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eyeInspect Installation Guide v5.9

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About the Documentation

- Refer to the Documentation Portal for additional technical documentation: https://docs.forescout.com/
- Have feedback or questions? Write to us at documentation@forescout.com

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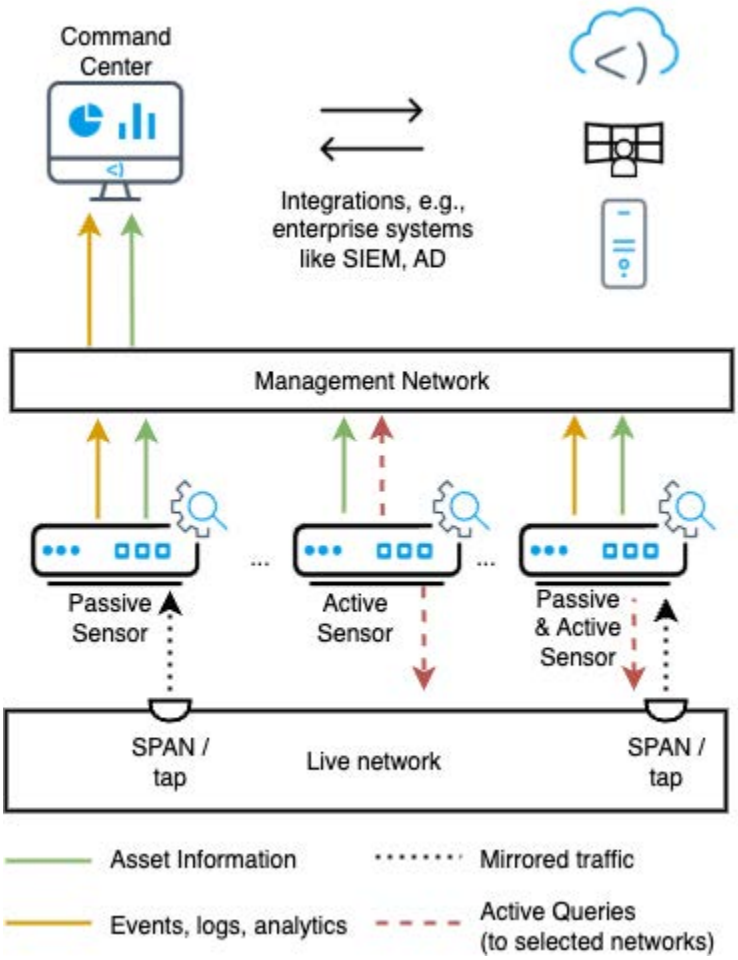
Table of Contents

About eyeInspect

This guide describes how to install eyeInspect. This page introduces the eyeInspect components and the terminology used in this document.

eyeInspect Architecture

An eyeInspect deployment consists of a Command Center and one or more Sensors, as shown in the figure below. Sensors can be Passive Sensors or Active Sensors.



The Command Center is a web-based application used for sensor and event management and provides visual representations and analysis capabilities for logs and events. The Command Center can interface with several third-party enterprise systems (for example, a SIEM system).

A Passive Sensor sends events and logs to the Command Center via the management interface, connected to the ICS / SCADA network via a SPAN / mirroring port to passively listen to the network traffic. Passive Sensors have several self-configuring detection engines and detection levels. Each Passive Sensor has one or more network monitoring ports and a management interface.

An Active Sensor remains inactive unless the eyeInspect operator issues a direct command. When a command is issued, the Active Sensor sends controlled queries to assets selected by the operator. Information retrieved in this way is then returned to the Command Center. An Active Sensor is connected to the ICS / SCADA network as a regular asset, and to the Command Center via the management interface.

The Command Center, Passive Sensor, and Active Sensor can all be accessed via SSH for server management. For demo and testing setups, the Monitoring Sensor can be installed together with the Command Center in one application.

eyeInspect Glossary

This section explains the terminology used by eyeInspect.

Term	Definition
Bundled installation	An installation of eyeInspect in which the Command Center, Flow Aggregator Forwarder, Passive Sensor and Active Sensor are installed together on one server.
Command Center	The eyeInspect management interface used for sensor and event management. The Command Center is a web based application accessible via HTTPS.
Enterprise Command Center	An optional component for the eyeInspect Suite, offering an enterprise-level management interface to monitor multiple Command Centers.
Active Sensor	An optional component of the eyeInspect Suite. It allows the eyeInspect operator to send requests for information to ICS assets in a controlled way.
Passive Sensor	An essential component of the eyeInspect Suite: a collection of Modules. A Passive Sensor monitors a subnet, i.e., a set of hosts, for malicious activities.
sdconfig	sdconfig is a utility used to configure the eyeInspect system.
eyeInspect operator	Person who uses eyeInspect, e.g. the person responsible for configuring and managing the system.
eyeInspect Physical Appliance	eyeInspect installed on a physical server, e.g. a 19" rack server or an embedded PC.
eyeInspect Virtual Appliance	eyeInspect deployed as virtual machine on a hypervisor, usually VMware ESXi.
WMI	Windows Management Instrumentation, a standard way of interacting with Windows hosts, which is used by Active Sensors.

eyeInspect Installation Prerequisites

Before you can install eyeInspect, there are several prerequisites that need to be addressed, including:

- Network, authentication, and credential requirements
- Configure firewall and proxy rules
- Download the eyeInspect installation ISO and create bootable USB
- Upload eyeInspect license files

Network, Authentication and Credential Requirements

To install and configure eyeInspect, establish the following:

- **Network:** The network on which eyeInspect will be included.
- **SPAN Port(s):** The ports for inbound and outbound monitoring for the targeted network segment(s).
- **Hostnames, Static IP Address, Gateway, and Subnet Mask for all desired components:** Command Center, Enterprise Command Center, Passive Sensors, and Active Sensors.
- **NTP Server Address:** The server address used for time synchronization. This is not required for short-term pilot or demonstration deployments.
- **For an existing LDAP/AD authentication database:** Provide the LDAP server address and bind information. LDAP-based authentication can also be implemented after the initial installation.
- **For querying certain assets with an Active Sensor:** Provide access and credentials for the selected assets that you want the Active Sensor to send queries to (for example, WMI or SEL).

Configure Firewall and Proxy Rules for eyeInspect

Before you can install or configure your eyeInspect Command Center or Sensors, you must set your firewall and proxy rules.

eyeInspect Firewall Rules

Source	Destination	Port	Description of Connection
Command Center	Active Sensor	22 (ssh)	System Management
Command Center	Passive Sensor	22 (ssh)	System Management
Enterprise Command	Command Center	443	Sends eyeInspect data

Source	Destination	Port	Description of Connection
Center			
Active Sensor	Command Center	9092	Sends Active Sensor data
Active Sensor	Target Hosts	Service-specific	Performs Active Sensor scans (WMI, SEL, etc.)
Passive Sensor	Command Center	29999* 9092	Sends Passive Sensor data
eyeInspect Operators	Command Center/ Enterprise Command Center	22 (ssh) 443 (https)	Command Center and Enterprise Command center GUI system management
(Optional) Primary Command Center	Secondary Command Center	5432 22 (ssh)	Bi-directional, Command Center High Availability (not enabled by default)

* Port can be customized for your system.

Firewalls and Proxies for Active Sensors

Active Sensors need to be connected to the network of their target assets. Having routers, firewalls, or proxies between the Active Sensor and their target asset diminishes the sensor's ability to retrieve data.

Firewalls and Proxies for Passive Sensors

The default port via which the Command Center and the Passive Sensor communicate is 29999. To change the port to something other than 29999, refer to Passive Sensor Startup Options in the eyeInspect Configuration Guide v5.9.

The following traffic must be allowed to reach the Command Center and the Passive Sensor:

- DNS access for Sensor and Command Center
- LDAP access for Command Center and Enterprise Command Center
- NTP access for the Sensor, Command Center and Enterprise Command Center (not required for demo deployments)
- SMTP access for Command Center alert forwarding
- Syslog access for Command Center alert forwarding

Note:
The open port 29999 for communication between the Command Center and Passive Sensor is not needed for bundled configurations where the Command Center and Passive Sensor are on one server.

Remember:
Internal services bind to localhost/loopback interfaces for inter-component communications

and are not accessible from external networks. Security audits may observe internal eyeInspect Command Center services bound to localhost or loopback addresses (127.0.0.1) in listening state. These services handle inter-component communications for processing, aggregating, and storing real-time traffic information collected from eyeInspect Sensors. Services bound to loopback interfaces are not accessible from external networks due to the iptables configuration.

Download the eyeInspect Installation ISO and Create Bootable USB

The eyeInspect installation bundle ISO includes all the necessary files to perform a fresh eyeInspect installation, including the Ubuntu operating system.

Download the eyeInspect Installation ISO

Download the ISO (***eyeinspect_5.9.0_install_amd64.iso***) from the Forescout Customer Support portal.

The ISO contains the following files:

Installer File	Description
ubuntu-22.04.4-live-server-amd64.iso (GNU/ Linux 5.15.0-107-generic x86_64)	The Ubuntu Server 22.04.4 LTS operating system for eyeInspect
eyeinspect_u22_1.0.1_configuration_amd64.run	Updates the base operating system with all applicable system updates available at the date of release, configures the OS for eyeInspect, and installs dependencies shared by all eyeInspect components
eyeinspect_command-center_5.9.1_install.run	Installs the eyeInspect Command Center and required dependencies
eyeinspect_sensor_5.9.1_install_amd64.run	Installs the eyeInspect Passive Sensor and required dependencies
eyeinspect_active-sensor_2.2.1_install_amd64.run	Installs the eyeInspect Active Sensor and required dependencies

Create Bootable USB

After downloading the ISO, flash it onto a bootable medium, such as a USB drive, to boot and install eyeInspect.

Upload eyeInspect License Files

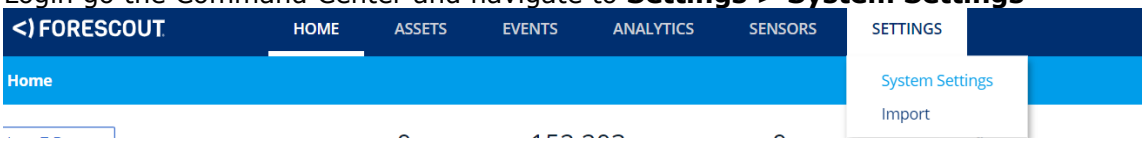
eyeInspect requires a valid license file. This file should be uploaded from the eyeInspect Command Center. Once a valid license is uploaded, all applicable functionality will be unlocked in the Command Center.

Note: While the installation and upgrade can be done without the license file, for the final configuration within the Command Center, it is necessary to upload the license file.

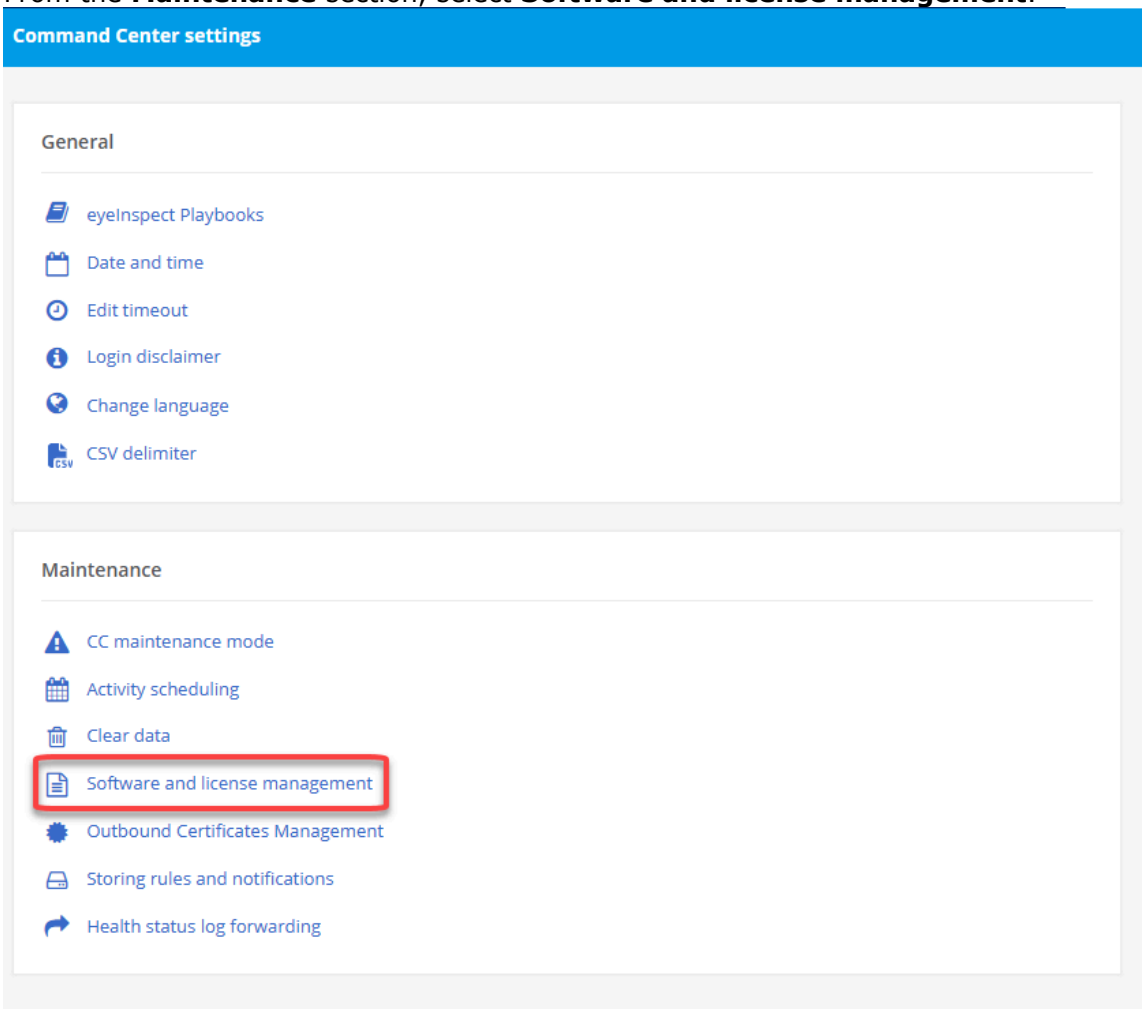
After the eyeInspect license expires, eyeInspect enters a 45-day grace period. During this time, everything works normally and data from sensors continues to be processed by the Command Center. Once the grace period ends, the Command Center stops accepting new data from sensors (similar to maintenance mode). Additionally, if the Command Center is rebooted after the grace period, login will be disabled until a new license is applied. Data processed during and before the grace period remains in the Command Center.

To upload the license file, do the following:

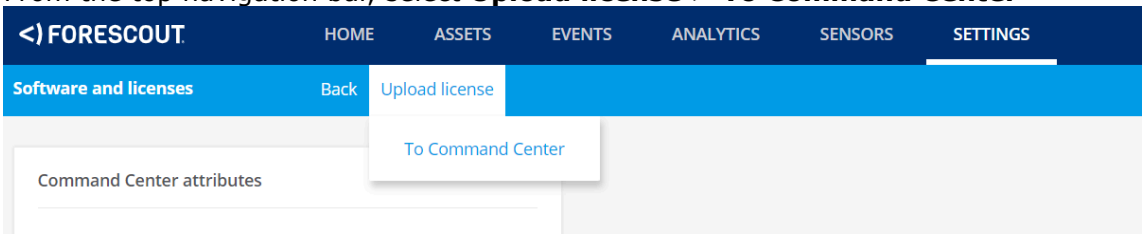
1. Login go the Command Center and navigate to **Settings > System Settings**



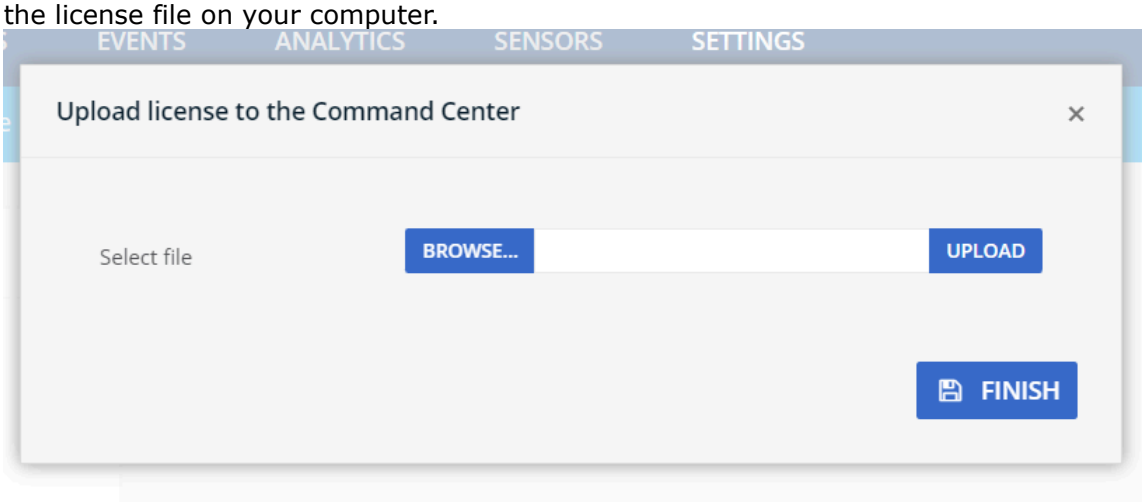
2. From the **Maintenance** section, select **Software and license management**.



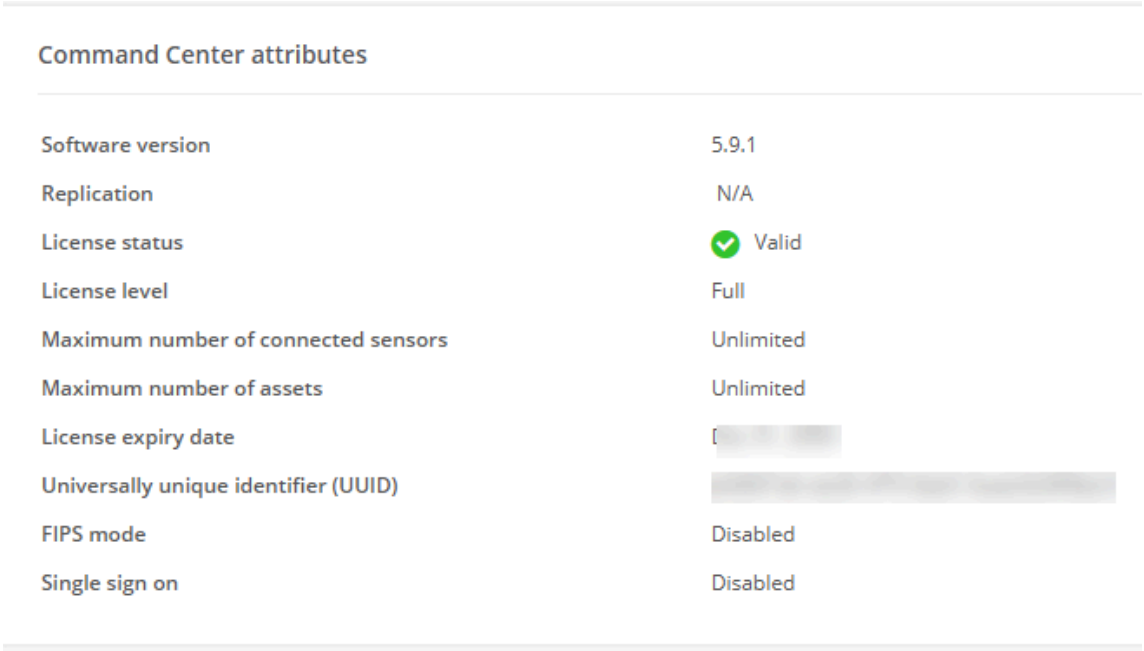
3. From the top navigation bar, select **Upload license > To Command Center**



4. From the **Upload license to the Command Center** dialog, select **BROWSE...** to select the license file on your computer.



5. Select **UPLOAD** to upload the license, and **FINISH** to save. The license details can then be viewed on the Command Center.



Install eyeInspect v5.9

The eyeInspect installation consists of three parts, bundled into one ISO for seamless installation:

1. **Installation of Ubuntu OS 22.04.4 LTS**, which includes:
    a. Language
    b. Keyboard
    c. Ubuntu mirror
    d. Disk setup
    e. `silentdefense` user
    f. Hostname `eyeinspect-iso`
    g. OpenSSH server
    h. OS configuration
2. **Configuration of eyeInspect system**, which includes:
    a. Change of password during initial login
    b. Change of the server hostname. The default hostname is `eyeinspect-iso`. Note that changing server hostname is optional.
3. **Installation of eyeInspect components**, with the following possible options:
    a. Command Center 5.9.1
    b. Passive Sensor 5.9.1 and Active Sensor 2.2.1
    c. Bundle installation (both **a** and **b**)

Note:
All three parts listed above are bundled together in the installation ISO and the user is guided by the on-screen prompts, as described in the following sections.

Install the Ubuntu OS

Prerequisite: Server Setup

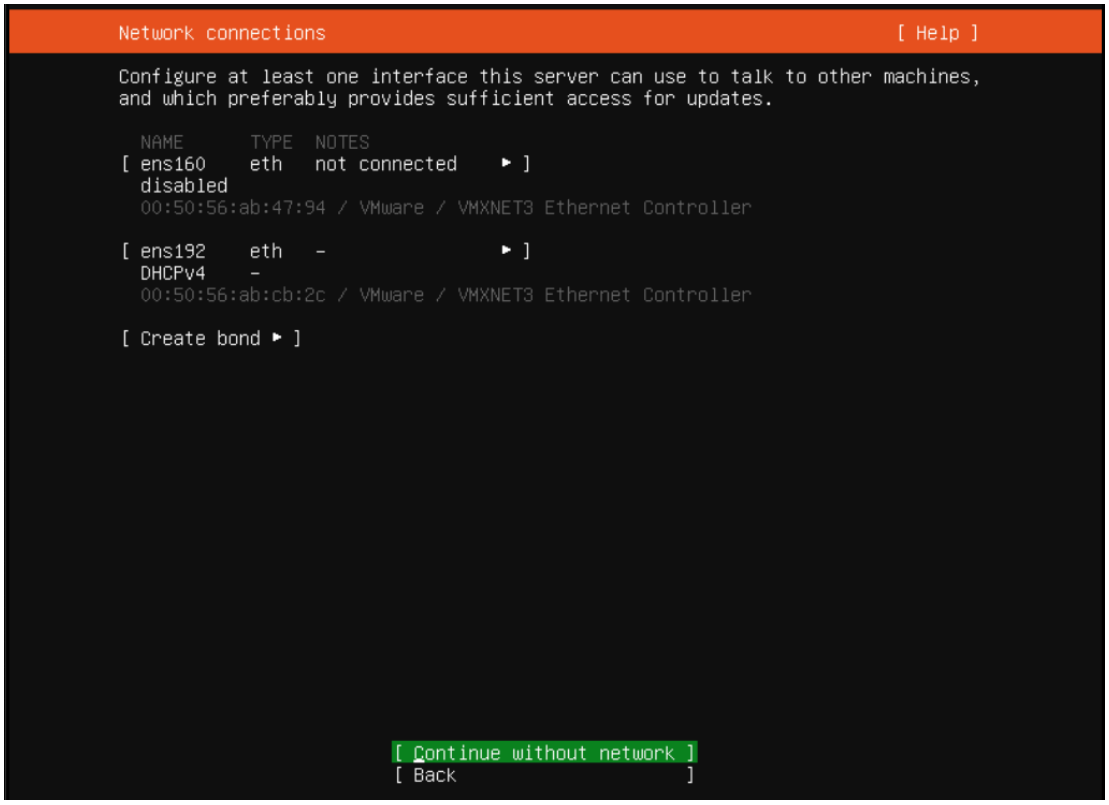
- If the server has UEFI boot capabilities, Secure Boot must be disabled due to required third-party kernel modules. Please consult your hardware manufacturer's documentation to make sure this feature is disabled before starting the installation of eyeInspect.
- When installing a server that will only be used as a Passive Sensor, verify the HyperThreading is enabled to improve performance. Please consult your hardware manufacturer's documentation in order to check the status of HyperThreading in the BIOS/UEFI environment.
- During the OS installation, make sure that the Ethernet cable is not connected to the server or that the server cannot reach any DHCP or network discovery service.

Install the Ubuntu OS 22.04.4 LTS

The eyeInspect installation begins by installing the Ubuntu OS 22.04.4 LTS (Long Term Support) Operating System on the server, using either physical media or remotely by using an out-of-band management solution. The installer will require configuring the network on the **Network connections** screen, as described below:

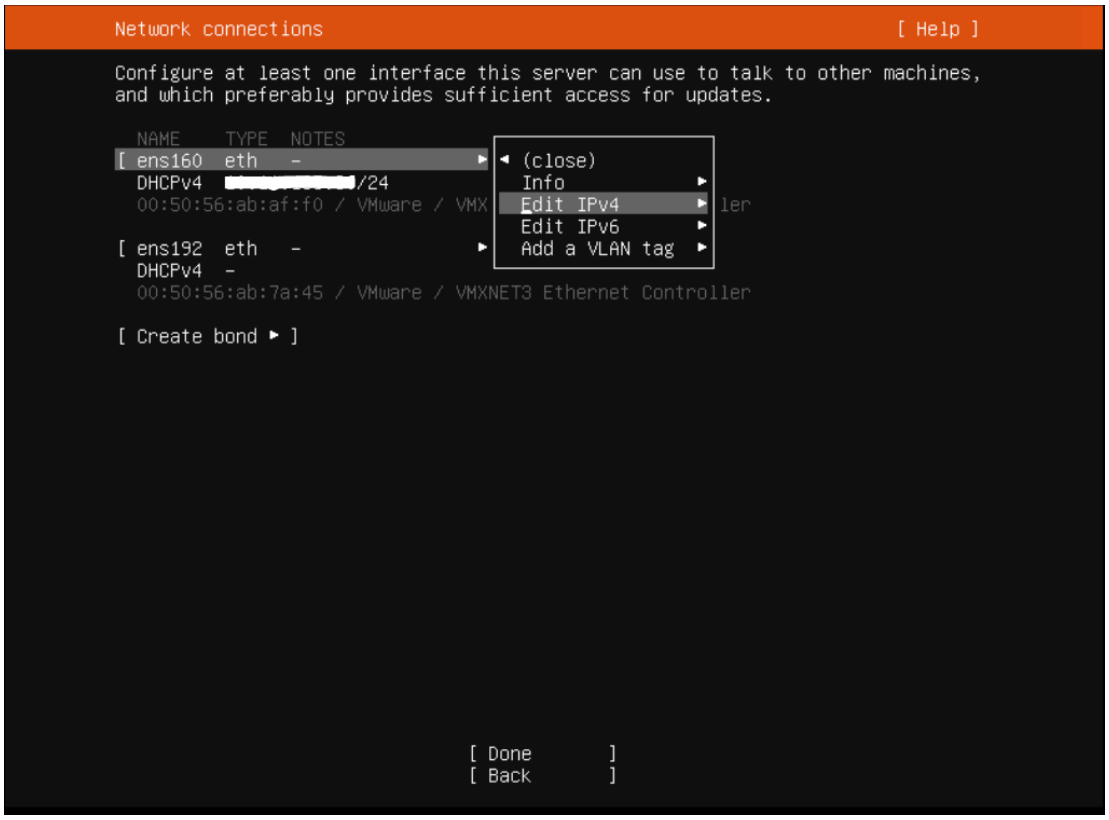
Note:
If DHCP is used, proceed directly to step 6. Navigate to the first interface in the displayed list and press Enter

1. Navigate to the first interface in the displayed list and press **Enter**.

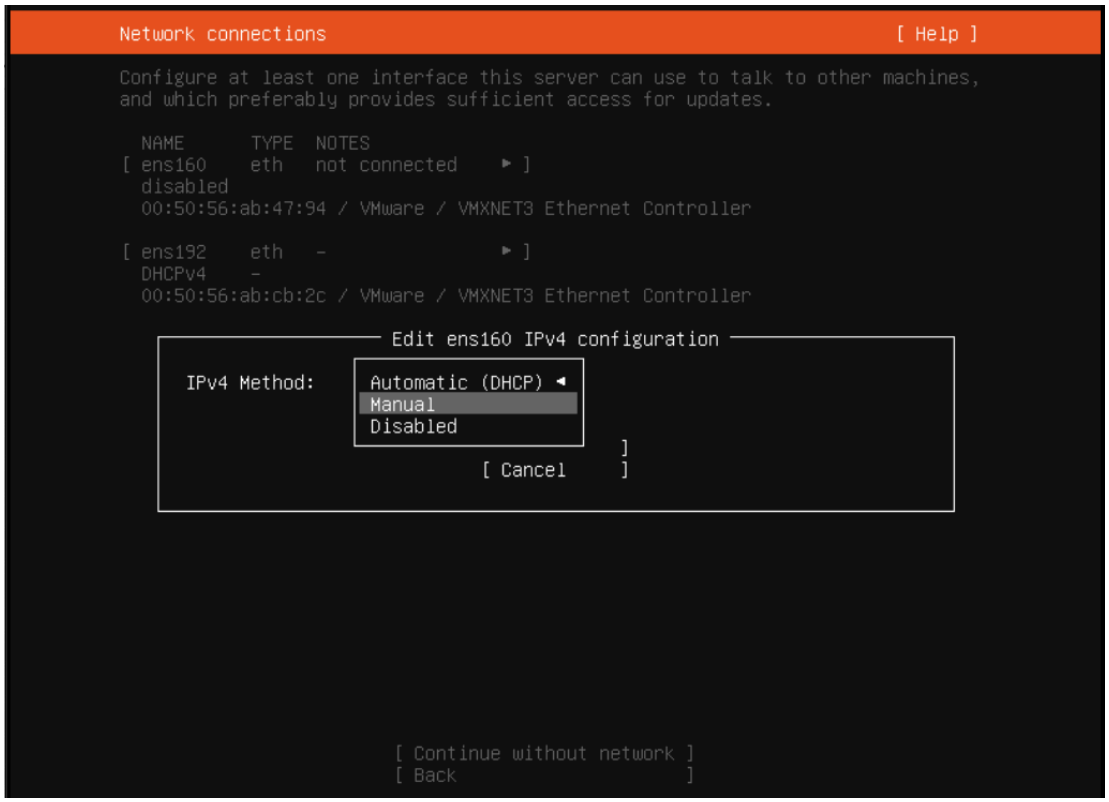


2. Ubuntu defaults to Dynamic Host Configuration Protocol (DHCP). To set a static IP address, select the **Edit IPv4** menu entry, and press **Enter**.

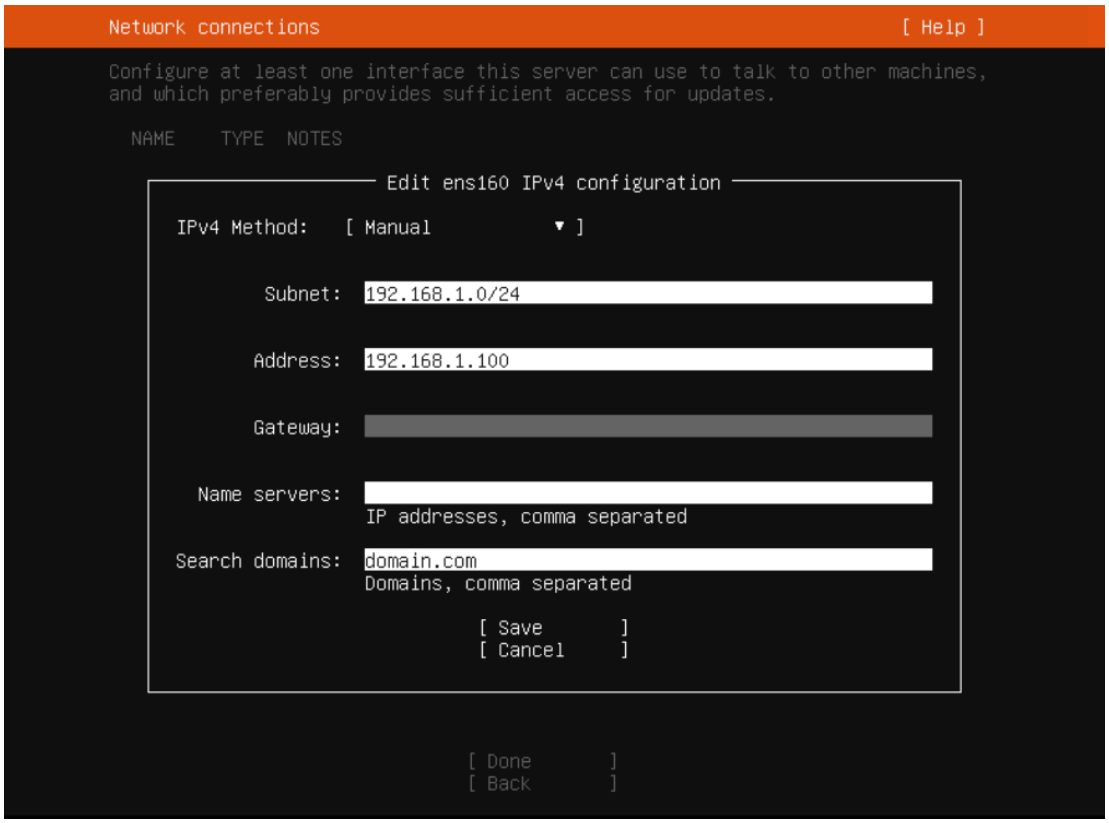
   Note:
   It is recommended to use static IP over DHCP for network configuration.



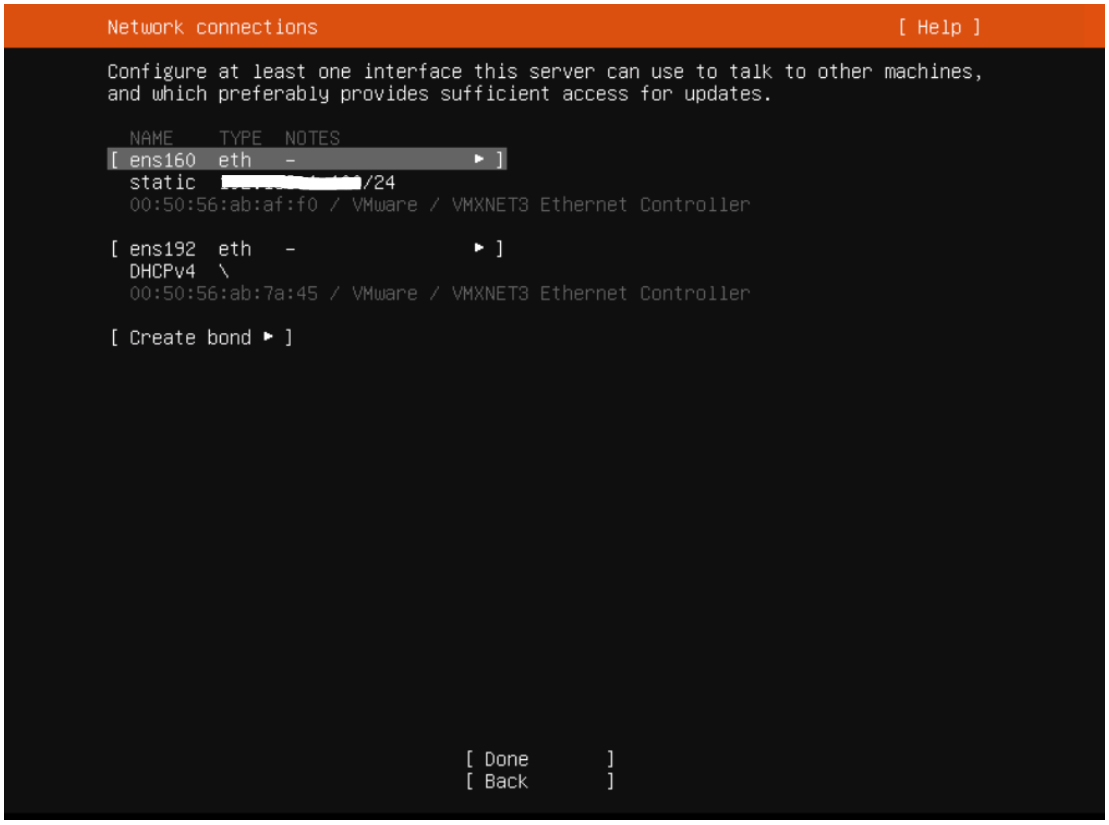
3. Select **Manual** as the IPv4 Method.



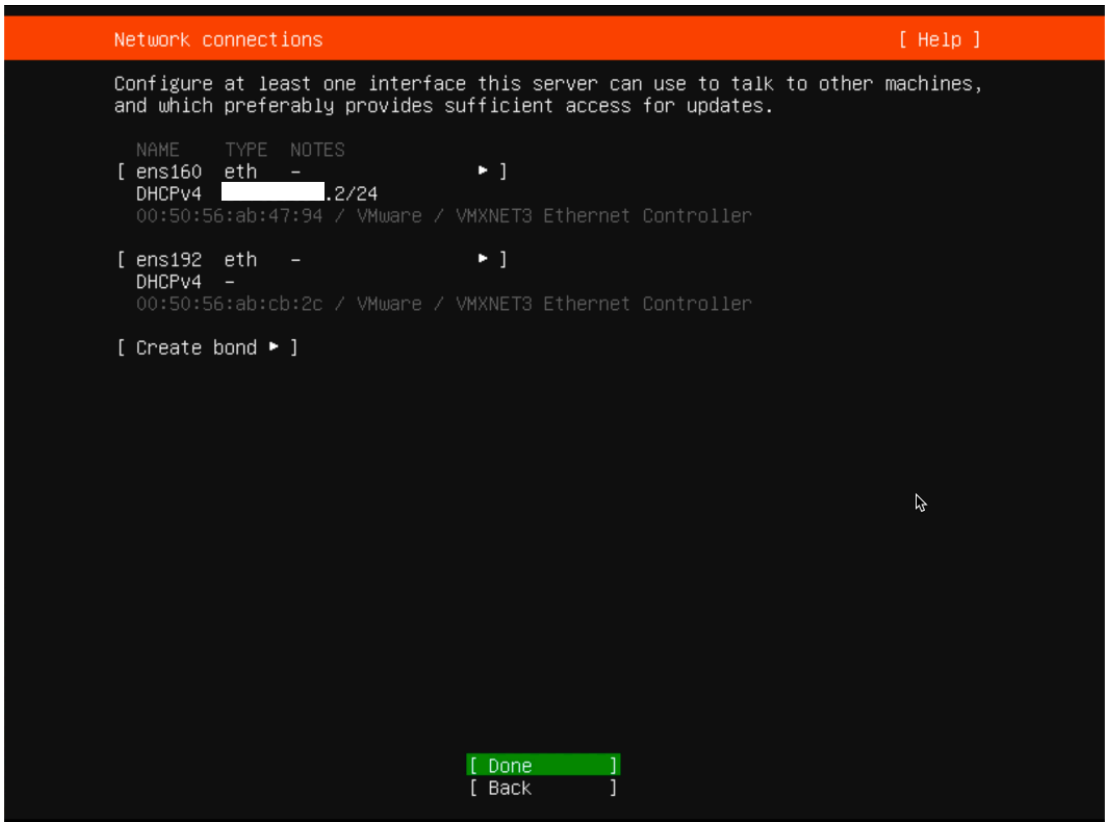
4. Fill in the LAN settings in the provided form, select Save and press Enter.



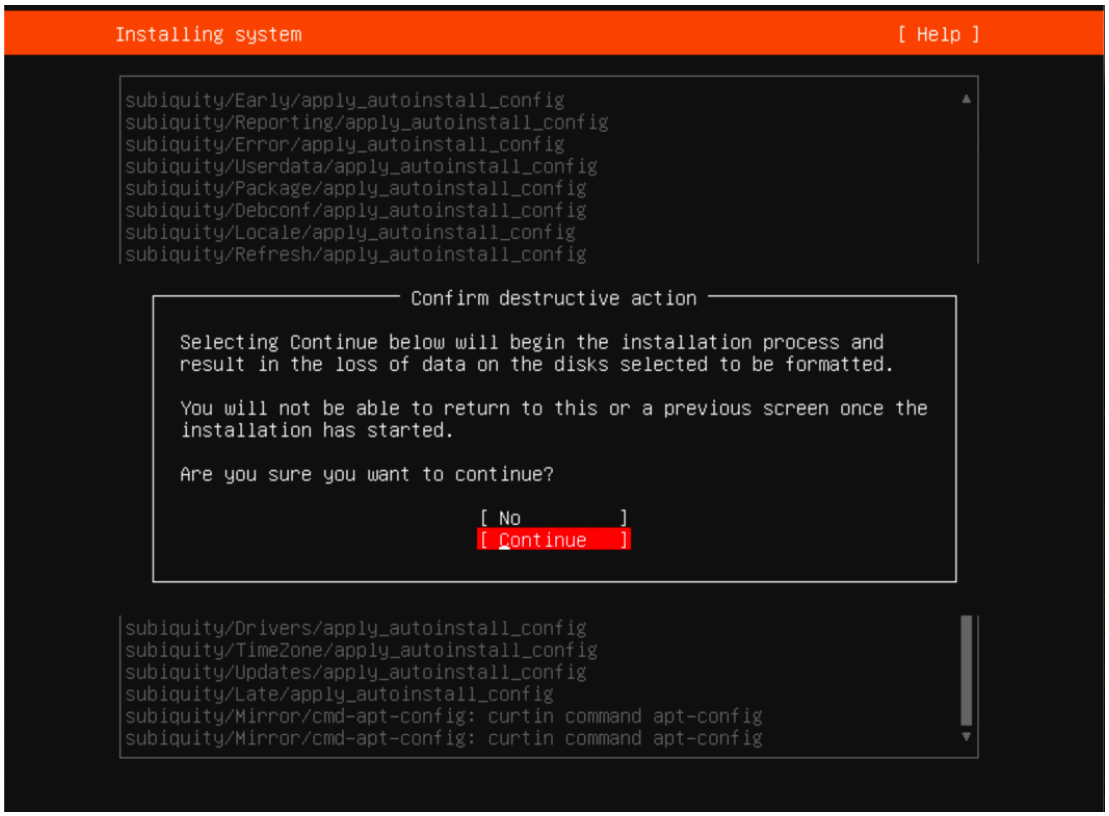
5. Preview the updated network connections, select **Done** and press **Enter**.



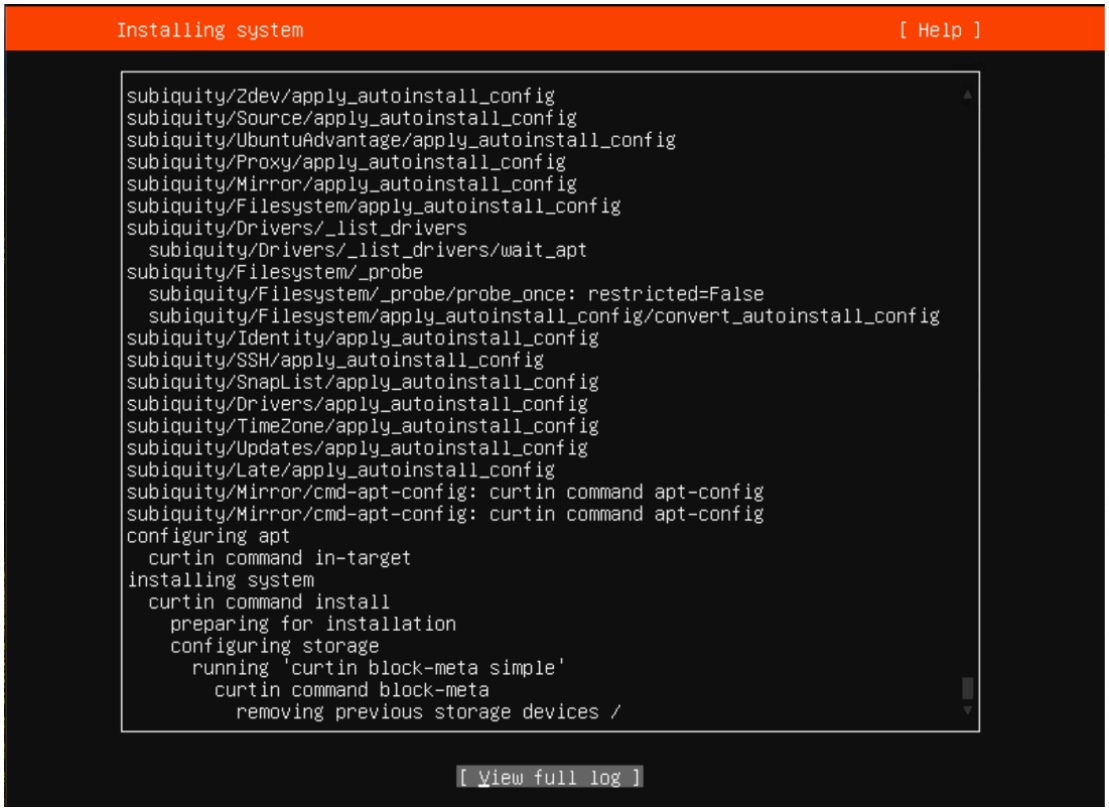
6. The DHCP will automatically provide a new IP address to the first interface. Select **Done** and press **Enter**.



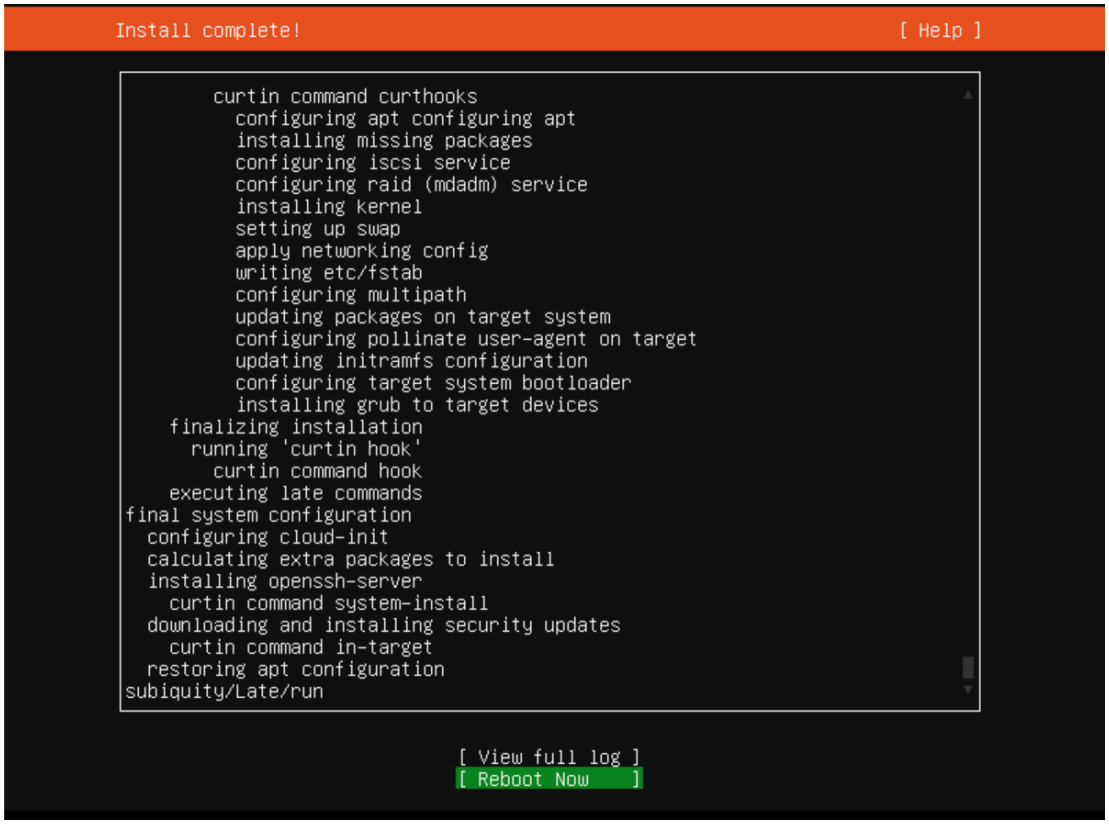
7. On the **Installing system** screen, a dialog appears asking for confirmation to begin installation. Select **Continue** and press **Enter** to proceed.



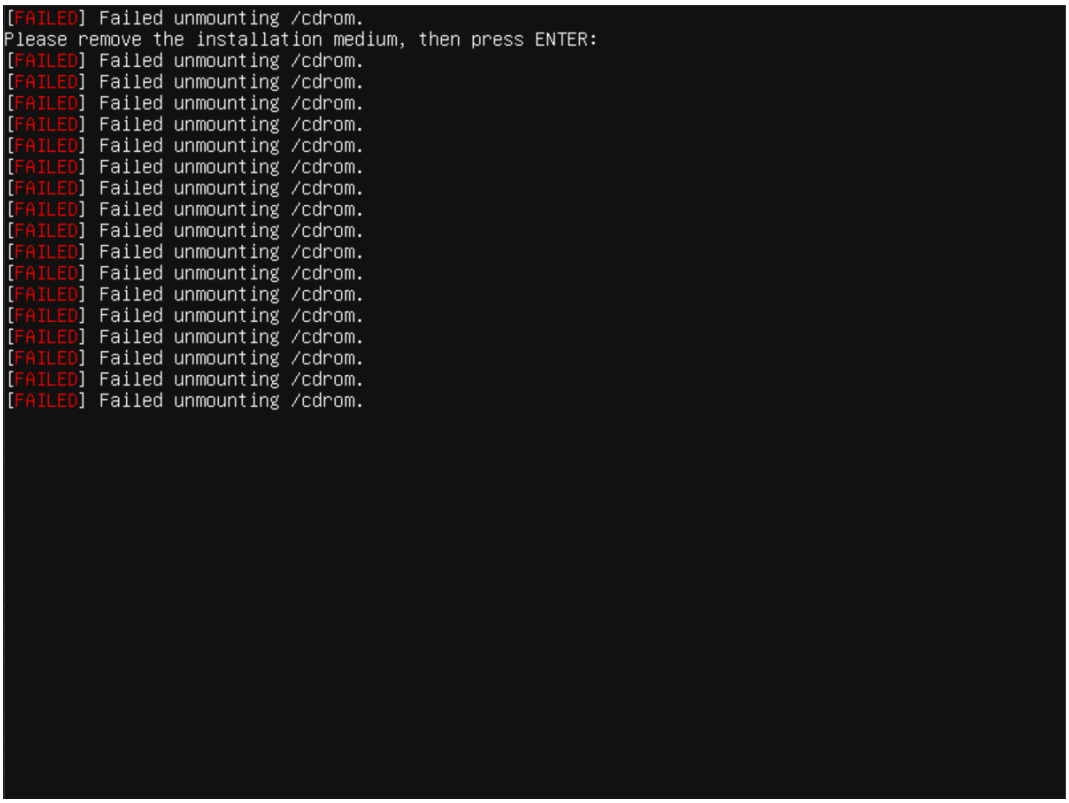
8. On the **Installing system** screen, you can preview the ongoing installation process and, optionally, see the detailed log by selecting **View full log** and pressing **Enter**.



9. When the title of the screen changes to **Install complete!**, continue by selecting **Reboot Now** from the bottom of the screen and press **Enter**.



Note:
If the Ubuntu install media is not removed, you may see the below error. In this case, remove the media as directed and press **Enter.**



The system reboots and proceeds to the eyeInspect system configuration.

(For Forescout OT HW 61 Series Models Only) Troubleshoot Networking Issues

If the management network interface does not work correctly after the OS installation, check whether the network cable for the server management interface is inserted in the correct port. It should be plugged into the first port (**iDRAC**) of the on-board management network interface card, as illustrated below. Other ports should be used for passive sensors.

OT hardware model 6120:

OT hardware model 6140/6160:

Configure the eyeInspect System

The eyeInspect system configuration starts, and the following in-progress screen is shown:

```
------------------------------Forescout eyeInspect------------------------------

   eyeInspect system configuration in progress!

   User silentdefense login will be released once the installation is completed.

--------------------------------------------------------------------------------
```

Upon completion, the user is prompted to change the password after first login.

```
------------------------------Forescout eyeInspect system configuration completed.

   eyeInspect system configuration completed.

   User unblocked, the first login requires a password change.

--------------------------------------------------------------------------------
eyeinspect-iso login:
```

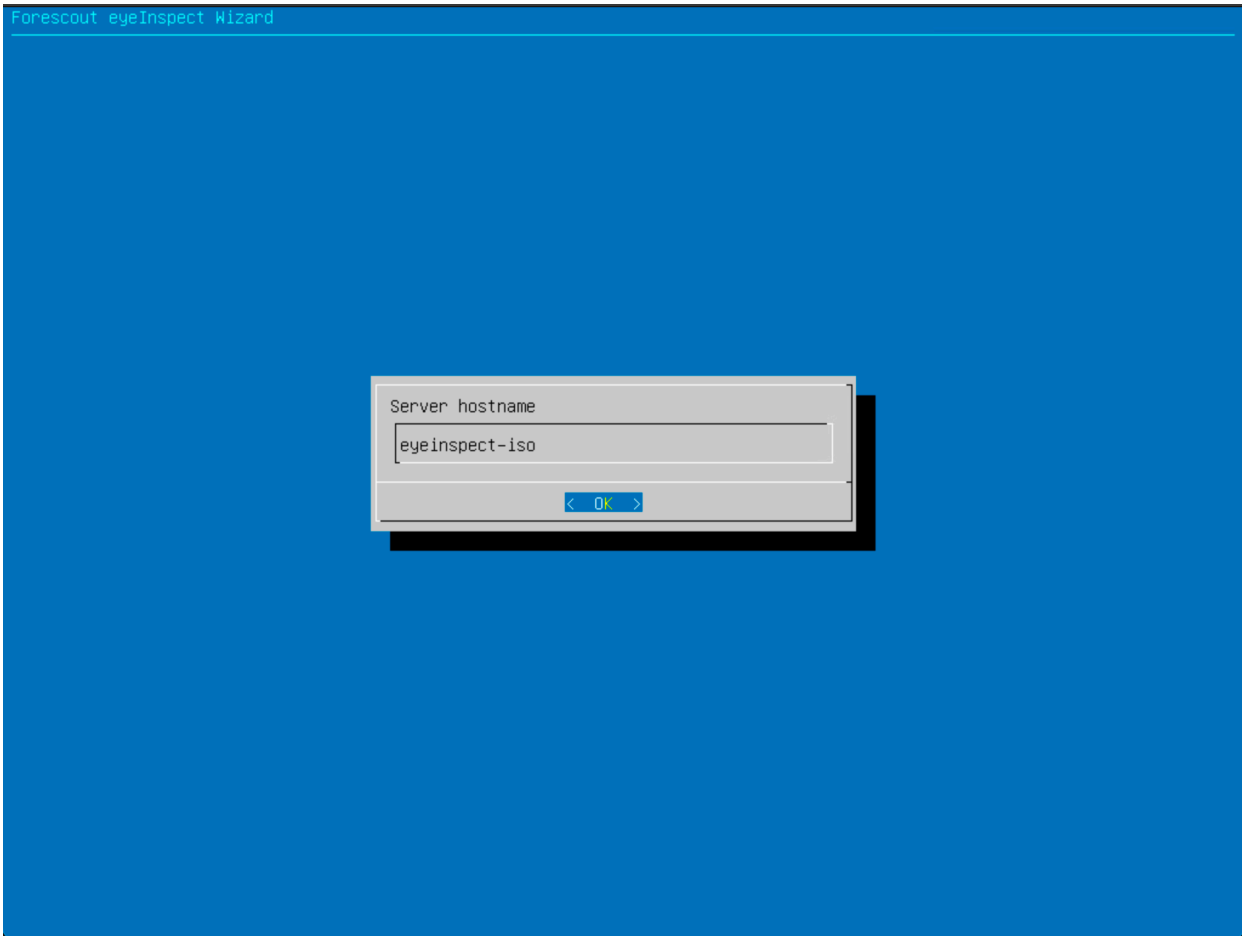
Follow the on-screen instructions to change the password.The initial login credentials are:

- **username: silentdefense**
- **password: silentdefense**

```
------------------------------Forescout eyeInspect system configuration completed.

   eyeInspect system configuration completed.

   User unblocked, the first login requires a password change.

--------------------------------------------------------------------------------
eyeinspect-iso login: silentdefense
Password:
You are required to change your password immediately (administrator enforced).
Changing password for silentdefense.
Current password:
New password:
Retype new password: _
```

After successful password change, the eyeInspect wizard starts.

The **Server hostname** dialog appears and displays the default hostname, ***eyeinspect-iso***..



If desired, change the hostname here, and select **OK**.

Note:

Changing hostname is optional.

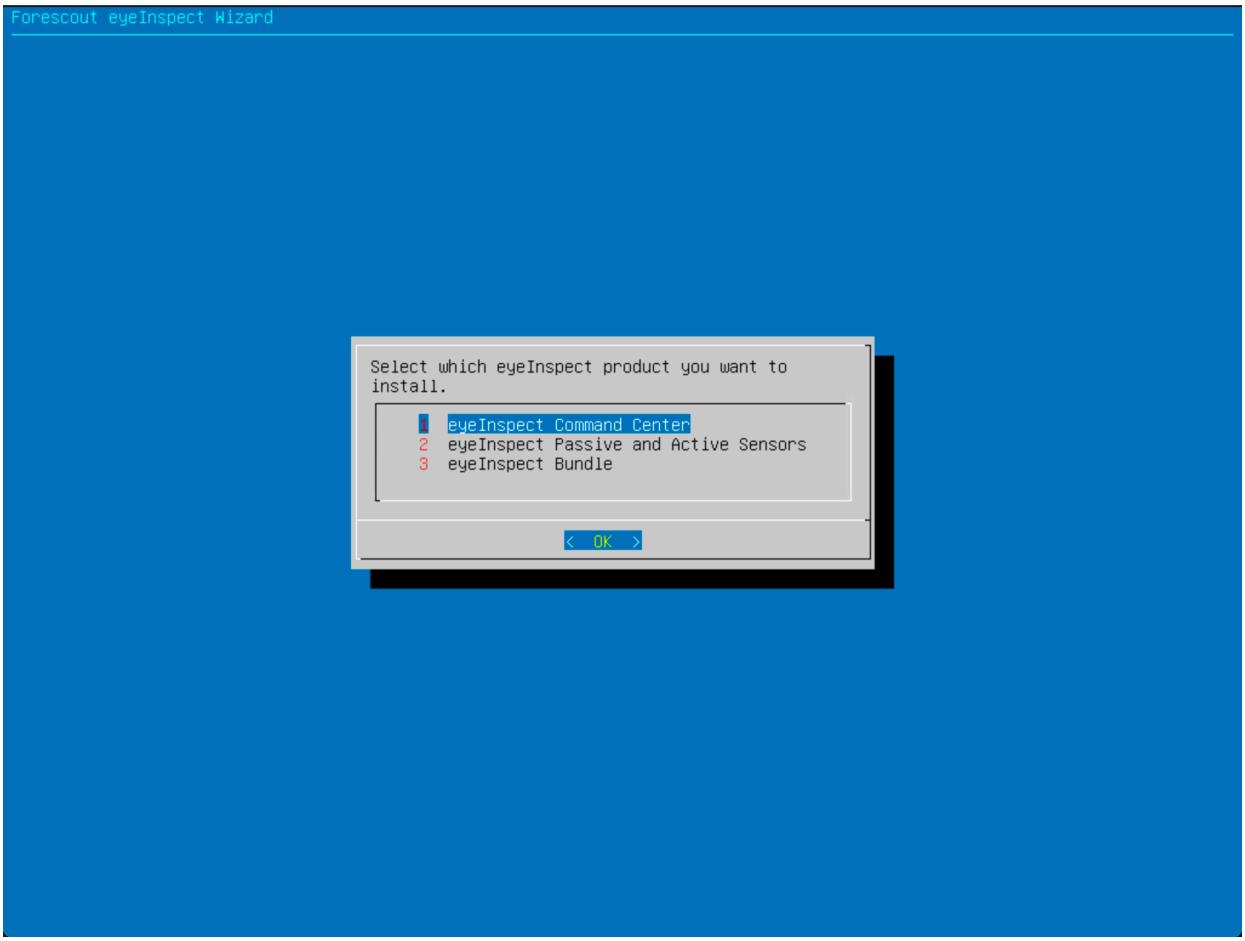
Note:

The hostname should not contain underscores (_).

The Wizard then proceeds to installation of the eyeInspect components.

Install the eyeInspect Components

The eyeInspect Wizard displays the three installation options available.



The installation process is described in detail in the following pages:

- Install the eyeInspect Command Center
- Install the eyeInspect Passive and Active Sensors
- Install the eyeInspect Bundle

Install the eyeInspect Command Center

To install the Command Center, do the following:

1. Select the first option eyeInspect Command Center and click OK. The installation begins, and a dialog with the installation in-progress message is displayed.
2. Upon completion, an installation successful message is displayed. Select OK to close the wizard and open the terminal.
3. Check if the system timezone is correct by running the following command:

```
~$ date
```

If the timezone is wrong, set it to the correct one by running the following command:

```
~$ sudo dpkg-reconfigure tzdata
```

4. Reboot the system by running the following command:

```
~$ sudo reboot
```

5. If you want the Command Center to communicate with the Passive Sensor via a port different than the default 29999, perform the following steps:
   a. Edit the **/etc/iptables/rules.v4** file by issuing the following command:

```
sudo nano /etc/iptables/rules.v4
```

   b. Add the following rule:

```
sudo iptables -I INPUT -p tcp -m tcp --dport <CUSTOM PORT> -j
ACCEPT
```

   c. Restart the firewall service by issuing the following command:

```
sudo systemctl restart netfilter-persistent
```

6. After the installation is complete, it is recommended to check if there is any eyeInspect OS update available, and if yes, to apply the update.

Prevent assets from disappearing

To prevent a known issue of **disappearing assets**, caused by the order of updating their information, perform the following steps:

1. Log in to the Command Center.
2. Navigate to Settings > System settings > Activity scheduling.
3. Open the scheduled activity of type Host cleanup.
4. Increase the Retention period (days) to 45.
5. Click Finish.
6. Log in the Command Center via SSH.
7. Open the **/opt/sdconsole/conf/application.properties** file in a command line editor of your choice.
   Note:
   Create this file if it does not already exist.
8. Set the following values:

```
sdcc.cronjob.maxFetchHosts=20000
sdcc.cronjob.maxFetchLinks=100000
```

9. If your network does not support dynamic IP assignment via a DHCP server, set also the following value:

```
sdcc.dhcp.cleanup=false
```

10. Save the changes and close the editor.
11. Restart the Command Center by running the following command:

```
sudo supervisorctl restart silentdefense-cc
```

Install the eyeInspect Passive and Active Sensors

To install the passive and active sensors, do the following:

1. Select the second option eyeInspect Passive and Active Sensors and select OK
2. The Passive Sensor installation begins, and a dialog box with the installation in-progress message is displayed.
3. Once the Passive Sensor installation is complete, the Active Sensor installation begins automatically, and a dialog box with an in-progress message is displayed.
4. Upon completion, you will see an installation successful message. Select OK to close the wizard and open the terminal.
5. Check if the system timezone is correct by running the following command:

   ```
   ~$ date
   ```

   If the timezone is wrong, set it to the correct one by running the following command:

   ```
   ~$ sudo dpkg-reconfigure tzdata
   ```

6. Reboot the system by issuing the following command:

   ```
   sudo reboot
   ```

7. After the installation is complete, Forescout recommends that you check if there is any eyeInspect OS update available, and if available, to apply the update.

Next Steps for Passive Sensor

After the installation is complete, perform the following steps to finish installing the passive sensor:

1. Log in the Passive Sensor via SSH and export existing sensor configuration via the nidstool by running the following command:

   ```
   sudo nidstool config export nids_config.yml
   ```

2. Edit the generated `nids_config.yml` file with the required parameters and save the file. The minimum necessary parameters required to start the Passive Sensor container are:
   a. sniff-threads
   b. interfaces
   c. mgmt-address
   d. mgmt-secondary-address (if the Command Center is in High Availability mode)

   For more information, refer to the table in the Passive Sensor Startup Options page in the eyeInspect Configuration Guide v5.9.
3. Apply the configuration and start the container by running the following commands:

   ```
   sudo nidstool config apply nids_config.yml --permissive
   sudo nidstool up nids-main
   ```

4. Accept the new Passive Sensor enrollment request. See Adding Passive Sensors (version 5.1.0 or higher) in the eyeInspect User Guide v5.9 for more information.

Next Steps for Active Sensor

After the installation is complete, perform the following steps to finish installing the active sensor:

1. Login to the active sensor via SSH and update the /opt/active-sensor/.env file with the following details:
    a. `SENSOR_NAME` - for identification during enrolment (optional)
    b. `ICSP_CC_IP` - IP address of the Command Center (required)
        Note:
        If no `ICSP_CC_IP` is provided, the active sensor will try to connect to a Command Center on the same host.
    c. `ICSP_CC_IP_SECONDARY` - if the Command Center is in High Availability mode (optional)
2. Start the container by running the following command:

```
sudo /opt/active-sensor/manage-containers.sh --up
```

3. Accept the new Active Sensor enrollment request. See Adding Active Sensors to the Command Center in the eyeInspect User Guide v5.9 for more information.
    Note:
    When changing the .env file while the container is running, you must restart the container with the manage-containers.sh script using the `--rm` and `--up` options.
    Note:
    After accepting the enrollment request, the active sensor may still show as disconnected. Allow a few minutes for the connection and health status to be updated.

After installing the Active Sensor, additional configuration may be required for Windows assets on the sensor's network. For all Windows assets that the operator wants to use Active Sensor to send WMI queries to, make sure that there are user credentials with WMI rights on those assets. Refer to Microsoft's Windows Management Instrumentation documentation for more information.

Connectivity

If Active Sensor is not returning the expected results, check that there are no firewalls or proxies separating the Active Sensor from its target assets.

Install the eyeInspect Bundle

To install all the components (Command Center, Passive Sensor and Active Sensor) together, select the third option - **eyeInspect Bundle** - and select **OK**.

1. The Command Center installation begins and a dialog with the installation in-progress message is displayed.
2. Next, the Passive Sensor installation begins and the appropriate message is displayed.
3. The last component to be installed is the Active Sensor.
4. Upon completion, an installation successful message is displayed. Select **OK** to close the wizard and open the terminal.

Next Steps

After the installation is complete, do the following :

- For the Command Center - go to Install the eyeInspect Command Center and follow from Step 3
- For the Passive Sensor - go to Next Steps for Passive Sensor
- For the Active Sensor - go to Next Steps for Active Sensor

Virtual Appliance Deployments

eyeInspect does not depend on a specific hypervisor. eyeInspect ISO can be used to create a virtual appliance on a hypervisor that supports OVA format and can create VMs with Ubuntu 22.04 OS.

For more information, go to the following sections of the Forescout OT Hardware Guidelines:

- Command Center
- Passive Monitoring Sensor Requirements