

StarWind Virtual SAN: Configuration Guide for Microsoft Windows Server in Amazon AWS, VSAN Deployed as a Windows-based Cloud Instance

2024

TECHNICAL PAPERS



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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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Introduction To Starwind Virtual San For Hyper-V

StarWind Virtual SAN is a native Windows hypervisor-centric hardware-less VM storage solution. It creates a fully fault-tolerant and high performing storage pool built for the virtualization workloads by mirroring the existing server's storage and RAM between the participating storage cluster nodes. The mirrored storage resources are then connected to all cluster nodes and treated just as a local storage by all hypervisors and clustered applications. High Availability (HA) is achieved by providing multipath access to all storage nodes. StarWind Virtual SAN delivers supreme performance compared to any dedicated SAN solution since it runs locally on the hypervisor and all I/O is processed by local RAM, SSD cache, and disks. This way it never gets bottlenecked by storage fabric.

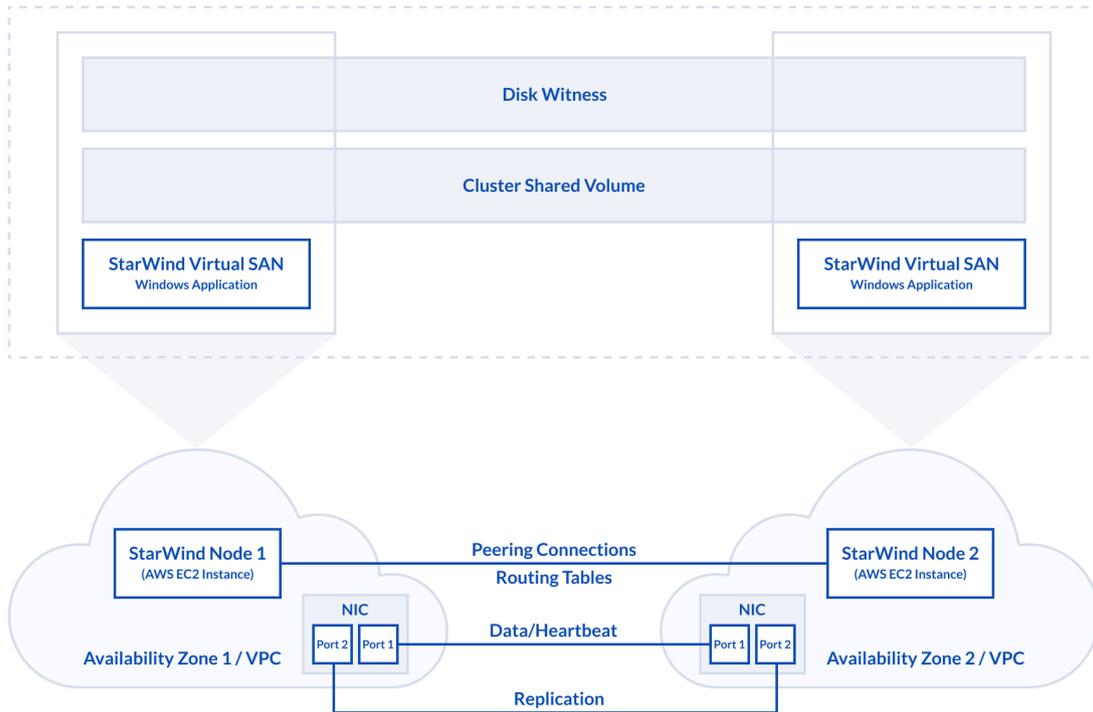
Architecture Diagram

The proper Virtual Private Cloud (VPC) configuration is a key to successfully realize Microsoft Failover Cluster instances on AWS.

There are two possible ways to deploy StarWind instances in AWS:

- two StarWind instances within the same VPC but in different Availability Zones using routing tables;
- two StarWind instances in different VPCs using a peering connection to communicate.

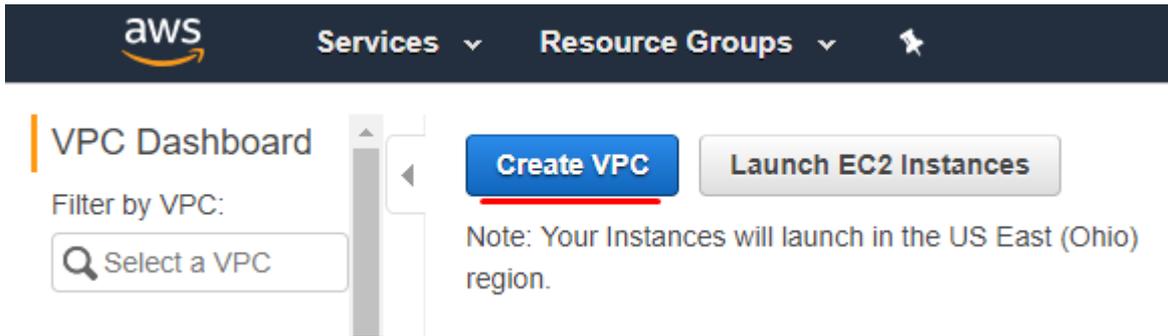
Principal architecture diagram:



Windows Failover Clustering requires Active Directory (AD) as an orchestrator. AD DC (Active Directory Domain Controller) can be either configured as on-premises DC (Domain Controller) with VPN connections to AWS StarWind Instances or/and the virtual instance in AWS EC2 with optional replication to the on-premises domain controller using built-in active directory replication. AWS AD DC best practices can be found by following this [link](#).

Configuring Networks In Aws Ec2

1. Select a region for use in AWS EC2.
2. Open AWS Management Console and navigate to VPC option in Networking & Content Delivery section.
3. Click on the Create VPC button.



4. Go to VPC with Public and Private Subnets tab and click Select.

Step 1: Select a VPC Configuration

<p>VPC with a Single Public Subnet</p> <p>VPC with Public and Private Subnets</p> <p>VPC with Public and Private Subnets and Hardware VPN Access</p> <p>VPC with a Private Subnet Only and Hardware VPN Access</p>	<p>In addition to containing a public subnet, this configuration adds a private subnet whose instances are not addressable from the Internet. Instances in the private subnet can establish outbound connections to the Internet via the public subnet using Network Address Translation (NAT).</p> <p>Creates:</p> <p>A /16 network with two /24 subnets. Public subnet instances use Elastic IPs to access the Internet. Private subnet instances access the Internet via Network Address Translation (NAT). (Hourly charges for NAT devices apply.)</p>	
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[Cancel and Exit](#)

5. Specify IP configuration for VPC. Click on Create VPC button.

Step 2: VPC with Public and Private Subnets

IPv4 CIDR block: 192.168.10.0/23 (507 IP addresses available)

IPv6 CIDR block: No IPv6 CIDR Block
 Amazon provided IPv6 CIDR block

VPC name: SW VPC Ohio

Public subnet's IPv4 CIDR: 192.168.10.0/24 (251 IP addresses available)

Availability Zone: us-east-2a

Public subnet name: Public subnet

Private subnet's IPv4 CIDR: 192.168.11.0/24 (251 IP addresses available)

Availability Zone: us-east-2a

Private subnet name: Private subnet

You can add more subnets after AWS creates the VPC.

Specify the details of your NAT gateway ([NAT gateway rates apply](#)). [Use a NAT instance instead](#)

Elastic IP Allocation ID: eipalloc-989792b6

Service endpoints
[Add Endpoint](#)

Enable DNS hostnames: Yes No

Hardware tenancy: Default

[Cancel and Exit](#) [Back](#) [Create VPC](#)

NOTE: All corresponding subnets must be located within the same Availability Zone.

6. Create one more VPC in the different region with subnets configured.

7. To create Peering Connections between VPC in different regions, Navigate to VPC dashboard and click on the Peering Connections tab.

The screenshot shows the AWS Management Console VPC Dashboard. At the top, there are buttons for 'Launch VPC Wizard' and 'Launch EC2 Instances'. A note states: 'Note: Your Instances will launch in the US East (N. Virginia) region.' Below this is a section titled 'Resources by Region' with a 'Refresh Resources' button. The main content area displays 'You are using the following Amazon VPC resources' in the N. Virginia region. The resources are listed in a grid:

- VPCs: 1 (See all regions)
- Nat Gateways: 0 (See all regions)
- Subnets: 6 (See all regions)
- VPC Peering Connections: 0 (See all regions)
- Route Tables: 1 (See all regions)
- Network ACLs: 1 (See all regions)
- Internet Gateways: 1 (See all regions)
- Security Groups: 2 (See all regions)
- Egress-only Internet Gateways: 0 (See all regions)
- Customer Gateways: 0 (See all regions)
- DHCP options sets: 1 (See all regions)
- Virtual Private Gateways: 0 (See all regions)

8. In the Create Peering Connection window, specify Peering connection name tag, VPC (Requester), Region, VPC (Acceptor).

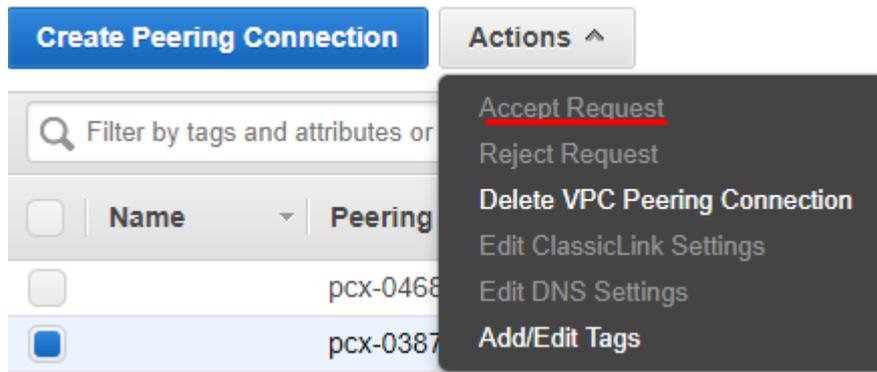
Create Peering Connection

The screenshot shows the 'Create Peering Connection' wizard. The 'Peering connection name tag' is set to 'SW Peering Connection'. Under 'Select a local VPC to peer with', the 'VPC (Requester)' is 'vpc-60f3dc08'. A table shows the associated CIDR block:

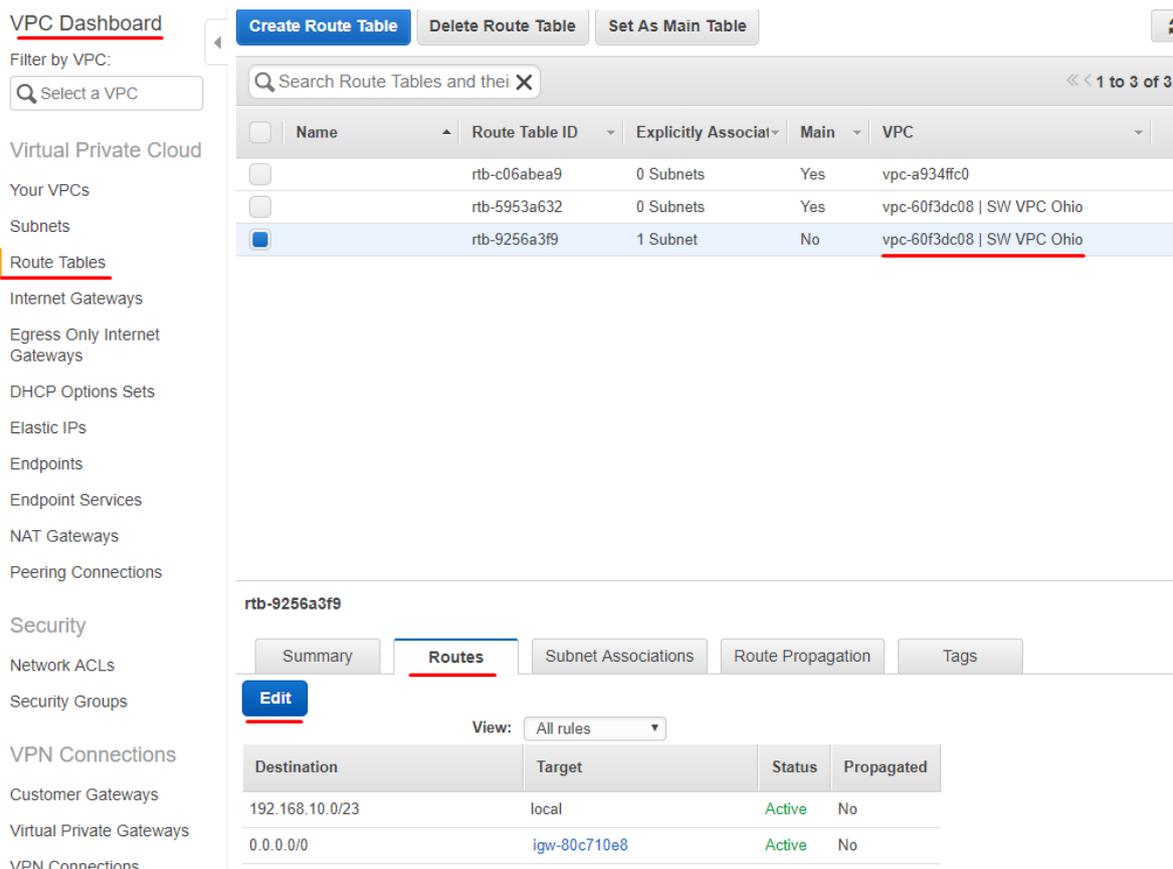
CIDR	Status	Status Reason
192.168.10.0/23	● associated	

Under 'Select another VPC to peer with', the 'Account' is 'My account', the 'Region' is 'N. Virginia (us-east-1)', and the 'VPC (Acceptor)' is 'vpc-60669f1a'. At the bottom, there are 'Cancel' and 'Create Peering Connection' buttons.

9. Navigate to Peering Connection on the different region and accept the connection by clicking Accept Request.



10. To add an additional Route for VPC connection, navigate to the Route Tables tab and click Edit on each VPC.



11. Click Add another route and specify public and private subnets from partner peering connection. Repeat the same operation on other VPC in the Route Tables.

VPC Dashboard

Filter by VPC:

Virtual Private Cloud

- Your VPCs
- Subnets
- Route Tables**
- Internet Gateways
- Egress Only Internet Gateways
- DHCP Options Sets
- Elastic IPs
- Endpoints
- Endpoint Services
- NAT Gateways
- Peering Connections

Security

- Network ACLs
- Security Groups

VPN Connections

- Customer Gateways
- Virtual Private Gateways
- VPN Connections

Search Route Tables and their associated subnets

<input type="checkbox"/>	Name	Route Table ID	Explicitly Associated	Main	VPC
<input type="checkbox"/>		rtb-c06abea9	0 Subnets	Yes	vpc-a934ffc0
<input type="checkbox"/>		rtb-5953a632	0 Subnets	Yes	vpc-60f3dc08 SW VPC Ohio
<input checked="" type="checkbox"/>		rtb-9256a3f9	1 Subnet	No	vpc-60f3dc08 SW VPC Ohio

Summary | **Routes** | Subnet Associations | Route Propagation | Tags

View: All rules

Destination	Target	Status	Propagated
192.168.10.0/23	local	Active	No
0.0.0.0/0	igw-80c710e8	Active	No
192.168.12.0/24	<u>pcx-038708198a310481e</u>	Active	No
192.168.13.0/24	<u>pcx-038708198a310481e</u>	Active	No

12. To allow RDP and iSCSI connections to the StarWind instances, all TCP or custom TCP rules must be configured in security groups. It is possible to either allow only 3389 (RDP port) and 3260 (iSCSI port) for security groups or allow all inbound/outbound TCP. To customize the settings according to the company's security policy, click Edit in the Security Group tab.

The screenshot displays the AWS Management Console interface for configuring a Security Group. On the left, a navigation menu lists various AWS services, with 'Security Groups' highlighted under the 'NETWORK & SECURITY' section. The main content area shows the 'Create Security Group' page for the group 'sg-dbc897b1'. A table lists two security groups, with 'sg-dbc897b1' selected. Below, the 'Inbound' tab is active, showing an 'Edit' button and a table of inbound rules.

Name	Group ID	Group Name	VPC ID	Description
	sg-6a268503	default	vpc-a934ffc0	default VPC security grou
<input checked="" type="checkbox"/>	sg-dbc897b1	default	vpc-60f3dc08	default VPC security grou

Type	Protocol	Port Range	Source	Description
All TCP	TCP	0 - 65535	0.0.0.0/0	
All TCP	TCP	0 - 65535	:::0	
All traffic	All	All	sg-dbc897b1 (default)	

The configuration is ready for the deployment of StarWind instances and configuring HA devices with Failover Clustering.

To configure 2 StarWind instances in one VPC, please follow the same process.

NOTE: StarWind virtual instances should be configured between 2 different Availability Zones and communication is allowed by routing tables.

Selecting The Starwind Virtual San Instance Deployment Option

StarWind Virtual SAN Instance can be created in one of the following ways: by creating a new Instance in AWS EC2 or by installing StarWind VSan for Hyper-V on the existing Windows-based EC2 Instance. Please select the required option.

Deploying Starwind Vsan For Hyper-V In A New Aws Ec2 Instance

1. Open StarWind Virtual SAN page on Amazon Marketplace by following this [link](#).
2. Select the Instance type: BYOL (Bring Your Own License) or StarWind Virtual SAN with fees per hour.



About StarWind

StarWind Software is a pioneer of storage virtualization. It keeps innovating and putting into production solutions built with a revolutionary vision years before these ideas get adopted by the rest of the IT world. Many companies claim doing this but few actually do. StarWind was one of the first to push Software Defined Storage out from the Test & Development niche right to the mainstream Hardcore Production dominated by hardware storage appliances. Being a visionary in Software-Defined Storage StarWind was among the first to bring in HyperConverged solution to the market in early 2008.

StarWind

[Visit the StarWind Website](#)

StarWind Products (3)

showing 1 - 3



StarWind Virtual SAN - BYOL

★★★★★ (0) | Version 8.0.0.12166 | Sold by [StarWind](#)

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Windows, Windows Server 2016 Base Windows Server 2016 - 64-bit Amazon Machine Image (AMI)



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Safety of mission-critical data is crucially important for your business. The more copies you have, the less is the risk of data damage or loss. StarWind Virtual Tape Library...

Windows, Windows Server 2016 Base Windows Server 2016 - 64-bit Amazon Machine Image (AMI)

3. Click on the Continue to Subscribe button.
4. Read and accept StarWind EULA. Click the Continue to Configuration button.
5. Select Region and click on the Continue to Launch button.
6. In the Choose Action section, select Launch through EC2 option from the drop-down list. Click Launch to proceed.



StarWind Virtual SAN

[< Product Detail](#) [Subscribe](#) [Configure](#) [Launch](#)

Launch this software

Review your configuration and choose how you wish to launch the software.

Configuration Details

Fulfillment Option	64-bit Amazon Machine Image (AMI) StarWind Virtual SAN <i>running on m4.xlarge</i>
Software Version	8.0.0.12167
Region	US East (N. Virginia)

Choose Action

Launch through EC2

Choose this action to launch your configuration through the Amazon EC2 console.

Launch

7. Select an Instance Type. StarWind highly recommends using the m4.xlarge type. Click Next: Configure Instance Details to continue.

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 2: Choose an Instance Type

<input checked="" type="radio"/>	General purpose	m5d.12xlarge	48	192	2 x 900 (SSD)	Yes	10 Gigabit	Yes
<input checked="" type="radio"/>	General purpose	m5d.24xlarge	96	384	4 x 900 (SSD)	Yes	25 Gigabit	Yes
<input checked="" type="radio"/>	General purpose	m5.large	2	8	EBS only	Yes	Up to 10 Gigabit	Yes
<input checked="" type="radio"/>	General purpose	m5.xlarge	4	16	EBS only	Yes	Up to 10 Gigabit	Yes
<input checked="" type="radio"/>	General purpose	m5.2xlarge	8	32	EBS only	Yes	Up to 10 Gigabit	Yes
<input checked="" type="radio"/>	General purpose	m5.4xlarge	16	64	EBS only	Yes	Up to 10 Gigabit	Yes
<input checked="" type="radio"/>	General purpose	m5.12xlarge	48	192	EBS only	Yes	10 Gigabit	Yes
<input checked="" type="radio"/>	General purpose	m5.24xlarge	96	384	EBS only	Yes	25 Gigabit	Yes
<input type="radio"/>	General purpose	m4.large	2	8	EBS only	Yes	Moderate	Yes
<input checked="" type="radio"/>	General purpose	m4.xlarge	4	16	EBS only	Yes	High	Yes
<input type="radio"/>	General purpose	m4.2xlarge	8	32	EBS only	Yes	High	Yes
<input type="radio"/>	General purpose	m4.4xlarge	16	64	EBS only	Yes	High	Yes
<input type="radio"/>	General purpose	m4.10xlarge	40	160	EBS only	Yes	10 Gigabit	Yes
<input checked="" type="radio"/>	General purpose	m4.16xlarge	64	256	EBS only	Yes	25 Gigabit	Yes

Cancel Previous **Review and Launch** Next: Configure Instance Details

8. Select the preconfigured VPC. Review the settings and assign an IP for the Instance. Then click Next: Add Storage.

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances ⓘ [Launch into Auto Scaling Group](#) ⓘ

Purchasing option ⓘ Request Spot instances

Network ⓘ [Create new VPC](#)

Subnet ⓘ [Create new subnet](#)
251 IP Addresses available

Auto-assign Public IP ⓘ

Placement group ⓘ Add instance to placement group.

Domain join directory ⓘ [Create new directory](#)

IAM role ⓘ [Create new IAM role](#)

Shutdown behavior ⓘ

Enable termination protection ⓘ Protect against accidental termination

Monitoring ⓘ Enable CloudWatch detailed monitoring
Additional charges apply.

EBS-optimized instance ⓘ Launch as EBS-optimized instance

Tenancy ⓘ

9. Add a new volume for StarWind Instance according to the requirements. Click Next:

Add Tags.

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encrypted
Root	/dev/sda1	snap-0aa82f61521d2a821	30	General Purpose S	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted
EBS	xvdb	Search (case-insensit	40	General Purpose S	120 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Tags](#)

10. Assign Tags if needed. Otherwise, this step can be ignored. Click Next: Configure Security Group.

11. Select the preconfigured security groups. Click Review and Launch.

Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

Assign a security group: Create a new security group
 Select an existing security group

Security Group ID	Name	Description	Actions
<input checked="" type="checkbox"/> sg-8e4e8bc4	default	default VPC security group	Copy to new

Inbound rules for sg-8e4e8bc4 (Selected security groups: sg-8e4e8bc4)

Type	Protocol	Port Range	Source	Description
All traffic	All	All	sg-8e4e8bc4 (default)	

12. Review the settings once again and click Launch.

Step 7: Review Instance Launch
free usage tier eligibility and usage restrictions. Don't show me this again

▼ AMI Details Edit AMI

StarWind Virtual SAN
[Copied ami-3efbc1d5 from eu-central-1] SWWSANHOURLY
Root Device Type: ebs Virtualization type: hvm

If you plan to use this AMI for an application that benefits from Microsoft License Mobility, fill out the [License Mobility Form](#). Don't show me this again

Your Free Trial expired on 03/17/2018 - 12:52 AM UTC+2.

Hourly Software Fees: \$0.22 per hour on m4.xlarge instance (Additional taxes may apply.)
Software charges will begin once you launch this AMI and continue until you terminate the instance.

By launching this product, you will be subscribed to this software and agree that your use of this software is subject to the pricing terms and the seller's [End User License Agreement](#)

▼ Instance Type Edit instance type

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
m4.xlarge	13	4	16	EBS only	Yes	High

▼ Security Groups Edit security groups

Security Group ID	Name	Description

Cancel Previous **Launch**

13. Repeat steps 1-12 on a different VPC or Availability Zone depending on the scenario.

Deploying Starwind Vsan For Hyper-V In An Existing Aws Ec2 Instance

StarWind Virtual SAN can be installed on existing Windows-based EC2 Instances via setup wizard.

1. Download StarWind setup executable file from StarWind website by following this link: <https://www.starwind.com/registration-starwind-virtual-san>

NOTE: The setup file is the same for x86 and x64 systems, as well as for all Virtual SAN deployment scenarios.

2. Launch the downloaded setup file on the existing EC2 Instance.

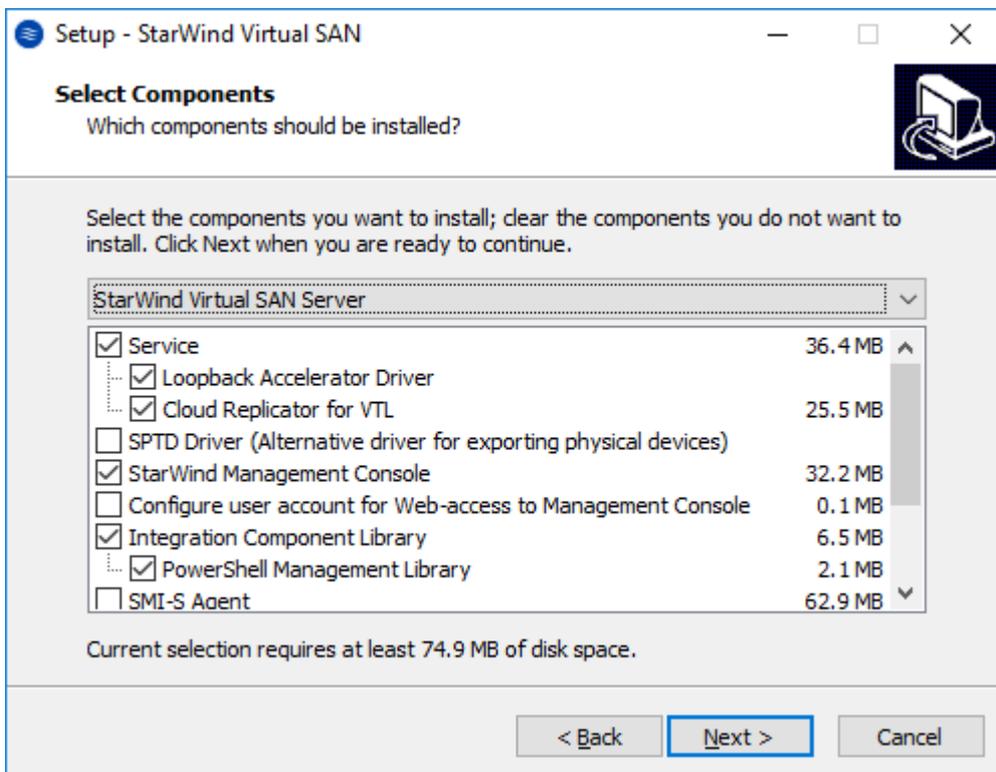
3. Read and accept the License Agreement.

4. Carefully read the information about new features and improvements. Read the text that indicates warnings for users who update existing software installations.

5. Click Browse to modify the installation path if necessary.

6. Select the following components for the minimum setup:

- StarWind Virtual SAN Service
StarWind Service is the “core” of the software. It can create iSCSI targets as well as share virtual and physical devices. The service can be managed from [StarWind Management Console](#) on any Windows computer or virtual machine on the network. Alternatively, the service can be managed from StarWind Web Console which is deployed separately.
- StarWind Management Console
StarWind Management Console is the Graphic User Interface (GUI) part of the software that controls and monitors all storage-related operations (e.g., allows users to create targets and devices on StarWind Virtual SAN servers connected to the network).



7. Specify the Start Menu folder.
8. Select the Create a desktop icon checkbox to create a desktop icon.
9. When the license prompt appears, choose one of the following options: request either a time-limited fully functional evaluation key, request a free version key or use the commercial license key obtained along with the purchase of StarWind Virtual SAN for Hyper-V by selecting the corresponding option.
10. Click Browse to locate the license file. Then click Next to continue.
11. Verify the installation settings. Click Back to make any changes or Install to continue.

12. Select the corresponding checkbox to launch the StarWind Management Console right after the setup wizard is closed. Click Finish.

13. Repeat the installation steps on the partner EC2 Instance.

Configuring Starwind Ec2 Instances

NOTE: Make sure that a domain controller is set up and that configured servers are joined to the domain.

1. Install Failover Clustering, Multipath I/O features on both servers. That can be done through Server Manager (the Add Roles and Features menu item).

2. Configure network interfaces on each node making sure that Synchronization and iSCSI/StarWind Heartbeat interfaces are in different subnets. In this document, 192.168.10.x/192.168.12.x subnet is used for iSCSI/StarWind Heartbeat traffic, while 192.168.11.x/192.168.13.x subnet is used for the Synchronization traffic.

NOTE: In order to allow iSCSI Initiators to discover all StarWind Virtual SAN interfaces, StarWind configuration file (StarWind.cfg) should be changed after stopping StarWind Service on the node where it will be edited.

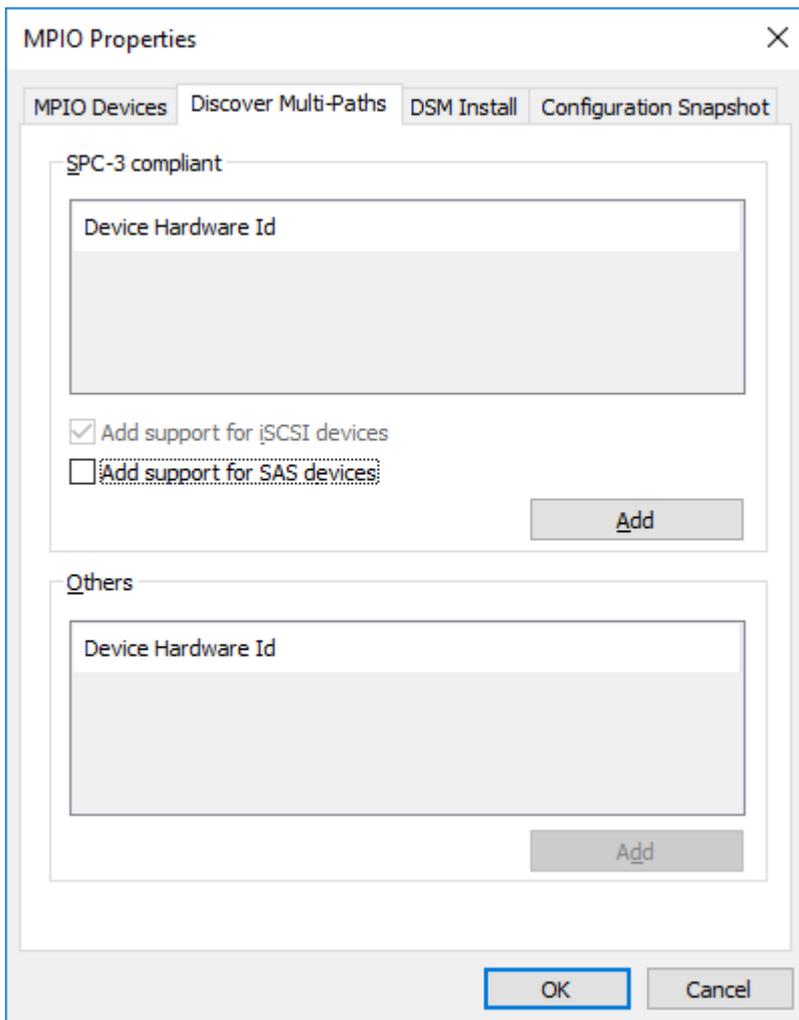
Locate StarWind Virtual SAN configuration file (the default path is: C:\Program Files\StarWind Software\StarWind\StarWind.cfg) and open it via Wordpad as Administrator.

Find the `<iScsiDiscoveryListInterfaces value="0"/>` string and change the value from 0 to 1 (should look as follows: `<iScsiDiscoveryListInterfaces value="1"/>`). Save the changes and exit Wordpad. Once StarWind.cfg is changed and saved, StarWind service can be started.

3. On cluster nodes, open MPIO manager: Start->Administrative Tools->MPIO.

4. Navigate to the Discover Multi-Paths tab.

5. Select the Add support for iSCSI devices checkbox and click Add.



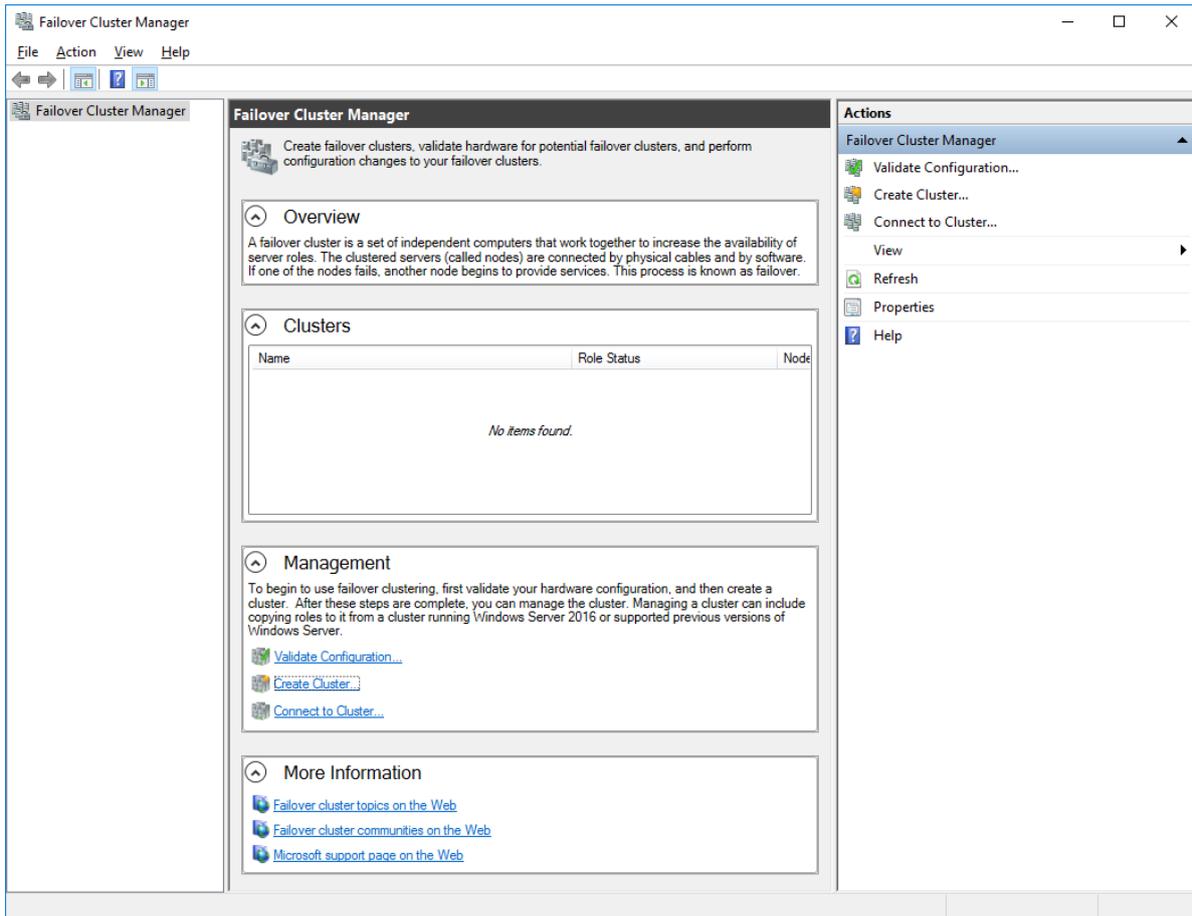
6. Optionally, click Yes to restart the server.

7. Repeat the procedure on the second server.

Creating A Failover Cluster In Hyper-V Server 2016

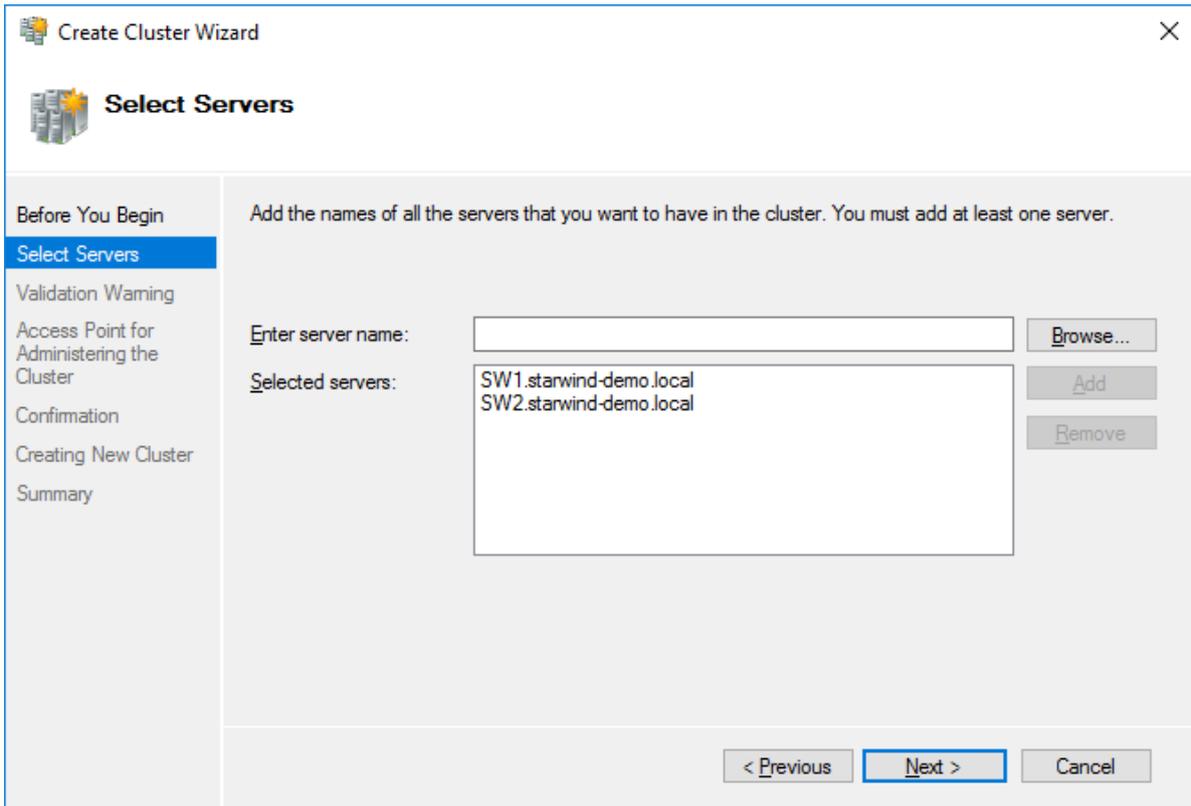
NOTE: To avoid issues during the cluster validation configuration, it is recommended to install the latest Microsoft updates on each node.

1. Open Server Manager. Select the Failover Cluster Manager item from the Tools menu.

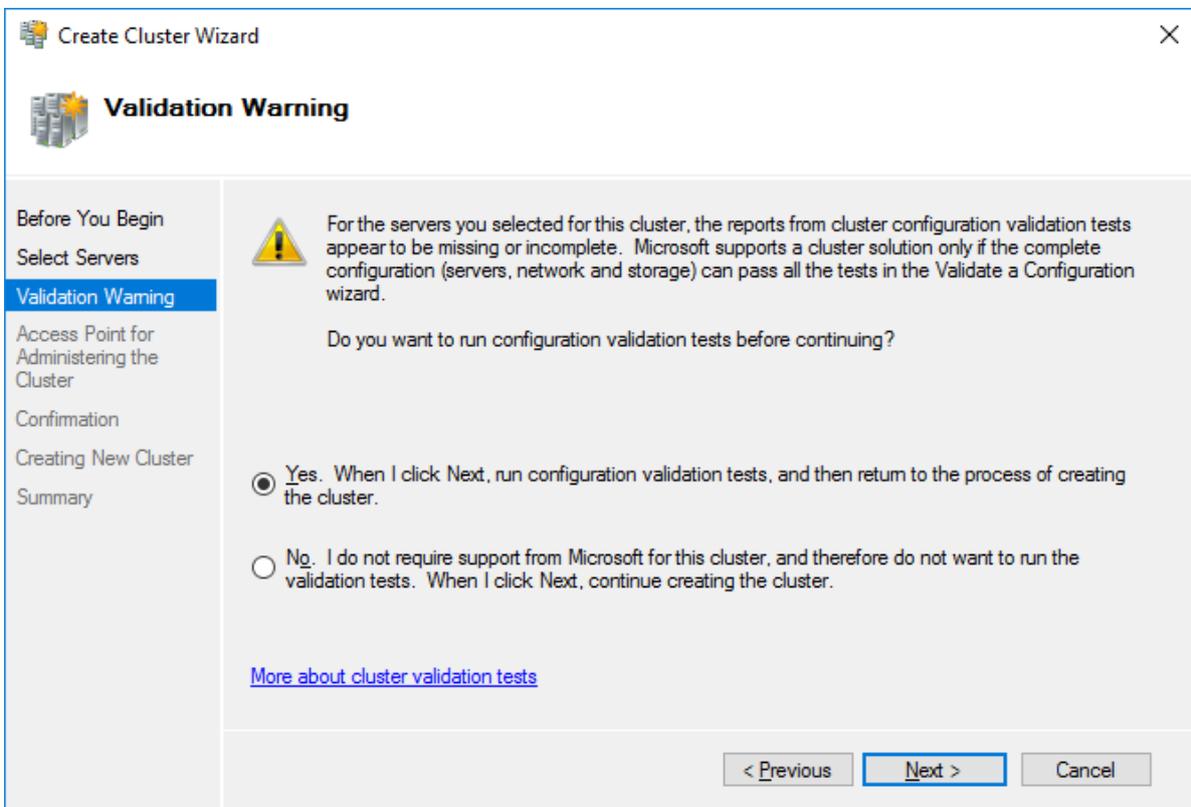


2. Click the Create Cluster link in the Actions section.

3. Specify the servers which should be added to the cluster.

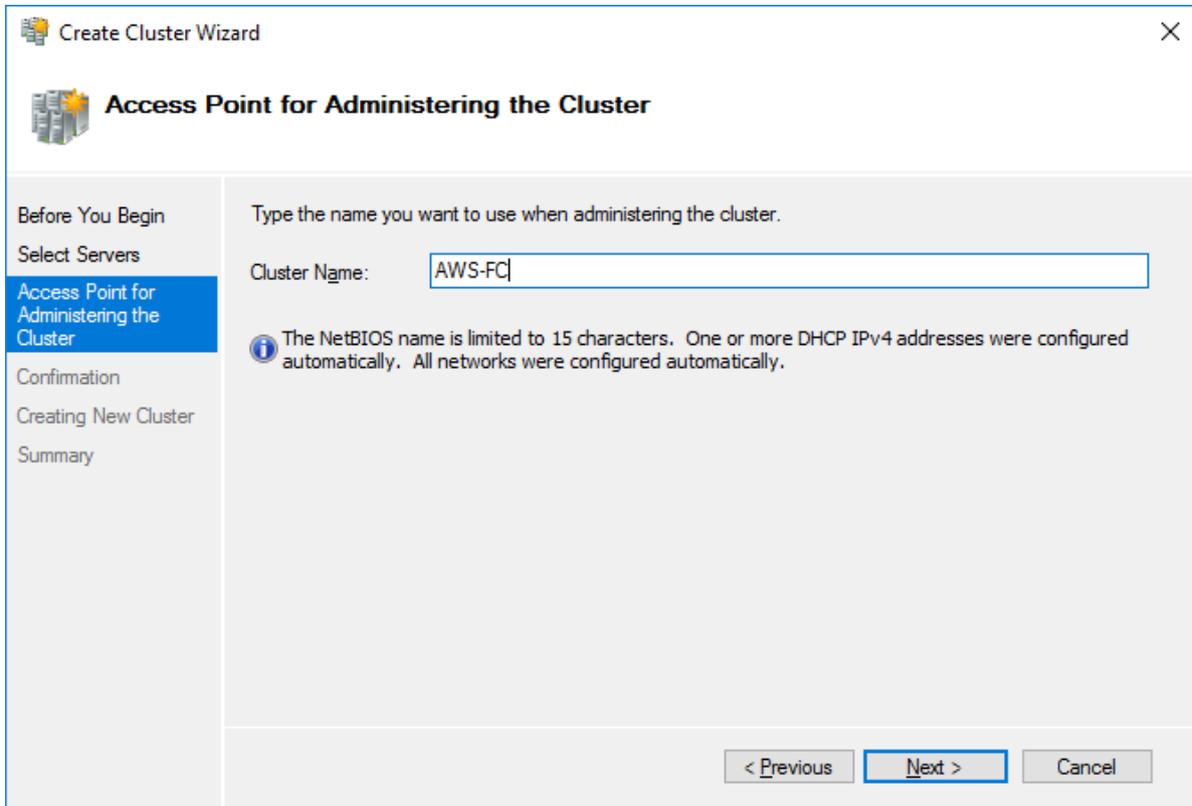


4. Validate the configuration by running the cluster validation tests: select Yes and click Next to continue.

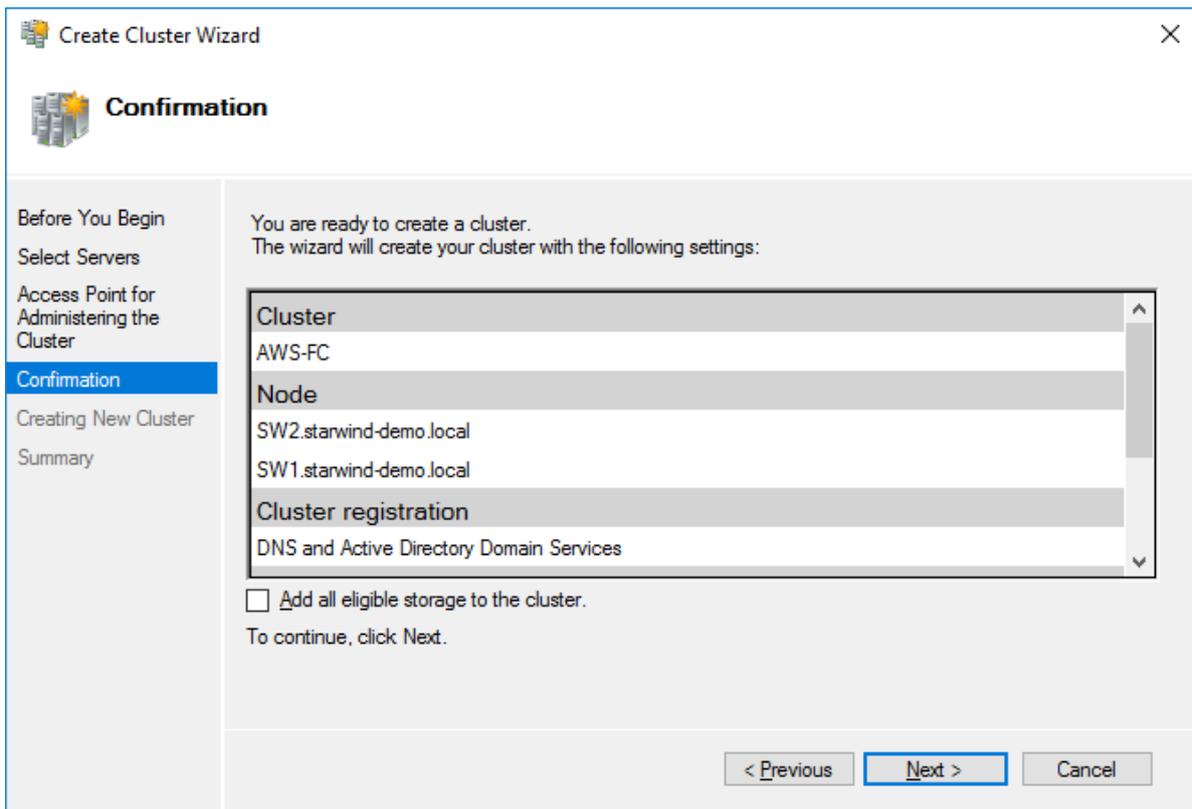


5. Specify the cluster name.

NOTE: If the cluster servers get IP addresses over DHCP, the cluster also gets its IP address over DHCP. If the IP addresses are set statically, set the cluster IP address manually.

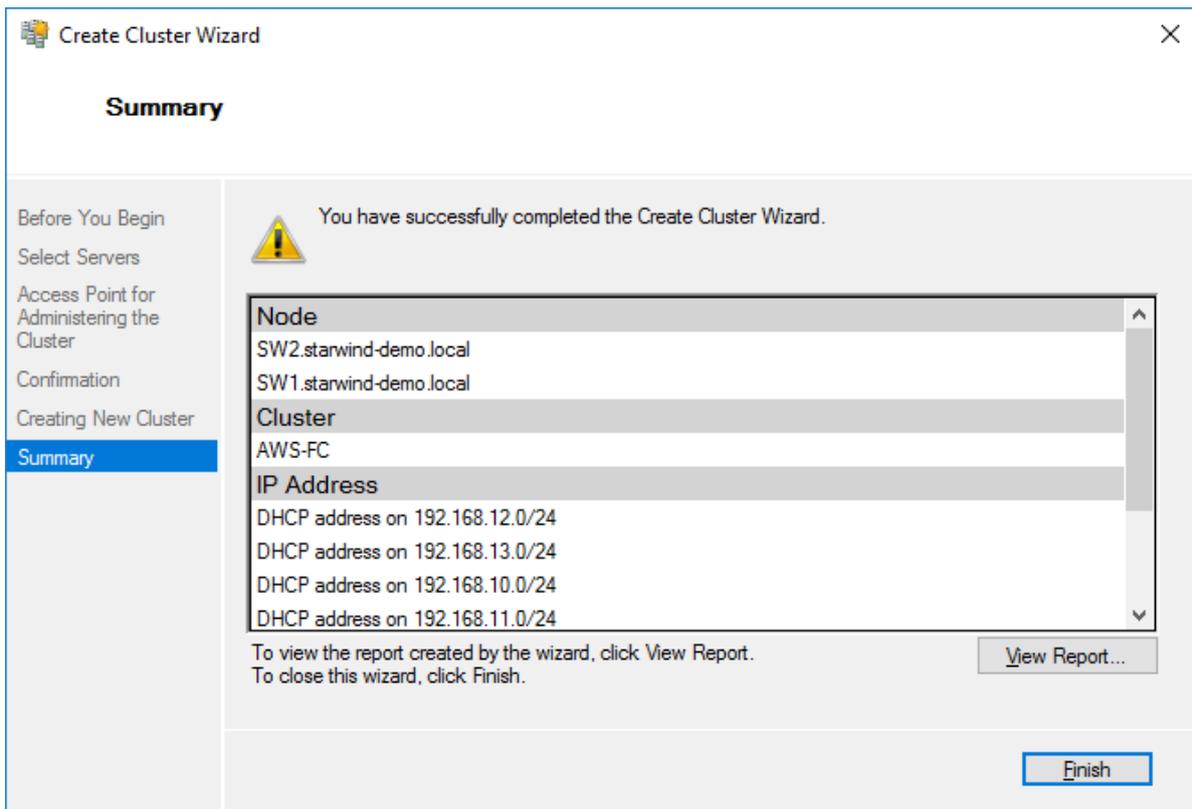


6. Make sure that all the settings are correct. If necessary, click Previous to change the settings.



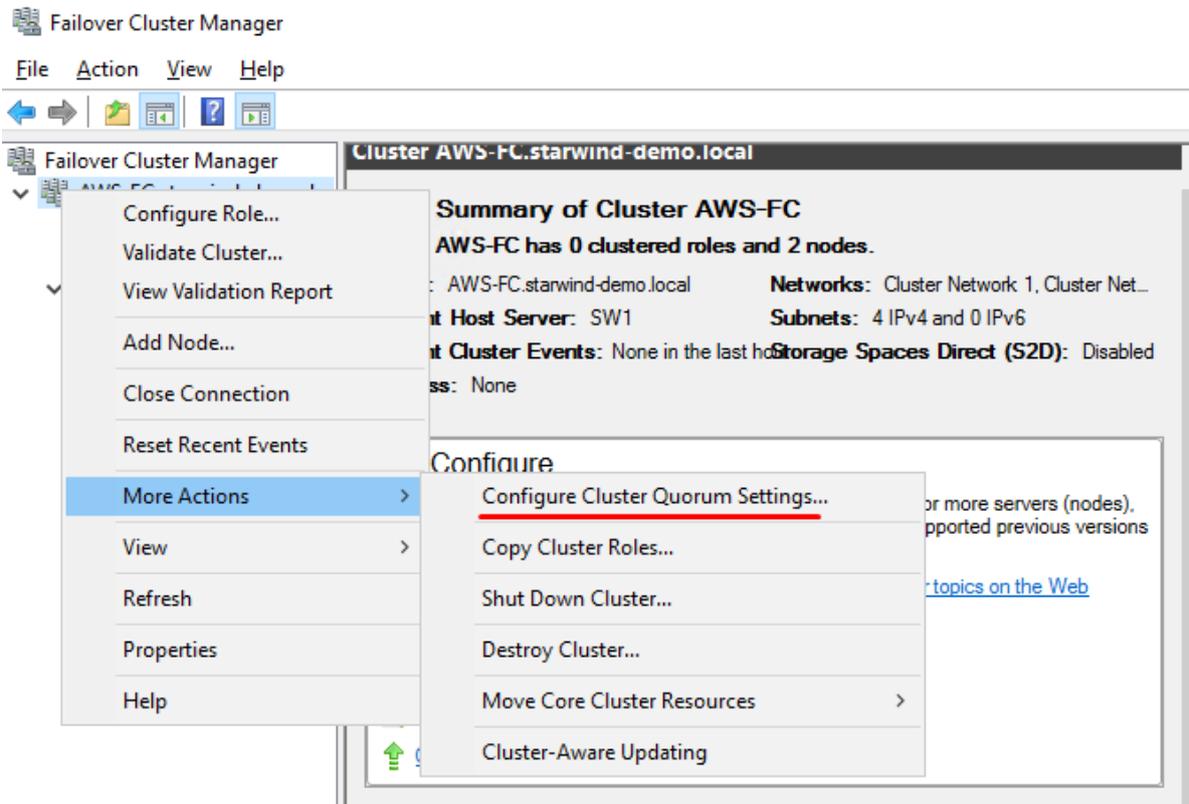
NOTE: If checkbox Add all eligible storage to the cluster is selected, the wizard will add all disks to the cluster automatically. The device with the smallest storage volume will be assigned as a Witness. It is recommended to uncheck this option before clicking Next and add cluster disks and the Witness drive manually.

7. The process of the cluster creation starts. Upon the completion, the system displays the summary with the detailed information. Click Finish to close the wizard.



Configuring the Witness Device

1. Open Failover Cluster Manager.
2. Navigate to Cluster->Storage -> Disks.
3. Click Add Disk in the Actions panel and select StarWind disks from the list. Then click OK.
4. To configure the Witness drive, right-click Cluster->More Actions->Configure Cluster Quorum Settings, follow the wizard, and use the default quorum configuration.



Contacts

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Customer Support Portal: <https://www.starwind.com/support>

Support Forum: <https://www.starwind.com/forums>

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