Cambium Networks™

HIGH AVAILABILITY ON NSE 3000

NSE 3000

Release 5.1.1

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September 2024

Contents

High Availability on NSE 3000

High Availability (HA) is critical in network infrastructure to reduce hardware downtime, maintain uninterrupted operations, and eliminate single points of failure. This guide outlines the process of configuring HA between two NSE 3000 devices.

Establishing an HA pair

If a site currently operates with a standalone NSE 3000 device, you can add a second NSE 3000 (referred to as the *Spare*) to provide hardware redundancy. The HA pair is created during the onboarding process of the Spare device into *cnMaestro*.

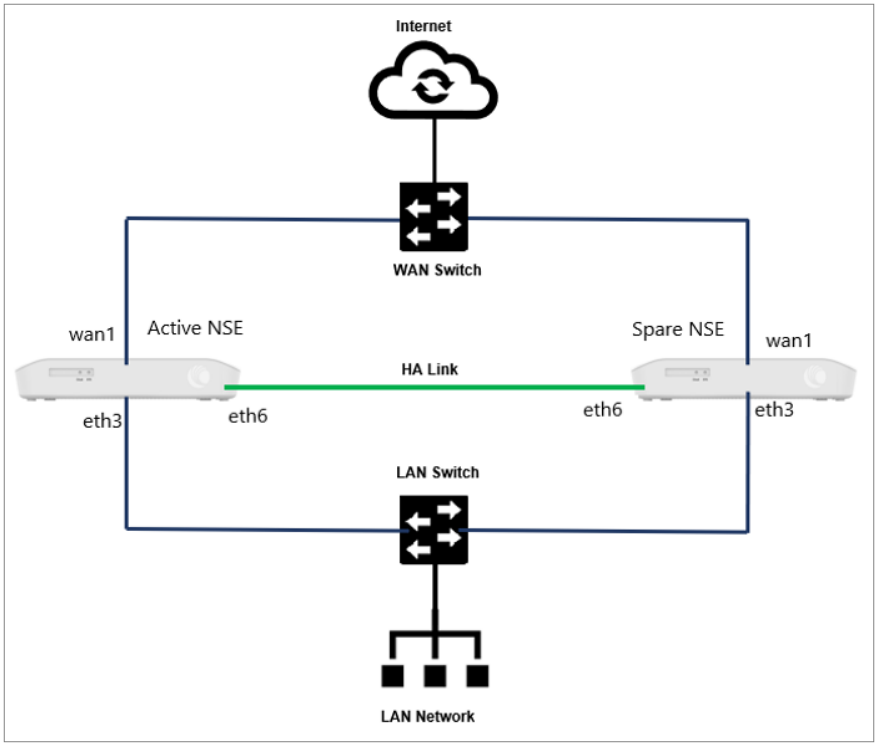
Once the *Spare* device successfully connects to the cloud and appears in the onboarding queue, you have two options:

- Add it as a standalone device to a new site, or
- Integrate it with the existing standalone NSE 3000 device at the site, creating an HA pair.

After the HA pair is formed, the original standalone device takes on the *Primary* role, while the *Spare* assumes the *Backup* role.

Figure 1 illustrates the process of configuring HA between two NSE 3000 devices.

Figure 1



The configuration between the *Primary* and *Backup* devices is synchronized by mapping both devices to the same NSE group. Ethernet Port 6 is exclusively used for exchanging control messages between the two devices.

The *Primary* device periodically sends control messages (keepalives) at predefined intervals to maintain communication and ensure synchronization.

If the *Backup* device misses three consecutive control messages from the *Primary* device—whether due to hardware failure or a reboot of the *Primary* device—it transitions to an *Active* state. Similarly, if both WAN links of the *Primary* device become unreachable, the *Backup* device also transitions to an *Active* state.

In the event that both the *Primary* and *Backup* devices lose their WAN connectivity, the *Primary* device retains its *Active* state. Once the *Primary* device recovers, it preempts the *Backup* device and resumes the *Active* state.

The device in the *Primary* role provides essential network services to downstream clients, including issuing IP addresses, performing network scans, and ensuring connectivity.

License

The NSE 3000 device requires a Tier-30 license for onboarding onto *cnMaestro*. However, when an HA pair is established by adding a *Spare* device, the license is shared between the *Active* and *Spare* devices, eliminating the need for an additional license for the *Spare* device.

Configuring HA pair from cnMaestro

To configure an HA pair consisting of an *Active* NSE 3000 device and a *Spare* NSE 3000 device, you can follow either of the following processes:

- Onboarding the Spare device from the onboarding queue
- Onboarding the Spare device directly into the site

Note

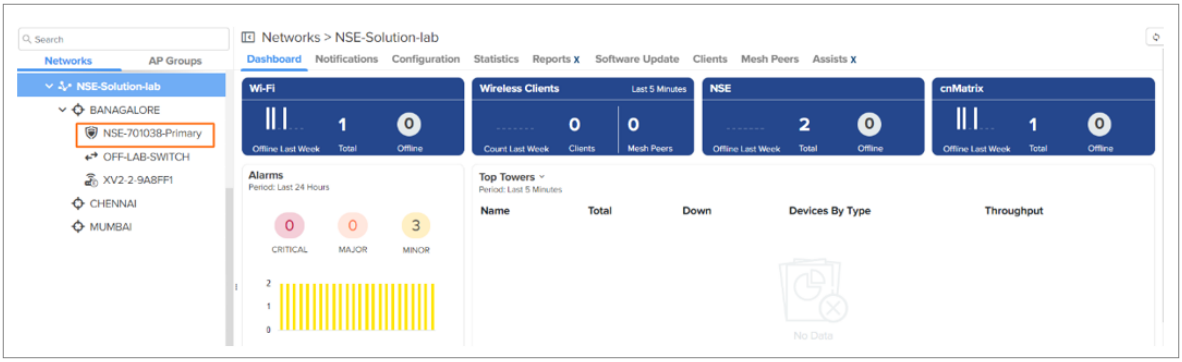
- Since the HA feature is supported from version 1.7, ensure the *Spare* device is running this firmware version; otherwise, the HA pairing may fail.
- Before adding a *Spare* device to the HA pair, verify that the HA feature is enabled on the **Basic Information** page under **NSE Groups > (Group Name)**, and that the NSE group is already associated with the *Primary* NSE 3000 device at the site.

Onboarding the Spare device from the onboarding queue

Using *cnMaestro*, you can establish an HA pair by onboarding the *Spare* NSE 3000 device from the onboarding queue as follows:

1. Ensure that a standalone *Active* NSE 3000 device is added to the site (as shown in Figure 2) and mapped to the NSE group.

Figure 2



2. To onboard the *Spare* NSE 3000 device, follow these steps:

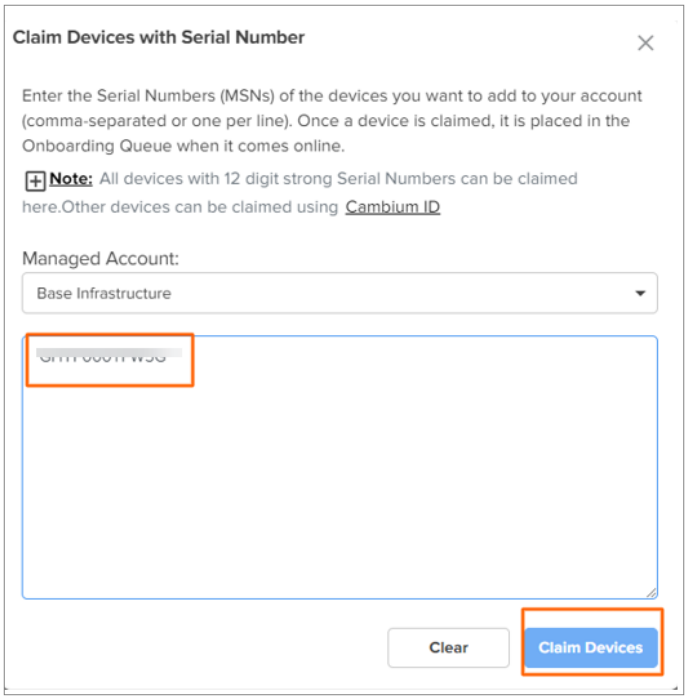
   a. From the cnMaestro home page, click the Onboard ( ) icon.

      The **Onboard** page appears.

   b. From the **Onboard** page, click the **Claim Device** button.

      The **Claim Devices with Serial Number** window appears.

      Figure 3

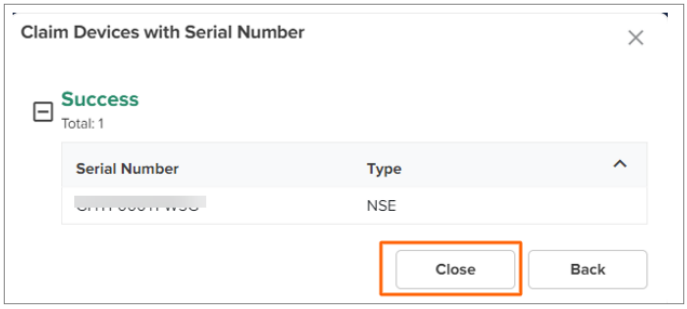


   c. Enter the Manufacturer Serial Number (MSN) of the NSE 3000 device.

   d. Click the **Claim Devices** button.

      The **Claim Devices with Serial Number** window appears.

Figure 4



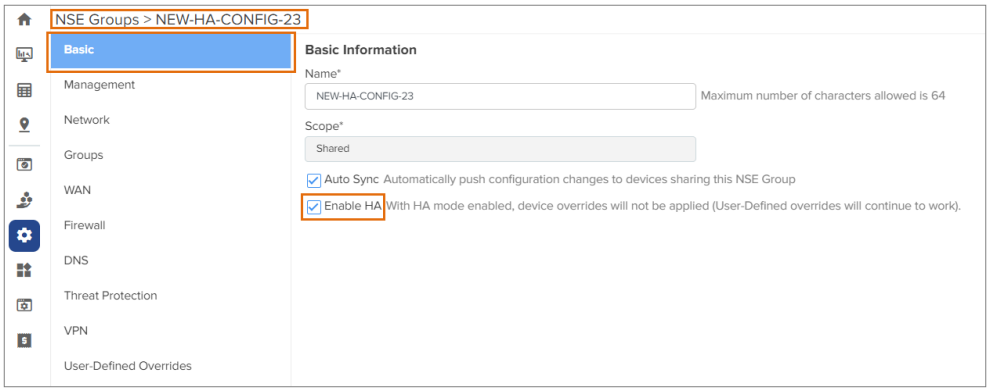
e. Click **Close**.

The HA pairing is established.

Note

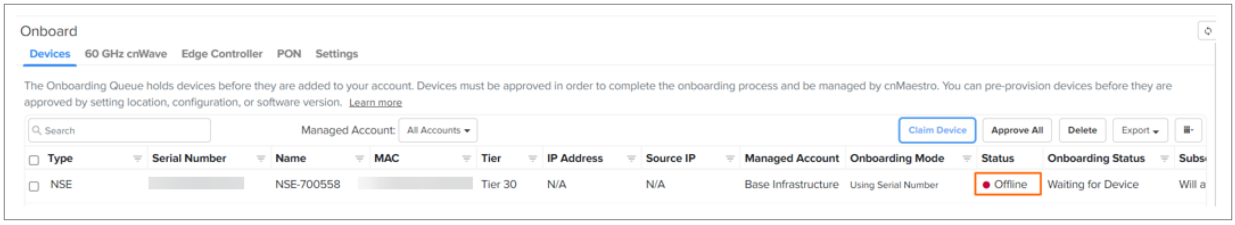
Before adding the *Spare* device to the HA pair, ensure that HA is enabled in the NSE group (as shown in Figure 5) and that the NSE group is attached to the *Active* NSE 3000 device at the site. The same NSE group must also be attached to the *Spare* NSE 3000 device, ensuring that the configuration remains identical on both devices.

Figure 5



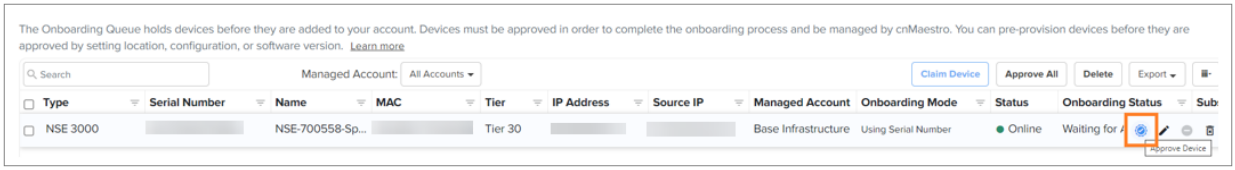
When the *Spare* device successfully connects to the cloud, it will appear in the onboarding queue, as shown in Figure 6.

Figure 6



Wait for the *Spare* device to come online. Once it appears online, you can proceed to the next step and approve the device, as shown in Figure 7.

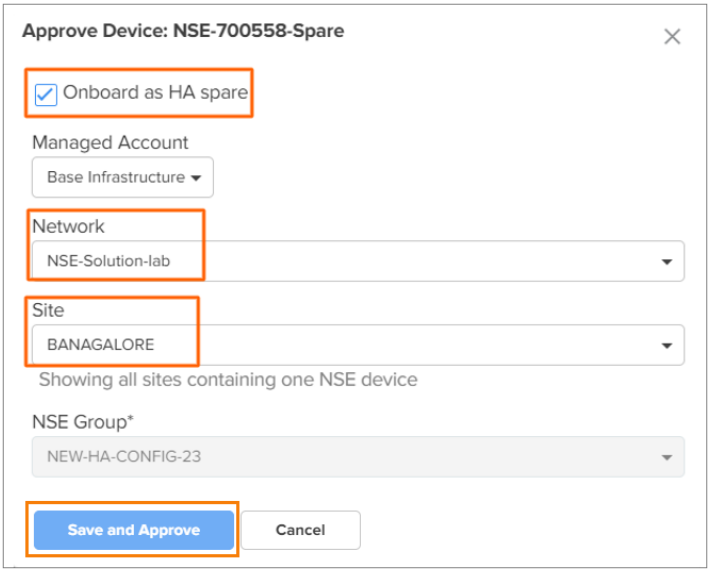
Figure 7



3. Click the Approve Device ( ) icon, as shown in Figure 7.

   The **Approve Device** window appears.

   Figure 8



4. Complete the following steps in the **Approve Device** window:

   a. Select the **Onboard as HA spare** checkbox. The numbering is still incorrect.

   b. From the **Network** drop-down list, choose the network to which you want to add the *Spare* device.

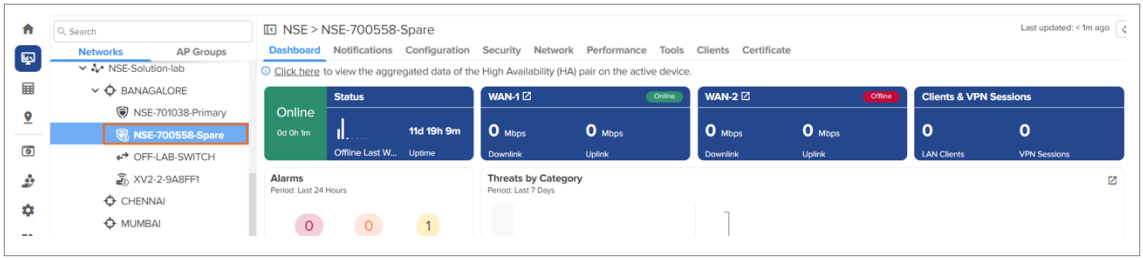
   c. From the **Site** drop-down list, choose the site to which you want to add the *Spare* device.

> **Note**
>
> The **NSE Group** field displays the name of the NSE group that is attached to the *Active* NSE 3000 device. Both the *Active* and *Spare* devices are attached to the same NSE group.

   d. Click **Save and Approve**.

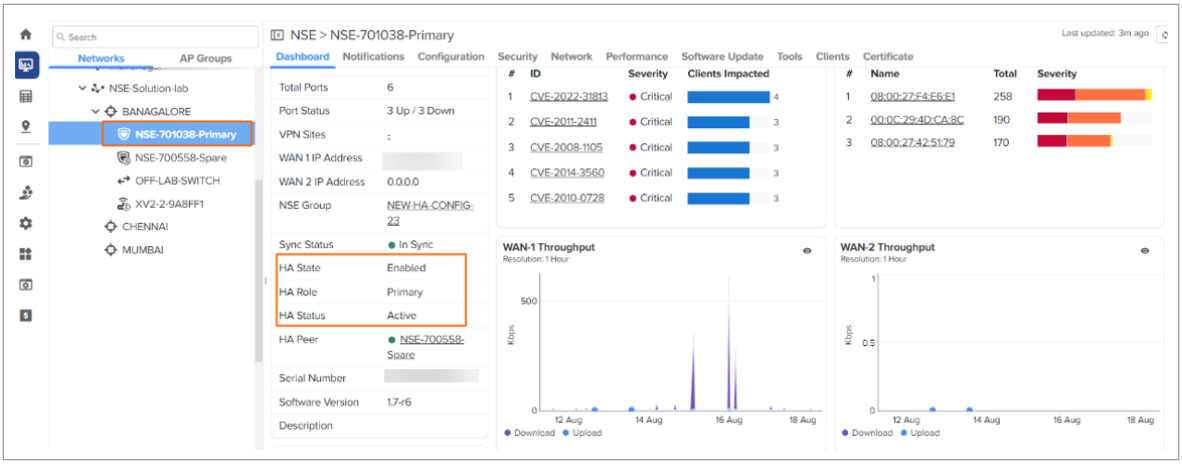
      The *Spare* device is added to the site, as shown in Figure 9.

Figure 9



5. Click on the *Primary* NSE 3000 device to view the **Details** section on the **Dashboard** page, as shown in Figure 10.

Figure 10

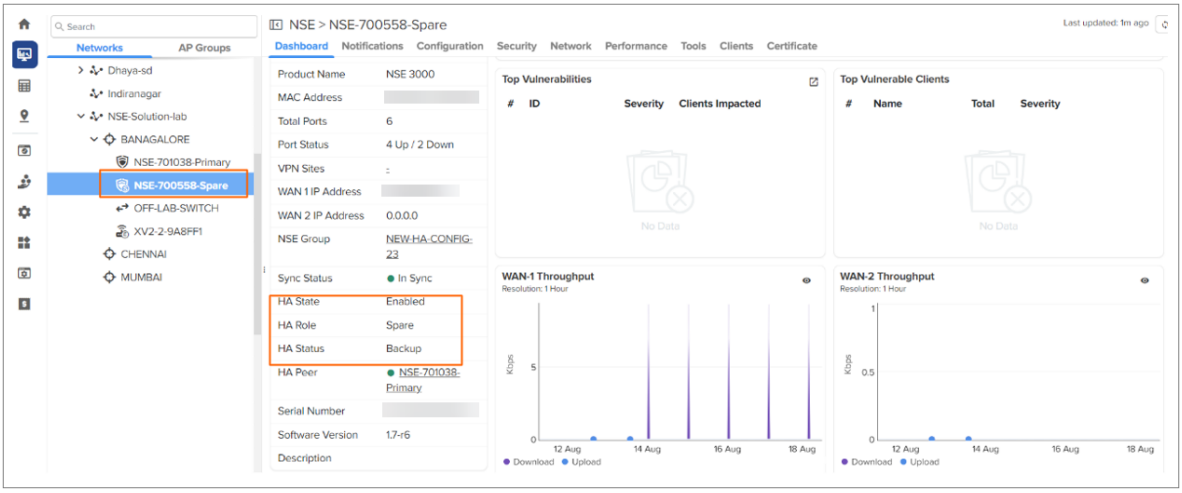


Verify the following information in the **Details** section:

- HA state: **Enabled**
- HA Role: **Primary**
- HA status: **Active**

6. Click on the *Spare* NSE 3000 device to view the **Details** section on the **Dashboard** page, as shown in Figure 11.

Figure 11



Verify the following information in the **Details** section:

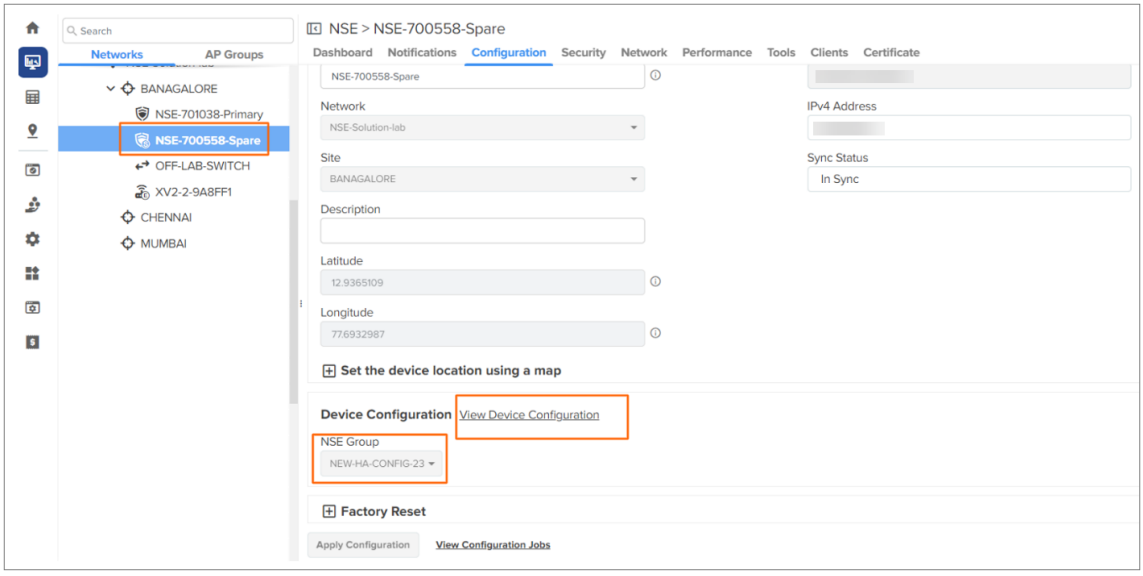
- HA state: **Enabled**
- HA Role: **Spare**
- HA status: **Backup**

7. On the **Dashboard** page of the *Spare* NSE 3000 device, complete the following steps:

   a. Click the **Configuration** tab.

      The **Configuration** page appears.

      Figure 12

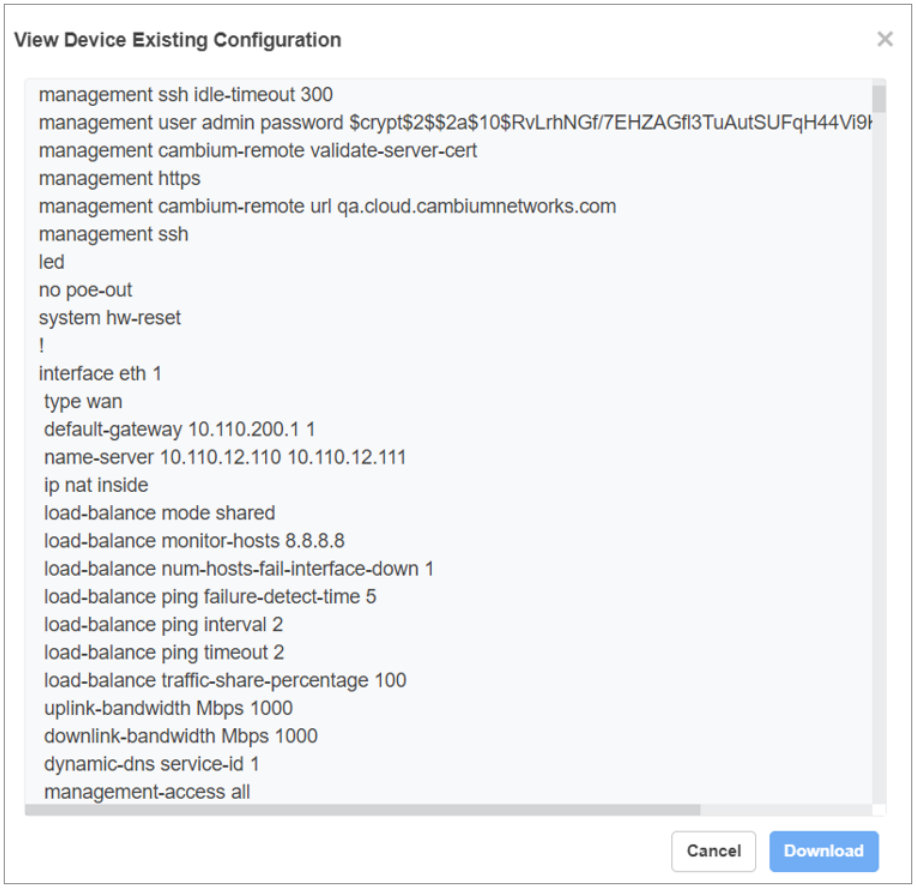


   b. Scroll down to the **Device Configuration** section.

c. Click **View Device Configuration** to verify that the same configuration is applied to the *Spare* device.

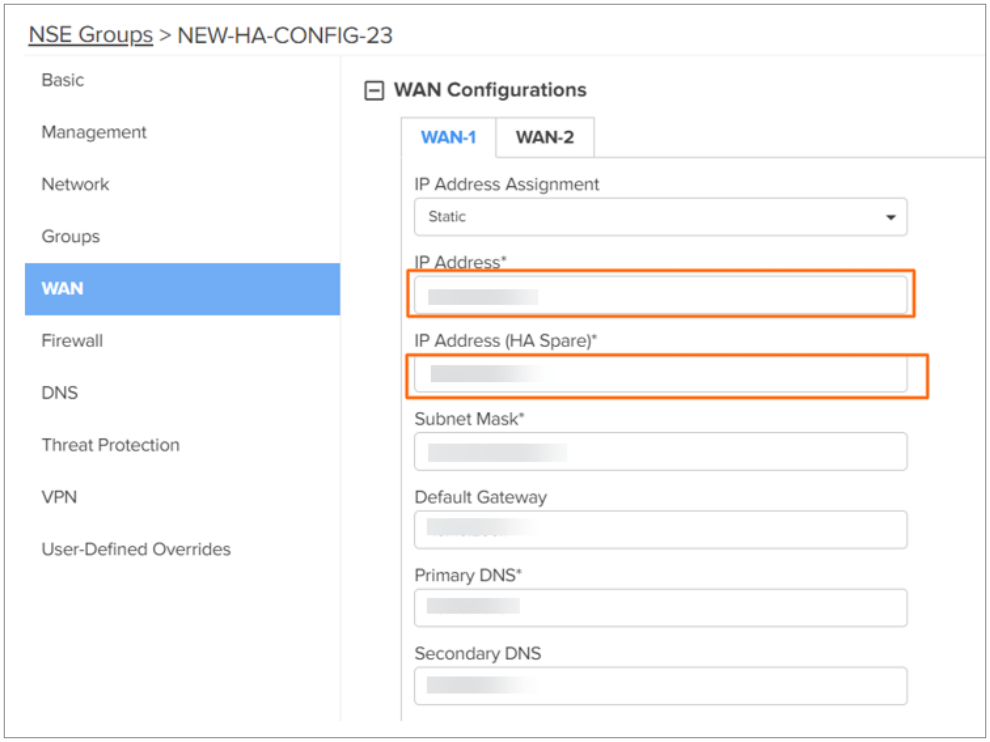
The **View Device Existing Configuration** page appears.

Figure 13



If the *Active* or *Spare* device needs to be assigned a static IP address on the WAN interface, you can configure it from the **WAN** page of the NSE group, as shown in Figure 14.

Figure 14



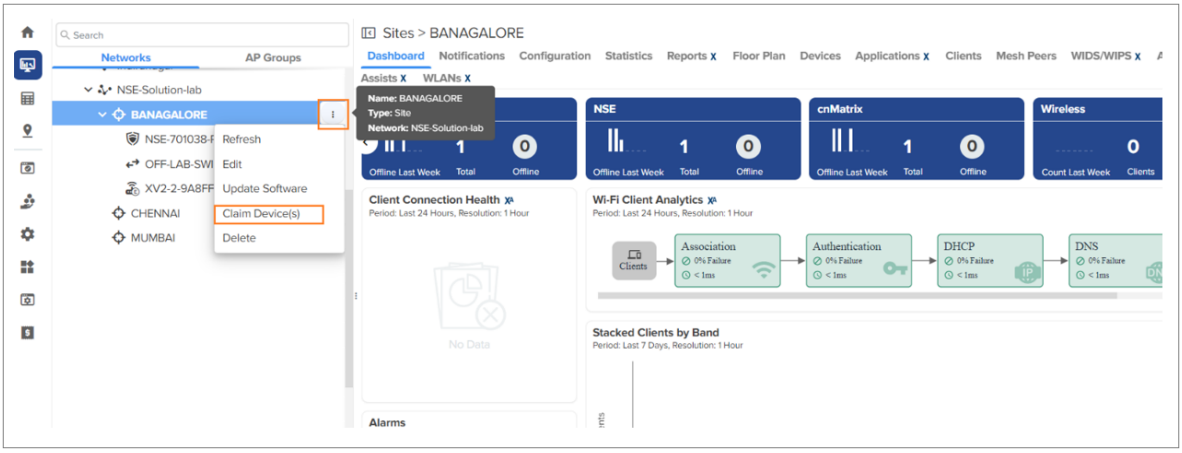
Onboarding the Spare device directly into the site

Using *cnMaestro*, you can establish an HA pair by onboarding the *Spare* device directly into the site as follows:

1. From the cnMaestro home page, click the **Monitor and Manage** ( ) icon.

   The **Networks** page appears.

   Figure 15

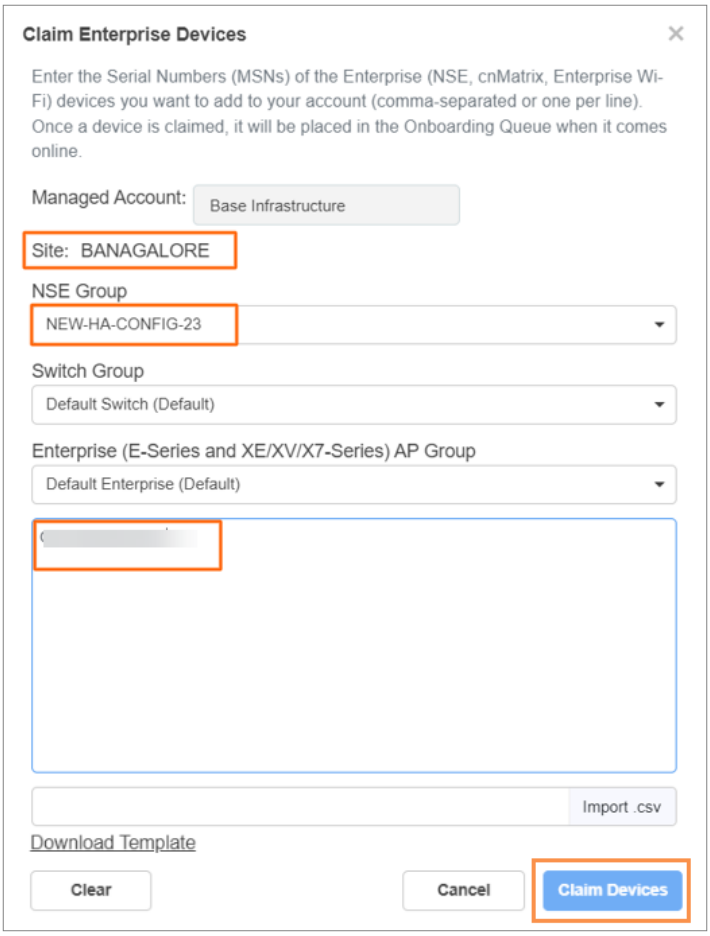


2. In the **Networks** section, expand the site panel.

3. Click the actions (⋮) icon and select **Claim Device(s)**.

   The **Claim Enterprise Devices** window appears.

   Figure 16



4. In the **Enter** field, enter the Manufacturer Serial Number (MSN) of the *Spare* NSE 3000 device.

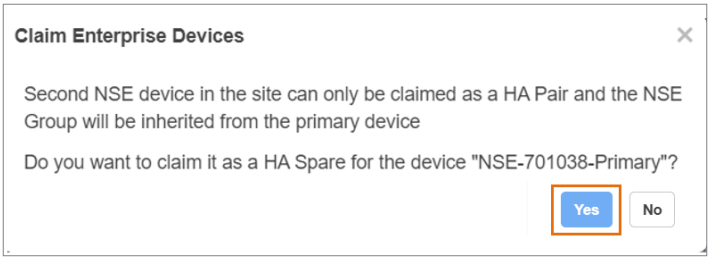
   Note

   - You can find the MSN on the bottom of the NSE 3000 device.
   - Ensure correct site name and NSE group name are selected. The NSE group attached to the *Primary* device must also be attached to the *Spare* device.

5. Click **Claim Devices**.

   The **Claim Enterprise Devices** window appears.

Figure 17



6. Click **Yes**.

After clicking **Yes**, wait for the *Spare* device to successfully form an HA pair with the *Active* NSE 3000 device. If the firmware version on the *Spare* device differs from that of the *Active* device, a firmware upgrade will be automatically initiated on the *Spare* device.

Once the HA pair is successfully formed, the *Spare* will appear in the system tree under the site.

The following figures show the HA statistics on the *Primary* and *Spare* devices, respectively:

Figure 18

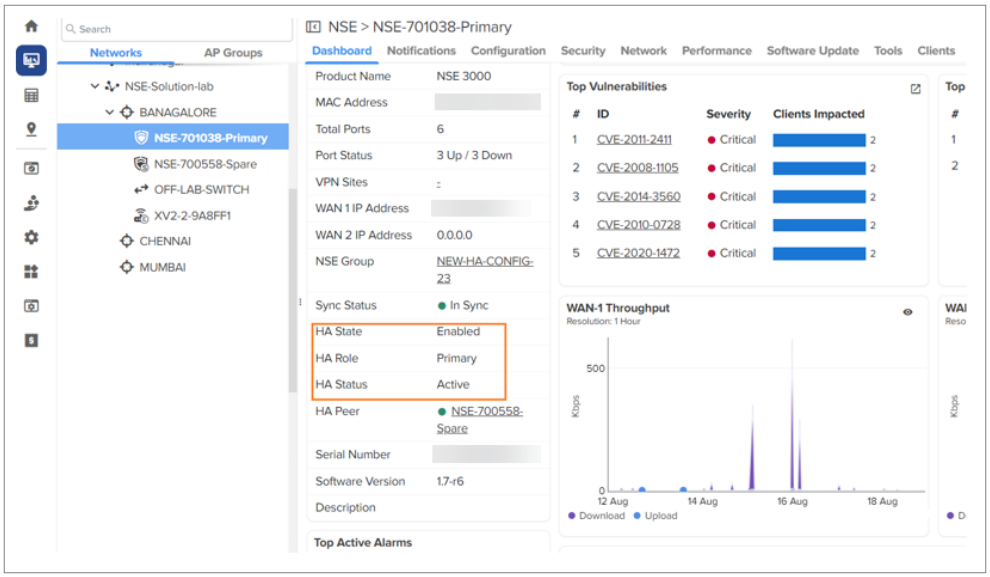
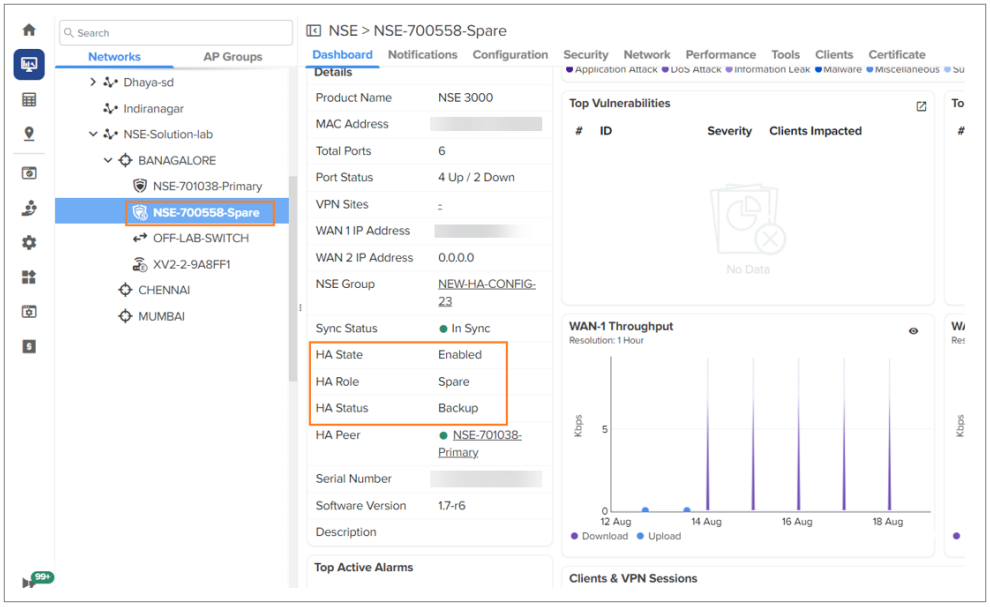


Figure 19



Removing a device from the HA pair

To remove a device from the HA pair, perform the following steps:

1. Factory reset the device.
2. Delete the device from the system tree.

State synchronization between Active and Spare devices

To ensure seamless failover, the *Primary* device in an HA pair synchronizes state information with the *Spare* device.

- After the HA pair is formed, the *Primary* device synchronizes DHCP leases with the *Spare* device. This ensures that no new IP addresses are issued to clients during an HA failover when the *Spare* device transitions to the *Primary* role.
- Similarly, the *Primary* device synchronizes WireGuard keys with the *Spare* device to prevent WireGuard client disconnections during an HA failover.

Firmware upgrade

In an HA setup, the *Primary* device synchronizes firmware upgrades with the *Spare* device.

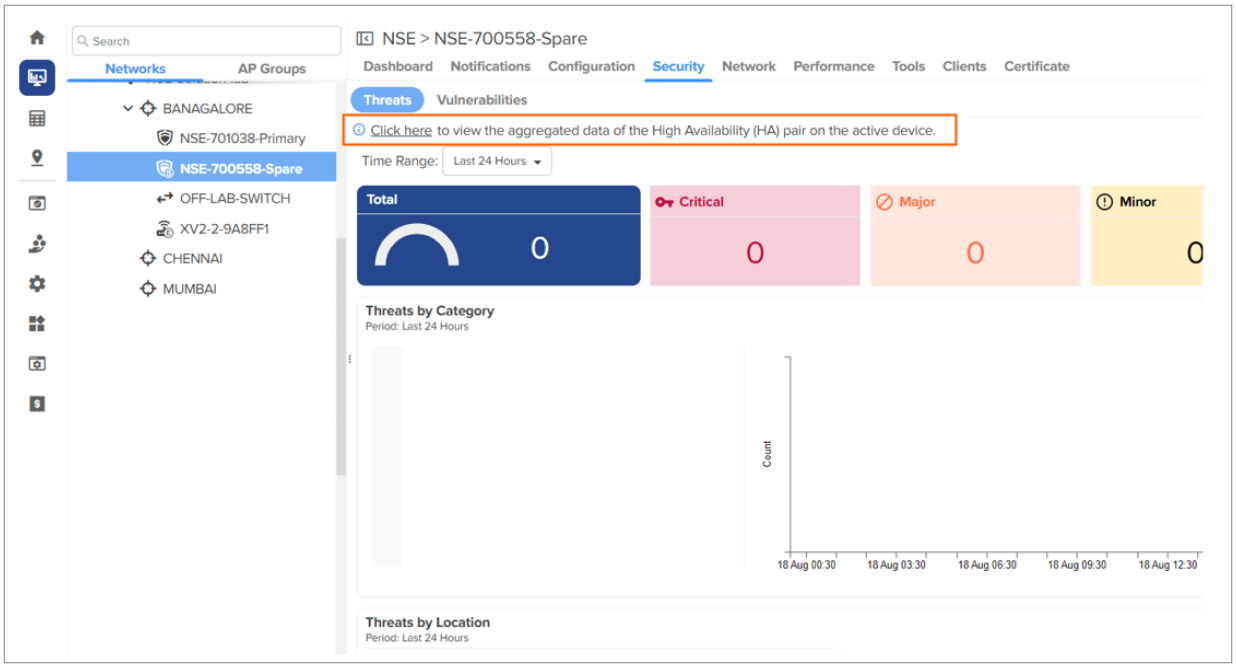
- The firmware on the *Primary* device triggers an automatic upgrade on the *Spare* device. The firmware on the *Primary* device automatically triggers an upgrade on the *Spare* device.
- While forming an HA pair, if the firmware version on the *Spare* device does not match that of the *Primary*, an upgrade is automatically triggered on the *Spare* device to align both devices to the same version.

Monitoring statistics

When both the *Active* and *Spare* devices are part of an HA pair, the *Primary* device displays monitoring statistics for clients, network security, and WAN. If an HA failover occurs, the *Spare* device transitions to the *Primary* role and takes over displaying the statistics. Once the original *Primary* device recovers, it resumes displaying the statistics.

In the *Spare* device, a banner (as shown in Figure 20) provides a link to the *Active* device's page to display the aggregated data.

Figure 20



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