StarWind Virtual SAN: Bare-Metal Installation on a Physical Server

2024

TECHNICAL PAPERS

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If you have questions about installing or using this software, check this and other documents first - you will find answers to most of your questions on the Technical Papers webpage or in StarWind Forum. If you need further assistance, please contact us .

About StarWind

StarWind is a pioneer in virtualization and a company that participated in the development of this technology from its earliest days. Now the company is among the leading vendors of software and hardware hyper-converged solutions. The company's core product is the years-proven StarWind Virtual SAN, which allows SMB and ROBO to benefit from cost-efficient hyperconverged IT infrastructure. Having earned a reputation of reliability, StarWind created a hardware product line and is actively tapping into hyperconverged and storage appliances market. In 2016, Gartner named StarWind "Cool Vendor for Compute Platforms" following the success and popularity of StarWind HyperConverged Appliance. StarWind partners with world-known companies: Microsoft, VMware, Veeam, Intel, Dell, Mellanox, Citrix, Western Digital, etc.

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Annotation

Relevant Products

This guide is applicable to StarWind Virtual SAN and StarWind Virtual SAN Free (Version V8 (Build 15469, CVM Version 20240530) and later).

Purpose

This guide provides a comprehensive outline of how to install and configure StarWind Virtual SAN on a physical or virtual server and create StarWind devices using the Web UI for further utilization by industry-standard hypervisors or server systems. It includes links to the system requirements, RAID settings, best practices, and steps to ensure seamless setup and integration.

Audience

The guide is for IT specialists, system administrators, and storage professionals who want to deploy and configure StarWind Virtual SAN on physical and virtual servers.

Expected Result

Users will possess a robust understanding of the steps and best practices for deploying and configuring StarWind Virtual SAN on commodity hardware.

Starwind Virtual San System Requirements

Before installing StarWind Virtual SAN on a physical machine, please ensure that the system meets the requirements listed here:
https://www.starwindsoftware.com/system-requirements

Storage provisioning guidelines:
https://knowledgebase.starwindsoftware.com/guidance/how-to-provision-physical-storage-to-starwind-virtual-san-controller-virtual-machine/

Recommended RAID settings for HDD and SSD disks:
https://knowledgebase.starwindsoftware.com/guidance/recommended-raid-settings-for-hdd-and-ssd-disks/

Please read StarWind Virtual SAN Best Practices document for additional information:
https://www.starwindsoftware.com/resource-library/starwind-virtual-san-best-practices

Pre-Configuring The Servers

The diagram below illustrates the network and storage configuration of the solution:
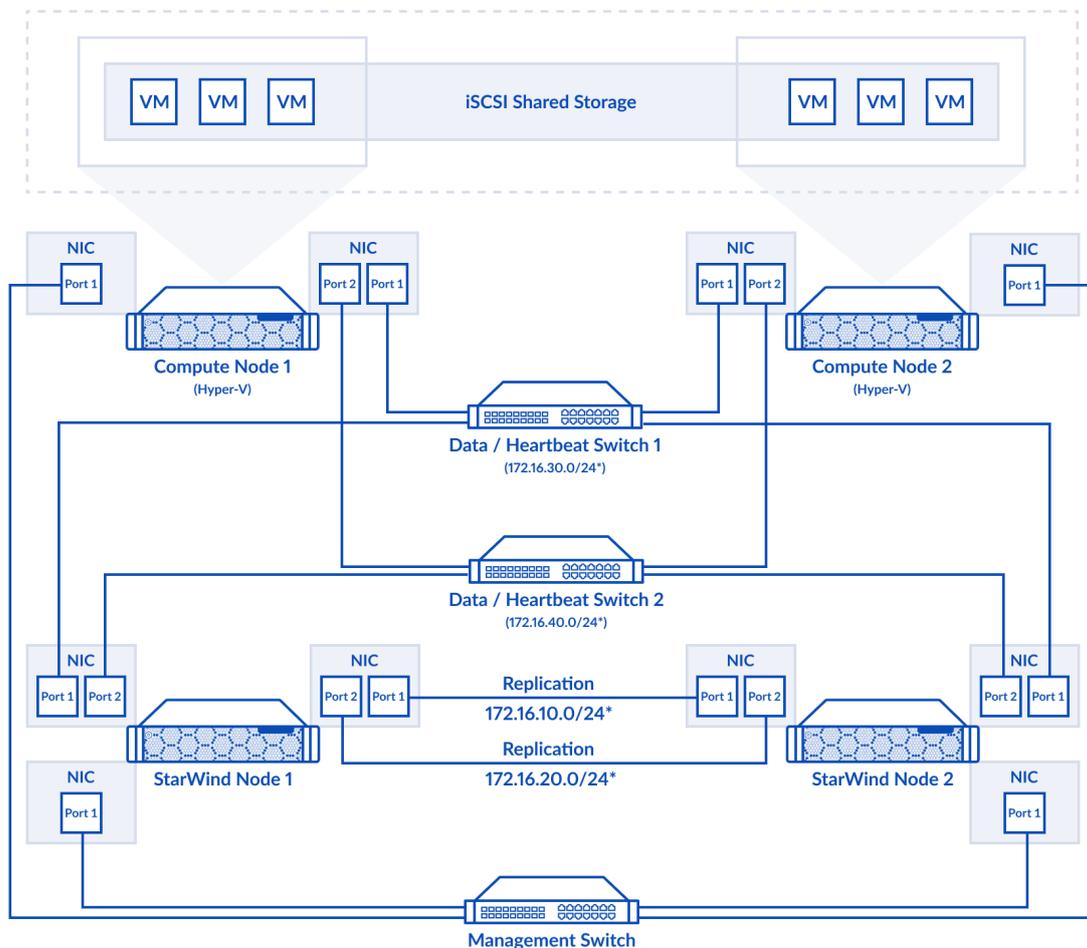
1. Deploy StarWind Virtual SAN on each server using the ISO image downloaded from this page: https://www.starwindsoftware.com/vsan#download

2. Install a minimum of 2 network interfaces on each server for a 2-node cluster configuration, and a minimum of 4 network interfaces on each server for a 3-node cluster configuration. These interfaces will be utilized for Data/Heartbeat and Replication traffic. Allocate additional network interfaces for the Management network traffic based on needs.

IMPORTANT:

- Ensure that the Data/Heartbeat and Replication networks do not share the same physical link.
- Connect Data/Heartbeat and Replication links either through redundant switches or directly between nodes, as illustrated in Prerequisites: Solution diagram

NOTE: For a redundant, high-availability configuration, configure at least two network interfaces for the Data network and two network interfaces for the Replication network on each appliance. Ensure that the network interfaces are interconnected between appliances through multiple direct links or via redundant switches.

3. Once the Virtual SAN storage devices (LUNs) are configured, install any hypervisor or server operating system on a separate physical machine to utilize standalone and/or highly available storage devices (LUNs).

Installing Starwind Vsan On Physical Machine

1. Download the StarWind Virtual SAN ISO from
https://www.starwindsoftware.com/vsan#download

2. Prepare the installation media using Etcher, Rufus on Windows workstation, or the dd command-line tool on Linux and macOS. For Network boot, mount the ISO to your server using iDRAC, iLo, or IPMI user interfaces.

3. Connect the installation media to your server and start the host.

4. Boot into the BIOS and enable Legacy boot mode. Save changes and reboot the host.

5. Upon server boot, press F12 or F2 to start the one-time boot menu. Select CD\DVD-ROM as the boot device.

Note: Refer to the server documentation to learn how to boot the menu key.

6. At this stage, the server should start booting the StarWind VSAN Live system. Once the system boots, the StarWind Text-based Installer launches.

7. Read the End-user License Agreement. Use the Tab button and arrow keys to select the Accept option, then press Enter.
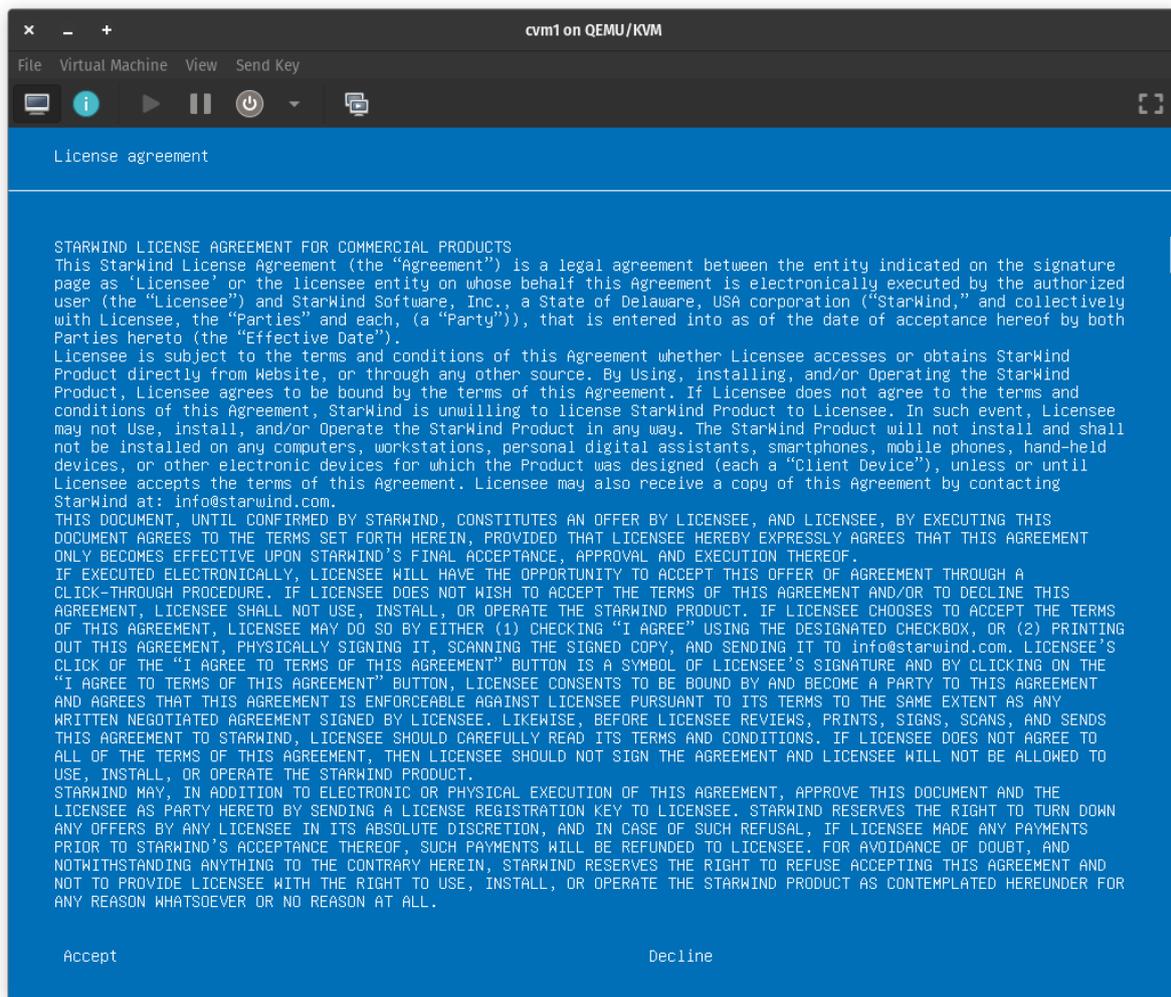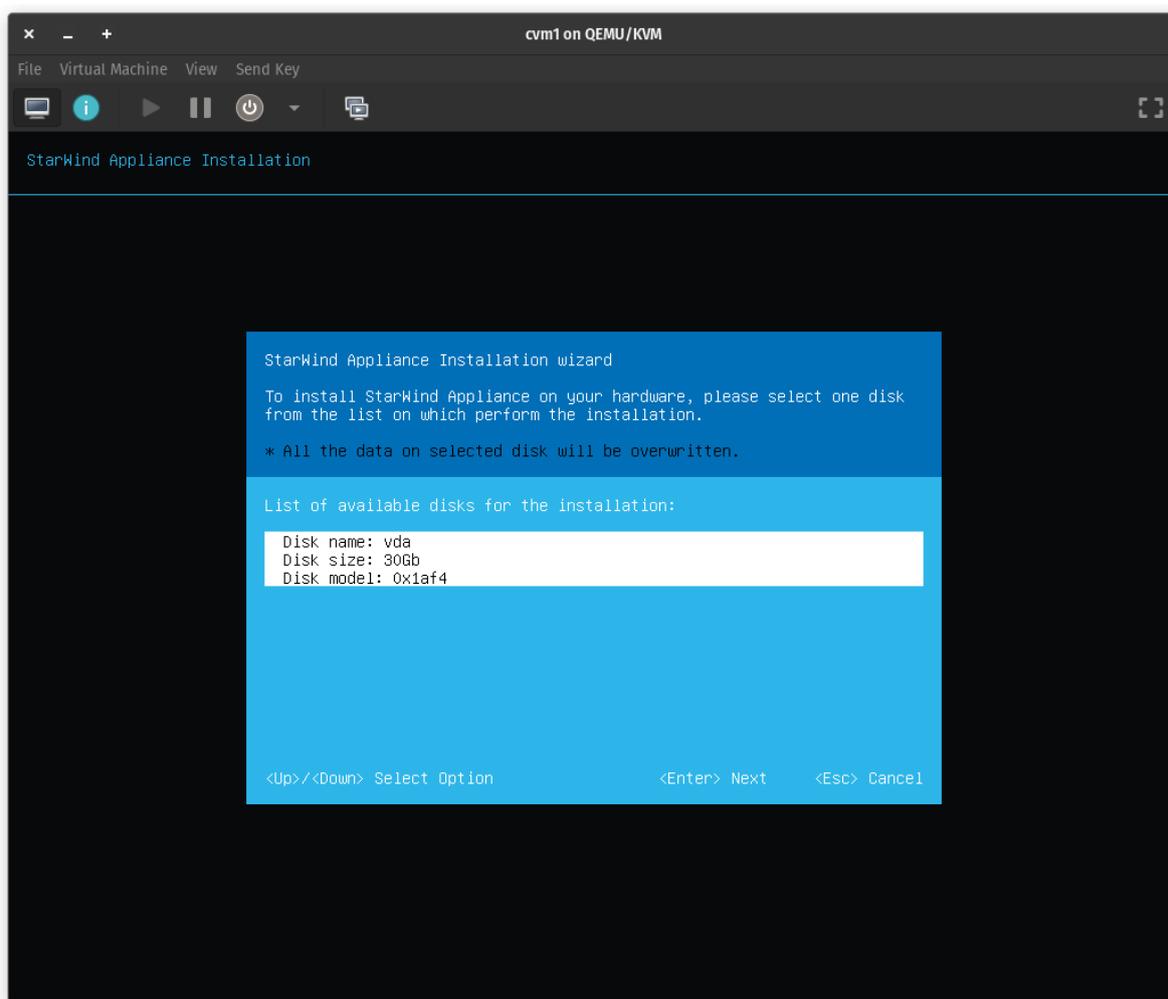
8. In the menu, select the "Install StarWind Appliance" option and press Enter.
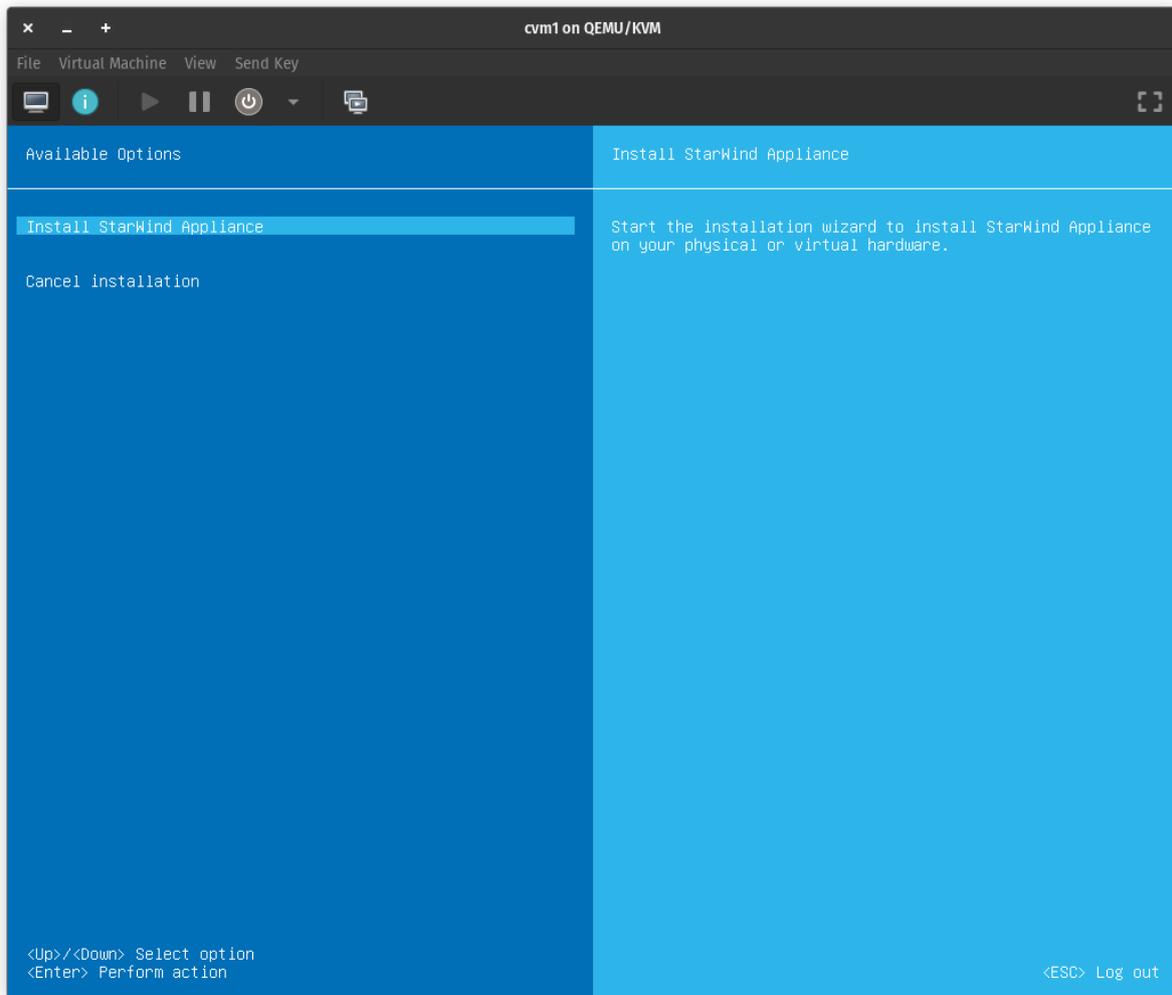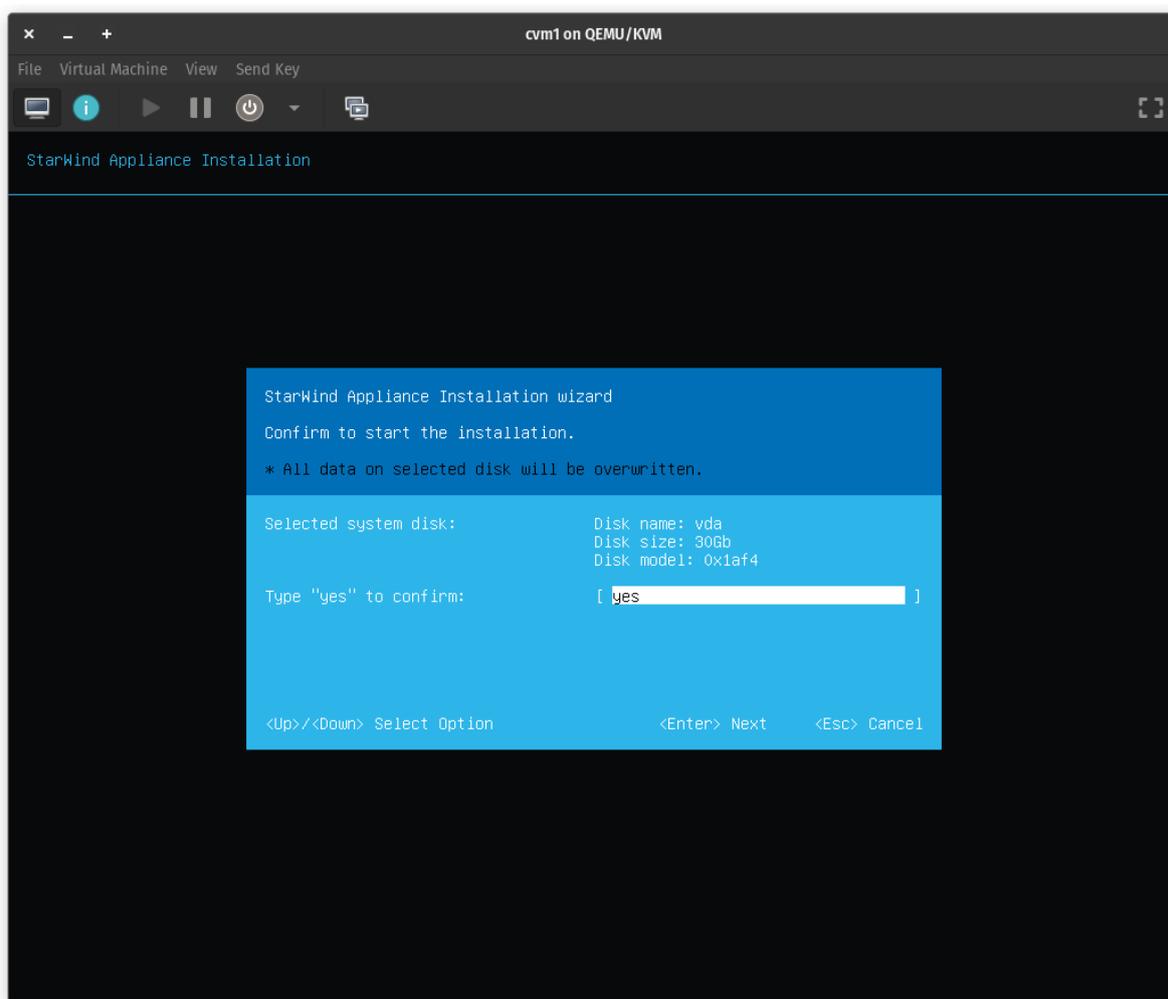
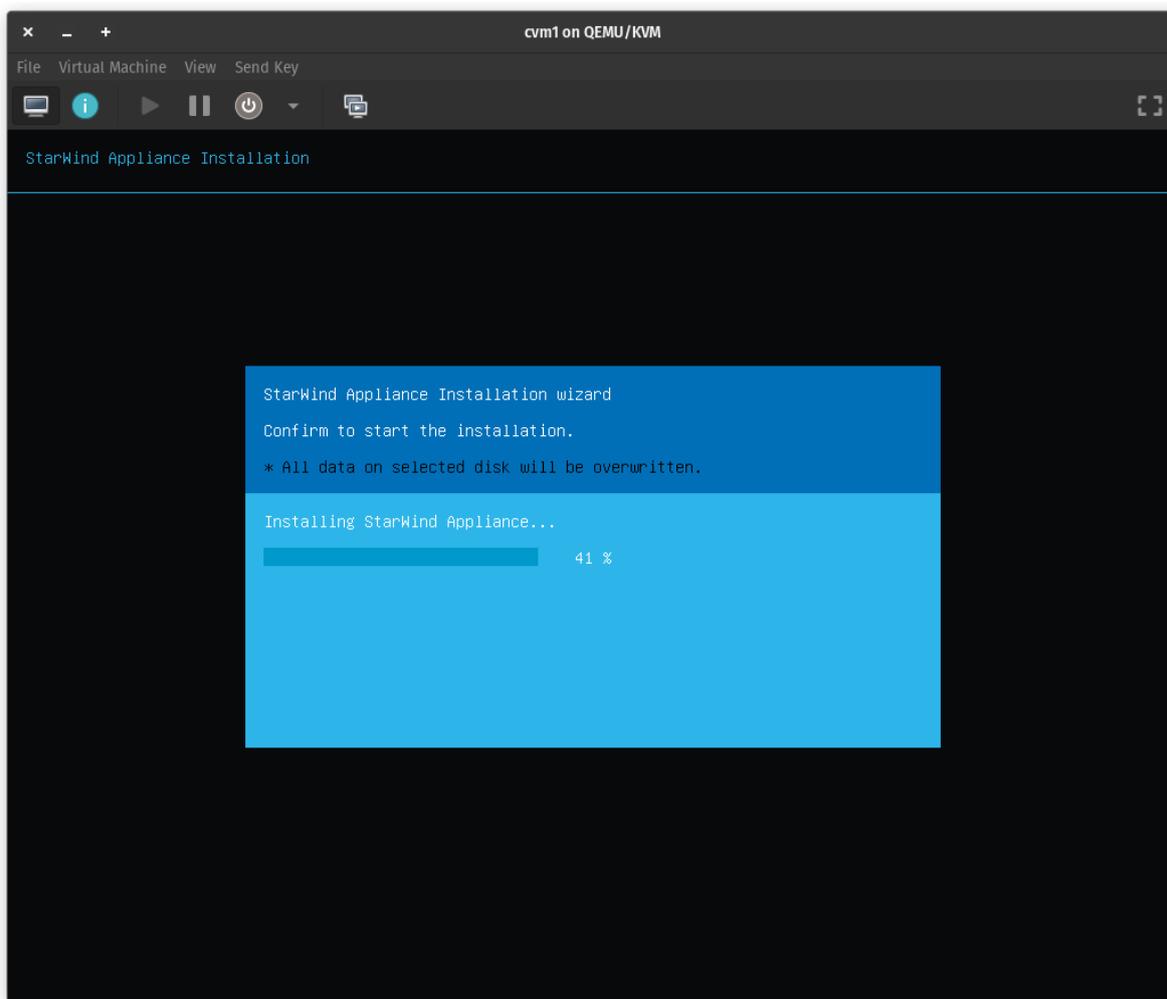9. Select one of the available disks on which to install StarWind VSAN, then press Enter.

Note: For OS redundancy, it is recommended to install VSAN on a RAID-1 (mirror) volume created on a Hardware RAID controller.
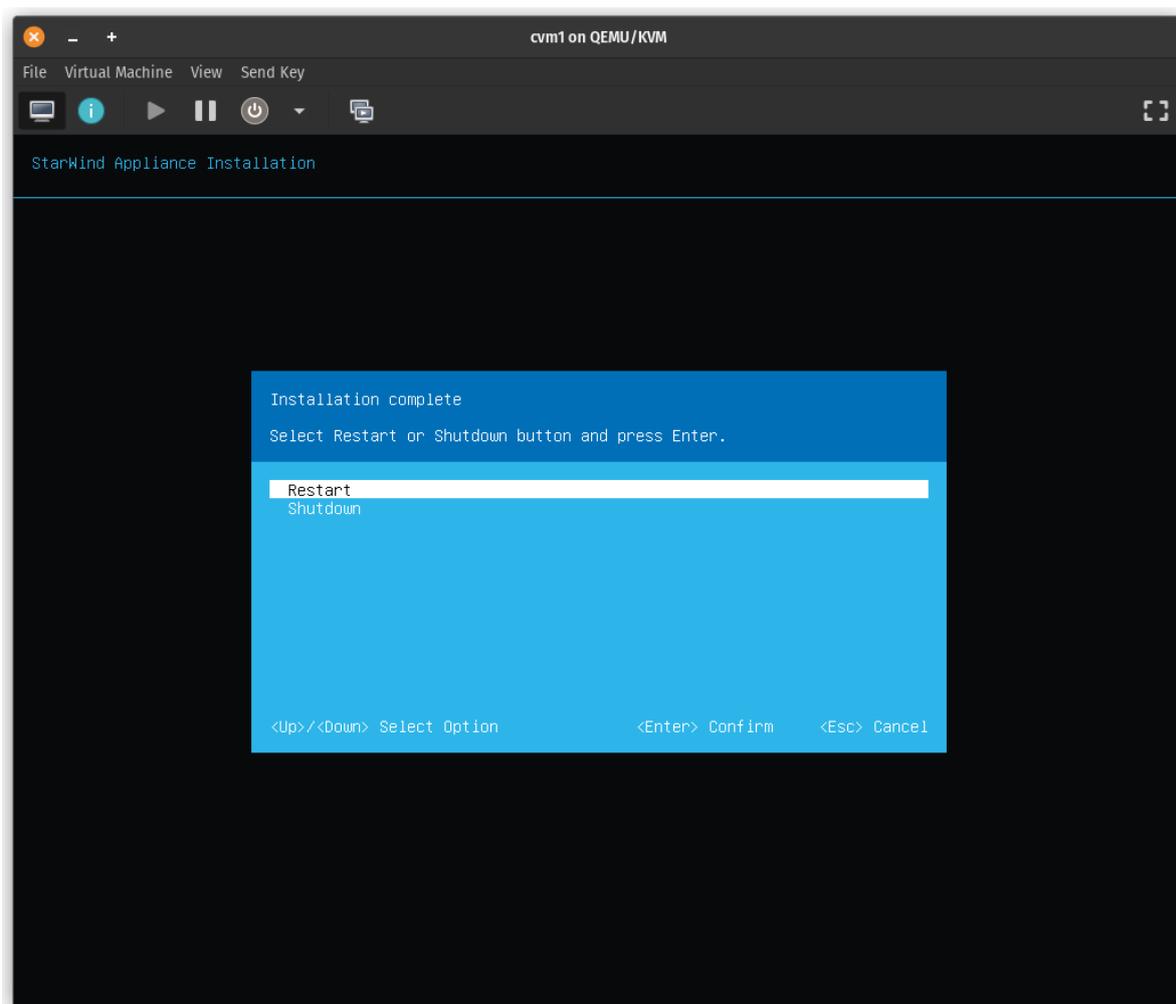
10. All data on the selected disk will be overwritten. Confirm the installation by typing "yes" and pressing Enter.

11. Wait until the installation finishes.

12. The installation is complete. Now you can select "Restart" to reboot the server.

13. Eject the installation media.

14. The server now boots StarWind Virtual SAN.

Using Text-Based User Interface

1. Using iDRAC, iLo, or IPMI user interfaces, or a physical monitor connected to the server, open the Remote Console to check the management IP address in the Text-based User Interface (TUI).
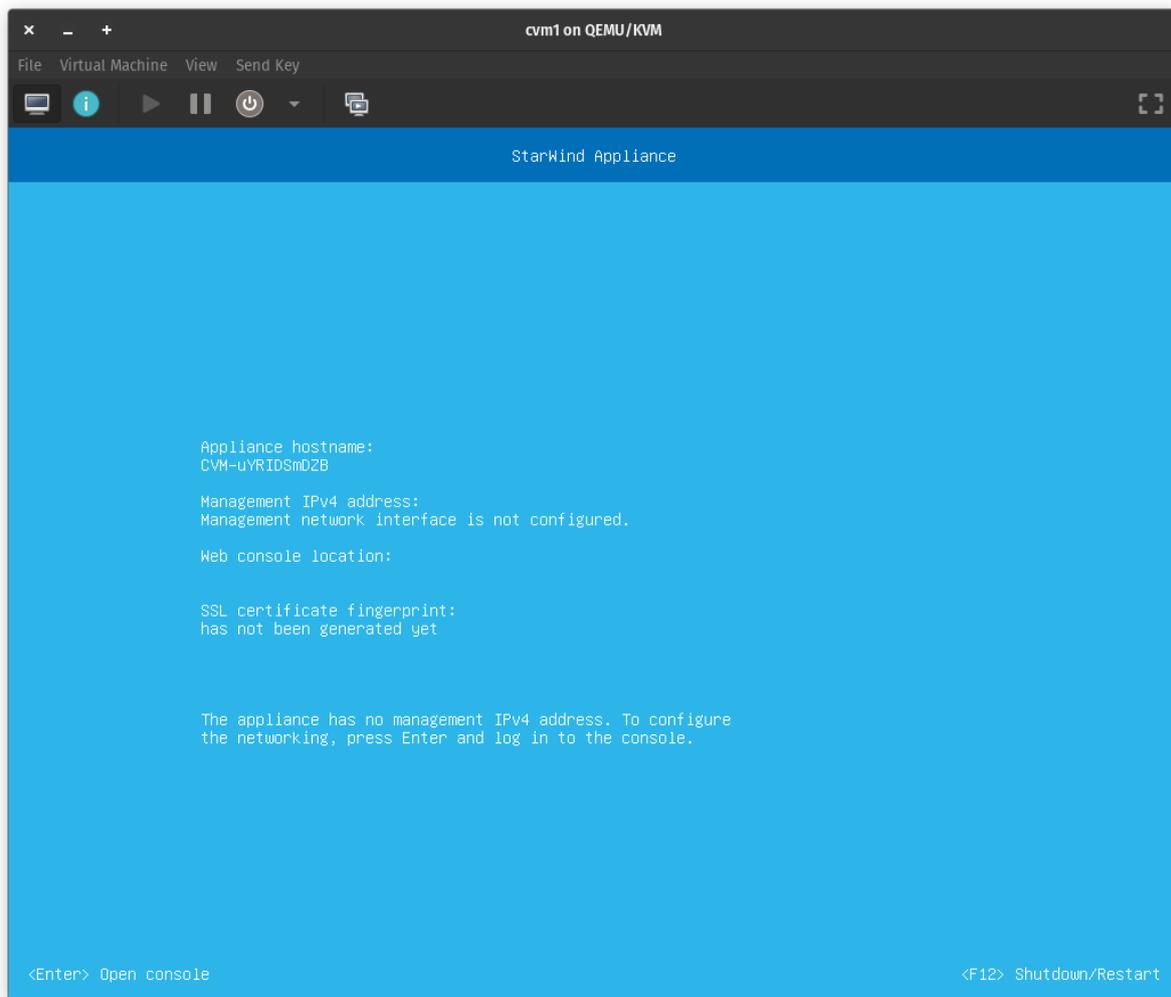
2. StarWind VSAN gets its Management IP from your DHCP server if one is available on your network. If an IP address is DHCP-assigned, skip this section, and proceed to the Initial Configuration Wizard to configure using the Web console. Otherwise, assign a static IP address manually.

3. Log in to the Text-based User Interface (TUI) using the default credentials: username "user", password "rds123RDS" without quotes.
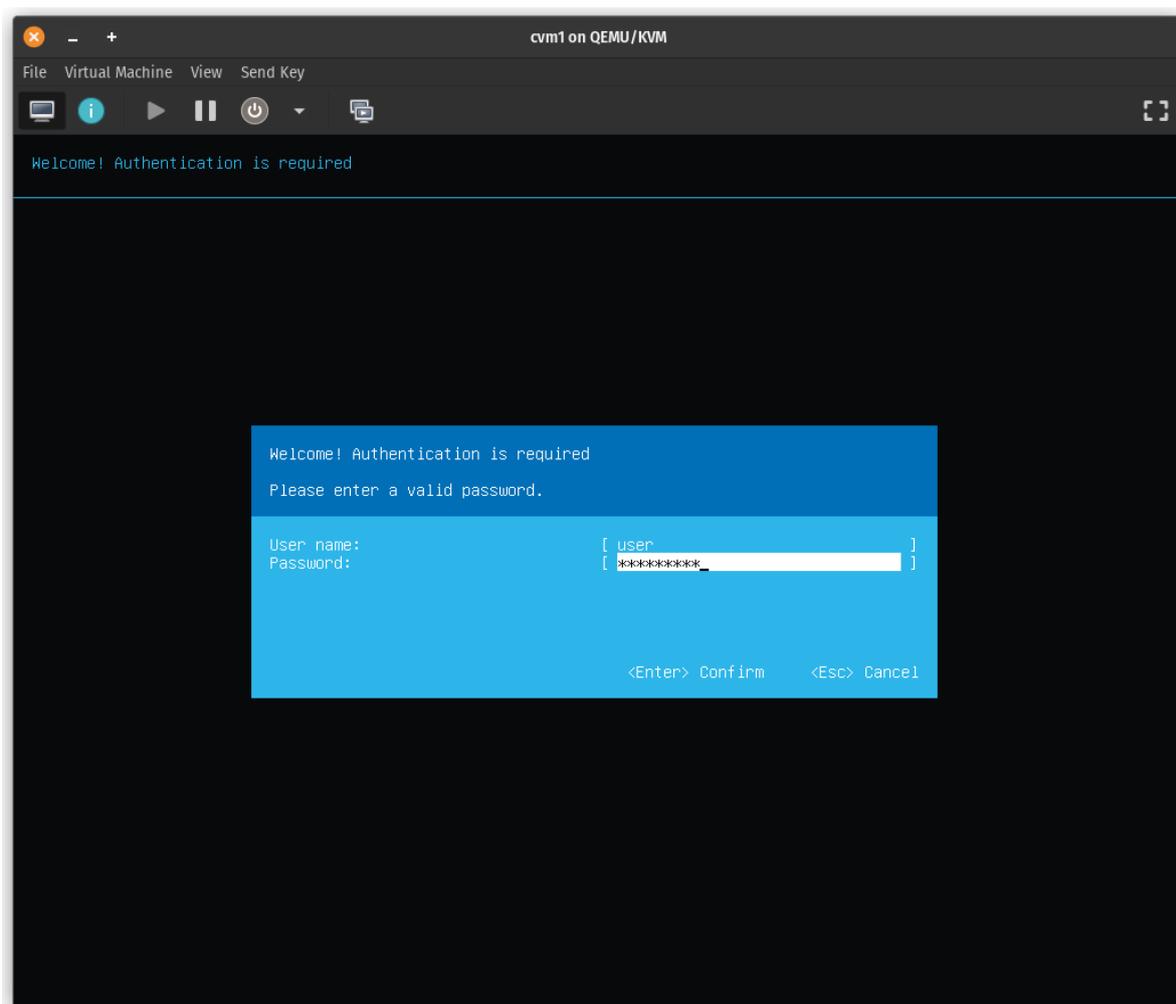
Note: Ignore any error messages that appear on the TUI screen, such as "Failed to start nbd daemon". Once the network is configured, the dependent services will restart.

4. Navigate to the "Configure Management Network" option and press Enter.
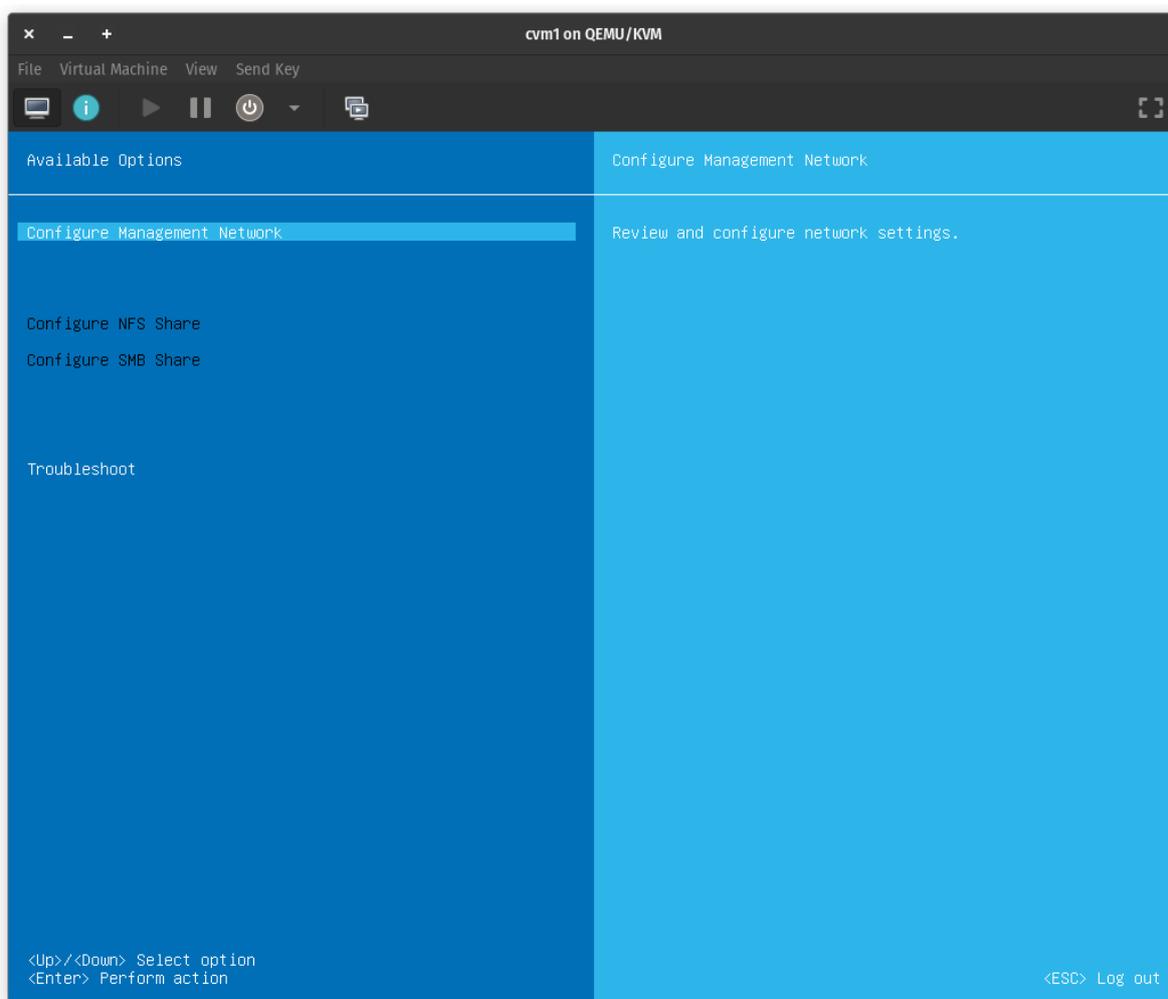
5. Step 1/4 provides information on the network interface identified by the appliance as the management network and its settings.
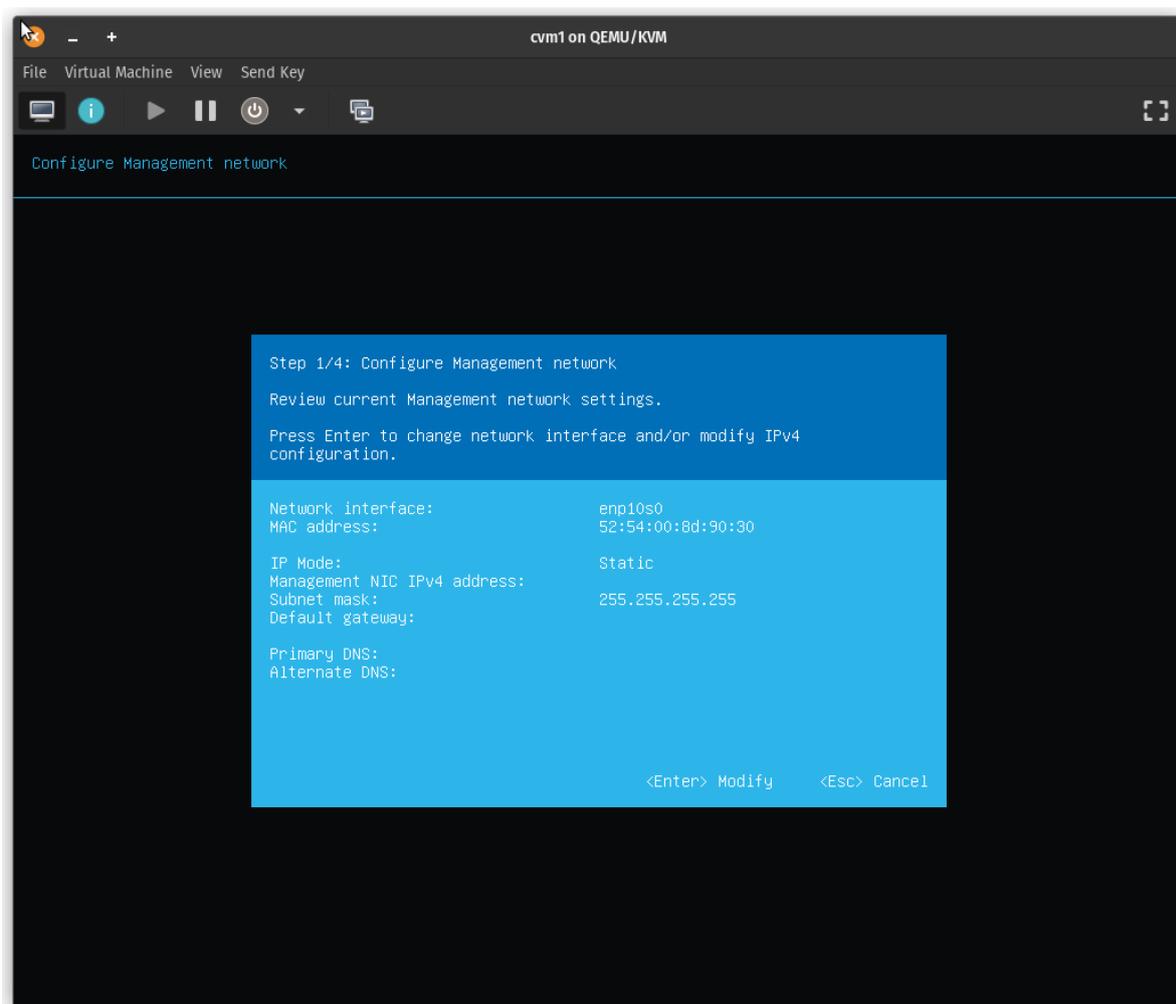
6. At step 2/4 select the network interface to use for the management network connection, then press the Space key.
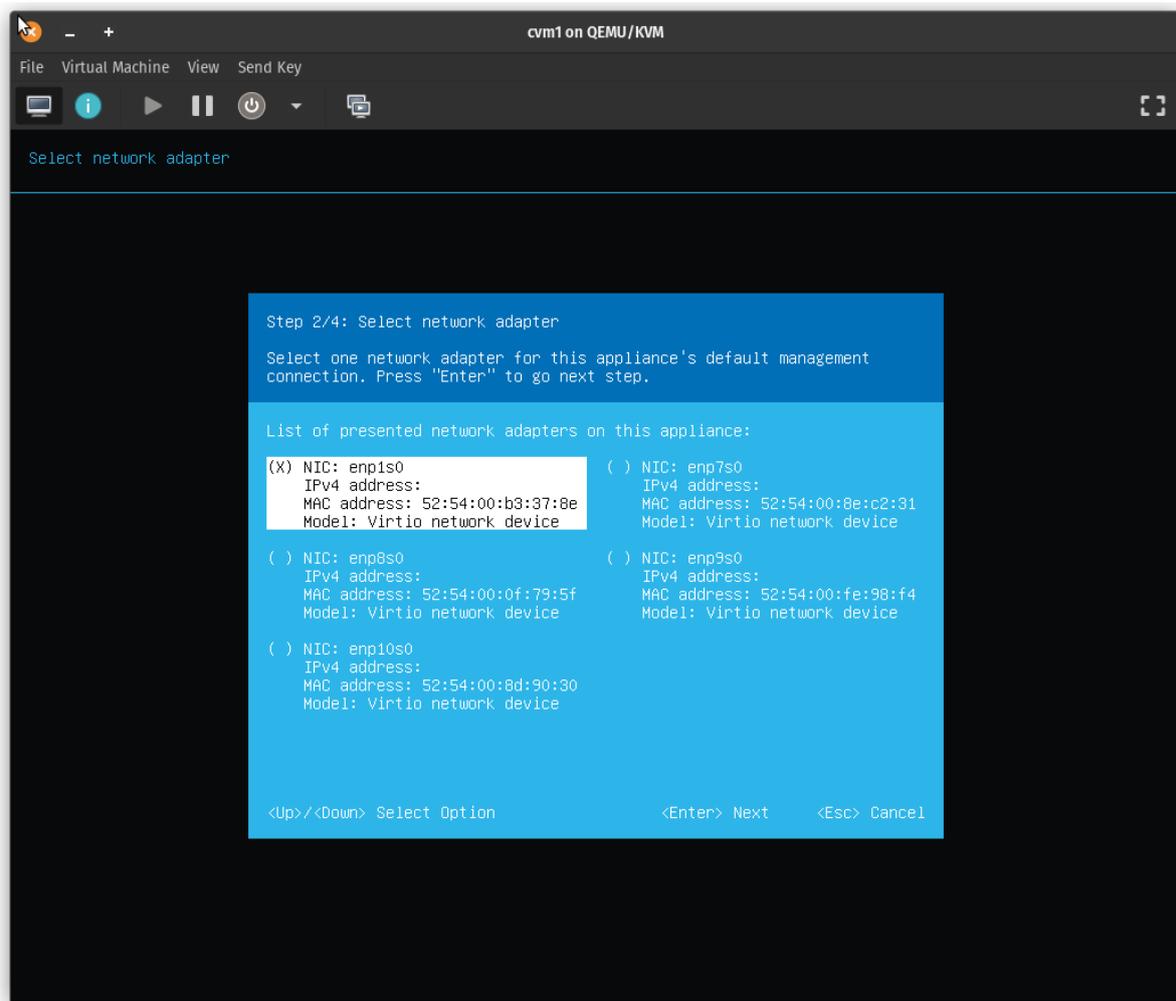
7. Specify network settings for the management connection with the following considerations:

- IPv4 address and network mask are required settings.
- The network mask can be specified as a subnet mask or in CIDR format.
- Gateway and DNS IP addresses are optional.
- Configuring Internet access by setting up the Gateway IP and DNS will allow checking, downloading, and installing in-place updates over the network.

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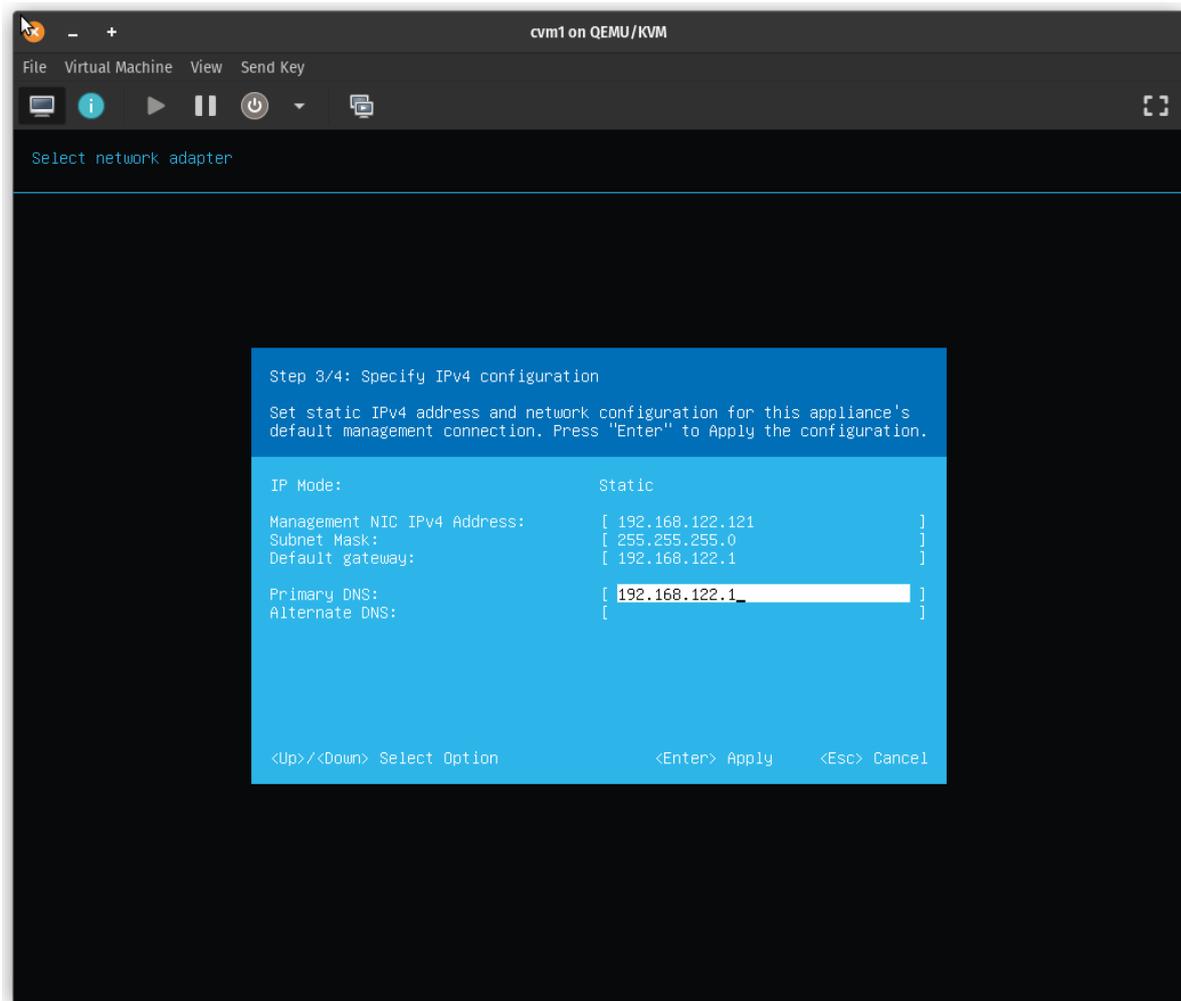
8. Press Enter to apply the management network configuration.
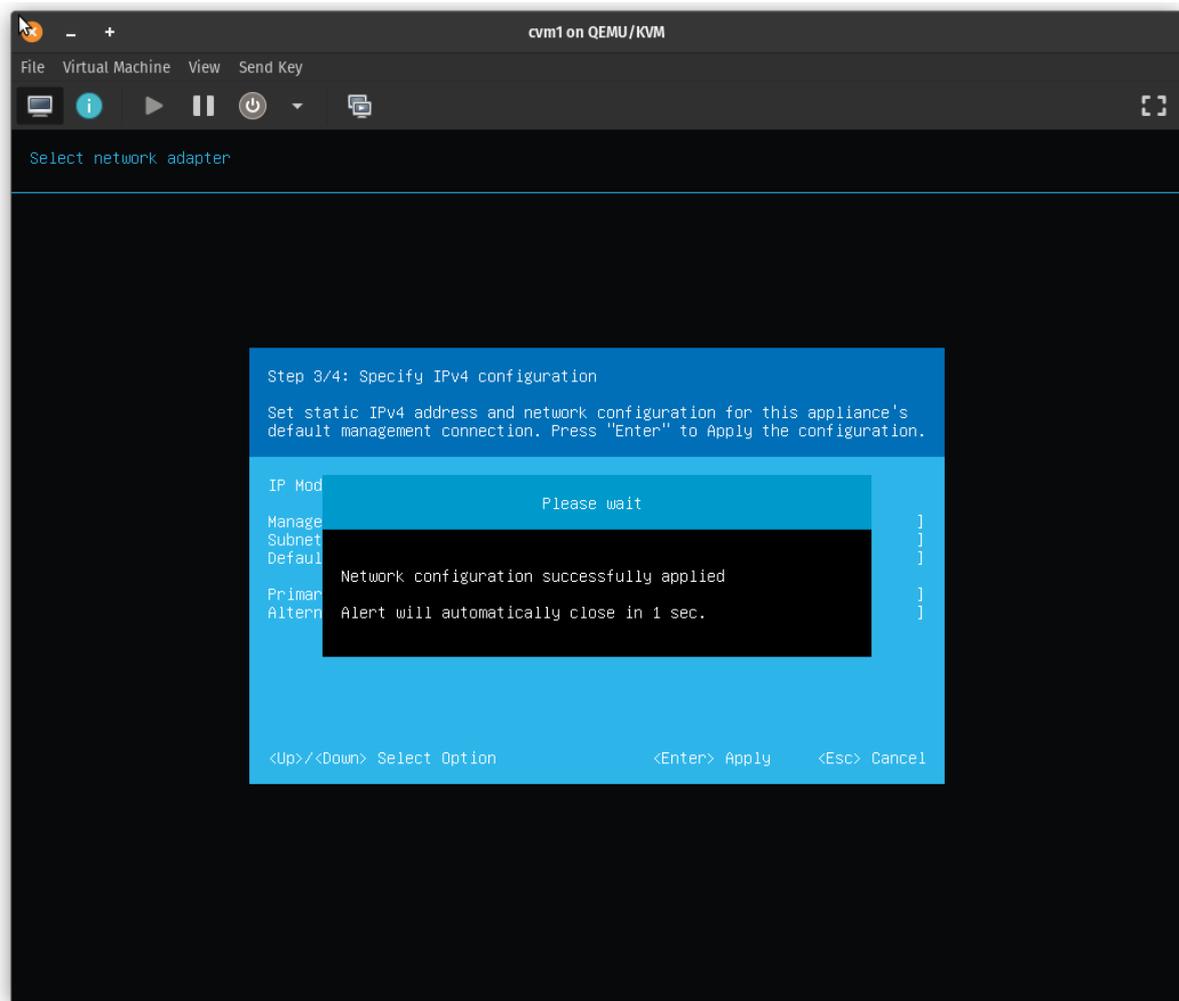
9. Log out from TUI, then open a web browser to connect to your VSAN Web console by specifying the management IP address.

Initial Configuration Wizard

1. Using the web browser, open a new tab and enter the VM IPv4 address to open StarWind VSAN Web Interface. Click "Advanced" and then "Continue to…"

2. StarWind VSAN web UI welcomes you, and the "Initial Configuration" wizard will guide you through the deployment process.
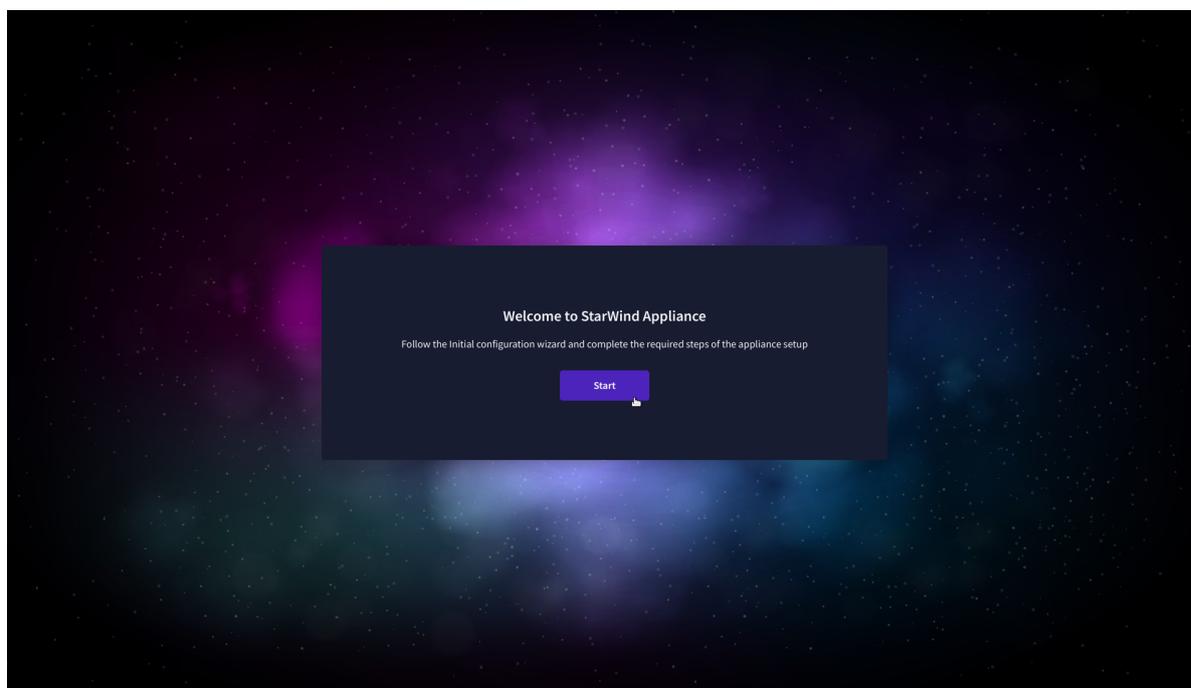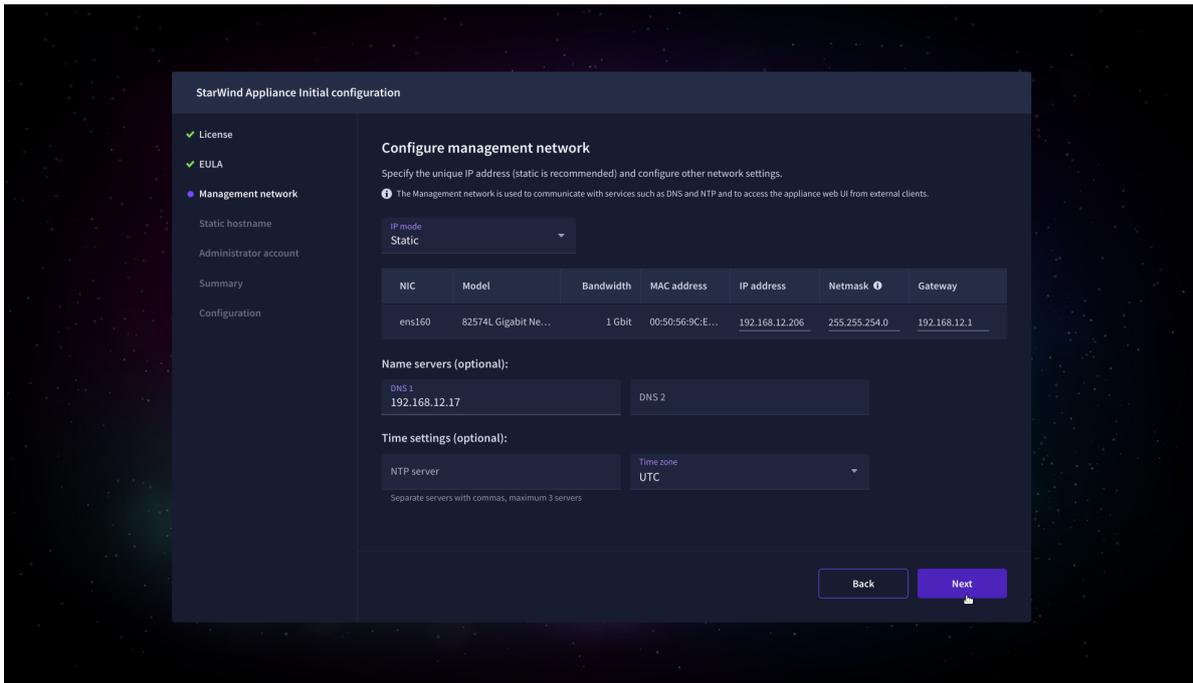

3. In the following step, upload the license file.
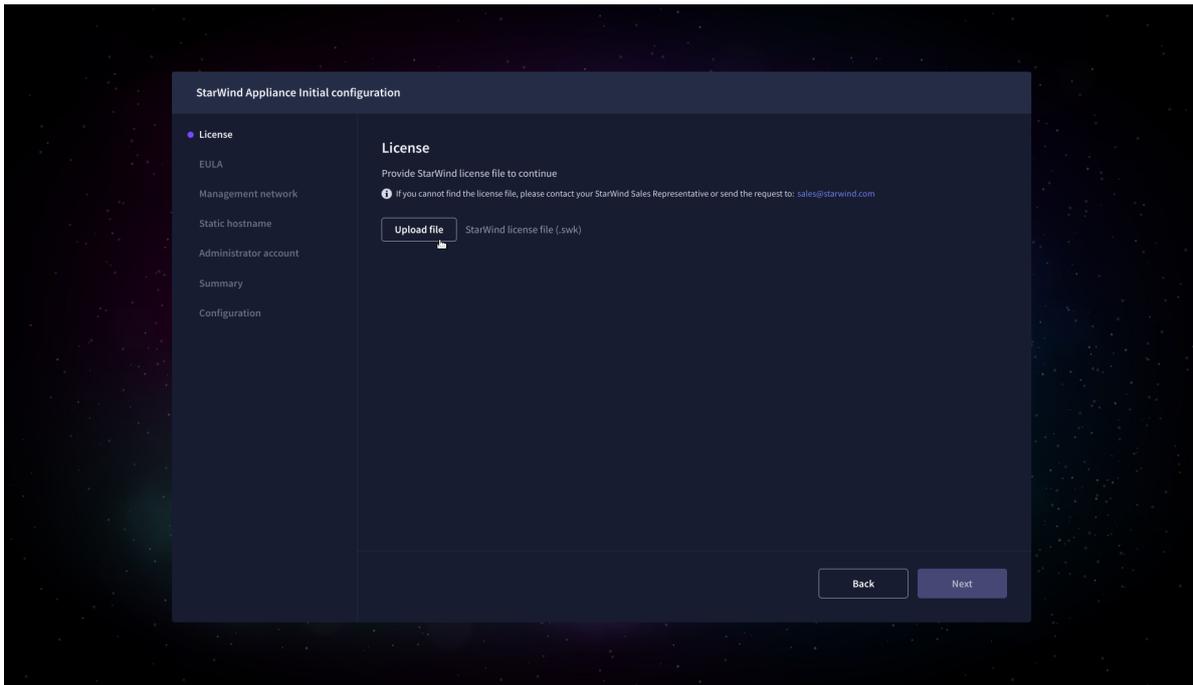
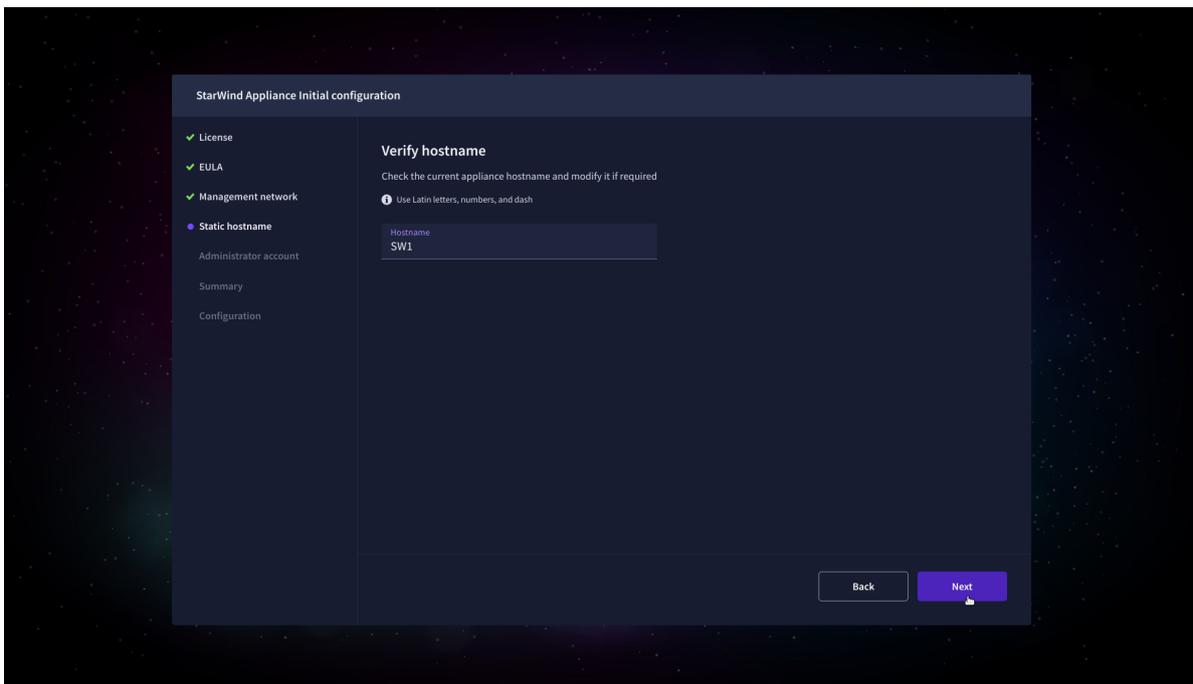4. Read and accept the End User License Agreement to proceed.
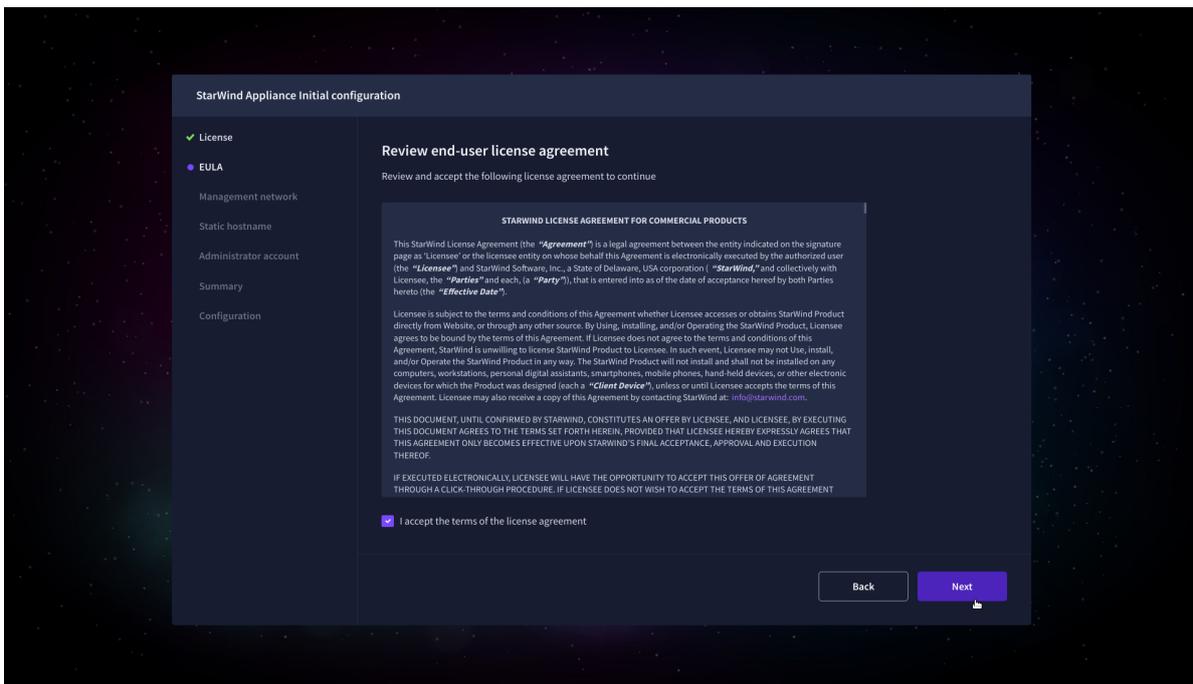
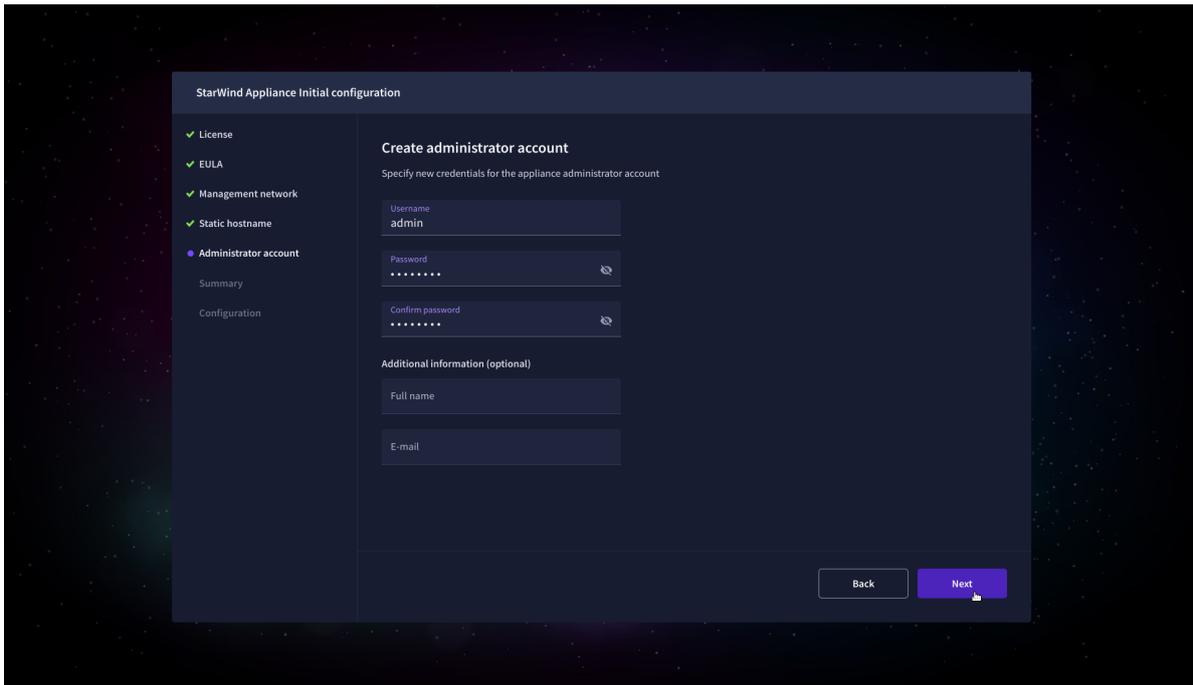5. Review or edit the Network settings and click Next.
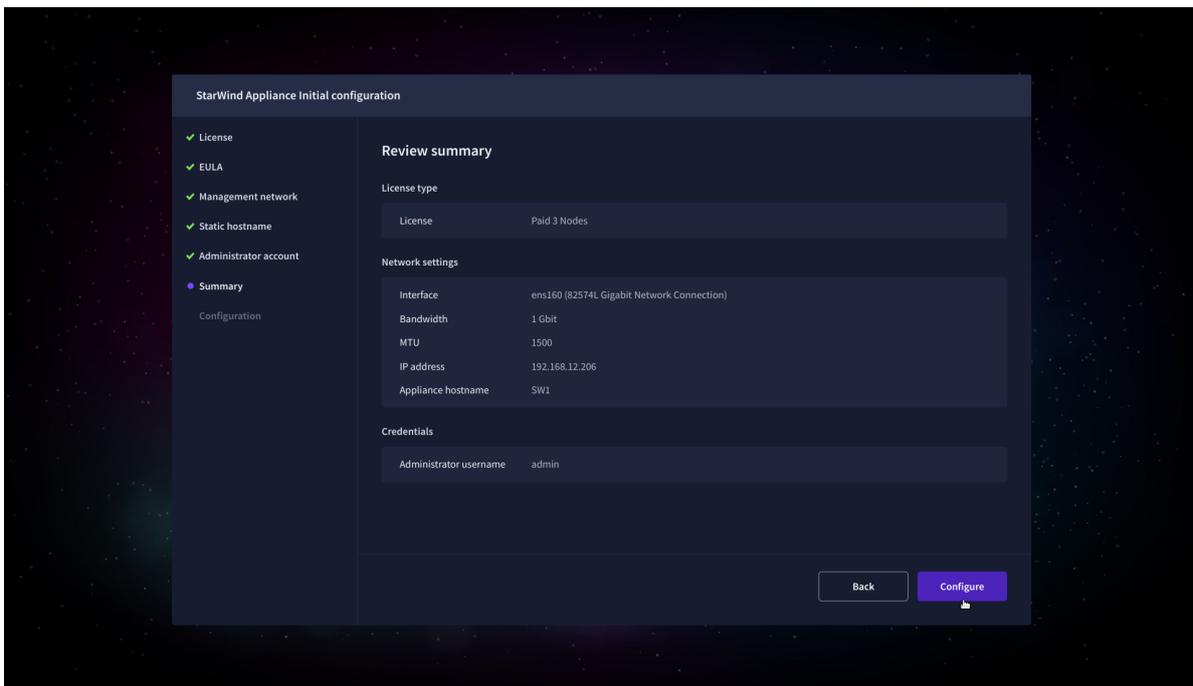NOTE: Static network settings are recommended for the configuration.

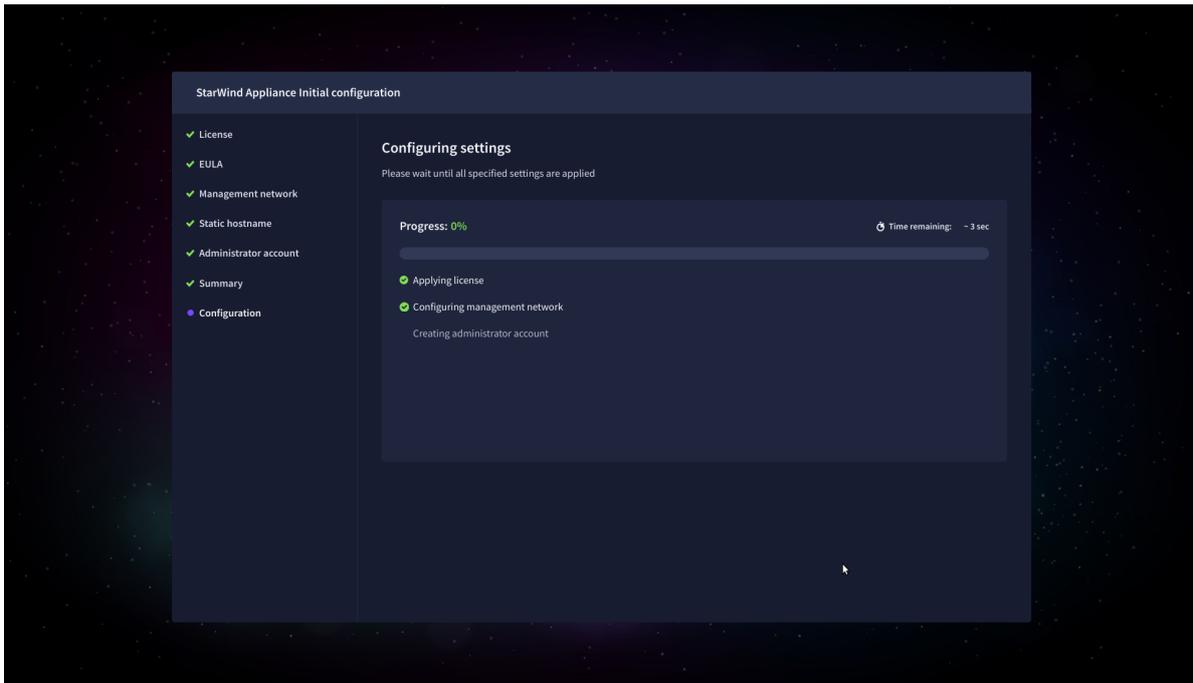6. Specify the hostname for the VSAN appliance and click Next.

7. Create an administrator account. Click Next.

8. Review your settings selection before setting up StarWind VSAN.

9. Please standby until the Initial Configuration Wizard configures StarWind VSAN for you.

10. The appliance is set and ready. Click on the Done button to install the StarWind vCenter Plugin right now or uncheck the checkbox to skip this step and proceed to the Login page.
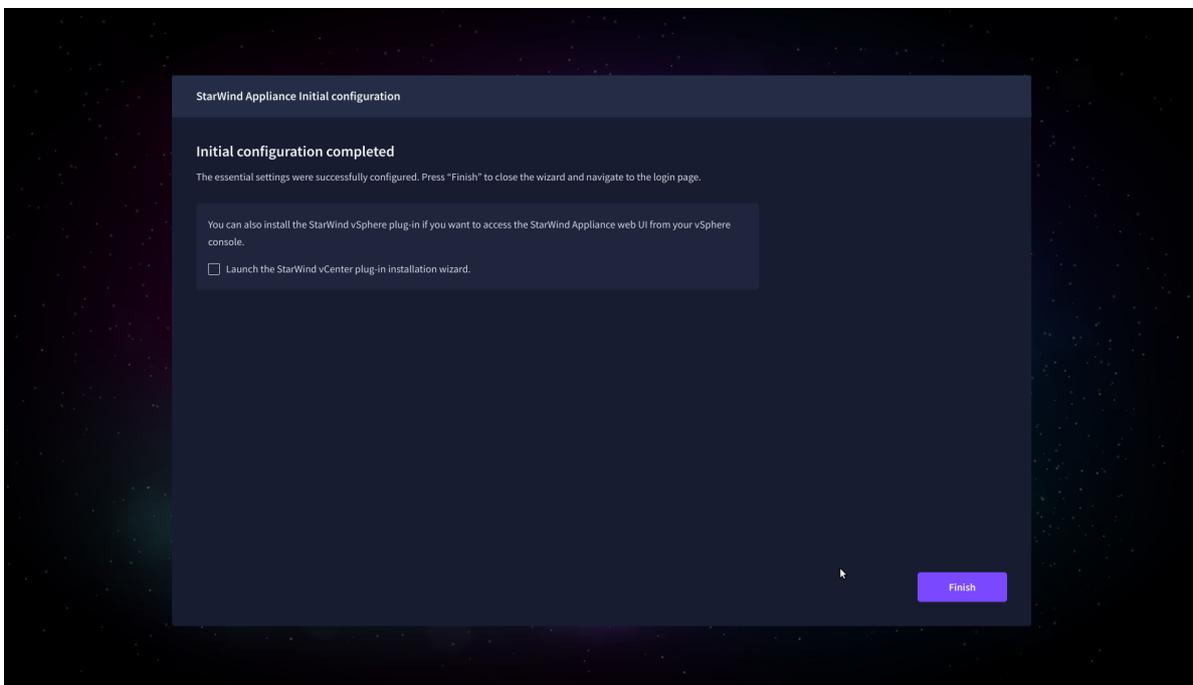

11. Repeat the initial configuration on other StarWind VSAN appliances that will be used to create 2-node or 3-node HA shared storage.
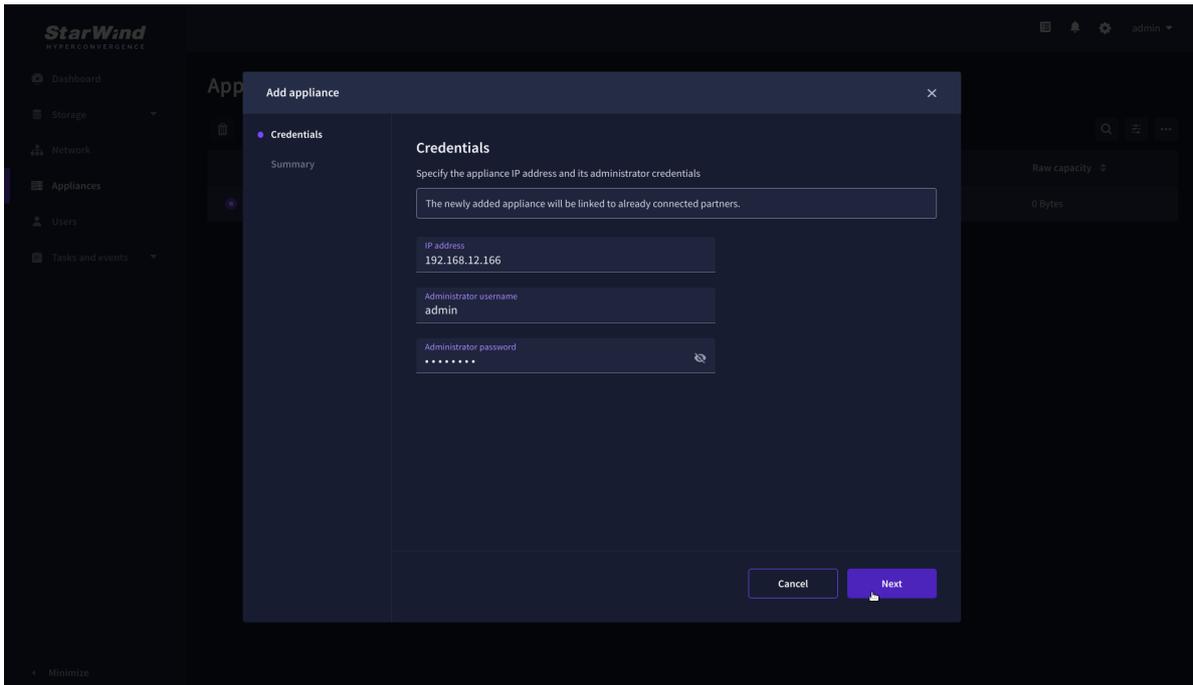
Add Appliance

To create 2-way or 3-way synchronously replicated highly available storage, add partner appliances that use the same license key.

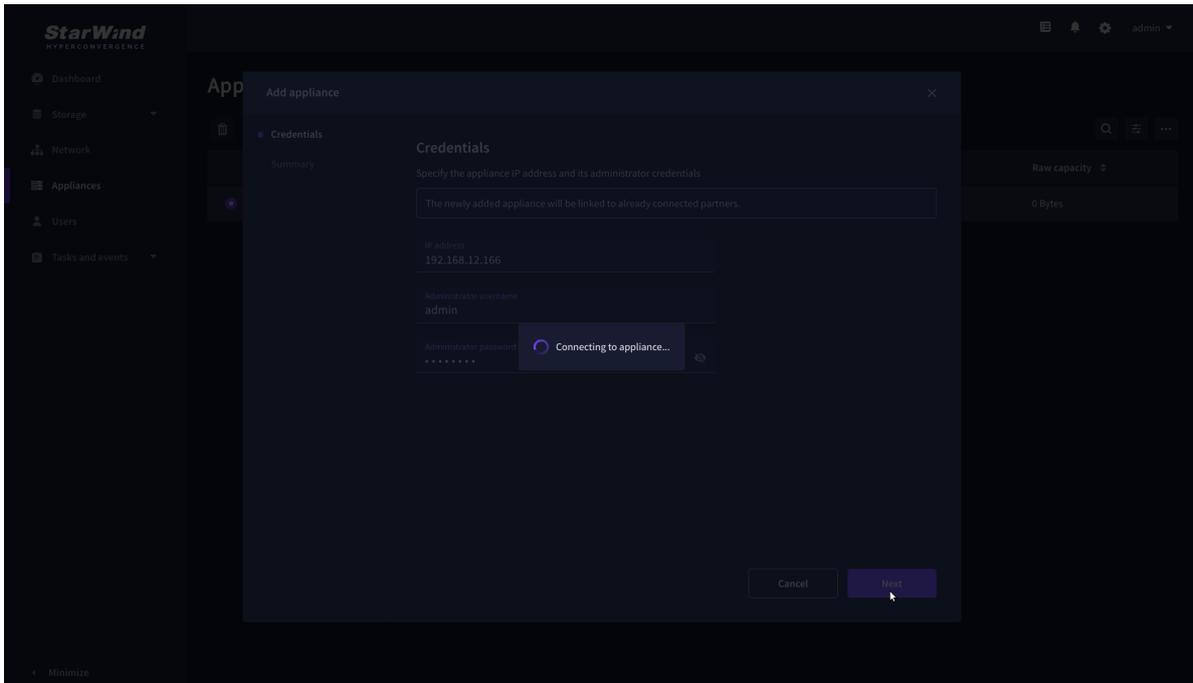1. Add StarWind appliance(s) in the web console, on the Appliances page.
NOTE: The newly added appliance will be linked to already connected partners.
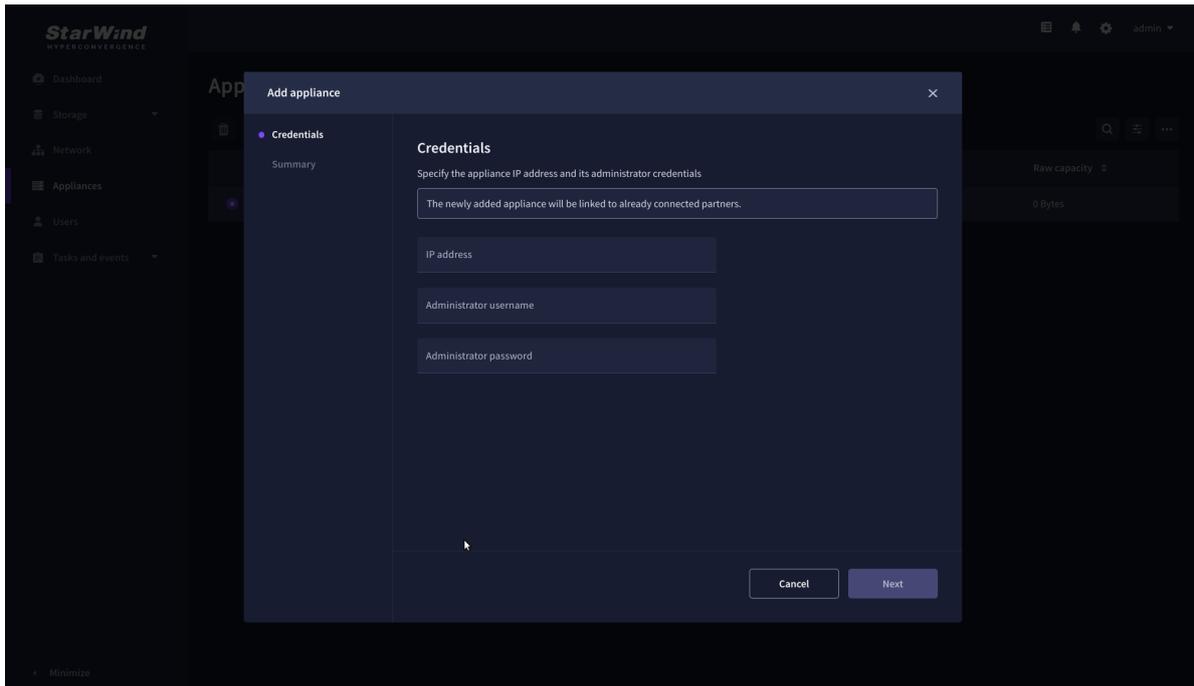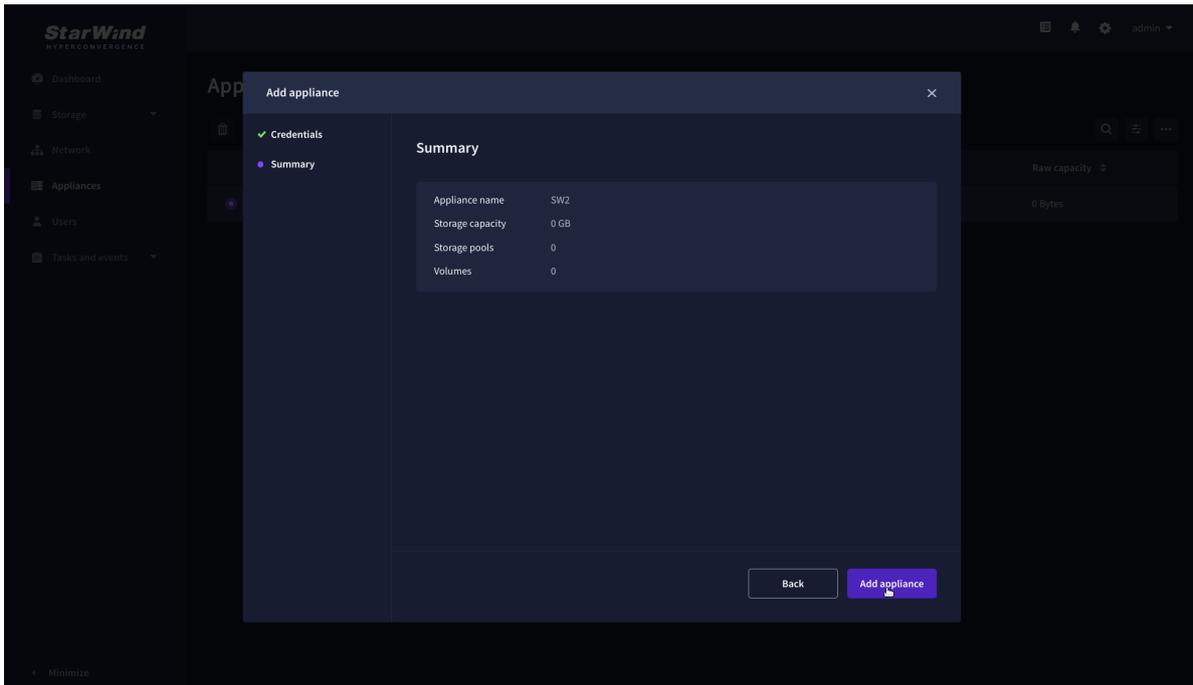

2. Provide credentials of partner appliance.
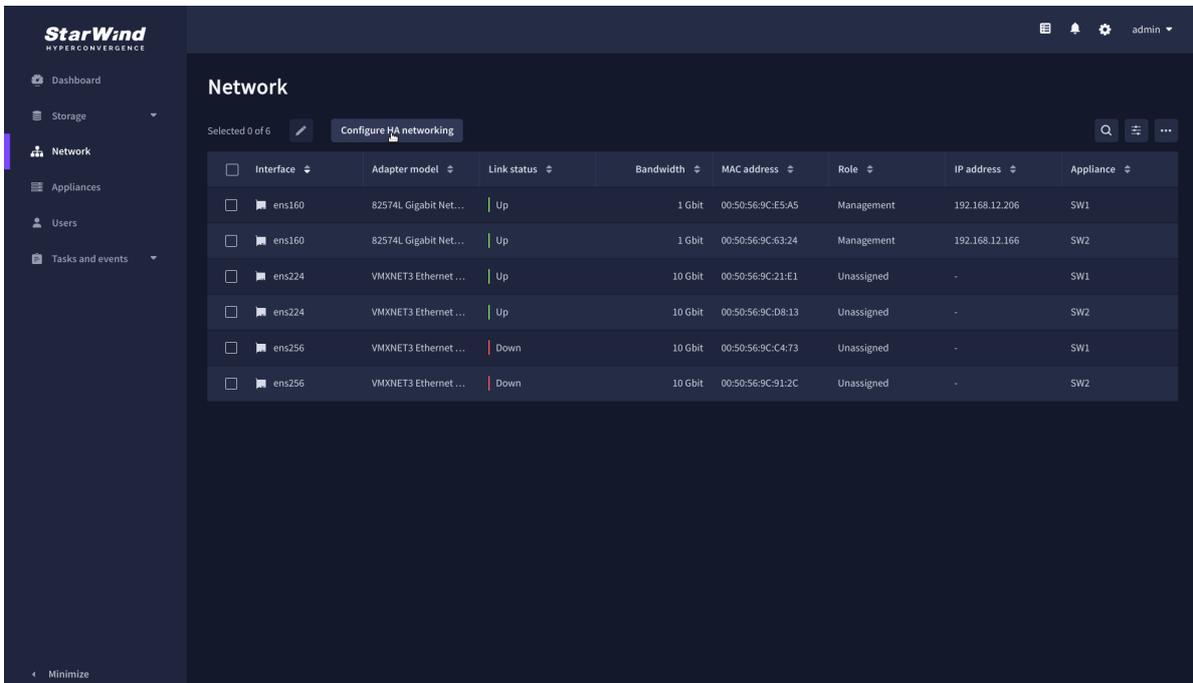
3. Wait for connection and validation of settings.

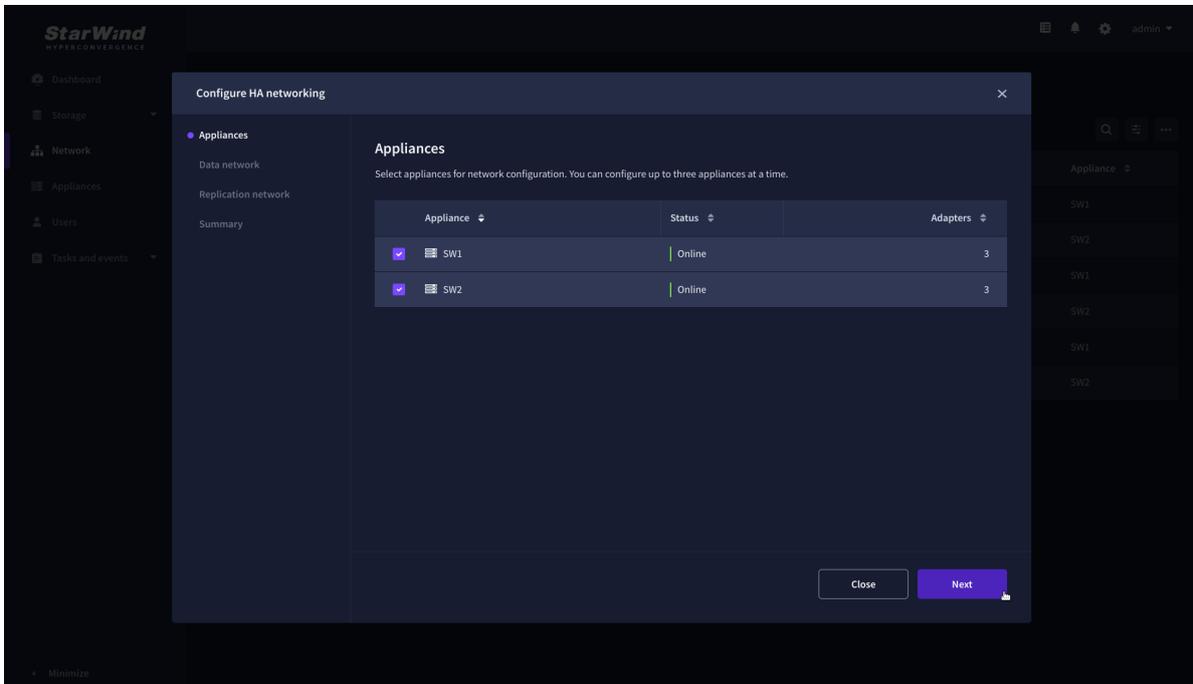4. Review the summary and click "Add appliance".

Configure Ha Networking

1. Launch the "Configure HA Networking" wizard.

2. Select appliances for network configuration.
NOTE: the number of appliances to select is limited by your license, so can be either two or three appliances at a time.
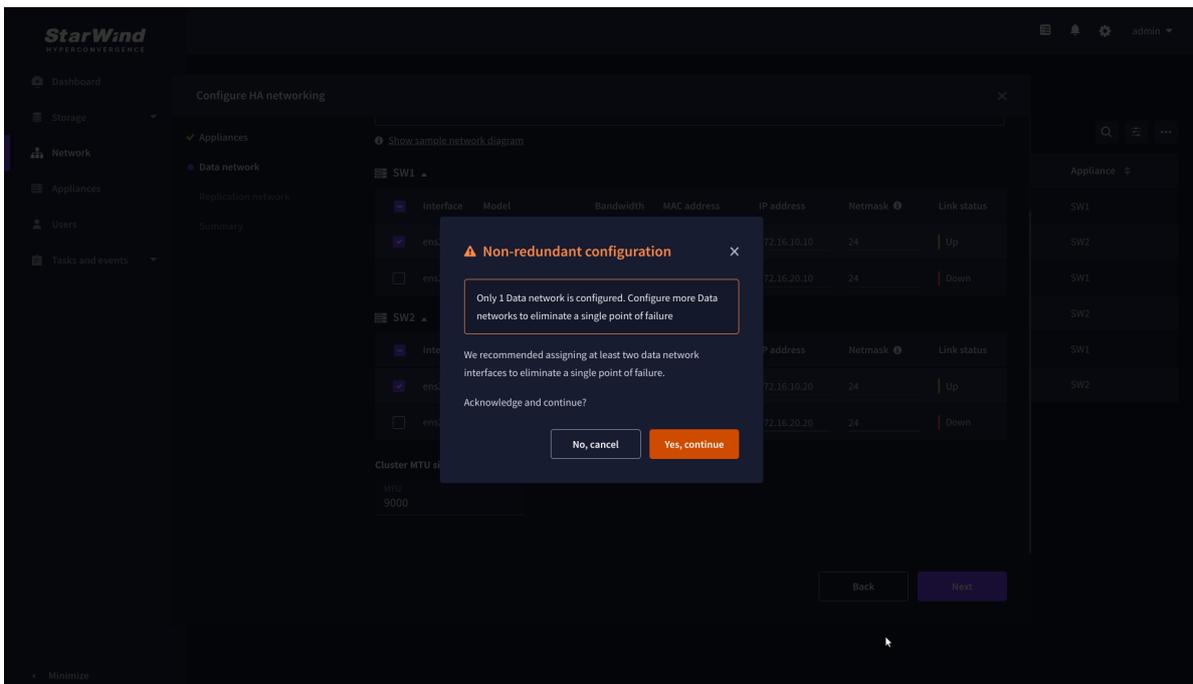

3. Configure the "Data" network. Select interfaces to carry storage traffic, configure them with static IP addresses in unique networks, and specify subnet masks:

- assign and configure at least one interface on each node
- for redundant configuration, select two interfaces on each node
- ensure interfaces are connected to client hosts directly or through redundant switches

4. Assign MTU value to all selected network adapters, e.g. 1500 or 9000. Ensure the switches have the same MTU value set.
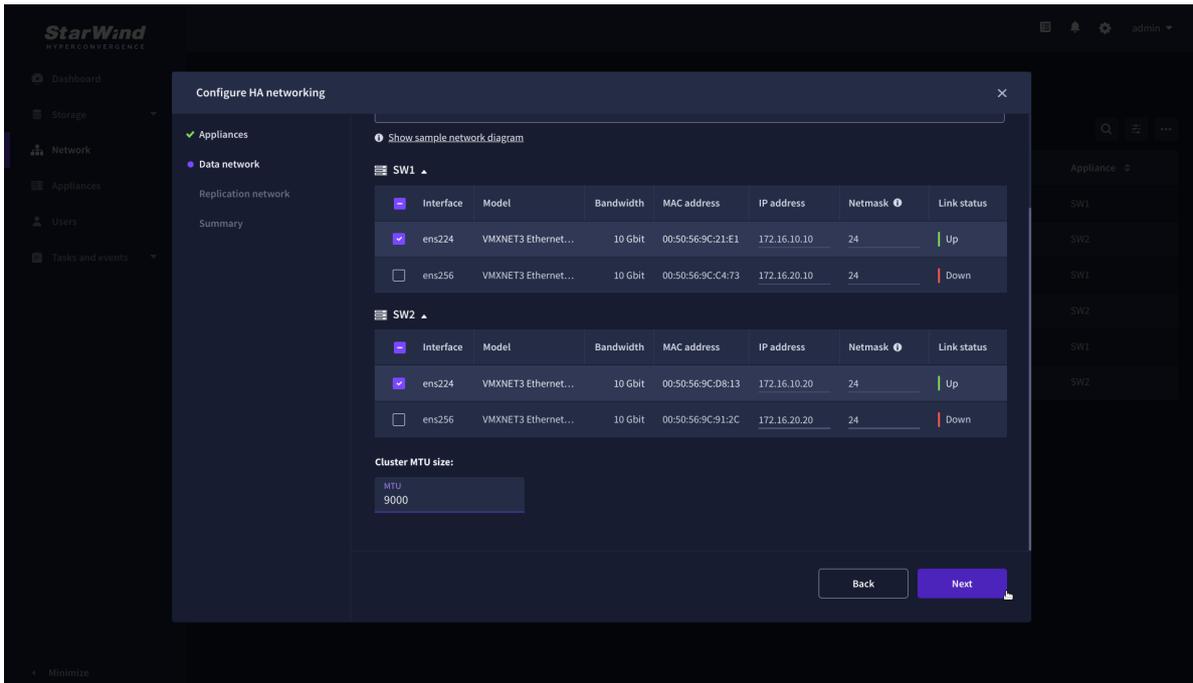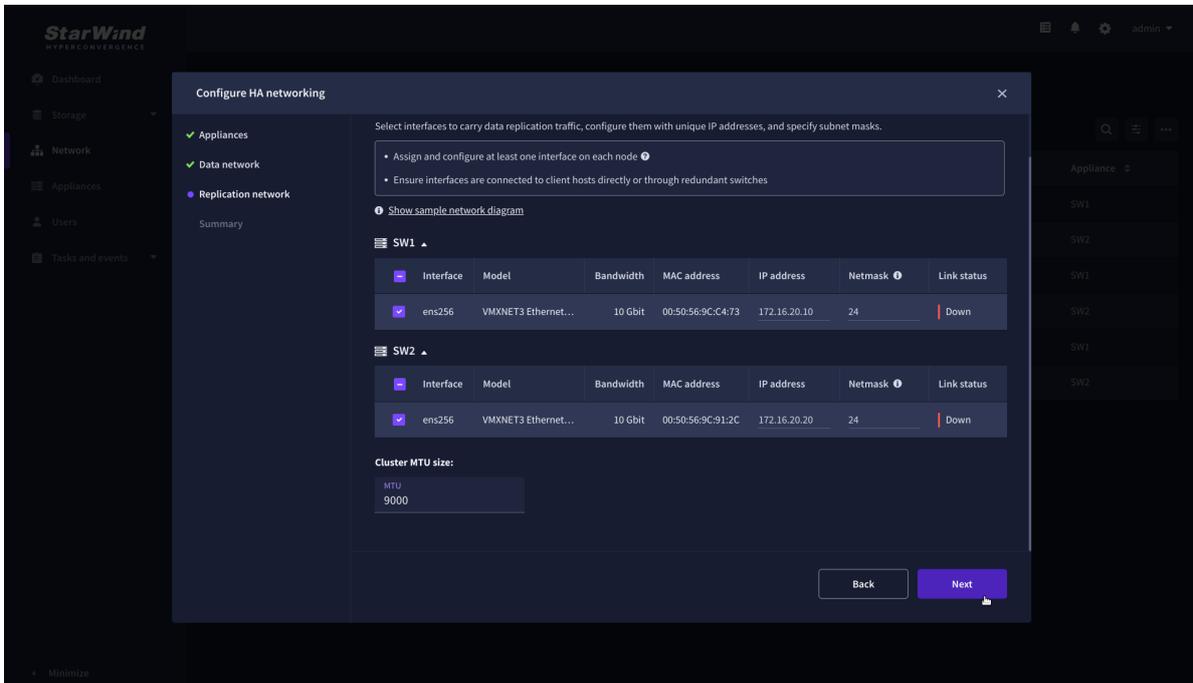
5. Click Next to validate Data network settings.

6. Configure the "Replication" network. Select interfaces to carry storage traffic, configure them with static IP addresses in unique networks, and specify subnet masks:

- assign and configure at least one interface on each node
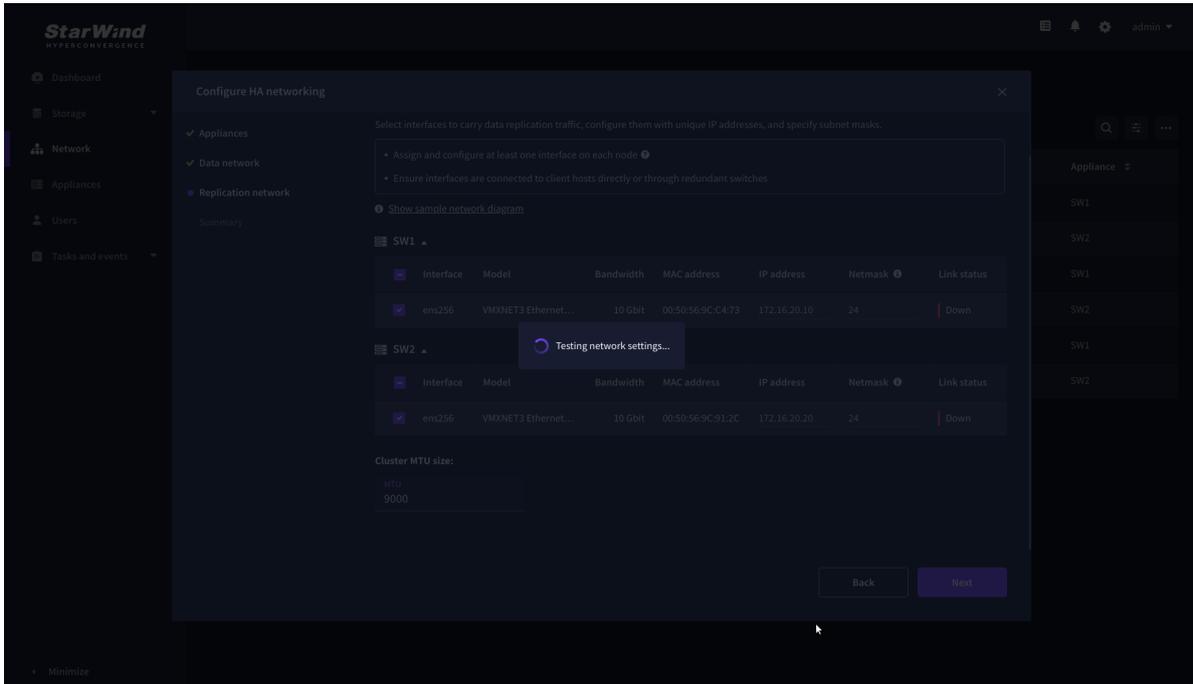- for redundant configuration, select two interfaces on each node

- ensure interfaces are connected to client hosts directly or through redundant switches

7. Assign MTU value to all selected network adapters, e.g. 1500 or 9000. Ensure the switches have the same MTU value set.
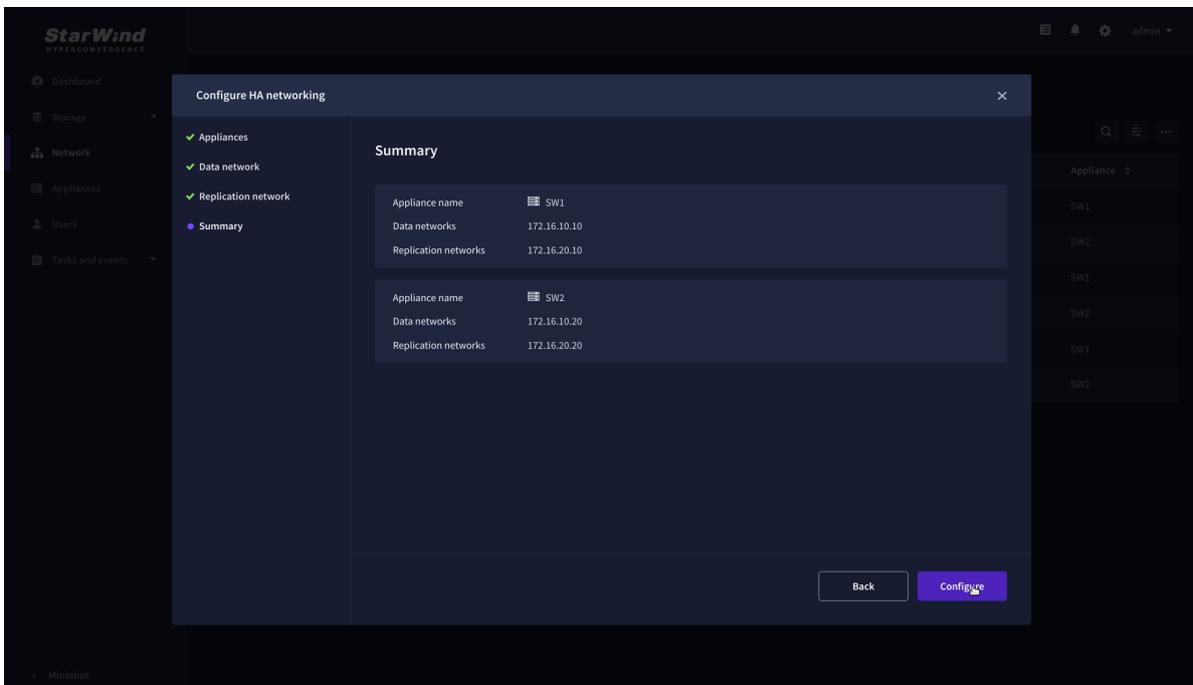

8. Click Next to validate the Replication network settings completion.
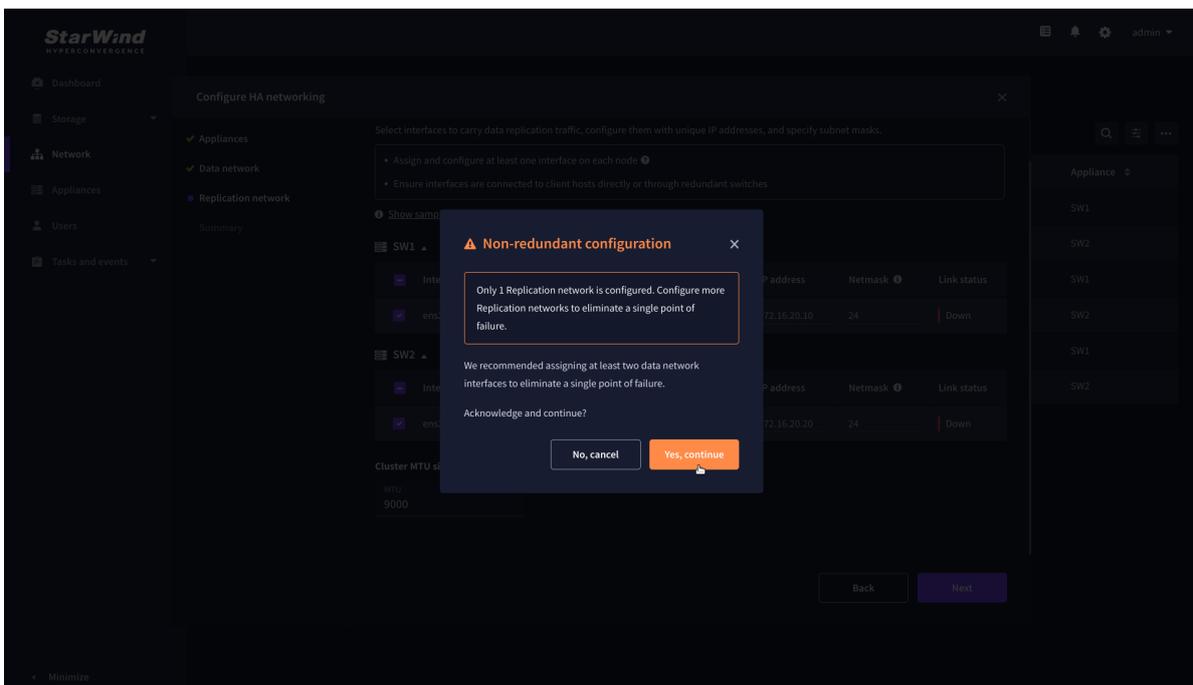
9. Review the summary and click Configure.
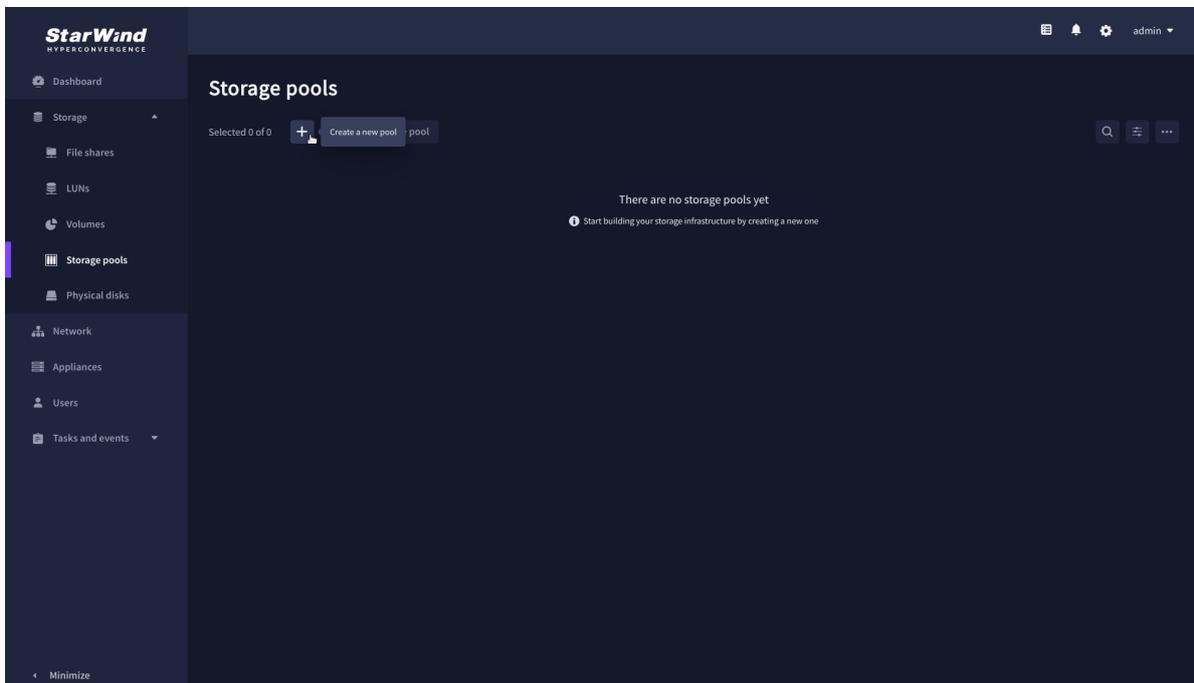
Add Physical Disks

Attach physical storage to StarWind Virtual SAN Controller VM:

- Ensure that all physical drives are connected through an HBA or RAID controller.
- Deploy StarWind VSAN CVM on each server that will be used to configure fault-tolerant standalone or highly available storage.
- Store StarWind VSAN CVM on a separate storage device accessible to the hypervisor host (e.g., SSD, HDD).
- Add HBA, RAID controllers, or NVMe SSD drives to StarWind CVM via a passthrough device.

Learn more about storage provisioning guidelines in the KB article.
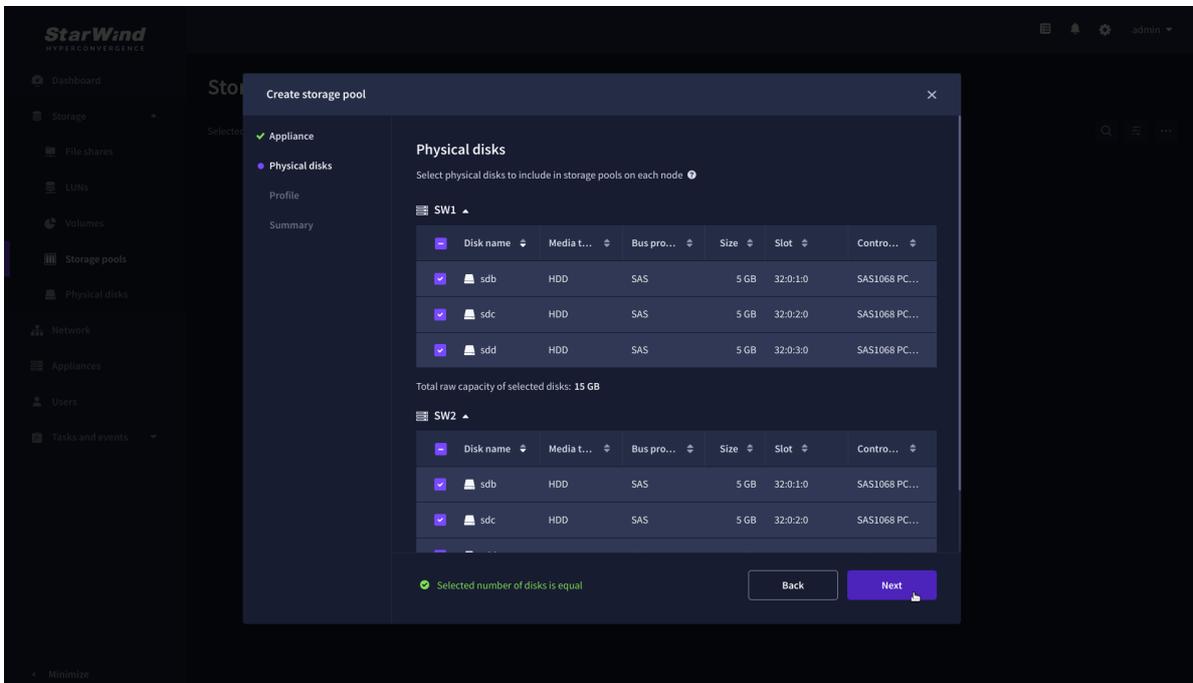
Create Storage Pool

1. Click the "Add" button to create a storage pool.

2. Select two storage nodes to create a storage pool on them simultaneously.
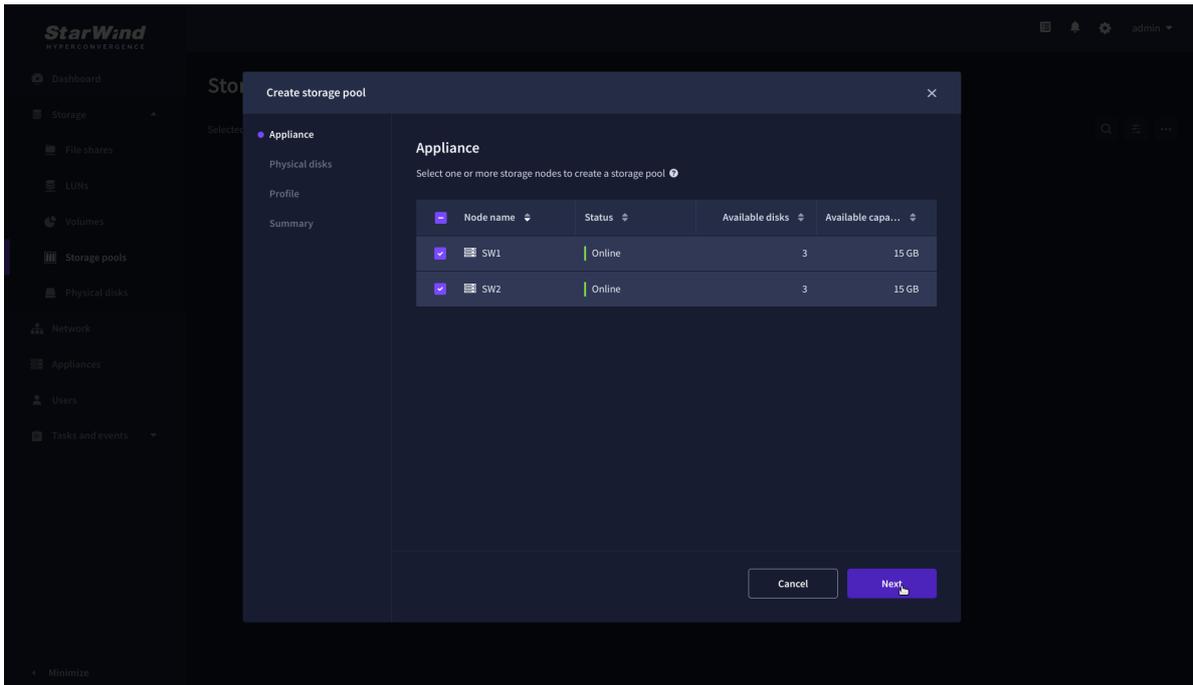
3. Select physical disks to include in the storage pool name and click the "Next" button. NOTE: Select identical type and number of disks on each storage node to create identical storage pools.


4. Select one of the preconfigured storage profiles or create a redundancy layout for the new storage pool manually according to your redundancy, capacity, and performance requirements.
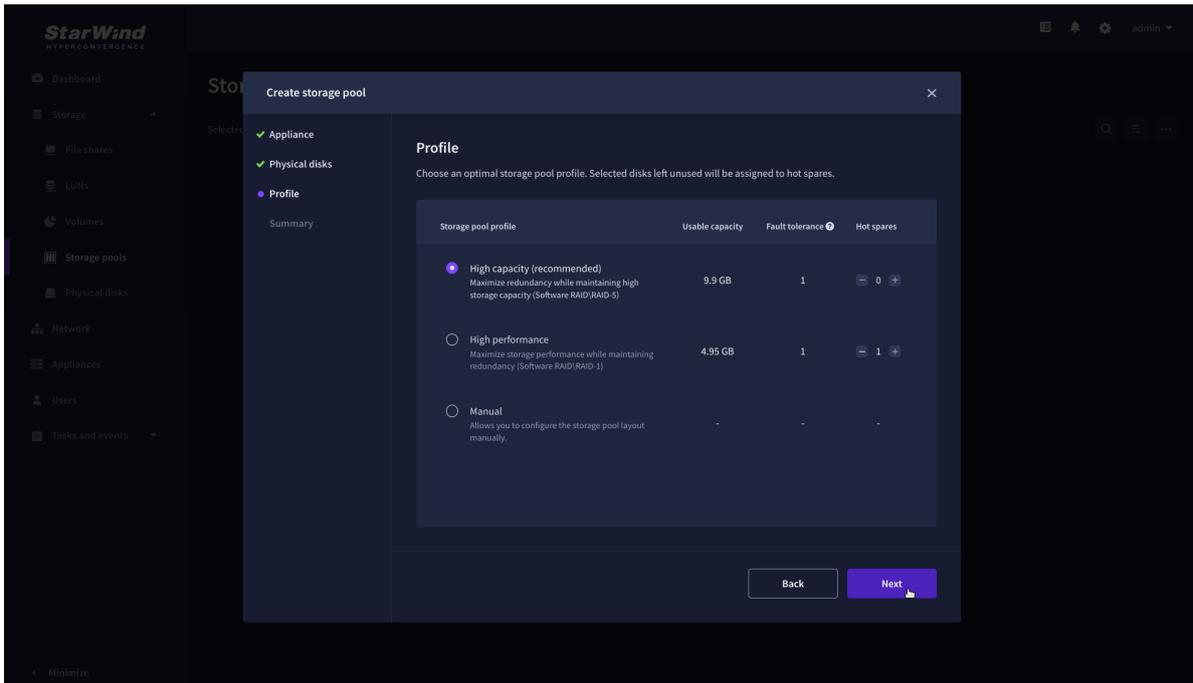
Hardware RAID, Linux Software RAID, and ZFS storage pools are supported and integrated into the StarWind CVM web interface. To make easier the storage pool configuration, the preconfigured storage profiles are provided to configure the recommended pool type and layout according to the direct-attached storage:

- hardware RAID – configures Hardware RAID's virtual disk as a storage pool. It is available only if a hardware RAID controller is passed through to the CVM
- high performance – creates Linux Software RAID-10 to maximize storage performance while maintaining redundancy
- high capacity – creates Linux Software RAID-5 to maximize storage capacity while maintaining
  redundancy
- better redundancy – creates ZFS Stripped RAID-Z2 (RAID 60)) to maximize redundancy while maintaining high storage capacity
- manual – allows users to configure any storage pool type and layout with attached storage

5. Review "Summary" and click the "Create" button to create the pools on storage servers simultaneously.
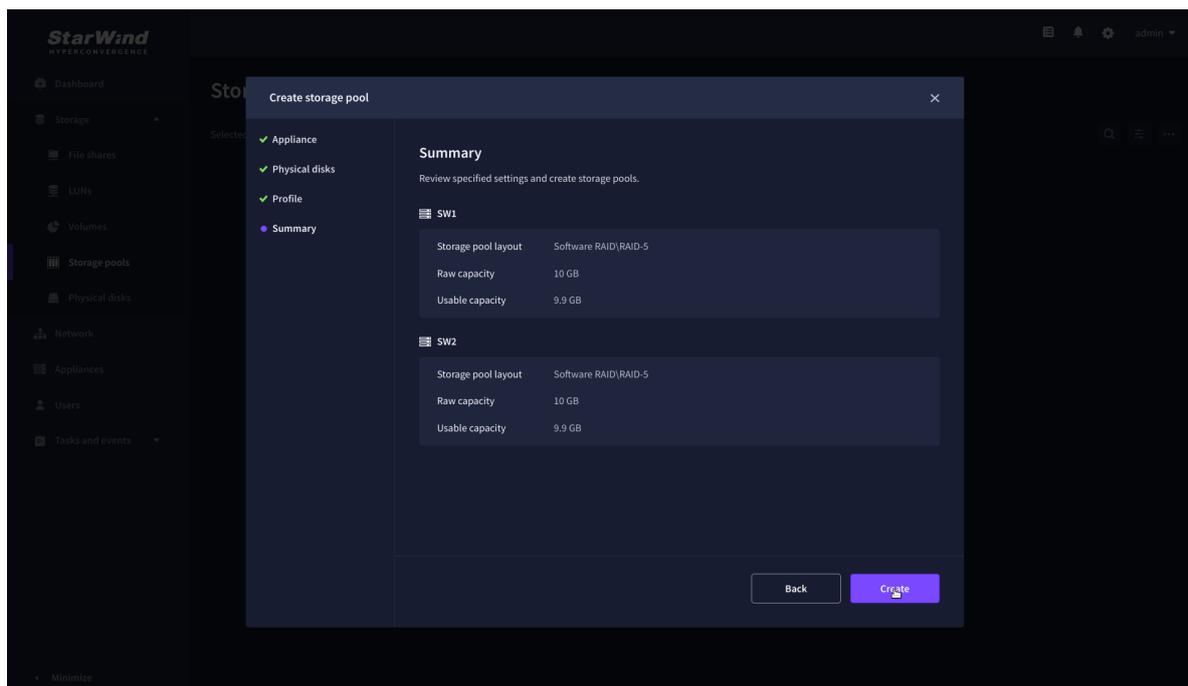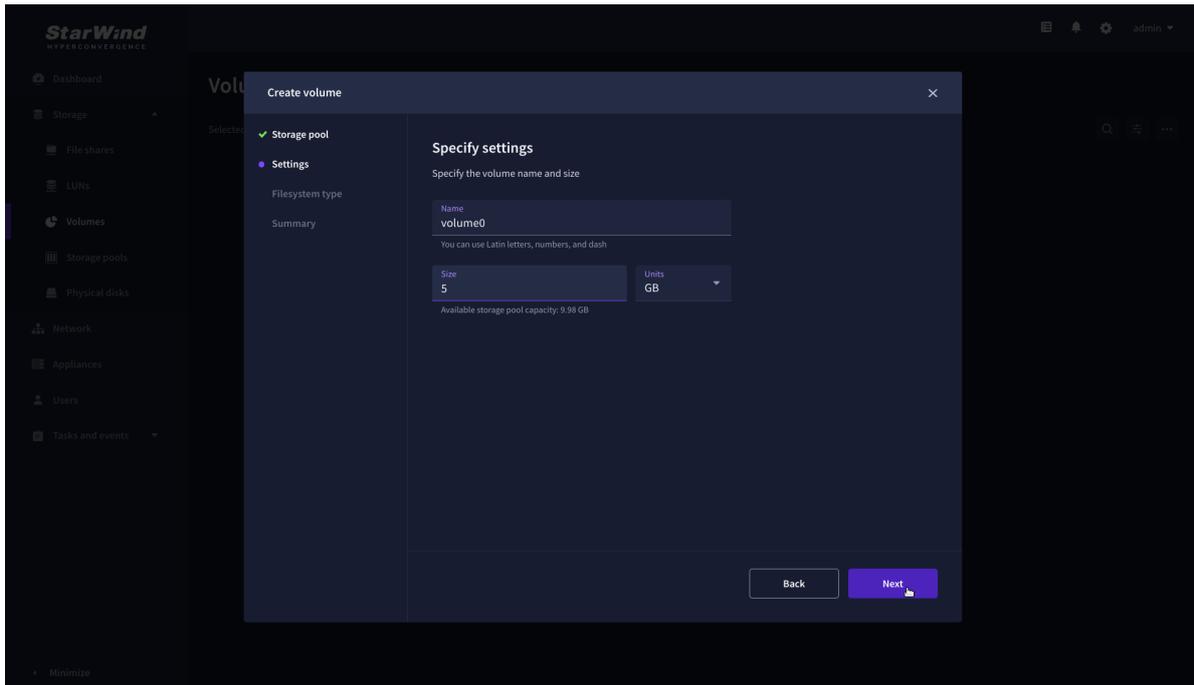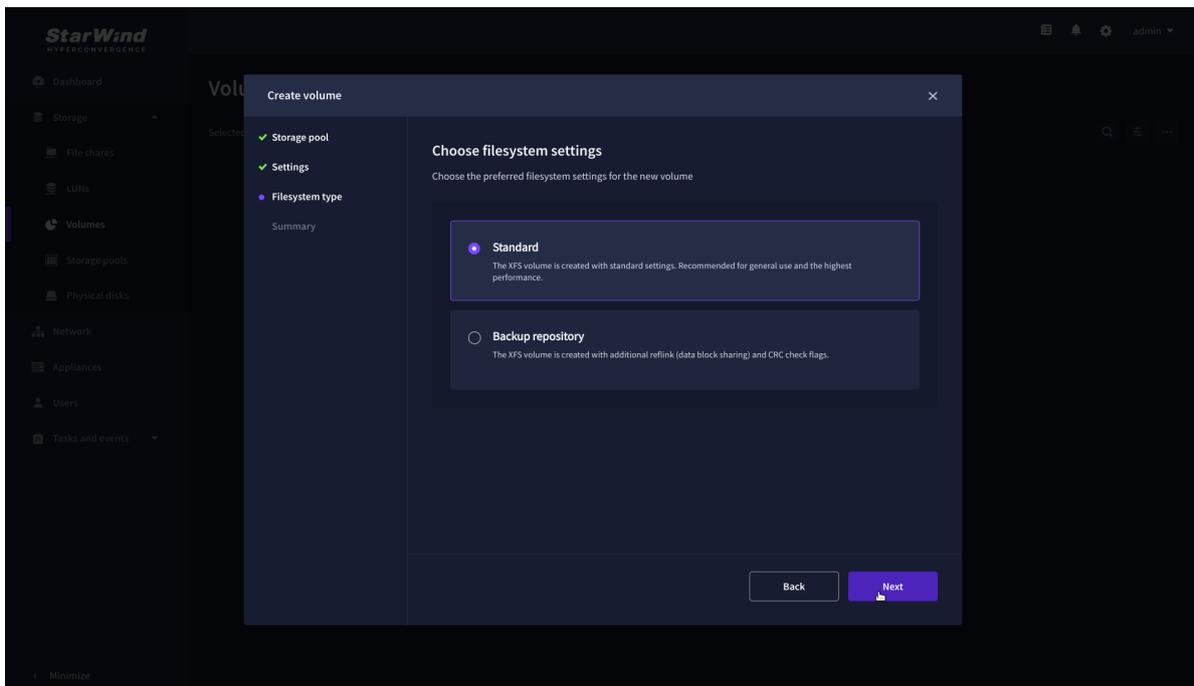
Create Volume

1. To create volumes, click the "Add" button.

2. Select two identical storage pools to create a volume simultaneously.
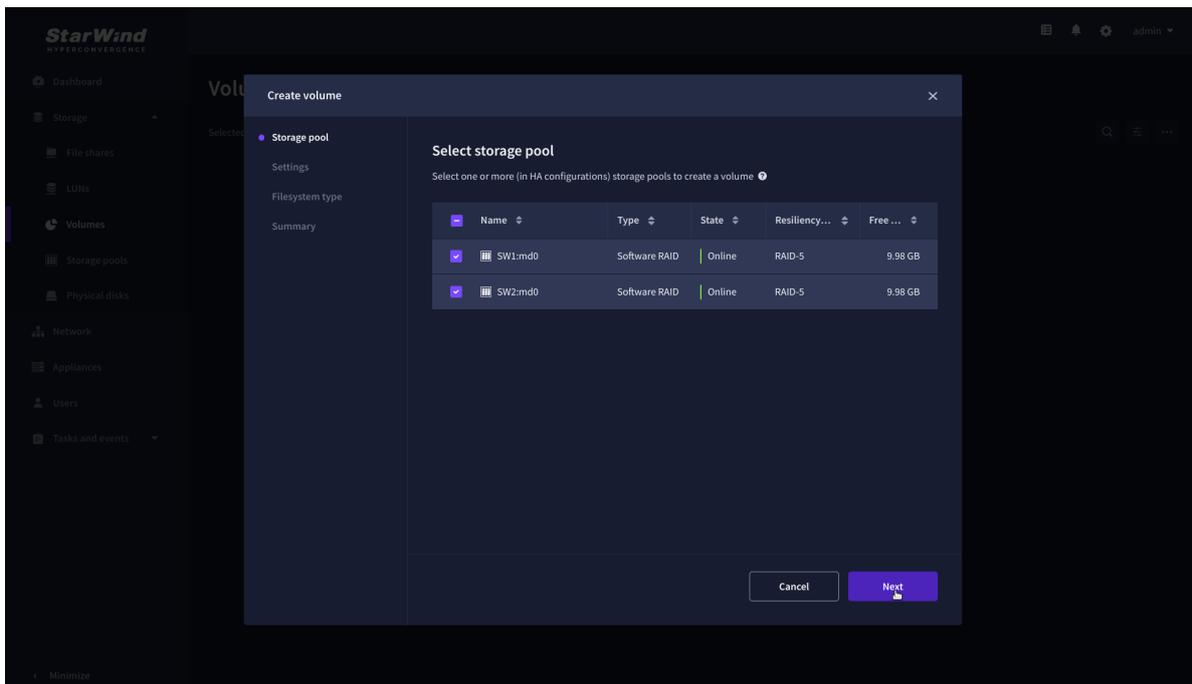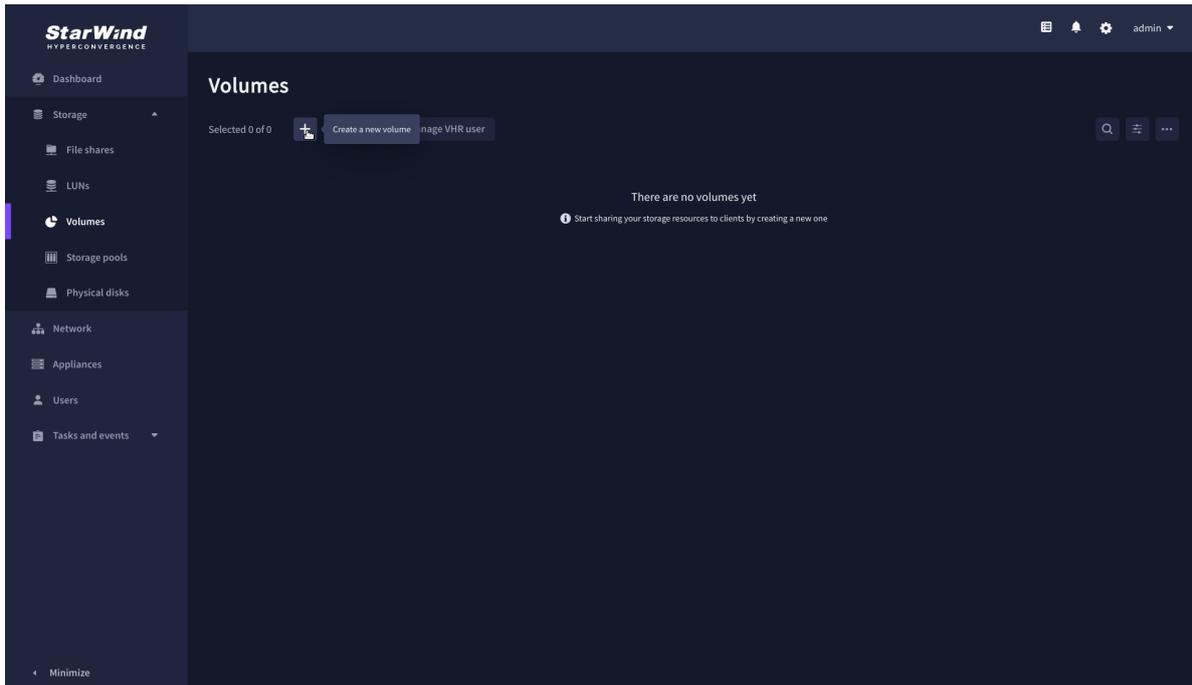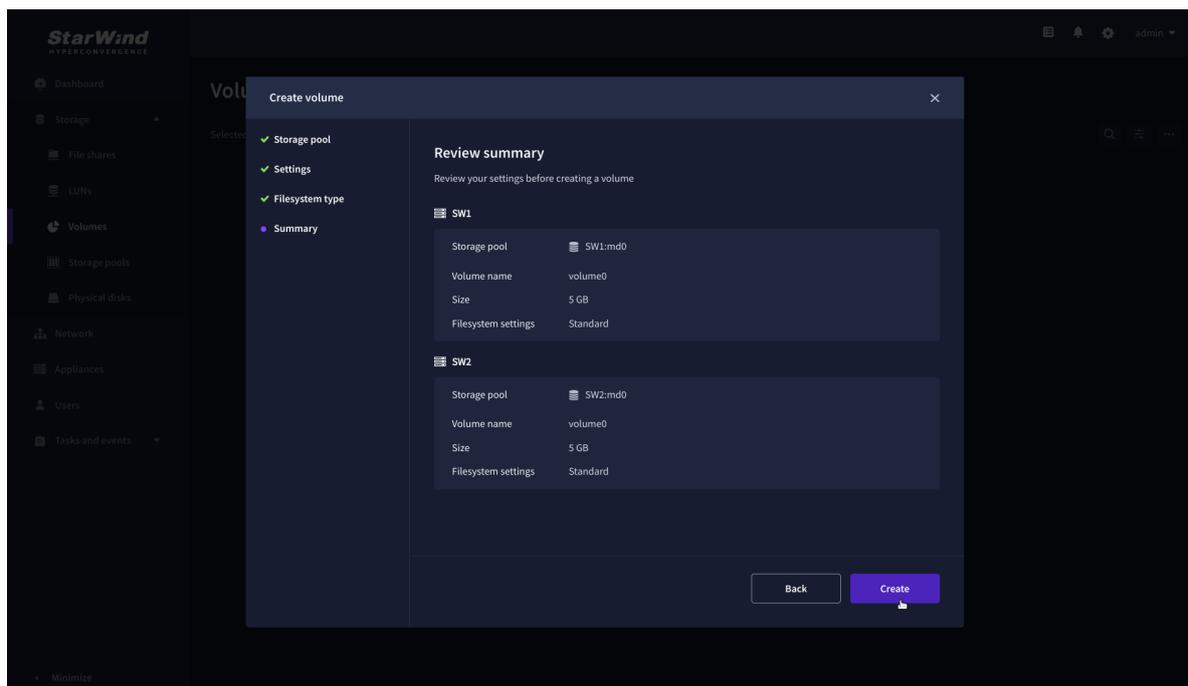
3. Specify volume name and capacity.
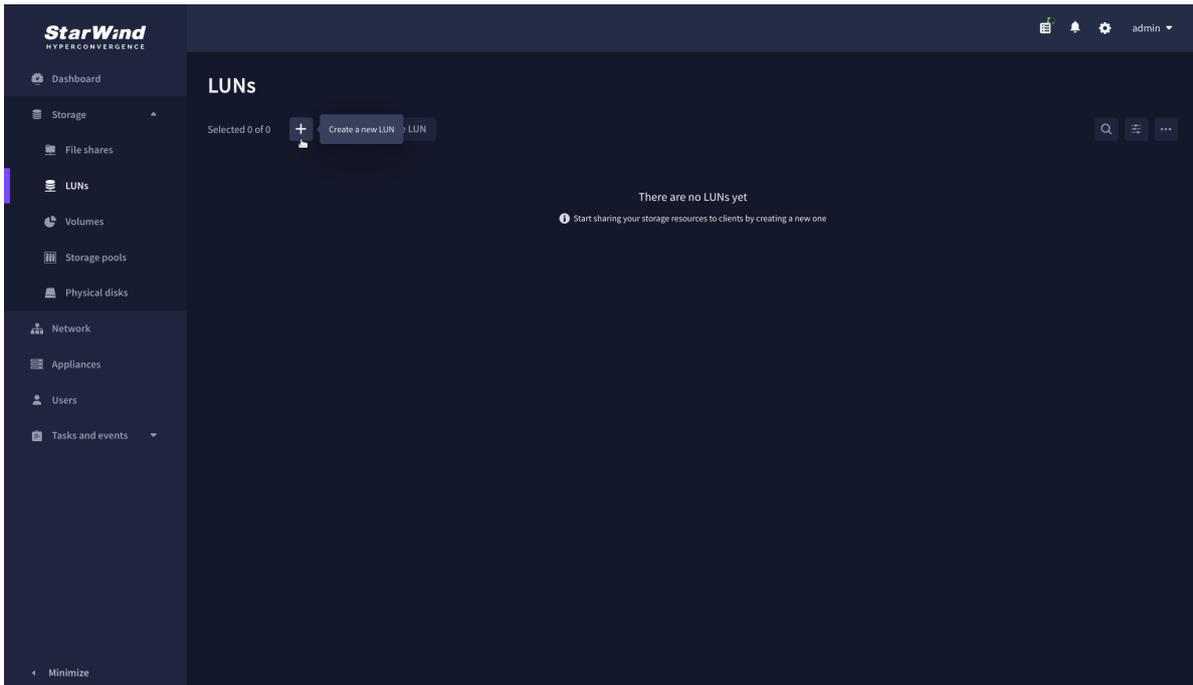
4. Select the Standard volume type.

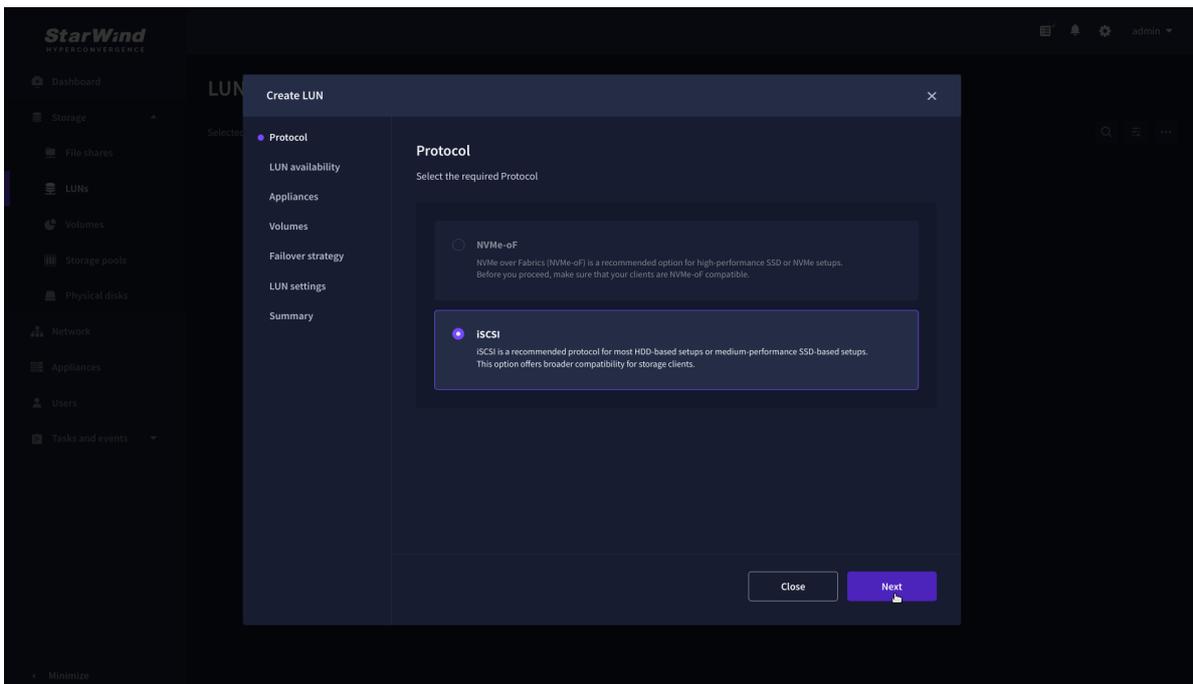5. Review "Summary" and click the "Create" button to create the pool.

Create Ha Lun

The LUN availability for StarWind LUN can be Standalone and High availability (2-way or 3-way replication) and is narrowed by your license.
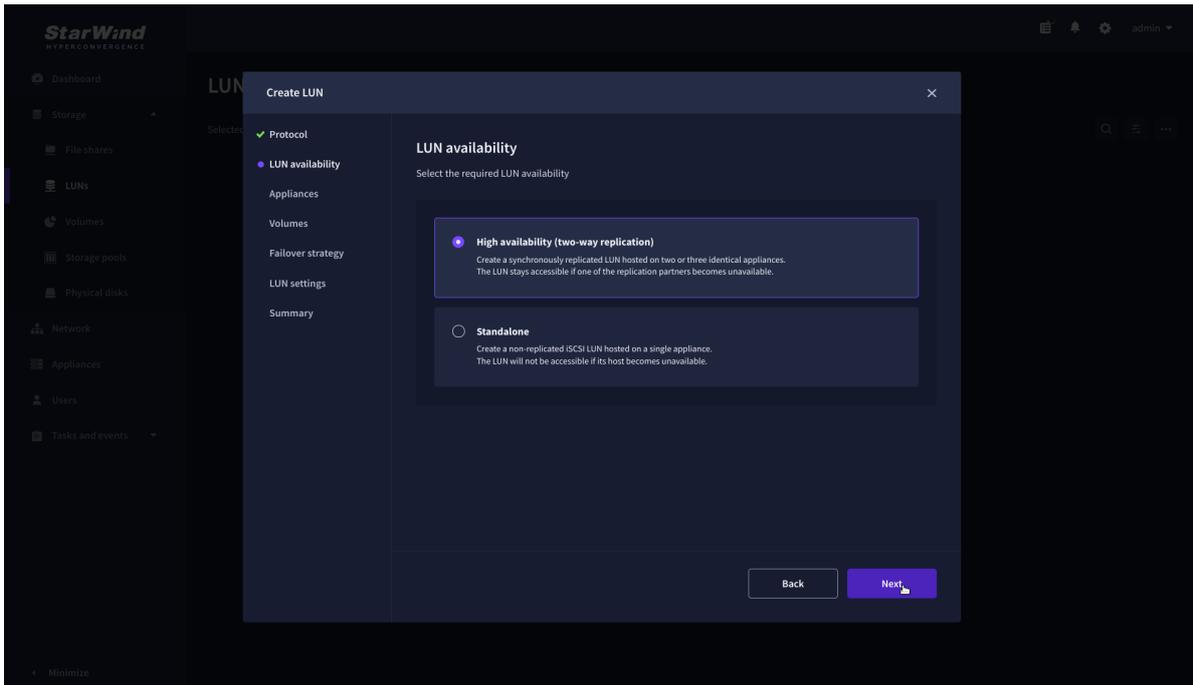
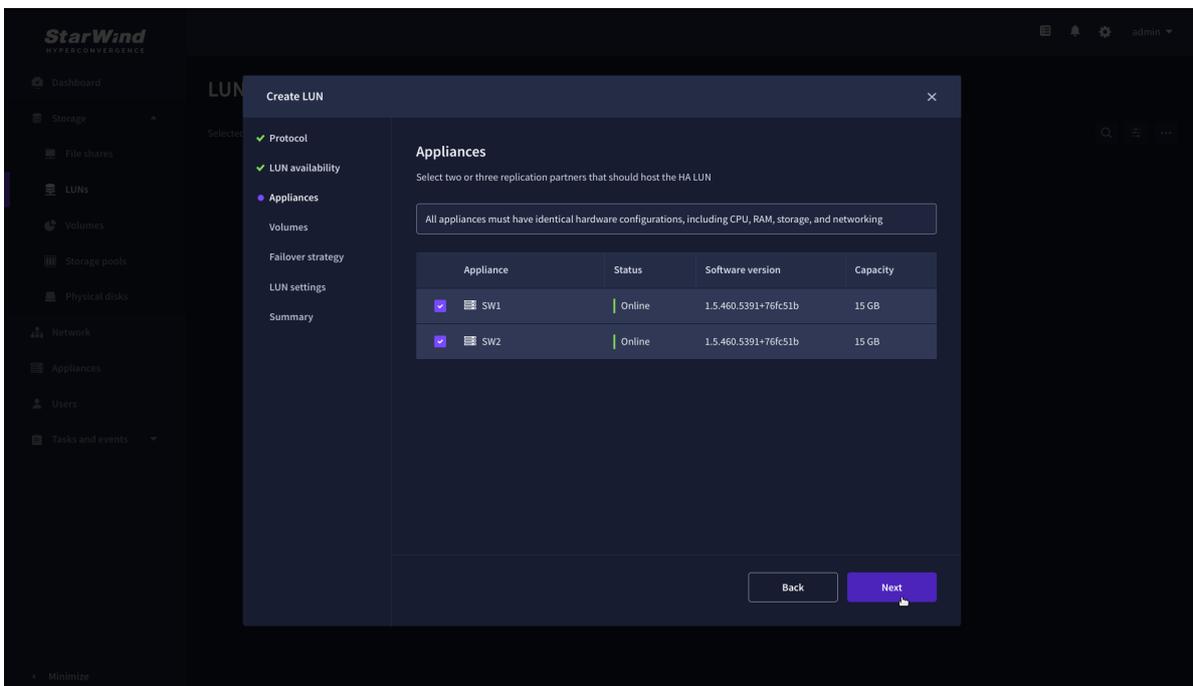1. To create a virtual disk, click the Add button.
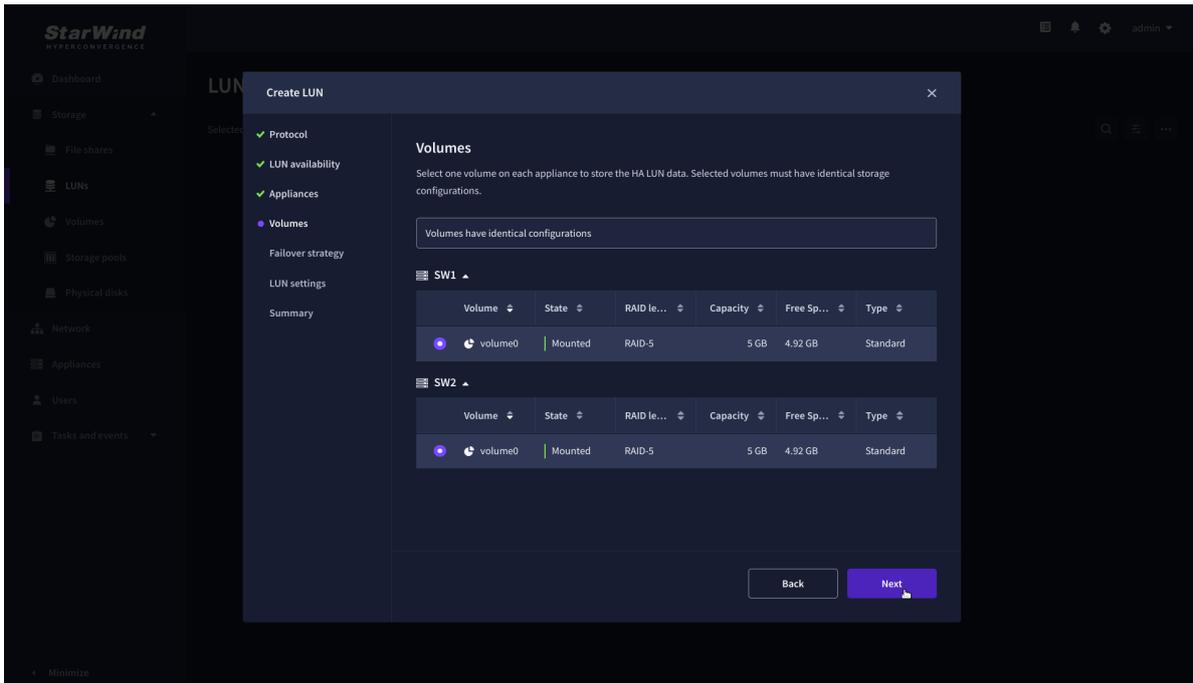
2. Select the protocol.

3. Choose the "High availability" LUN availability type.

4. Select the appliances that will host the LUN. Partner appliances must have identical hardware configurations, including CPU, RAM, storage, and networking.

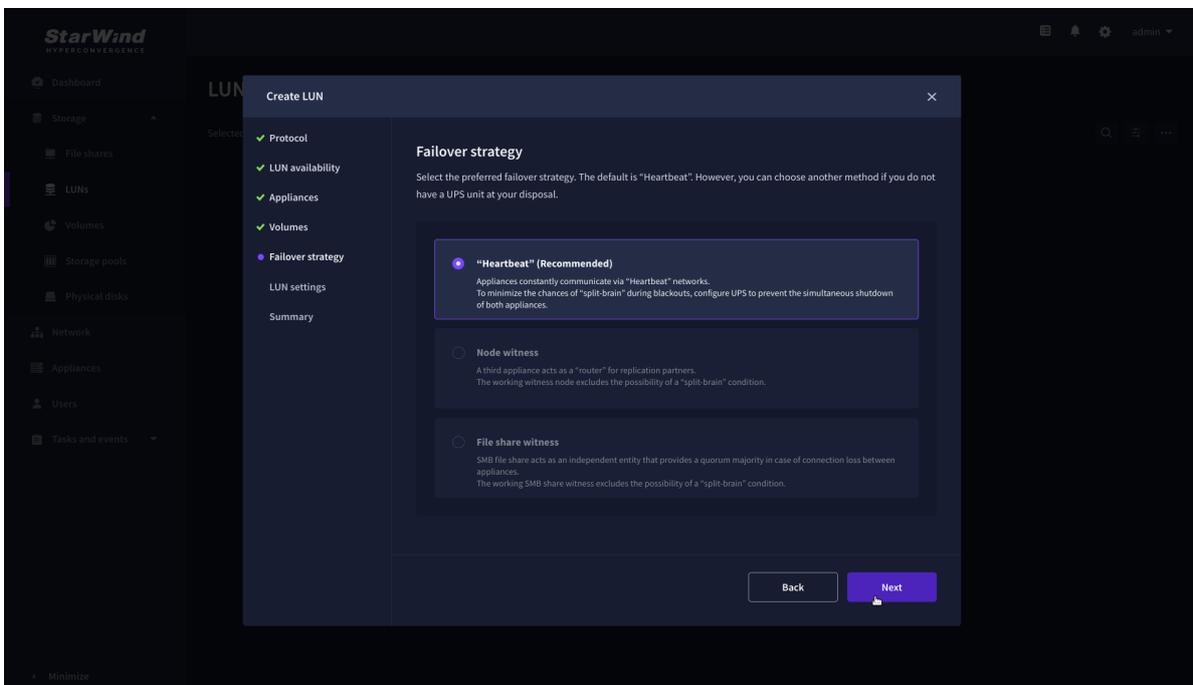5. Select a volume to store the LUN data. Selected volumes must have identical storage configurations.
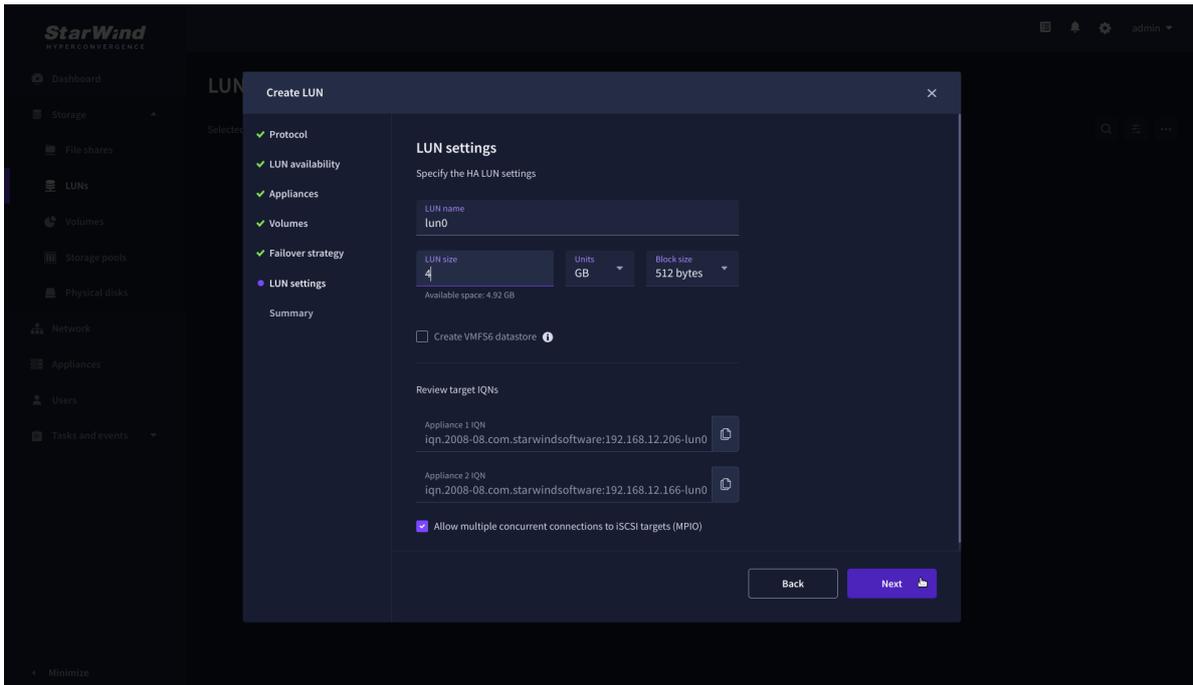
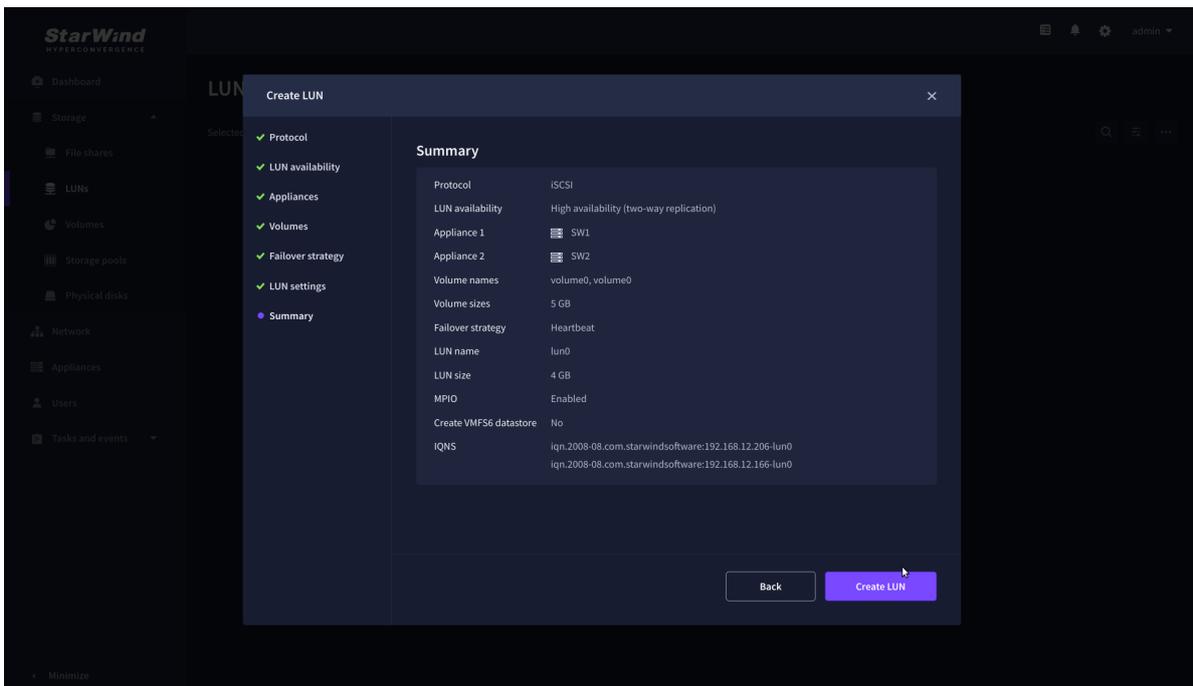6. Select the "Heartbeat" failover strategy.
NOTE: To use the Node witness or the File share witness failover strategies, the appliances should have these features licensed.

7. Specify the HA LUN settings, e.g. name, size, and block size. Click Next.

8. Review "Summary" and click the "Create" button to create the LUN.

Connecting Compute Nodes

To establish client connections to StarWind VSAN standalone and highly available storage devices (LUNs), follow these links for configuring settings on a hypervisor of your choice:

- VMware vSphere/ESXi – Connecting StarWind LUNs to VMware vSphere servers
- Microsoft Hyper-V – Connecting StarWind virtual disk to Hyper-V servers
- oVirt – Provisioning StarWind HA Storage to Hosts
- Proxmox VE – Connecting StarWind HA Storage to Proxmox Hosts

Conclusion

By following this guide, end-users can deploy StarWind Virtual SAN on commodity servers, configure highly available storage, and prepare it for client interconnections from compute (hypervisor) nodes. The guide provides key insights and steps to ensure a seamless deployment process.

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