating. The main content area features a search bar with 'Filtering' and 'Free Text Search' options. Below the search bar is a table with columns for Name, Status, Description, and Actions. Two nodes are listed:

| Name                               | Status   | Description   | Actions    |
|------------------------------------|--|---|------------|
| eng-dc-pod-1f.bne.oob.opengear.com | Connection Status: Connected: last status change 1 day ago<br>Configuration Template Run Status: Success   | Model: ACM7008-2<br>Firmware Version: 4.1.1u1<br>Enrollment Bundle: bne-dc<br>Management VPN Address: 192.168.128.32<br>NET1 MAC address: 00:00:ff:ff:00:1f<br>Network: 10.50.0.31<br>Serial Number: 0000000000000001 | [List] [X] |
| eng-dc-pod-20.bne.oob.opengear.com | Connection Status: Connected: last status change 1 day ago<br>Configuration Template Run Status: Success<br>Template(s) successfully applied: local template | Model: ACM7008-2<br>Firmware Version: 4.1.1u1<br>Enrollment Bundle: bne-dc<br>Management VPN Address: 192.168.128.33<br>NET1 MAC address: 00:00:ff:ff:00:20<br>Network: 10.50.0.32<br>Serial Number: 0000000000000001 | [List] [X] |

At the bottom of the table, there is a pagination control showing '1 2 3 4' and a 'Unenroll Selected' button. The footer of the page reads '© Opengear 2018 | Customer Support'.

**Configure Nodes > Node Enrollment > Enrolled Nodes** lists all currently enrolled nodes in the order they are enrolled to Lighthouse.

It also displays details about each node (such as model, firmware version, serial number) and status.

**Connection Status** is the current status of the node and displays either of two things:

- **Connected: Last status change x [time unit] ago:** The time since Lighthouse connected to the console server.
- **Disconnected: last status change x [time unit] ago:** The time since Lighthouse disconnected from the console server.

**Configuration Retrieval Status** displays if any configuration retrieval sections failed when performing a configuration sync with this node, such as Groups, Node Description, Authorization, or Serial Ports.

**Configuration Template Run Status** displays the result of the most recent configuration template push on this node, listing which templates finished applying, or failed to apply to the node. This information is displayed until the next template push has completed on this node.

The **Configuration Retrieval Status** and **Configuration Template Run Status** are not displayed if there is no relevant data to display and are only displayed for users with **Lighthouse Administrator** or **Node Administrator** permissions.

Here is what the results of the **Configuration Retrieval Status** and **Configuration Template Run Status** indicate:

- **Success:** all templates were successfully executed on the node.

- **Partial Failure:** some templates failed to execute on the node, or some config sections failed to synchronize.
- **Failure:** all templates failed to execute on the node, or all config sections failed to synchronize.

The detailed information is shown in a popover that appears when the summary of each status is clicked on, navigated to, or hovered over. The format of the detailed information for each status shown on relevant popovers is as follows:

- Retrieval failed for: section\_name, section\_name, section\_name.
- Template(s) failed to apply: template\_name, template\_name, template\_name.
- Template(s) successfully applied: template\_name, template\_name, template\_name.

## 7.4 Filtering pages displaying nodes

There are three ways to filter search results: Free Text Search, Smart Group Filtering, and Managed Device Filtering. They can be used independently from each other or in combination. **Manage > Managed Devices > Console Gateway** uses all of them because it is the only page which lists all nodes with managed devices.

### 7.4.1 Filtering using the Free Text Search field

The Free Text Search text-entry field allows the near real-time filtering. It searches over node name, firmware version, management VPN address, MAC address, and serial number. Type a string (e.g. *4.1.1* or *192.168.128.1* or *CM7148*) and press **Return** and only the nodes which include that string in their **Name** or **Description** will be displayed.

The Free Text Search field treats multiple search terms (i.e. terms delimited by the space character) as Boolean AND searches.

For example, a search on the string:

*4.1.1 CM7148*

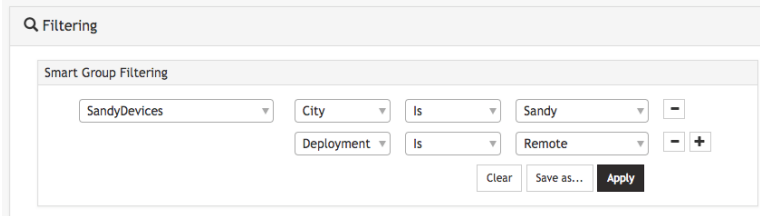
will return any nodes that have both *CM7148* AND *4.1.1* in searchable fields (e.g. *CM7148* in the name field and *4.1.1* in the firmware version field).

To make a search string that contains spaces into a single searched entity, enclose the string in double quotes.

### 7.4.2 Filtering using the Smart Group Filtering drop-down menu

Selecting from the **Select Smart Group** drop-down menu will set the page to display the subset of nodes that belong to the selected group. See *Creating Smart Groups* below for how to create such groups.

Once a particular Smart Group has been selected, further filtering options become available. For example:



In the example above, the **Configure Nodes > Node Enrollment > Enrolled Nodes** page is being filtered on the **SandyDevices** Smart Group.

It is then being further filtered to only display nodes with a **City** of *Sandy*, and a **Deployment** of *Remote*.

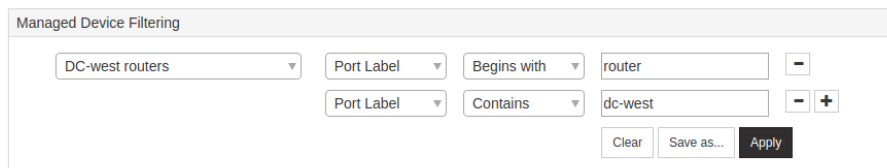
To add more filtering options:

1. Click the **+** button. An extra row of drop-down menus appears.
2. Select the desired tag from the left-most drop-down menu.
3. Select the filtering operator from middle drop-down menu.
4. Select or enter the value to be filtered against from the right-most drop-down menu.
5. Click **Apply**.

### 7.4.3 Filtering using the Managed Device Filtering drop-down menu

Selecting from the **Select Managed Device Filter** drop-down menu will set the page to display the subset of nodes with filtered managed devices. See *Creating Managed Device Filter* below for how to create managed device filters.

Once a particular Managed Device Filter has been selected, further filtering options become available. For example:



In the example above, the **Manage > Managed Devices > Console Gateway** page is being filtered on the **DC-west routers** Managed Device Filter. It is then being further filtered to only display nodes with a **Port Label** Begins with *router*, and a **Port Label** Contains *dc-west*.

To add more filtering options:

1. Click the **+** button. An extra row of drop-down menus appears.
2. Select the Port Label from the left-most drop-down menu.
3. Select the filtering operator from middle drop-down menu.
4. Enter the value to be filtered against from the right-most drop-down menu.
5. Click **Apply**.



## 7.5 Creating Smart Groups

Smart Groups are saved search parameters used within Lighthouse for grouping related remote nodes.

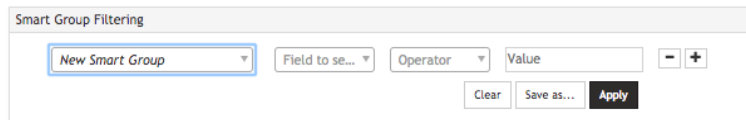
A given User Group can be linked to a particular Smart Group. When a Group is linked in this fashion, members of the Group inherit rights over all nodes in the group based on the Group's Role. See *Modifying existing groups* for how to set a Group's Role and Linked Smart Group.

Smart Groups can also be used to filter visible nodes on pages that display enrolled nodes (such as **Configure Nodes > Node Enrollment > Enrolled Nodes**) to make it easier to drill down to a particular console.

Smart groups are dynamic, so as more nodes are added to the system, the filters will automatically update.

To create a Smart Group:

1. Navigate to any page which displays the Smart Group search interface, for example **Configure Nodes > Node Enrollment > Enrolled Nodes** or **Manage > Nodes > Node Web UI**.
2. Click on the **Select Smart Group** drop-down and select **New Smart Group**. This populates a number of new drop-downs and text boxes.



3. Click the **Field to search** drop-down to select a Node attribute to filter on.

These attributes include details about the device (**Model, Firmware Version, Serial Number, NET1 MAC Address**), and also include any **tags** that have been configured in the system. For filtering access to devices, tags are generally the most useful attribute to filter on. When a tag is selected, the **Value** text box becomes a drop down with the values for that tag.

4. Click the **Operator** drop-down to select the operator to apply to the **Value**. In general, the **Is** operator is the most useful.
5. Select the **Value** to be matched against.
6. Click **Apply** to see the results of the filter.
7. Click **Save As** and type in a name for the search.

This Smart Group can now be used for filtering nodes for display, and for access.

## 7.6 Editing an existing Smart Group

To edit an existing Smart Group:

Select **Configure Nodes > Edit Smart Groups**.

- Click the **X** icon to delete an existing Smart Group.
- Click the **Edit Group** icon to change a Smart Group's name.

To change the search parameters used by a Smart Group:

1. Navigate to a page that displays Smart Groups for filtering (e.g. **Configure Nodes > Node Enrollment > Enrolled Nodes**).
2. Select the Smart Group you wish to change from the **Select Smart Group** drop-down menu.
3. Change the parameters (e.g. **Tag** and **Operator** values) as required.
4. Click **Save as**.

Save Smart Group

Name  Save as a new group, or overwrite the existing one

5. Leave the Smart Group name unedited and click **Apply**. The changed **Smart Group** will overwrite the existing Smart Group.

## 7.7 Creating Managed Device Filters

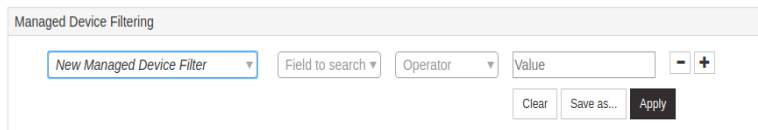
Managed Device Filters are saved search parameters used within Lighthouse for grouping related managed devices on remote nodes.

Managed Device Filters can be used to filter visible nodes with managed devices on the **Manage > Managed Devices > Console Gateway** page to make it easier to find a particular console.

Managed Device Filters are dynamic, so as more nodes with managed devices which match saved filters are added to the system, the filters will automatically update.

To create a Managed Device Filter:

1. Navigate to the **Manage > Managed Devices > Console Gateway** page
2. Click on the **Select Managed Device Filter** drop-down and select **New Managed Device Filter**. This populates a number of new drop-downs and text boxes.



3. Click the **Field to search** drop-down to select a Node attribute to filter on.
4. Select **Port Label** configuration.
5. Click the **Operator** drop-down to select the operator to apply to the **Value**. In general, the **Contains** operator is the most useful.
6. Populate the **Value** to be matched against.
7. Click **Apply** to see the results of the filter.
8. Click **Save As** and type in a name for the filter.

This Managed Device Filter can now be used for filtering nodes with managed devices for display and access.

## 7.8 Editing an existing Managed Device Filter

To edit an existing Managed Device Filter, select **Configure Nodes > Edit Managed Device Filters** page.

The screenshot shows the Opengear Lighthouse Central Management interface. The top navigation bar includes the Opengear logo, 'Lighthouse™ Central Management', and links for 'Add Node', 'Help', 'System', and 'Log out'. The left sidebar has a red header with 'MONITOR', 'MANAGE', and 'CONFIGURE NODES'. Under 'CONFIGURE NODES', there is a dropdown menu with options: 'Node Enrollment', 'Enrolled Nodes', 'Pending Nodes', 'Enrollment Settings', 'Enrollment Bundles', 'Edit Tags', 'Edit Smart Groups', 'Edit Managed Device Filters' (highlighted), and 'Configuration Templating'. The main content area is titled 'Edit Managed Device Filters' and contains a table with one row: 'DC-west routers'. The table has columns for 'Name' and 'Actions'. The 'Actions' column contains icons for a list view, a gear (edit), and a trash can (delete). A refresh button is located at the bottom right of the table area. A footer note reads '© Opengear 2018 | Customer Support'.

- Click the **X** icon to delete an existing Managed Device Filter.
- Click the **edit** icon to change a Managed Device Filter's name.

To change the search parameters used by a Managed Device Filter:

1. Navigate to a page that displays Managed Device Filter, such as **Manage > Managed Devices > Console Gateway**.
2. Select the Managed Device Filter you wish to change from the **Select Managed Device Filter** drop-down menu.
3. Change the parameters (e.g. **Operator** values) as required.
4. Click **Save as**.
5. Leave the Managed Device Filter name unedited and click **Apply**. The modified **Managed Device Filter** overwrites the existing Managed Device Filter.

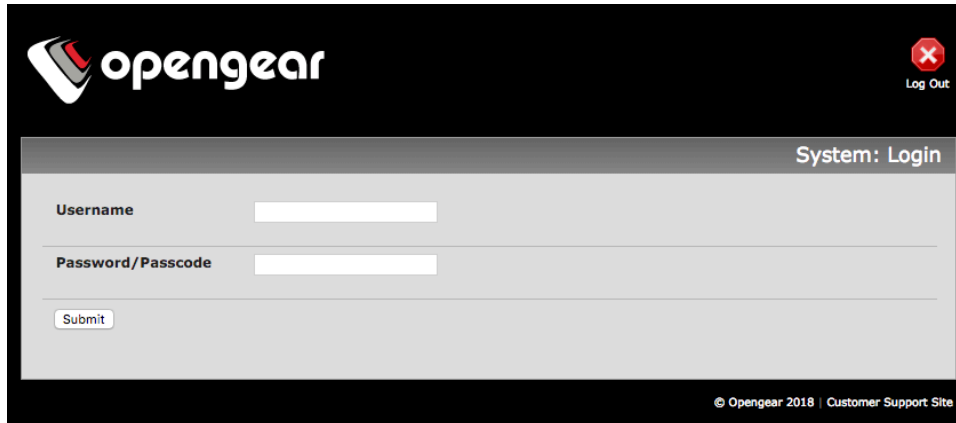
The screenshot shows a dialog box titled 'Save Managed Device Filter'. It has a text input field for 'Name' containing 'DC-west routers'. To the right of the input field, there is a note: 'Save as a new managed device filter, or overwrite the existing one'. The dialog box has a scroll bar on the right side.

Cancel Apply

## 7.9 Connecting to a Node's web-management interface

Once a node has been enrolled, its own web-management interface can be accessed from within the Lighthouse UI. To connect to an enrolled node's web-management interface:

1. Select **Manage > Nodes > Node Web UI**.
2. In the **Actions** column, click the **Access Web UI** link for the node you wish to connect to. The web-based login for that node loads.
3. Authenticate using the username and password required by that node.



This system is being accessed via Lighthouse - [click here to return to Lighthouse](#)

**NOTE:** At the bottom of the browser window is a visual indication that the console server session is being mediated through Lighthouse. This footer also contains a link allowing for a quick return to Lighthouse.

## 7.10 Connecting to a node's serial ports via Console Gateway

Searching for serial ports on Lighthouse can be accomplished by selecting **Manage > Managed Devices > Console Gateway** and **Manage > Managed Devices > Quick Search**.

**NOTE:** Port-centric search allows filtering via the Managed Device Filters and displays a list of ports within enrolled nodes that match the search terms, while Node-centric search allows filtering via Smart Groups, and Node properties. Quick Search can be used to quickly filter on the managed device label.

### Node-centric searching

1. Select **Manage > Managed Devices > Console Gateway**.
2. Find the console port you wish to access using the **Smart Group Filtering** options to restrict the listed nodes.
3. Click the **+** icon in the **Access Console Ports** row adjacent the node you wish to access.

### Port-centric searching

1. Select **Manage > Managed Devices > Console Gateway**.

2. Find the console port you wish to access by using the **Managed Device Filtering** options to restrict the listed managed devices within enrolled nodes.

In both cases, once the particular serial port is located, serial port access via **Console Gateway** can be accomplished in two ways:

- HTML5 Web Terminal
- SSH

### Quick Search

1. Select **Manage > Managed Devices > Quick Search**.
2. Enter the managed device label, aka name, in the **Quick Managed Device Search** field. This search will live-update as you type.
3. Use **Web Terminal** and/or **SSH** links inside **Actions** on a particular port to access it.

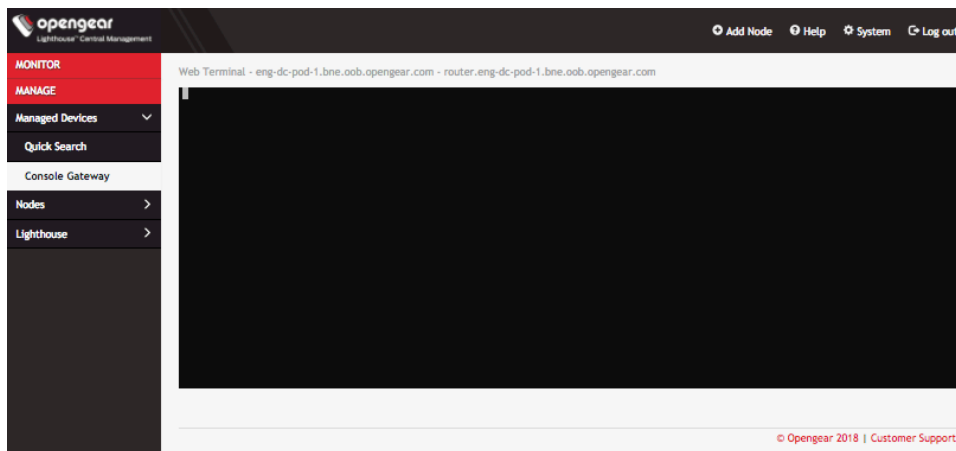
#### 7.10.1 Access via HTML5 Web Terminal

To provide easy console port access, Lighthouse includes a HTML5 Web Terminal. The HTML5 Web Terminal includes native cut, copy and paste support. The terminals available on nodes do not.

To access a console port via the **Web Terminal**:

1. Locate the port you wish to access using one of the search techniques discussed above.
2. Click the **Web Terminal** link for the particular port. A new tab opens containing the **Web Terminal**.

To close a terminal session, close the tab, or type `~.` in the **Web Terminal** window.



#### 7.10.2 Access via SSH

To access ports via SSH, the user can either use a console chooser menu to select the node and the console port or use a direct SSH link from the Web UI to connect directly to the port.

To access a console port via a Direct SSH link:

1. Locate the port you wish to access using one of the search techniques discussed above.
2. Click the **SSH** link to connect to the URL.

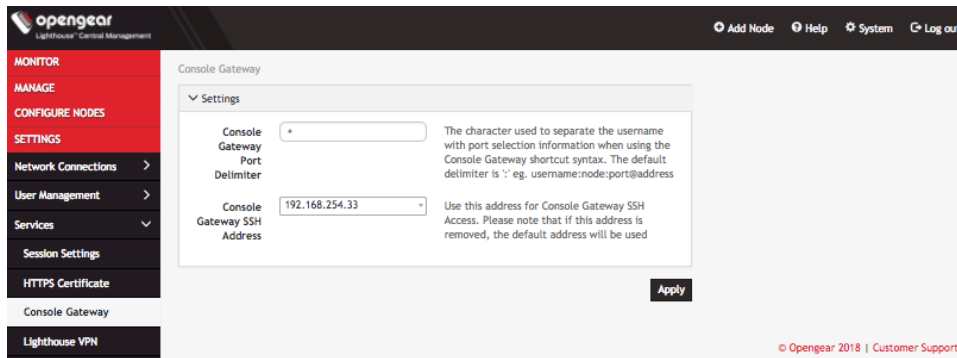
These auto-generated links use the colon (:) as the field-delimiter. The auto-generated SSH link has the following form:

```
ssh://user-name:console-server-name:port-number@lighthouse-ip-address
```

Some web browsers associate the colon character with delimiting the protocol at the beginning of a URI so they don't pass these auto-generated URIs correctly.

To work around this, the default delimiter character can be changed. To change this character:

Select **Settings > Services > Console Gateway**.



- Enter an alternative delimited character in the **Console Gateway Port Delimiter** text-entry field. The caret character — ^ — is the most common alternative delimiter for URIs being parsed by browsers.
- Use the **Console Gateway SSH Address** drop down menu to choose an address from which to SSH. The list of available addresses contains the current network interfaces and external network addresses. The value defaults to *net1:dhcp* if it exists and *net1:static* otherwise. You can add additional external addresses to this list using the **Settings > System > Administration** page.

To use the console chooser menu, use SSH to connect to the Lighthouse appliance, with the username format *username:serial*. This will connect to the Lighthouse and present a list of nodes that the user has access to. Once the user selects a node, they are presented with a list of console ports they have access to. When one is selected, the user is connected to that port.

For faster access, there are username format shortcuts that give more specific lists of serial ports, or direct access without a menu.

- **username:node\_name**  
When a valid node name is specified, a list of console ports that the user has access to on that node will be presented. If they do not have access to that node, the connection will fail.
- **username:node\_name:port\_name**  
When a valid node name and port name are specified, and the user has access to that node and

port, the user will be directly connected to that port. If they do not have access to that port, the connection will fail.

- **username:port\_name**

When a valid port name is specified, the user will be connected to first port with that port name found. If the user does not have access to that port, the connection will fail.

**NOTE:** Node names and port names are not case sensitive.

### 7.10.3 Example Console Gateway session

```
$ ssh adminuser:serial@lighthouse-name-or-ip-here
```

```
1: cm71xx
```

```
Connect to remote > 1
```

```
1: Cisco Console
```

```
2: Port 2
```

```
Connect to port > 1
```

```
router#
```



## 8. Lighthouse user management

Lighthouse 5.2.0 supports locally defined users, and remote users that are authenticated and authorized by AAA.

Users must be members of one or more groups. Each group has a role assigned to it, which determines the level of access that group members will have to the system. These roles are:

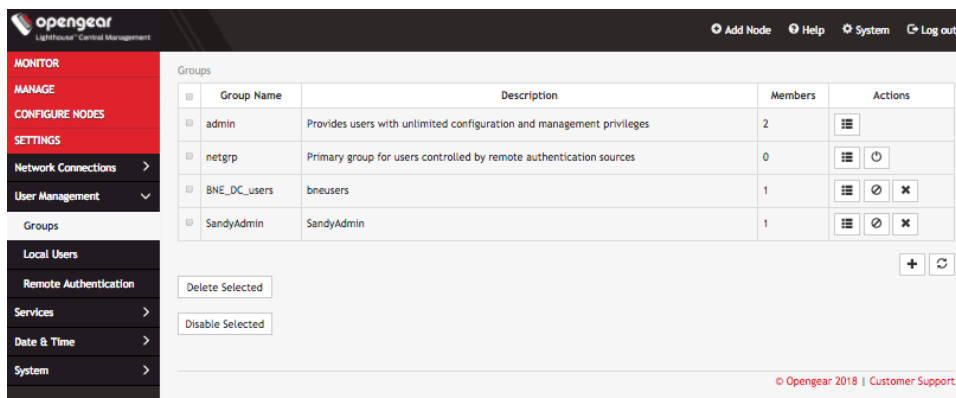
| Role                     | Description   |
|--------------------------|---|
| Lighthouse Administrator | The <b>Lighthouse Administrator</b> role is assigned to groups whose members need to manage and maintain the Lighthouse appliance. Members have access to all data on the Lighthouse system   |
| Node Administrator       | The <b>Node Administrator</b> role is assigned to groups that need to manage and maintain a set of Nodes. Each group with the <b>Node Administrator</b> role also must have an associated <b>Smart Group</b> which is evaluated to define the set of nodes that the group members have access to. |
| Node User                | The <b>Node User</b> role is assigned to groups that need to access a set of Nodes. Each group with the <b>Node User</b> role also must have an associated <b>Smart Group</b> which is evaluated to define the set of nodes that the group members have access to.                                |

Group membership can either be defined locally for local users or defined on the AAA server. Groups that are assigned by the AAA servers must still exist locally.

### 8.1 Password fields in Lighthouse

All password fields in Lighthouse are **write-only**. They accept data from the clipboard or pasteboard but do not pass data out. Passwords that you don't want to either type or retype, must be copied to your local clipboard or pasteboard outside Lighthouse. They can then be safely copied in to password fields in the Lighthouse user interface.

### 8.2 Creating new groups



To create a new group:

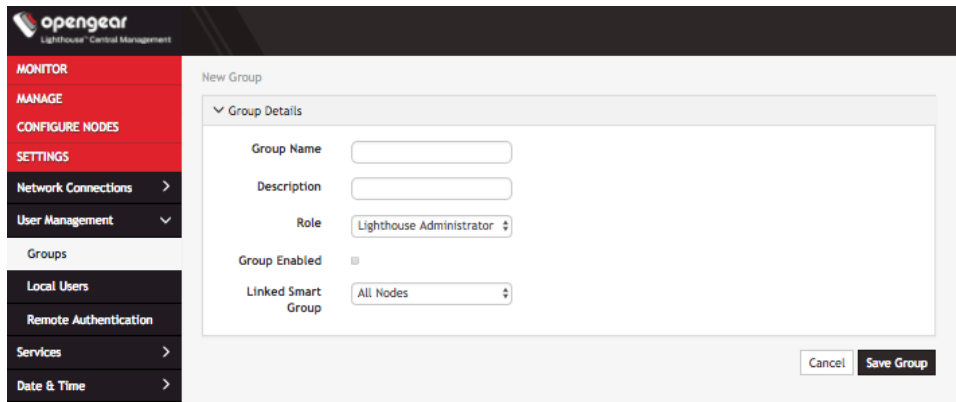
1. Select **Settings > User Management > Groups**.
2. Click **+**. The **New Group** dialog opens.
3. Enter a **Group Name**, **Description**, and select a **Role** for the group.

**Group Name** is case sensitive. It can contain numbers and some alphanumeric characters. When using remote authentication, characters from a user's remote groups that are not allowed on Lighthouse will be converted to underscores during the authentication stages. Local groups can be created that take that into account, allowing the authentication to continue.

If the **Role** selected is **Lighthouse Administrator**, members of the group will automatically be added to the **All Nodes Linked Smart Group**.

If the **Role** selected is **Node Administrator** or **Node User**, select a **Smart Group** to define the nodes that the group has access to.

1. Select **Group Enabled** checkbox to enable group.
2. Click **Save Group**.



The screenshot shows the 'New Group' configuration form in the Lighthouse interface. The form is titled 'New Group' and is located under the 'User Management' > 'Groups' menu. The form contains the following fields:

- Group Name:** A text input field.
- Description:** A text input field.
- Role:** A dropdown menu with 'Lighthouse Administrator' selected.
- Group Enabled:** A checkbox that is currently unchecked.
- Linked Smart Group:** A dropdown menu with 'All Nodes' selected.

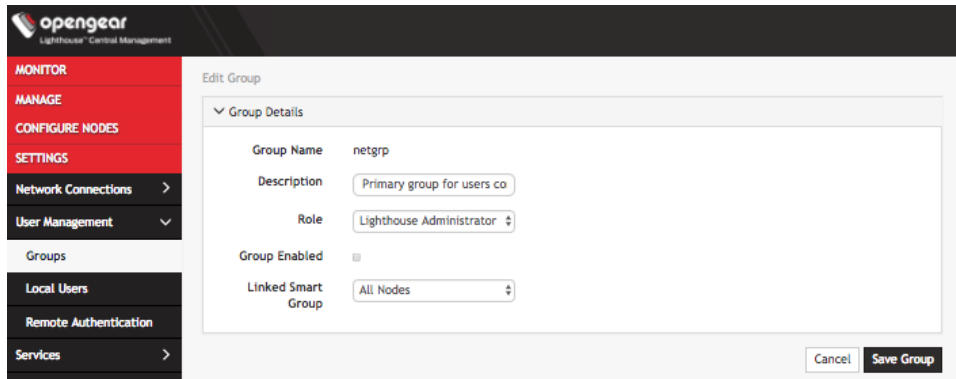
At the bottom right of the form, there are two buttons: 'Cancel' and 'Save Group'.

**NOTE:** When a new group is given the **Lighthouse Administrator** role, members of the group will have access to the `sudo` command. Groups or users with the **Lighthouse Administrator** role are added to the **admin** group, which is in the list of allowed sudoers. On first boot of a new Lighthouse instance, the **root** user is the only member of the **admin** group and the only user with `sudo` access.

### 8.3 Modifying existing groups

To modify an existing group:

1. Select **Settings > User Management > Groups**.
2. Click **Edit** in the **Actions** section of the group to be modified and make desired changes.
3. Click **Save Group**.



The **Modify Group** dialog allows the group's **Description**, **Role**, and **Linked Smart Group** to be set and changed.

If a Group's **Role** is **Lighthouse Administrator**, the group's **Linked Smart Group** is **All Nodes** and this cannot be changed. If a Group has a **Linked Smart Group** other than **All Nodes**, the group's **Role** cannot be set to **Lighthouse Administrator**.

See *Creating Smart Groups* above for details regarding creating and using Smart Groups.

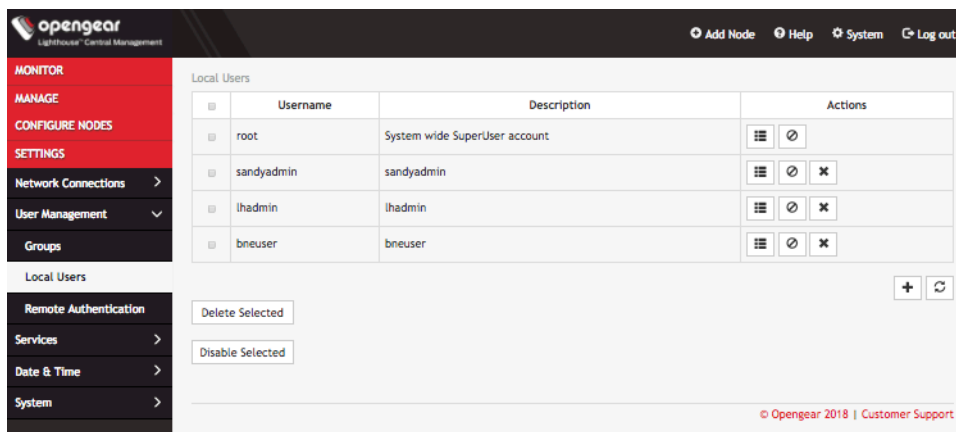
The **Modify Group** dialog also allows you to delete a group. All users who were members of the deleted group lose any access and administrative rights inherited from the group.

## 8.4 A note on default netgrp Lighthouse group

The **netgrp** group is inherited as the primary group for all remote AAA users who are not defined locally on Lighthouse. By default, **netgrp** has the **Lighthouse Administrator** role and is disabled - it must be enabled to take effect for remote AAA users.

## 8.5 Creating new users

To create a new user:



1. Select **Settings > User management > Local Users**.  
If you have not yet created any users, the root user is the only user listed.
2. Click the **+** button. The **New User** dialog appears.

**opengear**  
Lighthouse Central Management

**MONITOR**  
**MANAGE**  
**CONFIGURE NODES**  
**SETTINGS**  
Network Connections >  
User Management >  
Groups  
Local Users  
Remote Authentication  
Services >  
Date & Time >  
System >

New User

▼ User Details

Username

Description

Password  The user's authentication secret. Note: A password may not be required if remote authentication is being used

Confirm Password  Re-enter the user's password for confirmation

Group Memberships

| <input type="checkbox"/> | Group Name   | Description   | Members |
|--------------------------|--------------|---|---------|
| <input type="checkbox"/> | admin        | Provides users with unlimited configuration and management privileges | 2       |
| <input type="checkbox"/> | netgrp       | Primary group for users controlled by remote authentication sources   | 0       |
| <input type="checkbox"/> | BNE_DC_users | bneusers  | 1       |
| <input type="checkbox"/> | SandyAdmin   | SandyAdmin  | 1       |

0 / 4 Groups Selected

User Enabled

Cancel Save User

3. Enter a **Username, Description, and Password**.
4. Re-enter the **Password** in the **Confirm Password** field.
5. Select the **Enabled** checkbox.
6. Click **Apply**.

To create a new user without password which causes them to fail back to remote authentication:

1. Select **Settings > User management > Remote Authentication**
2. Apply Remote Authentication Settings.
3. Select **Settings > User management > Local Users**
4. Click the **+** button. The **New User** dialog loads.
5. Enter a **Username, Description**.
6. Select the **Remote Password Only** checkbox.
7. Select the **Enabled** checkbox.
8. Click **Apply**.

**NOTE:** When a new user is created, an entry is added to the syslog, indicating the new user's name, the user that performed the operation, and the time that it occurred:

```
2018-04-03T12:42:48.587744+00:00 lighthouse configurator_users[28915]: User <newuser>
added to passwords file
2018-04-03T12:42:48.710530+00:00 lighthouse og-rest-api: User <newuser> created by
<root>
```

If the created user is set to disabled, the `configurator_users` message will not appear as they have not been added to the passwords file.

You can view the syslog from within Lighthouse by clicking **Help > Technical Support Report**.

## 8.6 Modifying existing users

To modify an existing user:

1. Select **Settings > User management > Local Users**
2. Click **Edit** in the **Actions** section of the user to be modified and make desired changes.
3. Click **Save User**.

The screenshot shows the 'Edit User' interface. The left sidebar contains navigation options: MONITOR, MANAGE, CONFIGURE NODES, SETTINGS, Network Connections, User Management (selected), Groups, Local Users, Remote Authentication, Services, Date & Time, and System. The main area is titled 'Edit User' and contains the following fields and table:

- User Details:**
  - Username: sandyadmin
  - Description: sandyadmin
  - Password: [input field]
  - Confirm Password: [input field]
- Group Memberships:**

| <input type="checkbox"/>            | Group Name   | Description   | Members |
|-------------------------------------|--------------|---|---------|
| <input type="checkbox"/>            | admin        | Provides users with unlimited configuration and management privileges | 2       |
| <input type="checkbox"/>            | netgrp       | Primary group for users controlled by remote authentication sources   | 0       |
| <input type="checkbox"/>            | BNE_DC_users | bneusers  | 1       |
| <input checked="" type="checkbox"/> | SandyAdmin   | SandyAdmin  | 1       |
- 1 / 4 Groups Selected**
- User Enabled:**
- Buttons: Cancel, Save User

The **Modify Users** dialog allows the user's **Description** to be changed and the user's **Password** to be reset. The username cannot be changed. To disable a user, uncheck the **Enabled** checkbox.

Disabled users cannot login to Lighthouse using either the Web-based interface or via shell-based logins (i.e. `sshusername-you-disabled@lighthouse-name-or-ip`). The user and the `/home/username-you-disabled` directory still exist in the Lighthouse VM file system.

## 8.7 Deleting users

To delete a user:

1. Select **Settings > User management > Local Users**
2. Click **Delete** in the **Actions** section of the user to be modified.
3. Click **Yes** in the **Confirmation** dialog.

## 8.8 Disabling a Lighthouse root user

To disable a root user:

1. Make sure that another user exists that is in a group that has the **Lighthouse Administrator** role.
2. Select **Settings > User management > Local Users**
3. Click **Disable** in the **Actions** section of the root user.
4. Click **Yes** in the **Confirmation** dialog.

To enable root user back log in with another user exists that is in a group that has the **Lighthouse Administrator** role and click **Enable** in the **Actions** section of the root user.

## 8.9 Configuring AAA

Lighthouse supports three AAA systems:

- LDAP (Active Directory and OpenLDAP)
- RADIUS
- TACACS+

Authentication works much the same with each, but group membership retrieval varies. The following sections detail the configuration settings for each provider and explain how group membership retrieval works.

To begin, select **Settings > User Management > Remote Authentication**.

### 8.9.1 LDAP Configuration

The screenshot shows the 'Remote Authentication' configuration page for LDAP. The 'Scheme' is set to 'LDAP'. Below this, there is a table for 'Remote authentication servers' with columns for 'Address' and 'Port' (defaulting to 389). The 'Port' column has minus and plus signs for adjustment. Below the table are several input fields with descriptive text:

- LDAP base DN**: The distinguished name of the search base. For example: dc=my-company,dc=com
- LDAP bind DN**: The distinguished name to bind to the server with. The default is to bind anonymously.
- Bind DN password**: [Input field]
- Confirm password**: [Input field]
- LDAP username attribute**: The LDAP attribute that corresponds to the login name of the user (commonly "sAMAccountName" for Active Directory, and "uid" for OpenLDAP).
- LDAP group membership attribute**: The LDAP attribute that indicates group membership in a user record (commonly "memberOf" for Active Directory, and unused for OpenLDAP).

An 'Apply' button is located at the bottom right of the configuration area.

1. Select **LDAP** from the **Scheme** drop-down box.

2. Add the **Address** and optionally the **Port** of the LDAP server to query.
3. Add the **Base DN** that corresponds to the LDAP system being queried.

For example, if a user's distinguished name is **cn=John Doe,dc=Users,dc=ACME,dc=com**, the **Base DN** is **dc=ACME,dc=com**

4. Add the **Bind DN**. This is the distinguished name of a user with privileges on the LDAP system to perform the lookups required for retrieving the username of the users, and a list of the groups they are members of.
5. Add the password for the binding user.
6. Add the **Username Attribute**. This depends on the underlying LDAP system. Use **sAMAccountName** for Active Directory systems, and **uid** for OpenLDAP based systems.
7. Add the **Group Membership Attribute**. This is only needed for Active Directory and is generally **memberOf**.

**NOTE:** Multiple servers can be added. The LDAP subsystem will query them in a round-robin fashion.

## 8.9.2 RADIUS configuration

To configure RADIUS:

1. Select **Settings > User Management > Remote Authentication**.

Remote Authentication

Settings

Scheme: RADIUS

Remote authentication servers

| Address        | Port (defaults to 1812) |     |
|----------------|-------------------------|-----|
| 192.168.250.20 | 1812                    | - + |

Remote accounting servers

| Address | Port (defaults to 1812) |     |
|---------|-------------------------|-----|
|         |                         | - + |

Server password: \*\*\*\*\*

Confirm server password: \*\*\*\*\*

Apply

2. In the **Settings** section, select **RADIUS** from the **Scheme** drop-down menu.
3. Add the **Address** and optionally the **Port** of the RADIUS authentication server to query.
4. Add the **Address** and optionally the **Port** of the RADIUS accounting server to send accounting information to.
5. Add the **Server password** (Also known as the RADIUS Secret).

**NOTE:** Multiple servers can be added. The RADIUS subsystem will query them in a round-robin fashion.

To provide group membership, RADIUS needs to be configured to provide a list of group names via the Framed-Filter-Id attribute. The following configuration snippet shows how this can be configured for FreeRADIUS:

```
operator1 Auth-Type := System
    Framed-Filter-ID = ":group_name=west_coast_admin,east_coast_user:"
```

**NOTE:** The **Framed-Filter-ID** attribute must be delimited by the colon character.

### 8.9.3 TACACS+ configuration

To configure TACACS+:

1. Select **Settings > User Management > Remote Authentication**.

Remote Authentication

Settings

Scheme: TACACS+

| Remote authentication servers | Address              | Port (defaults to 49) |
|-------------------------------|----------------------|-----------------------|
|                               | <input type="text"/> | <input type="text"/>  |

TACACS+ login method: PAP  
The method used to authenticate to the server. Defaults to PAP. To use DES encrypted passwords, select Login

Server password:

Confirm server password:

TACACS+ service:   
The service to authenticate with. This determines which set of attributes are returned by the server. Defaults to "raccess"

Apply

2. Select **TACACS+** from the **Scheme** drop-down menu.
3. Add the **Address** and optionally the **Port** of the TACACS+ authentication server to query.
4. Select the **Login Method**. **PAP** is the default method. However, if the server uses DES-encrypted passwords, select **Login**.
5. Add the **Server password**, also known as the TACACS+ Secret.
6. Add the **Service**. This determines the set of attributes sent back by the TACACS+ server

**NOTE:** Multiple servers can be added. The TACACS+ subsystem will query them in a round-robin fashion.

To provide group membership, TACACS+ needs to be configured to provide a list of group names This following configuration snippet shows how this can be configured for a tac\_plus server:

```
user = operator1 {
    service = raccess {
        groupname = west_coast_admin,east_cost_user
    }
}
```



To do this with Cisco ACS, see *Setting up permissions with Cisco ACS 5 and TACACS+* on the Opendgear Help Desk.

## 9. Lighthouse central configuration

Templates are a centralized way of changing the configuration for enrolled OpenGear console server nodes by pushing pre-defined configuration templates to selected nodes. Lighthouse 5.2.0 supports the creation and execution of Group, Authentication and Script templates.

### 9.1 Creating new group templates

Only users assigned to the **Lighthouse Administrator** role can access **Configure Nodes > Configuration Templating > Group Templates** and create templates.

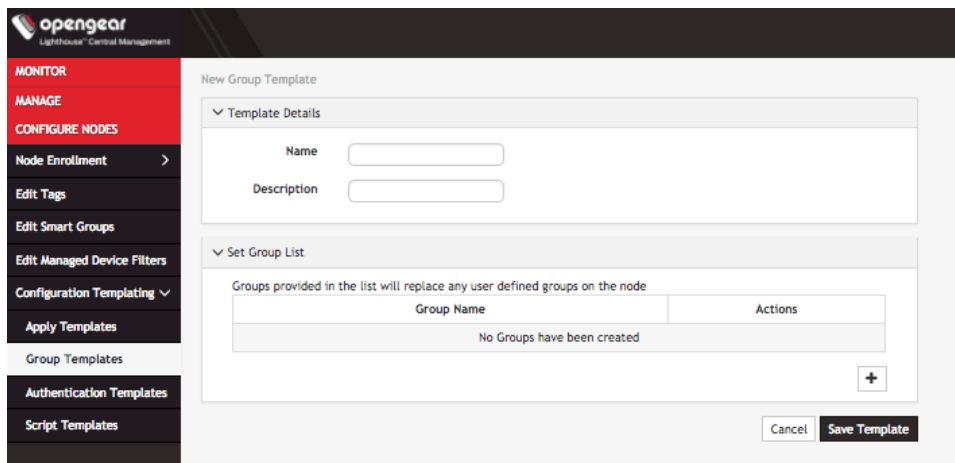
A group template contains a list of groups that are set as the list of user-defined groups on the node. Each group has a defined role which determines what privileges group members will have.

The available roles are:

- **Node Administrator** – maps to the administrator role on the nodes.
- **Node User** – maps to the all ports user role and the pmshell role on the nodes.

To create a new group template:

1. Select **Configure Nodes > Configuration Templating > Group Templates**.
2. Click the **+** button. The **New Group Template** dialog loads.



3. Enter a **Name** and **Description** for a template in the **Template Details** section.
4. Click the **+** button in the **Set Group List** section to add a new group. The **Group Details** dialog loads.
5. Enter a **Group Name**, a **Description**, and select a **Role** for the group.
6. Click **Apply**.
7. Click **Save Template**.

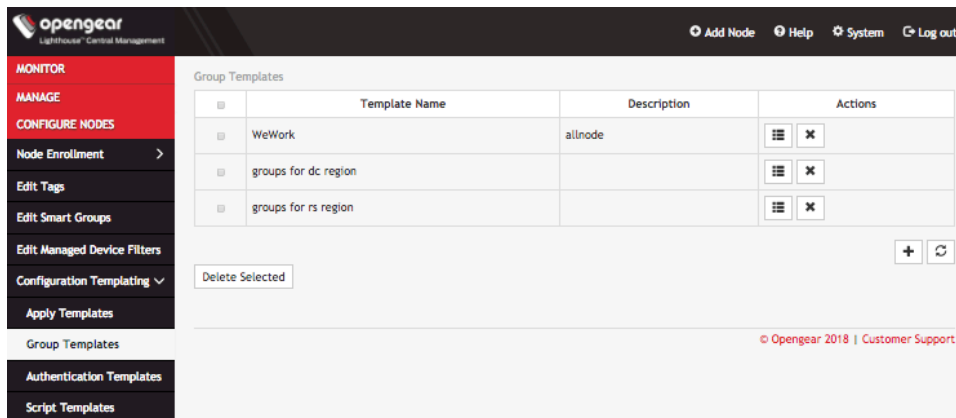
**NOTE:** When a group template is pushed to a node, all custom groups on that node are replaced by the groups defined in the template's group list.

## 9.2 Modifying existing group templates

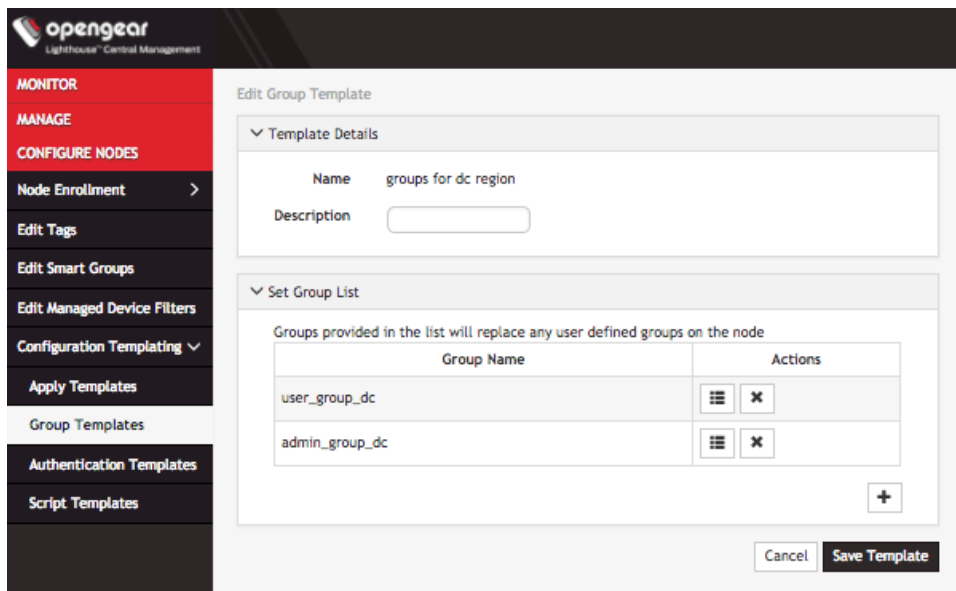
The **Edit Group Template** dialog allows a template's **Description** and **Group List** to be set and changed.

To modify an existing group template:

1. Select **Configure Nodes > Configuration Templating > Group Templates**.



2. Click **Edit** in the **Actions** section of the template to be modified. The **Edit Group Template** dialog appears.



3. Make changes as required.
4. Click **Save Template**.

## 9.3 Deleting group templates

To delete a group template:

1. Select **Configure Nodes > Configuration Templating > Group Templates**.
2. Click **Delete** in the **Actions** section of the template to be removed. The **Confirmation** alert box appears.

**Confirmation** ×

---

Are you sure you want to proceed with this action?

3. Click **Yes** in the **Confirmation** dialog. The group template is deleted.

## 9.4 Creating new authentication templates

Only users assigned to the **Lighthouse Administrator** role can access **Configure Nodes > Configuration Templating > Authentication Templates** and create authentication templates.

The supported modes are **Local**, **Radius**, **TACACS+**, and **LDAP**. For example, if an authentication template is configured to use **RADIUS** as an authentication source, that corresponds to **RADIUSDownLocal** with **Use Remote Groups** ticked on the downstream node.

To create a new authentication template:

1. Select **Configure Nodes > Configuration Templating > Authentication Templates**.
2. Click the **+** button. The **New Authentication Template** dialog loads.

The screenshot shows the 'New Authentication Template' dialog in the OpenGear Lighthouse interface. The dialog is titled 'New Authentication Template' and has a sidebar on the left with navigation options: MONITOR, MANAGE, CONFIGURE NODES, Node Enrollment, Edit Tags, Edit Smart Groups, Edit Managed Device Filters, Configuration Templating (selected), Apply Templates, Group Templates, Authentication Templates, and Script Templates. The main content area is divided into two sections: 'Template Details' and 'Authentication Settings'. The 'Template Details' section has input fields for 'Name' and 'Description'. The 'Authentication Settings' section has a 'Pre-populate from Lighthouse' section with a 'Pre-populate' button and a description: 'Pre-populate the template fields with the current Lighthouse remote authentication settings.' Below this is a 'Scheme' dropdown menu currently set to 'Local users only'. At the bottom right of the dialog are 'Cancel' and 'Save Template' buttons.

3. Enter a **Name** and **Description** for a template in the **Template Details** section.
4. Select a desired Scheme or click **Pre-populate** to pre-populate a template with the current Lighthouse remote authentication configuration.
5. Enter or update authentication settings if required. See *Configuring AAA* above for an example.

6. Click **Save Template**.

**NOTE:** When an authentication template is pushed to a node, the authentication settings at that node are replaced by the those defined in the authentication template.

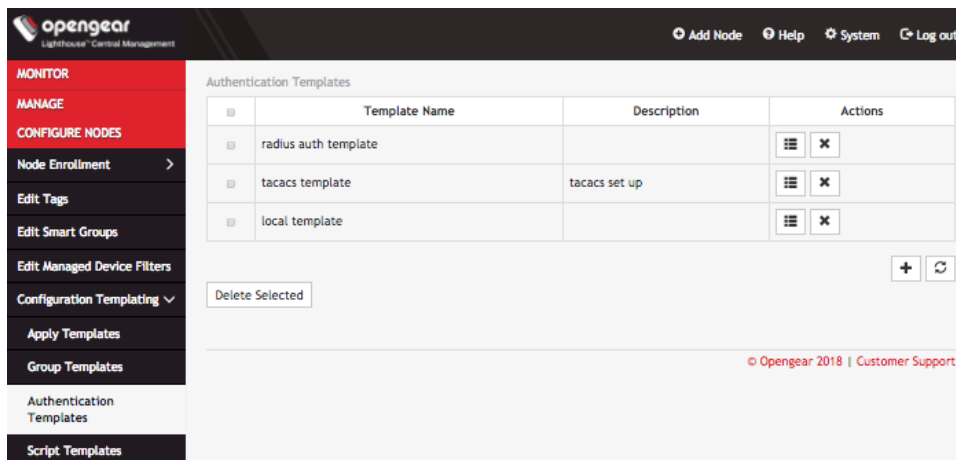
**NOTE:** The authentication templates do not currently support the full list of settings that the Opengear console servers support. However, templates can be applied, and then additional settings configured manually.

## 9.5 Modifying existing authentication templates

The **Edit Authentication Template** dialog allows the template's **Description** and **Authentication Settings** to be set and changed.

To modify an existing authentication template:

1. Select **Configure Nodes > Configuration Templating > Authentication Templates**.



The screenshot shows the Opengear Lighthouse Central Management interface. The top navigation bar includes the Opengear logo, "Lighthouse - Central Management", and links for "Add Node", "Help", "System", and "Log out". The left sidebar is divided into sections: "MONITOR", "MANAGE", and "CONFIGURE NODES". Under "CONFIGURE NODES", there are several menu items: "Node Enrollment", "Edit Tags", "Edit Smart Groups", "Edit Managed Device Filters", "Configuration Templating" (which is expanded to show "Apply Templates" and "Group Templates"), "Authentication Templates" (the current page), and "Script Templates". The main content area is titled "Authentication Templates" and contains a table with the following data:

|                          | Template Name        | Description   | Actions   |
|--------------------------|----------------------|---------------|---|
| <input type="checkbox"/> | radius auth template |               | <input type="checkbox"/> <input type="checkbox"/> |
| <input type="checkbox"/> | tacacs template      | tacacs set up | <input type="checkbox"/> <input type="checkbox"/> |
| <input type="checkbox"/> | local template       |               | <input type="checkbox"/> <input type="checkbox"/> |

Below the table, there is a "Delete Selected" button and a "+ Refresh" button. At the bottom right of the main content area, there is a copyright notice: "© Opengear 2018 | Customer Support".

2. Click **Edit** in the **Actions** section of the template to be modified. The **Edit Authentication Template** dialog appears.

The screenshot shows the 'Edit Authentication Template' interface in the OpenGear Lighthouse Central Management system. The page title is 'radius auth template'. The form is divided into two main sections: 'Template Details' and 'Authentication Settings'.

- Template Details:**
  - Name: radius auth template
  - Description: (empty text box)
- Authentication Settings:**
  - Pre-populate from Lighthouse: Pre-populate (checkbox) - Pre-populate the template fields with the current Lighthouse remote authentication settings.
  - Scheme: RADIUS (dropdown menu)
  - Remote authentication servers:
 

| Address        | Port (defaults to 1812) |     |
|----------------|-------------------------|-----|
| 192.168.250.20 | 1812                    | - + |
  - Remote accounting servers:
 

| Address        | Port (defaults to 1813) |     |
|----------------|-------------------------|-----|
| 192.168.250.21 | 1813                    | - + |
  - Server password: (password field)
  - Confirm server password: (password field)

At the bottom right of the form, there are 'Cancel' and 'Save Template' buttons.

5. Make required changes.
6. Click **Save Template**.

## 9.6 Deleting authentication templates

To delete an authentication template:

1. Select **Configure Nodes > Configuration Templating > Authentication Templates**.
2. Click **Delete** in the **Actions** section of the template to be removed. The **Confirmation** alert box appears.

### Confirmation



Are you sure you want to proceed with this action?

No Yes

3. Click **Yes** in the **Confirmation** dialog. The authentication template is deleted.

## 9.7 Creating new script templates

Only users assigned to the **Lighthouse Administrator** role can access **Configure Nodes > Configuration Templating > Script Templates** and create script templates.

Script Templates allow the user to upload arbitrary shell scripts to be run on a node. A script may set additional configuration settings not available in other templates or store additional files onto the node such as certificates, for example. The uploaded script must have a `.sh` extension and can't be more than 1MB in size. Other than those, there are no other restrictions on the script file to be uploaded. Once saved, the template will store the size and SHA1 checksum of the script. This can be used to verify the script contents of the template once saved. To apply script templates, the selected nodes need to be running firmware version 4.1.1 or later.

To create a new script template:

1. Select **Configure Nodes > Configuration Templating > Script Templates**.
2. Click the **+** button. The **New Script Template** dialog loads.

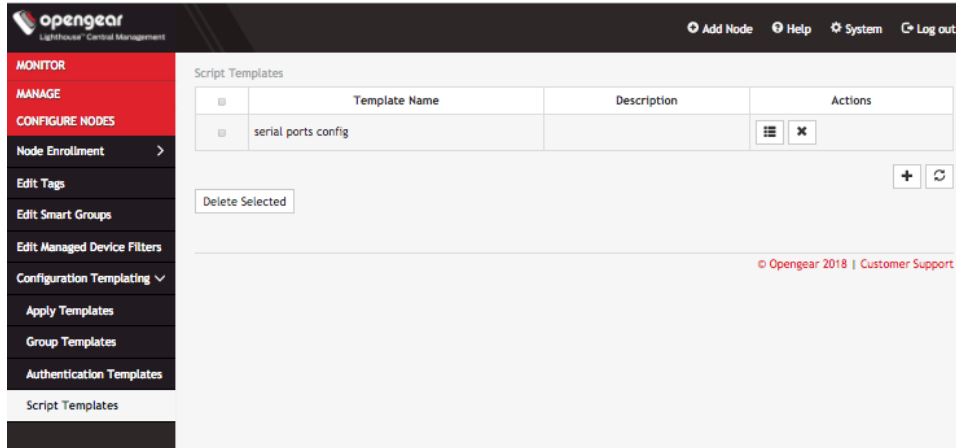
The screenshot shows the 'New Script Template' dialog in the OpenGear Lighthouse Central Management interface. The dialog is titled 'New Script Template' and is divided into two main sections: 'Template Details' and 'Upload Script File'. The 'Template Details' section contains fields for 'Name', 'Description', and 'Script timeout' (set to 15). Below these are two rows of information: 'Script checksum' and 'Script size (kB)', both showing 'No script uploaded'. The 'Upload Script File' section contains a 'Script File' field with a 'Choose File' button and the text 'No file chosen'. Below this is a note: 'Maximum script file size is 1 MB. Script must be in shell executable format (.sh)'. At the bottom right, there are 'Cancel' and 'Save Template' buttons. A sidebar on the left shows navigation options under 'CONFIGURE NODES', with 'Script Templates' selected.

3. Enter a **Name** and **Description** for a template in the **Template Details** section.
4. To select a script to upload, click **Choose file**.
5. Click **Save Template**. **Script checksum** and **Script size** are shown after template with uploaded script is saved.

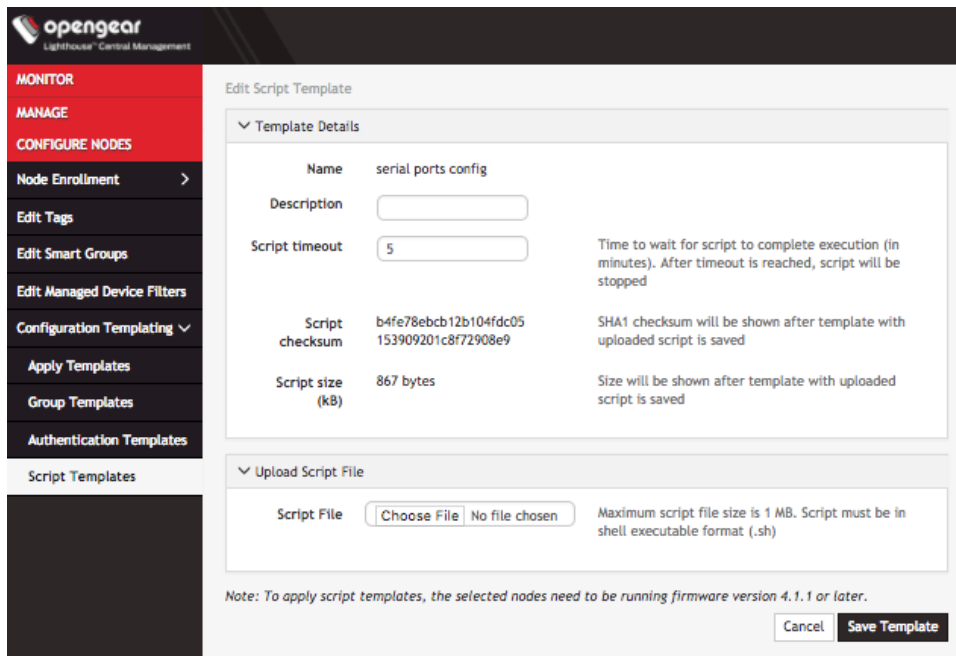
## 9.8 Modifying existing script templates

The **Edit Script Template** dialog allows the template's **Description**, **Script timeout**, and **Script File** to be uploaded. To modify an existing script template:

1. Select **Configure Nodes > Configuration Templating > Script Templates**.



2. Click **Edit** in the **Actions** section of the template to be modified. The **Edit Script Template** dialog appears.



3. Make required changes.
4. Click **Save Template**.

## 9.9 Deleting script templates

To delete a script template completely:

1. Select **Configure Nodes > Configuration Templating > Script Templates**.
2. Click **Delete** in the **Actions** section of the template to be removed. The **Confirmation** alert box appears.



**Confirmation**

Are you sure you want to proceed with this action?

3. Click **Yes** in the **Confirmation** dialog. The script template is deleted.

## 9.10 Apply Templates

Users with **Lighthouse Administrator** privileges (i.e. users with the **Lighthouse Administrator** role or users who are members of groups with the **Lighthouse Administrator** role) can access **Configure Nodes > Configuration Templating > Apply Templates** and execute templates affecting any node.

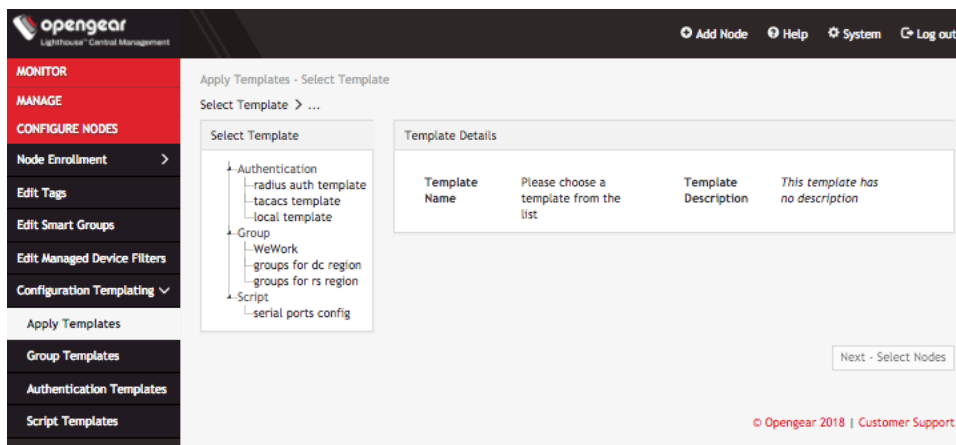
Users with Node Administrator privileges (i.e. users with the Node Administrator role or users who are members of groups with the Node Administrator role) can access **Configure Nodes > Configuration Templating > Apply Templates** and execute templates affecting nodes in Smart Groups linked to their role.

**Apply Templates** consists of four stages, each one a step in the overall wizard. The steps are:

1. Select Template.
2. Select Nodes.
3. Preflight. This is a test run, simulating what happens if the template is pushed to the selected nodes.
4. Execution.

To apply a template:

1. Select **Configure Nodes > Configuration Templating > Apply Templates**.



2. Select a template from the existing template tree. **Template Details** populates with details from the selected template.

- Click **Next – Select Nodes**. The **Select Nodes** stage loads.

Apply Templates - Select Nodes

Select Template > Select Nodes > ...

Template Name: WeWork

Template Description: allnode

Q Filtering

Smart Group Filtering: Select Smart G... -

Free Text Search: eng-dc-pod-1.bne.

| Name                              | Status  | Description  | Actions |
|-----------------------------------|---|--|---------|
| eng-dc-pod-1.bne.oob.opengear.com | Connection Status: Connected: last status change 1 week ago<br>Configuration Template Run Status: Success | Model: ACA7008-2<br>Firmware Version: 4.1.1u1<br>Enrollment Bundle: bne-dc<br>Management VPN Address: 192.168.128.3<br>NET1 MAC address: 00:00:ff:ff:00:01<br>Network: 10.50.0.1<br>Serial Number: 0000000000001 |         |

Back - Select Template

Next - Preflight

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- Select nodes from the list of enrolled nodes. You can use the **Smart Group Filtering** and **Free Text Search Filtering** to narrow down the results.

The screenshot above shows filtering being used to set the list of enrolled nodes to match the set of nodes an administrator wishes to deal with.

**NOTE:** Third-party nodes are not supported for template execution.

- Click **Next – Preflight**. The **Preflight** stage loads. This stage requires manual refresh to retrieve updated **Preflight Result** and **Details**.

After all nodes finish preflight, a success message appears and **Next – Push Configuration** becomes active.

Apply Templates - Preflight

Select Template > Select Nodes > Preflight > ...

Template Name: local template

Template Description: This template has no description

✓ Configuration template preflight has finished

| Preflight Result | Name                              | Status  | Details                            |
|------------------|-----------------------------------|---|------------------------------------|
| ⊕                | eng-dc-pod-4.bne.oob.opengear.com | Connection Status: Connected: last status change 1 week ago<br>Configuration Template Run Status: Success | 1 change(s)<br>Data updated: auth. |

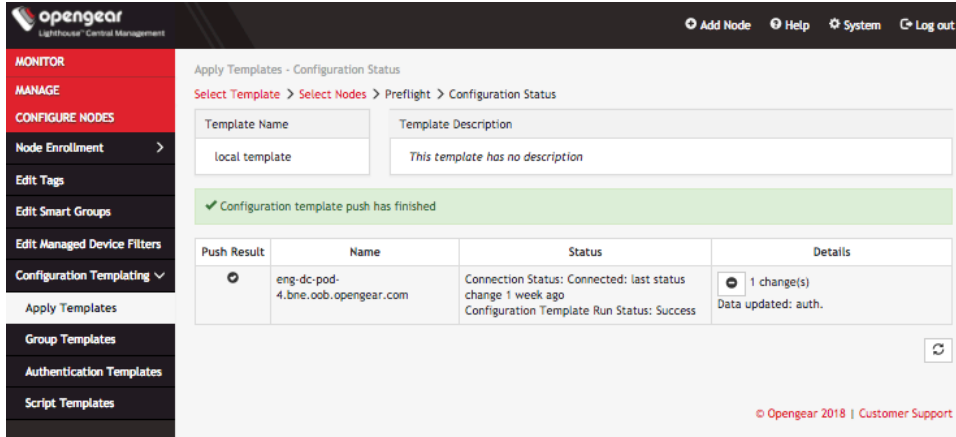
Back - Select Nodes

Next - Push Configuration

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6. Select desired nodes for template execution and click **Next – Push Configuration**. The **Configuration Status** stage loads. This stage requires manual refresh to retrieve updated **Push Result** and **Details**.

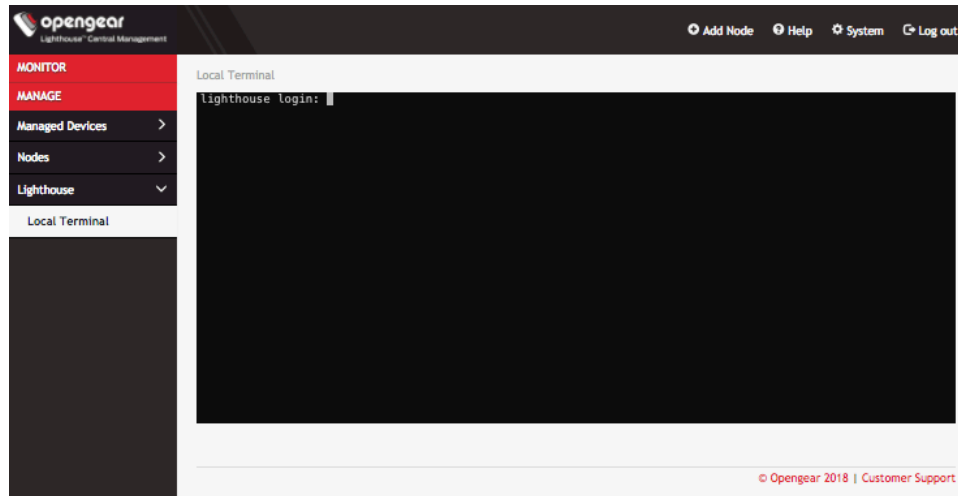
After all nodes finish the template push a success message appears.



## 10. Command line tools

Lighthouse 5.2.0 includes a web-based terminal. To access this bash shell instance:

1. Select **Manage > Lighthouse > Local Terminal**.



2. At the presented login prompt, enter an administrator's username and press **Return**.
3. A `password:` prompt appears. Enter the administrator's password and press **Return**.
4. A bash shell prompt appears.

This shell supports most standard bash commands and also supports copy-and-paste to and from the terminal.

Lighthouse-specific shell-based tools are listed below.

### 10.1 node-command

The `node-command` tool is used to run commands on managed console servers, allowing administrators to easily run a single CLI command in bulk, on all or on a range of their console server deployment.

To run node commands, you must be authorized as an admin group user.

You can get an overview of the tool from the command line:

```
node-command --help
```

See a list of all the registered console servers that the tool can operate on:

```
node-command --list-nodes
```

#### Example node-command Output

```
== node-command ID 2017-05-19T14:08:33.360164_29534 ==
14:08:33 [SUCCESS] BNE-R01-ACM7004-5 192.168.128.2:22
OpenGear/ACM7004-5 Lighthouse 3b90d826 -- Tue May 9 13:42:16 EST 2017

14:08:33 [SUCCESS] BNE-R02-IM7216 192.168.128.3:22
OpenGear/IM72xx Lighthouse 3b90d826 -- Tue Jul 5 13:42:16 EST 20167
```

## 10.2 node-info

`node-info` is a shell-based tool for pulling more detailed information from console servers.

### Example `node-info` output

```
$ node-info -A
BNE-R01-ACM7004-5
  address: 192.168.128.2
  id: nodes-1
  ssh port: 22
  description: Brisbane Rack 1
  enrollment status: Enrolled
  connection status: Connected
BNE-R02-IM7216
  address: 192.168.128.3
  id: nodes-2
  ssh port: 22
  description: Brisbane Rack 2
  enrollment status: Enrolled
  connection status: Connected
```

## 10.3 node-upgrade

`node-upgrade` is a tool for running bulk firmware upgrades on managed console servers.

By passing in required information — such as the firmware version to upgrade to, the location of the firmware image to upgrade with, and the nodes to upgrade — via appropriate flags, `node-upgrade` can upgrade the firmware on multiple console servers and report results back to `STD OUT` with a single command.

`node-upgrade` accepts twelve flags as follows:

|  |  |
|--|--|
| <code>-h --help</code>                 | Display this message   |
| <code>-q --quiet</code>                | Suppress command output                                      |
| <code>-b --batch</code>                | Suppress node-command output                                 |
| <code>-l --list-nodes</code>           | List all nodes matching query, or all nodes if none selected |
| <code>-i --node-id=ID</code>           | Select node by config ID                                     |
| <code>-n --node-name=name</code>       | Select node by name  |
| <code>-a --node-address=address</code> | Select node by VPN address                                   |
| <code>-g --smartgroup=name</code>      | Select nodes by the smart group they resolve to              |
| <code>-A --all</code>                  | Select all available nodes                                   |
| <code>-f --firmware-dir</code>         | The directory of the firmware file(s).                       |

|                                  |   |
|----------------------------------|---|
| <code>-v --version</code>        | The firmware version to upgrade to.           |
| <code>-z --ignore-version</code> | Ignore firmware version warnings for upgrade. |

### An example `node-upgrade` run

The following is an example `node-upgrade` command. It sets `/mnt/nvram/` as the directory `node-upgrade` looks to for the firmware image used as the source for all the firmware upgrade attempts. Every console server being managed from the active Lighthouse instance is targeted for an upgrade and the target console servers are set to upgrade to firmware 4.0.0.

```
# node-upgrade -A -f /mnt/nvram -v 4.1.0
```

When run, `node-upgrade` returns information to `STD OUT`, such as the following:

```
Upgrading firmware for device family: ACM550X
Upgrading firmware for device family: CM71XX
Upgrading firmware for device family: CM7196
Upgrading firmware for device family: ACM7004-5
Upgrading firmware for device family: IM72XX
im7208: flashing firmware file: im72xx-4.1.0.flash
[FAILURE] acm5508: not upgraded to OpenGear/ACM5508-2 version 4.1.0.
Reason for failure: No firmware available for ACM550X device family.
[FAILURE] cm7148: not upgraded to OpenGear/CM7148-2-DAC version 4.1.0.
Reason for failure: netflash failed due to the same firmware currently
on the device.
[FAILURE] cm7196: not upgraded to OpenGear/CM7196A-2-DAC version
4.1.0. Reason for failure: netflash failed due to the same firmware
currently on the device.
[FAILURE] acm7004: not upgraded to OpenGear/ACM7004-5-LMR version
4.1.0. Reason for failure: netflash failed due to the same firmware
currently on the device.
[SUCCESS] im7208: upgraded to OpenGear/IM7208-2-DAC-LR version 4.1.0.
```

`node-upgrade` also returns status codes 0 (success) or 1 (failure) when particular conditions are met.

Exit code 0 (success) is returned under the following conditions:

- Success
- Successful upgrade of all nodes.
- No nodes selected for upgrade.
- No firmware found in nominated directory.

Exit code 1 (failure) is returned under the following conditions:

- Missing or invalid command line options.
- The current user is not authorized to execute commands on a node.
- The specified firmware directory was invalid (i.e. because it does not exist or is not readable).
- At least one node upgrade failed.

## 10.4 ogadduser

`ogadduser` is a shell-based tool for creating users.

Basic `ogadduser` usage syntax is as follows:

```
$ ogadduser -u testuser -p mypassword -g admin
```

**NOTE:** When a new user is created via `ogadduser`, an entry is added to the syslog.

## 10.5 ogconfig-cli

`ogconfig-cli` allows users to inspect and modify the configuration tree from the command line. It is inherently transactional in nature, allowing users to ensure their configuration is correct before pushing it to the configuration server.

As the root user, start the tool with:

```
ogconfig-cli
```

### 10.5.1 Commands to try from within the `ogconfig-cli` tool

- `help`
- `get .`
- `print . 2`
- `print users[0].username`
- `find users enabled false`

### 10.5.2 Config searches uses `ogconfig-cli`

You can perform simple config searches from inside `ogconfig-cli` with the `find` command.

**NOTE:** The element being searched must be a list, otherwise the command will return an error.

The syntax is:

```
find <path of list to search> <element to search for> <value to search for>
```

For example, to find enabled users use:

```
ogcfg > find users enabled true
```

Or to find the enabled ports on a particular node set:

```
ogcfg> find nodes[0].ports mode 'ConsoleServer'
```

### 10.5.3 Changing a configuration from within `ogconfig-cli`

From inside `ogconfig-cli`:

```
ogcfg> set system.hostname "opengear-lighthouse-new"
ogcfg> push
ogcfg> quit
```

To see that the change has taken effect:

```
$ cat /etc/hostname
```

A configuration change doesn't take effect until it is pushed to the configuration server. For example, from inside `ogconfig-cli`:

```
ogcfg> set system.hostname "opengear-lighthouse-new-again"
ogcfg> print system.hostname
ogcfg> quit
```

To verify that the change did not yet take effect:

```
$ cat /etc/hostname
```

### 10.5.4 Configuration validation from within `ogconfig-cli`

Configuration is internally validated before being applied so that an incorrect configuration cannot be accidentally set. For example, from inside `ogconfig-cli`, setting an invalid ethernet link speed is rejected:

```
ogcfg> set system.net.physifs[0].ethernet.link_speed "1GB"
ogcfg> push
Commit failed
  Messages:   String is not in the list of allowed values
              Push command failed

ogcfg> quit
```

### 10.5.5 Support for mounting the hard disks with `ogconfig-cli`

Extra hard disks can be mounted in the Lighthouse VM by adding them to the configuration. Each new disk needs to have a partition created and formatted. Partitions can be created using `fdisk` or `cgdisk`, and should be formatted using the `ext4` filesystem, using the `mkfs.ext4` command:

```
root@lighthouse:~# mkfs.ext4 /dev/sdb1
```

You must also create the directory in which to mount the filesystem. In general, new filesystems should be mounted in the provided mountpoint of `/mnt/aux`. Any other filesystems should be mounted within the filesystem mounted here.



Add the information to the configuration system using `ogconfig-cli` as follows, modifying the path for your specific situation.

```
ogcfg> var m !append system.mountpoints map
{8435270-fb39-11e7-8fcf-4fa11570959}: Map <>
ogcfg> set {m}.node "/dev/sdb1"
{b8c37c6-fb39-11e7-971c-23517b19319}: String </dev/sdb1>
ogcfg> set {m}.path "/mnt/aux"
{1fb50d8-fb39-11e7-994c-0f10b09cbd4}: String </mnt/aux>
ogcfg> push
OK
```

## 10.6 oglicdump

`oglicdump` is a shell-based tool for displaying and saving the current third-party licensing status of a Lighthouse instance.

When used without a switch, `oglicdump` writes the current status to `STD OUT`.

To write this status out to a file, or in machine readable form, or as a raw license container string, or to write out a sub-set of the licensing information (such as licenses for a given SKU), use one of the switches `oglicdump` supports:

|                                 |  |
|---------------------------------|--|
| <code>-h</code>                 | Displays this help.  |
| <code>-v</code>                 | Display version information  |
| <code>-o &lt;file&gt;</code>    | File to write out to. Default is stdout.   |
| <code>-s &lt;SKU&gt;</code>     | Specific SKU code to dump out. Default is all SKU codes.                                     |
| <code>-f &lt;feature&gt;</code> | Specific feature value to dump out. This is only valid in conjunction with <code>-s</code> . |
| <code>-c</code>                 | Output contacts only. This is only valid in conjunction with <code>-s</code> .               |
| <code>-m</code>                 | Output machine readable, as in compact formatted.  |
| <code>-r</code>                 | Output the raw license container strings from config.  |

## 10.7 cron

`Cron` service can be used for scheduled `cron` jobs runs. Daemon can be managed via the `/etc/init.d/crond` interface, and `cron` tables managed via `crontab`. `Crontab` supports:

### Usage:

```
crontab [options] file
crontab [options]
crontab -n [hostname]
```

### Options:

|                              |                                    |
|------------------------------|------------------------------------|
| <code>-u &lt;user&gt;</code> | define user                        |
| <code>-e</code>              | edit user's <code>crontab</code>   |
| <code>-l</code>              | list user's <code>crontab</code>   |
| <code>-r</code>              | delete user's <code>crontab</code> |

```
-i          prompt before deleting
-n <host>   set host in cluster to run users' crontabs
-c          get host in cluster to run users' crontabs
-x <mask>   enable debugging
```

To perform start/stop/restart on crond service:

```
/etc/init.d/crond start
```

Cron doesn't need to be restarted when crontab file is modified, it will examine the modification time on all crontabs and reload those which have changed.

To verify the current crond status:

```
/etc/init.d/crond status
```

To check current cron jobs running with the following command to list all crontabs:

```
crontab -l
```

To edit or create a custom crontab file:

```
crontab -e
```

This will open a personal cron configuration file. Each line can be defined as one command to run. The following format is used:

```
minute hour day-of-month month day-of-week command
```

For example, append the following entry to run a script every day at 3am:

```
0 3 * * * /etc/config/backup.sh
```

Save and close the file.

## 10.8 sysflash

sysflash is the shell-based tool for upgrading a Lighthouse instance's system.

Basic syntax is as follows:

```
# sysflash [flags] [path/to/system-image.lg_upg | Percent-encoded URL to firmware-image.lg_upg]
```

Image filenames cannot include spaces. And, as the syntax example above notes, URLs must be Percent-encoded.

sysflash includes eight flags which modify the standard upgrade behavior as well as the `-h` or `--help` flag, which returns all the available flags and their effects:

|   |  |
|---|--|
| <code>-b, --board-name &lt;name&gt;</code>        | Override board name (currently <code>lighthouse-vm</code> )  |
| <code>-B, --board-revision &lt;version&gt;</code> | Override board revision (currently 1.0)                      |
| <code>-V, --vendor &lt;vendor&gt;</code>          | Override vendor (currently <code>opengear</code> )           |
| <code>-I, --no-version-check</code>               | Do not check software version for upgradability              |
| <code>-m, --no-migration</code>                   | Do not migrate current config. Start fresh.                  |
| <code>-v, --verbose</code>                        | Increase verbosity (may repeat)                              |
| <code>-o, --no-boot-once</code>                   | Do not modify bootloader (implies <code>--no-reboot</code> ) |
| <code>-r, --no-reboot</code>                      | Do not reboot after upgrading                                |
| <code>-h, --help</code>                           | Print this help  |

## 10.9 Selecting nodes using shell-based tools

There are a number of ways to select nodes (also known as console servers) as targets on which to run a command. These can be used multiple times, or together, to select a range of console servers:

Select individually by name, address, Lighthouse VPN address, config index or smart group (as per `--list-nodes` output):

```
node-command --node-name BNE-R01-IM4248
node-command --node-address 192.168.0.33
node-command --node-index nodes-1
node-command --smartgroup="model-acm"
```

### 10.9.1 Select all nodes

```
node-command --all
```

### 10.9.2 Running commands on selected nodes

Once nodes are selected, the commands to be run for each can be given. These are run on each managed node, in parallel. Any command you can run from a node shell can be run on each managed node.

**NOTE:** All commands are run as root.

For example, to check the version on two specific, configured nodes, selecting one by name and the other by index, run the following command:

```
node-command --node-name BNE-R01-ACM7004-5 --node-index nodes-2 cat
/etc/version
```

**NOTE:** When using non-trivial selection arguments, check which target nodes have been selected on your initial command pass by using the `--list-nodes` switch rather than the final command.

## 11. System upgrades

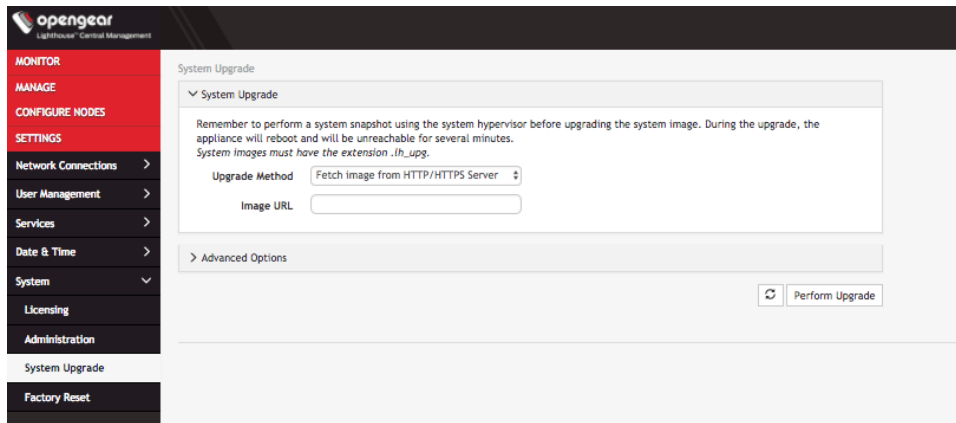
A Lighthouse appliance's system can be upgraded using a `.lh_upg` image file.

Once the upgrade is complete, the Lighthouse instance reboots. It is unavailable during the reboot process.

### 11.1 Upgrading the system from within Lighthouse

To upgrade a Lighthouse instance's system using the Lighthouse UI:

1. Select **Settings > System > System Upgrade**.
2. Select the **Upgrade Method**, either **Fetch image from HTTP/HTTPS Server** or **Upload Image**.



If upgrading via **Fetch image from HTTP/HTTPS Server**:

1. Enter the URL for the system image in the **Image URL** text-entry field.
2. Click **Perform Upgrade**.

Or if upgrading via **Upload Image**:

1. Click the **Choose file** button.
2. Navigate to the directory containing the `system-upgrade-image.lh_upg` file.
3. Select the `system-upgrade-image.lh_upg` file and press **Return**.
4. Click **Perform Upgrade**.

**NOTE:** The **Advanced Options** section, which expands to present an **Upgrade Options** text-entry field, should only be used if a system upgrade is being performed as part of an Opengear Support call. If a specific option is required, the Opengear Support technician will specify it.

Once the upgrade has started, the **System Upgrade** page displays feedback as to the state of the process.

A system upgrade attempt will return the error **System version was not higher than the current version** if the selected image file is not, in fact, a more recent version than that already installed.

## 11.2 Upgrading the Lighthouse system via the Local Terminal

Lighthouse includes a shell-based tool – `sysflash` – that allows a user with administrative privileges to upgrade the instance’s system from the **Local Terminal**.

To upgrade Lighthouse instance’s system using the Lighthouse **Local Terminal**:

1. Select **Manage > Lighthouse > Local Terminal**.
2. At the `[hostname] login:` prompt, enter an administrator username and press **Return**.
3. At the `Password:` prompt, enter the administrator’s password and press **Return**.
4. To use `sysflash` in conjunction with a `.lh_upg` file available via an HTTP or HTTPS server:

At the Local Terminal bash shell prompt, enter a URL. **It must be URL-encoded:**

```
sysflash http[s]://3A%2F%2Fdomain.tld%2Fpath%2Fto%2Ffirmware-upgrade-  
image.lh_upg
```

5. Press **Return**.

To use `sysflash` in conjunction with a `.lh_upg` file available via the local file system:

1. At the Local Terminal bash shell prompt enter:

```
sysflash /path/to/system-upgrade-image.lh_upg.
```

2. Press **Return**.

**NOTE:** `sysflash` includes several flags that allow for variations in the standard system upgrade process. These flags should not be used unless directed to do so by OpenGear Support.

Flags are listed by running either of the following at a Local Terminal bash shell prompt:

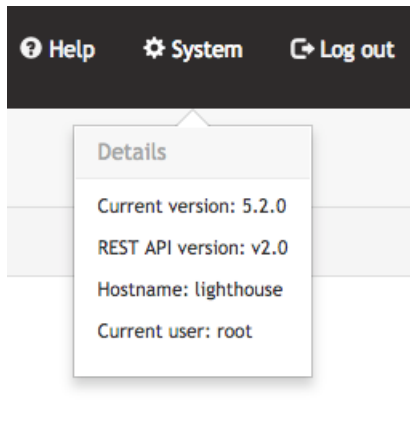
- `sysflash -h` or
- `sysflash --help`
- The same listing is presented in the `sysflash` entry of the Command line tools chapter above.

## 12. Troubleshooting

### 12.1 Finding the current Lighthouse instance version

#### 12.1.1 Using the web UI

1. Click **System** on the top right of the Lighthouse instance's web UI.
2. The **Details** menu appears, listing the Lighthouse instance's **Current version**, **REST API version**, **Hostname**, and **Current user**.



#### 12.1.2 Via the local Lighthouse shell

1. Click **Manage > Lighthouse > Local Terminal**
2. At the `[hostname] login:` prompt, enter an administrator username and press **Return**.
3. At the `Password:` prompt, enter the administrator's password and press **Return**.
4. At the bash shell prompt, enter `cat /etc/version` and press **Return**.

The current Lighthouse instance's version is returned to `STD OUT`. For example:

```
[administrator-username]@[hostname]:~# cat /etc/version
5.2.0
```

**NOTE:** The procedure above uses the Web UI to reach the Lighthouse Local Terminal. This is not the only way to reach the Lighthouse shell and `cat /etc/version` works in any circumstance where an administrator has access to the Lighthouse shell. For example, many of the Virtual Machine Manager applications that can run a Lighthouse instance offer virtual console access. If this is available and an administrator logs in to the Lighthouse shell via this console, the command string will work as expected.

#### 12.1.3 Other information sources related to a Lighthouse instance's version

Two other command strings can be useful when specifics about a particular Lighthouse instance are needed.

Both these commands can be run by an administrator with access to a running Lighthouse instance's bash shell.

First is `cat /etc/sw*`. This command concatenates the following four files to `STD OUT`:

```
/etc/sw_product
/etc/sw_variant
/etc/sw_vendor
/etc/sw_version
```

For example:

```
# cat /etc/sw*
ironman
release
opengear
5.2.0
```

Second is `cat /etc/issue`. `/etc/issue` is a standard \*nix text file which contains system information for presenting before the system's login prompt. On a Lighthouse instance, `etc/issue` contains the vendor, and the Ironman/Lighthouse version

```
# cat /etc/issue
Opengear Ironman 5.2.0 \n \l
```

## 12.2 Technical support reports

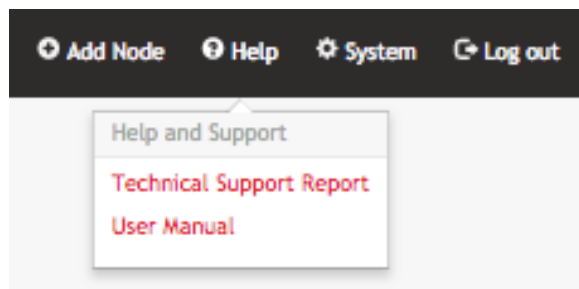
Lighthouse 5.2.0 can generate a technical support report that includes Lighthouse configuration information and the current system log for the Lighthouse VM.

If you contact Opengear Technical Support, the support technician may ask for this report.

### 12.2.1 Generate a support report via the Lighthouse interface

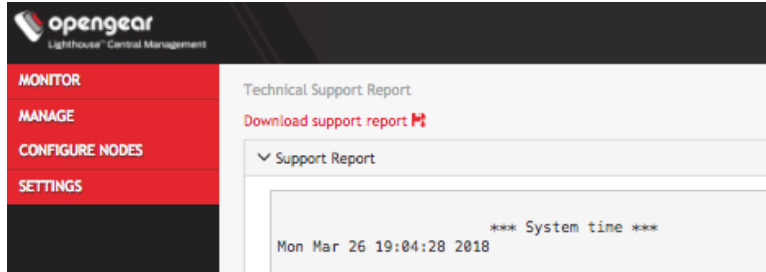
To generate a complete configuration and status report regarding a given Lighthouse VM:

1. Select **Help > Technical Support Report**.



Lighthouse generates this support report on demand and the report includes the current system log. This process can take several minutes.

2. Click **Download support report**.



This downloads a PKZip archive to your local system. The archive's filename is structured as follows:

```
support-[host-name]-[iso-8601-order-date-and-time-stamp].zip
```

It contains two files:

- `system.txt` – the configuration information also presented in the **Technical Support Report** window.
- `messages` – the current Lighthouse VM system log.

The two files are also presented in the **Support Report** text box below the **Download support report** link. Because the report includes the current system log, this will almost certainly be a long but scrollable presentation. This presentation is, however, searchable using your web browser's built-in search function.

### 12.2.2 Generate a support report via the local terminal

To generate a complete configuration and status report regarding a given Lighthouse VM:

1. Select **Manage > Lighthouse > Local Terminal**.
2. At the `[hostname] login:` prompt, enter an administrator username and press **Return**.
3. At the `password:` prompt, enter the administrator's password and press **Return**.
4. At the bash shell prompt, enter

```
support-report -z > /tmp/support.zip
```

and press **Return**

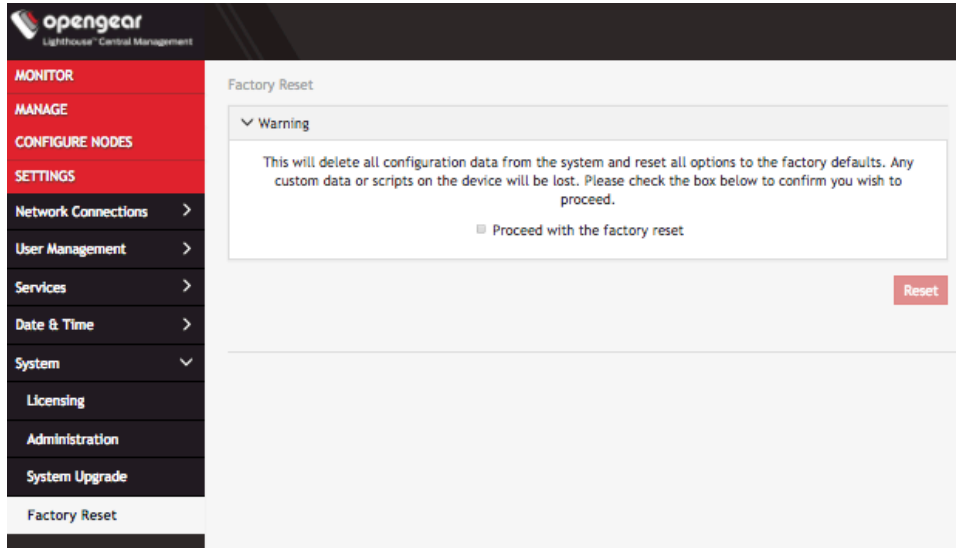
**NOTE:** This is the recommended way of running the `support-report` command. The `-z` switch generates the same combined file produced by the **Download support report** link noted in the Lighthouse UI-specific procedure above. And the redirect saves this generated PKZip file to `/tmp/support.zip` for retrieval at your convenience.

## 12.3 Returning a Lighthouse instance to factory settings

To return an enrolled console server to its factory settings using Lighthouse:



1. Login to the Lighthouse web-based interface as **root**. Other users, even those with full administrative privileges, do not have the permissions required to reset the Lighthouse VM to its factory settings.
2. Select **Settings > System > Factory Reset**.



3. Select the **Proceed with the factory reset** checkbox.
4. Click **Reset**.

Alternatively, running the following shell script as root performs a full factory reset:

```
/usr/bin/factory_reset
```

This script prompts for confirmation before performing the factory reset. The factory reset procedure and the shell script are equivalent to logging in to a console server's web-based management interface (see *Connecting to a console server's web-management interface* above) and doing the following:

1. Select **Administration**
2. Check the **Config Erase** checkbox.
3. Click **Apply**.

**NOTE:** Returning a console server to its factory settings in this fashion does **not** un-enroll the server from the Lighthouse VM.

**NOTE:** You can download the latest User Manual from the OpenGear documentation page at [opengear.com/support/documentation](http://opengear.com/support/documentation). It can be easily accessed by **Help > User Manual** link in the top bar menu.

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