Lenovo

Cluster Management Workflows for ThinkSystem Storage Manager

Version 9.15.1

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Contents

Chapter 1. Workflows for ThinkSystem Storage Manager

The workflow guide provides workflows for some of the new functions that are introduced in ThinkSystem Storage Manager.

ONTAP 9.15.1

Workflows that are introduced or enhanced in Storage Manager 9.15.1 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.15.1:

- Support for SnapMirror Active Sync (previously called SMBC)
- Increased limit for volumes in a consistency group
- Persistent reservations for VMware virtual volumes with WSFC
- Support for NFSv3 over RDMA
- FPolicy support for NFSv4
- Support for AutoSupport delivery using SMTP over TLS

ONTAP 9.14.1

Workflows that are introduced or enhanced in Storage Manager 9.14.1 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.14.1:

- Support for NFSv4.1 session trunking
- Support for multiple MetroCluster IP configurations on the same SN2100 switch
- Support for nondisruptive transitions of workloads and data from an existing MetroCluster FC configuration to a new MetroCluster IP configurations using a shared switch
- Support for object locking based on user roles and lock retention period
- Support for consistency group operations with the CLI
- Support for NVE on SVM root volumes
- Enhanced support to core OAuth 2.0
- Enhanced support for Autonomous Ransomware Protection
- Increase in usable aggregate space on FAS platforms
- Change in reporting of physical used space in TSSE volumes
- Support for SnapMirror failover rehearsal using Storage Manager
- Support for editing or deleting ports in a broadcast domain using Storage Manager
- Support for S3 bucket lifecycle management using Storage Manager
- Support for assigning tags to clusters and volumes using Storage Manager

ONTAP 9.13.1

Workflows that are introduced or enhanced in Storage Manager 9.13.1 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.13.1:

- Support for Multi-Admin Verification

- Support for DM3010H
- Enhanced suppport for managing consistancy groups
- Support for Asynchronous SnapMirror with consistancy groups
- Support for eight node MetroCluster IP configurations
- Support for Mediator assisted automatic unplanned switchover due to environmental shutdown
- Support for four node MetroCluster IP configuration upgrades using switchover and switchback
- Increased data LIF limits
- Support for S3 bucket lifecycle management
- Support for Multi-admin verify functionality with Autonomous Ransomware Protection
- Support for automatic transition from learning to active mode with Autonomous Ransomware Protection
- Support for Autonomous Ransomware Protection of FlexGroup volumes
- Support for sequential packing using temperature-sensitive storage efficiency on AFF platforms
- Option to enable File System Analytics by default
- Support for temperature-sensitive storage efficiency

ONTAP 9.12.1

Workflows that are introduced or enhanced in Storage Manager 9.12.1 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.12.1:

- FlexGroup Rebalance
- NFS v4 session trunking
- 12 Node NVMe support
- 30000 Cluster Volume limit
- File\Object Multi-Protocol support
- ONTAP security hardening
- Replicated ARP training
- Easy FPolicy training
- SM-BC enhancements

ONTAP 9.11.1

Workflows that are introduced or enhanced in Storage Manager 9.11.1 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.11.1:

- Introduction of Insights feature
- Manual tier creation allowed in Storage Manager
- Enhancements for Consistency Groups
- Introduction of FlexGroup rebalancing
- Consistency group enhancements
- Multiple Admin support
- Additional systems added to hardware visualization for DM3000H, DM5000H, and DM7000H

ONTAP 9.10.1

Workflows that are introduced or enhanced in Storage Manager 9.10.1 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.10.1:

- Ransomware Detection
- S3 SnapMirror support for DR
- Enhancements for Consistency Groups
- Enhancements for EMS Notification Management
- Certificates can be managed from Storage Manager
- Enhancements for ONTAP file analytics

ONTAP 9.9.1

Workflows that are introduced or enhanced in Storage Manager 9.9.1 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.9.1:

- Full Support for SnapMirror Synchronous relationships
- Enhanced Error and Warning messages in Dashboard
- Hardware visualization support in Storage Manager
- Fast directory delete with Storage Manager
- SVM DR support for FlexGroup volumes
- Single LUN performance enhancement

ONTAP 9.8

Workflows that are introduced or enhanced in Storage Manager 9.8 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.8:

- Full support for S3 object storage with on-prem ONTAP.
- Support for SnapMirror Business Continuity.
- Support for new status dashboard showing network and storage health.
- Support for NFS 4.2

ONTAP 9.7

Workflows that are introduced or enhanced in Storage Manager 9.7 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.7:

New simplified user experience for ThinkSystem Storage Manager as default.

ONTAP 9.6

Workflows that are introduced or enhanced in Storage Manager 9.6 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.6:

MetroCluster switchover and switchback

Starting with Storage Manager 9.6, you can use MetroCluster switchover and switchback operations to allow one cluster site to take over the tasks of another cluster site. This capability allows you to facilitate maintenance or recovery from disasters.

Cluster Management Using Storage Manager 9.6

ONTAP 9.5

Workflows that are introduced or enhanced in Storage Manager 9.5 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is enhanced in Storage Manager 9.5:

Setting up NVMe protocol

In Storage Manager 9.5, when you set up the NVMe protocol for a storage virtual machine (SVM), you must ensure that at least one LIF is configured for each node in an HA pair.

Cluster Management Using Storage Manager 9.5

ONTAP 9.4

Workflows that are introduced or enhanced in Storage Manager 9.4 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflow is introduced in Storage Manager 9.4:

Setting up NVMe protocol

You can set up the NVMe protocol for a storage virtual machine (SVM) by using Storage Manager. After the NVMe protocol is enabled on the SVM, you can provision namespaces and assign the namespaces to a host and a subsystem.

Cluster Management Using Storage Manager 9.4

Workflows that are introduced or enhanced in Storage Manager 9.4 are included in the guide of Cluster Management Using ThinkSystem Storage Manager. The following workflows are introduced in Storage Manager 9.4:

- Setting up SAML authentication

  You can set up Security Assertion Markup Language (SAML) authentication so that remote users are authenticated through a secure identity provider (IdP) before they log in to Storage Manager.
- Setting up peering

  Setting up peering involves creating intercluster logical interfaces (LIFs) on each node, creating cluster peering relationship, and creating SVM peering relationship.

Cluster Management Using Storage Manager 9.4

Workflows are provided for the following functionalities that were introduced or enhanced in Storage Manager 9.4:

Chapter 2 “Setting up a cluster by using ThinkSystem Storage Manager ” on page 7

Provides information about creating a cluster manually or by using a template file, setting up the network, providing storage recommendation, creating an aggregate, and creating an SVM by using Storage Manager.

Workflows are provided for the following functionalities that were introduced or enhanced in Storage Manager 9.4:

- Chapter 2 “Setting up a cluster by using ThinkSystem Storage Manager ” on page 7

  Provides information about creating a cluster and setting up node management networks, cluster management networks, and AutoSupport messages and event notifications by using Storage Manager.

- Chapter 5 “Managing FlexGroup volumes using Storage Manager” on page 15

  Provides information about creating FlexGroup volumes, editing the properties of existing FlexGroup volumes, resizing FlexGroup volumes, changing the status of FlexGroup volumes, and deleting FlexGroup volumes.

Chapter 2. Setting up a cluster by using ThinkSystem Storage Manager

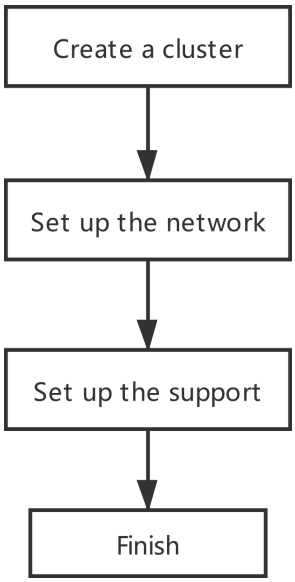
You can use ThinkSystem Storage Manager to set up the cluster automatically by entering values in a guided setup.

Before you begin

- You must have configured the node management IP addresses for at least one node.
- Nodes must be in the default mode of HA.
- Nodes must be running data ONTAP 9.4 or later.
- Nodes must be of the same version.
- All of the nodes must be healthy, and cabling for the nodes must be set up.
- The cabling and connectivity must be in place for your cluster configuration.
- You must have sufficient cluster management, node management, Service Processor IP addresses, and gateway and netmask details.
- If the cluster interface is present on a port, then that port must be present in the cluster IPSpace.

About this task

Setting up a cluster manually includes creating a cluster, setting up node management and cluster management networks, and enabling AutoSupport messages.



Setting up the cluster manually

You can use Storage Manager to manually setup the cluster by creating a cluster, setting up the node management and cluster management networks, and setting up event notifications.

Creating a cluster

You can use ThinkSystem Storage Manager to create and set up a cluster in your data center.

About this task

If the cluster supports ONTAP 9.4 or later, you can add only those storage systems that are running ONTAP 9.4 or later.

Step 1. Open the web browser, and then enter the node management IP address that you have configured: `https://`*node-management-IP*

- If you have set up the credentials for the cluster, the Login page is displayed.

  You must enter the credentials to log in.
- If you have not set up the credentials for the cluster, the Guided Setup window is displayed.

  Click the **Guided Setup** icon to set up a cluster.

Step 2. In the Cluster page, enter a name for the cluster.

Note: If all the nodes are not discovered, click **Refresh**.

The nodes in that cluster network are displayed in the Nodes field.

Step 3. Optional: If desired, update the node names in the Nodes field.

Step 4. Enter the password for the cluster.

Step 5. Add cluster IP, Subnet Mask, and Gateway.

Step 6. Add an additional Node IP address.

Step 7. Click the blank box next to AutoSupport enable or NTP if you want to enable the service.

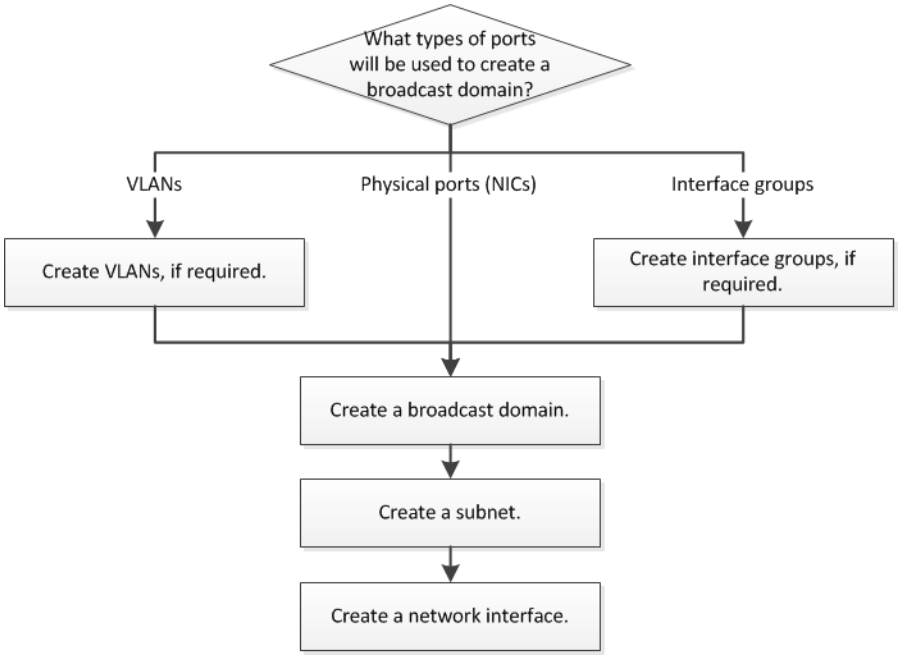
Step 8. Click **Submit**.

After you finish

Enter the network details in the Network page to continue with the cluster setup.

Chapter 3. Setting up the network

You can use Storage Manager to set up the network for accessing data from storage virtual machines (SVMs) and managing SVMs. You must create a broadcast domain by using any type of port (VLANs, physical ports, or interface groups) and then create a subnet and a network interface.



Creating VLAN interfaces

You can create a VLAN to maintain separate broadcast domains within the same network domain by using Storage Manager.

Step 1. Click **Network → Ethernet Ports**.

Step 2. Click **+ VLAN**.

Step 3. In the Create VLAN dialog box, select the node, the port, and the VLAN ID.

Step 4. Click **Save**.

Creating interface groups

You can use Storage Manager to create an interface group—single-mode, static multimode, or dynamic multimode (LACP)—to present a single interface to clients by combining the capabilities of the aggregated network ports.

Before you begin

Free ports must be available that do not belong to any broadcast domain or interface group, or that host a VLAN.

Step 1. Click **Network → Ethernet Ports**.

Step 2. Click **+ Link Aggregation Group**.

Step 3. In the Add Link Aggregation Group setup screen, specify the following settings:

- Node that the Link Aggregation Group will be created on
- Ports to include
- Mode to use
- Load Distribution to use

Step 4. Click **Save**.

Creating broadcast domains

Starting with ONTAP 9.14.1 you will again be able to configure broadcast domains directly from ThinkSystem Storage Manager.

This will include the ability to create new broadcast domains, edit existing broadcast domains or even delete an existing broadcast domain.

Creating network interfaces

You can use Storage Manager to create a network interface or LIF to access data from storage virtual machines (SVMs), to manage SVMs and to provide an interface for intercluster connectivity.

Before you begin

The broadcast domain that is associated with the subnet must have allocated ports.

About this task

- Dynamic DNS (DDNS) is enabled by default when a LIF is created.

  However, DDNS is disabled if you configure the LIF for intercluster communication using iSCSI, NVMe, or FC/FCoE protocols, or for management access only.
- You cannot use Storage Manager to create a network interface if the ports are degraded.

  You must use the command-line interface (CLI) to create a network interface in such cases.
- To create NVMeoF data LIF the SVM must already be set up, the NVMe service must already exist on the SVM and the NVMeoF capable adapters should be available.
- NVMe protocol is enabled only if the selected SVM has the NVMe service configured.

Step 1. Click **Network**.

Step 2. Click **Network Interfaces** and then click the **+** sign.

Step 3. In the Create Network Interface dialog box, specify an interface name.

Step 4. Specify an interface role:

If you want to...	Then...
Associate the network interface with a data LIF	1. Select **Serves Data**. 2. Select the SVM for the network interface.
Associate the network interface with an intercluster LIF	1. Select **Intercluster Connectivity**. 2. Select the IPspace for the network interface.
Associate the network interface with Storage VM management	1. Select **Storage VM Management**. 2. Select the port and IP address for the network interface.

Step 5. Select the appropriate protocols.
The interface uses the selected protocols to access data from the SVM.

Note: If you select the NVMe protocol, the rest of the protocols are disabled. If NAS (CIFS and NFS) protocols are supported then they remain available. The NVMe transports field is displayed when you select the NVMe protocol and FC-NVMe is shown as the transport protocol.

Step 6. Assign the IP address:

If you want to...	Then...
Specify the IP address manually without using a subnet	1. Select **Without a subnet**. 2. In the Add Details dialog box, perform the following steps: a. Specify the IP address and the network mask or prefix. b. Optional: Specify the gateway. c. If you do not want to use the default value for the Destination field, specify a new destination value. If you do not specify a destination value, the Destination field is populated with the default value based on the family of the IP address. If a route does not exist, a new route is automatically created based on the gateway and destination. 3. Click **OK**.

Step 7. Specify the IP address or port.

- For iSCSI, you will need to specify an IP address to use.
- For FC, you will need to specify the port to use.
- For data LIFs, the Port details area displays all of the ports from the broadcast domain that is associated with the IPspace of the SVM.
- For intercluster LIFs, the Port details area displays all of the ports from the broadcast domain that is associated with the required IPspace.
- The Port details area will display only NVMe capable adapters if the NVMe protocol is selected.

Step 8. Click **Save**.

Chapter 4. Using Insights for Storage Manager

In ONTAP 9.11.1, one of the core new features is to support Insights.

You will see **Insights** as one of the links directly below the Dashboard. The Insights link will take you to a panel that shows multiple cards that allow you to perform tasks from two groups.

The first group are tasks labeled as "Needs your attention". The second group allows you to apply best practices.

These best practices are based on the tasks listed in the Lenovo Security Best Practice Guide.

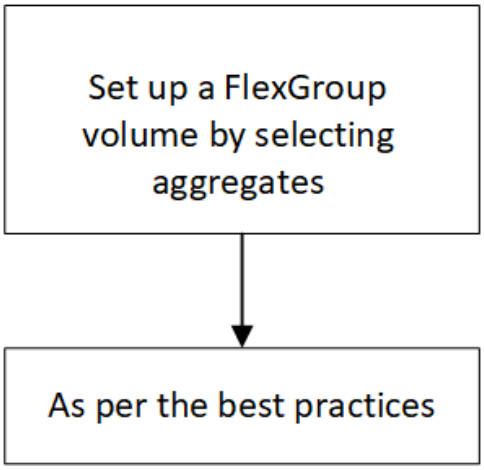
You can click **Dismiss** for a topic you do not wish to apply. Or you can click on **Fix It** to make the required changes.

You will also be able to click on **Learn more about best practices for security** which will link to the Lenovo security hardening guide.

You can also see a Light Bulb icon in additional areas of Storage Manager. This icon indicates a task associated with the Insights that are listed.

Chapter 5. Managing FlexGroup volumes using Storage Manager

You can use Storage Manager to create FlexGroup volumes as per the best practices.



Creating FlexGroup volumes

A FlexGroup volume can contain many volumes that can be administered as a group instead of individually. You can use Storage Manager to create a FlexGroup volume by selecting specific aggregates or by selecting system-recommended aggregates.

About this task

- You can create only read/write (rw) FlexGroup volumes.
- Starting with Storage Manager 9.6, you can create FlexGroup volumes in a MetroCluster configuration.

Step 1. Click **Storage → Volumes**.

Step 2. Click the **+** sign to add a volume.

Step 3. Select **More options**.

Step 4. Select **Distribute volume data across cluster (FlexGroup)**.

Step 5. Assign a name, the size, and the required permissions to the FlexGroup.

Step 6. Choose the required protection policies and select **Save**.

Chapter 6. Using FlexGroup Rebalance

In ONTAP 9.11.1, one of the new features is to support FlexGroup Rebalance.

Flexgroup Rebalance is supported for moving volume data between the constituent volumes that comprise the FlexGroup. This feature is displayed by after you select the volume and specify the level of balance for the FlexGroup.

- If the volume shows **High**, all constituent volumes are evenly balanced and no action is needed.
- If the volume shows **Mid**, the FlexGroup is starting to become unbalanced and user action may be required.
- If the volume shows **Low**, the volume is unbalanced and user action should be taken to rebalance the volume.

The rebalance operation is a background task. When the user invokes the task, they should select the duration that the task should run for and then select **Rebalance**.

If you wish to manually invoke the rebalance task, perform the following steps:

1. Click **Storage → Volumes**.
2. Select the volume to manage.
3. Select **...** and then click **Rebalance** from the menu.

Chapter 7. Creating a bucket

ThinkSystem Storage Manager 9.8 introduces support for ONTAP S3 as a storage device. This is done by enabling FlexGroups to act as a storage bucket..

Creating a new bucket

Most of the configuration activities for creating an S3 bucket are performed via the CLI. You can perform limited activities in the ThinkSystem Storage Manager GUI. These activities include adding a bucket in an existing SVM and copying permissions from that bucket to a newly created bucket.

Step 1. Click **Storage → Buckets**.

Step 2. Specify the name of the bucket, the SVM to assign the bucket to, and the capacity of the bucket.

Step 3. If needed, click **Additional Options** and specify the additional parameters, including the user permissions and if the bucket should be used for tiering.

Step 4. Click on **Save**

Chapter 8. Creating a new Storage Virtual Machine

You can use Storage Manager to create a new Storage Virtual machine that will be used to service either file, block or object storage.

Creating a Storage Virtual machine

A Storage Virtual Machine (SVM) is the basic building of. It is used to assign volume ownerships, configure replication or even assign access control lists.

About this task

- Storage Virtual Machines can host either file, block or object.
- If you create a Storage Virtual Machine hosting file based services, you will then use the Volume creation wizard. If you create a Storage Virtual Machine hosting block based services, you will use the LUN creation wizard.

Note: In the case of the LUN creation, a volume will be created automatically for serving the LUNs.

Step 1. Click **Storage → Storage VMs**.

Step 2. Click the **+Add** button to add a Storage Virtual Machine.

Step 3. Specify the name of the Storage Virtual Machine.

Step 4. Click the tabs below for select the access protocol you wish to use.

- **SMB/CIFS, NFS, S3**
- **iSCSI**
- **FC**
- **NVMe/FC**

If you want to...	Then...
Enable CIFS protocol by configuring the CIFS server using an Active Directory	1. Select the Active Directory box. 2. Enter the Active Directory administrator name. 3. Enter the Active Directory administrator password. 4. Enter a name for the CIFS server. 5. Enter a name for the Active Directory domain. 6. Depending on your requirements, select the One data LIF on this SVM or One data LIF per node on this SVM box. 7. Provide data LIF details, such as IP address, subnet mask, gateway, and port. 8. Provide DNS details.
Enable CIFS protocol by configuring the CIFS server using a workgroup	1. Select the Workgroup box. 2. Enter a name for the workgroup. 3. Enter a name for the CIFS server. 4. Depending on your requirements, select the One data LIF on this SVM or One data LIF per node on this SVM check box. 5. Provide data LIF details, such as IP address, subnet mask, gateway, and port.

If you want to...	Then...
Enable NFS protocol	1. Select the NFS box. 2. Depending on your requirements, select the One data LIF on this SVM or One data LIF per node on this SVM check box. 3. Provide data LIF details, such as IP address, subnet mask, gateway, and port.
Enable iSCSI protocol	1. Select the iSCSI box. 2. Provide data LIF details, such as IP address, subnet mask, gateway, and port.

Step 5. Click on **Save** to create the new Storage Virtual machine.

Chapter 9. Creating a consistancy Group

One of the new features in ONTAP 9.10.1 is that users are now able to create a consistency group directly from Storage Manager.

Step 1. Choose **Storage → Consistency Group**.

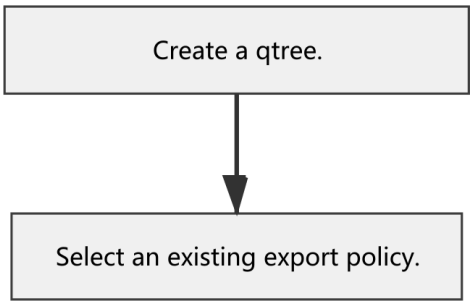
Step 2. Select **+Add**.

Step 3. Choose either Using existing volumes or Using new LUNs:

- If you choose to use an existing volume, perform as follows:
  1. Select a group name.
  2. Choose the volume from the Volumes dialog box.
  3. Click **Save**.
- If you choose to use new LUNs, perform as follows:
  1. Specify the name for the consistency group, the number of LUNs, LUN size, host initiator address, host type and host format.
  2. Click **Save**.

Chapter 10. Providing data access to qtrees using export policies

You can export a qtree by assigning an export policy to it. This enables you to export a specific qtree on a volume and make it directly accessible to clients instead of exporting the entire volume.



Creating qtrees

Qtrees enable you to manage and partition your data within a volume. You can use the Create Qtree dialog box in Storage Manager to add a new qtree to a volume on your storage system.

Step 1. Click **Storage → Qtrees**.

Step 2. Click the **+** sign to add a new Qtree.

Step 3. Assign a name to the new Qtrees and select a volume to apply it to.

Step 4. Click on the blank box next to Quotas enabled and configure it if you wish to enable this service.

Step 5. Choose the security style to apply.

Step 6. Click **Save**.

Changing rules for an export policy

You can use Storage Manager to modify an existing export rule that was created using Storage Manager 9.4 or later.

Before you begin

You must have created the export policy to which you want to add the export rules.

Step 1. Click **Storage → QTrees**.

Step 2. Select the Qtree to modify.

Step 3. Click the **...** sign.

Step 4. Select **edit export policy**.

Step 5. Optional: If desired, choose the followings:

a. Inherit the policy from the volume.

b. Select an existing export policy.

c. Add a new export policy.

   If you choose to add a new export policy, you will need to specify the name in the Name field and click the **+** sign to add the policy in the form of `0.0.0.0/0` for the client specification.

Step 6. Provide the supported protocols and permissions.

Chapter 11. Enabling Multi-Admin administration

In ONTAP 9.11.1, one of the features added is the ability to require that many of the administrative tasks require multiple administrative verifications. You can enable the feature by performing the following operations:

Step 1. Click **Cluster**.

Step 2. Select **Settings**.

Step 3. Click **Multi-Admin Approval**.

Step 4. Select the wheel icon which will start the configuration process.

Step 5. Create or modify the approval group to use, the rules that the group is responsible for, and any additional changes that you want to make under the advanced settings.

Step 6. Click **Save**.

Chapter 12. Enabling OAuth 2.0

One of the new features added in ONTAP 9.14.1 is the ability to support external authentication mechanisms like OAuth 2.0.

To enable OAuth 2.0 you will need to perform the following steps:

Step 1. Click **Cluster**.

Step 2. Select **Settings**.

Step 3. Go to the card labeled **OAuth 2.0 authorization**.

Step 4. Click **+** sign.

Step 5. Fill out all of the required fields and click **Add**.

Chapter 13. Configuring Protection

All features that are used to manage Snapshot and SnapMirror relationships are now done under a new section in the ThinkSystem Storage Manager 9.7 GUI.

Creating mirror relationships

You can create a new mirror relationship for your cluster from this menu.

Step 1. Click **Protection → Overview**.

Step 2. Click **Add Networks Interfaces**.

Step 3. In the Add Intercluster Interface dialogue box, assign a new IP address and subnet mask for the interfaces to use.

Step 4. Click **Save**.

Step 5. Click the **...** sign next to **Cluster Peers**.

Step 6. Click **Manage Cluster Peers**.

Step 7. Click **+ Peer Cluster**.

Step 8. Select the IPspace to use, Storage VM Permissions, Passphrase to use, and Intercluster network interfaces that were assigned in Step 3 on page 31.

Step 9. Click **Initiate Cluster Peering**.

Displaying current mirror relationships

You can display any of the current mirror relationships that have been created from this menu.

Step 1. Click **Protection → Relationships**.

Appendix A. Contacting Support

You can contact Support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to https://datacentersupport.lenovo.com/serviceprovider and use filter searching for different countries. For Lenovo support telephone numbers, see https://datacentersupport.lenovo.com/supportphonelist for your region support details.

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