Cambium Networks™

QUICK START GUIDE

Network Service Edge (NSE)

Release 2.0

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Contents

About This Guide

This document explains how to configure the Network Service Edge (NSE) products. It is intended for use by the system designer, system installer, and system administrator.

Purpose

Documents specific to the NSE products are intended to instruct and assist personnel in the operation, installation, and maintenance of the NSE devices and ancillary devices of NSE products. It is recommended that all personnel engaged in such activities must be properly trained.

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Cross references

References to external publications are shown in italics. Other cross references, emphasized in blue text in electronic versions, are active links to the references.

This document is divided into topics that are divided into sections. Sections are not numbered and are listed in the table of contents.

Feedback

We appreciate feedback from the users of our documents. This includes feedback on the structure, content, accuracy, or completeness of our documents. To provide feedback, visit our support website - https://support.cambiumnetworks.com.

Warnings, cautions, and notes

The following sections describe how warnings, notes, and cautions are used in this document and in all documents of Cambium Networks:

Warnings

Warnings precede instructions that contain potentially hazardous situations. Warnings are used to alert the reader to possible hazards that could cause loss of life or physical injury. A warning has the following format:

Warning

Warning text and consequence for not following the instructions in the warning.

Cautions

Cautions precede instructions and are used when there is a possibility of damage to systems, software, or individual items of equipment within a system. However, this damage presents no danger to personnel. A

caution has the following format:

Caution

Caution text and consequence for not following the instructions in the caution.

Notes

A note means that there is a possibility of an undesirable situation or provides additional information to help the reader understand a topic or concept. A note has the following format:

Note

Note text.

Important regulatory information

Complying with rules for the country of operation

USA specific information

Caution

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Canada specific information

Caution

This device complies with ISEDC ’s license-exempt RSSs. Operation is subject to the following two conditions:

- This device may not cause interference.
- This device must accept any interference, including interference that may cause undesired operation of the device. This device must accept any interference, including interference that may cause undesired operation of the device.

Renseignements spécifiques au Canada

Note

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- L’appareil ne doit pas produire d’interférences; et
- L’utilisateur de l’appareil doit accepter toute interférence radioélectrique, même si elle est susceptible d’en compromettre le bon fonctionnement.

EU Declaration of Conformity

Hereby, Cambium Networks declares that the Cambium Networks NSE 3000 and 4000 Series complies with the essential requirements and other relevant provisions of Directives 2014/30/EU, 2014/35/EU, and 2011/65/EU. The declaration of conformity may be consulted at https://www.cambiumnetworks.com/support/compliance/.

Specific expertise and training for professional installers

To ensure that the NSE products are installed and configured in compliance with the requirements of EU, ISEDC, and the FCC, installers must have the skills and training described in this section.

The Cambium Networks technical training program details can be accessed from the following link:

https://www.cambiumnetworks.com/training/

Legal and Open-Source Software statements

Refer to the NSE Legal and Open-Source Guide for:

- Cambium Networks end user license agreement and
- Open-Source Software Notices

Problems and warranty

Reporting problems

If any problems are encountered when installing or operating this equipment, follow this procedure to investigate and report:

1. Search this document and the software release notes of supported releases.
2. Visit the support website (Cambium Networks).
3. Ask for assistance from the Cambium Networks product supplier.
4. Gather information from affected units, such as any available diagnostic downloads.
5. Escalate the problem by emailing or telephoning support.

Repair and service

If unit failure is suspected, obtain details of the Return Material Authorization (RMA) process from the support website.

Hardware warranty

Cambium's standard hardware warranty is for one (1) year from the date of shipment from Cambium Networks or a Cambium distributor. Cambium Networks warrants that hardware will conform to the relevant published specifications and will be free from material defects in material and workmanship under normal use and service. Cambium shall within this time, at its own option, either repair or replace the defective product within thirty (30) days of receipt of the defective product. Repaired or replaced products will be subject to the original warranty period but not less than thirty (30) days.

Caution

Using non-Cambium parts for repair could damage the equipment or void warranty. Contact Cambium for service and repair instructions.

Portions of Cambium equipment may be damaged from exposure to electrostatic discharge. Use precautions to prevent damage.

Security advice

Cambium Networks systems and equipment provide security parameters that can be configured by the operator based on their particular operating environment. Cambium Networks recommends setting and using these parameters following industry recognized security practices. Security aspects to be considered are protecting the confidentiality, integrity, and availability of information and assets. Assets include the ability to communicate, information about the nature of the communications, and information about the parties involved.

In certain instances Cambium Networks makes specific recommendations regarding security practices, however the implementation of these recommendations and final responsibility for the security of the system lies with the operator of the system.

Caring for the environment

The following information describes national or regional requirements for the disposal of Cambium Networks supplied equipment and for the approved disposal of surplus packaging.

In EU countries

The following information is provided to enable regulatory compliance with the European Union (EU) directives identified and any amendments made to these directives when using Cambium Networks equipment in EU countries.

Disposal of Cambium equipment

European Union (EU) Directive 2012/19/EU Waste Electrical and Electronic Equipment (WEEE).

Do not dispose the Cambium Networks equipment at landfill sites. For disposal instructions, refer to https://www.cambiumnetworks.com/support/compliance/.

Disposal of surplus packaging

Do not dispose the surplus packaging in landfill sites. In the EU, it is the individual recipient's responsibility to ensure that packaging materials are collected and recycled according to the requirements of EU environmental law.

In non-EU countries

In non-EU countries, dispose of Cambium equipment and all surplus packaging in accordance with national and regional regulations.

Basic information about NSE products

This section provides basic information about the NSE products and prerequisite tasks. This information helps you to set up the system before proceeding with the configuration of NSE devices.

This section covers the following topics:

The Network Service Edge (NSE) product delivers advanced security, routing, and SD-WAN policies for small and medium enterprises.

Existing hardware platforms

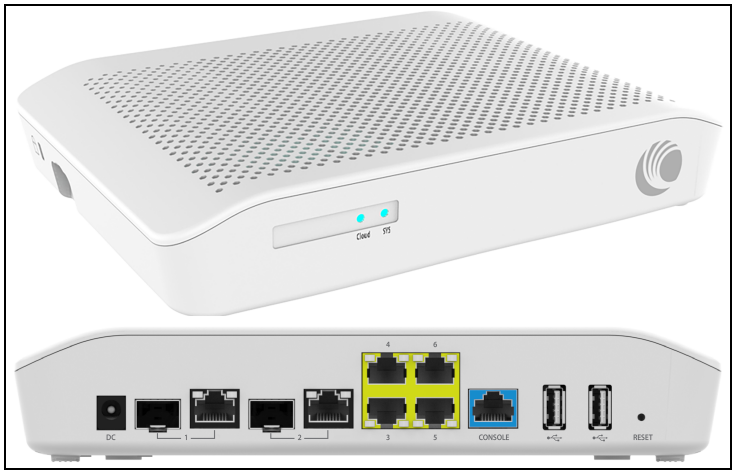
The following table lists the hardware platforms in the NSE series of products.

Hardware Platform	Description	Supported Software Version
NSE3000	Cloud managed SD-WAN Security Gateway with multiple WANs, 2 x 1 Gbps SFP / RJ45, and 4 x 1 Gbps RJ-45	Release 1.0
NSE4000	Cloud managed SD-WAN Security Gateway with multiple WANs, 2 x 10 Gbps SFP+, and 8 x 2.5 Gbps RJ-45	Release 2.0

NSE3000

NSE3000 features two WAN ports and four LAN ports, and supports reliable connectivity with WAN throughputs of up to 1 Gbps. It also supports an industry-leading IDS/IPS engine, advanced application, geo-IP firewalls, network security scanners, anti-malware protection, SD-WAN, and cutting-edge application visibility and control.

Figure 1 *NSE3000 device*



NSE4000

NSE4000 features eight 2.5 GbE Ethernet ports and two 10 GbE SFP+ ports with secure throughput of 3.2 Gbps and Layer-3 Firewall throughput of 10 Gbps. It supports an industry-leading IDS/IPS engine, advanced application, geo-IP firewalls, network security scanners, anti-malware protection, SD-WAN, and cutting-edge application visibility and control.

Warning

Class 1 Laser product

Laser Class 1 optical transceiver only shall be used.

Warning

Class I Equipment

This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.

Caution

Risk of electrical shock

To disconnect power, remove all power cords from the unit. To reduce the risk of electric shock, the PoE ports on this product must not be connected to cabling that is routed outside the building where this device is located.

Caution

Risk of explosion if battery is replaced by an incorrect type

Replace the battery only with the same or equivalent type as recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Figure 2 *NSE4000 device*

Hardware information

NSE products include the following hardware platforms:

Table 1 *Hardware information*

Description	Hardware specifications	
	NSE3000	**NSE4000**
WAN Ports	2 x 1 Gbps RJ45/SFP **Note**: (default) The ports can be reassigned as WAN or LAN to create additional WAN ports.	1 x SFP+ Fiber 1 x 2.5 GbE **Note**: (default) The ports can be reassigned as WAN or LAN to create additional WAN ports.
LAN Ports	4 x 1 Gbps RJ45	1 x SFP+ 7 x 2.5 Gbps RJ-45 (including 4 PoE+) (default)
Dimensions	175.16 mm x 232.72 mm x 43 mm	330 mm x 230 mm x 44 mm
Weight	0.65 kg	2.64 kg
Max Power consumption	22.8 W	• With PoE excluded—36 W • With PoE included—156 W • PoE single-port load—30 W **Note**: Max PoE power consumption—120 W
Power Supply	40 W DC	100-240 V AC, 50-60Hz
Operating temperature	0°C–40°C	0°C–40°C
Operating humidity	10 %–90 %	10 %–90 %

Figure 3 *NSE3000 Device Ports*

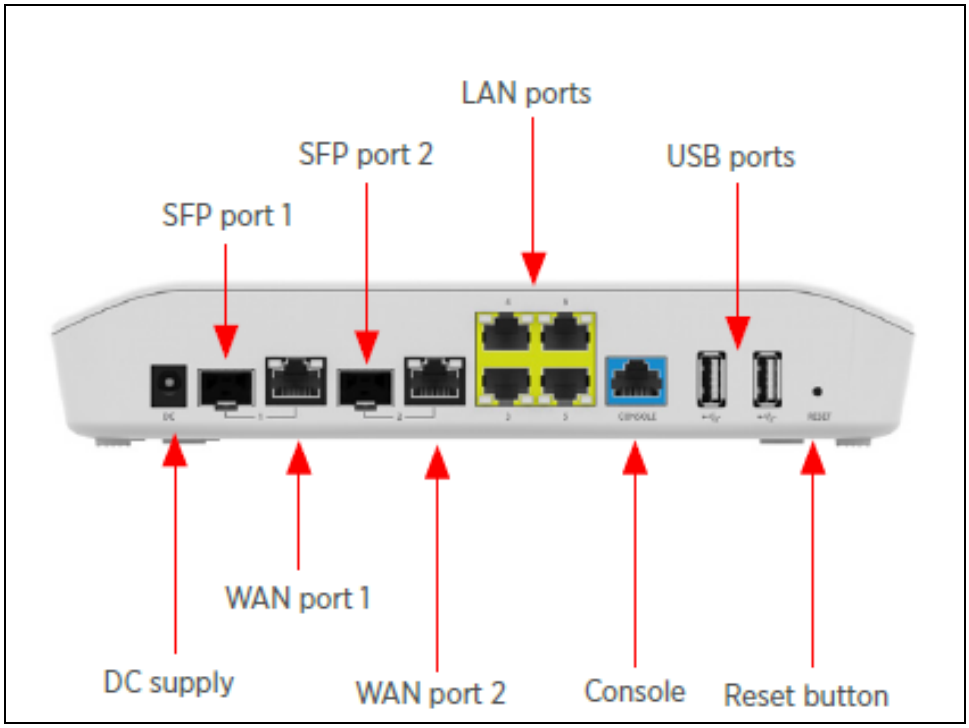
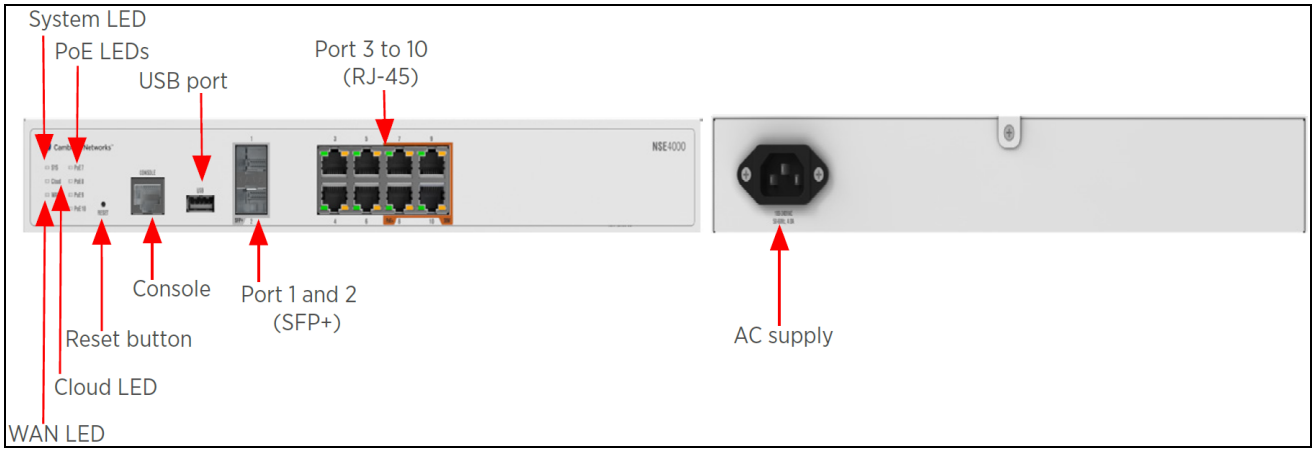


Figure 4 *NSE4000 Device Ports*



Note

By default, Port 1 (SFP+) and Port 3 (RJ-45) function as WAN ports, while Port 2 (SFP+) and Ports 4–10 (RJ-45) are configured as LAN ports.

Package contents

The NSE products package contains the following contents:

NSE3000

- NSE3000 device
- AC adapter
- Screws x 2
- Wall plugs x 2
- Plugs x 2
- Pads x 2

Figure 5 *NSE3000 package contents*

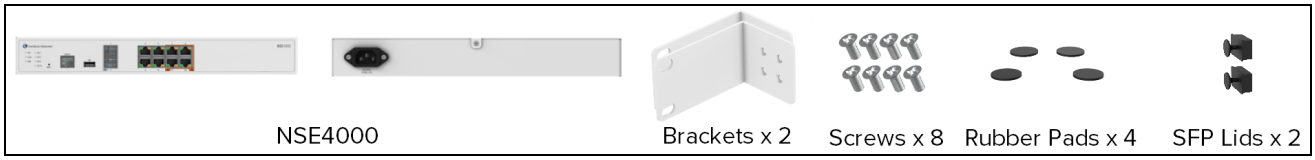
NSE4000

- NSE4000 device
- Brackets x 2
- Screws x 8
- Rubber pads x 4
- SFP lids x 2

Note

Power cable is not included in the NSE4000 package. You can purchase a compatible cable separately.

Figure 6 *NSE4000 package contents*



Prerequisite tasks for NSE3000

Before performing the configuration tasks, ensure that you have met the following hardware requirements (for example):

- A personal computer (PC) or laptop if you want to connect directly to the NSE3000 device web UI.
- NSE3000 device with IP address configured.

To put the whole system together, you must perform the following prerequisite tasks:

1. Installing rubber feet
2. Power supply—NSE3000

3. LED status—NSE3000

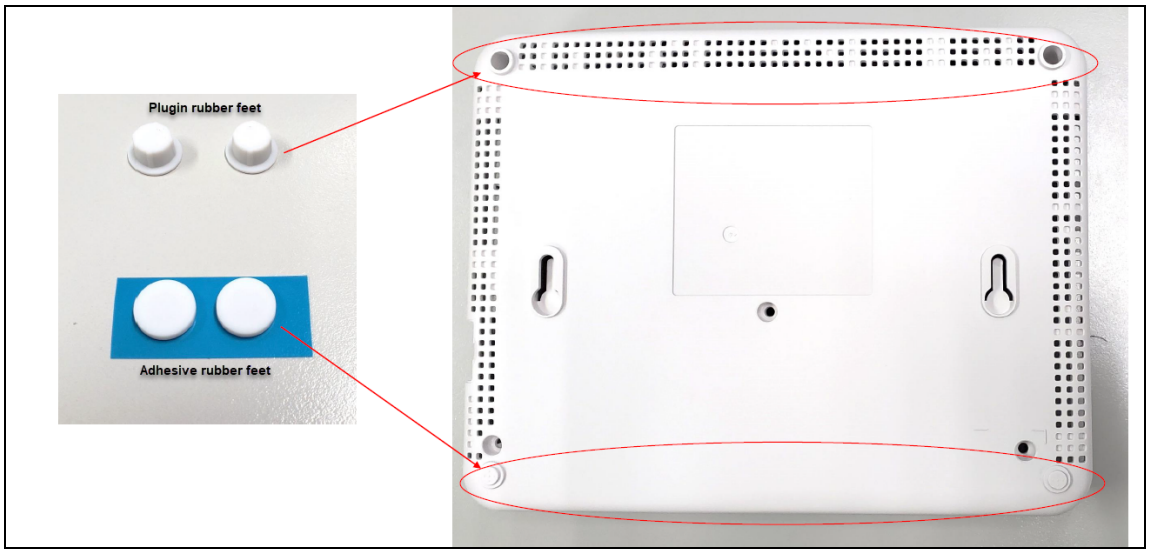
These prerequisite tasks help you to ensure that each component of the system is working before the final integration.

Installing rubber feet

This section describes how to install rubber feet on rubber slots of the NSE3000 device. Following two types of rubber feet are used for installation:

- Plugin type
- Adhesive type

Figure 7 *Types of rubber feet*



To install the rubber feet, perform the following steps:

Plugin type

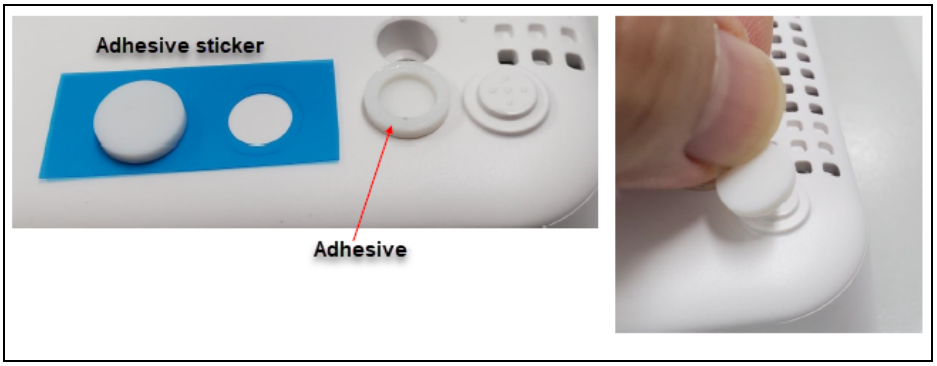
1. Place the plugin rubber feet on the rubber slots.
2. Press the plugin rubber feet as shown in Figure 8.

   Figure 8 *Placing the Plugin rubber feet type*

Adhesive type

1. Peel the adhesive rubber feet from the sticker.
2. Place the adhesive rubber feet on the rubber slots.
3. Press the adhesive rubber feet as shown in Figure 9.

Figure 9 *Placing the adhesive rubber feet type*



Power supply—NSE3000

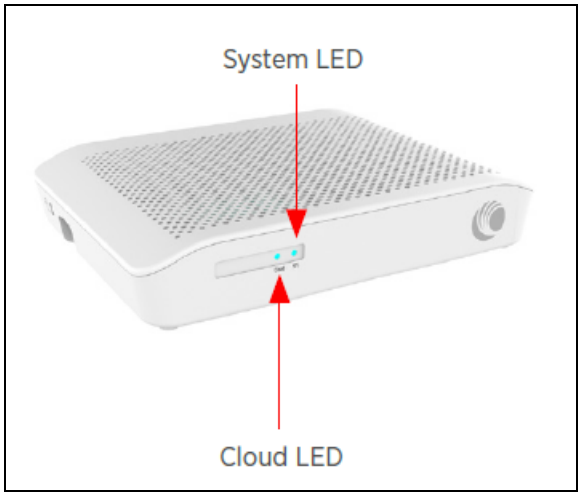
Connect the AC power cords of the power supply to a power inlet and connect the DC plug to the DC jack of the NSE3000 device.

LED status—NSE3000

LED status of the device displays as shown below:

- When NSE3000 is booting up, the system LED (SYS) is amber in color.
- When NSE3000 is fully up and running, the system LED (SYS) is green in color.

Figure 10 *NSE3000 LED*



Prerequisite tasks for NSE4000

Before performing the configuration tasks, ensure that you have met the following hardware requirements (for example):

- A personal computer (PC) or laptop if you want to connect directly to the NSE4000 device web UI.
- NSE4000 device with IP address configured.

To put the whole system together, you must perform the following prerequisite tasks:

1. Mounting NSE4000
    - Placing device on a flat surface
    - Mounting the device on a rack
2. Power supply—NSE4000
3. LED status—NSE4000

These prerequisite tasks help you to ensure that each component of the system is working before the final integration.

Mounting NSE4000

NSE4000 can be mounted either on a flat surface, such as a table, or on a rack.

Placing device on a flat surface

To place the device on a flat surface, attach the rubber footpads at the bottom of the NSE4000 at each corner.

Figure 11 *Attaching rubber footpads*

Mounting the device on a rack

To mount the NSE4000 on a rack, complete the following steps:

1. Attach the mounting brackets and fasten the brackets using the eight bracket screws.

   Figure 12 *Attaching mounting brackets*

2. Secure the mounting brackets to the rack using the mounting screws.

   Figure 13 *Attaching device to the rack*

Power supply—NSE4000

Connect the AC power cords of the power supply to a power inlet and connect the AC plug to the AC jack of the NSE4000 device.

LED status—NSE4000

LED status of the device displays as shown below:

- When NSE4000 is booting up, the system LED (SYS) is amber in color.
- When NSE4000 is fully up and running, the system LED (SYS) is green in color.

Managing NSE devices

You can manage NSE devices mainly through the cnMaestro Cloud UI or in some cases by using the device UI.

- Managing NSE devices using cnMaestro
- Managing NSE devices using device UI

Managing NSE devices using cnMaestro

NSE devices are completely managed by the easy-to-use, secure, and cloud-hosted Cambium Networks cnMaestro management system. A single-pane-of-glass management to operate and manage all Cambium Networks enterprise products, including NSE, Enterprise Wi-Fi APs, and cnMatrix switches.

To manage the NSE devices using cnMaestro, refer to the cnMaestro Cloud User Guide.

Managing NSE devices using device UI

If the devices have trouble in connecting to the internet or cnMaestro, you can onboard the devices using the device UI. For more information, refer to Managing NSE devices using device UI.

Managing NSE devices using device UI

This chapter covers the following topics:

Configuring the management PC

To configure the management PC on the NSE devices perform the following steps:

1. Ensure that the Ethernet port on the management PC is configured to use DHCP.
2. Connect the Ethernet port on the management PC to any of the LAN ports.
3. Verify that the management PC obtains an IP address in the 192.168.200.0/24 subnet. Use the ipconfig or ifconfig command to verify the IP address.

See Figure 3 for NSE3000 device ports and Figure 4 for NSE 4000 device ports.

Logging into the device UI

To access the NSE devices using the web UI, perform the following steps:

Note

New user must onboard the NSE devices to cnMaestro. For onboarding information, refer to the cnMaestro Cloud User Guide.

1. Use the default IP address (http://192.168.200.1) to connect to the NSE device setup.
2. Ensure that your PC is set up to communicate with the required range of IP addresses.
3. Open a web browser and type the URL—http://192.168.200.1—to access the NSE device UI.

   The **Sign In** page appears, as shown in Figure 14.

Figure 14 *Sign In page - NSE3000*

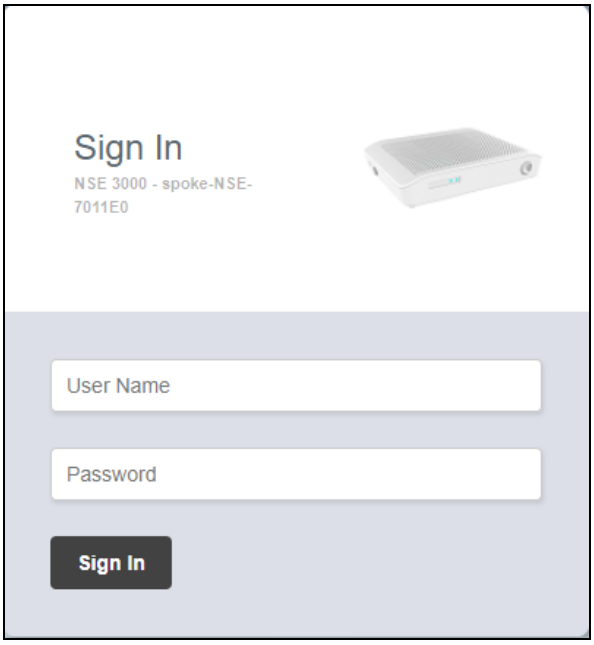


Figure 15 *Sign In page - NSE4000*

4. Type an appropriate username and password.
   - Default username: admin
   - Default password: admin
5. Click **Sign In**.

   The NSE device dashboard page appears, as shown in Figure 16 and Figure 17.

For more information about the NSE device dashboard page, refer to Viewing the dashboard.

NSE Dashboard

This section provides information about UI controls and the main NSE device dashboard page, and covers the following topics:

- UI Controls
- Viewing the dashboard

UI Controls

Before configuring NSE devices, familiarize yourself with the UI controls (as described in Table 2). These UI controls are required for adding, viewing, and managing NSE device configuration.

Table 2 *List of UI controls*

UI Control	UI Control name	Description
	Reboot	To reboot the system from the UI.
	Logout	To logout the system from the UI.

Viewing the dashboard

On logging into the NSE device UI, the dashboard page appears as shown in .

Figure 16 *NSE3000 Dashboard*

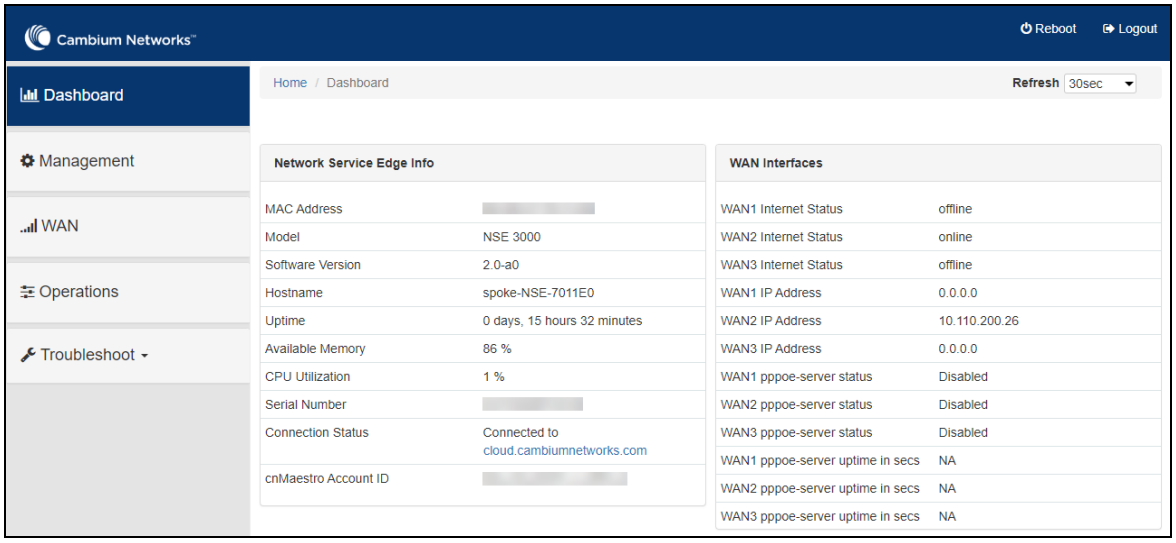


Figure 17 *NSE4000 Dashboard*

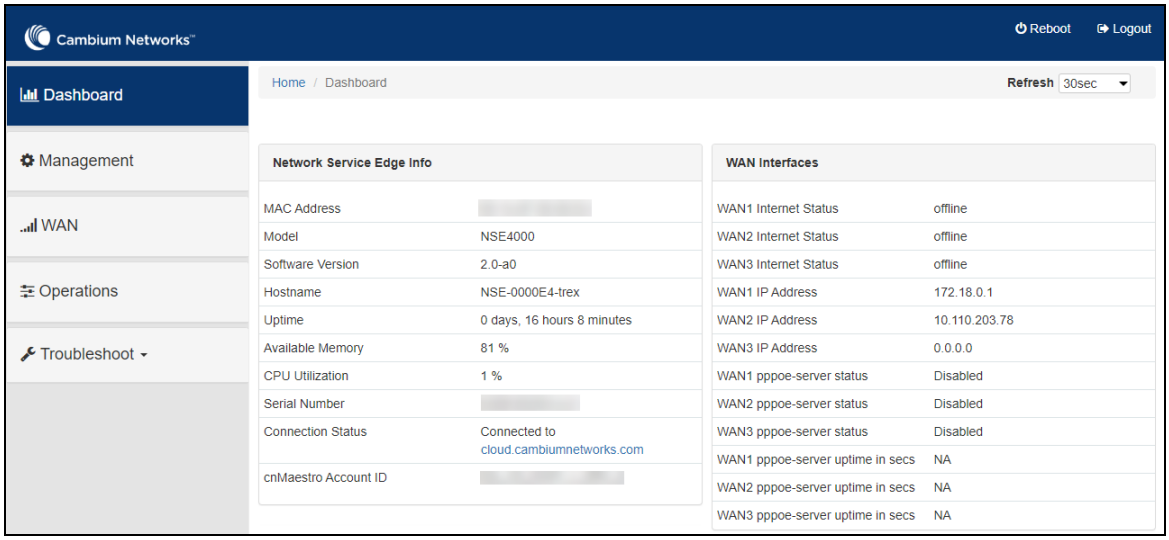


Table 3 provides the details of the parameters on the main dashboard.

Table 3 *Dashboard parameters*

Parameters	Description
Network Service Edge Info	
MAC Address	Media Access Control (MAC) address. The hardware address that the factory assigns to the module for identification in the Data Link layer interface of the Open Systems Interconnection system. This address serves as an electronic serial number.
Model	Provides information related to the NSE device model number and configured hostname.
Software Version	Provides the information about the software version used by the NSE device.
Hostname	The unique identifier that serves as name of your computer or server can be as long as 255 characters and consists of numbers and letters.
Uptime	Time period (in seconds) at which the last successful registration of the NSE device occurred.
Available Memory	Provides the information about the available memory of CPU.
CPU Utilization	This field indicates the current CPU utilization of the device.
Serial Number	Serial number of the device that is used for device identification.
Connection Status	This field indicates the device connectivity.
cnMaestro Account ID	This field shows Account ID which is registered with Cambium Networks and it allows operator to manage devices using cnMaestro.
WAN Interfaces	
WAN1 Internet Status	Indicates the WAN1 Internet status.
WAN2 Internet Status	Indicates the WAN2 Internet status.

Parameters	Description
WAN3 Internet Status	Indicates the WAN3 Internet status.
WAN1 IP Address	WAN1 IP address that is assigned to the network interface and used for device management.
WAN2 IP Address	WAN2 IP address that is assigned to the network interface and used for device management.
WAN3 IP Address	WAN3 IP address that is assigned to the network interface and used for device management.
WAN1 pppoe-server status	Status of the WAN 1 PPPoE server.
WAN2 pppoe-server status	Status of the WAN 2 PPPoE server.
WAN3 pppoe-server status	Status of the WAN 3 PPPoE server.
WAN1 pppoe-server uptime in secs	Duration (in seconds) for which the WAN1 PPPoE server is up.
WAN2 pppoe-server uptime in secs	Duration (in seconds) for which the WAN2 PPPoE server is up.
WAN3 pppoe-server uptime in secs	Duration (in seconds) for which the WAN3 PPPoE server is up.

WAN

The **WAN** parameters, for each end-user requirements and type of wireless station in the WAN page. For more information about the WAN configuration, refer to the WAN Configuration section.

Operations

The **Operation** page allows users to perform maintenance tasks of the NSE devices:

- **Firmware update**: To upgrade firmware of the NSE devices.
- **System**: To provide different methods of debugging issues and recovering devices.
- **Configuration**: To configure NSE device settings.

For more information about the parameters on the **Operation page**, refer to the Operations section.

Troubleshooting

The **Troubleshoot** page provides users to debug and troubleshoot the system remotely. The Troubleshoot page contains multiple sections, as listed below:

- **Connectivity**: Provides different network tests to check the network connectivity of NSE devices.
- **Logs**: Supports the feasibility to check logs for different modules of NSE devices. These logs help the customer to debug an issue.

For more information about the parameters on the **Troubleshoot** page, refer to the Troubleshooting section.

WAN Configuration

The **WAN** page allows the user to configure the NSE device IP address and DNS server details.

To view and configure the WAN settings, perform the following steps:

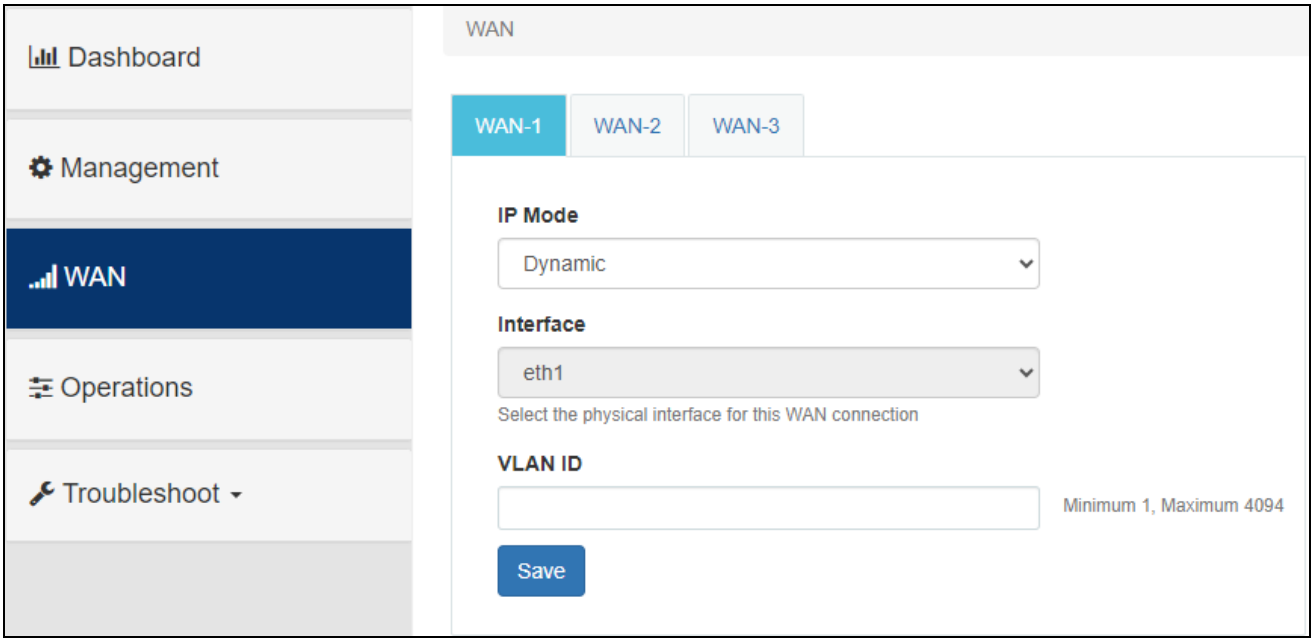
1. Navigate to the **WAN** page.

   The **WAN** page appears, as shown in Figure 18.

   Note

   By default, WAN1 page is displayed. You can configure WAN on WAN1, WAN2, or WAN3.

   Figure 18 *The WAN page*



2. Configure the parameters as described in Table 4.

   Table 4 *WAN configuration parameters*

Parameters	Description
IP Mode	Determines the network that must be configured to use IPv4 addresses. The following IP modes are supported: • Dynamic • Static • PPPoE

Parameters	Description
VLAN ID	VLANs are identified by a VLAN ID (a number between 0 – 4094), with the default VLAN on any network being with 1. Each port on a switch or router can be assigned to be a member of a VLAN, to allow receiving and sending traffic on that VLAN.
Following parameters appear only when you select the mode as **Static** as the **IP Mode**, as shown in Figure 19.	
IP Address	Specify the 32-bit binary number that identifies a network element by both network and host.
Subnet Mask	Specify the subnet mask for the destination IP/network for this route.
Gateway	Specify the gateway for the destination IP/network for this route.
DNS	
Primary DNS	Configure the primary DNS server for clients on this network.
Secondary DNS	Configure the secondary DNS server for clients on this network.
Following parameters appear only when you select the mode as **PPPoE** as the **IP Mode**, as shown in Figure 20.	
AC Name	Access Concentrator name (max 32 characters).
Service Name	Allows to configure Service name (max 32 characters).
User Name	User name provided to the WAN.
Password	Password used to authenticate to the WAN.
MTU	Allows to configure MTU for PPPoE from 500-1492 bytes.
TCP MSS Clamping	Enable or disable TCP MSS Clamping.

Figure 19 *IP Mode - Static*

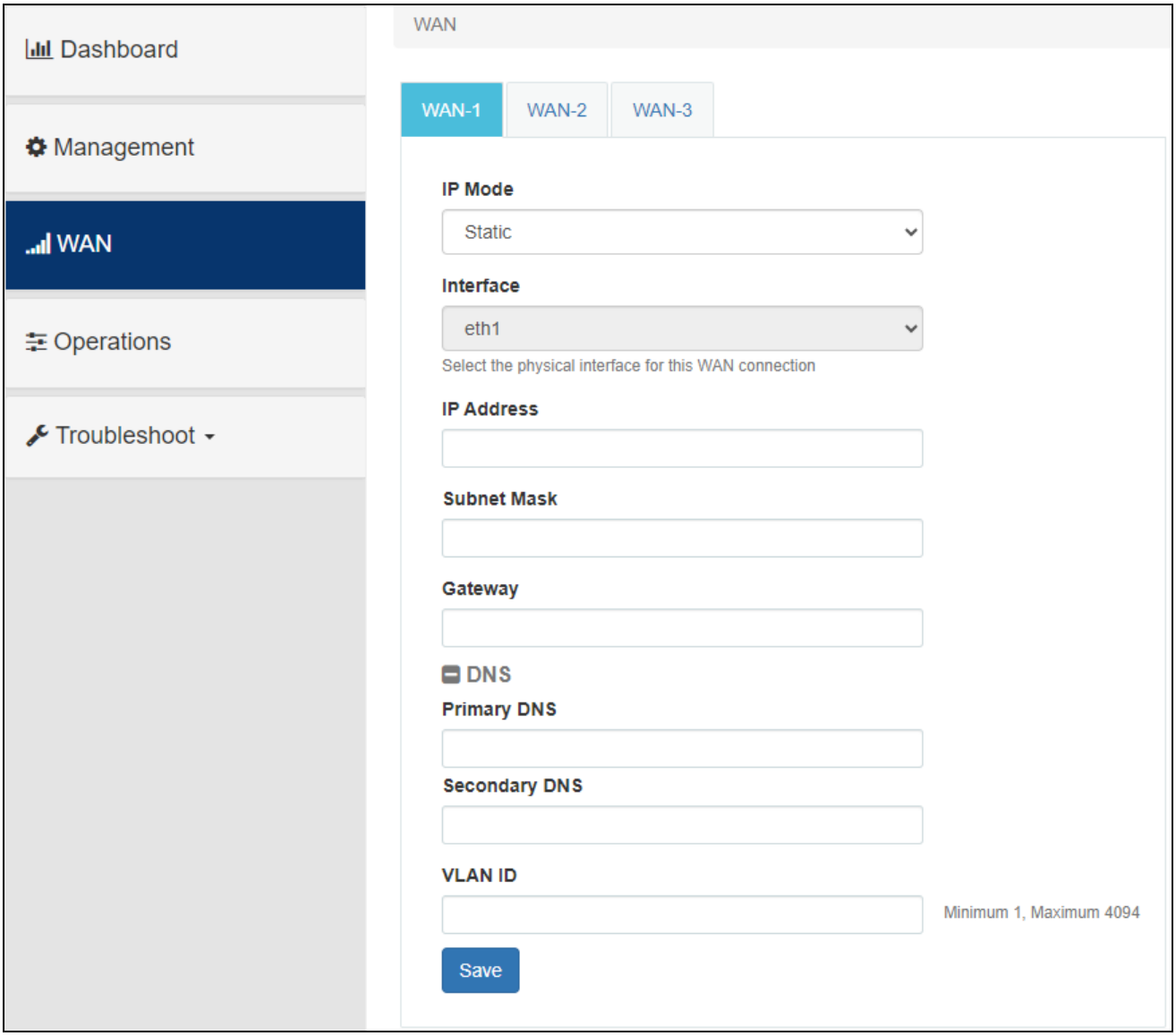
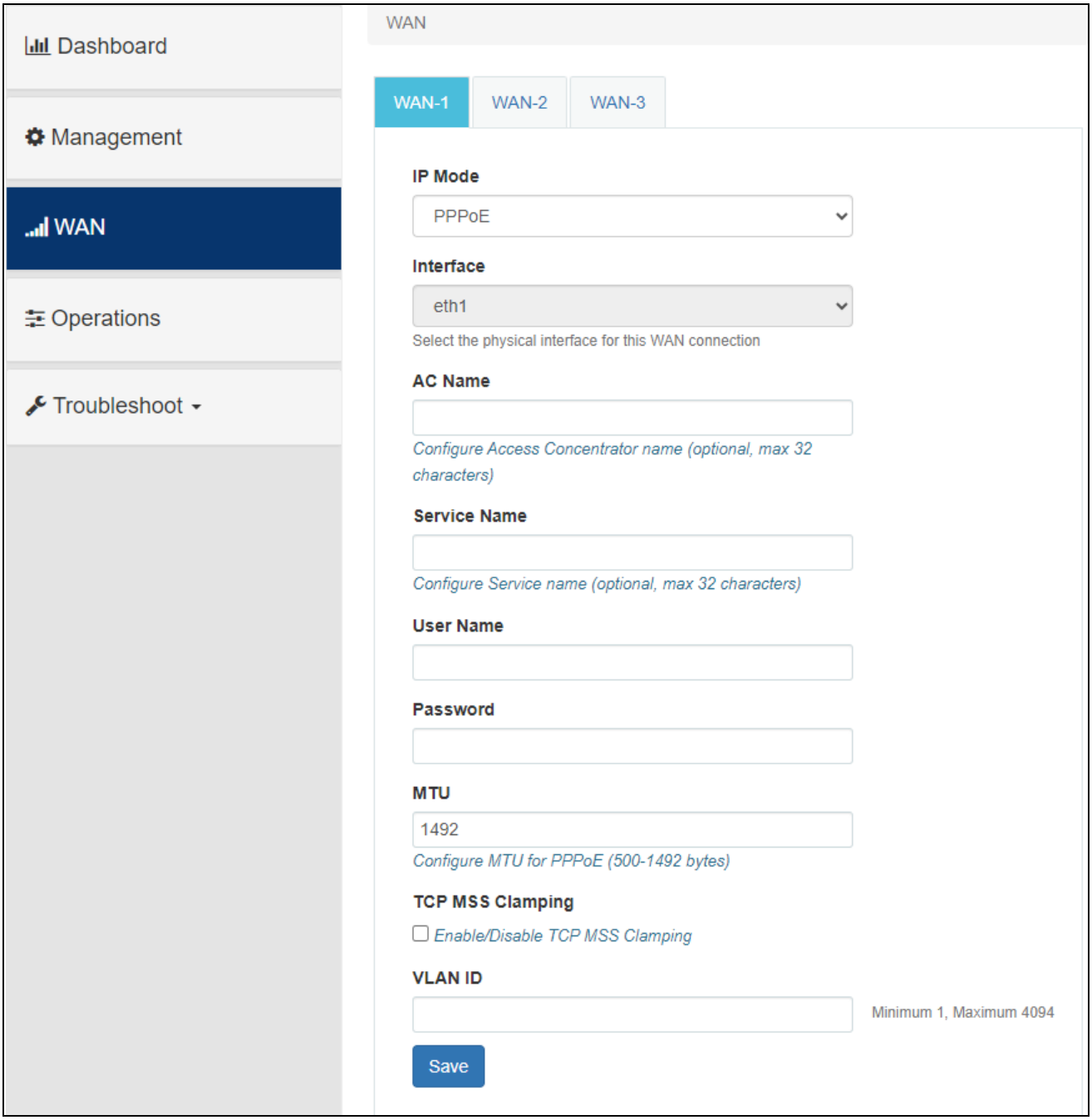


Figure 20 *IP Mode - PPPoE*



3. Click **Save**.

Operations

This section provides an overview of administrative functionalities of NSE devices, such as the following:

- Firmware upgrade
- System

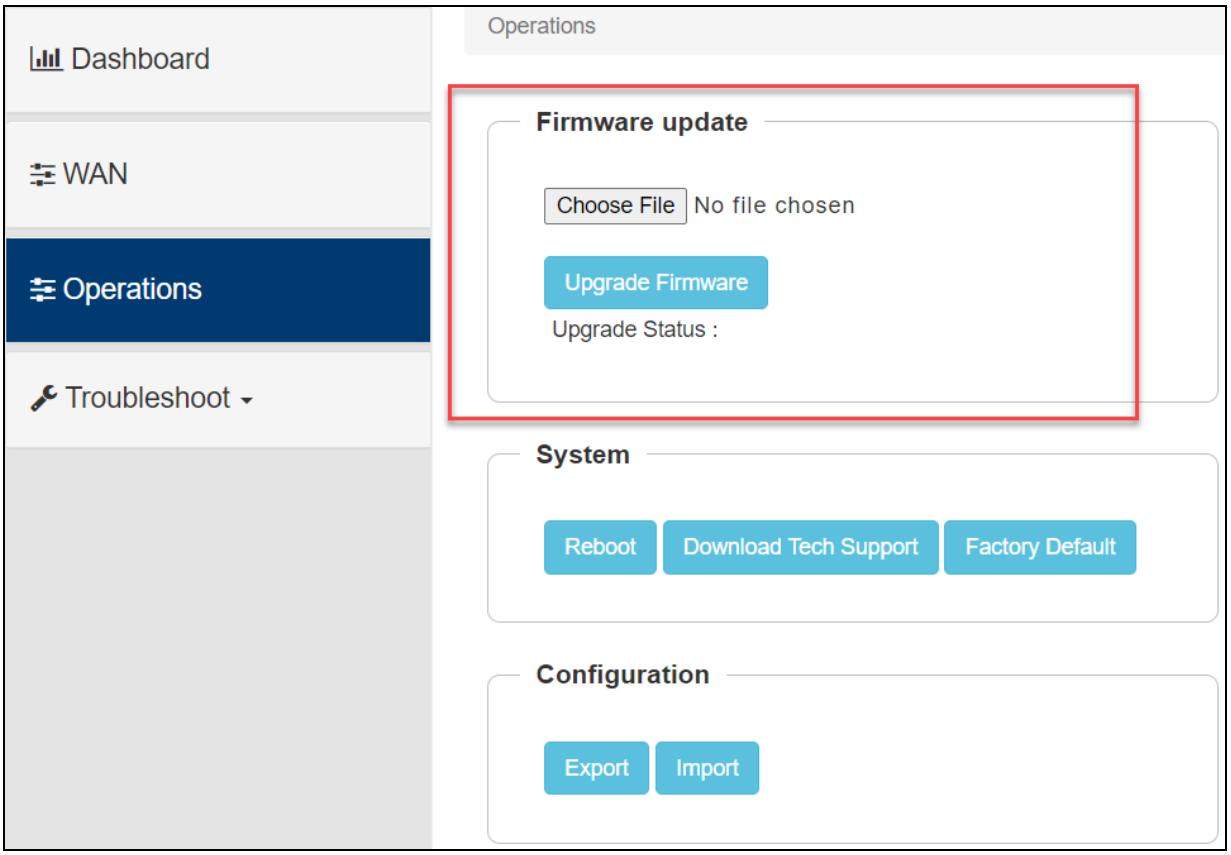
- Configuration

Firmware upgrade

Allows you to upgrade the firmware version on the NSE devices by uploading the file from the browser. The same process can be followed to downgrade the device to a previous firmware version if required. Configuration is maintained across the firmware upgrade process.

1. Navigate to the **Operation** page > **Firmware update** section.

   Figure 21 *Firmware update section*



2. Click **Choose File**.

   A file browser window appears.

3. Browse the location where you have saved the firmware file on your machine locally.
4. Select the file and click **Open**.

   The local import file is selected.

5. To initiate upgrade once the file is selected, click **Upgrade Firmware**.

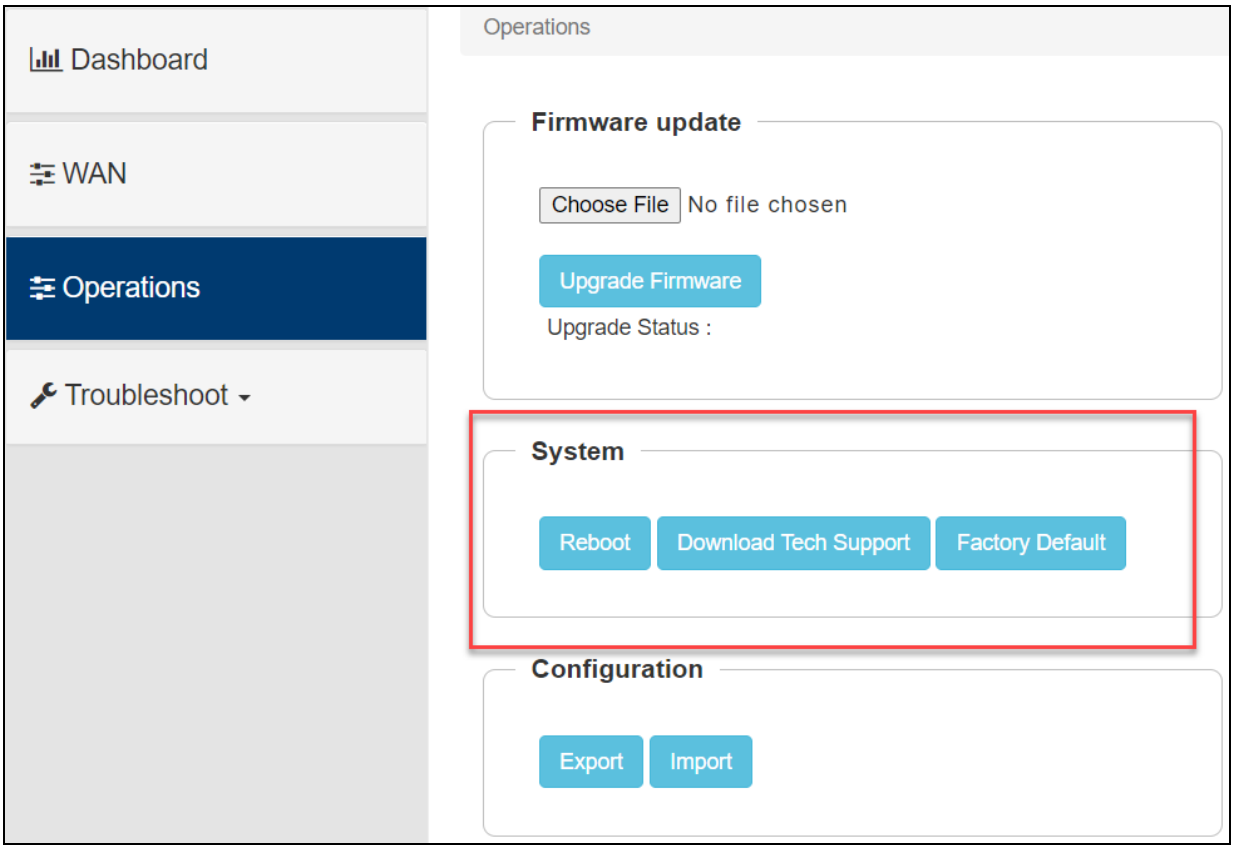
   The status of the upgrade is displayed in the **Upgrade Status** field.

System

This section provides multiple troubleshooting tools provided by NSE devices.

1. Navigate to the **Operation** page > **System** section.

Figure 22 *System functions*



2. To reboot the device, click **Reboot**.
3. Click **Yes** in the confirmation window.
4. To download the tech support dump file, click **Download Tech Support**.
5. Click **OK** in the confirmation window and select the folder where you want to download the file.
6. Click **Save**.
7. To reset the device configuration to the factory settings, click **Factory Default**.
8. Click **Yes** in the confirmation window.

   The device configuration is restored to the factory settings and the device is restarted.

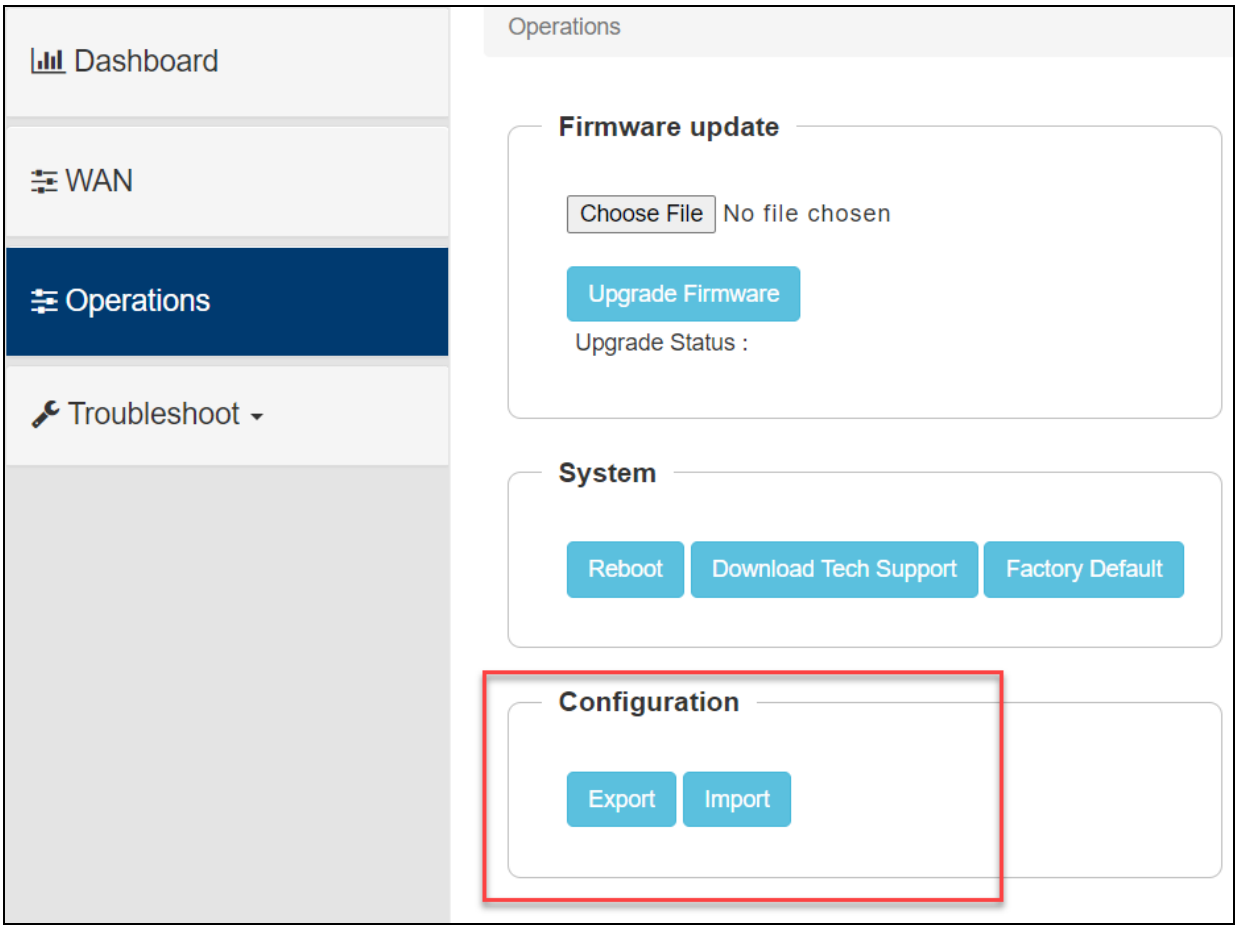
Configuration

The device configuration can either be exported from the device as a text file or imported into the device from a previous backup.

Ensure that when a configuration file is imported onto the device, a restart is necessary to activate that new configuration.

1. Navigate to **Operation** page > **Configuration** section.

Figure 23 *Export or Import Device Configuration*



2. To download the existing device configuration, click **Export**.

   The configuration file is saved in the selected folder.

3. To upload the device configuration from a file, perform the following steps:

   a. Click **Import**.

   b. Select the file that you want to import.

   c. Click **Open**.

Troubleshooting

This chapter provides detailed information about troubleshooting methods supported by NSE. Troubleshooting methods supported by NSE devices as shown below:

- Connectivity
- Logs

Connectivity

This tool helps to check the accessibility of remote hosts from NSE devices. Three types of tools are supported under this category:

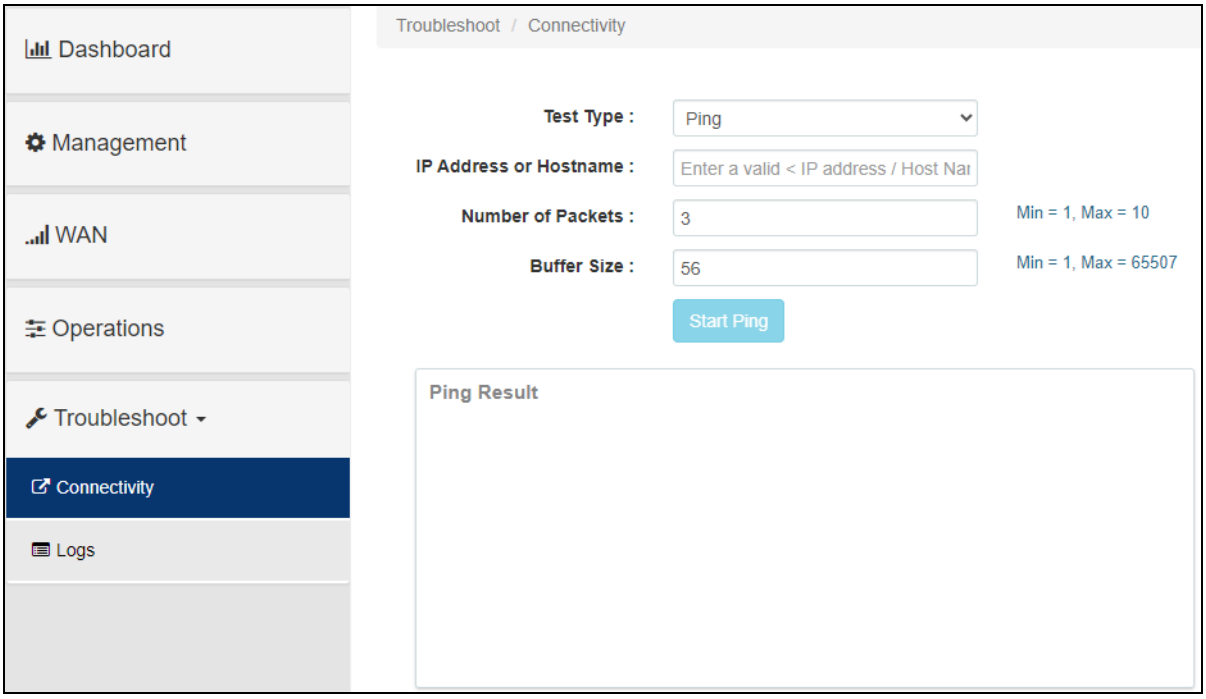
- Ping
- DNS Lookup
- Traceroute

Ping

To check the Ping result, perform the following steps:

1. Navigate to **Troubleshoot** > **Connectivity.**
2. Select **Test Type** as **Ping** from the drop-down list as shown in Figure 24.

Figure 24 *Ping connectivity*



3. Set the values for each parameter, as described in Table 5.

Table 5 *Ping parameters*

Parameters	Description
IP Address or Hostname	Validates the IPv4 address or Hostname reachability of the destination host.
Number of Packets	Specify the number of packets for this connectivity (Min = 1 and Max = 10).
Buffer Size	Specify the buffer size for this connectivity (Min = 1 and Max = 65507).
Ping Result	Displays the ping results.

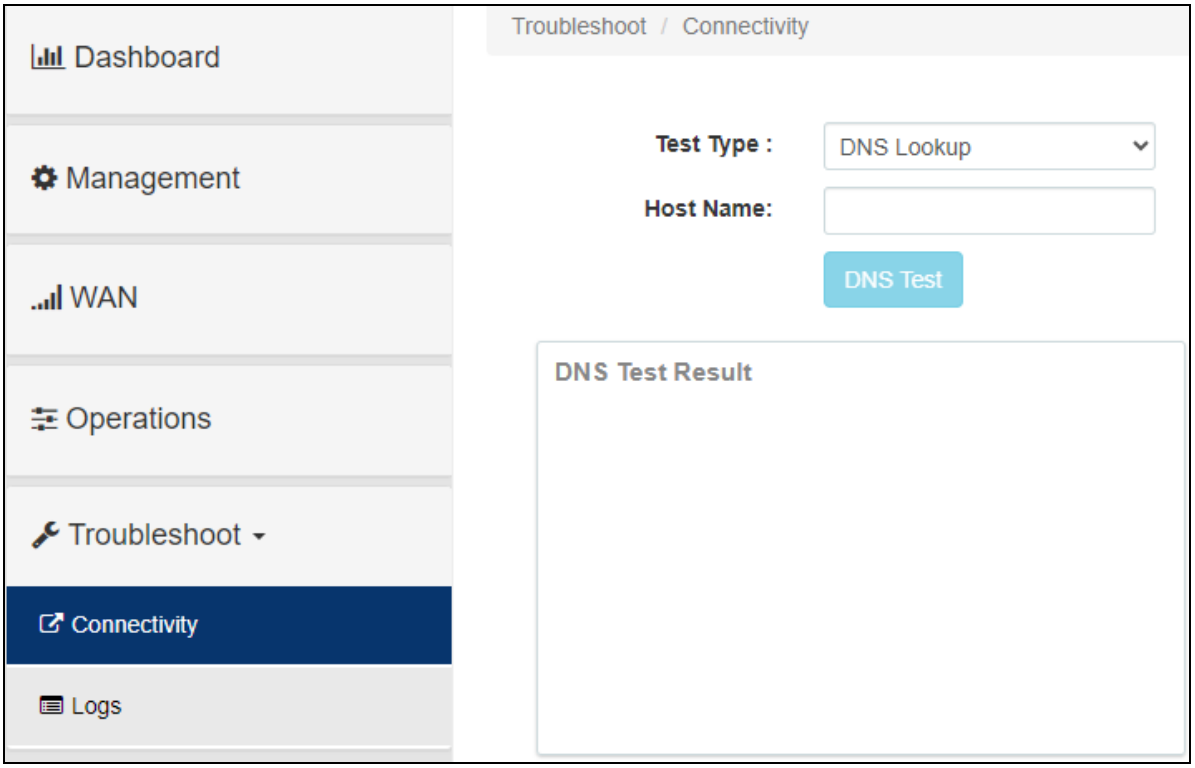
4. Click **Start Ping**.

DNS Lookup

To check the DNS test result, perform the following steps:

1. Navigate to **Troubleshoot** > **Connectivity.**
2. Select **Test Type** as **DNS Lookup** from the drop-down list as shown in Figure 25.

   Figure 25 *DNS Lookup connectivity*



3. Set the values for each parameter, as described in Table 6.

   Table 6 *DNS Lookup parameters*

Parameters	Description
Host Name	Specify the hostname of this connectivity.
DNS Test Result	Displays the IPs that are associated with configured Hostname.

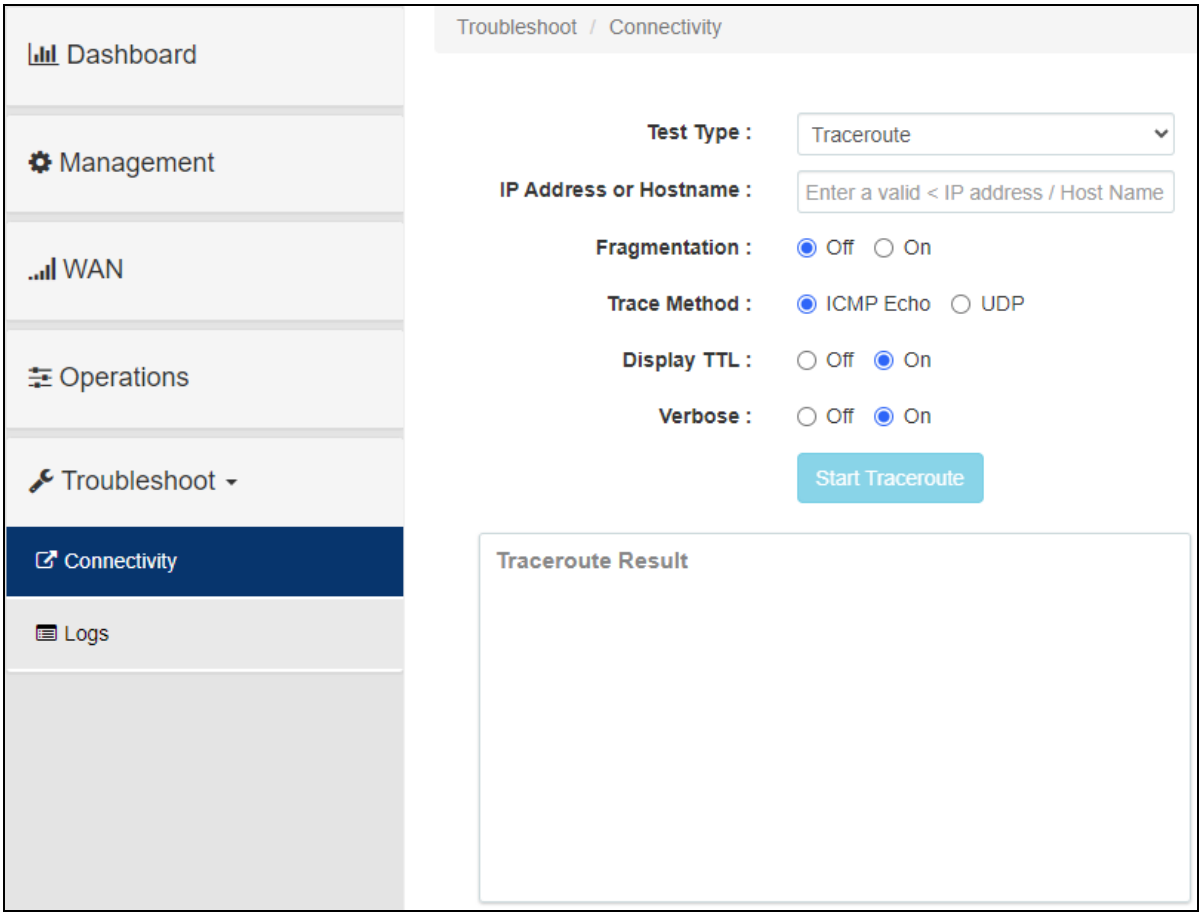
4. Click **DNS Test**.

Traceroute

To check the Traceroute result, perform the following steps:

1. Navigate to **Troubleshoot** > **Connectivity.**
2. Select **Test Type** as **Traceroute** from the drop-down list as shown in Figure 26.

Figure 26 *Traceroute connectivity*



3. Set the values for each parameter, as described in Table 7.

Table 7 *Traceroute parameters*

Parameters	Description
IP Address or Hostname	Specify the Valid IP address or Hostname for this connectivity.
Fragmentation	Allows to on or off fragmentation.
Trace Method	Allows to specify the trace method as ICMP Echo or UDP.
Display TTL	Allows to on or off the display TTL.
Verbose	Allows to on or off the verbose.
Traceroute Result	Displays the result of the traceroute.

4. Click **Start Traceroute**.

Logs

Two types of tools are supported under this category:

- Events
- Debug Logs

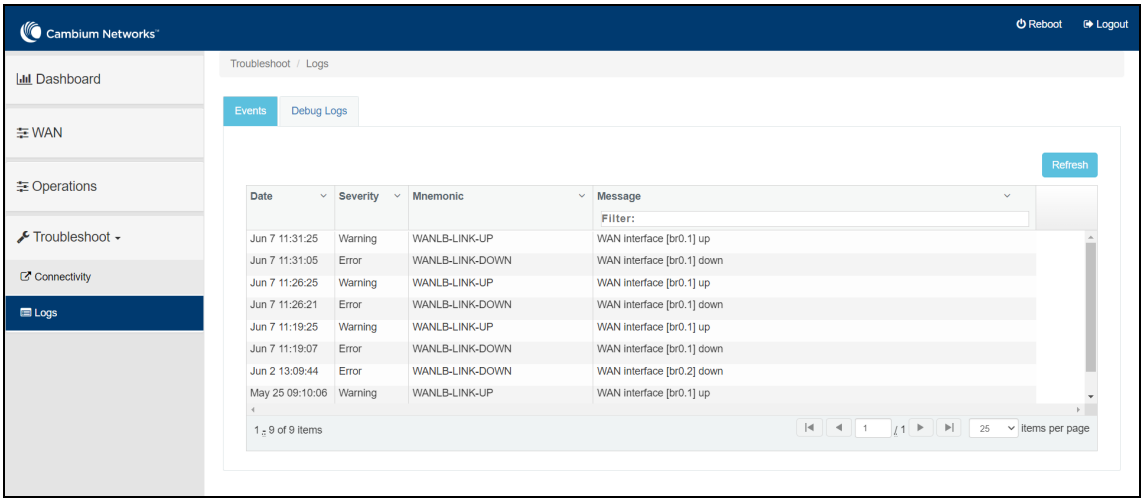
Events

NSE devices generate events that are necessary for troubleshooting across. NSE devices generate events for troubleshooting.

1. Navigate to **Troubleshoot** > **Logs** > **Events** tab**.**

   The **Events** page appears, as shown in Figure 27.

   Figure 27 *Events*



2. View the data of Events device parameters, as described in Table 8.

   Table 8 *Events parameters*

Parameters	Description
Date	Displays the date and time at which the events were created.
Severity	Displays the severity of logs that must be forwarded to the server.
Mnemonic	Displays the mnemonic of the device.
Message	Displays the messages that are sent to the NSE device.
Refresh	Allows to refresh the event logs.

Debug Logs

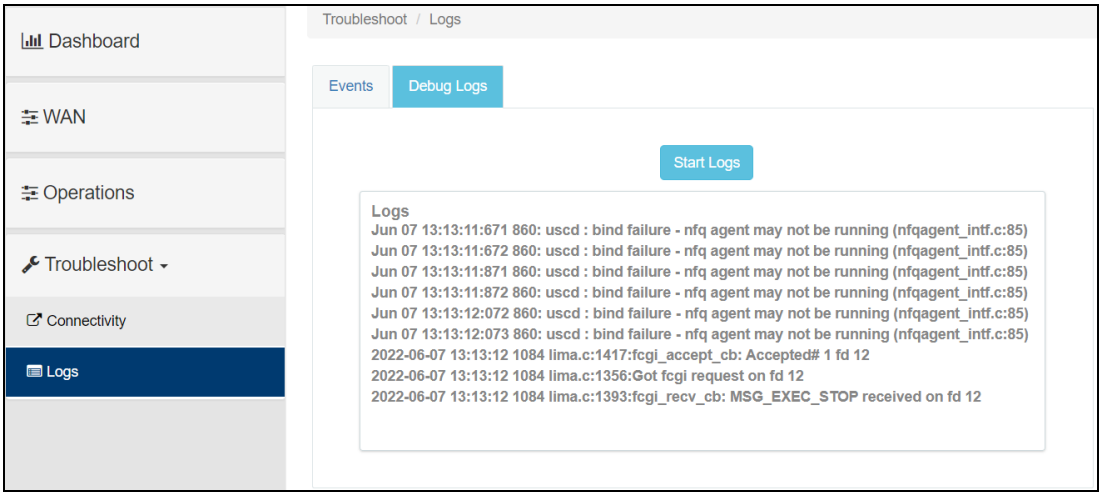
NSE devices support multi-level logging, which will ease debug issues.

To create a Debug Logs, perform the following steps:

1. Navigate to **Troubleshoot** > **Logs** > **Debug Logs** tab.

   The Debug Logs page appears, as shown in Figure 28.

Figure 28 *Debug Logs page*



2. View the data of **Debug Logs** device parameters, as described in Table 8.

Table 9 *Events parameters*

Parameters	Description
Start Logs	Initiates the Log collection process.
Logs	Displays the logs of the NSE device.

3. Click **Start Logs**.

Glossary

Term	Description
AP	Access Point Module. One module that distributes network or Internet services to subscriber modules.
API	Application Program Interface
ARP	Address Resolution Protocol. A protocol defined in RFC 826 to allow a network element to correlate a host IP address to the Ethernet address of the host.
BT	Bluetooth
DFS	Dynamic Frequency Selection.
DHCP	Dynamic Host Configuration Protocol defined in RFC 2131. The protocol that enables a device to be assigned a new IP address and TCP/IP parameters, including a default gateway, whenever the device reboots. Thus, DHCP reduces configuration time, conserves IP addresses, and allows modules to be moved to a different network within the system.
Ethernet Protocol	Any of several IEEE standards that define the contents of frames that are transferred from one network element to another through Ethernet connections.
FCC	Federal Communications Commission of the U.S.A.
GPS	Global Positioning System. A network of satellites that provides absolute time to networks on earth, which use the time signal to synchronize transmission and reception cycles (to avoid interference) and to provide reference for troubleshooting activities.
UI	User interface.
HTTP	Hypertext Transfer Protocol, used to make the Internet resources available on the World Wide Web.
HTTPS	Hypertext Transfer Protocol Secure
HT	High Throughput
IP Address	The 32-bit binary number identifies a network element by both network and host. See also Subnet Mask.
IPv4	The traditional version of Internet Protocol, defines 32-bit fields for data transmission.
LLDP	Link Layer Discovery Protocol
MAC Address	Media Access Control address. The hardware address that the factory assigns to the module for identification in the Data Link layer interface of the Open Systems Interconnection system. This address serves as an electronic serial number.
MIB	Management Information Base. Space that allows a program (agent) in the network to relay information to a network monitor about the status of defined variables (objects).
MIR	Maximum Information Rate.
PPPoE	Point to Point Protocol over Ethernet. Supported on SMs for operators who use PPPoE in other parts of their network operators who want to deploy PPPoE to realize per-subscriber authentication, metrics, and usage control.
Proxy Server	Network computer that isolates another from the Internet. The proxy server communicates for the other computer, and sends replies to only the appropriate computer which has an IP

Term	Description
	address that is not unique or not registered.
PoE	Power over Ethernet.
SLA	Service Level Agreement
VLAN	Virtual local area network. An association of devices through software that contains broadcast traffic, as routers would, but in the switch-level protocol.
VPN	A virtual private network for communication over a public network. One typical use is to connect remote employees, who are at home or in a different city, to their corporate network over the Internet. Any of several VPN implementation schemes are possible. SMs support L2TP over IPSec (Level 2 Tunneling Protocol over IP Security) VPNs and PPTP (Point to Point Tunneling Protocol) VPNs, regardless of whether the Network Address Translation (NAT) feature enabled.

Cambium Networks

Cambium Networks delivers wireless communications that work for businesses, communities, and cities worldwide. Millions of our radios are deployed to connect people, places and things with a unified wireless fabric that spans multiple standards and frequencies of fixed wireless and Wi-Fi, all managed centrally via the cloud. Our multi-gigabit wireless fabric offers a compelling value proposition over traditional fiber and alternative wireless solutions. We work with our Cambium certified ConnectedPartners to deliver purpose-built networks for service provider, enterprise, industrial, and government connectivity solutions in urban, suburban, and rural environments, with wireless that just works.

Support website	https://support.cambiumnetworks.com
Support enquiries	
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Telephone number list	https://www.cambiumnetworks.com/guides
User Guides	https://support.cambiumnetworks.com
Address	Cambium Networks Limited, Unit B2, Linhay Business Park, Eastern Road, Ashburton, Devon, TQ13 7UP United Kingdom

Cambium Networks™

www.cambiumnetworks.com