SonicOS 7 NSv

NSv Getting Started Guide

for ESXi

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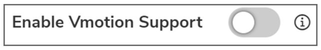
Introducing the NSv Series

This SonicWall® SonicOS 7 NSv Getting Started Guide describes how to install SonicWall NSv and provides basic configuration information.

The SonicWall® NSv is SonicWall's virtualized next-generation firewall appliance that provides Deep Packet Inspection (DPI) security and segmentation in virtual environments. With some platform specific differences, SonicOS 7 running on the NSv offers the same feature functionality and security features of a physical appliance, with comparable performance. SonicOS Virtual is a fully featured 64-bit SonicOS 7 powered by SonicCore.

ⓘ **NOTE:** NSv10/25/50/100/200/300/400/800/1600 instances running on 6.5.4.4-44v-21-1288 image supports vMotion by default.

ⓘ **NOTE:** NSv270/470/870 instances does not support Vmotion by default and need to enable the vMotion option. Diagram to enable Vmotion on these instances is present in diagram page and can be accessed using URL: https://<MGMT IP of NSv>/sonicui/7/m/mgmt/settings/diag. Image shows the option that needs to be enabled for vMotion to work on NSv:



Enable Vmotion Support ○ ⓘ

SonicWall® NSv series firewalls support both ***Classic*** mode and ***Policy*** mode. Selection of or changing between ***Classic*** and ***Policy*** modes is supported on NSv series from SonicOS 7.0.1 pnwards. For more information on supported or unsupported feature list refer to the Feature Support Information section and changing between ***Classic*** and ***Policy*** modes is supported on NSv series refer to the *About SonicOS 7 for the TZ, NSa, NSv, and NSsp Series Features Specific to NSv* guide in https://www.sonicwall.com/support/technical-documentation.

Topics:

Feature Support Information

The Feature Support List table shows key SonicOS features and whether or not they are supported or unsupported in deployments of the NSv. The SonicWall NSv has nearly all the features and functionality of a SonicWall NSa hardware virtual machine running SonicOS 7 firmware.

For more information about supported features, refer to the SonicOS 7 NSv administration guide. This and other documents for the SonicWall NSv are available by selecting **NSv** as the **Product** at: https://www.sonicwall.com/support/technical-documentation.

The Feature Support List of NSv table shows the key SonicOS 7 features.

FEATURE SUPPORT LIST

Functional Category	Feature Area	Feature
Unified Security Policy	**Unified Policy combining Layer 4 to Layer 3 Rules**	Source/Destination IP/Port/Service
		Application based Control
		CFS/Web Filtering
		Botnet
		Geo-IP/country
		Single Pass Security
		Services enforcement

Functional Category	Feature Area	Feature
		Decryption Policy
		DoS Policy
		EndPoint Security Policy
		Rule Diagram
	Profile Based Objects	
		Endpoint Security
		Bandwidth Management
		QoS Marking
		Content Filter
		Intrusion Prevention
		DHCP Option
		AWS VPN
	Action Profiles	
		Security Profile
		DoS Profile
	Signature Objects	
		AntiVirus Signature Object
		AntiSpyware Signature Object
	Rule Management	
		Cloning
		Shadow rule analysis
		In-cell editing
		Group editing
		Export of Rules
		LiveCounters
	Managing Views	
		Used/unused rules
		Active/inactive rules
		Sections
		Customizable Grid/Layout
		Custom Grouping
TLS 1.3	**Supporting TLS 1.3 with enhanced security**	
SDWAN	**SDWAN Scalability**	

Functional Category	Feature Area	Feature
	SDWAN Usability Wizard	
API	**API Driven Management**	
	Full API Support	
Dashboard	**Enhanced Home Page**	
		Actionable Dashboard
		Enhanced Device View
		Top Traffic and User summary
		Insights to threats
		Policy/Object Overview
		Profiles and Signatures Overview
		Zero-Day Attack Origin Analysis
	Notification Center	
Debugging	**Enhanced Packet Monitoring**	
	UI based System Logs Download	
	SSH Terminal on UI	
	System Diagnostic Utility Tools	
	Policy Lookup	
Capture Threat Assessment (CTA 2.0)	**Executive Template**	
	Customizable Logo/Name/Company	
	Industry and Global Average Statistics	
	Risky File Analysis	
	Risky Application Summary	
	Malware Analysis	
	Glimpse of Threats	
Monitoring	**Risky Application Summary**	
	Enhanced AppFlow Monitoring	
Management	**CSC Simple Reporting**	
	ZeroTouch Registration and Provisioning	

Functional Category	Feature Area	Feature
General	**SonicCoreX and SonicOS Containerization**	
	Data Encryption using AES-256	
	Enhanced Online Help	

Node Counts Per Platform

The supported node count varies by NSv platform. This is the maximum number of nodes/users that can connect to the NSv at any one time, and is displayed on the **System Status** page. The Maximum Node Counts Per Platform table shows this information.

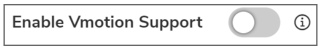
MAXIMUM NODE COUNTS PER PLATFORM

Platform	Maximum Node Count
NSv 270	unlimited
NSv 470	unlimited
NSv 870	unlimited

Installation File / Supported Platforms

Release Version	Supported Hypervisor Versions
SonicOS 7 for NSv	ESXi 6.7 and 7.0 or higher [1]

ⓘ **NOTE:** NSv 10/25/50/100/200/300/400/800/1600 instances running on 6.5.4.4-44v-21-1288 image supports vMotion by default.

ⓘ **NOTE:** NSv270/470/870 instances does not support Vmotion by default and need to enable the vMotion option. Diagram to enable Vmotion on these instances is present in diagram page and can be accessed using URL: https://<MGMT IP of NSv>/sonicui/7/m/mgmt/settings/diag. Image shows the option that needs to be enabled for vMotion to work on NSv: 

[1] ESXi 6.5 or higher is recommended for production environments. The ESXi vSwitch configuration should have the **MAC address changes** option enabled.

Hardware Compatibility

SonicWall NSv is supported on ESXi running on relatively modern chipsets, Intel Penryn and higher (2008). If the chipset is too old, the installation halts with the message; “This system does not support SSE4_1.” For more information, see https://kb.vmware.com/s/article/1005764.

Support for SR-IOV

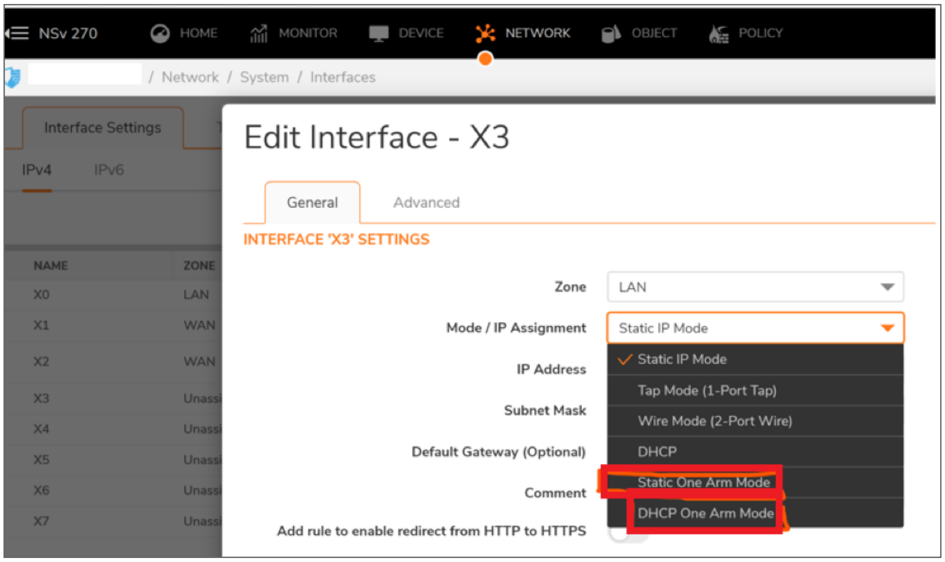
SonicWall NSv instances on VMware ESXi and on Linux KVM support Single-Root Input/Output Virtualization (SR-IOV). This feature allows a single PCI Express bus resource such as an SSD or NIC to be shared in a virtual environment. For details on configuration, see Configuring SR-IOV.

Support for vMotion

SonicWall NSv instances on VMware ESXi and on Linux KVM support vMotion. VMware vMotion enables the live migration of a running SonicWall NSv from one physical server to another with zero downtime, continuous service availability, and complete transaction integrity. It also provides transparency to users. VMotion is a key enabling technology for creating the dynamic, automated, and self- optimizing data center.

Support for One-Arm Mode

By default, SonicOS assumes at least two interfaces, x0 for LAN and x1 for WAN in deployment. This might be true for hardware platforms. It is not the case any more for cloud platforms. SonicWall NSv instances on VMware ESXi support One-arm mode. One-arm mode allows NSv to also work when only one interface is present in the system. When there is one interface in NSv, by default, this is X0 on LAN, one-arm mode allows all traffic to come/go from X0.



Edit Interface - X3

INTERFACE 'X3' SETTINGS

Zone: LAN

Mode / IP Assignment: Static IP Mode

IP Address

Subnet Mask

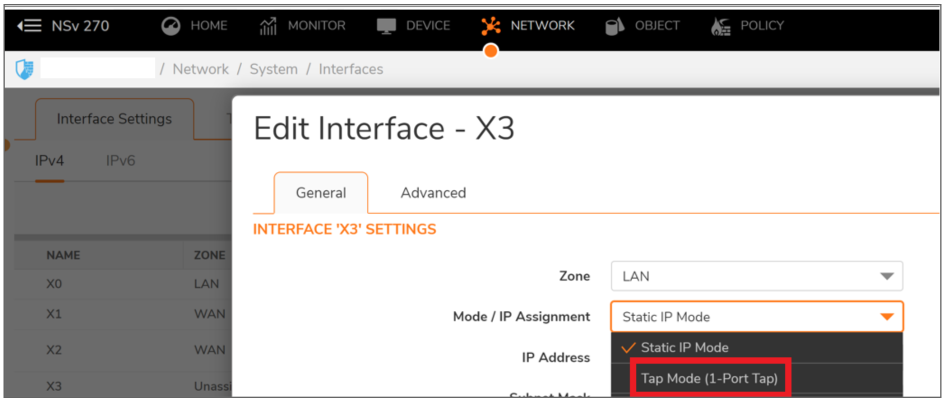
Default Gateway (Optional)

Comment

Add rule to enable redirect from HTTP to HTTPS

Support for Tap Mode

SonicWall NSv instances on VMware ESXi support Tap mode, which provides new method non-disruptive, incremental insertion into the network. Tap mode injects a mirrored packet stream via a single switch port on the firewall, eliminating the need for physically intermediate insertion. Tap mode can operate on multiple concurrent port instances, supporting discrete streams from multiple taps.



Edit Interface - X3

INTERFACE 'X3' SETTINGS

Zone: LAN

Mode / IP Assignment: Static IP Mode

IP Address

Product Matrix and Requirements

The following table shows the hardware resource requirements for the SonicWall NSv virtual machines.

Product Models	NSv 270	NSv 470	NSv 870
Maximum Cores[1]	2	4	8

Product Models	NSv 270	NSv 470	NSv 870
Minimum Total Cores	2	4	8
Management Cores	1	1	1
Maximum Data Plane Cores	1	3	7
Network Interfaces	8	8	8
Supported IP/Nodes	Unlimited	Unlimited	Unlimited
Minimum Memory Required [2]	4G	8G	10G
Minimum Hard Disk/Storage	50G	50G	50G

On NSv deployments with Jumbo Frame support enabled, the Minimum Memory requirements are higher. This increases TCP performance. See the Memory Requirements on NSv with Jumbo Frames Enabled vs Disabled table that follows.

MEMORY REQUIREMENTS ON NSV WITH JUMBO FRAMES ENABLED VS DISABLED

NSv Model	Minimum Memory – Jumbo Frames Enabled	Minimum Memory – Jumbo Frames Disabled
NSv 270	6G	4G
NSv 470	10G	8G
NSv 870	14G	10G

[1] If the actual number of cores allocated exceeds the number of cores defined in the previous table, extra cores are used as CPs.

[2] Memory requirements are higher with Jumbo Frames enabled. See the Memory Requirements on NSv with Jumbo Frames Enabled vs Disabled table.

Backup and Recovery Information

In certain situations, it might be necessary to contact SonicWall for help as directed in SonicWall Support, or visit SonicWall, use SafeMode, or deregister the NSv virtual machine:

- If the splash screen remains displayed, this can indicate that the disk is corrupted. Contact SonicWall Technical Support for assistance.
- If the disk is not recoverable, then the NSv virtual machine needs to be deregistered with MySonicWall. Contact technical support for more information.
- If SonicOS does not boot up, you can go into SafeMode and download the log files, upload a new SonicOS image, or take other actions. For more information about SafeMode, see Using SafeMode on the NSv.
- If SonicOS fails three times during the boot process, it boots into SafeMode. Verify that the minimum required memory is available and allocated based on the NSv model. If it still cannot boot up, download the logs while in SafeMode and contact SonicWall Technical Support for assistance.

Moving configuration settings from SonicWall physical appliances to the NSv is not supported. However, configuration settings can be moved from one NSv to another. Contact SonicWall Technical Support for assistance.

Best Practices and Recommendations

- Configuration settings import is ***not*** supported from the SonicWall physical appliances to the NSv Series.
- SonicWall NSv supports the vmxnet3 VMware Network Adapter Type. Exactly eight virtual network interfaces (vNICs) are supported on each NSv platform. Adding and removing interfaces is supported, but the total must stay within the range of two to eight.
- To configure Virtual Interfaces in NSv, map the NSv parent interface for the virtual interface to a port group with the VLAN ID 4095 (Trunk Port). NSv treats a port group with VLAN 4095 as a Trunk Port.
- SonicWall recommends that you do not use the NSv snapshot functionality. For more information, see https://kb.vmware.com/s/article/1025279.

High Availability Configurations

NSv virtual machines deployed on NSv can be configured as high availability Active/Standby pairs to eliminate a single point of failure and provide higher reliability. Two identical NSv instances are configured so that when the primary fails, the secondary takes over to maintain communications between the Internet and the protected network. These redundant NSv instances could share the same license when registered on MySonicWall as associated products. For details, refer to the technical publications portal.

Additional licensing allows configuration of an Active/Standby pair to handle a Stateful fail-over in which the Standby NSv takes over without having to initialize network connections and VPNs. However, dynamic ARP entries and common virtual MACs are not currently supported. For more details, refer to the technical publications portal.

Exporting and Importing Firewall Configurations

Moving configuration settings from SonicWall physical appliances to the NSv is not supported. However, configuration settings can be moved from one SonicOS 7 NSv to another or from an NSv running SonicOS 6.5.4.4 to an NSv running SonicOS 7.0.1 or higher (but not SonicOSX).

Go to https://www.sonicwall.com/support/technical-documentation/ for more information about exporting and importing configuration settings. Search for **SonicOS 7 updates and upgrades**.

Upgrading from SonicOS 6.5

SonicOS 7 NSv supports only fresh deployments. You can register NSv as SonicOS (Classic mode) or SonicOSX (Policy mode). If running SonicOS, you can import settings from a 6.5.4.4 NSv. If the NSv is registered as SonicOSX, you cannot import settings and must manually navigate policies, application rules, and content filtering rules for SonicOS 7 NSv installations. Note that there are console, API, and SonicOS web approaches to completing these configurations.

ⓘ **NOTE:** Upgrading to SonicOS 7 from SonicOS 6.5.4 requires a Secure Upgrade Path key that must be purchased separately. You can choose from any of the following:

- SONICWALL NSV 270 SECURE UPGRADE VIRTUAL APPLIANCE ONLY NO ATTACHED SUBSCRIPTION (EXISTING SONICWALL CUSTOMERS ONLY)
- SONICWALL NSV 470 SECURE UPGRADE VIRTUAL APPLIANCE ONLY NO ATTACHED SUBSCRIPTION (EXISTING SONICWALL CUSTOMERS ONLY)
- SONICWALL NSV 870 SECURE UPGRADE VIRTUAL APPLIANCE ONLY NO ATTACHED SUBSCRIPTION (EXISTING SONICWALL CUSTOMERS ONLY)
- SONICWALL NSV 270 SECURE UPGRADE PLUS ESSENTIAL EDITION (2YR, 3YR, or 5YR)
- SONICWALL NSV 470 SECURE UPGRADE PLUS ESSENTIAL EDITION (2YR, 3YR, or 5YR)
- SONICWALL NSV 870 SECURE UPGRADE PLUS ESSENTIAL EDITION (2YR, 3YR, or 5YR)

To upgrade an existing SonicOS 6.5.4.v NSv deployment to SonicOS 7.0.1 or higher:

1. Purchase a Secure Upgrade license key.
2. Log into MySonicWall and register the Secure Upgrade serial number. Enter a descriptive "friendly" name in the available field, shown here as "SecureUpgrade1."
3. Click **Choose management options**.
4. In the **Secure Upgrade** popup window, select **Register Only** at the top.
5. Select the Trade-In Unit from the list of registered NSv instances. This is the SonicOS 6.5.4.v NSv instance to be upgraded to SonicOS 7.
6. Click **Done** after selecting the Trade-In Unit. The Secure Upgrade serial number is then registered to your MySonicWall account.
7. The action item Secure Upgrade Transfer is added to the To do list at the bottom of the page.

   You can perform the service transfer ***after*** you have deployed the SonicOS 7 NSv instance and moved the configuration settings ("prefs") from the SonicOS 6.5.4.v NSv to the new SonicOS 7 NSv.

   The service transfer moves all active services from the SonicOS 6.5.4.v NSv to the new SonicOS 7 NSv and then deregisters the SonicOS 6.5.4.v NSv.

   ⓘ **NOTE:** If you do not perform the service transfer within 60 days, the transfer is performed automatically.
8. Deploy a new SonicOS 7 NSv instance with the desired model and platform.
9. Register the SonicOS 7 NSv using the **Secure Upgrade** serial number. When prompted to select either Classic mode or Policy mode, select Classic mode. Classic mode supports configuration settings

imported from a SonicOS 6.5.4.v NSv.

Registration initiates a 60-day countdown at the end of which the SonicOS 6.5.4.v NSv is deregistered, completing the Secure Upgrade Transfer.

10. Log into the SonicOS 6.5.4.v NSv and export the configuration settings to a file on your management computer.
11. Using the migration tool (https://migratetool.global.sonicwall.com/), migrate the SonicOS 6 NSv preferences to SonicOS 7 NSv model.
12. Log into SonicOS 7 NSv and import the configuration settings file.

    The upgrade is now complete and the SonicOS 7 NSv is ready for use.

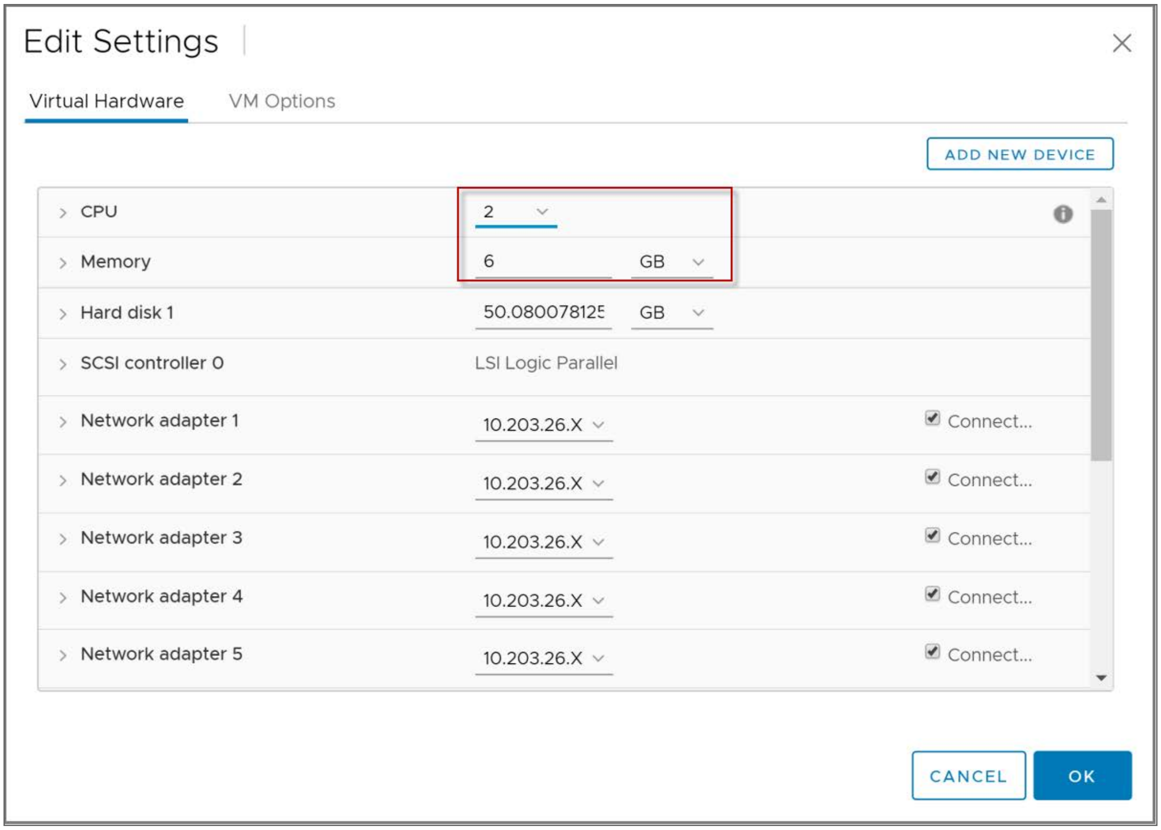
Upgrading to a Higher Capacity NSv Model

It is possible to move up to a higher capacity NSv model, but not down to a lower capacity model. Refer to the knowledgebase article: https://www.sonicwall.com/support/knowledge-base/how-do-i-upgrade-from-one-nsv-model-to-another/190503165228828/

For additional details, go to https://www.sonicwall.com/support/technical-documentation/ and search for **SonicOS 7 updates and upgrades**.

For details on the number of process and memory to allocate to the virtual machine to upgrade, refer to Product Matrix and Requirements.

To update the virtual machine for processor and memory allocations, power-down the virtual machine then right-click on the virtual machine and select **Edit Settings**. The processor and memory settings then appear:



CPU 2

Memory 6 GB

Hard disk 1 50.080078125 GB

SCSI controller 0 LSI Logic Parallel

Network adapter 1 10.203.26.X ☑ Connect...

Network adapter 2 10.203.26.X ☑ Connect...

Network adapter 3 10.203.26.X ☑ Connect...

Network adapter 4 10.203.26.X ☑ Connect...

Network adapter 5 10.203.26.X ☑ Connect...

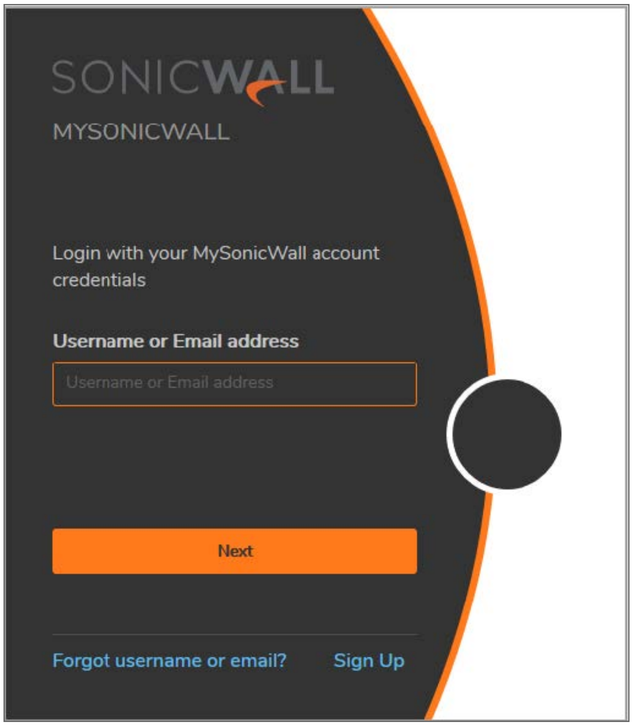
Creating a MySonicWall Account

A MySonicWall account is required to obtain the OVA file for initial installation of the NSv virtual machine, for product registration to enable full functionality of SonicOS features, and for access to licensed security services. For a High Availability configuration, MySonicWall provides a way to associate a secondary NSv that can share security service licenses with your primary virtual machine.

MySonicWall registration information is not sold or shared with any other company.

To create a MySonicWall account:

1. In your web browser, navigate to https://www.mysonicwall.com.
2. In the login screen, click the **Sign Up** link.



Login with your MySonicWall account credentials

Username or Email address

3. Complete the account information, including email and password.
4. Enable two-factor authentication if desired.
5. If you enabled two-factor authentication, select one of the following authentication methods:
    - **Email (one-time passcode)** where an email with a one-time passcode is sent each time you log into your MySonicWall account.
    - **Microsoft/Google Authentication App** where you use a Microsoft or Google authenticator application to scan the code provided. If you are unable to scan the code, you can click on a link for a secret code. After the code is scanned, you need only click a button.
6. Click **Continue** to go to the **COMPANY** page.
7. Complete the company information and click **Continue**.
8. On the **YOUR INFO** page, select whether you want to receive security renewal emails.
9. Identify whether you are interested in beta testing of new products.
10. Click **Continue** to go to the **EXTRAS** page.
11. Select whether you want to add additional contacts to be notified for contract renewals.
12. If you opted for additional contacts, input the information and click **Add Contact**.
13. Click **Finish**.
14. Check your email for a verification code and enter it in the **Verification Code** field. If you did not receive a code, contact Customer Support by clicking on the link.

15. Click **Done**. You are returned to the login window so you can login into MySonicWall with your new account.

2

Installing SonicOS on the NSv Series

Topics:

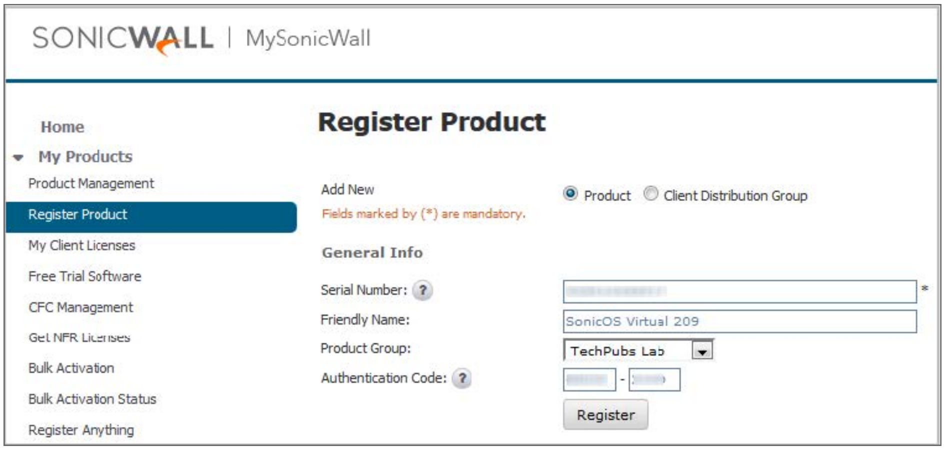
Obtaining the OVA from MySonicWall

Refer to the purchase confirmation email for more information about downloading the OVA files.

If you do not have a MySonicWall account, see Creating a MySonicWall Account for more information about creating one.

To perform initial registration and obtain the OVA file for deployment:

1. In a browser, log into your MySonicWall account.
2. Navigate to **My Products > Register Product**.
3. Fill in the **Serial Number**, **Friendly Name**, **Product Group**, and **Authentication Code** fields, and then click **Register**.



Register Product

Add New ● Product ○ Client Distribution Group

Fields marked by (*) are mandatory.

General Info

Serial Number: [redacted] *

Friendly Name: SonicOS Virtual 209

Product Group: TechPubs Lab

Authentication Code: [redacted] - [redacted]

4. The **Registration Code** is displayed. Make a note of it.

   You are now given access to the OVA file for your NSv model.

5. Download the OVA file and save it to your management computer.

You are now ready to deploy the OVA on your ESXi server. See Installing SonicOS on the NSv Series for more information.

After your NSv installation is complete, boot up SonicOS and log in. See Managing SonicOS on the NSv Series for more information.

After you have connected and have internet access from the NSv, you must register your NSv Series instance using the Registration Code to complete the registration process. See Registering the NSv Appliance from SonicOS.

If your NSv is deployed in a closed network, see Licensing and Registering Your NSv.

Installing the NSv Virtual Machine

SonicWall NSv Series is installed by deploying an OVA file to your ESXi server. Each OVA file contains the software components needed. Deploy the OVA file by using the vSphere or vCenter client, which are available with ESXi.

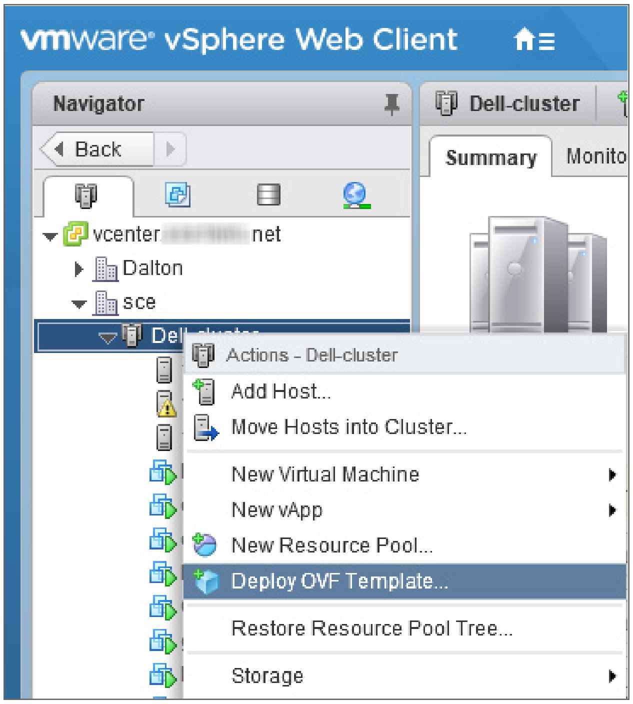
> ⓘ **NOTE:** The elements of VMware must already be in place and the administrator must be familiar with the basics of deploying a virtual machine on the ESXi server.

> ⓘ **TIP:** Step 14 has some important information about selecting your networks. Even if you do not need all these step-by-step instructions, be sure to follow the instructions in Step 14 to avoid connectivity issues after the deployment.

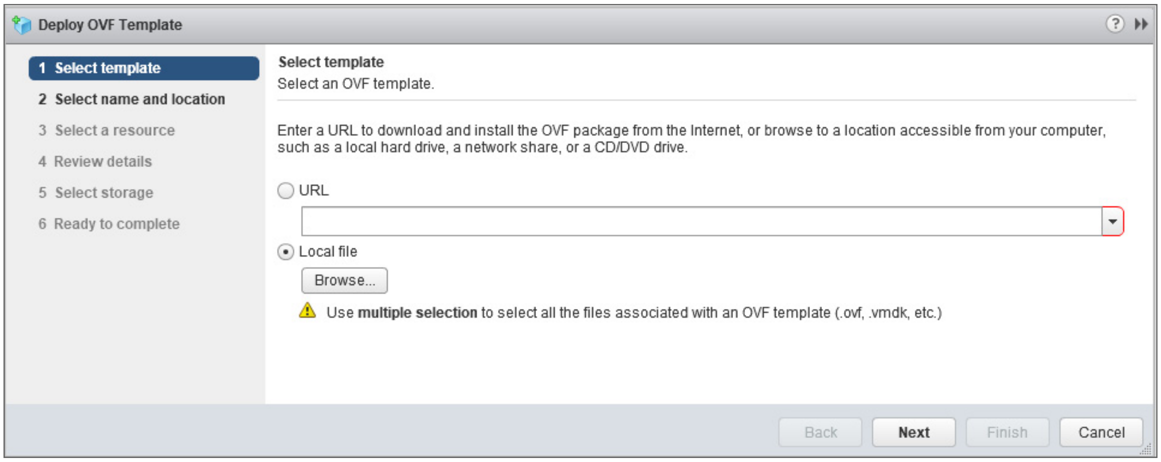
To perform a fresh installation on the NSv Series:

1. Download the NSv Series OVA file from MySonicWall to a computer with vSphere / vCenter access.
2. Access vSphere or vCenter and log on to your ESXi server.

3. Navigate to the location where you want to install the virtual machine, and select the folder.
4. To begin the import process, click **Actions** and select **Deploy OVF Template**.



5. In the **Select template** screen, select **Local file**:
   - **Local file** – Click **Browse** and navigate to the NSv Series OVA file that you previously downloaded.



Select template

Select an OVF template.

Enter a URL to download and install the OVF package from the Internet, or browse to a location accessible from your computer, such as a local hard drive, a network share, or a CD/DVD drive.

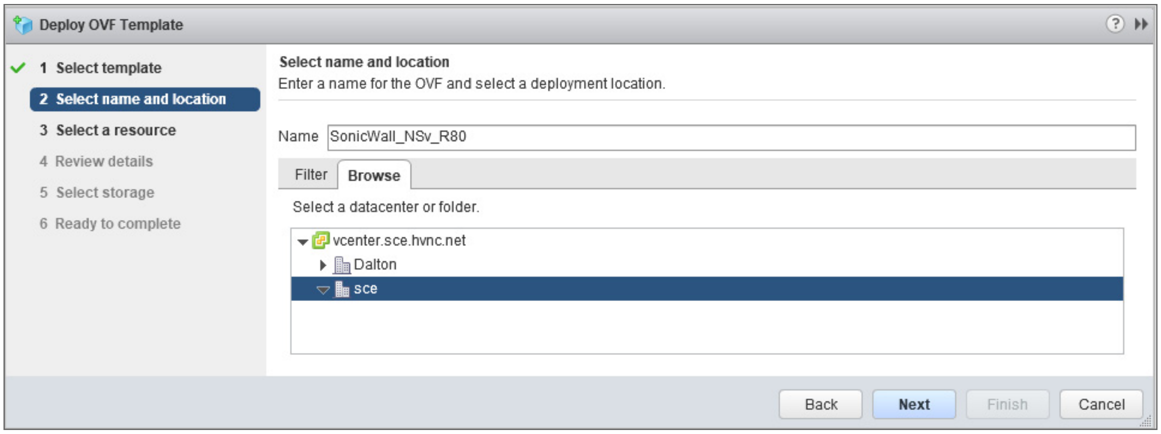
○ URL

● Local file

Browse...

⚠ Use **multiple selection** to select all the files associated with an OVF template (.ovf, .vmdk, etc.)

6. Click **Next**.
7. In the **Select name and location** screen, type a descriptive name for the NSv virtual machine into the **Name** field, and then select the location for it from the ESXi folder structure.



Deploy OVF Template

✓ 1 Select template
2 Select name and location
3 Select a resource
4 Review details
5 Select storage
6 Ready to complete

Select name and location
Enter a name for the OVF and select a deployment location.

Name: SonicWall_NSv_R80

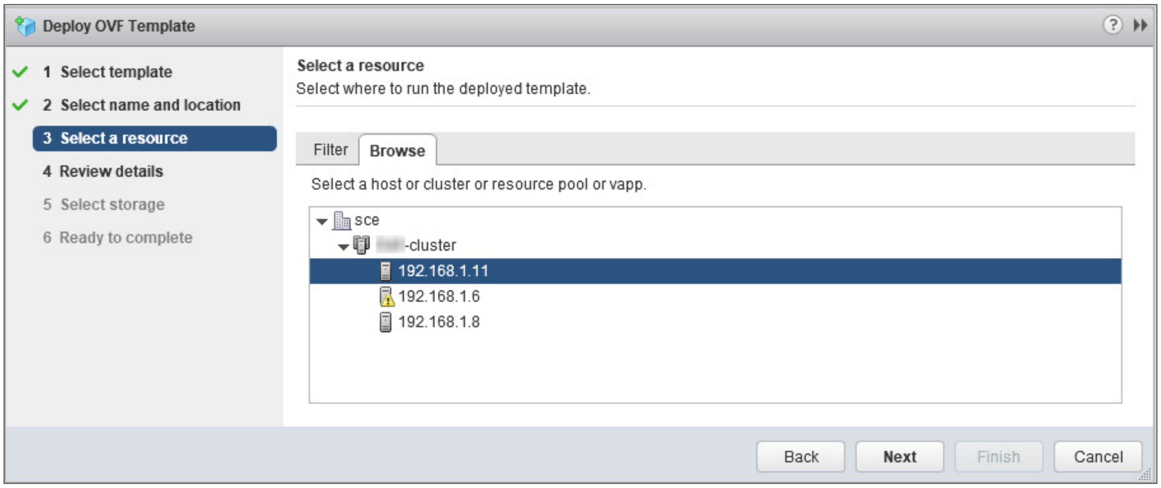
Filter | **Browse**

Select a datacenter or folder.

- vcenter.sce.hvnc.net
  - Dalton
  - sce

Back | **Next** | Finish | Cancel

8. Click **Next**.
9. In the **Select a resource** screen, click **Next** to accept the default resource for the selected folder, or select a different resource and then click **Next**. Wait while the resource is validated. This is the resource pool where you want to deploy the template.



Deploy OVF Template

✓ 1 Select template
✓ 2 Select name and location
3 Select a resource
4 Review details
5 Select storage
6 Ready to complete

Select a resource
Select where to run the deployed template.

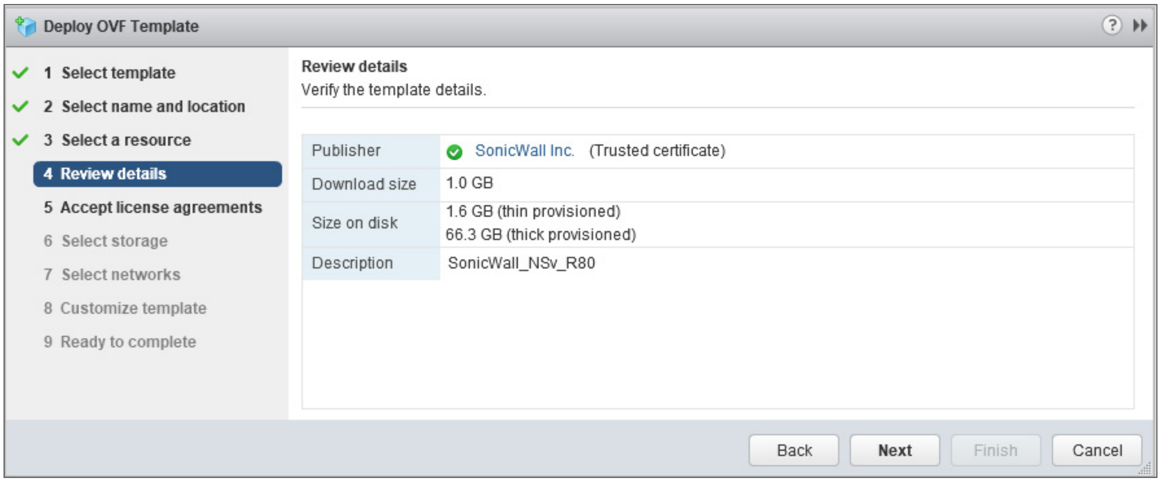
Filter | **Browse**

Select a host or cluster or resource pool or vapp.

- sce
  - [redacted]-cluster
    - 192.168.1.11
    - 192.168.1.6
    - 192.168.1.8

Back | **Next** | Finish | Cancel

10. In the **Review details** screen, verify the template details and then click **Next**.

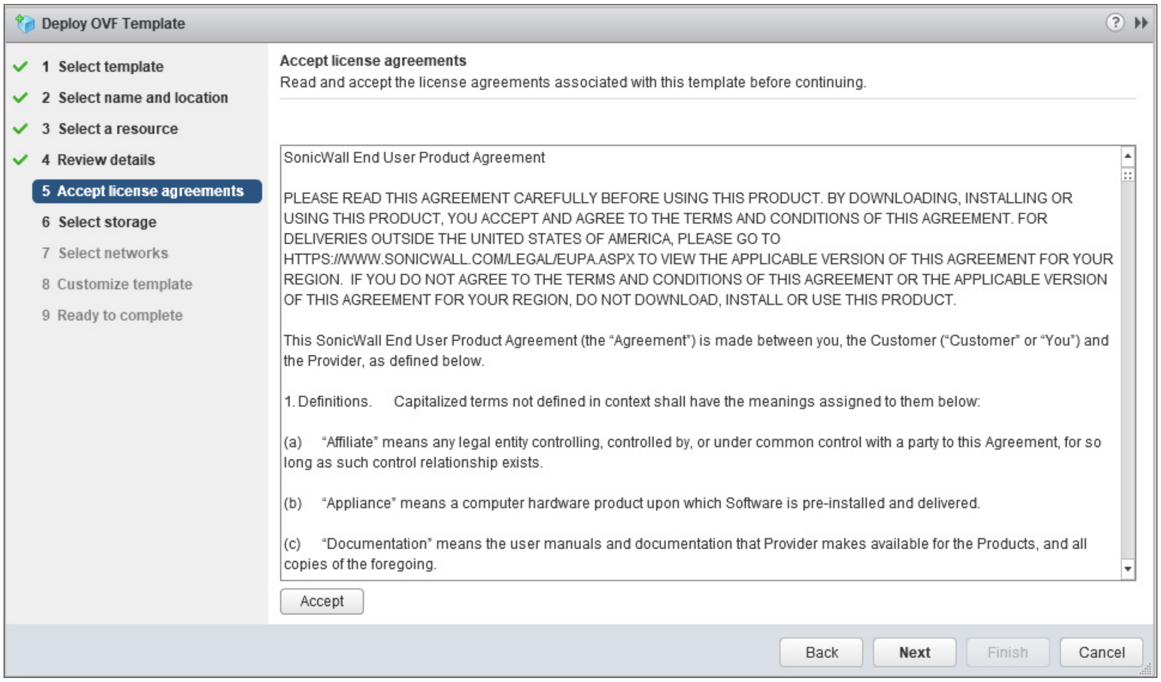


Review details

Verify the template details.

Publisher	✓ SonicWall Inc. (Trusted certificate)
Download size	1.0 GB
Size on disk	1.6 GB (thin provisioned) 66.3 GB (thick provisioned)
Description	SonicWall_NSv_R80

11. In the **Accept license agreements** screen, read the agreement, click **Accept** and then click **Next.**



Accept license agreements

Read and accept the license agreements associated with this template before continuing.

SonicWall End User Product Agreement

PLEASE READ THIS AGREEMENT CAREFULLY BEFORE USING THIS PRODUCT. BY DOWNLOADING, INSTALLING OR USING THIS PRODUCT, YOU ACCEPT AND AGREE TO THE TERMS AND CONDITIONS OF THIS AGREEMENT. FOR DELIVERIES OUTSIDE THE UNITED STATES OF AMERICA, PLEASE GO TO HTTPS://WWW.SONICWALL.COM/LEGAL/EUPA.ASPX TO VIEW THE APPLICABLE VERSION OF THIS AGREEMENT FOR YOUR REGION. IF YOU DO NOT AGREE TO THE TERMS AND CONDITIONS OF THIS AGREEMENT OR THE APPLICABLE VERSION OF THIS AGREEMENT FOR YOUR REGION, DO NOT DOWNLOAD, INSTALL OR USE THIS PRODUCT.

This SonicWall End User Product Agreement (the "Agreement") is made between you, the Customer ("Customer" or "You") and the Provider, as defined below.

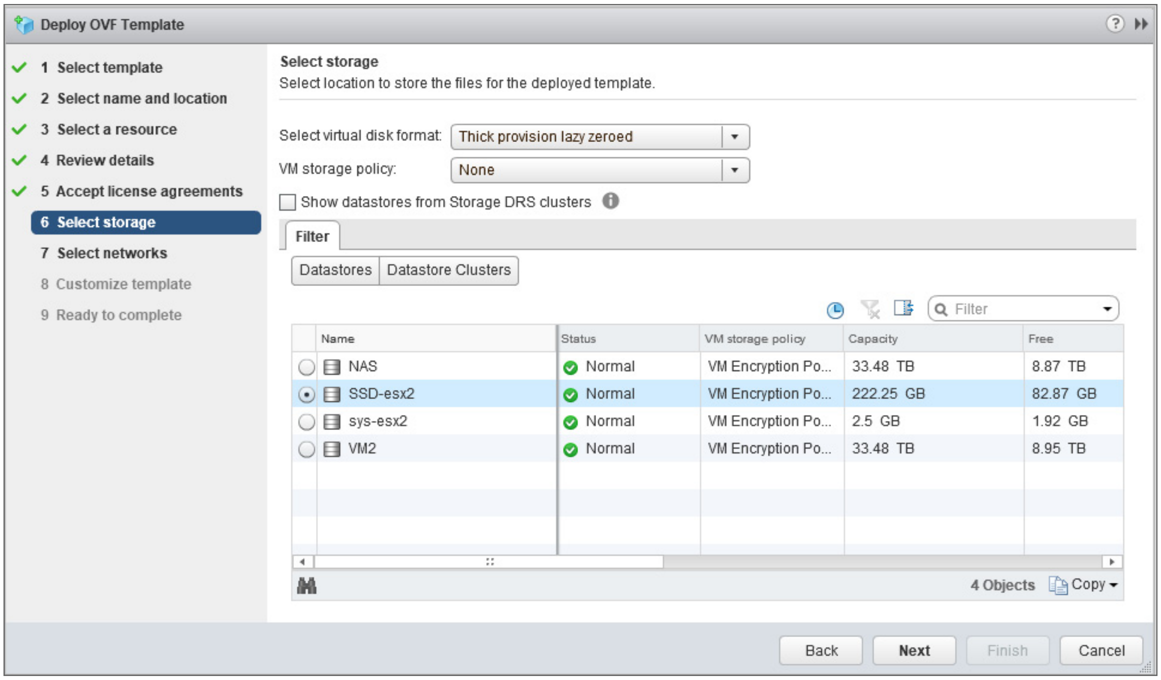
1. Definitions. Capitalized terms not defined in context shall have the meanings assigned to them below:

(a) "Affiliate" means any legal entity controlling, controlled by, or under common control with a party to this Agreement, for so long as such control relationship exists.

(b) "Appliance" means a computer hardware product upon which Software is pre-installed and delivered.

(c) "Documentation" means the user manuals and documentation that Provider makes available for the Products, and all copies of the foregoing.

12. In the **Select storage** screen, first select a datastore from the table. This is the location where you want to store the virtual machine files.



Deploy OVF Template

✓ 1 Select template
✓ 2 Select name and location
✓ 3 Select a resource
✓ 4 Review details
✓ 5 Accept license agreements
6 Select storage
7 Select networks
8 Customize template
9 Ready to complete

Select storage
Select location to store the files for the deployed template.

Select virtual disk format: Thick provision lazy zeroed
VM storage policy: None
□ Show datastores from Storage DRS clusters

Filter

Datastores | Datastore Clusters

	Name	Status	VM storage policy	Capacity	Free
○	NAS	✓ Normal	VM Encryption Po...	33.48 TB	8.87 TB
●	SSD-esx2	✓ Normal	VM Encryption Po...	222.25 GB	82.87 GB
○	sys-esx2	✓ Normal	VM Encryption Po...	2.5 GB	1.92 GB
○	VM2	✓ Normal	VM Encryption Po...	33.48 TB	8.95 TB

4 Objects

13. Leave the default settings for the datastore provisioning and click **Next**. The default is **Thick Provision Lazy Zeroed**.

14. In the **Select networks** screen, ***first sort the list of interfaces*** by clicking the **Source Network** column heading. Then select the vSwitch networks that are mapped to the NSv virtual machine interfaces. The source networks are the NSv virtual machine interfaces (X0, X1, X2, X3, X4, X5, X6, X7), and the destination networks are the vSwitch ports of your existing vSwitch network configuration. If your vSwitch networks are not fully configured, you can further adjust the interface/vSwitch port pairs after the import.

    ⓘ | **NOTE:** The ESXi vSwitch configuration should have the option for **MAC address changes** enabled for the vSwitch ports connected to the NSv.

    For advanced configurations (DVS), consult the ESXi documentation on vSwitch configuration.

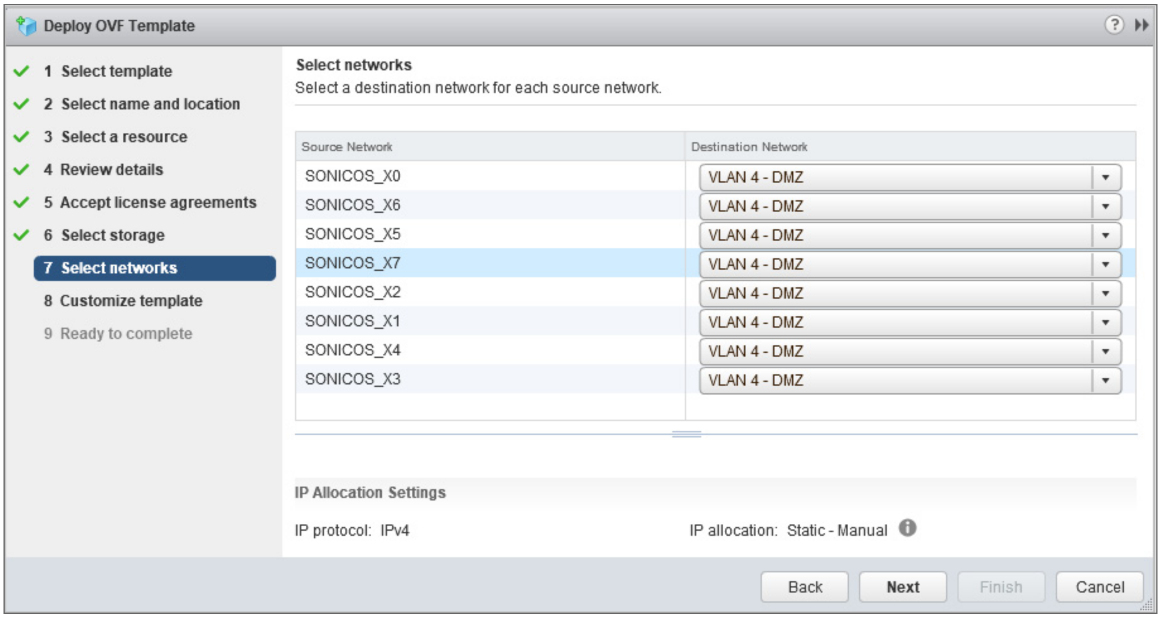
    Typically, the NSv Series is deployed between your internal network and a network with internet access, and therefore you map the source **X0** to your LAN network (vSwitch port), and map the source **X1** to the WAN network (vSwitch port) with connectivity to the internet.

    ⓘ | **IMPORTANT: SONICOS_X1** (the default WAN Interface) is set to ***DHCP*** by default, with ***HTTPS management*** enabled for the NSv Series, as this configuration eases deployments in virtual/cloud environments.

    ⓘ | **NOTE:** System defaults for the X0 and X1 interfaces are:

    - X0 – Default LAN – `192.168.168.168`
    - X1 – Default WAN – DHCP addressing, with HTTPS and Ping management enabled

    ⓘ | **NOTE:** Configuration settings imported from physical firewalls to the NSv Series are not supported.



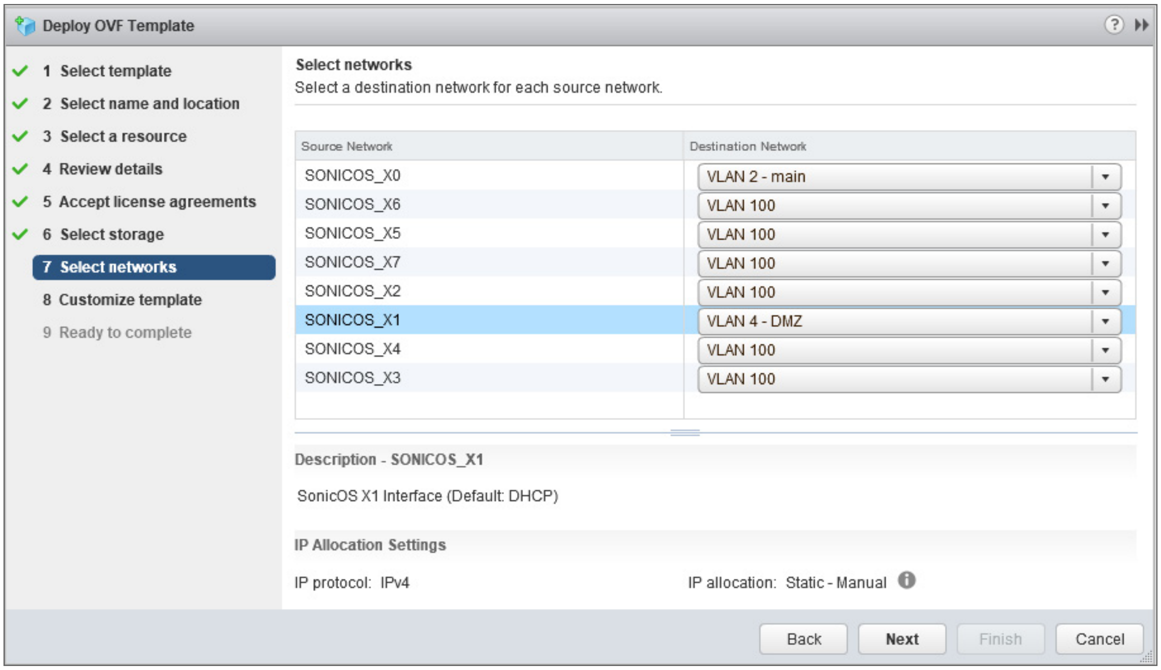
Select networks

Select a destination network for each source network.

Source Network	Destination Network
SONICOS_X0	VLAN 4 - DMZ
SONICOS_X6	VLAN 4 - DMZ
SONICOS_X5	VLAN 4 - DMZ
SONICOS_X7	VLAN 4 - DMZ
SONICOS_X2	VLAN 4 - DMZ
SONICOS_X1	VLAN 4 - DMZ
SONICOS_X4	VLAN 4 - DMZ
SONICOS_X3	VLAN 4 - DMZ

IP Allocation Settings

IP protocol: IPv4 IP allocation: Static - Manual



Select networks

Select a destination network for each source network.

Source Network	Destination Network
SONICOS_X0	VLAN 2 - main
SONICOS_X6	VLAN 100
SONICOS_X5	VLAN 100
SONICOS_X7	VLAN 100
SONICOS_X2	VLAN 100
SONICOS_X1	VLAN 4 - DMZ
SONICOS_X4	VLAN 100
SONICOS_X3	VLAN 100

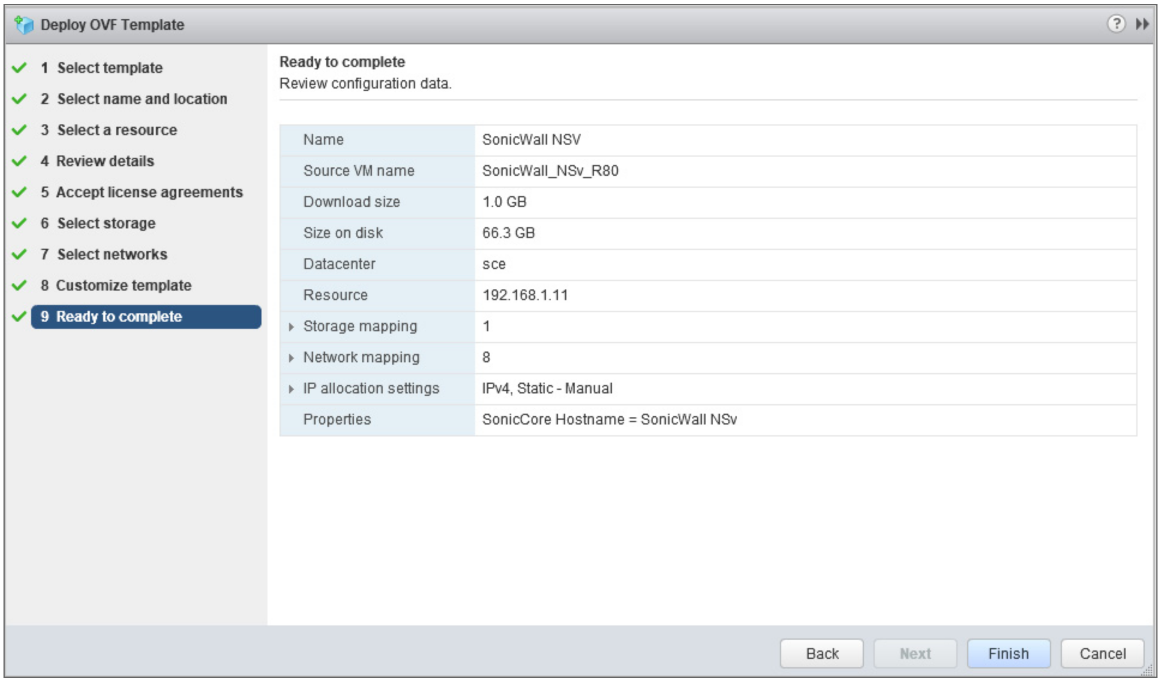
Description - SONICOS_X1

SonicOS X1 Interface (Default: DHCP)

IP Allocation Settings

IP protocol: IPv4 IP allocation: Static - Manual

15. Click **Next**.
16. In the **Ready to complete** screen, review the settings and click **Finish** to create the NSv virtual machine. To change a setting, click **Back** to navigate back through the screens to make a change.



- ✓ 1 Select template
- ✓ 2 Select name and location
- ✓ 3 Select a resource
- ✓ 4 Review details
- ✓ 5 Accept license agreements
- ✓ 6 Select storage
- ✓ 7 Select networks
- ✓ 8 Customize template
- ✓ 9 Ready to complete

Ready to complete
Review configuration data.

Name	SonicWall NSV
Source VM name	SonicWall_NSv_R80
Download size	1.0 GB
Size on disk	66.3 GB
Datacenter	sce
Resource	192.168.1.11
Storage mapping	1
Network mapping	8
IP allocation settings	IPv4, Static - Manual
Properties	SonicCore Hostname = SonicWall NSv

The name of the new NSv virtual machine appears in the left pane of the vSphere or vCenter window when complete.

The next step is to power on your NSv virtual machine in the vSphere or vCenter interface. See Viewing and Editing Virtual Machine Settings for more information about powering on your NSv and related topics.

After your NSv virtual machine is powered on, the next step is to register it on MySonicWall. See Registering the NSv Virtual Machine with SonicOS for more information about registering your NSv.

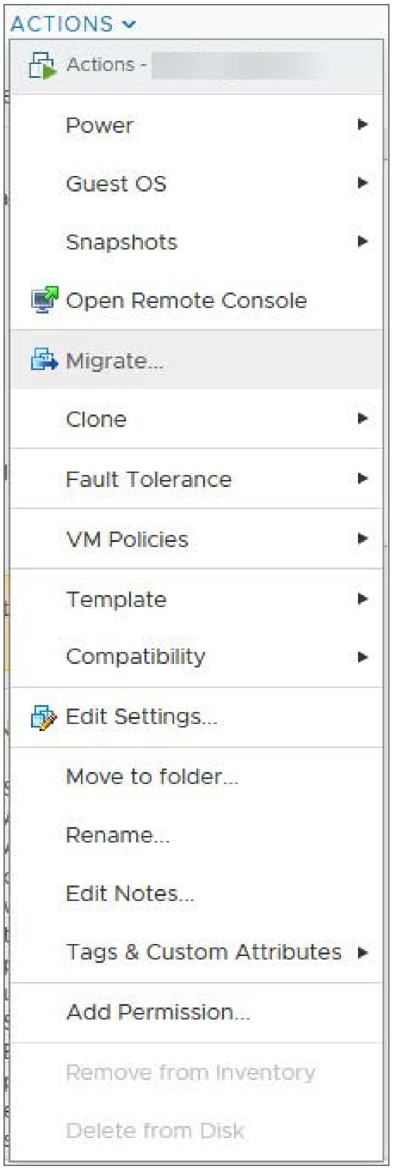
Other related topics are:

- Managing SonicOS on the NSv Series
- Using System Diagnostics
- Using the Virtual Console and SafeMode

Viewing and Editing Virtual Machine Settings

When logged into vSphere or vCenter, you can view and edit some basic information for your NSv Series instance.

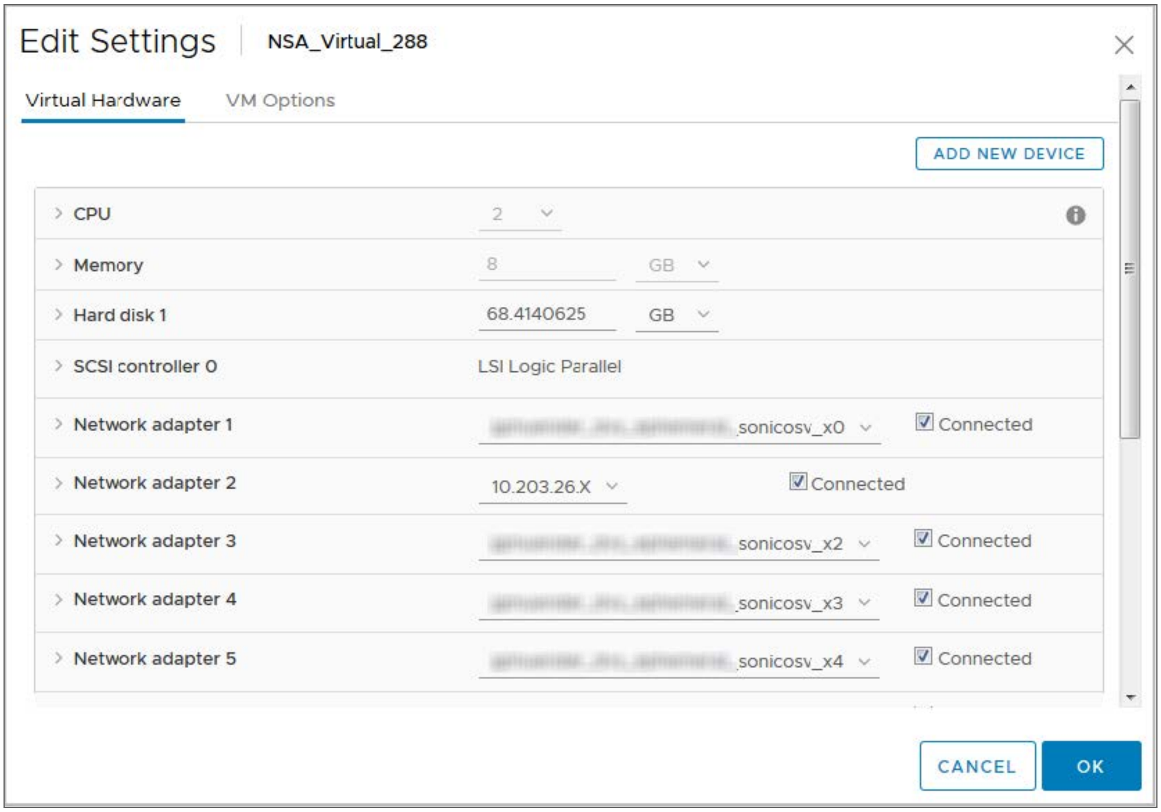
With your NSv Series instance selected in the left pane, click **ACTIONS** to view the options.



Select **Power** to choose from **Power On**, **Power Off**, **Shut Down Guest OS**, **Restart Guest OS**, and other options.

Select **Open Remote Console** to launch the same *ESXi Remote Console* that you get with the **Launch Remote Console** link on the **Summary** screen.

Select **Edit Settings** to open the Edit Settings dialog where you can access settings for the number of CPUs, Memory size, Hard disk size, Network adapters, and other items in the ESXi configuration for this NSv Series instance.



CPU	2	
Memory	8 GB	
Hard disk 1	68.4140625 GB	
SCSI controller 0	LSI Logic Parallel	
Network adapter 1	[redacted]_sonicosv_x0	☑ Connected
Network adapter 2	10.203.26.X	☑ Connected
Network adapter 3	[redacted]_sonicosv_x2	☑ Connected
Network adapter 4	[redacted]_sonicosv_x3	☑ Connected
Network adapter 5	[redacted]_sonicosv_x4	☑ Connected

The ESXi Network adapters are mapped to the NSv Series interfaces as follows:

NETWORK ADAPTERS TO NSV SERIES INTERFACES MAPPING

Network Adapter #	NSv Series Interface	Default IP	Default Zone
Network adapter 1	x0	`192.168.168.168`	LAN
Network adapter 2	x1	DHCP	WAN
Network adapter 3	x2	N/A	LAN
Network adapter 4	x3	N/A	LAN
Network adapter 5	x4	N/A	LAN
Network adapter 6	x5	N/A	LAN
Network adapter 7	x6	N/A	LAN
Network adapter 8	x7	N/A	LAN

Troubleshooting Installation Configuration

If the NSv fails to come up, follow the instruction in Using the Virtual Console and SafeMode to go to the NSv Management Console window or the SonicOS CLI window. Check the boot messages:

ⓘ | **NOTE:** The error messages that follow indicate that the virtual machine cannot boot.

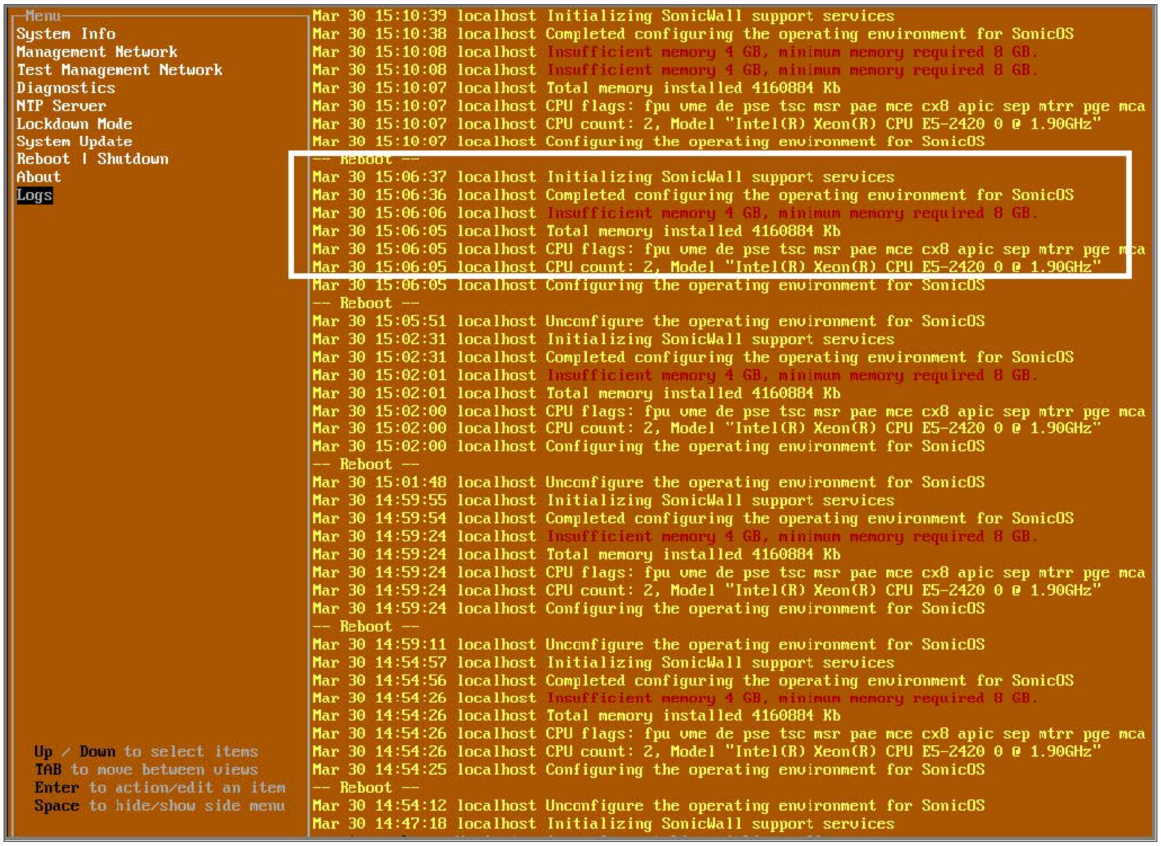
Insufficient Memory Assignment

The following messages appear when the virtual machine has insufficient memory. This might occur when doing an NSv installation or an NSv product upgrade.

SonicOS boot message:

```
Insufficient memory 4 GB, minimum memory required 10 GB for NSv model: “NSv 800 Beta” Power
off the Network Security virtual machine and assign 10 GB to this virtual machine.
```

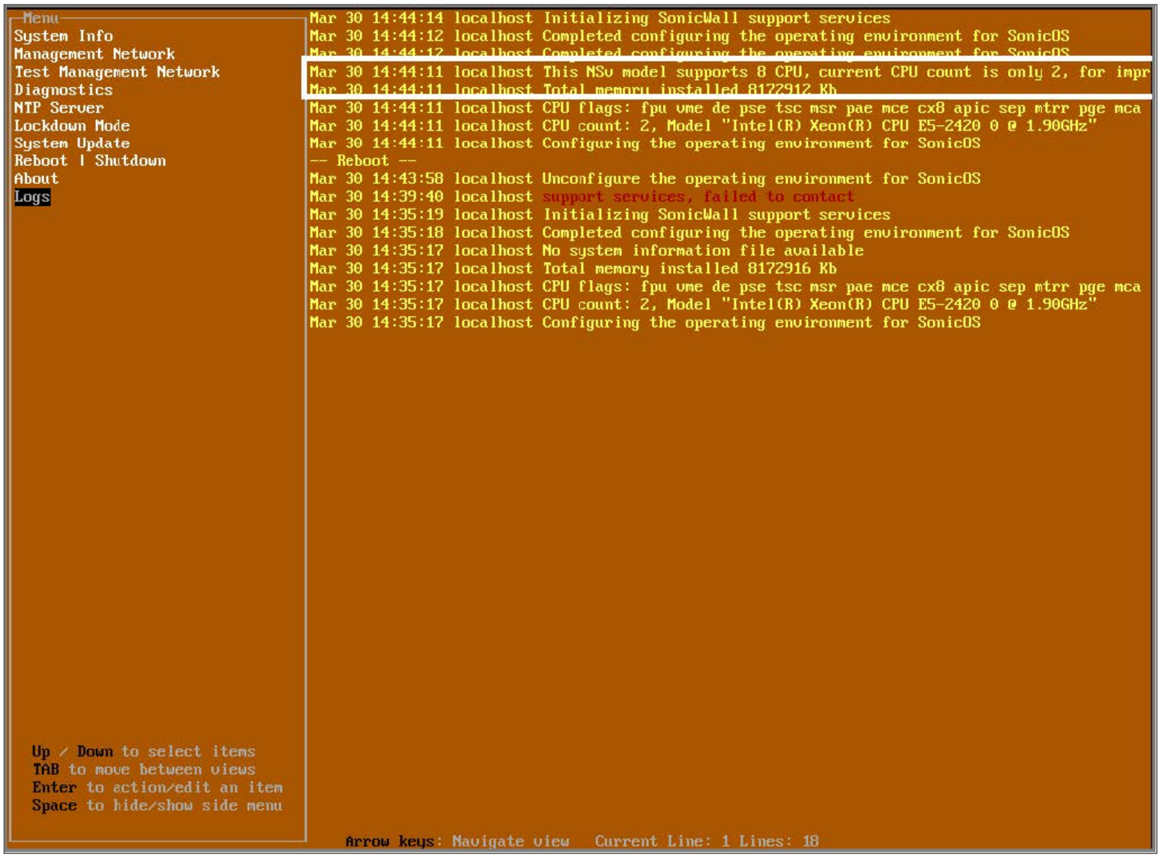
This message can also appear in the Management Console logs as shown in the following images.



```
Mar 30 15:10:39 localhost Initializing SonicWall support services
Mar 30 15:10:38 localhost Completed configuring the operating environment for SonicOS
Mar 30 15:10:08 localhost Insufficient memory 4 GB, minimum memory required 8 GB.
Mar 30 15:10:08 localhost Insufficient memory 4 GB, minimum memory required 8 GB.
Mar 30 15:10:07 localhost Total memory installed 4160884 Kb
Mar 30 15:10:07 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Mar 30 15:10:07 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz"
Mar 30 15:10:07 localhost Configuring the operating environment for SonicOS
-- Reboot --
Mar 30 15:06:37 localhost Initializing SonicWall support services
Mar 30 15:06:36 localhost Completed configuring the operating environment for SonicOS
Mar 30 15:06:06 localhost Insufficient memory 4 GB, minimum memory required 8 GB.
Mar 30 15:06:05 localhost Total memory installed 4160884 Kb
Mar 30 15:06:05 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Mar 30 15:06:05 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz"
Mar 30 15:06:05 localhost Configuring the operating environment for SonicOS
-- Reboot --
Mar 30 15:05:51 localhost Unconfigure the operating environment for SonicOS
Mar 30 15:02:31 localhost Initializing SonicWall support services
Mar 30 15:02:31 localhost Completed configuring the operating environment for SonicOS
Mar 30 15:02:01 localhost Insufficient memory 4 GB, minimum memory required 8 GB.
Mar 30 15:02:01 localhost Total memory installed 4160884 Kb
Mar 30 15:02:00 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Mar 30 15:02:00 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz"
Mar 30 15:02:00 localhost Configuring the operating environment for SonicOS
-- Reboot --
Mar 30 15:01:48 localhost Unconfigure the operating environment for SonicOS
Mar 30 14:59:55 localhost Initializing SonicWall support services
Mar 30 14:59:54 localhost Completed configuring the operating environment for SonicOS
Mar 30 14:59:24 localhost Insufficient memory 4 GB, minimum memory required 8 GB.
Mar 30 14:59:24 localhost Total memory installed 4160884 Kb
Mar 30 14:59:24 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Mar 30 14:59:24 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz"
Mar 30 14:59:24 localhost Configuring the operating environment for SonicOS
-- Reboot --
Mar 30 14:59:11 localhost Unconfigure the operating environment for SonicOS
Mar 30 14:54:57 localhost Initializing SonicWall support services
Mar 30 14:54:56 localhost Completed configuring the operating environment for SonicOS
Mar 30 14:54:26 localhost Insufficient memory 4 GB, minimum memory required 8 GB.
Mar 30 14:54:26 localhost Total memory installed 4160884 Kb
Mar 30 14:54:26 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Mar 30 14:54:26 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz"
Mar 30 14:54:25 localhost Configuring the operating environment for SonicOS
-- Reboot --
Mar 30 14:54:12 localhost Unconfigure the operating environment for SonicOS
Mar 30 14:47:18 localhost Initializing SonicWall support services
```

ⓘ **NOTE:** For details on navigating the NSv Management Console to troubleshoot the installation, see Configuring SR-IOV.

Memory might be insufficient without an insufficient memory log entry:


Menu
System Info
Management Network
Test Management Network
Diagnostics
NTP Server
Lockdown Mode
System Update
Reboot | Shutdown
About
Logs
Up / Down to select items
TAB to move between views
Enter to action/edit an item
Space to hide/show side menu
Arrow keys: Navigate view   Current Line: 1 Lines: 18

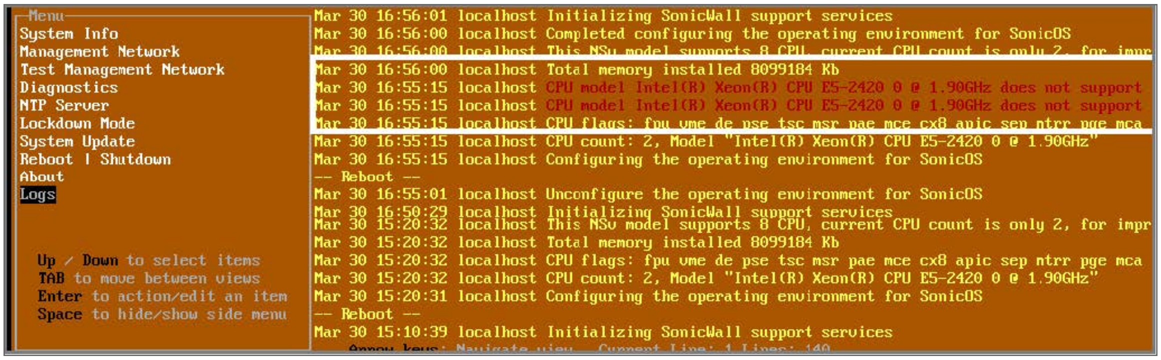
```
Mar 30 14:44:14 localhost Initializing SonicWall support services
Mar 30 14:44:12 localhost Completed configuring the operating environment for SonicOS
Mar 30 14:44:12 localhost Completed configuring the operating environment for SonicOS
Mar 30 14:44:11 localhost This NSv model supports 8 CPU, current CPU count is only 2, for impr
Mar 30 14:44:11 localhost Total memory installed 8172912 Kb
Mar 30 14:44:11 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Mar 30 14:44:11 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz"
Mar 30 14:44:11 localhost Configuring the operating environment for SonicOS
-- Reboot --
Mar 30 14:43:58 localhost Unconfigure the operating environment for SonicOS
Mar 30 14:39:40 localhost support services, failed to contact
Mar 30 14:35:19 localhost Initializing SonicWall support services
Mar 30 14:35:18 localhost Completed configuring the operating environment for SonicOS
Mar 30 14:35:17 localhost No system information file available
Mar 30 14:35:17 localhost Total memory installed 8172916 Kb
Mar 30 14:35:17 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Mar 30 14:35:17 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz"
Mar 30 14:35:17 localhost Configuring the operating environment for SonicOS
```

Incompatible CPU

If the CPU does not support AES instructions the following message appears:

```
CPU Model Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz is not supported by SonicWall Network
Security Virtual

CPU Model Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz does not support the Advanced
Encryption Standard(AES) instructions

Refer to Getting Started Guide and install the SonicWall Network Virtual on a supported
platform
```

The message can also be seen in the logs provided by the management console:



```
Mar 30 16:56:01 localhost Initializing SonicWall support services
Mar 30 16:56:00 localhost Completed configuring the operating environment for SonicOS
Mar 30 16:56:00 localhost This NSv model supports 8 CPU, current CPU count is only 2, for impr
Mar 30 16:56:00 localhost Total memory installed 8099184 Kb
Mar 30 16:55:15 localhost CPU model Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz does not support
Mar 30 16:55:15 localhost CPU model Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz does not support
Mar 30 16:55:15 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Mar 30 16:55:15 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz"
Mar 30 16:55:15 localhost Configuring the operating environment for SonicOS
-- Reboot --
Mar 30 16:55:01 localhost Unconfigure the operating environment for SonicOS
Mar 30 16:50:29 localhost Initializing SonicWall support services
Mar 30 15:20:32 localhost This NSv model supports 8 CPU, current CPU count is only 2, for impr
Mar 30 15:20:32 localhost Total memory installed 8099184 Kb
Mar 30 15:20:32 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Mar 30 15:20:32 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz"
Mar 30 15:20:31 localhost Configuring the operating environment for SonicOS
-- Reboot --
Mar 30 15:10:39 localhost Initializing SonicWall support services
    Arrow keys: Navigate view   Current Line: 1 Lines: 140
```

If the CPU does not support SSE 4.1 or 4.2 instructions, the following message appears:

```
CPU Model Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz is not supported by SonicWall Network
Security Virtual

CPU Model Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz does support SSE 4.1 or 4.2
instructions

Refer to Getting Started Guide and install the SonicWall Network Virtual on a supported
platform
```

Incorrect CPU Configuration

All cores must be on the same socket. Customer needs to change the CPU configuration in settings.

```
The SonicWall Network Security requires all virtual CPU to reside on a single socket. Power
down the virtual machine and adjust the CPU configuration such that all CPU reside on the
same socket.
```

ⓘ **NOTE:** This error might occur when EVC masks the CPU capability. https://communities.vmware.com/thread/536227 resolution is to disabled EVC.

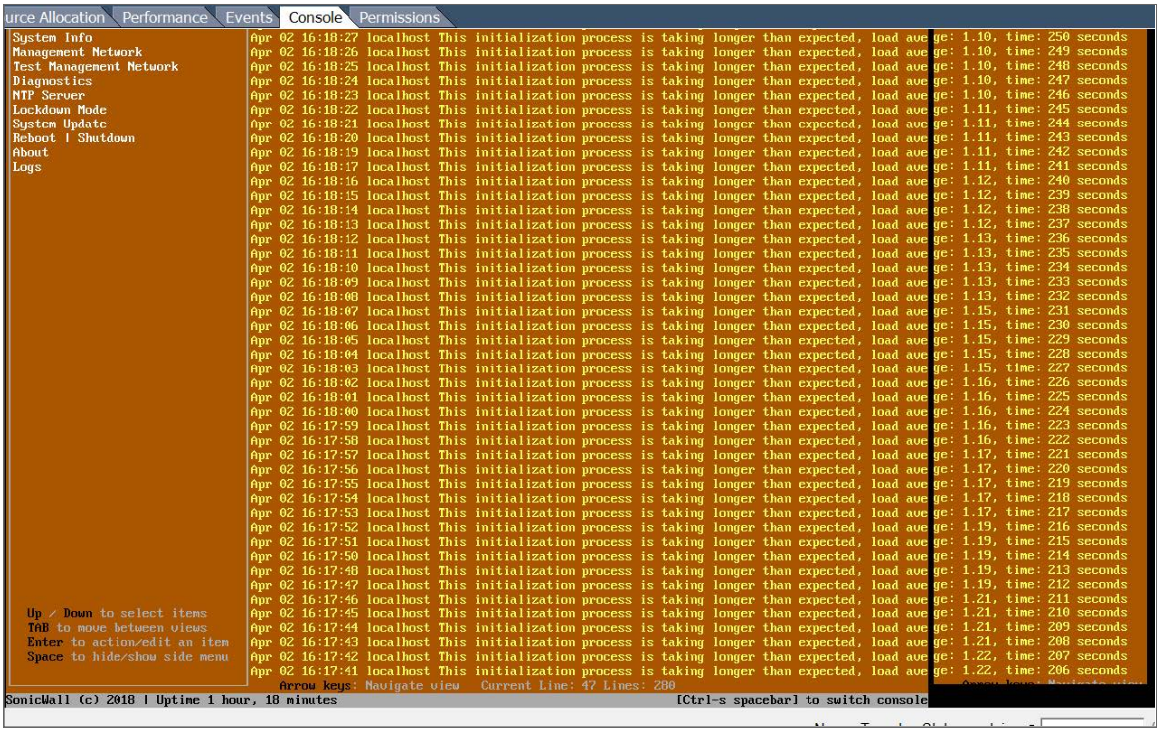
Insufficient Resources at Time of Configuration

If the infrastructure where the NSv is being installed has poor performance the following message might appear at time of installation:

```
*******************************************************************

Initializing services: IMPORTANT, DO NOT POWEROFF OR REBOOT

-- Warning --

This initialization is taking longer than expected.
```

```
Please ensure sufficient compute resources are available to the SonicWall Network
Security Virtual.

*****************************************************************
```

If this message occurs during initialization, more information is available in the logs:



```
Apr 02 16:18:27 localhost This initialization process is taking longer than expected, load ave ge: 1.10, time: 250 seconds
Apr 02 16:18:26 localhost This initialization process is taking longer than expected, load ave ge: 1.10, time: 249 seconds
Apr 02 16:18:25 localhost This initialization process is taking longer than expected, load ave ge: 1.10, time: 248 seconds
Apr 02 16:18:24 localhost This initialization process is taking longer than expected, load ave ge: 1.10, time: 247 seconds
Apr 02 16:18:23 localhost This initialization process is taking longer than expected, load ave ge: 1.10, time: 246 seconds
Apr 02 16:18:22 localhost This initialization process is taking longer than expected, load ave ge: 1.11, time: 245 seconds
Apr 02 16:18:21 localhost This initialization process is taking longer than expected, load ave ge: 1.11, time: 244 seconds
Apr 02 16:18:20 localhost This initialization process is taking longer than expected, load ave ge: 1.11, time: 243 seconds
Apr 02 16:18:19 localhost This initialization process is taking longer than expected, load ave ge: 1.11, time: 242 seconds
Apr 02 16:18:17 localhost This initialization process is taking longer than expected, load ave ge: 1.11, time: 241 seconds
Apr 02 16:18:16 localhost This initialization process is taking longer than expected, load ave ge: 1.12, time: 240 seconds
Apr 02 16:18:15 localhost This initialization process is taking longer than expected, load ave ge: 1.12, time: 239 seconds
Apr 02 16:18:14 localhost This initialization process is taking longer than expected, load ave ge: 1.12, time: 238 seconds
Apr 02 16:18:13 localhost This initialization process is taking longer than expected, load ave ge: 1.12, time: 237 seconds
Apr 02 16:18:12 localhost This initialization process is taking longer than expected, load ave ge: 1.13, time: 236 seconds
Apr 02 16:18:11 localhost This initialization process is taking longer than expected, load ave ge: 1.13, time: 235 seconds
Apr 02 16:18:10 localhost This initialization process is taking longer than expected, load ave ge: 1.13, time: 234 seconds
Apr 02 16:18:09 localhost This initialization process is taking longer than expected, load ave ge: 1.13, time: 233 seconds
Apr 02 16:18:08 localhost This initialization process is taking longer than expected, load ave ge: 1.13, time: 232 seconds
Apr 02 16:18:07 localhost This initialization process is taking longer than expected, load ave ge: 1.15, time: 231 seconds
Apr 02 16:18:06 localhost This initialization process is taking longer than expected, load ave ge: 1.15, time: 230 seconds
Apr 02 16:18:05 localhost This initialization process is taking longer than expected, load ave ge: 1.15, time: 229 seconds
Apr 02 16:18:04 localhost This initialization process is taking longer than expected, load ave ge: 1.15, time: 228 seconds
Apr 02 16:18:03 localhost This initialization process is taking longer than expected, load ave ge: 1.15, time: 227 seconds
Apr 02 16:18:02 localhost This initialization process is taking longer than expected, load ave ge: 1.16, time: 226 seconds
Apr 02 16:18:01 localhost This initialization process is taking longer than expected, load ave ge: 1.16, time: 225 seconds
Apr 02 16:18:00 localhost This initialization process is taking longer than expected, load ave ge: 1.16, time: 224 seconds
Apr 02 16:17:59 localhost This initialization process is taking longer than expected, load ave ge: 1.16, time: 223 seconds
Apr 02 16:17:58 localhost This initialization process is taking longer than expected, load ave ge: 1.16, time: 222 seconds
Apr 02 16:17:57 localhost This initialization process is taking longer than expected, load ave ge: 1.17, time: 221 seconds
Apr 02 16:17:56 localhost This initialization process is taking longer than expected, load ave ge: 1.17, time: 220 seconds
Apr 02 16:17:55 localhost This initialization process is taking longer than expected, load ave ge: 1.17, time: 219 seconds
Apr 02 16:17:54 localhost This initialization process is taking longer than expected, load ave ge: 1.17, time: 218 seconds
Apr 02 16:17:53 localhost This initialization process is taking longer than expected, load ave ge: 1.17, time: 217 seconds
Apr 02 16:17:52 localhost This initialization process is taking longer than expected, load ave ge: 1.19, time: 216 seconds
Apr 02 16:17:51 localhost This initialization process is taking longer than expected, load ave ge: 1.19, time: 215 seconds
Apr 02 16:17:50 localhost This initialization process is taking longer than expected, load ave ge: 1.19, time: 214 seconds
Apr 02 16:17:48 localhost This initialization process is taking longer than expected, load ave ge: 1.19, time: 213 seconds
Apr 02 16:17:47 localhost This initialization process is taking longer than expected, load ave ge: 1.19, time: 212 seconds
Apr 02 16:17:46 localhost This initialization process is taking longer than expected, load ave ge: 1.21, time: 211 seconds
Apr 02 16:17:45 localhost This initialization process is taking longer than expected, load ave ge: 1.21, time: 210 seconds
Apr 02 16:17:44 localhost This initialization process is taking longer than expected, load ave ge: 1.21, time: 209 seconds
Apr 02 16:17:43 localhost This initialization process is taking longer than expected, load ave ge: 1.21, time: 208 seconds
Apr 02 16:17:42 localhost This initialization process is taking longer than expected, load ave ge: 1.22, time: 207 seconds
Apr 02 16:17:41 localhost This initialization process is taking longer than expected, load ave ge: 1.22, time: 206 seconds
         Arrow keys: Navigate view   Current Line: 47 Lines: 280
SonicWall (c) 2018 | Uptime 1 hour, 18 minutes                 [Ctrl-s spacebar] to switch console
```

Incorrect Network Adapter Configuration

When you add a non-VMXNET3 driver, the following error message appears on boot:

```
The SonicWall Network Security Virtual network adapters have been modified

      NSv configuration supports 8 VMXNET Ethernet adapters

       Currently 1 non VMXNET3 Ethernet adapters are configured

Power down the virtual machine and remove the 1 non VMXNET3 network adapters
```

Incorrect Number of Network Adapters

The NSv supports exactly 8 VMXNET3 Network adapters. When you add or remove a VMXNET3 Network adapter, the following error message appears:

```
The SonicWall Network Security Virtual network adapters have been modified

NSv requires 8 Ethernet adapters, currently 7 are configured

Power down the virtual machine and configure the additional 1 VMXNEt network adapters
```

Insufficient Memory When Jumbo Frames Enabled

The following error message appears on boot when there is insufficient memory and Jumbo frames have been enabled. The resolution is to power off the virtual machine and increase the memory.

```
Insufficient memory 5 GB. The minimum memory required is 10 GB for NSv model: “NSv 400”
with the jumbo frame feature enabled

Power off the Network Security virtual machine and assign 10 GB of memory to this
virtual machine
```

3

Licensing and Registering Your NSv

Topics:

- Registering the NSv Appliance from SonicOS

Registering the NSv Virtual Machine with SonicOS

After you have installed and configured the network settings for your NSv Series virtual machine, you can log into SonicOS management and register it in your MySonicWall account. Registration of your SonicWall NSv Series virtual machine follows the same process as for SonicWall hardware-based appliances.

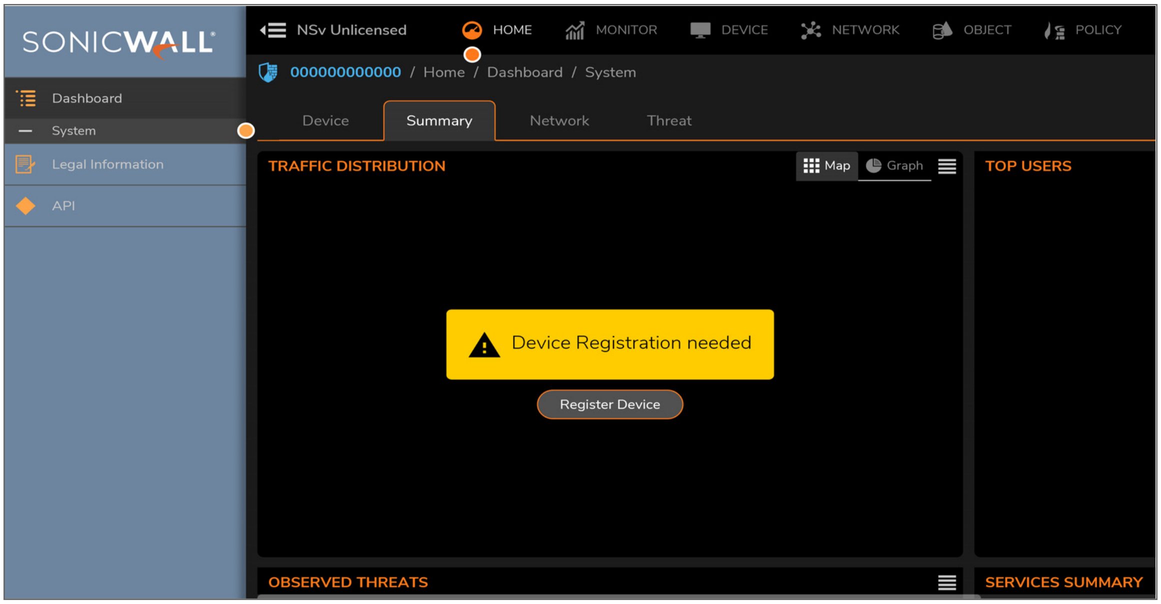
ⓘ | **NOTE:** System functionality is extremely limited when registration is not complete. See Using System Diagnostics for more information.

To register your NSv virtual machine:

1. Point your browser to your NSv Series WAN or LAN IP address and log in as the administrator with default credentials.

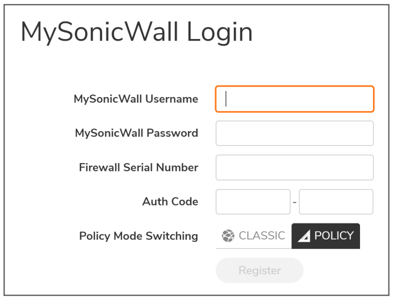
   ⓘ | **NOTE:** Ensure to use the new password if you have updated the default password.

2. Go to **Dashboard | System > Summary** and click **Register Device**.



Device Registration needed

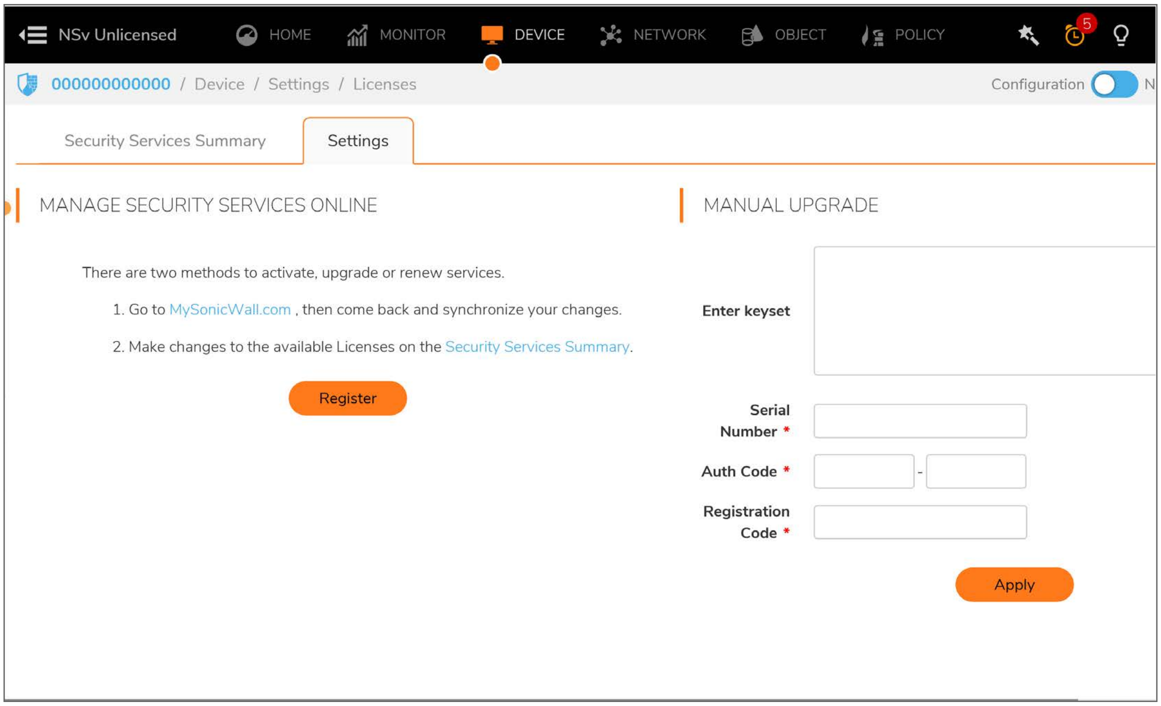
3. At this point you can log into MySonicWall and name the NSv installation while providing the **Firewall Serial Number** and authorization code (**Auth Code**), and select a **Policy Mode Switching** option (**Classic** or **Policy**). Click **Register** to complete the registration.



MySonicWall Login

MySonicWall Username	
MySonicWall Password	
Firewall Serial Number	
Auth Code	-
Policy Mode Switching	CLASSIC [✓ POLICY]

If you are unable to reach MySonicWall, use the **Keyset**, **Serial Number**, **Auth Code**, and **Registration Code** provided by your SonicWall representative in the **Settings** tab.



NSv Unlicensed | HOME | MONITOR | DEVICE | NETWORK | OBJECT | POLICY

000000000000 / Device / Settings / Licenses

Configuration

Security Services Summary | Settings

MANAGE SECURITY SERVICES ONLINE

There are two methods to activate, upgrade or renew services.

1. Go to MySonicWall.com , then come back and synchronize your changes.
2. Make changes to the available Licenses on the Security Services Summary.

Register

MANUAL UPGRADE

Enter keyset

Serial Number *

Auth Code * -

Registration Code *

Apply

Click **Apply** to complete the registration.

4. Log in to SonicOS and check that the licensing is enabled.

4

SonicOS Management

Topics:

- Managing SonicOS on the NSv Series
- Using System Diagnostics

Managing SonicOS on the NSv Series

The X1 interface is the default WAN Interface and is set to use DHCP addressing by default, with HTTPS management enabled. To ease testing, you can utilize a DHCP server on the X1 connected network. If DHCP is not available, use the console to access the CLI and configure a static IP address.

The X0 interface is the default LAN interface, and also has HTTPS management enabled. Its IP address is set to `192.168.168.168` by default. You can map this interface to your own network during initial deployment of the OVF template. After deployment, you can reconfigure the IP address to an address in your network.

To log into SonicOS for management of the NSv:

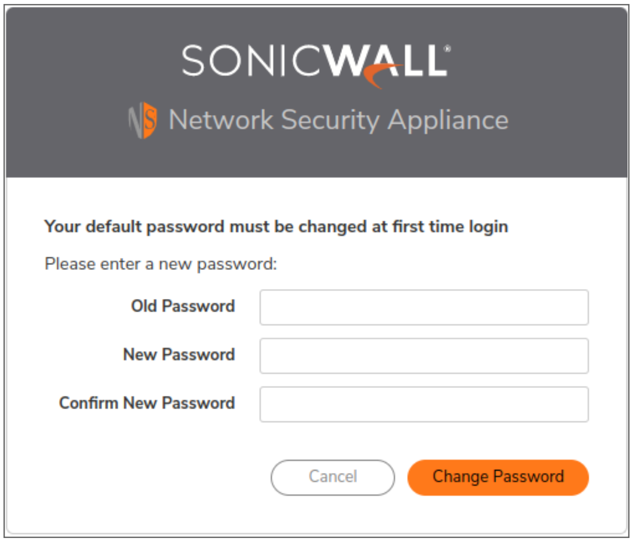
1. Point your browser to either the LAN or WAN IP address. The login screen is displayed.

   When the X1 WAN interface is using DHCP addressing, DNS is also enabled. You can generally access the WAN address from any machine in your network.

   If you have an existing network on `192.168.168.0/24` in your environment, you can access the default IP address of the X0 LAN interface of your NSv Series from a computer on that network for SonicOS management. The NSv Series X0 IP address is `192.168.168.168` by default.

2. Enter the administrator credentials.

   Your default password must be changed at first time while logging in after upgrade. Create a password that meets the security requirements. A password should have at least one uppercase letter, one lowercase letter, one number, and one special character. For example, MyP@ssw0rd.



Your default password must be changed at first time login

Please enter a new password:

Old Password	
New Password	
Confirm New Password	

a. In the **Old Password** text box, enter your default password.

b. In the **New Password** text box, enter your new password.

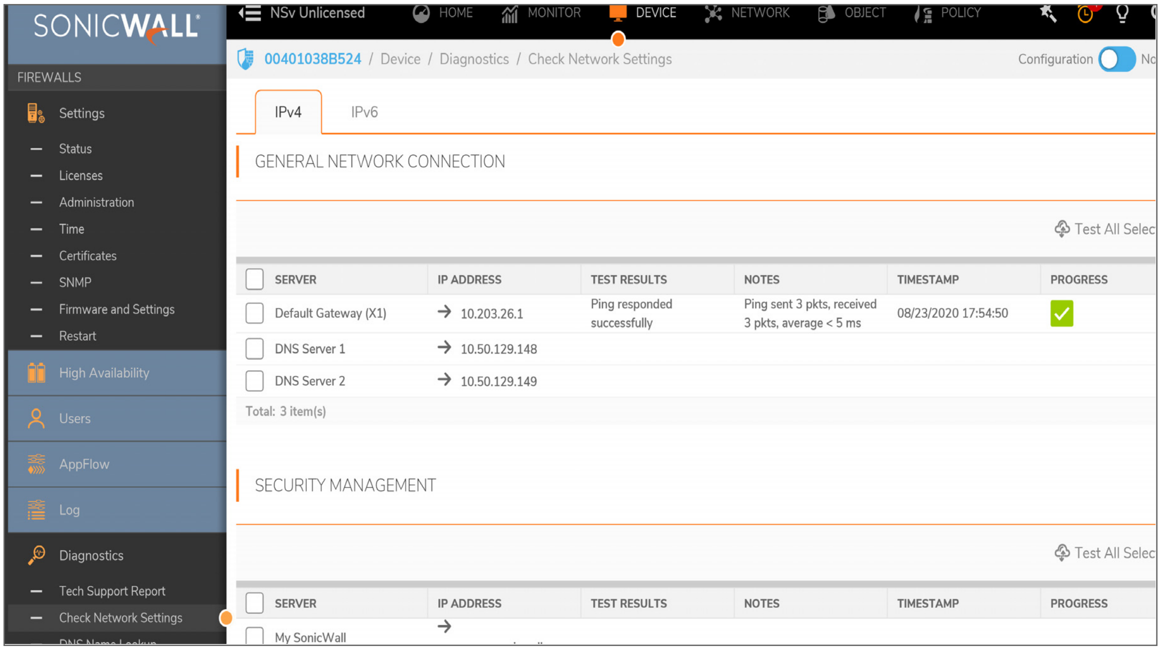
c. In the **Confirm Password** text box, re-enter the new password.

3. Click **Change Password**.

   The SonicOS management interface is displayed. You can navigate and update the configuration just as you would with any SonicWall network security virtual machine

Using System Diagnostics

Check Network Settings, at **DEVICE | Diagnostics > Check Network Settings**. is a diagnostic tool that automatically checks the network connectivity and service availability of several predefined functional areas of the NSv Series, returns the results, and attempts to describe the causes if any exceptions are detected. This tool helps you locate the problem area when users encounter a network problem.



□ SERVER	IP ADDRESS	TEST RESULTS	NOTES	TIMESTAMP	PROGRESS
□ Default Gateway (X1)	→ 10.203.26.1	Ping responded successfully	Ping sent 3 pkts, received 3 pkts, average < 5 ms	08/23/2020 17:54:50	✓
□ DNS Server 1	→ 10.50.129.148				
□ DNS Server 2	→ 10.50.129.149				

Total: 3 item(s)

□ SERVER	IP ADDRESS	TEST RESULTS	NOTES	TIMESTAMP	PROGRESS
□ My SonicWall	→				

Specifically, Check Network Settings automatically tests the following functions:

- Default Gateway settings
- DNS settings
- MySonicWall server connectivity
- License Manager server connectivity
- Content Filter server connectivity

To use the **Check Network Settings** tool, first select it in the **Diagnostics** drop-down menu and then click the check box in the row for the item that you want to test. The results are displayed in the same row. A green check mark signifies a successful test, and a red X indicates that there is a problem.

To test multiple items at the same time, select the **Server** checkbox at the top of the table to select all items or select the checkbox for each desired item and then click **TEST ALL SELECTED**.

If the probes fail, you can click the arrow to the left of the **IP Address** field of the failed item to jump to the configuration page to investigate the root cause.

5

Using the Virtual Console and SafeMode

Topics:

Using the ESXi Remote Console to Configure the WAN or LAN Interfaces

You can use the ESXi remote console to set the IP address and network settings of the NSv Series interfaces, to change between static and DHCP addressing, and to enable SonicOS management on your NSv Series instance.

For example, depending on your network environment, you might need to configure a static IP address on your NSv Series X1 WAN interface. If you do so, you need to configure HTTPS management to allow remote management over the WAN.

The NSv Series X0 IP address is `192.168.168.168` by default. If your LAN network uses a different IP address range, then you might want to configure your NSv Series X0 IP address with an address in your existing LAN network. This allows you to manage SonicOS from a computer on your LAN.

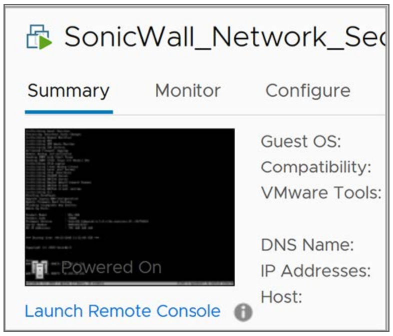
The *ESXi Remote Console* allows you to log into the NSv Management console and use the command line interface (CLI) to configure these network settings.

ⓘ **NOTE:** To type within the console window, click your mouse inside the window. To regain control of your mouse, press **Ctrl+Alt**.

To use the console to enable SonicOS management:

1. Log into vSphere or vCenter and select your NSv Series instance in the left pane.
2. Do one of the following to open the ESXi remote console:

- Click on the image of the console to access the console in browser window.

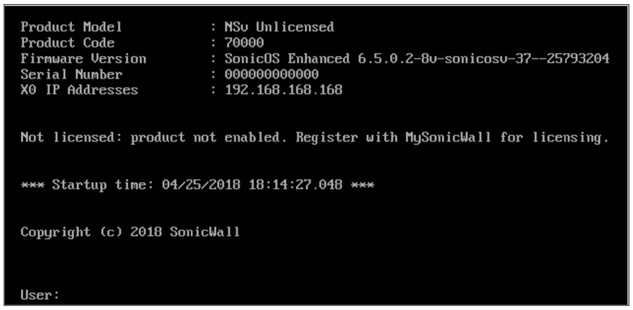


- The **Launch Console** dialog opens. You can select either **Web Console** or **VMware Remote Console** (VMRC). Optionally select **Remember my choice**. Then click **OK**.
- Click **Launch Remote Console**.
- Click **Actions > Open Remote Console**.

3. Click inside the console window.

   ⓘ **NOTE:** Press **Ctrl+Alt** to regain control of your mouse, or with the Web Console method simply move your mouse away from the console area.

4. Log in using the administrator credentials (default: admin/password).



```
Product Model            : NSv Unlicensed
Product Code             : 70000
Firmware Version         : SonicOS Enhanced 6.5.0.2-8v-sonicosv-37--25793204
Serial Number            : 000000000000
X0 IP Addresses          : 192.168.168.168

Not licensed: product not enabled. Register with MySonicWall for licensing.

*** Startup time: 04/25/2018 18:14:27.048 ***

Copyright (c) 2018 SonicWall


User:
```

5. Use the `show status` command at the admin prompt to view interface settings and other information.

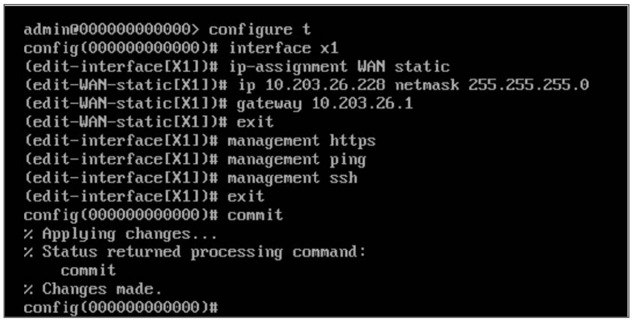
   ⓘ **NOTE:** You must press the spacebar when **---MORE---** displays to see additional interfaces at the end of the display. This way you can determine the WAN X1 IP address, even if you did not map any NSv interfaces to the ESXi vSwitch interfaces during installation.

6. To use a static IP address for the WAN, type the following sequence of commands to enable a static IP and management access on the X1 WAN interface. The command prompt changes as you enter or exit different command levels. This command sequence that follows uses example IP address settings in the `10.203.26.0` network. These settings should be replaced with the correct settings for your environment.

```
configure t

interface x1

ip-assignment WAN static
```

```
ip 10.203.26.228 netmask 255.255.255.0

gateway 10.203.26.1

exit

management https

management ping

management ssh

exit

commit
```

After entering `commit`, the console displays `Applying changes` and other status information, then displays the `config` prompt. Type `exit` to return to the `admin` command level and prompt.



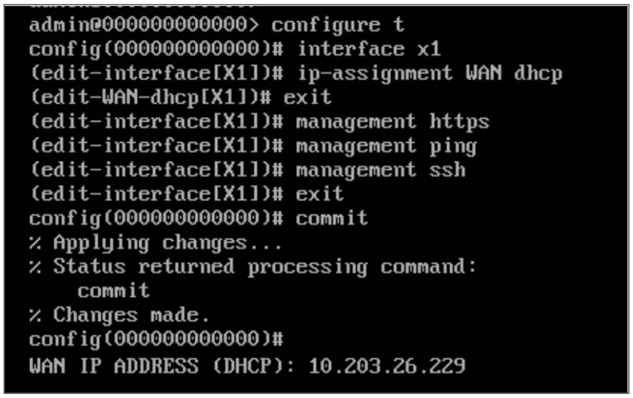
```
admin@000000000000> configure t
config(000000000000)# interface x1
(edit-interface[X1])# ip-assignment WAN static
(edit-WAN-static[X1])# ip 10.203.26.228 netmask 255.255.255.0
(edit-WAN-static[X1])# gateway 10.203.26.1
(edit-WAN-static[X1])# exit
(edit-interface[X1])# management https
(edit-interface[X1])# management ping
(edit-interface[X1])# management ssh
(edit-interface[X1])# exit
config(000000000000)# commit
% Applying changes...
% Status returned processing command:
    commit
% Changes made.
config(000000000000)#
```

7. To return to DHCP for the WAN address, type the following sequence of commands to enable DHCP and management access on the X1 WAN interface. The command prompt changes as you enter or exit different command levels.

```
configure t

interface x1

ip-assignment WAN dhcp

exit

management https

management ping

management ssh

exit
```

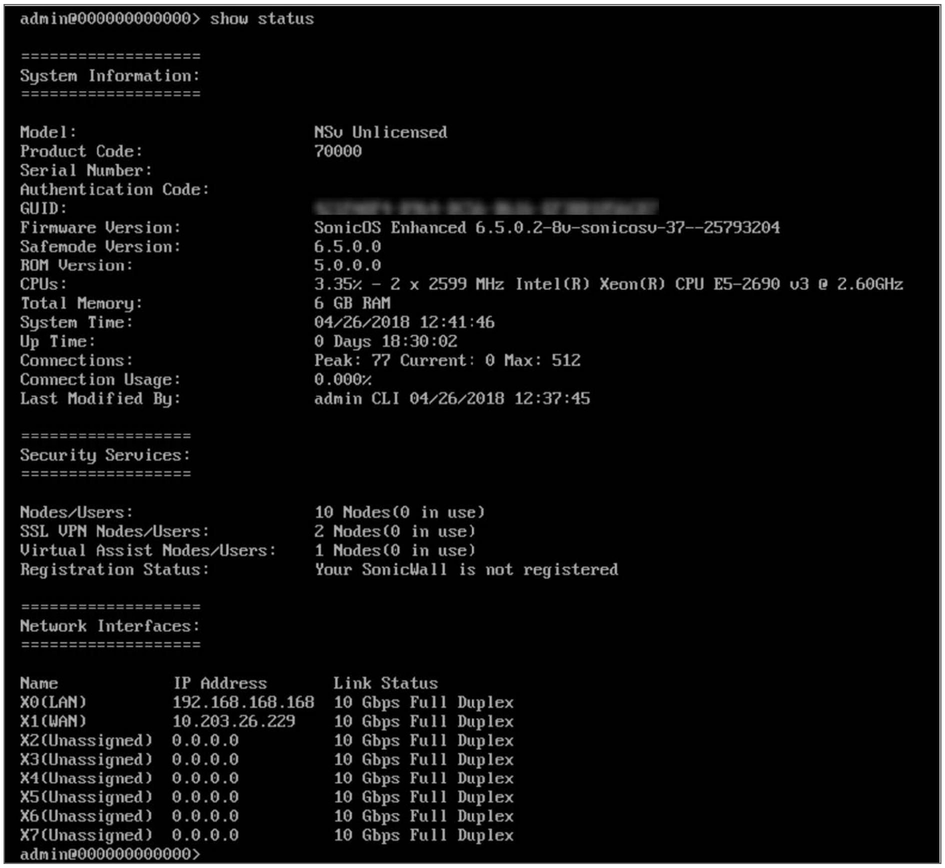
```
commit
```

After entering commit, the console displays **Applying changes** and other status information, then displays the configuration prompt. After a few seconds, the assigned DHCP address is displayed. You can access the SonicOS web management interface at that address.



```
admin@000000000000> configure t
config(000000000000)# interface x1
(edit-interface[X1])# ip-assignment WAN dhcp
(edit-WAN-dhcp[X1])# exit
(edit-interface[X1])# management https
(edit-interface[X1])# management ping
(edit-interface[X1])# management ssh
(edit-interface[X1])# exit
config(000000000000)# commit
% Applying changes...
% Status returned processing command:
    commit
% Changes made.
config(000000000000)#
WAN IP ADDRESS (DHCP): 10.203.26.229
```

8. You can use the `show status` command at the admin prompt to view the assigned IP address for the X1 (WAN) interface and other information.



```
admin@000000000000> show status

===================
System Information:
===================

Model:                        NSv Unlicensed
Product Code:                 70000
Serial Number:
Authentication Code:
GUID:                         [redacted]
Firmware Version:             SonicOS Enhanced 6.5.0.2-8v-sonicosv-37--25793204
Safemode Version:             6.5.0.0
ROM Version:                  5.0.0.0
CPUs:                         3.35% - 2 x 2599 MHz Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz
Total Memory:                 6 GB RAM
System Time:                  04/26/2018 12:41:46
Up Time:                      0 Days 18:30:02
Connections:                  Peak: 77 Current: 0 Max: 512
Connection Usage:             0.000%
Last Modified By:             admin CLI 04/26/2018 12:37:45

==================
Security Services:
==================

Nodes/Users:                  10 Nodes(0 in use)
SSL VPN Nodes/Users:          2 Nodes(0 in use)
Virtual Assist Nodes/Users:   1 Nodes(0 in use)
Registration Status:          Your SonicWall is not registered

===================
Network Interfaces:
===================

Name            IP Address      Link Status
X0(LAN)         192.168.168.168 10 Gbps Full Duplex
X1(WAN)         10.203.26.229   10 Gbps Full Duplex
X2(Unassigned)  0.0.0.0         10 Gbps Full Duplex
X3(Unassigned)  0.0.0.0         10 Gbps Full Duplex
X4(Unassigned)  0.0.0.0         10 Gbps Full Duplex
X5(Unassigned)  0.0.0.0         10 Gbps Full Duplex
X6(Unassigned)  0.0.0.0         10 Gbps Full Duplex
X7(Unassigned)  0.0.0.0         10 Gbps Full Duplex
admin@000000000000>
```

9. To change the X0 LAN static IP address, use the following commands:

   ⓘ | **NOTE:** SonicOS HTTPS management is enabled by default on the X0 interface.

   For a static IP address in an example `10.10.10.0/24` LAN network, enter:

   ```
   configure t

   interface x0

   ip 10.10.10.100 netmask 255.255.255.0

   exit

   exit

   commit
   ```

   An alternative approach to changing the X0 IP address to `192.168.1.1` at the CLI follows:

   ```
   config(2CB8ED694DF8)# interface X0

   (edit-interface[X0])# ip-assignment LAN static

   (edit-LAN-static[X0])# ip 192.168.1.1 netmask 255.255.255.0

   (edit-LAN-static[X0])# commit

   % Applying changes...

   % Status returned processing command:

   commit

   % Changes made
   ```

10. When IP address configuration and management settings are complete, type `restart` to reboot NSv Series with the new settings.

    ⓘ | **NOTE:** Press **Ctrl+Alt** to regain control of your mouse.

    After configuring an IP address and enabling management, you can log into SonicOS on your NSv Series instance from a browser, or ping the virtual machine from a command window or other application.

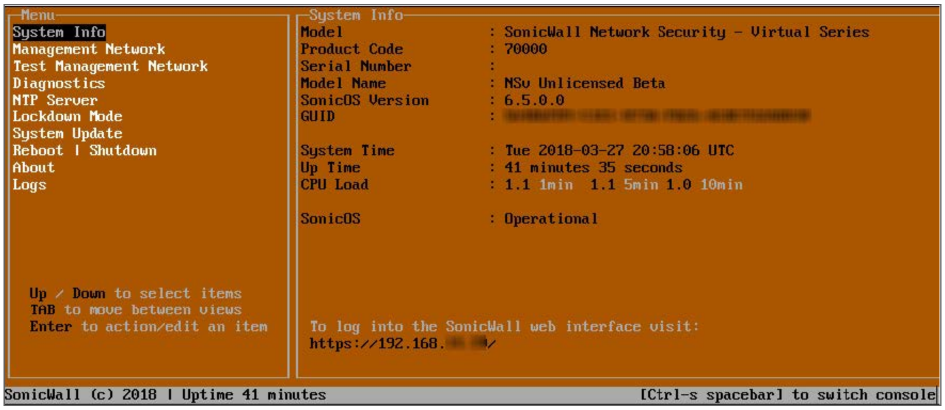
Navigating the NSv Management Console

The NSv management console provides options for viewing and changing system and network settings, running diagnostics, rebooting SonicOS, and other functions.

The NSv management console can be accessed after you log into the ESXi remote console.

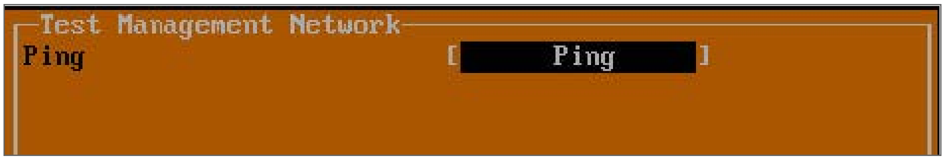
To navigate and use the management console:

1. Log into the ESXi remote console by selecting your NSv in the vSphere or vCenter interface and clicking **Actions > Open Remote Console**, then clicking inside the console window. Use your initial login credential (admin / password) to get to the SonicOS prompt.
2. Press **Ctrl+s** and then press the **spacebar** to toggle between the SSH virtual console or NSv remote console and the NSv management console. That is, press the Ctrl key and ‘s’ key together, then release and press the **spacebar**. The NSv management console has an orange background.



```
-Menu-                          -System Info-
System Info                     Model               : SonicWall Network Security - Virtual Series
Management Network              Product Code        : 70000
Test Management Network         Serial Number       :
Diagnostics                     Model Name          : NSv Unlicensed Beta
NTP Server                      SonicOS Version     : 6.5.0.0
Lockdown Mode                   GUID                : [redacted]
System Update
Reboot | Shutdown               System Time         : Tue 2018-03-27 20:58:06 UTC
About                           Up Time             : 41 minutes 35 seconds
Logs                            CPU Load            : 1.1 1min  1.1 5min 1.0 10min

                                SonicOS             : Operational



  Up / Down to select items
  TAB to move between views
  Enter to action/edit an item    To log into the SonicWall web interface visit:
                                  https://192.168.[redacted]/

SonicWall (c) 2018 | Uptime 41 minutes                        [Ctrl-s spacebar] to switch console
```

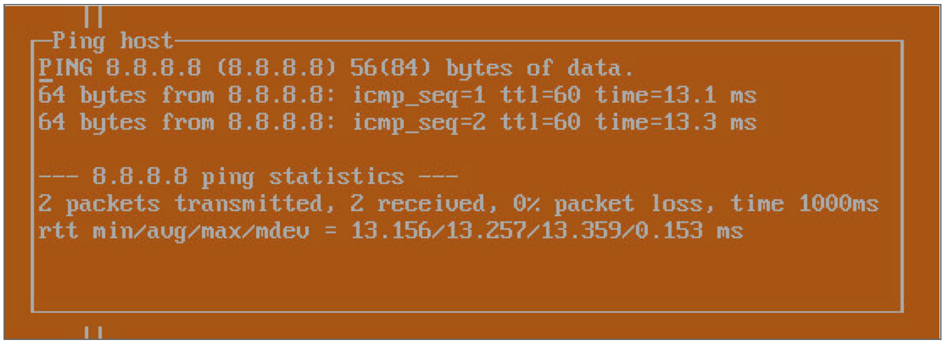
3. The main menu is displayed in the side menu (left pane). Use the up/down arrow keys to move the focus between menu items. As the focus shifts, the right pane displays the options and information for that menu item. The currently selected item is highlighted in black.
4. Press the **Tab** key to move the focus from side menu to the main view (right pane), or vice versa.
5. In the main view, use the up/down arrow keys to move the focus between options. Items shown inside square brackets denote actionable items.



```
-Test Management Network-
Ping                                  [       Ping       ]
```

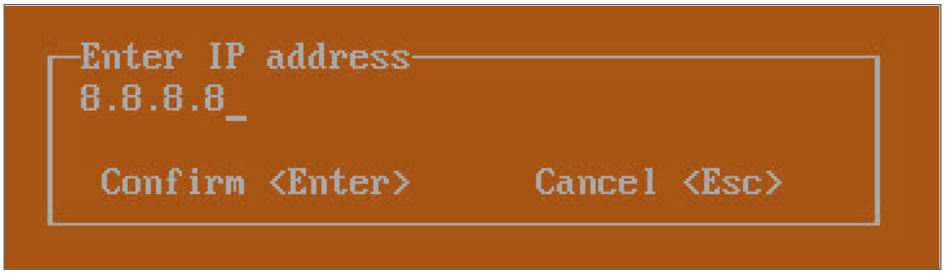
6. To select an option for editing or to choose the associated action, use the up/down arrow keys to move the focus to the editable/actionable items and press the **Enter** key.

   An edit/selection dialog is displayed in the middle of the main view following the option list. Some dialogs have selectable actions and some are information only:



```
Ping host
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=60 time=13.1 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=60 time=13.3 ms

--- 8.8.8.8 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1000ms
rtt min/avg/max/mdev = 13.156/13.257/13.359/0.153 ms
```

Some dialogs are for input:



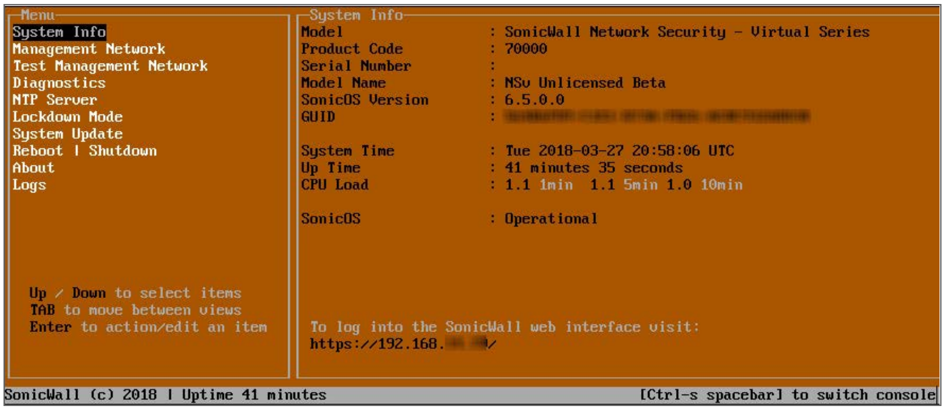
```
Enter IP address
8.8.8.8_

 Confirm <Enter>        Cancel <Esc>
```

7. Use the arrow keys as needed to move between selections in the dialog. To change a value, press **Backspace** to erase each character, then type in the new value. When ready, press **Enter** to commit the change or perform the selected action. You can dismiss the dialog by pressing **Esc**.

The NSv management menu choices are described in the following sections:

- System Info
- Management Network or Network Interfaces
- Test Management Network
- Diagnostics
- NTP Server
- Lockdown Mode
- System Update
- Reboot | Shutdown
- About
- Logs

System Info



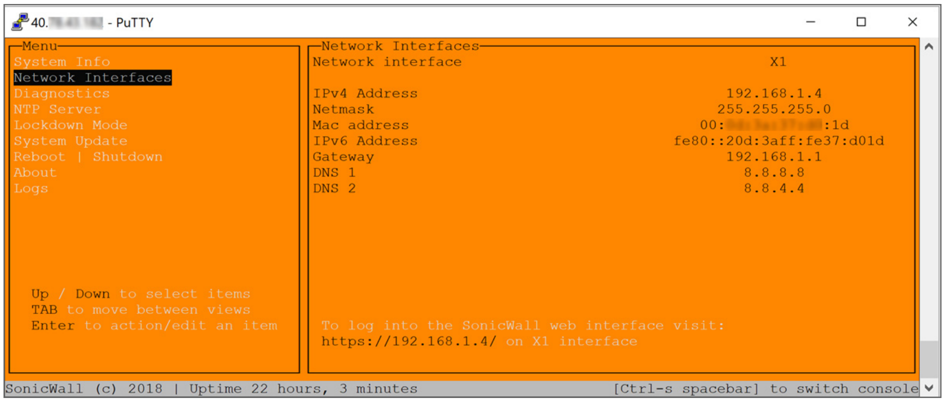
```
Menu                                    System Info
System Info                             Model                : SonicWall Network Security - Virtual Series
Management Network                      Product Code         : 70000
Test Management Network                 Serial Number        :
Diagnostics                             Model Name           : NSv Unlicensed Beta
NTP Server                              SonicOS Version      : 6.5.0.0
Lockdown Mode                           GUID                 : [redacted]
System Update
Reboot | Shutdown                       System Time          : Tue 2018-03-27 20:58:06 UTC
About                                   Up Time              : 41 minutes 35 seconds
Logs                                    CPU Load             : 1.1 1min  1.1 5min 1.0 10min

                                        SonicOS              : Operational




  Up / Down to select items
  TAB to move between views
  Enter to action/edit an item           To log into the SonicWall web interface visit:
                                         https://192.168.[redacted]/

SonicWall (c) 2018 | Uptime 41 minutes                              [Ctrl-s spacebar] to switch console
```

Some of the information in the **System Info** screen is dynamic. The following information is displayed:

- **Model** – This is the model of the NSv virtual machine.
- **Product code** – This is the product code of the NSv virtual machine.
- **Serial Number** – The serial number for the virtual machine; this is a number unique to every NSv instance deployed. This number can be used to identify the NSv virtual machine on MySonicWall.
- **Model Name** – This is the model name of the NSv virtual machine.
- **SonicOS Version** – This is the currently running SonicOS version of the NSv virtual machine.
- **GUID** – Every NSv instance has a GUID that is displayed here.
- **System Time** – This is the current system time on the NSv virtual machine.
- **Up Time** – This is the total time that the NSv virtual machine has been running.
- **Average Load** – This shows the average CPU load for the last 1 minute, 5 minutes and 10 minutes. You can change the Average load time durations to view the CPU load over longer or shorter time periods.
- **SonicOS** – This presents the current state of the SonicOS service on the NSv. ***Operational*** is displayed here when the SonicOS service is running normally, ***Not Operational*** when there is a problem with the service and ***Operational (debug)*** if the service is currently running in debug mode.

Management Network or Network Interfaces

NETWORK INTERFACES SCREEN



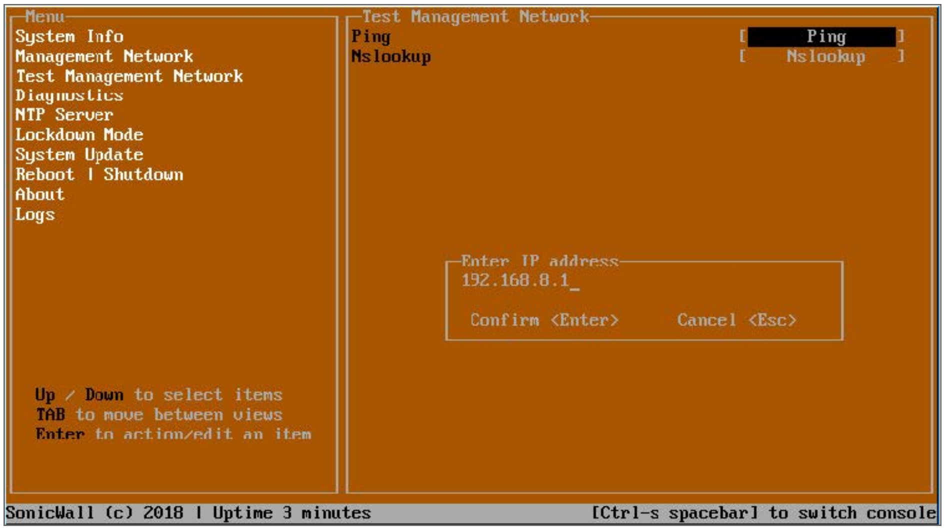
```
-Menu-----------------------------  -Network Interfaces---------------------------------------------
 System Info                        Network interface                                    X1
 Network Interfaces
 Diagnostics                        IPv4 Address                                    192.168.1.4
 NTP Server                         Netmask                                        255.255.255.0
 Lockdown Mode                      Mac address                                  00:[redacted]:1d
 System Update                      IPv6 Address                              fe80::20d:3aff:fe37:d01d
 Reboot | Shutdown                  Gateway                                         192.168.1.1
 About                              DNS 1                                             8.8.8.8
 Logs                               DNS 2                                             8.8.4.4



   Up / Down to select items
   TAB to move between views
   Enter to action/edit an item       To log into the SonicWall web interface visit:
                                      https://192.168.1.4/ on X1 interface

SonicWall (c) 2018 | Uptime 22 hours, 3 minutes                       [Ctrl-s spacebar] to switch console
```

In this screen, the network settings are read-only except when the management console is in SafeMode. In SafeMode, you can configure these settings.

- **Management Interface** – This is the current interface serving as the management interface. This defaults to X1.
- **IPv4 Address** – This is the IPv4 address currently assigned to the management interface.
- **Netmask** – This is the netmask currently assigned to the management interface.
- **Mac Address** – This is the MAC address of the management interface.
- **IPv6 address** – This is the IPv6 address currently assigned to the management interface.
- **Gateway** – This is the default gateway currently in use by the NSv virtual machine.
- **DNS** – This is a list of the DNS servers currently being used by the NSv virtual machine.

Test Management Network

The **Test Management Network** screen is displayed for an NSv, but not for an NSv. In an NSv, the **Ping** and **Nslookup** commands are available on the **Diagnostics** screen.



Enter IP address
192.168.0.1_

Up / Down to select items
TAB to move between views
Enter to action/edit an item

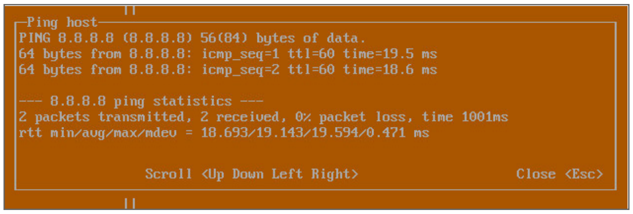
SonicWall (c) 2018 | Uptime 3 minutes [Ctrl-s spacebar] to switch console

The **Test Management Network** screen provides the **Ping** and **Nslookup** tools to test connectivity between the management interface and the local network. **Ping** is used to test whether hosts in the network are reachable. **Nslookup** is available for sending DNS queries from the NSv virtual machine.

To use Ping:

1. Select **Test Management Network** in the Menu and press **Tab** to move the focus into the **Test Management Network** screen.
2. Select **Ping** to highlight it and then press **Enter** to display the **Enter IP address** dialog.
3. Navigate into the dialog, press **Backspace** to clear the current value, and then type in the IP address that you want to ping.
4. Press **Enter**.

   The ping output is displayed in the **Ping host** dialog.

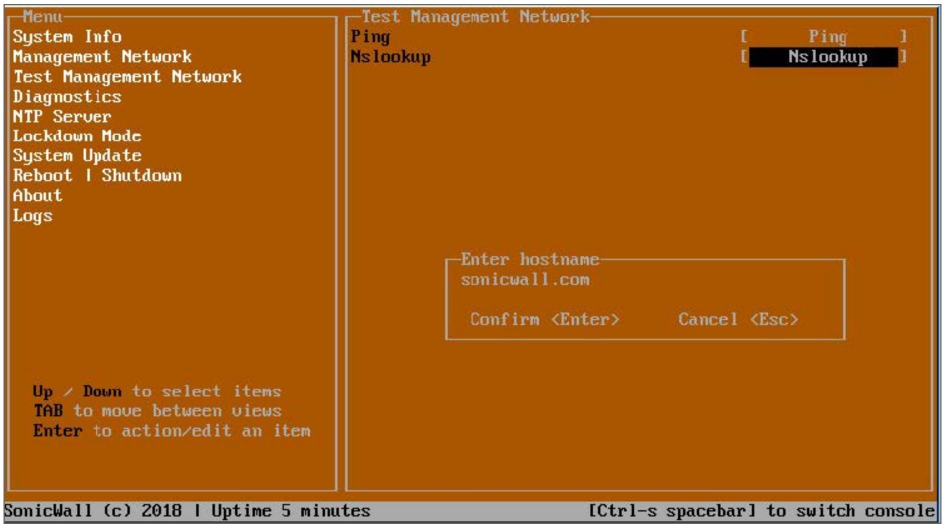
   

   ```
   PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
   64 bytes from 8.8.8.8: icmp_seq=1 ttl=60 time=19.5 ms
   64 bytes from 8.8.8.8: icmp_seq=2 ttl=60 time=18.6 ms

   --- 8.8.8.8 ping statistics ---
   2 packets transmitted, 2 received, 0% packet loss, time 1001ms
   rtt min/avg/max/mdev = 18.693/19.143/19.594/0.471 ms
   ```

5. Press the **Esc** key to close the dialog.

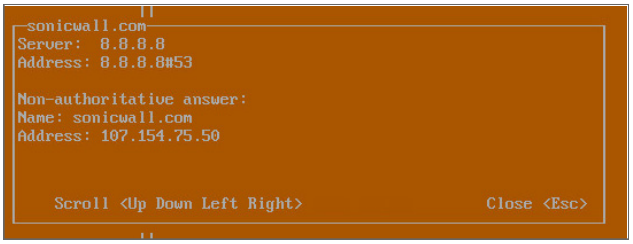
To use Nslookup:

1. Select **Test Management Network** in the Menu and press **Tab** to move the focus into the **Test Management Network** screen.
2. Select **Nslookup** to highlight it and press **Enter** to display the **Enter hostname** dialog.



3. Navigate into the dialog, press **Backspace** to clear the current value, and then type in the hostname that you want to look up with a DNS query.
4. Press **Enter**.

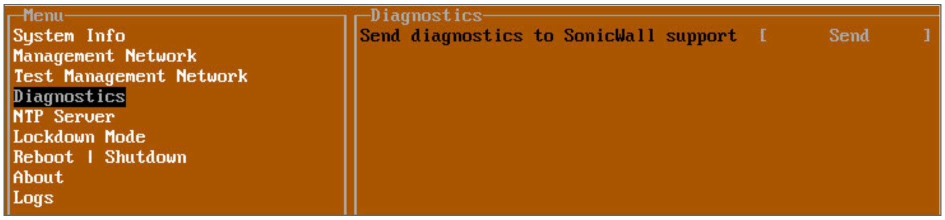
   The Nslookup query results are displayed in an information dialog. You can scroll up and down within the dialog by using the up/down arrow keys.



```
sonicwall.com
Server:   8.8.8.8
Address: 8.8.8.8#53

Non-authoritative answer:
Name: sonicwall.com
Address: 107.154.75.50
```

5. Press the **Esc** key to close the dialog.

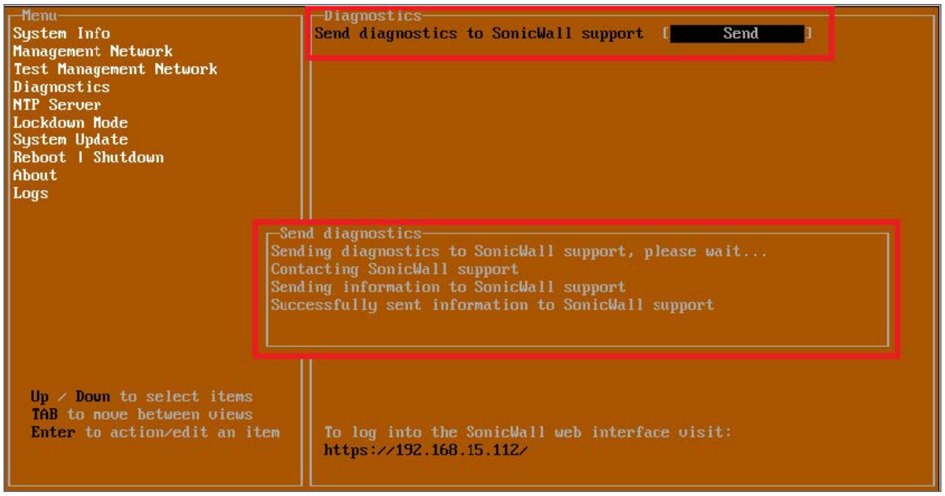
Diagnostics



In the **Diagnostics** screen, you can send diagnostics to SonicWall Technical Support. This has the same functionality as clicking **SEND DIAGNOSTIC REPORTS TO SUPPORT** in the **INVESTIGATE | Tools | System Diagnostics** page of the SonicOS web management interface.

ⓘ **NOTE:** Your NSv virtual machine must have internet access to send the diagnostics report to SonicWall Support.

To send the diagnostics report, select **Send** in the main view to highlight it, then press **Enter**. A dialog box showing the diagnostics send output is displayed. The last message indicates success or failure.



```
Send diagnostics to SonicWall support  [          Send          ]

Sending diagnostics to SonicWall support, please wait...
Contacting SonicWall support
Sending information to SonicWall support
Successfully sent information to SonicWall support

To log into the SonicWall web interface visit:
https://192.168.15.112/
```

Press the **Esc** key to close the dialog.

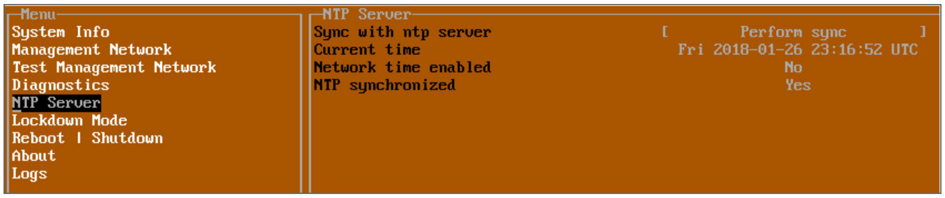
Any errors during the Send process are displayed in the **Send diagnostics** dialog box.

Common reasons for the report failing to send include:

- Misconfigured/missing default gateway
- Misconfigured/missing DNS servers
- Inline proxy

ⓘ **NOTE:** The **Send Diagnostics** tool does not currently work through HTTP proxies.

NTP Server



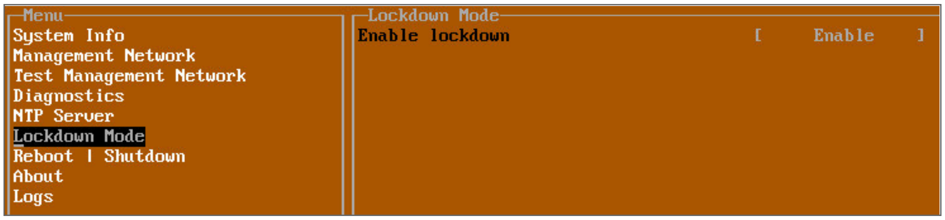
```
Sync with ntp server                 [        Perform sync        ]
Current time                           Fri 2018-01-26 23:16:52 UTC
Network time enabled                                No
NTP synchronized                                    Yes
```

In the **NTP Server** screen, you can synchronize with an NTP server. For complete NTP Server configuration options, log into the SonicOS management interface and navigate to the **MANAGE | Appliance > System Time** page.

The **NTP Server** screen displays the following information:

- **Sync with NTP server** – This button forces the NSv virtual machine's NTP client to perform a sync with the configured NTP server(s).
- **Current time** – The current time on the NSv virtual machine.
- **Network time enabled** – A Yes/No value determining whether the NTP client is currently configured to keep in sync with an NTP server.
- **NTP synchronized** – A Yes/No value determining if the NSv virtual machine is currently synchronized with the configured NTP server(s).

Lockdown Mode



```
Menu                              Lockdown Mode
System Info                       Enable lockdown          [    Enable    ]
Management Network
Test Management Network
Diagnostics
NTP Server
Lockdown Mode
Reboot | Shutdown
About
Logs
```

In the **Lockdown Mode** screen, you can enable ***Strict Lockdown*** mode. When enabled, the management console is effectively disabled. A dialog box that cannot be closed is permanently displayed on the management console. This prevents any person from accessing the management console.

To enable Strict Lockdown mode, select **Enable** and then press **Enter**.

△ **CAUTION: Be careful about enabling Strict Lockdown mode. Strict Lockdown mode cannot be disabled.**

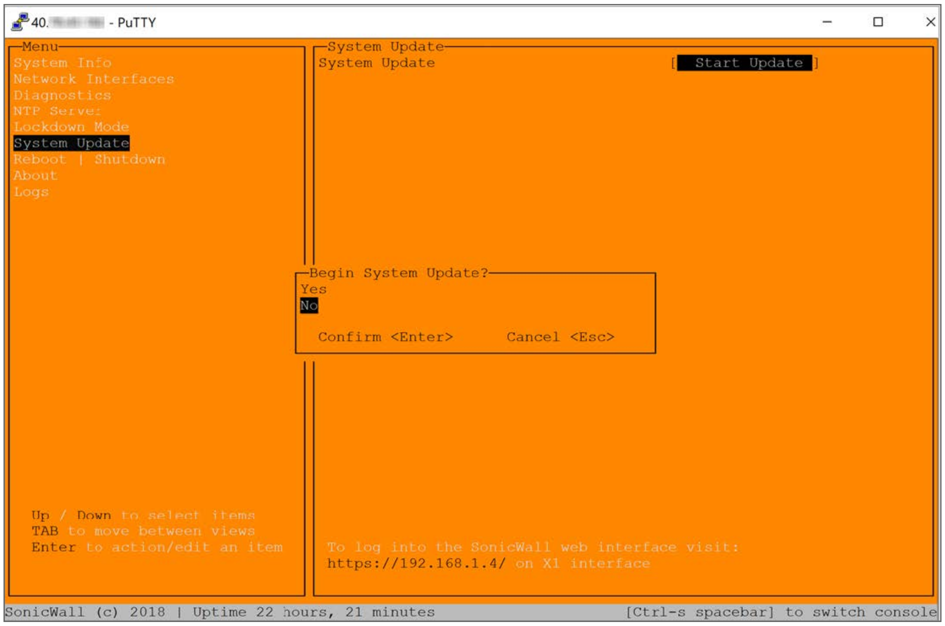
Temporary Lockdown Mode

A temporary lockdown mode can be enabled and disabled in SonicOS on the **MANAGE | Appliance > Base Settings** page. You can enable lockdown mode by clearing the **Enable management console** checkbox under the **Advanced Management** section, and can disable lockdown mode by selecting the checkbox. Click **ACCEPT** after each change.

The management console is automatically enabled/disabled a few seconds after it has been enabled/disabled in the SonicOS web interface page.

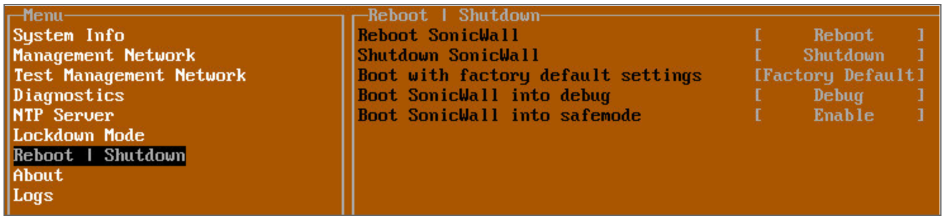
System Update

The **System Update** screen is available on NSv.



```
Menu                          System Update
System Info                   System Update                          [ Start Update ]
Network Interfaces
Diagnostics
NTP Server
Lockdown Mode
System Update
Reboot | Shutdown
About
Logs

                             Begin System Update?
                             Yes
                             No

                               Confirm <Enter>      Cancel <Esc>

  Up / Down to select items
  TAB to move between views
  Enter to action/edit an item   To log into the SonicWall web interface visit:
                                 https://192.168.1.4/ on X1 interface
SonicWall (c) 2018 | Uptime 22 hours, 21 minutes        [Ctrl-s spacebar] to switch console
```

Reboot | Shutdown



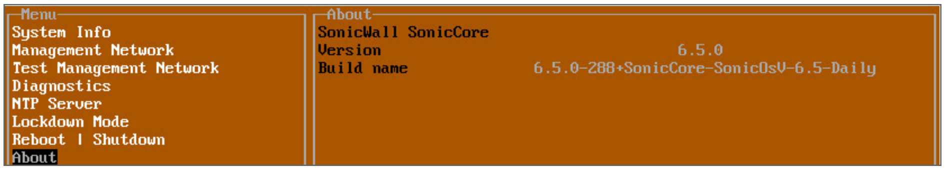
```
Menu                        Reboot | Shutdown
System Info                 Reboot SonicWall                      [    Reboot     ]
Management Network          Shutdown SonicWall                    [   Shutdown    ]
Test Management Network     Boot with factory default settings    [Factory Default]
Diagnostics                 Boot SonicWall into debug             [     Debug     ]
NTP Server                  Boot SonicWall into safemode          [    Enable     ]
Lockdown Mode
Reboot | Shutdown
About
Logs
```

The **Reboot | Shutdown** screen provides functions for rebooting the NSv virtual machine, enabling debug mode, and enabling SafeMode. To perform an action, position the focus and then press **Enter** to select the desired action. Select **Yes** in the confirmation dialog, then press **Enter** again.

The actions available on the **Reboot | Shutdown** screen are:

- **Reboot SonicWall** – Restarts the NSv Series virtual machine with current configuration settings.
- **Shutdown SonicWall** – Powers off the NSv Series virtual machine.
- **Boot with factory default settings** – Restarts the NSv Series virtual machine using factory default settings. All configuration settings are erased.
- **Boot SonicWall into debug** – Restarts the NSv Series virtual machine into debug mode. Normally this operation is performed under the guidance of SonicWall Technical Support.
- **Boot SonicWall into safemode** – Puts the NSv Series virtual machine into SafeMode. For more information, see Using SafeMode on the NSv.

About

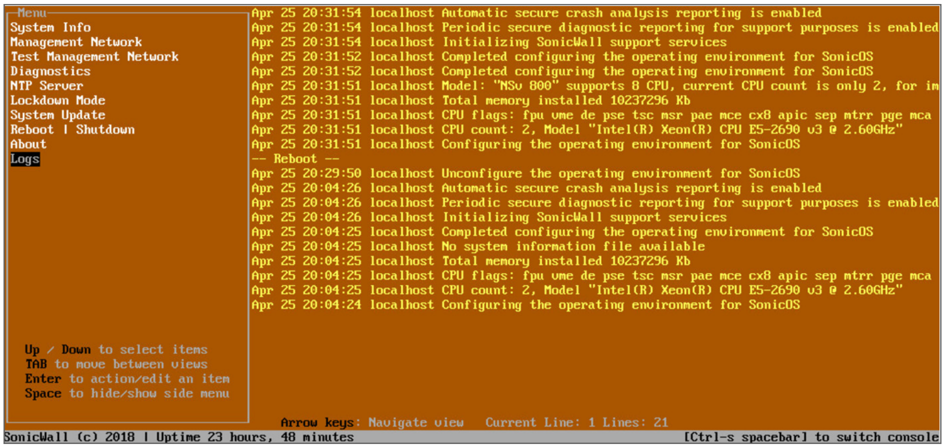


```
About
SonicWall SonicCore
Version                              6.5.0
Build name               6.5.0-288+SonicCore-SonicOsV-6.5-Daily
```

The **About** screen provides information about the software version and build.

Logs

The **Logs** screen displays log events for the NSv virtual machine.



```
Apr 25 20:31:54 localhost Automatic secure crash analysis reporting is enabled
Apr 25 20:31:54 localhost Periodic secure diagnostic reporting for support purposes is enabled
Apr 25 20:31:54 localhost Initializing SonicWall support services
Apr 25 20:31:52 localhost Completed configuring the operating environment for SonicOS
Apr 25 20:31:52 localhost Completed configuring the operating environment for SonicOS
Apr 25 20:31:51 localhost Model: "NSv 800" supports 8 CPU, current CPU count is only 2, for im
Apr 25 20:31:51 localhost Total memory installed 10237296 Kb
Apr 25 20:31:51 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Apr 25 20:31:51 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz"
Apr 25 20:31:51 localhost Configuring the operating environment for SonicOS
-- Reboot --
Apr 25 20:29:50 localhost Unconfigure the operating environment for SonicOS
Apr 25 20:04:26 localhost Automatic secure crash analysis reporting is enabled
Apr 25 20:04:26 localhost Periodic secure diagnostic reporting for support purposes is enabled
Apr 25 20:04:26 localhost Initializing SonicWall support services
Apr 25 20:04:25 localhost Completed configuring the operating environment for SonicOS
Apr 25 20:04:25 localhost No system information file available
Apr 25 20:04:25 localhost Total memory installed 10237296 Kb
Apr 25 20:04:25 localhost CPU flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
Apr 25 20:04:25 localhost CPU count: 2, Model "Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz"
Apr 25 20:04:24 localhost Configuring the operating environment for SonicOS

    Arrow keys: Navigate view   Current Line: 1 Lines: 21
SonicWall (c) 2018 | Uptime 23 hours, 48 minutes          [Ctrl-s spacebar] to switch console
```

Configuring SR-IOV

For high performance requirements in a virtual environment, VMware ESXi provides two options for exposing the HW level NIC as a PCI device directly into the virtual machine Guest OS. The first option is the "pass-through" mode. The other option is "SR-IOV." For "pass-through" mode, the HW NIC is directly exposed as a PCI device into the virtual machine Guest OS. We need to add a "PCI device" in the virtual machine configuration settings. The "pass-through" mode NIC can only be used by one virtual machine and can in no way to share this HW NIC with other virtual machines on the same Host. For the "SR-IOV" mode, if the NIC supports this mode, it can expose the "Virtual Function (VF)" virtualized PCI devices into the Guest virtual machine as Network Adapters. So multiple virtual machines can use different VF NICs from the same HW PF (Physical Function) NIC.

Prerequisites

This document (particularly the screenshots), is based on a Dell R740 server with an Intel X520 NIC. For other servers and NICs, the settings might be different.

- Get the iDrac access to your host server (for enabling SR-IOV settings in BIOS).

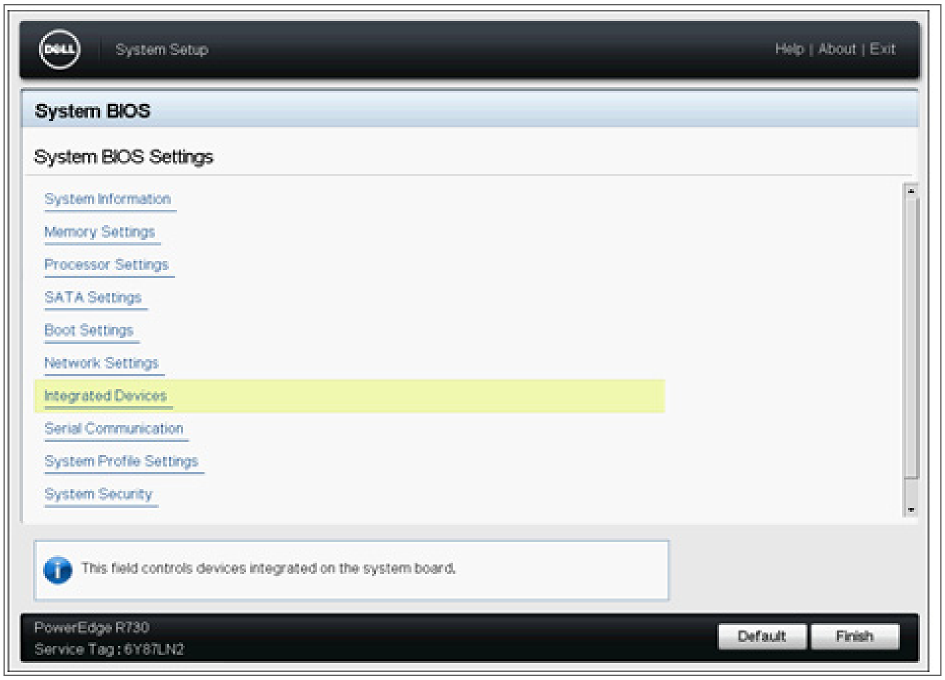
  > ⓘ **NOTE:** You might need to use old IE as the iDrac virtual console as a JAVA SE applet, as you might not be able to pop-out on some modern browsers.

- Get the vCenter access to configure the host server and virtual machines on the server.

Procedures

To enable SR-IOV in BIOS:

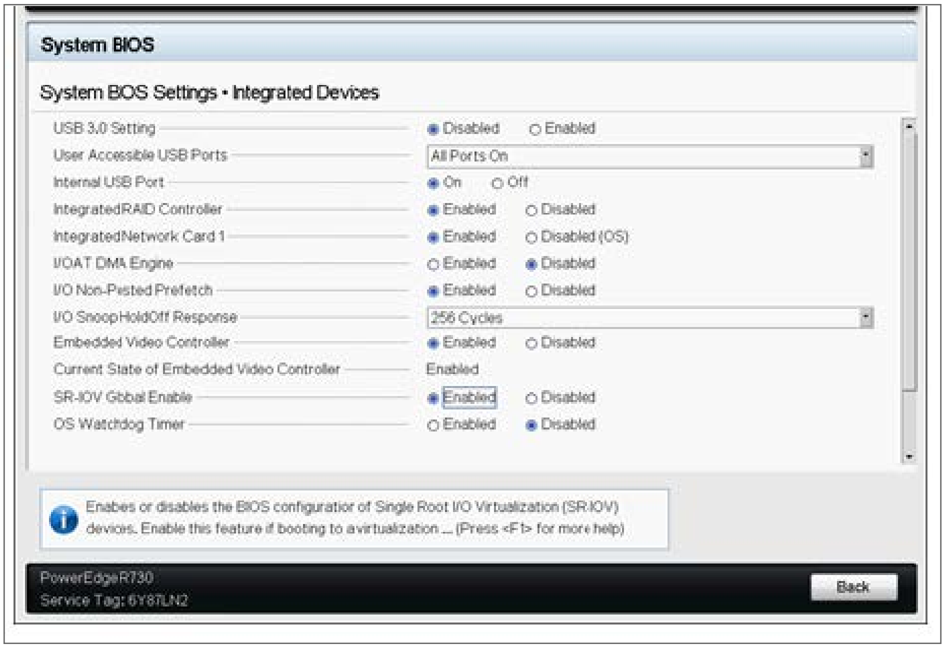
1. Go to **System BIOS Settings > Integrated Devices**.



This field controls devices integrated on the system board.

PowerEdge R730
Service Tag : 6Y87LN2

2. Enable the **SR-IOV Global Enable** option.



System BIOS

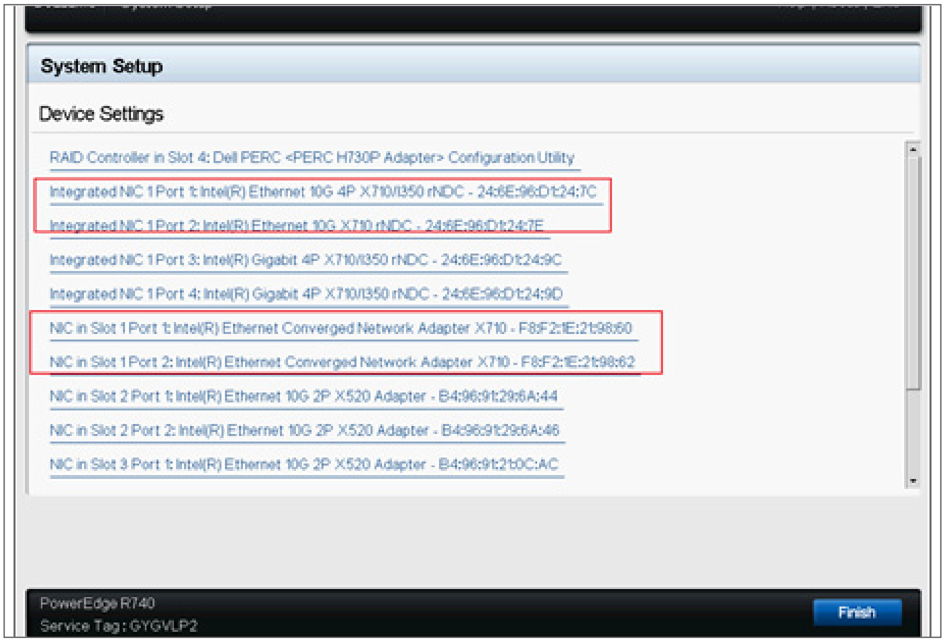
System BIOS Settings • Integrated Devices

USB 3.0 Setting	● Disabled ○ Enabled
User Accessible USB Ports	All Ports On
Internal USB Port	● On ○ Off
Integrated RAID Controller	● Enabled ○ Disabled
Integrated Network Card 1	● Enabled ○ Disabled (OS)
I/OAT DMA Engine	○ Enabled ● Disabled
I/O Non-Posted Prefetch	● Enabled ○ Disabled
I/O Snoop HoldOff Response	256 Cycles
Embedded Video Controller	● Enabled ○ Disabled
Current State of Embedded Video Controller	Enabled
SR-IOV Global Enable	● Enabled ○ Disabled
OS Watchdog Timer	○ Enabled ● Disabled

Enables or disables the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. Enable this feature if booting to a virtualization ... (Press <F1> for more help)

PowerEdge R730
Service Tag: 6Y87LN2

ⓘ **NOTE:** If the NIC has some separate SR-IOV settings, you might also need to check them in the BIOS settings. For example, for the Intel 710 NICs, you need to enable the SR-IOV for each NIC in BIOS settings.



System Setup

Device Settings

RAID Controller in Slot 4: Dell PERC <PERC H730P Adapter> Configuration Utility

Integrated NIC 1 Port 1: Intel(R) Ethernet 10G 4P X710/I350 rNDC - 24:6E:96:D1:24:7C

Integrated NIC 1 Port 2: Intel(R) Ethernet 10G X710 rNDC - 24:6E:96:D1:24:7E

Integrated NIC 1 Port 3: Intel(R) Gigabit 4P X710/I350 rNDC - 24:6E:96:D1:24:9C

Integrated NIC 1 Port 4: Intel(R) Gigabit 4P X710/I350 rNDC - 24:6E:96:D1:24:9D

NIC in Slot 1 Port 1: Intel(R) Ethernet Converged Network Adapter X710 - F8:F2:1E:21:98:60

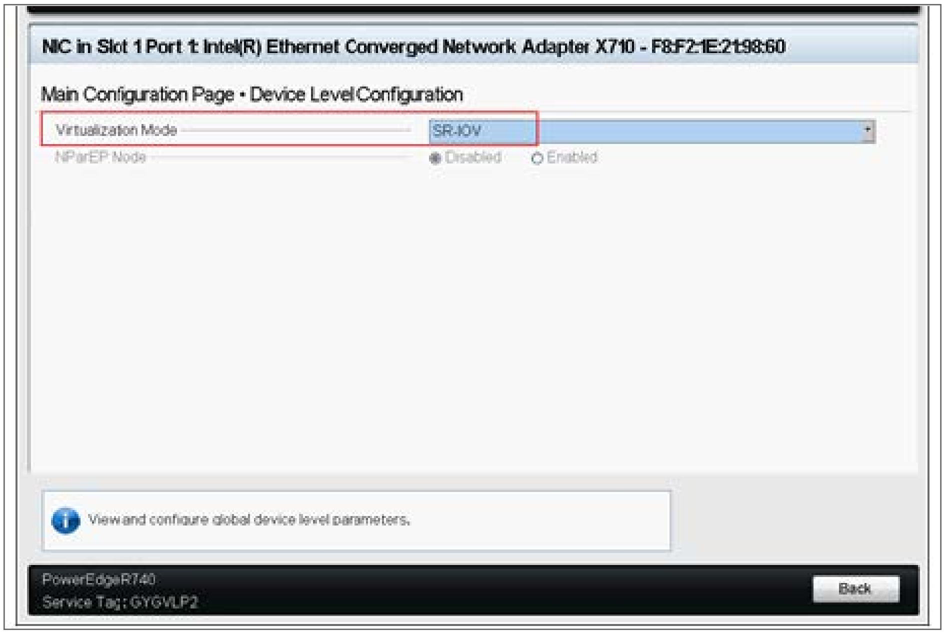
NIC in Slot 1 Port 2: Intel(R) Ethernet Converged Network Adapter X710 - F8:F2:1E:21:98:62

NIC in Slot 2 Port 1: Intel(R) Ethernet 10G 2P X520 Adapter - B4:96:91:29:6A:44

NIC in Slot 2 Port 2: Intel(R) Ethernet 10G 2P X520 Adapter - B4:96:91:29:6A:46

NIC in Slot 3 Port 1: Intel(R) Ethernet 10G 2P X520 Adapter - B4:96:91:21:0C:AC

PowerEdge R740
Service Tag: GYGVLP2



NIC in Slot 1 Port 1: Intel(R) Ethernet Converged Network Adapter X710 - F8:F2:1E:21:98:60

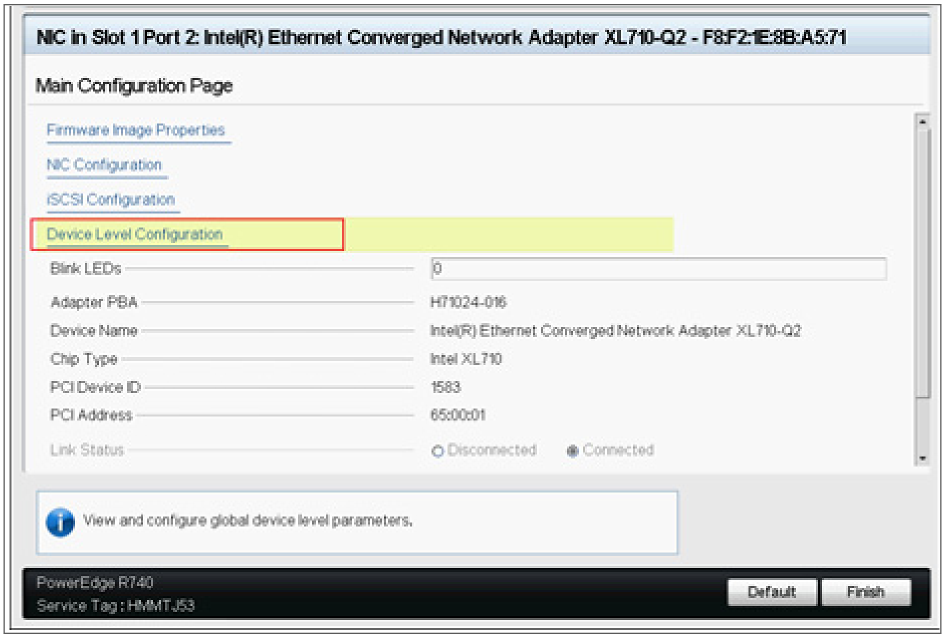
Main Configuration Page • Device Level Configuration

Virtualization Mode: SR-IOV

NParEP Mode: ● Disabled ○ Enabled

View and configure global device level parameters.

PowerEdgeR740
Service Tag: GYGVLP2



NIC in Slot 1 Port 2: Intel(R) Ethernet Converged Network Adapter XL710-Q2 - F8:F2:1E:8B:A5:71

Main Configuration Page

Blink LEDs: 0

Adapter PBA: H71024-016

Device Name: Intel(R) Ethernet Converged Network Adapter XL710-Q2

Chip Type: Intel XL710

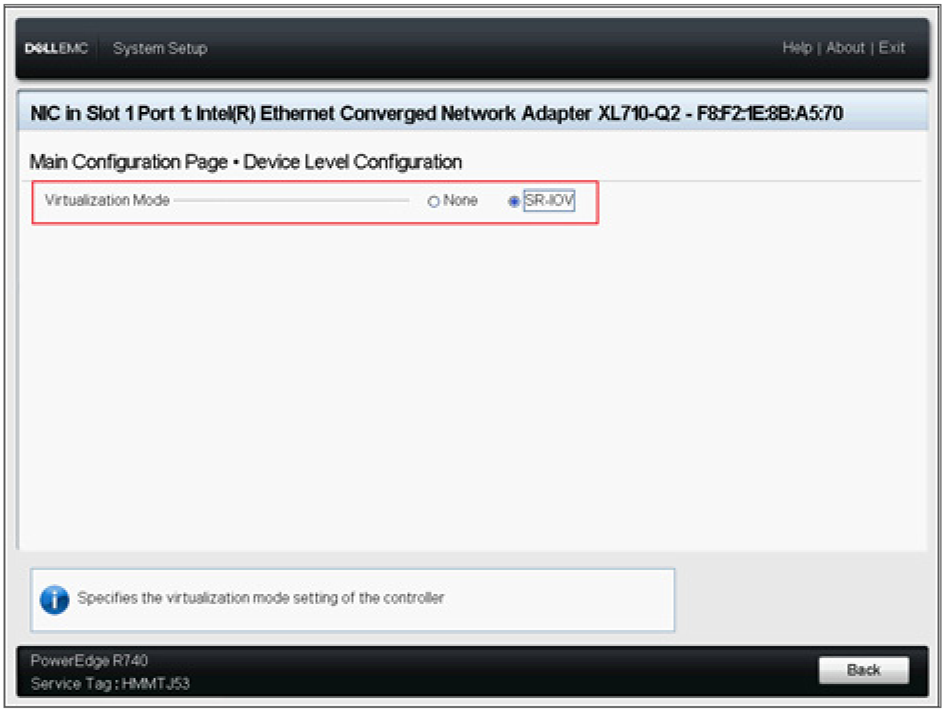
PCI Device ID: 1583

PCI Address: 65:00:01

Link Status: ○ Disconnected ● Connected

View and configure global device level parameters.

PowerEdge R740
Service Tag: HMMTJ53



NIC in Slot 1 Port 1: Intel(R) Ethernet Converged Network Adapter XL710-Q2 - F8:F2:1E:8B:A5:70

Main Configuration Page • Device Level Configuration

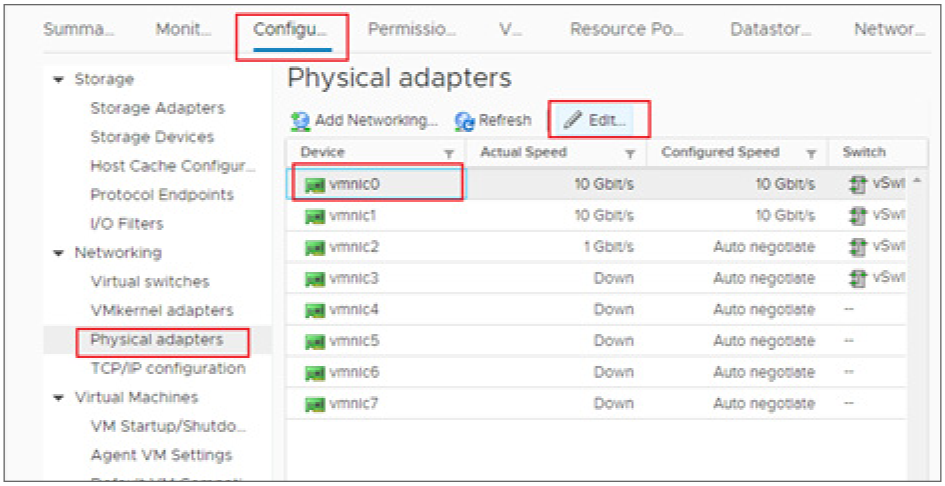
Virtualization Mode ○ None ● SR-IOV

Specifies the virtualization mode setting of the controller

PowerEdge R740
Service Tag : HMMTJ53

To enable SR-IOV in VMware Host NIC settings:

1. Go to the Host's **Configuration > Networking > Physical adapters**, find your NIC that supports SR-IOV, click **Edit**.

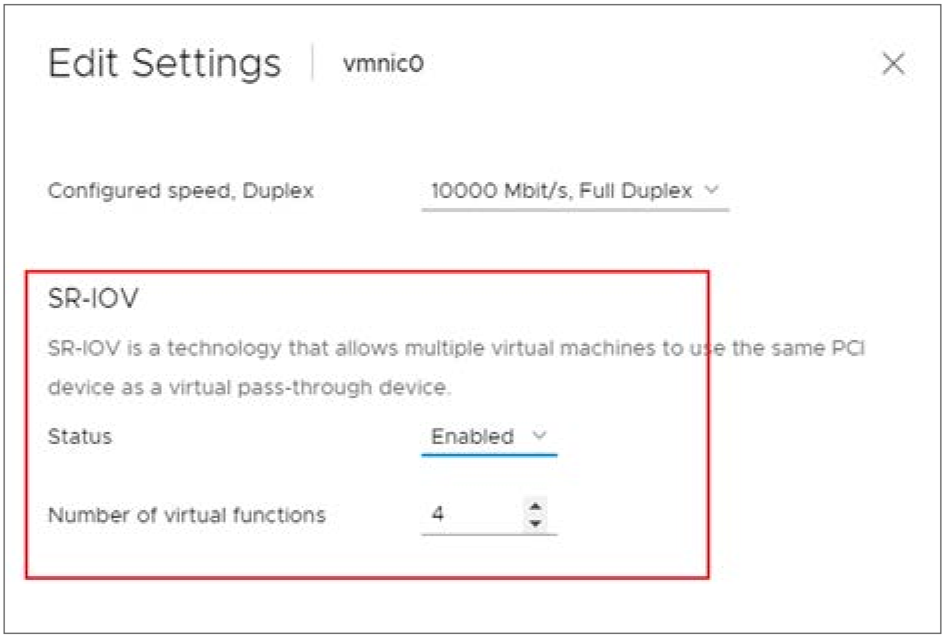


Physical adapters

Device	Actual Speed	Configured Speed	Switch
vmnic0	10 Gbit/s	10 Gbit/s	vSwi
vmnic1	10 Gbit/s	10 Gbit/s	vSwi
vmnic2	1 Gbit/s	Auto negotiate	vSwi
vmnic3	Down	Auto negotiate	vSwi
vmnic4	Down	Auto negotiate	--
vmnic5	Down	Auto negotiate	--
vmnic6	Down	Auto negotiate	--
vmnic7	Down	Auto negotiate	--

2. In the **SR-IOV** section, set the **Status** to **Enabled** and set the value of **Number of virtual functions** to some value that is larger than 0.

   ⓘ **NOTE:** There could be some maximum VF number for different NICs, you should check the NIC specifications or BIOS settings for this maximum number.



Edit Settings | vmnic0

Configured speed, Duplex: 10000 Mbit/s, Full Duplex

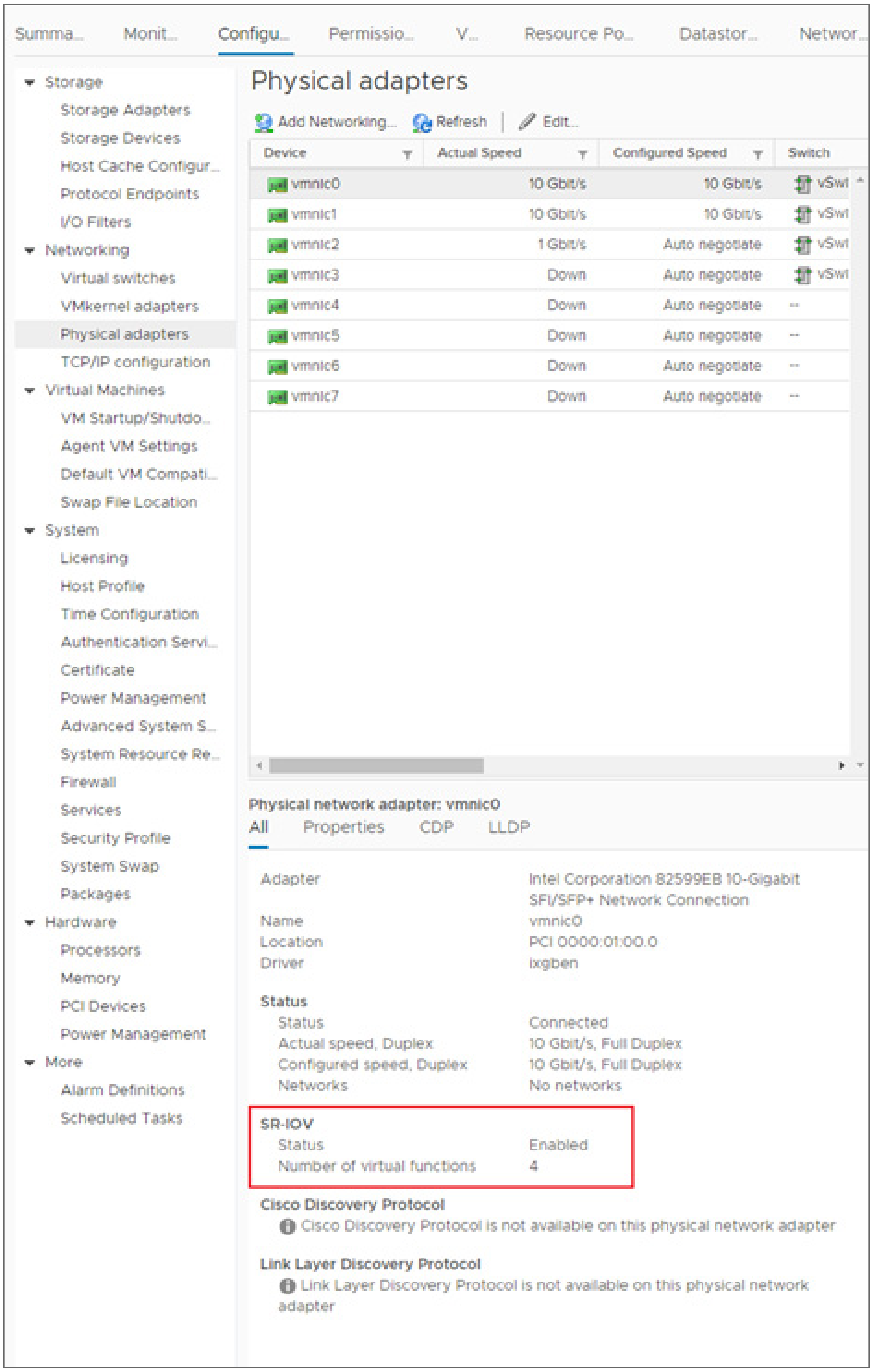
SR-IOV

SR-IOV is a technology that allows multiple virtual machines to use the same PCI device as a virtual pass-through device.

Status: Enabled

Number of virtual functions: 4

3. After configuring the SR-IOV settings for all the NICs you want to use, you need to reboot the "Host" and then check the SR-IOV status of those NICs to make sure they are all available.



Physical adapters

Device	Actual Speed	Configured Speed	Switch
vmnic0	10 Gbit/s	10 Gbit/s	vSwi
vmnic1	10 Gbit/s	10 Gbit/s	vSwi
vmnic2	1 Gbit/s	Auto negotiate	vSwi
vmnic3	Down	Auto negotiate	vSwi
vmnic4	Down	Auto negotiate	--
vmnic5	Down	Auto negotiate	--
vmnic6	Down	Auto negotiate	--
vmnic7	Down	Auto negotiate	--

Physical network adapter: vmnic0

Adapter	Intel Corporation 82599EB 10-Gigabit SFI/SFP+ Network Connection
Name	vmnic0
Location	PCI 0000:01:00.0
Driver	ixgben
Status	
Status	Connected
Actual speed, Duplex	10 Gbit/s, Full Duplex
Configured speed, Duplex	10 Gbit/s, Full Duplex
Networks	No networks
SR-IOV	
Status	Enabled
Number of virtual functions	4

Cisco Discovery Protocol

Cisco Discovery Protocol is not available on this physical network adapter

Link Layer Discovery Protocol

Link Layer Discovery Protocol is not available on this physical network adapter

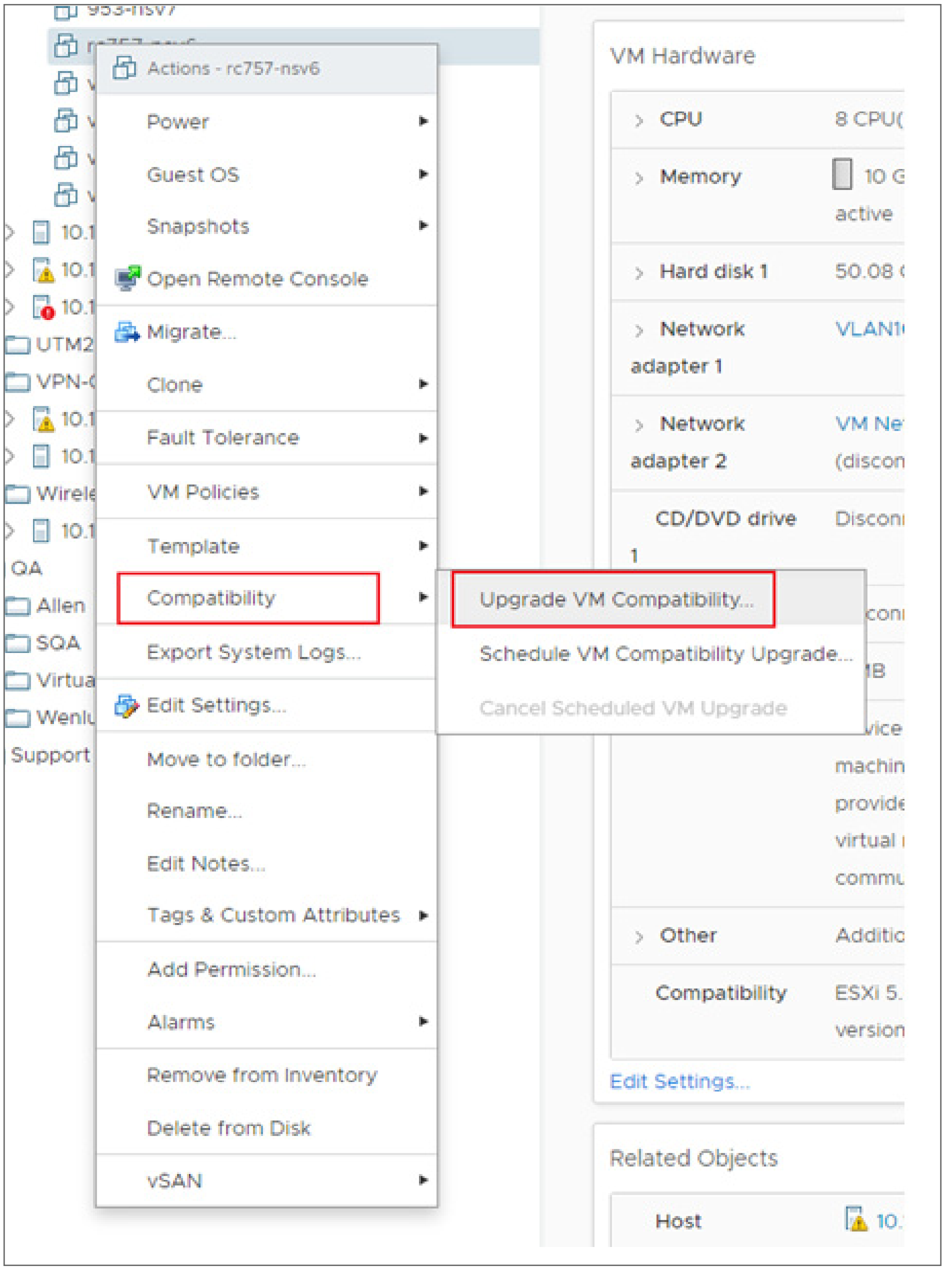
Now that the **Host** settings are established, configure the NSv virtual machine to add the SR-IOV interfaces.

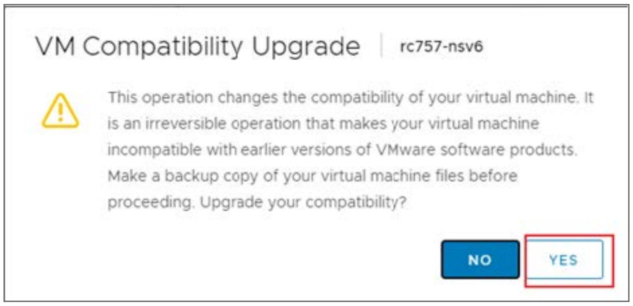
If the vCenter GUI reports errors and does not function as expected, there is a CLI command in ESXi SSH that can do the same for configuring the SR-IOV VF number:

1. Use `esxcli network nic list` to locate the driver names of your NICs.
2. Use `esxcfg-module ixgben -s max_vfs=4,4,4,4`. The "`ixgben`" is the driver name in this case, and the "`4,4,4,4`" means configure all four ports with four maximum VF number.

To add SR-IOV Network Adapters into your virtual machine:

1. Set the "VM compatibility" of your NSv virtual machine (right-click the virtual machine and see the "Compatibility" option). Note, this is the very "key" step to be able to add the SR-IOV network adapter in your virtual machine. See the "Prerequisites" in https://docs.vmware.com/en/VMware-vSphere/6.7/com.vmware.vsphere.networking.doc/GUID-898A3D66-9415-4854-8413-B40F2CB6FF8D.html.

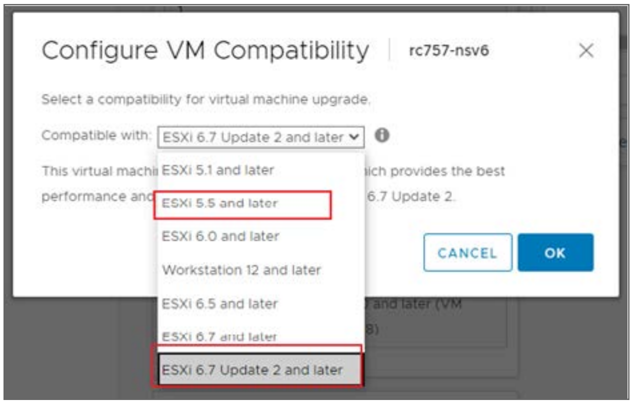

Actions - rc757-nsv6
Power
Guest OS
Snapshots
Open Remote Console
Migrate...
Clone
Fault Tolerance
VM Policies
Template
Compatibility
Export System Logs...
Edit Settings...
Move to folder...
Rename...
Edit Notes...
Tags & Custom Attributes
Add Permission...
Alarms
Remove from Inventory
Delete from Disk
vSAN
Upgrade VM Compatibility...
Schedule VM Compatibility Upgrade...
Cancel Scheduled VM Upgrade
VM Hardware
CPU
Memory
Hard disk 1
Network adapter 1
Network adapter 2
CD/DVD drive 1
Other
Compatibility
Edit Settings...
Related Objects
Host



VM Compatibility Upgrade | rc757-nsv6

This operation changes the compatibility of your virtual machine. It is an irreversible operation that makes your virtual machine incompatible with earlier versions of VMware software products. Make a backup copy of your virtual machine files before proceeding. Upgrade your compatibility?

2. According to VMware's guide, the compatibility should be "ESXi 5.5 or later." It is suggested to use the latest version that the Host supports. So select the default "ESXi 6.7 Update 2 and later" for this host.



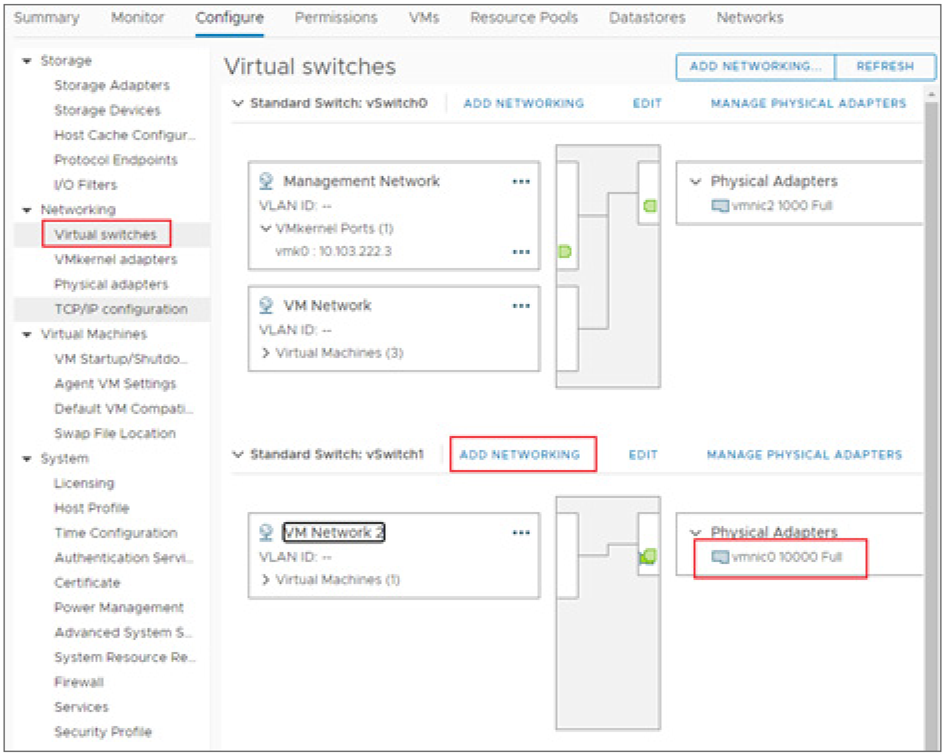
Configure VM Compatibility | rc757-nsv6

Select a compatibility for virtual machine upgrade.

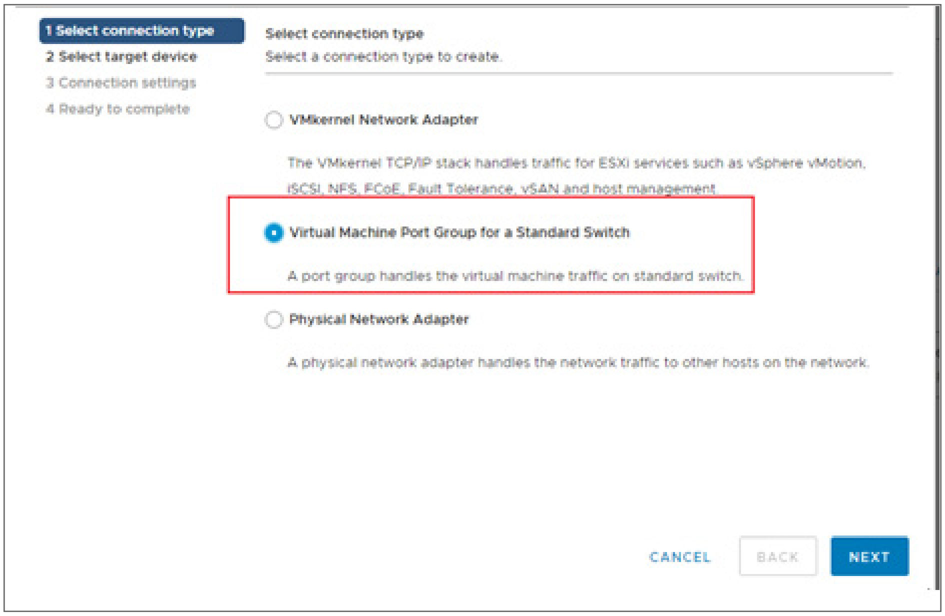
Compatible with: ESXi 6.7 Update 2 and later

This virtual machi ich provides the best performance and 6.7 Update 2.

3. You might like to add new "virtual networking" to the vSwitches with your physical adapters.



4. Make sure you select the vSwitch of your SR-IOV physical adapter.



Select connection type

Select a connection type to create.

○ VMkernel Network Adapter

The VMkernel TCP/IP stack handles traffic for ESXi services such as vSphere vMotion, iSCSI, NFS, FCoE, Fault Tolerance, vSAN and host management.

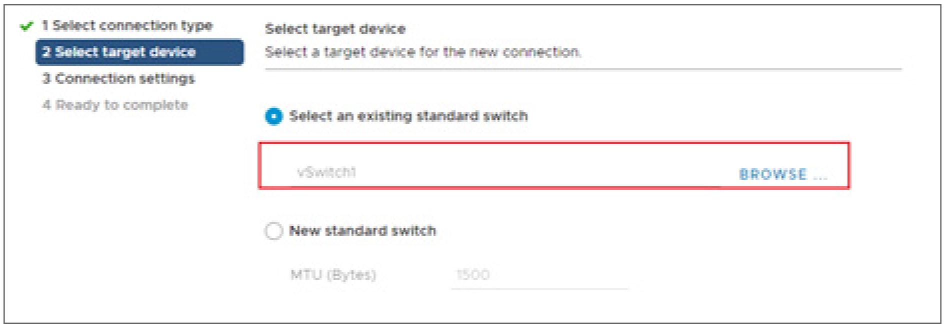
● Virtual Machine Port Group for a Standard Switch

A port group handles the virtual machine traffic on standard switch.

○ Physical Network Adapter

A physical network adapter handles the network traffic to other hosts on the network.

5. To make the multiple SR-IOV VF can be used by multiple different virtual machines, set different VLAN IDs for different networks. Then you can select different networks for different virtual machines.



✔ 1 Select connection type
2 Select target device
3 Connection settings
4 Ready to complete

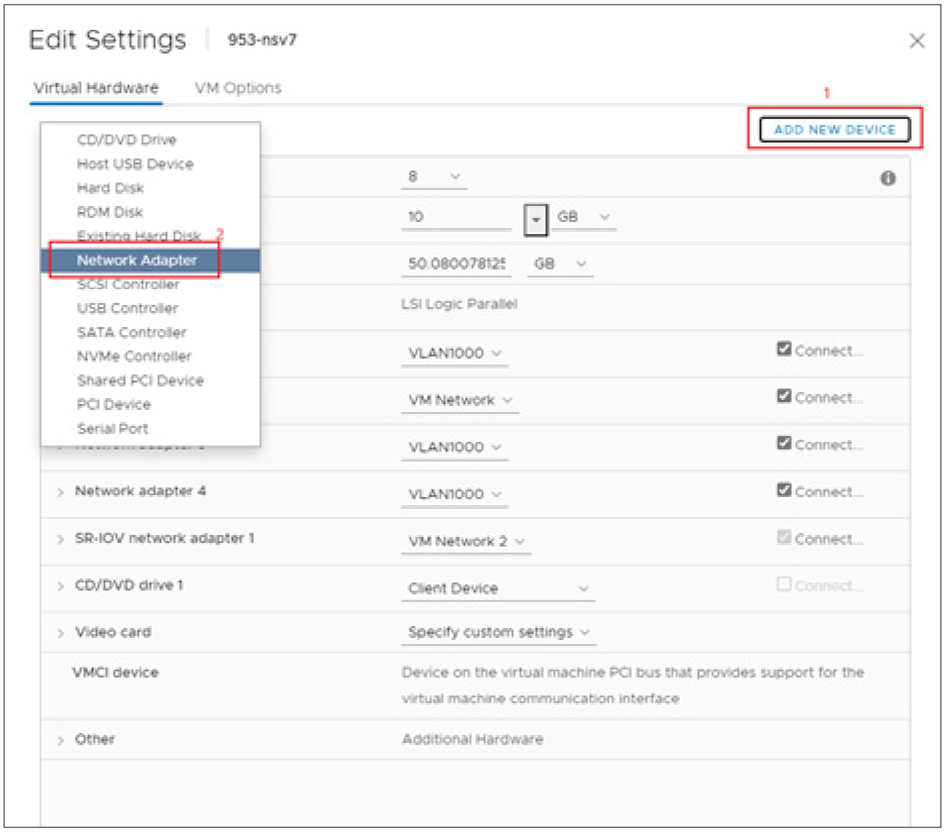
Select target device
Select a target device for the new connection.

● Select an existing standard switch
vSwitch1 BROWSE ...

○ New standard switch
MTU (Bytes) 1500

To configure the virtual machine to add the SR-IOV Network Adapters:

1. Open the **Edit Settings** of your NSv virtual machine. Click the **ADD NEW DEVICE** and **Select Network Adapter**.

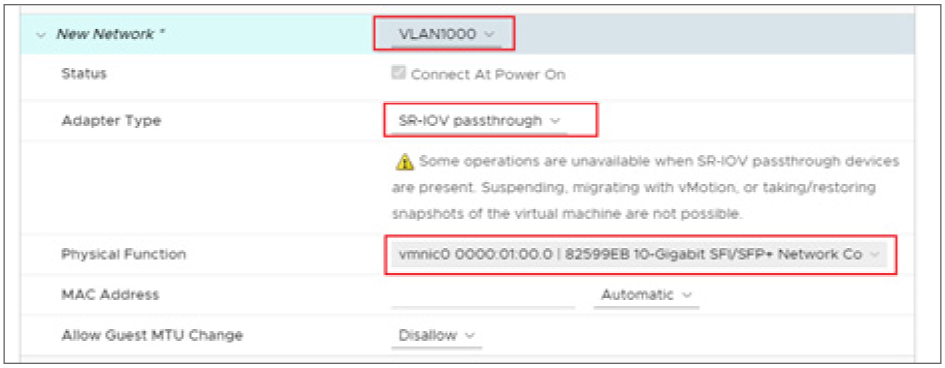


Edit Settings | 953-nsv7
Virtual Hardware VM Options
ADD NEW DEVICE

CD/DVD Drive
Host USB Device
Hard Disk
RDM Disk
Existing Hard Disk
Network Adapter
SCSI Controller
USB Controller
SATA Controller
NVMe Controller
Shared PCI Device
PCI Device
Serial Port

	8	
	10 GB	
	50.080078125 GB	
	LSI Logic Parallel	
	VLAN1000	☑ Connect...
	VM Network	☑ Connect...
	VLAN1000	☑ Connect...
› Network adapter 4	VLAN1000	☑ Connect...
› SR-IOV network adapter 1	VM Network 2	☑ Connect...
› CD/DVD drive 1	Client Device	□ Connect...
› Video card	Specify custom settings	
VMCI device	Device on the virtual machine PCI bus that provides support for the virtual machine communication interface	
› Other	Additional Hardware	

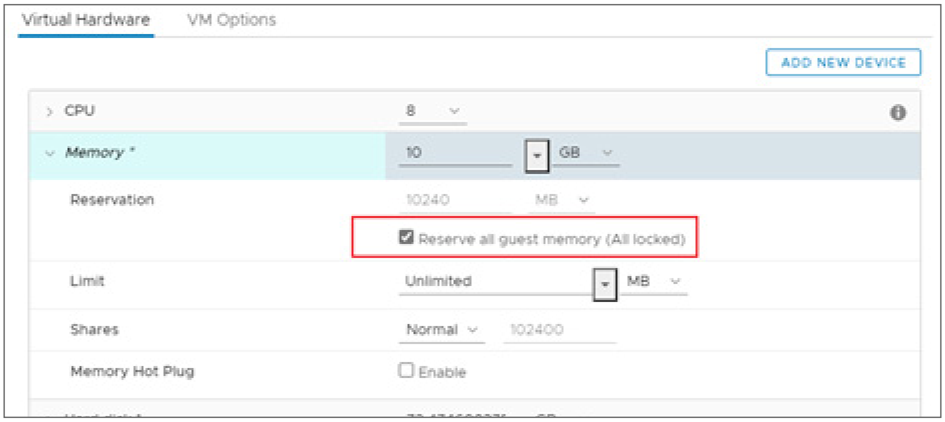
2. Edit your newly added Network Adapter by: changing the **Adapter Type** to **SR-IOV passthrough** and select the **Physical Function** to the physical NIC and select your virtual Network.



New Network *	VLAN1000
Status	☑ Connect At Power On
Adapter Type	SR-IOV passthrough
	⚠ Some operations are unavailable when SR-IOV passthrough devices are present. Suspending, migrating with vMotion, or taking/restoring snapshots of the virtual machine are not possible.
Physical Function	vmnic0 0000:01:00.0 | 82599EB 10-Gigabit SFI/SFP+ Network Co
MAC Address	Automatic
Allow Guest MTU Change	Disallow

You can add multiple SR-IOV adapters to the same virtual machine if your total NIC number does not exceed the "maximum physical interfaces supported in NSv." Now you are done with all the SR-IOV settings in VMware. You might need to configure your real physical switch that connected to the physical function NIC port to add the VLANs for supporting different VF sending traffics with different VLAN ID.

3. Enable the **Reserve all guest memory (All locked)** option in the virtual machine Memory part.



CPU	8
Memory *	10 GB
Reservation	10240 MB
	☑ Reserve all guest memory (All locked)
Limit	Unlimited MB
Shares	Normal 102400
Memory Hot Plug	☐ Enable

ⓘ **IMPORTANT:** Otherwise, the virtual machine with SR-IOV devices cannot boot up because of a memory error.

Performance Enhancement Configurations

From the images in the previous sections on configuration, we use the Intel 82599 (or X520) NIC as an example. But because of the limitations with these NICs, the RSS configurations can only be configured by the PF driver side. And after some testing and investigations, both the "ixgben" and "ixgbe" drivers from VMware cannot fully enable the multi-queue RSS feature in NSv's virtual machine side. So all packets goes to only one RX queue for each NIC port. This could result in some multicore contentions on the RX side (might make more CPU time visible on the ODP scheduler when doing the performance profiling).

To achieve the best performance for NSv, make sure the RSS feature on the VF side inside the NSv works as expected (multiple RX queue can all evenly get packets when we have multiple traffic flows running through NSv). Currently, only the i40e (Intel 7xx NICs) driver works as expected and gets the best performance.

Replace the default VMWARE Native driver (ends with "n") with original driver

Before going into the steps for enabling RSS on the PF driver side, enable the original Intel NIC drivers (such as "i40e" for Intel 7xx NICs) and disable the native VMware drivers (such as the "i40en" for Intel 7xx NICs).

The main reason for replacing the driver is that the "native" driver does NOT work with DPDK's VF driver and always causes SonicOS to fail at the early stages of configuring VF drivers.

You can use the following commands to check which drivers are in use.

```
[root@ESXi-10D7D100D252:~] esxcfg-nics -l | grep i40e
vmnic0  0000:18:00.0   i40en   Up      10000Mbps   Full    24:6e:96:d1:24:7c 1500   Intel
Corporation Ethernet Controller X710 for 10GbE SFP+

vmnic1  0000:18:00.1   i40en   Up      10000Mbps   Full    24:6e:96:d1:24:7e 1500   Intel
Corporation Ethernet Controller X710 for 10GbE SFP+

vmnic4  0000:3b:00.0   i40en   Up      10000Mbps   Full    f8:f2:1e:21:98:60 1500   Intel
Corporation Ethernet Controller X710 for 10GbE SFP+

vmnic5  0000:3b:00.1   i40en   Up      10000Mbps   Full    f8:f2:1e:21:98:62 1500   Intel
Corporation Ethernet Controller X710 for 10GbE SFP+
```

If the third column says "i40en," then it means you need to replace it with "i40e."

Then check if the "i40e" drivers are available on your system. If not, you might need to search for and download them from VMware's website.

```
[root@ESXi-10D7D100D252:~] esxcli system module list | grep i40e
i40en_ens                    true                         true
i40e                         true                         true
i40en                        true                         true
```

As you can see, we have both "i40e" and "i40en" drivers and all enabled and loaded by default. Now we need to disable the "i40en" and make sure enable the "i40e" driver module.

```
esxcli system module set -e=true -m=i40e

esxcli system module set -e=false -m=i40en
```

Reboot the Host server to apply this change. After the system boots up, you can check with "`esxcfg-nics -l | grep i40e`" to verify all those X710 NICs are using the "i40e" driver module instead of the "i40en."

Set the RSS and max_vfs parameters for i40e driver

There are some other parameters that can be set for the "i40e" driver. Use the following commands to see a list of these parameters and brief descriptions.

```
[root@ESXi-10D7D100D252:~] esxcli system module parameters list --module i40e
```

Name	Type	Value	Description
RSS	array of int	4,4,4,4	Number of Receive-Side Scaling Descriptor Queues: 0 = disable/default, 1-4 = enable (number of cpus)
VMDQ	array of int		Number of Virtual Machine Device Queues: 0/1 = disable, 2-16 enable (default = 8)
debug	int		Debug level (0=none,...,16=all)
heap_initial	int		Initial heap size allocated for the driver.
heap_max	int		Maximum attainable heap size for the driver.
max_vfs	array of int	4,4,4,4	Number of Virtual Functions: 0 = disable (default), 1-128 = enable this many virtual machines
skb_mpool_initial	int		Driver's minimum private socket buffer memory pool size.
skb_mpool_max	int		Maximum attainable private socket buffer memory pool size for the driver.

There are only two parameters that we need to set for enabling SR-IOV and RSS features: "max_vfs" and "RSS." As the maximum RSS queues are four for current i40e and we set the maximum number of virtual machines to four as example, then you can use the following command to set the values.

```
esxcli system module parameters set --module i40e -p "RSS=4,4,4,4 max_vfs=4,4,4,4"
```

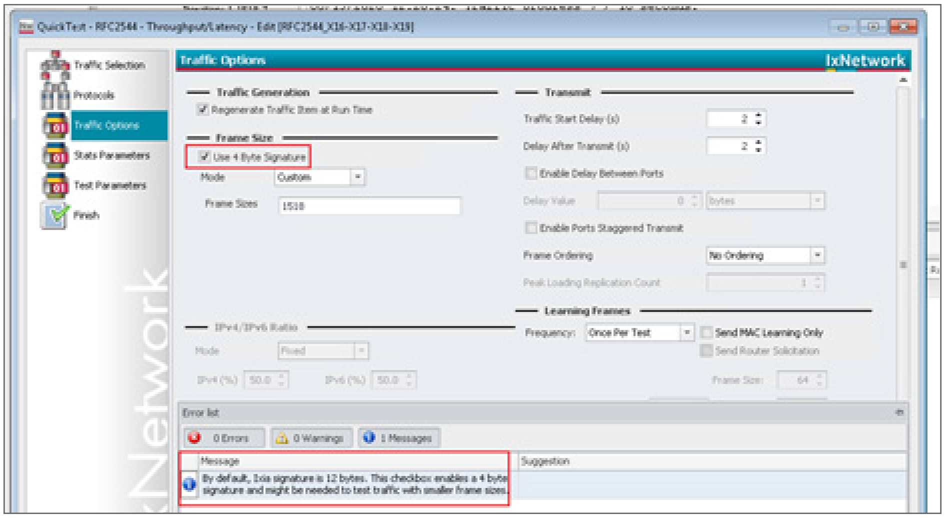
Please note that we set four numbers for both parameters. This is because we have four NICs in "esxcfg-nics" results and we would like to enable these features for all these four NICs.

After this command, then you need to reboot the Host again to apply these changes.

After the system boots up, you can change your NSv's NIC settings to setup the SR-IOV interfaces upon the X710 physical NIC and do the performance testing.

Note on Test Methods

- **Always use multiple flows to test the performance**
  Because of our multicore processing design, always use multiple traffic flow when testing the throughput.
  And for these flows, we should make sure only one of the four tuples (`srcIP/dstIP/srcPort/dstPort`) changes for each flow. This can make sure the RSS hash and our connection tag hash work perfectly to distribute the flows to different cores.
- **Disable the Use 4 Byte Signature feature in IXIA**
  In IxNetwork RFC2544 test settings, the following configuration could affect the result.



QuickTest - RFC2544 - Throughput/Latency - Edit [RFC2544_X16-X17-X18-X19]

Traffic Options

Traffic Generation

☑ Regenerate Traffic Item at Run Time

Frame Size

☑ Use 4 Byte Signature

Mode: Custom

Frame Sizes: 1518

Transmit

Traffic Start Delay (s): 2

Delay After Transmit (s): 2

□ Enable Delay Between Ports

Delay Value: 0 bytes

□ Enable Ports Staggered Transmit

Frame Ordering: No Ordering

Peak Loading Replication Count: 1

Learning Frames

Frequency: Once Per Test

□ Send MAC Learning Only

□ Send Router Solicitation

Frame Size: 64

IPv4/IPv6 Ratio

Mode: Fixed

IPv4 (%): 50.0 IPv6 (%): 50.0

Error list

0 Errors 0 Warnings 1 Messages

Message	Suggestion
By default, Ixia signature is 12 bytes. This checkbox enables a 4 byte signature and might be needed to test traffic with smaller frame sizes.	

This **Use 4 Byte Signature** option can only be used in testing the packets with a 64 bytes size. Otherwise, disable this option.

Using SafeMode on the NSv

The NSv virtual machine enters SafeMode when SonicOS restarts three times unexpectedly within 200 seconds. When the NSv virtual machine is in SafeMode, the virtual machine starts with a very limited set of services and features enabled. This is useful when trying to troubleshoot issues. The NSv virtual machine can also be configured to boot into SafeMode by using the **Reboot | Shutdown** screen in the NSv management console.

Topics:

How Management Console Differs in SafeMode

In SafeMode, some of the features the management console provides are different in the following ways:

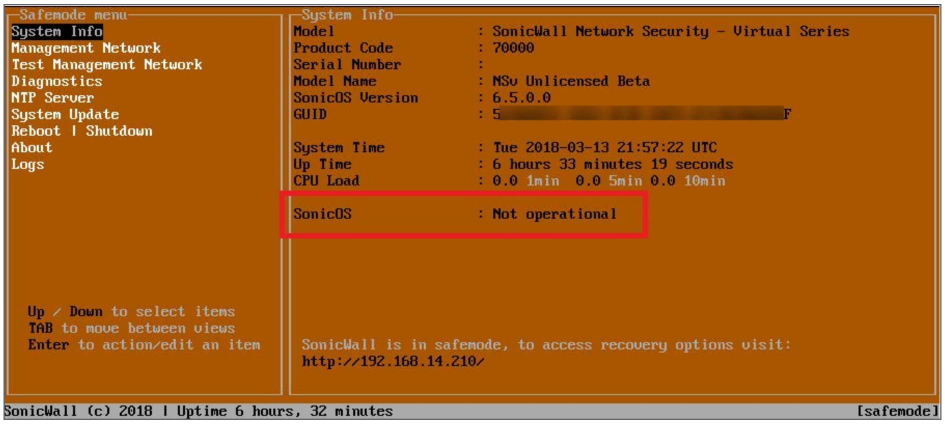
- Configurable interfaces
- Configurable default gateway
- Configurable DNS servers

  ⓘ | **NOTE:** Changes made to interfaces in SafeMode are ***not*** persistent between reboots.

When the NSv is in SafeMode, the SonicOS service is one of the services that is not enabled and is shown as Not operational on the SafeMode **System Info** screen.

Entering SafeMode

After booting into SafeMode, the Management Console always starts with the **System Info** screen.



```
-Safemode menu-                   -System Info-
System Info                       Model                : SonicWall Network Security - Virtual Series
Management Network                Product Code         : 70000
Test Management Network           Serial Number        :
Diagnostics                       Model Name           : NSv Unlicensed Beta
NTP Server                        SonicOS Version      : 6.5.0.0
System Update                     GUID                 : [redacted]
Reboot | Shutdown
About                             System Time          : Tue 2018-03-13 21:57:22 UTC
Logs                              Up Time              : 6 hours 33 minutes 19 seconds
                                  CPU Load             : 0.0 1min  0.0 5min 0.0 10min

                                  SonicOS              : Not operational




  Up / Down to select items
  TAB to move between views
  Enter to action/edit an item     SonicWall is in safemode, to access recovery options visit:
                                   http://192.168.14.210/

SonicWall (c) 2018 | Uptime 6 hours, 32 minutes                                            [safemode]
```

ⓘ | **NOTE:** To exit SafeMode, disable it on the **Reboot | Shutdown** screen or deploy a new firmware image. See Disabling SafeMode and Installing a New SonicOS Version in SafeMode for more information.

Topics:

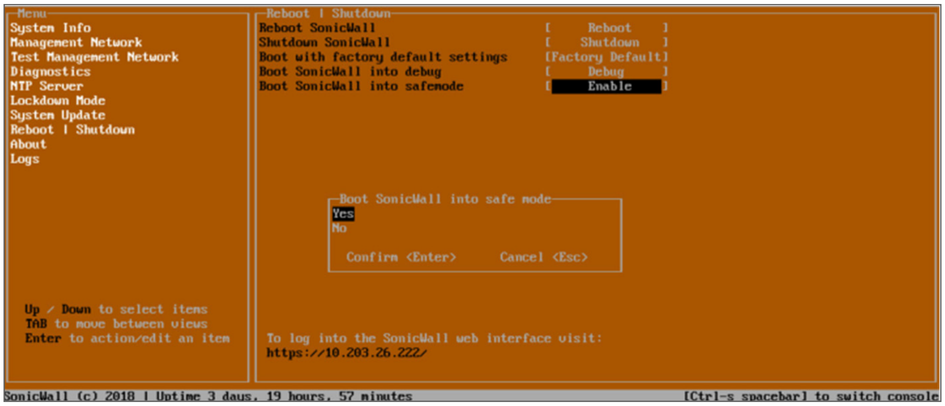
- Enabling SafeMode
- Disabling SafeMode
- Configuring the Management Network in SafeMode

Enabling SafeMode

SafeMode can be enabled from the management console.

To enable SafeMode:

1. Access the NSv management console as described in one of:
   - For NSv, see: Connecting to the Console with SSH
2. In the console, select the **Reboot | Shutdown** option and then press **Enter**.
3. Navigate down to the **Boot SonicWall into safemode** option to highlight **Enable**, and then press **Enter**.



```
Menu                              Reboot | Shutdown
System Info                       Reboot SonicWall                        [     Reboot     ]
Management Network                Shutdown SonicWall                      [    Shutdown    ]
Test Management Network           Boot with factory default settings      [Factory Default]
Diagnostics                       Boot SonicWall into debug               [     Debug      ]
NTP Server                        Boot SonicWall into safemode            [     Enable     ]
Lockdown Mode
System Update
Reboot | Shutdown
About
Logs

                                           Boot SonicWall into safe mode
                                           Yes
                                           No

                                             Confirm <Enter>      Cancel <Esc>

  Up / Down to select items
  TAB to move between views
  Enter to action/edit an item     To log into the SonicWall web interface visit:
                                   https://10.203.26.222/

SonicWall (c) 2018 | Uptime 3 days, 19 hours, 57 minutes              [Ctrl-s spacebar] to switch console
```

4. Select **Yes** in the confirmation dialog.
5. Press **Enter**.

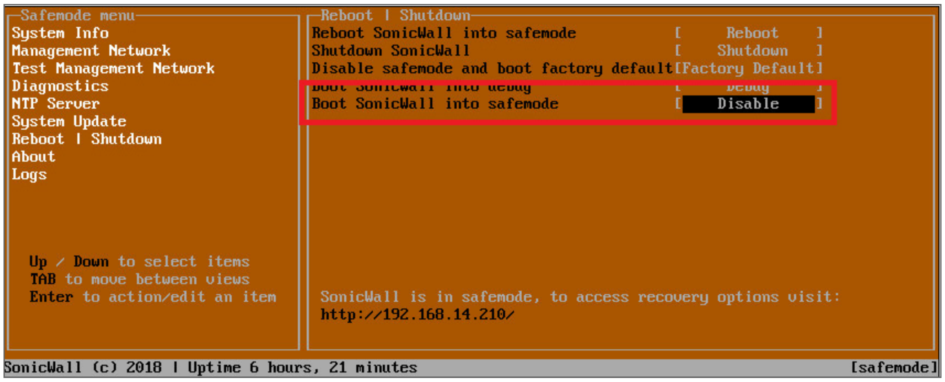
   The NSv immediately reboots and comes back up in SafeMode.

   ⓘ **NOTE:** In SafeMode, the web interface is served from an HTTP server. The HTTPS server is not started in SafeMode.

Disabling SafeMode

To disable SafeMode:

1. In the SafeMode menu in the NSv management console, select the **Reboot | Shutdown** option and press **Enter**.
2. In the **Reboot | Shutdown** screen, navigate down to the **Boot SonicWall into safemode** option to highlight **Disable**, and then press **Enter**.



```
Safemode menu                      Reboot | Shutdown
System Info                        Reboot SonicWall into safemode             [     Reboot     ]
Management Network                 Shutdown SonicWall                         [    Shutdown    ]
Test Management Network            Disable safemode and boot factory default[Factory Default]
Diagnostics                        Boot SonicWall into debug                  [     Debug      ]
NTP Server                         Boot SonicWall into safemode               [    Disable     ]
System Update
Reboot | Shutdown
About
Logs



  Up / Down to select items
  TAB to move between views
  Enter to action/edit an item      SonicWall is in safemode, to access recovery options visit:
                                    http://192.168.14.210/

SonicWall (c) 2018 | Uptime 6 hours, 21 minutes                                    [safemode]
```

3. Select **Yes** in the confirmation dialog.
4. Press **Enter**.

   The NSv immediately reboots and boots up in normal mode.

Configuring the Management Network in SafeMode

When the Management Console is in SafeMode, the **Management Network** screen in the NSv management console provides features to configure the NSv virtual machine interfaces:

- **Management Interface** – This is the currently selected interface. This defaults to X1. Use this to select any of the NSv virtual machine interfaces.
- **IPv4 Address** – The current IPv4 address currently assigned to the Management Interface.
- **Netmask** – The current Netmask assigned to the Management Interface.
- **Mac Address** – The MAC address of the Management Interface.
- **IPv6 Address** – The currently assigned IPv6 address of the Management Interface.
- **Gateway** – The current Default Gateway currently in use by the NSv virtual machine.
- **DNS** – A list of the current DNS servers currently being used by the NSv virtual machine.

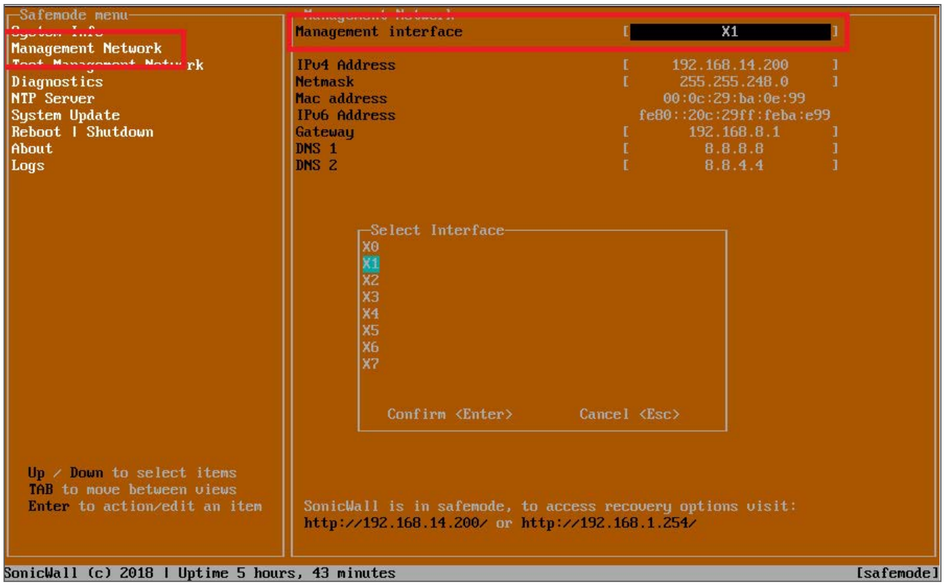
Changes made to interfaces in SafeMode are ***not*** persistent between reboots.

Topics:

- Configuring Interface Settings
- Disabling an Interface

Configuring Interface Settings

In SafeMode, the **Management Network** screen includes editable and actionable items that are read-only when the management console is in normal mode.

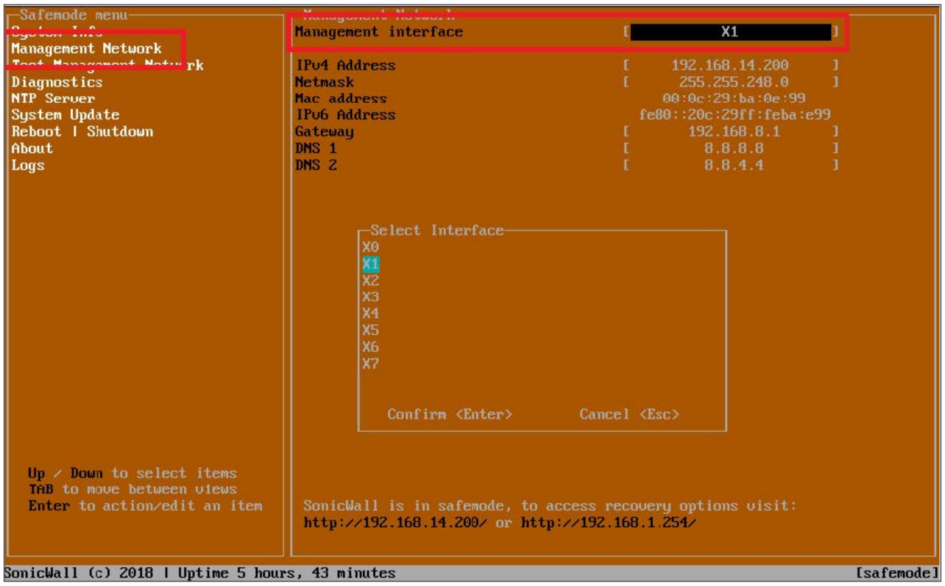


```
Safemode menu                    Management Network
System Info                      Management interface                [          X1          ]
Management Network
Test Management Network          IPv4 Address                        [    192.168.14.200    ]
Diagnostics                      Netmask                             [    255.255.248.0     ]
NTP Server                       Mac address                            00:0c:29:ba:0e:99
System Update                    IPv6 Address                         fe80::20c:29ff:feba:e99
Reboot | Shutdown                Gateway                             [     192.168.8.1      ]
About                            DNS 1                               [       8.8.8.8        ]
Logs                             DNS 2                               [       8.8.4.4        ]

                                         Select Interface
                                         X0
                                         X1
                                         X2
                                         X3
                                         X4
                                         X5
                                         X6
                                         X7

                                           Confirm <Enter>        Cancel <Esc>

  Up / Down to select items
  TAB to move between views
  Enter to action/edit an item     SonicWall is in safemode, to access recovery options visit:
                                   http://192.168.14.200/ or http://192.168.1.254/

SonicWall (c) 2018 | Uptime 5 hours, 43 minutes                                     [safemode]
```

To edit an interface:

1. In the SafeMode **Management Network** screen, select the **Management interface** option and then press **Enter**.

   The **Select Interface** list appears, displaying all of the interfaces available on the NSv.



```
Safemode menu                    Management Network
System Info                      Management interface                [          X1          ]
Management Network
Test Management Network          IPv4 Address                        [    192.168.14.200    ]
Diagnostics                      Netmask                             [    255.255.248.0     ]
NTP Server                       Mac address                            00:0c:29:ba:0e:99
System Update                    IPv6 Address                         fe80::20c:29ff:feba:e99
Reboot | Shutdown                Gateway                             [     192.168.8.1      ]
About                            DNS 1                               [       8.8.8.8        ]
Logs                             DNS 2                               [       8.8.4.4        ]

                                         Select Interface
                                         X0
                                         X1
                                         X2
                                         X3
                                         X4
                                         X5
                                         X6
                                         X7

                                           Confirm <Enter>        Cancel <Esc>

  Up / Down to select items
  TAB to move between views
  Enter to action/edit an item     SonicWall is in safemode, to access recovery options visit:
                                   http://192.168.14.200/ or http://192.168.1.254/

SonicWall (c) 2018 | Uptime 5 hours, 43 minutes                                     [safemode]
```

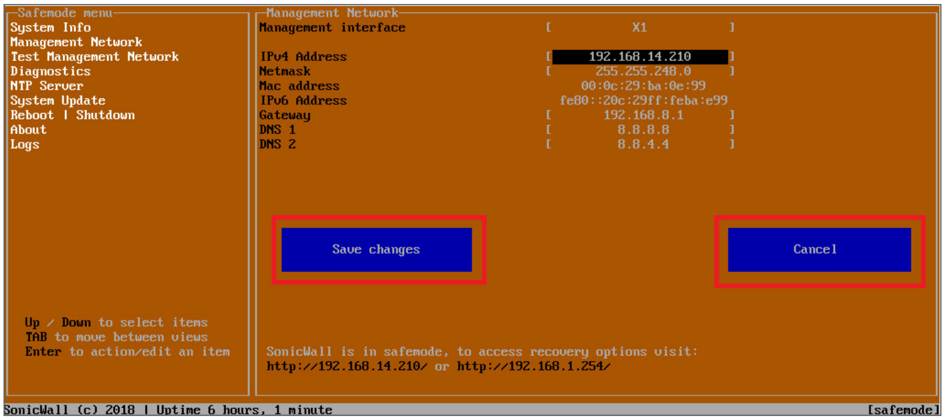
2. Select the interface you wish to edit and press **Enter**.

   The IPv4 and IPv6 addresses, Netmask, MAC address, Gateway, and DNS settings are displayed on the screen above the interface selection dialog.

3. To edit the IPv4 address, select **IPv4 Address** on the screen and press **Enter**.

The on-screen dialog displays the current IP address.

4. Navigate into the dialog and make the desired changes, then press **Enter** to close the dialog or press **Esc** to cancel and close the dialog.
5. Two new buttons appear on the screen after you make changes to an interface setting: **Save changes** or **Cancel**. You can use the **Tab** key to navigate to these buttons.



```
Safemode menu               Management Network
System Info                 Management interface         [        X1          ]
Management Network
Test Management Network     IPv4 Address                 [  192.168.14.210    ]
Diagnostics                 Netmask                      [  255.255.248.0     ]
NTP Server                  Mac address                     00:0c:29:ba:0e:99
System Update               IPv6 Address                  fe80::20c:29ff:feba:e99
Reboot | Shutdown           Gateway                      [   192.168.8.1      ]
About                       DNS 1                        [     8.8.8.8        ]
Logs                        DNS 2                        [     8.8.4.4        ]

                              Save changes                         Cancel

  Up / Down to select items
  TAB to move between views
  Enter to action/edit an item  SonicWall is in safemode, to access recovery options visit:
                                http://192.168.14.210/ or http://192.168.1.254/
SonicWall (c) 2018 | Uptime 6 hours, 1 minute                                  [safemode]
```

ⓘ **NOTE:** You cannot navigate to the left navigation pane until you either save changes or cancel using these buttons.

Do one of the following:

- To make changes to other settings for this interface, navigate to the desired setting, press **Enter**, make the changes in the dialog, then press **Enter** to close the dialog for that setting. Repeat for other settings, as needed.
- If finished making changes to the settings for this interface, press **Tab** to navigate to the **Save changes** button and then press **Enter** to save your changes.
- Press **Tab** to navigate to the **Cancel** button and then press **Enter** to cancel all changes to the settings for this interface.

Disabling an Interface

You can disable an interface while in SafeMode.

To disable an interface:

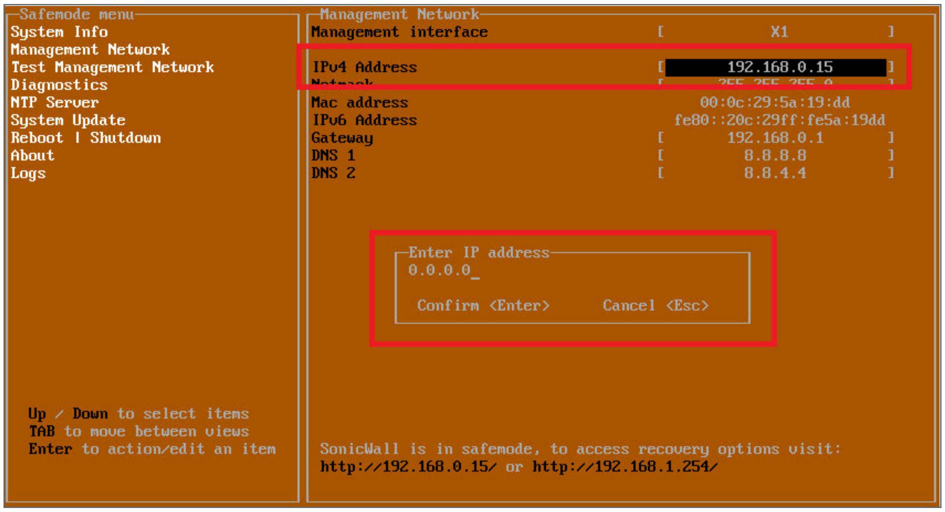
1. In the SafeMode **Management Network** screen, select the **Management interface** option.
2. Press **Enter**.

   The **Select Interface** list appears, displaying all of the interfaces available on the NSv.
3. Select the interface you wish to edit and press **Enter**.

   The IPv4 and IPv6 addresses, Netmask, MAC address, Gateway, and DNS settings are displayed previously on the interface selection dialog.
4. Select **IPv4 Address** and press **Enter**.

The onscreen dialog displays the current IP address.

5. Navigate into the dialog and change the IP address to `0.0.0.0`, then press **Enter**.

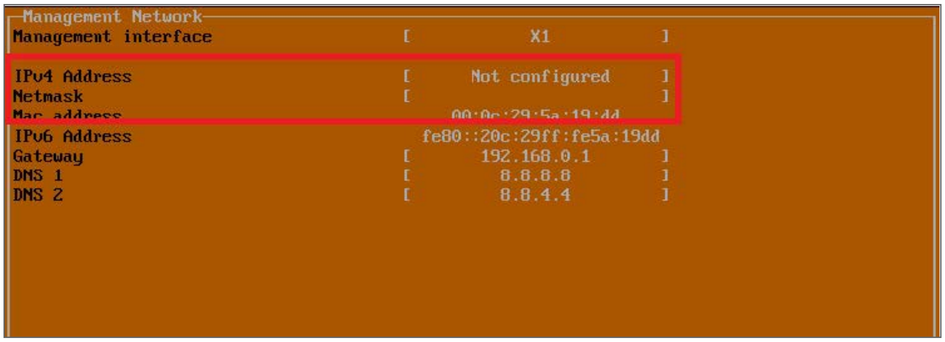


```
Safemode menu                      Management Network
System Info                        Management interface                [        X1        ]
Management Network
Test Management Network            IPv4 Address                        [   192.168.0.15   ]
Diagnostics                        Netmask                             [  255.255.255.0   ]
NTP Server                         Mac address                            00:0c:29:5a:19:dd
System Update                      IPv6 Address                        fe80::20c:29ff:fe5a:19dd
Reboot | Shutdown                  Gateway                             [    192.168.0.1   ]
About                              DNS 1                               [      8.8.8.8     ]
Logs                               DNS 2                               [      8.8.4.4     ]

                                           Enter IP address
                                           0.0.0.0_

                                            Confirm <Enter>        Cancel <Esc>

  Up / Down to select items
  TAB to move between views
  Enter to action/edit an item      SonicWall is in safemode, to access recovery options visit:
                                    http://192.168.0.15/ or http://192.168.1.254/
```

Save changes displays.

6. Press **Tab** to navigate to **Save changes** and then press **Enter**.

   The interface is disabled.



```
Management Network
Management interface                    [           X1           ]

IPv4 Address                            [     Not configured     ]
Netmask                                 [                        ]
Mac address                                  00:0c:29:5a:19:dd
IPv6 Address                              fe80::20c:29ff:fe5a:19dd
Gateway                                 [      192.168.0.1       ]
DNS 1                                   [        8.8.8.8         ]
DNS 2                                   [        8.8.4.4         ]
```

Installing a New SonicOS Version in SafeMode

SWI files are used to upgrade SonicOS. You can download the latest SWI image file from MySonicWall.

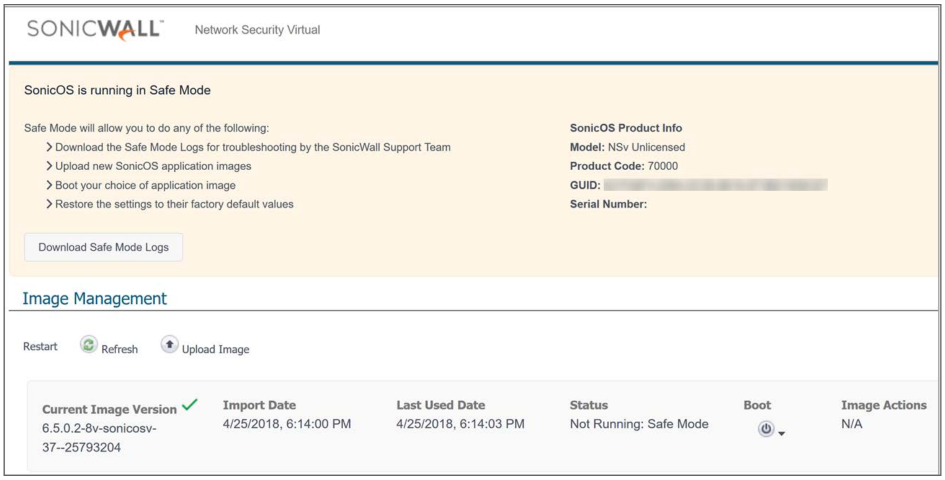
For additional information on uploading a new image, refer to: https://www.sonicwall.com/support/knowledge-base/?sol_id=180404172741874

In SafeMode, you can upload a new SonicOS SWI image and apply it to the NSv virtual machine. The SafeMode web management interface is used to perform an upgrade, rather than SafeMode in the NSv management console. When viewing the NSv management console in SafeMode, the URL for the SafeMode web interface is displayed at the bottom of the screen.

ⓘ | **NOTE:** In SafeMode, the web management interface is only available by way of **http** (not **https**).

To install a new SonicOS from SafeMode:

1. Depending on the type of NSv deployment, determine the IP address to use to access the SafeMode web management interface:
   - On an NSv deployed in Azure, you can access the Safemode web interface at the public IP address assigned to the NSv.
2. In a browser, navigate to `http://<IP address>`, using the applicable IP address. The SafeMode web management interface displays.



SonicOS is running in Safe Mode

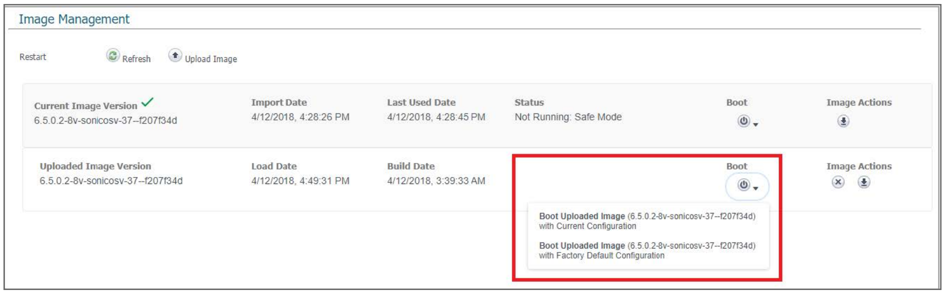
Safe Mode will allow you to do any of the following:

- Download the Safe Mode Logs for troubleshooting by the SonicWall Support Team
- Upload new SonicOS application images
- Boot your choice of application image
- Restore the settings to their factory default values

SonicOS Product Info
Model: NSv Unlicensed
Product Code: 70000
GUID: [redacted]
Serial Number:

Current Image Version ✓	Import Date	Last Used Date	Status	Boot	Image Actions
6.5.0.2-8v-sonicosv-37--25793204	4/25/2018, 6:14:00 PM	4/25/2018, 6:14:03 PM	Not Running: Safe Mode	⏻ ▾	N/A

3. Click **Upload Image** to select an SWI file and then click **Upload** to upload the image to the virtual machine. A progress bar provides feedback on the file upload progress. After the upload completes, the image is available in the **Image Management** list in the SafeMode web interface.
4. In the row with the uploaded image file, click **Boot** and select one of the following:
   - **Boot Uploaded Image with Current Configuration**
   - **Boot Uploaded Image with Factory Default Configuration**



Current Image Version ✓	Import Date	Last Used Date	Status	Boot	Image Actions
6.5.0.2-8v-sonicosv-37--f207f34d	4/12/2018, 4:28:26 PM	4/12/2018, 4:28:45 PM	Not Running: Safe Mode	⏻ ▾	⤓

Uploaded Image Version	Load Date	Build Date		Boot	Image Actions
6.5.0.2-8v-sonicosv-37--f207f34d	4/12/2018, 4:49:31 PM	4/12/2018, 3:39:33 AM		⏻ ▾	⊗ ⤓

Boot Uploaded Image (6.5.0.2-8v-sonicosv-37--f207f34d) with Current Configuration

Boot Uploaded Image (6.5.0.2-8v-sonicosv-37--f207f34d) with Factory Default Configuration

The NSv virtual machine reboots with the new image.

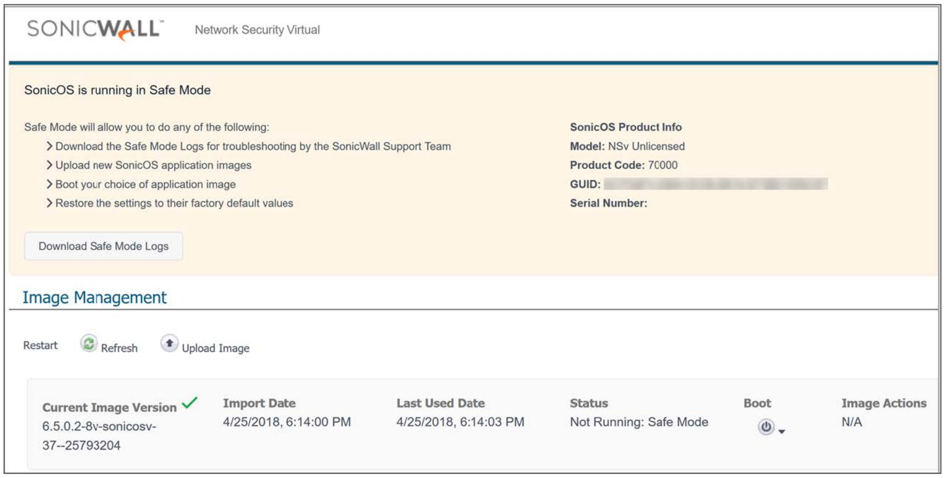
Downloading Logs in SafeMode

When the NSv virtual machine is in SafeMode, extra logging information is kept that can be downloaded. The logs are available from the SafeMode web management interface that can be accessed through the URL provided at the public IP address of an NSv.

ⓘ | **NOTE:** In SafeMode, the web management interface is only available by way of **http** (not **https**).

To download logs from SafeMode:

1. In a browser, navigate to `http://<IP address>`, using the applicable IP address. The SafeMode web management interface displays.



SonicOS is running in Safe Mode

Safe Mode will allow you to do any of the following:

- Download the Safe Mode Logs for troubleshooting by the SonicWall Support Team
- Upload new SonicOS application images
- Boot your choice of application image
- Restore the settings to their factory default values

SonicOS Product Info
Model: NSv Unlicensed
Product Code: 70000
GUID: [redacted]
Serial Number:

Current Image Version ✓	Import Date	Last Used Date	Status	Boot	Image Actions
6.5.0.2-8v-sonicosv-37--25793204	4/25/2018, 6:14:00 PM	4/25/2018, 6:14:03 PM	Not Running: Safe Mode	⏻ ▾	N/A

2. Click **Download Safe Mode Logs**. A compressed file is downloaded that contains a number of files, including a `console_logs` file that contains detailed logging information.

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SonicWall Support

Technical support is available to customers who have purchased SonicWall products with a valid maintenance contract.

The Support Portal provides self-help tools you can use to solve problems quickly and independently, 24 hours a day, 365 days a year. To access the Support Portal, go to https://www.sonicwall.com/support.

The Support Portal enables you to:

- View knowledge base articles and technical documentation
- View and participate in the Community forum discussions at https://community.sonicwall.com/technology-and-support.
- View video tutorials
- Access https://mysonicwall.com
- Learn about SonicWall professional services
- Review SonicWall Support services and warranty information
- Register for training and certification
- Request technical support or customer service

To contact SonicWall Support, visit https://www.sonicwall.com/support/contact-support.

About This Document

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232-005383-00 Rev D

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