Configuring DE Series systems

Using System Manager to set up DE Series storage

Pools and volume groups

For DE Series storage arrays, physical hardware is provisioned into logical components so that data can be organized and easily retrieved. Two types of grouping are supported:

- Pools
- RAID volume groups

For more information about the concept of pools and volume groups, refer to the documentations on https://datacentersupport.lenovo.com/tw/en/storagepubs:
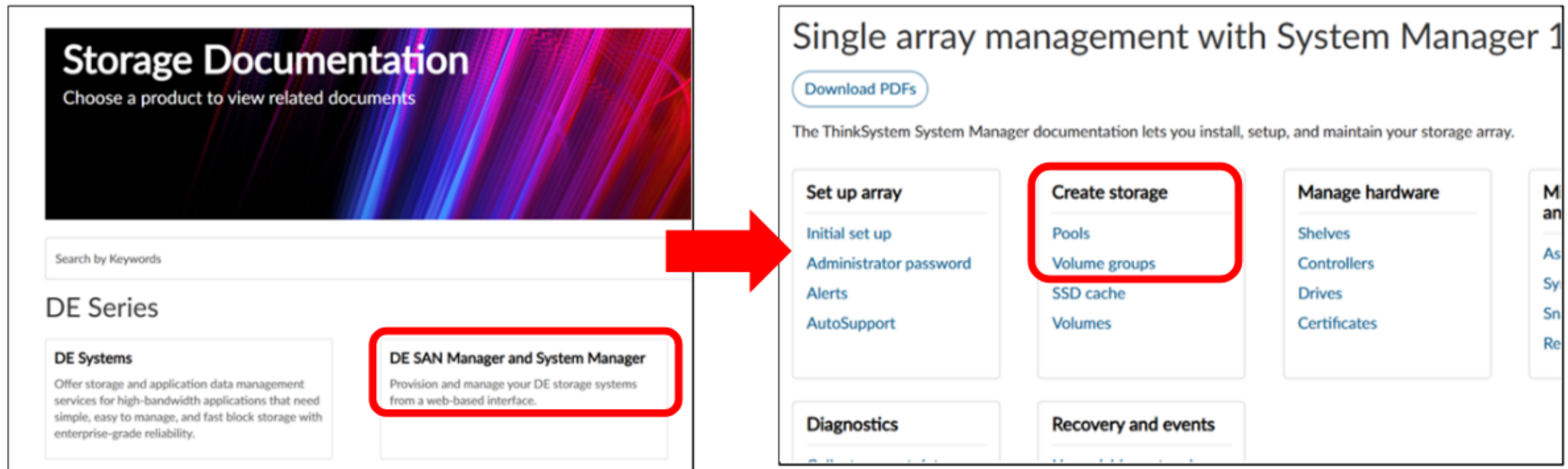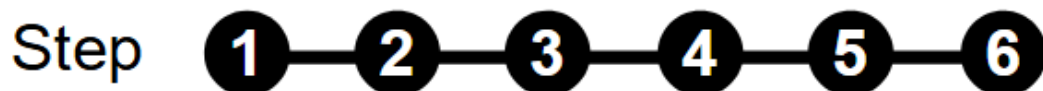
Pool configuration
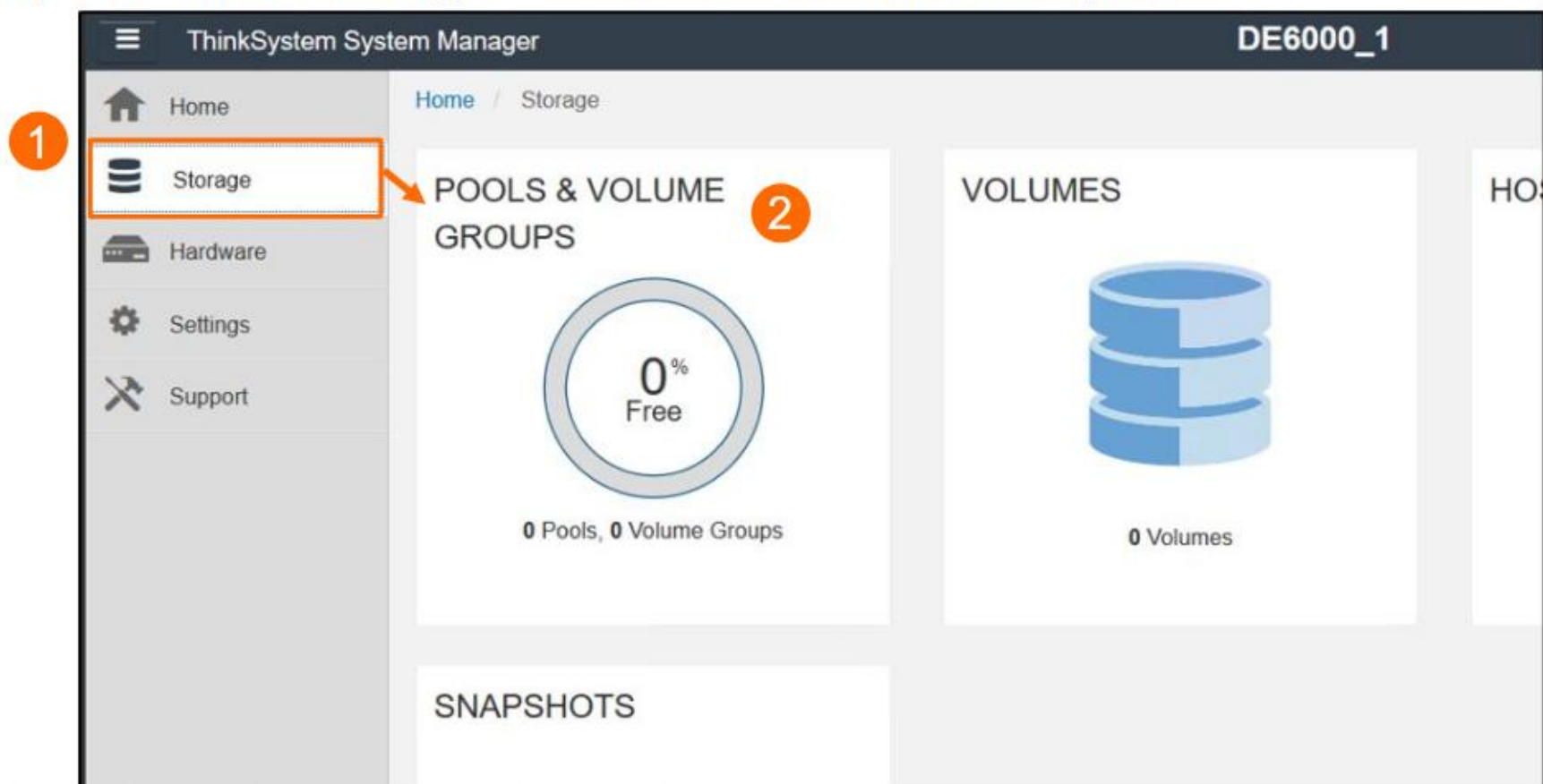
Pool configuration guideline:
- To create a pool, the storage array must have a minimum of 11 drives, each with the same type of drive: HDD or SSD.
- Shelf loss protection requires that the drives comprising the pool are located in at least six different drive shelves and that there are no more than two drives in a single drive shelf.
- Drawer loss protection requires that the drives comprising the pool are located in at least five different drawers and that the pool includes an equal number of drive shelves from each drawer.

Click each number in turn to see the System Manager pool configuration process.

Step   **1**—**2**—**3**—**4**—**5**—**6**

Lenovo

Pool configuration

To create a pool, select **Storage** → **Pools & Volume Groups**.
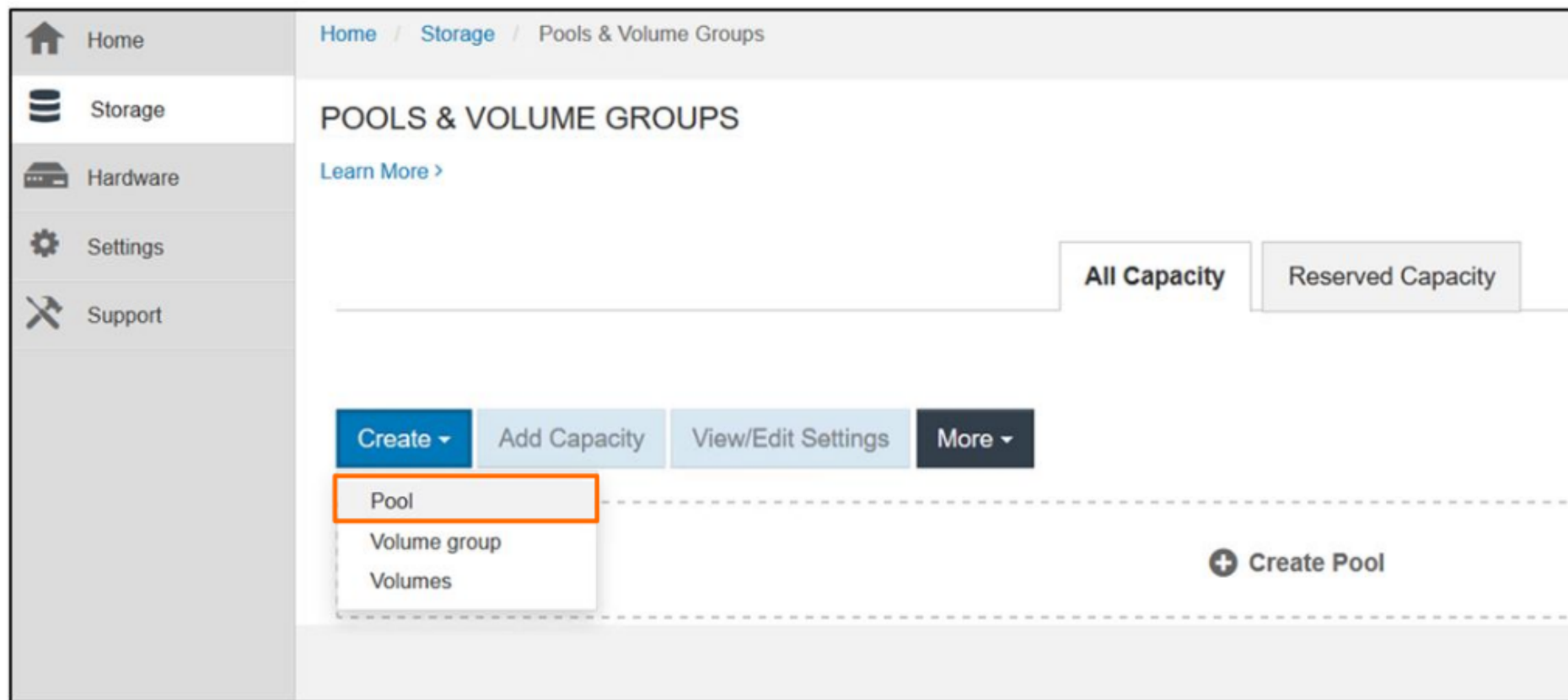

Step ①──❷──❸──❹──❺──❻

Pool configuration

Select **Create** → **Pool**. The Create Pool dialog box will be displayed.

Step ①——②——③——④——⑤——⑥ 📄

Pool configuration

Enter a name and select a capacity for the pool, and then select **Create**. At least 11 drives are required for a pool.

Step ①—②—③—④—⑤—⑥

Pool configuration

A message will be displayed to let you know that the pool has been created.
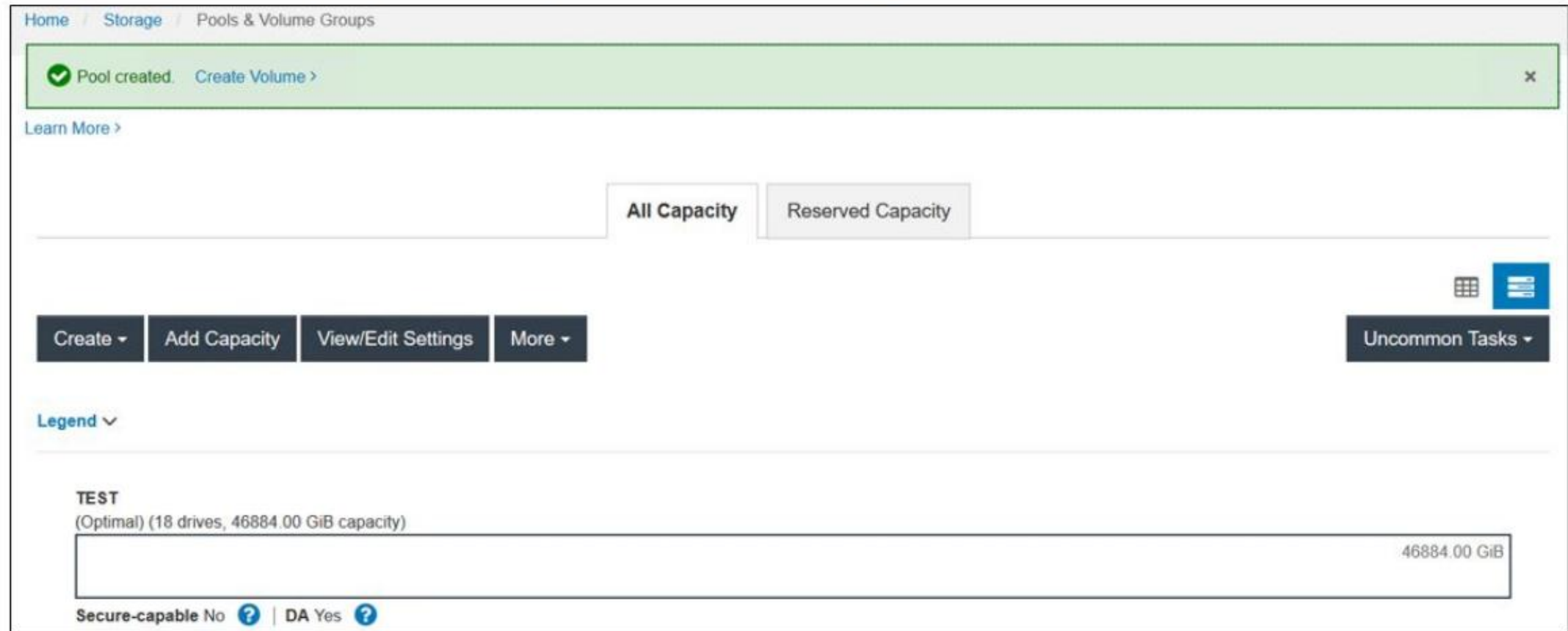
Step ①—②—③—④—⑤—⑥ 📄

Pool configuration

By selecting **View/Edit Settings**, users can edit the existing pool settings.

Step ①━②━③━④━⑤━⑥ 📄

Pool Settings ✕

Properties | **Settings**

Name ❓

TEST

Capacity alerts

☑ Send me a critical alert when...

— | 85 | % | + | of capacity has been allocated.

☐ Send me an early alert when...

— | 50 | % | + | of capacity has been allocated.

Modification priorities

Critical reconstruction priority ❓

Highest (default)

Degraded reconstruction priority ❓

High (default)

Background operation priority ❓

Low (default)

Preservation capacity ❓

Why can't I increase my preservation capacity?

Update preservation capacity to...

— | 2 | + | drive(s)

Save | Cancel

Lenovo

Pool configuration

To delete an existing pool, select the pool, and then select **Uncommon Tasks → Delete**. A **Confirm Delete** window will be displayed with a message asking users to confirm that they want to delete the pool.


Step ① ② ③ ④ ⑤ ⑥
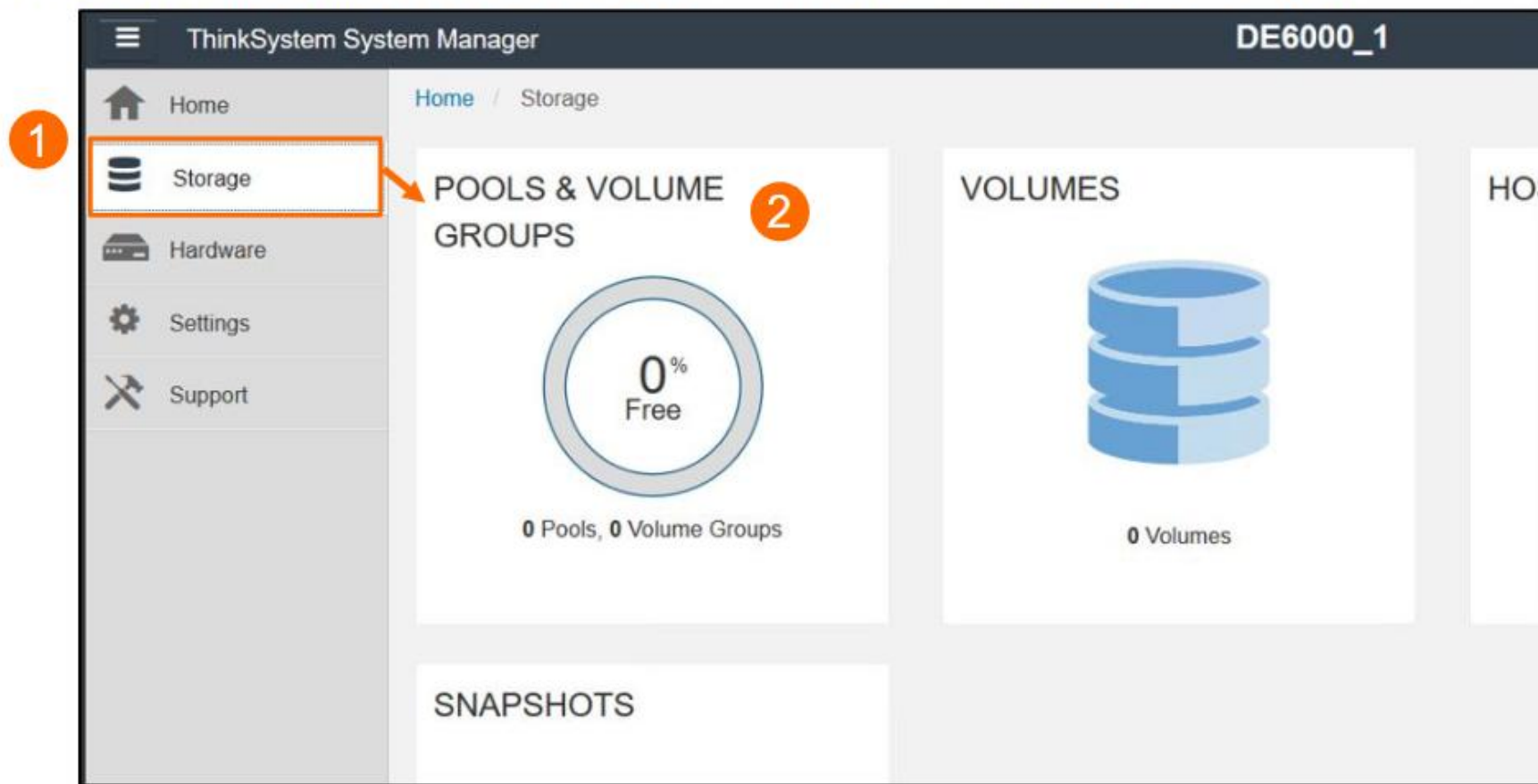
Volume group configuration

Users must follow the following guidelines to create a volume group:
- A volume group requires at least one unassigned drive.
- Limits exist as to how much drive capacity users can have in a single volume group. These limits vary according to the user's host type.
- To enable shelf/drawer loss protection, users must create a volume group that uses drives located in at least three shelves or drawers unless they are using RAID 1, in which case, two shelves or drawers is the minimum.

Click each number in turn to see the System Manager volume group configuration process.

Step 1—2—3—4—5—6
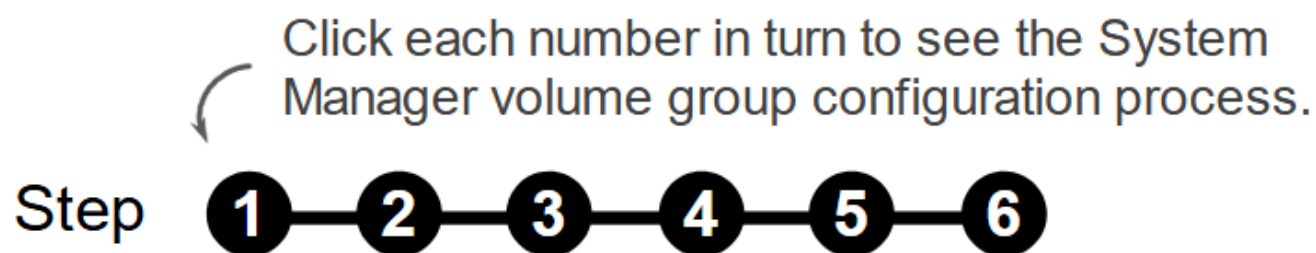
Volume group configuration

To create a volume group, select **Storage** → **Pools & Volume Groups**.
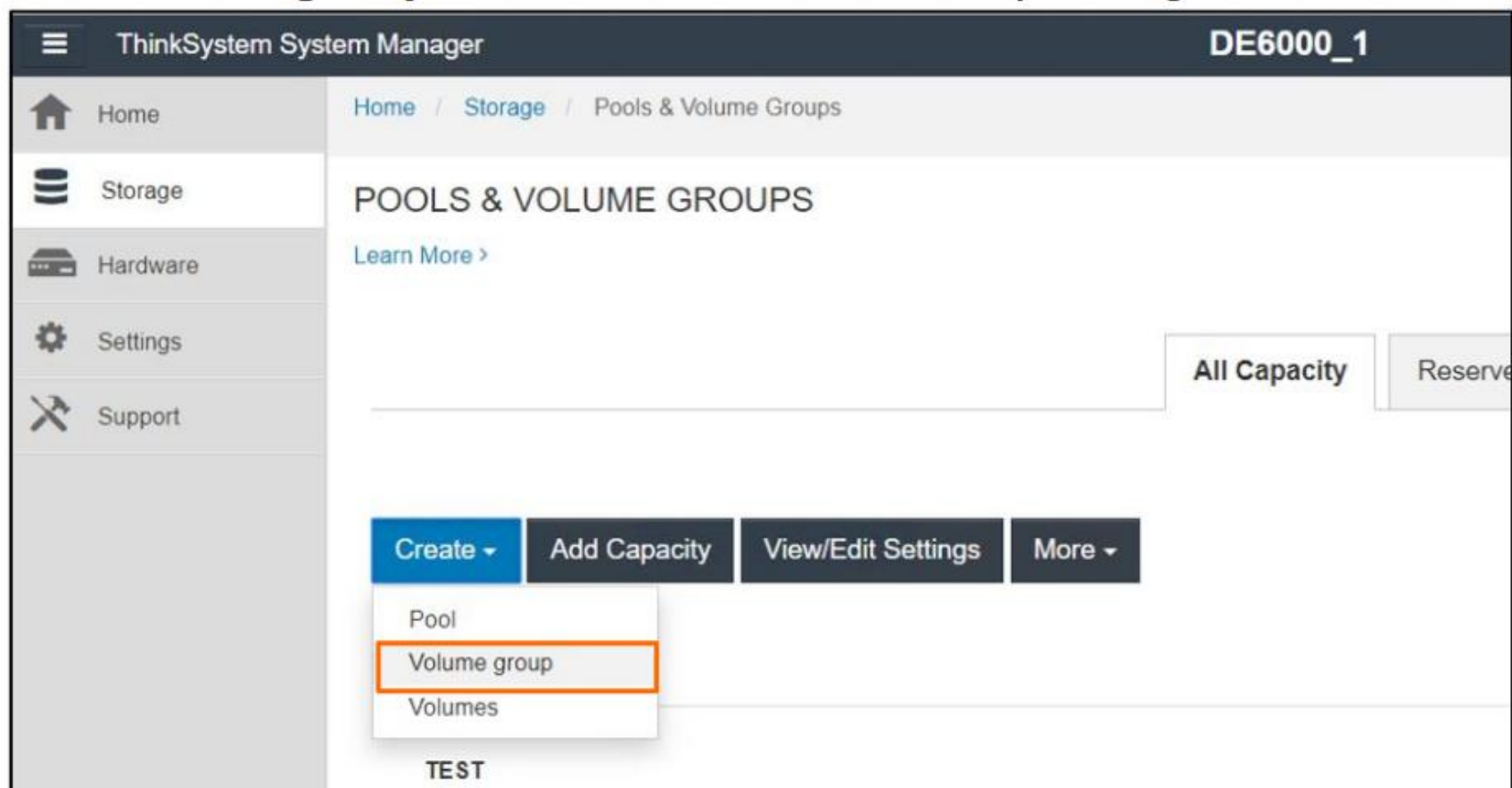

Step ① — ② — ③ — ④ — ⑤ — ⑥ 📄

Volume group configuration

Select **Create** → **Volume group**. The Create Volume Group dialog box will be displayed.

Step ❶—②—❸—❹—❺—❻ 📄

Volume group configuration

Enter a name for the volume group, and then select the RAID level that best meets data storage and protection requirements.
The volume group candidate table will be displayed. It will only contain the candidates that support the selected RAID level.

Create Volume Group ✕

What RAID level is best for my application?

What is shelf loss protection and drawer loss protection?

Name ❓

TEST_VG

RAID level

1 ▾

RAID 1 (or "disk mirroring") offers high performance and the best data availability. Select four or more drives to achieve mirroring and striping (known as RAID 10 or RAID 1+0). Free capacity equals half of the drives in the volume group.
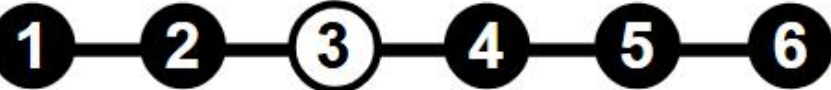
Select a capacity for your volume group ...   Manually select drives (advanced)

Free Capacity (GiB)	Total Drives ▾	Secure-Capable	DA Capable	Shelf Loss Protection	Drawer Loss Protection
11161.56	6	No	Yes	No	Yes
7441.04	4	No	Yes	No	Yes
3720.52	2	No	Yes	No	Yes

Create   Cancel
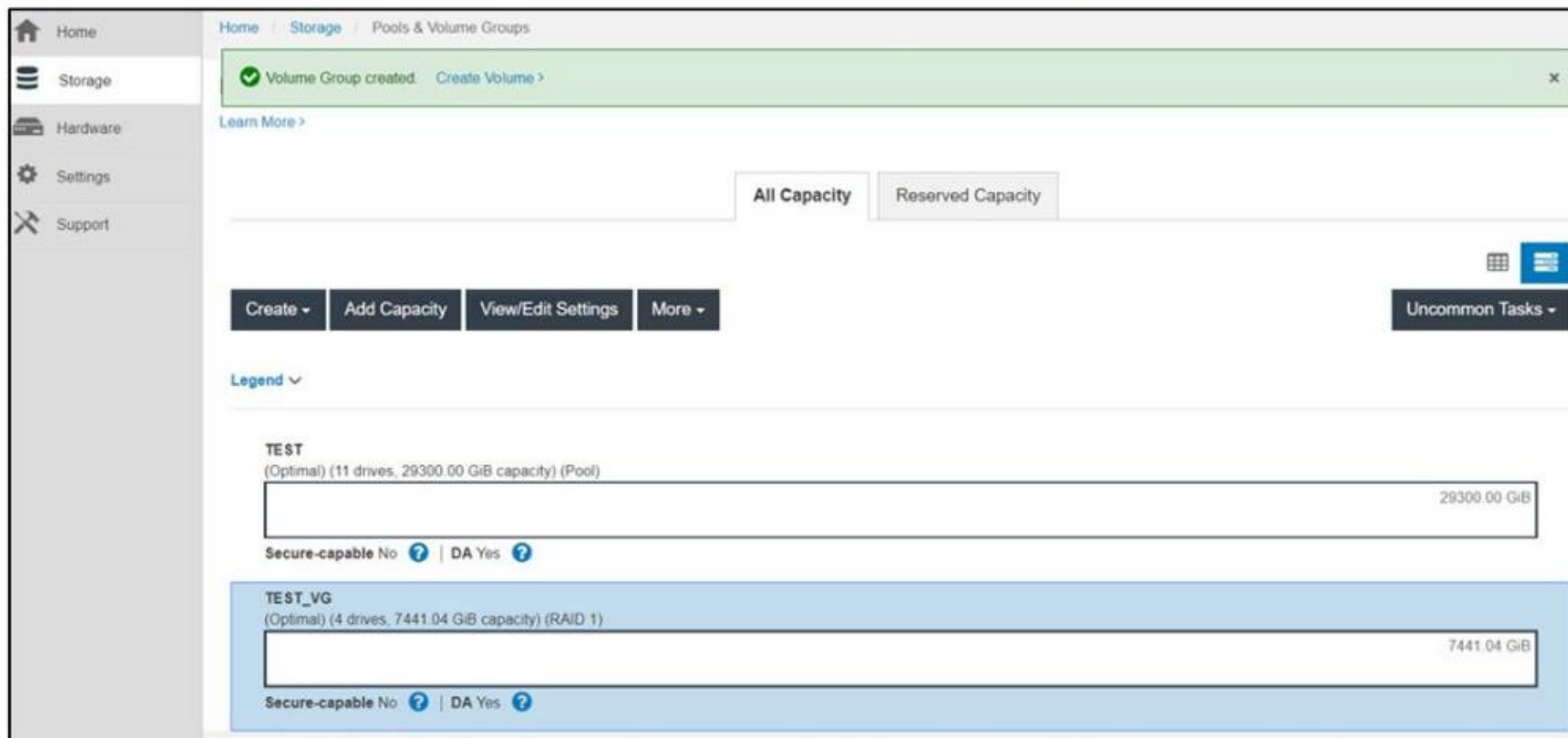
Step ① ② ③ ④ ⑤ ⑥ 📄

Volume group configuration

A message will be displayed to let you know that the volume group has been created.

Step ①—②—③—④—⑤—⑥

Volume group configuration

By selecting **View/Edit Settings**, users can edit the existing volume group settings.

Step ①—②—③—④—⑤—⑥

Volume Group Settings ✕

|	
Name:	TEST_VG
RAID level:	1 (or 10) ▾
Status:	Optimal
Free capacity (GiB):	7441.04 ❓
Total drives:	4
Drive type:	HDD (SAS)
Drive capacities (GiB):	All 3720.52
Hot spare protected:	Yes ❓
Secure-capable:	No ❓
Secure-enabled:	No ❓
Data Assurance (DA) capable:	Yes ❓
Shelf loss protection:	No ❓
Drawer loss protection:	Yes ❓

Save   Cancel

Volume group configuration

To delete an existing volume group, select the group, and then select **Uncommon Tasks → Delete**. A **Confirm Delete** window will be displayed with a message asking users to confirm that they want to delete the group.

Step ①—②—③—④—⑤—⑥

Lenovo
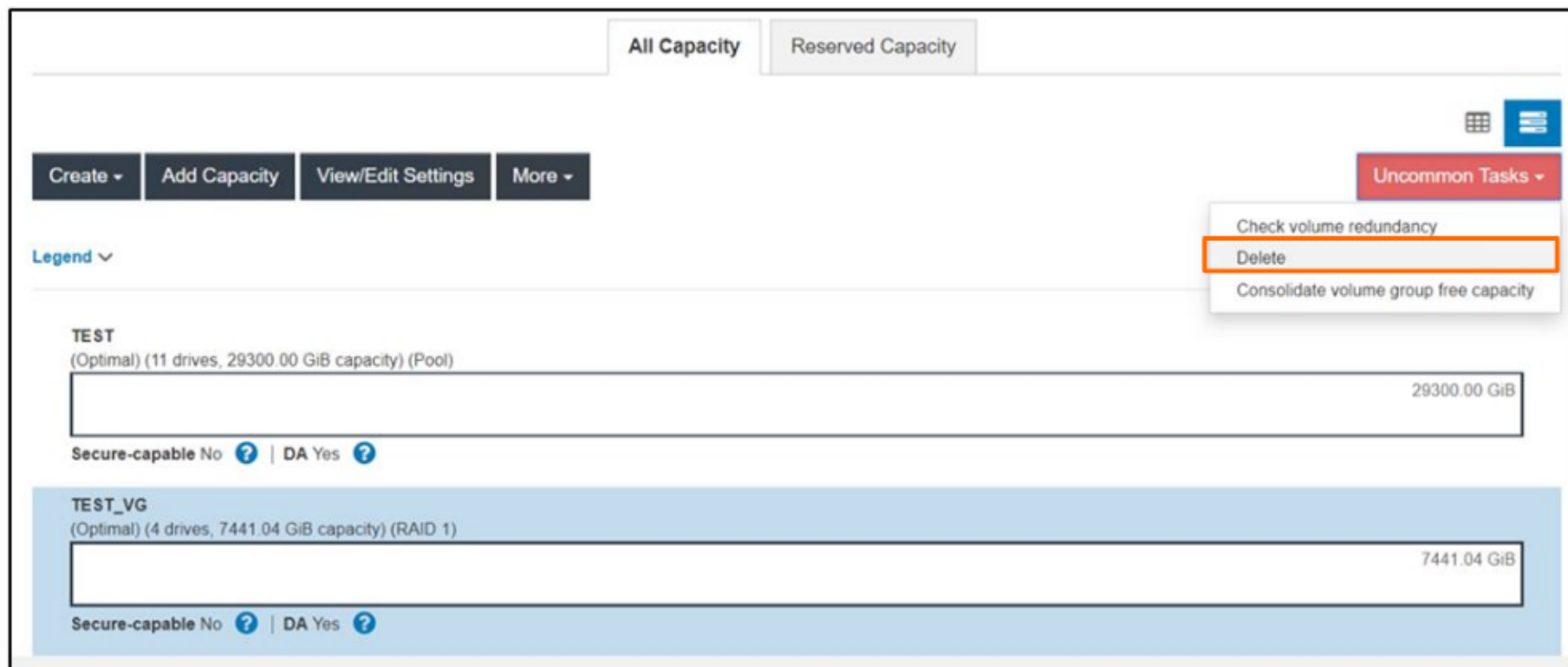
Volume configuration

Volumes are data containers that manage and organize storage space on the storage array. Volumes are created from the storage capacity available on the storage array, and they make it easy to organize and use the system's resources. This concept is similar to the use of folders and directories on a computer to organize files for easy and quick access.

Volumes are the only data layer visible to hosts. In a SAN environment, volumes are mapped to logical unit numbers (LUNs), which are visible to hosts. LUNs hold accessible user data using one or more of the host access protocols supported by the storage array – for example, FC, iSCSI, and SAS.

For more information about the concept of volumes in DE Series storage arrays, refer to the following DE Series documentation: https://thinksystem.lenovofiles.com/help/index.jsp?topic=%2Fthinksystem_system_manager_11.50.3%2FGUID-A1AC7A71-25D6-4C3D-B801-88C7406BC471-VOLUMES.html&cp=7_0_7_2_1_0

Click each number in turn to see the System Manager volume configuration process.

Step   **1**—**2**—**3**—**4**—**5**—**6**—**7**

Lenovo

Volume configuration
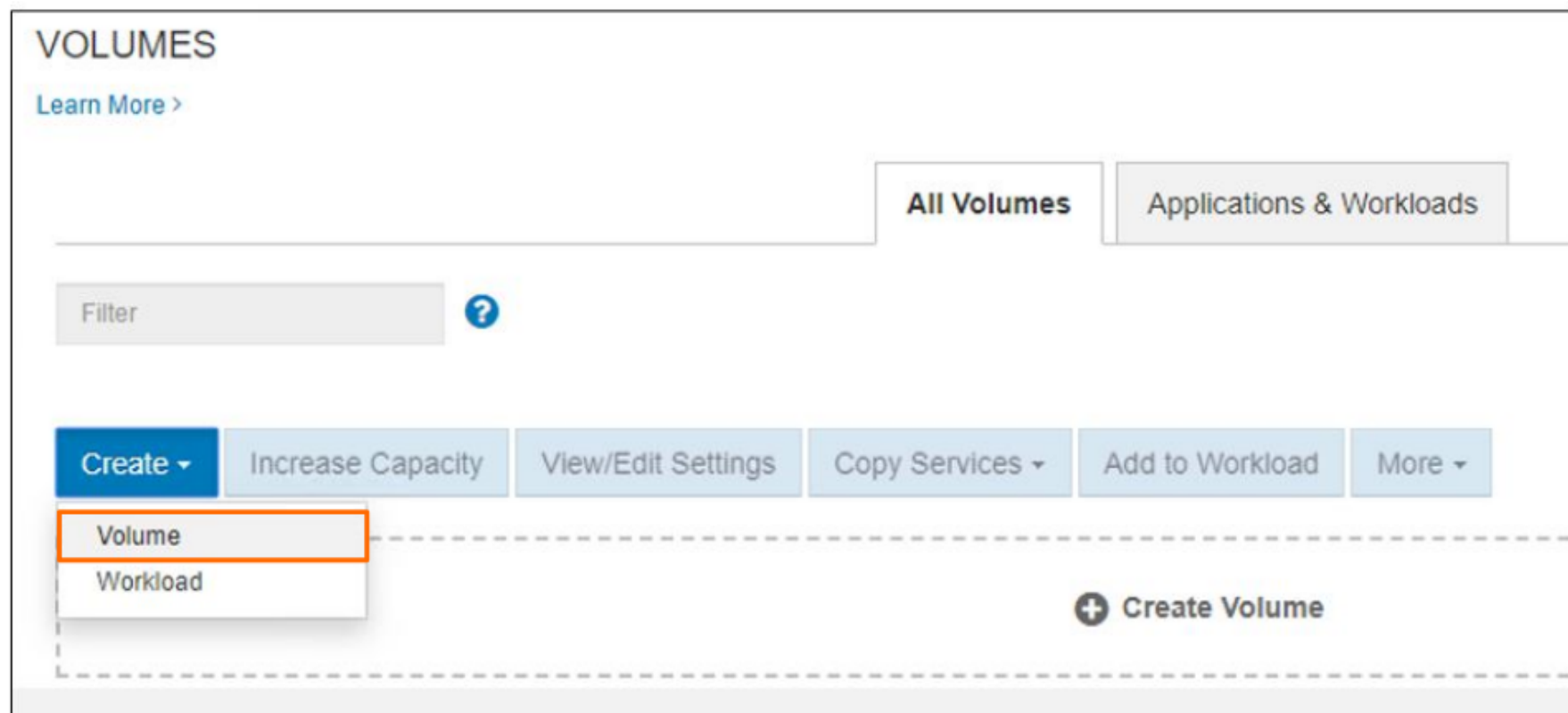
To create a volume, go to **Storage** → **VOLUMES**.

Step ①—②—③—④—⑤—⑥—⑦
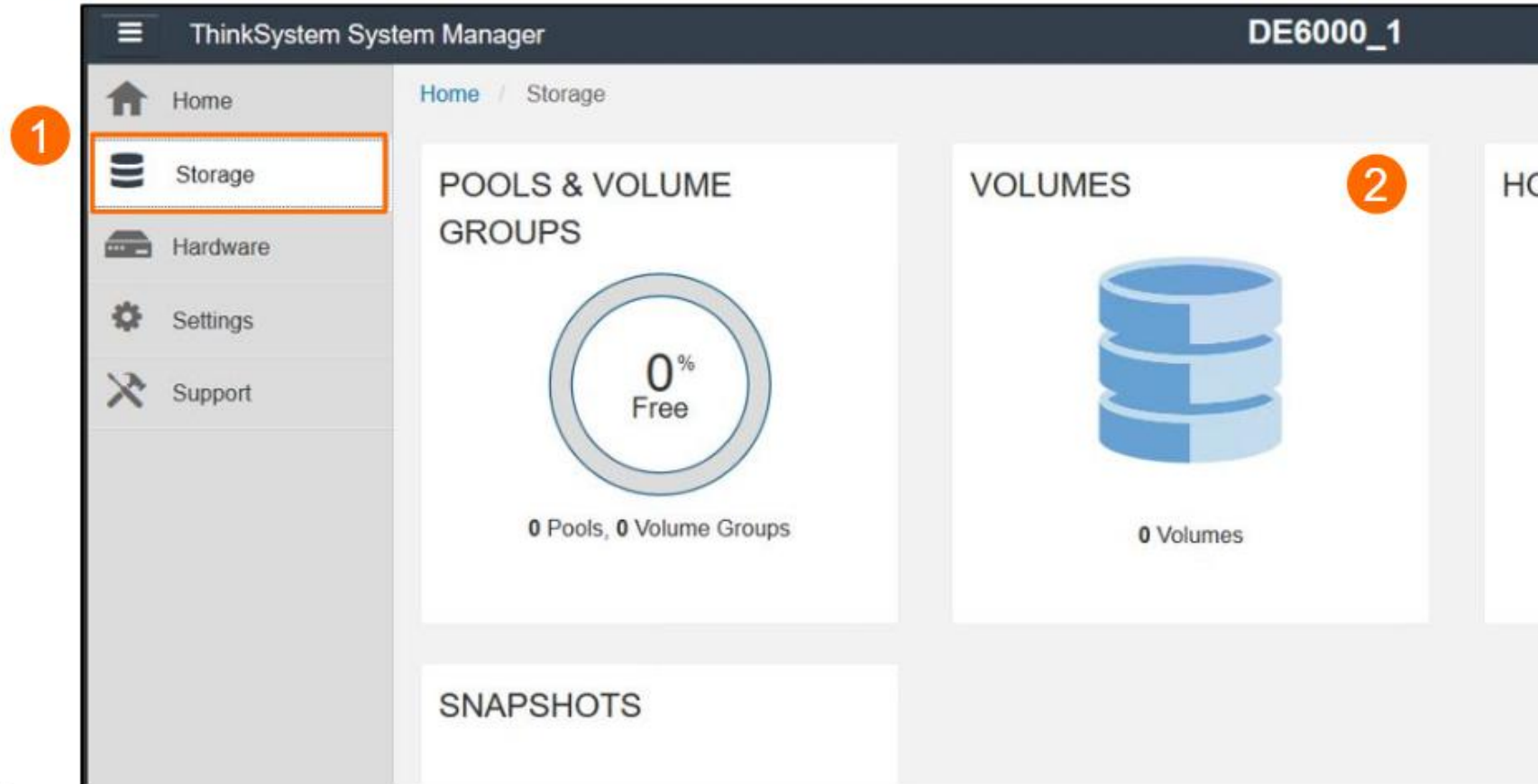
Volume configuration

Select **Create** → **Volume**. The Create Volumes dialog box will be displayed.

VOLUMES

Learn More >

	All Volumes	Applications & Workloads

Filter ❓

Create ▾	Increase Capacity	View/Edit Settings	Copy Services ▾	Add to Workload	More ▾

Volume
Workload

➕ **Create Volume**

Step ❶—②—❸—④—❺—❻—❼ 🗎
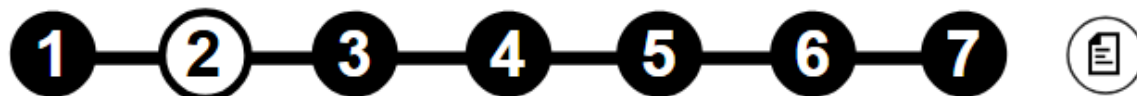
Volume configuration

Select a specific host or host cluster to assign it to a volume. This assignment grants a host or a host cluster access to one or more volumes for I/O operations. If necessary, users can choose to assign a host later.

Create Volumes ✕

| **1 Select Host** | 2 Select Workload | 3 Add/Edit Volumes | 4 Review |

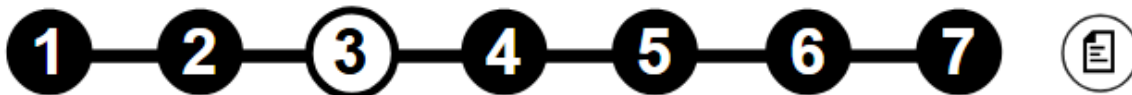Make my created volumes visible to the following host or host cluster...

Select a host or host cluster: ❓

Assign host later ▾

Cancel   Next >

Step ① ② ③ ④ ⑤ ⑥ ⑦ 📄

Lenovo

Volume configuration

Select a workload to customize the storage array configuration for a specific application, such as Microsoft SQL Server, Microsoft Exchange, Video Surveillance applications, or VMware. Users can select **Other application** if the application they intend to use on the storage array is not listed.

Create Volumes   ✕

| 1 Select Host | 2 Select Workload | 3 Add/Edit Volumes | 4 Review |

Select a workload for the created volumes...

How does my workload impact volume creation?

○ Create volumes for an existing workload

   Select   ▾

⦿ Create a new workload

   How do application-specific workloads help me manage my storage array?

Select the application you would like to create a new workload for...

   SAP HANA   ▾

Workload Name ❓

   sap_hana_TEST_workload_1

‹ Back   Cancel   Next ›

Step ①—②—③—④—⑤—⑥—⑦ 🗐
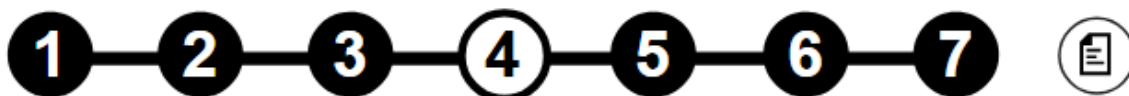
Volume configuration

System Manager may suggest a volume configuration based on the selected application or workload. This volume configuration will be optimized to the type of application the workload supports. Users can accept the recommended volume configuration or edit it as needed.

If users selected **Other application**, they must manually specify the volumes and characteristics they want to create.

Create Volumes ✕

1 Select Host   2 Select Workload   3 Add/Edit Volumes   4 Review

I want to create volumes from the following pool(s) and/or volume group(s)...

TEST
(Optimal) (11 drives, 29300.00 GiB capacity) (Pool)

■ Allocated ☐ Proposed ☐ Free

10000.00 GiB   19300.00 GiB

Secure-capable No ❓ | DA Yes ❓

☐   Volume Name   Reported Capacity

☐   1   10000   GiB   ▾ ✕

+ Add new volume

TEST_VG
(Optimal) (4 drives, 7441.04 GiB capacity) (RAID 1)

■ Allocated ☐ Proposed ☐ Free

7441.04 GiB

Secure-capable No ❓ | DA Yes ❓

+ Add new volume

‹ Back   Cancel   Next ›

Step ①—②—③—④—⑤—⑥—⑦ 🗒

Volume configuration

Review the summary of the volumes users intend to create. Click **Finish** to complete the creation process, or click **Cancel** to edit the volume settings again.

Create Volumes ✕

1 Select Host	2 Select Workload	3 Add/Edit Volumes	4 Review

Name	Pool/ Volume Group	Assigned To	Associated Workload	Volume Type	Reported Capacity (GiB)	Segment Size (KiB)
1	TEST	Unassigned	sap_hana_TEST_workload_1	SAP HANA	10000.00	Not Applicable

< Back   Cancel   Finish

Step ❶—❷—❸—❹—❺—⑥—❼ 📄

Lenovo

Volume configuration

The volume has been created.

VOLUMES							

Learn More >

All Volumes | Applications & Workloads

Filter ❓

Create ▾ | Increase Capacity | View/Edit Settings | Copy Services ▾ | Add to Workload | More ▾ | Delete

Name	Status	Assigned To	LUN	Pool/ Volume Group	Reported Capacity (GiB)	Allocated Capacity (GiB)	Edit
1	Optimal	Unassigned	None	Pool TEST	10000.00	10000.00	✏️

Total rows: 1

Step ❶─❷─❸─❹─❺─❻─⑦ 📄

Lenovo

NTP server configuration

Network Time Protocol (NTP) enables the storage array to use Simple Network Time Protocol (SNTP) to automatically synchronize the controller clocks with an external host.

Controller A

- Configure management ports
- Configure iSCSI ports
- Configure NTP server
- Configure DNS server
- View settings
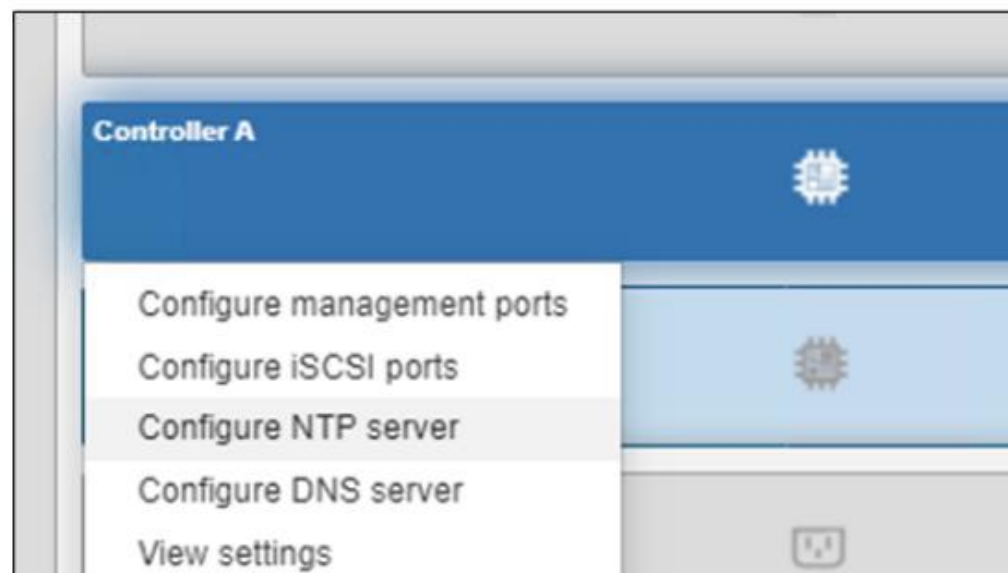
Click each number in turn to see the NTP server address configuration process.

Step **1** — **2** — **3** — **4**

NTP server configuration

Go to **Hardware → Show back of shelf**.
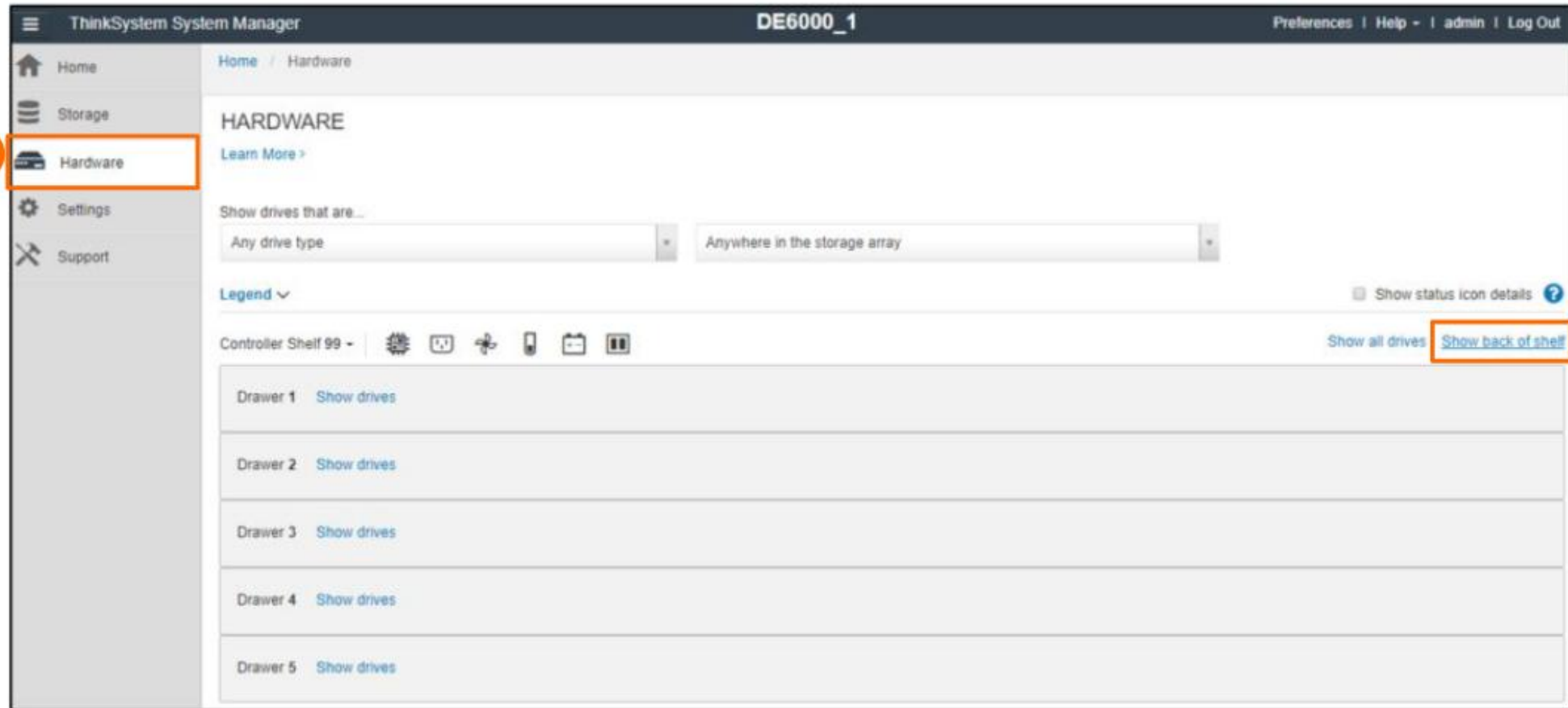
Step ①──❷──❸──❹ 📄

Lenovo

NTP server configuration

Select one of the controllers
→ **Configure NTP server.**

Step ①—②—③—④

Lenovo

NTP server configuration

Select one of the controllers
→ **Configure NTP server**.

Step ① ─② ─③ ─④ 📄

Lenovo
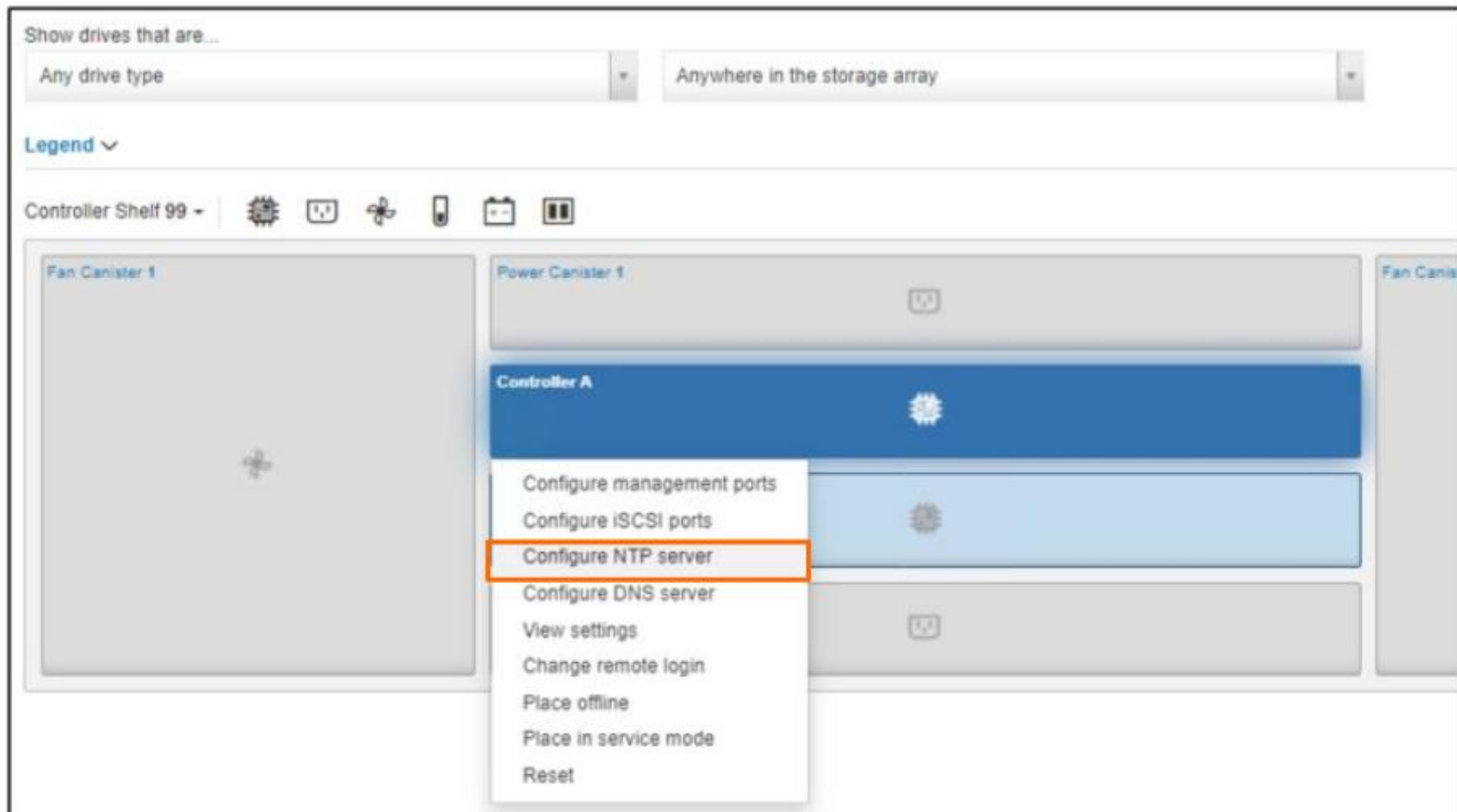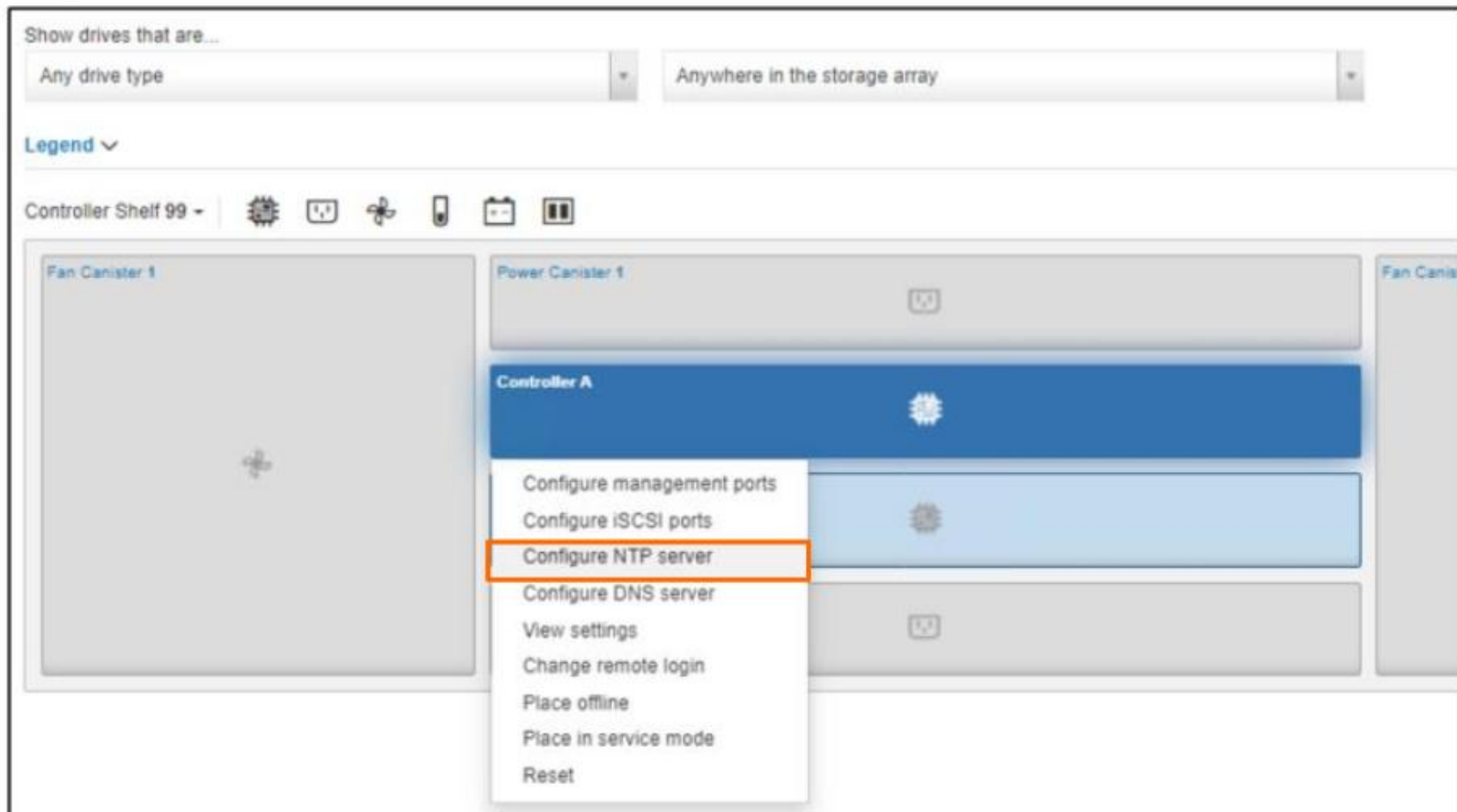
NTP server configuration

Go to the **Controller → View Settings → DNS / NTP** tab to verify the current NTP settings on the controller.

Controller A Settings ✕

| Base | Cache | Host Interfaces | Drive Interfaces | Management Ports | DNS / NTP |

Domain name system (DNS) server settings

DNS configuration: Automatic

Primary DNS server: None

Backup DNS server: None

Network time protocol (NTP) server settings

NTP service: Enabled

NTP configuration: Automatic

Primary NTP server: None

Backup NTP server: None

Close

Step ❶—❷—❸—④ 📄

Lenovo

DNS server configuration

Domain Name System (DNS) is used to resolve fully qualified domain names (FQDN) for the controllers and an NTP server. The management ports on the storage array can simultaneously support IPv4 and IPv6 protocols.
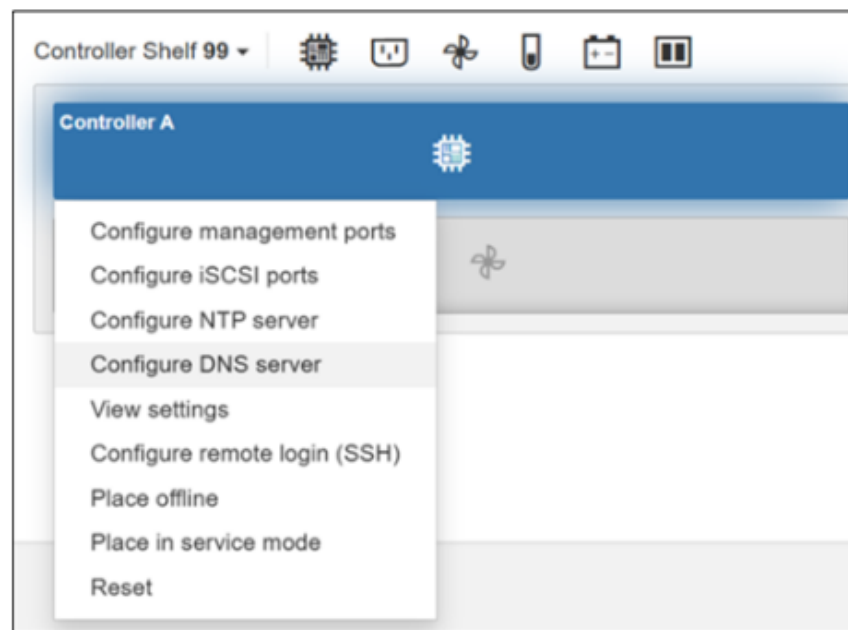
Click each number in turn to see the DNS server address configuration process.

Step **1**—**2**—**3**—**4**

DNS server configuration

Go to **Hardware → Controllers & Components**

Step ①—②—③—④ 📄

DNS server configuration

Select one of the controllers
→ **Configure DNS server**.

Show drives that are...

| Any drive type | ▾ | Anywhere in the storage array | ▾ |

Legend ▾

Controller Shelf 99 ▾

Fan Canister 1

Power Canister 1

Controller A

Configure management ports
Configure iSCSI ports
Configure NTP server
Configure DNS server
View settings
Change remote login
Place offline
Place in service mode
Reset

Fan Ca

Step ➊—②—➌—④

Lenovo

DNS server configuration

Depending on the users' requirements, select either **Automatically obtain DNS server from DHCP server** or **Manually specify DNS server address**.

Configure Domain Name System (DNS) Server ✖

DNS server configuration for Controller A

○ Automatically obtain DNS server addresses from DHCP server ❓

◉ Manually specify DNS server addresses

Primary DNS server ❓

Backup DNS server (Optional) ❓

Save   Cancel

Step   ❶─❷─③─❹   ▤

DNS server configuration

Depending on the users' requirements, select either **Automatically obtain DNS server from DHCP server** or **Manually specify DNS server address**.

Configure Domain Name System (DNS) Server   ✖

DNS server configuration for Controller A

○ Automatically obtain DNS server addresses from DHCP server ❓

◉ Manually specify DNS server addresses

Primary DNS server ❓

[   ]

Backup DNS server (Optional) ❓

[   ]

Save   Cancel

Step **1**—**2**—③—**4**   📄

Lenovo

DNS server configuration

Go to the **Controller → View Settings → DNS / NTP** tab to verify the current DNS settings on the controller.

Controller A Settings ✕

| Base | Cache | Host Interfaces | Drive Interfaces | Management Ports | **DNS/NTP** |

Domain name system (DNS) server settings

DNS configuration: Automatic

Primary DNS server: None

Backup DNS server: None

Network time protocol (NTP) server settings

NTP service: Disabled

Close

Step ➊—➋—➌—④ 📄

Lenovo

Enabling or disabling remote login

Go to the **Hardware** page and click **Show back of shelf**.

Step ①—❷—❸ 📄

Lenovo

Enabling or disabling remote login

Select the controller you want to change the remote login setting on, and then select **Change remote login**.
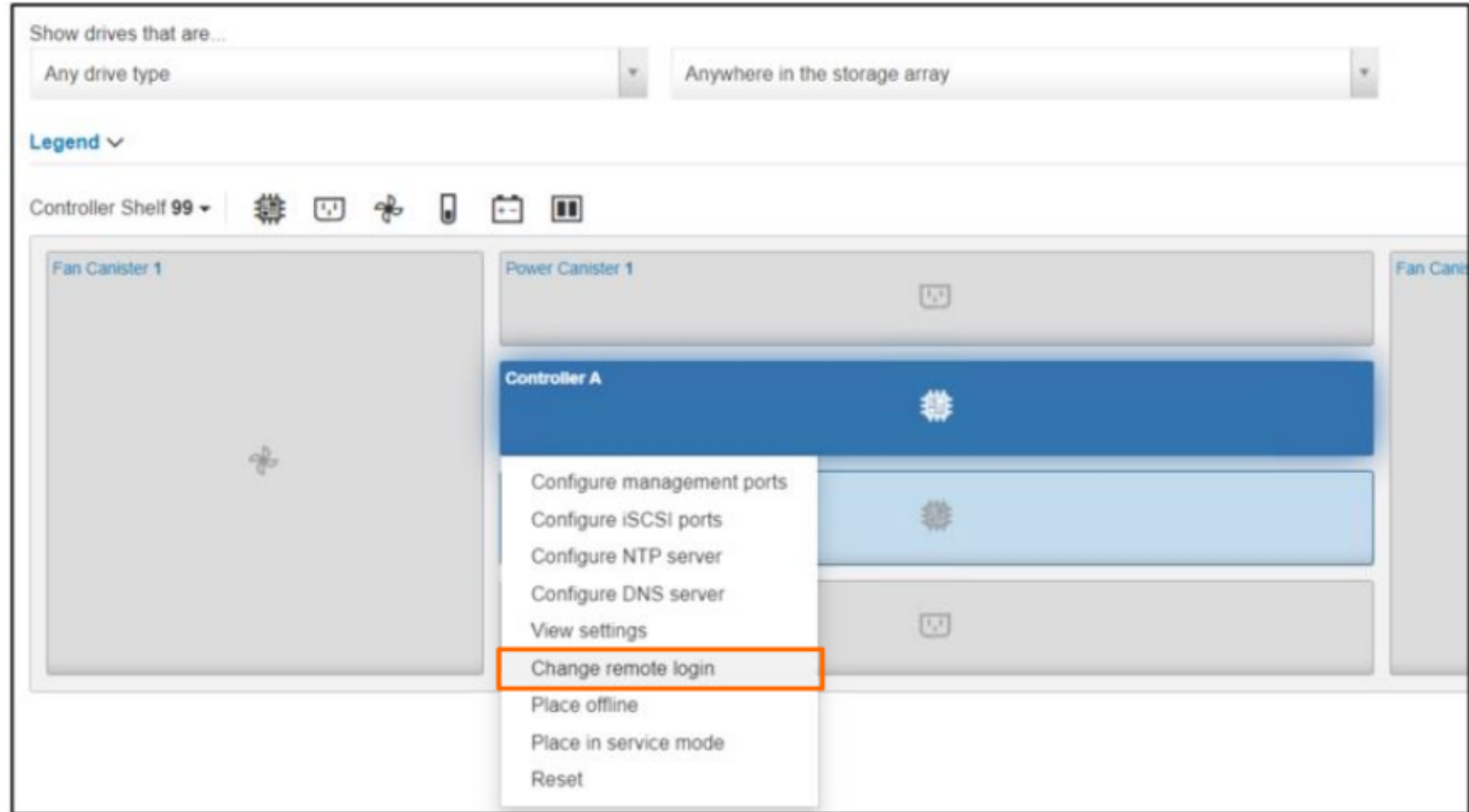
Step **1**—**2**—**3**

Enabling or disabling remote login

Click **Yes** to change the remote login setting status.
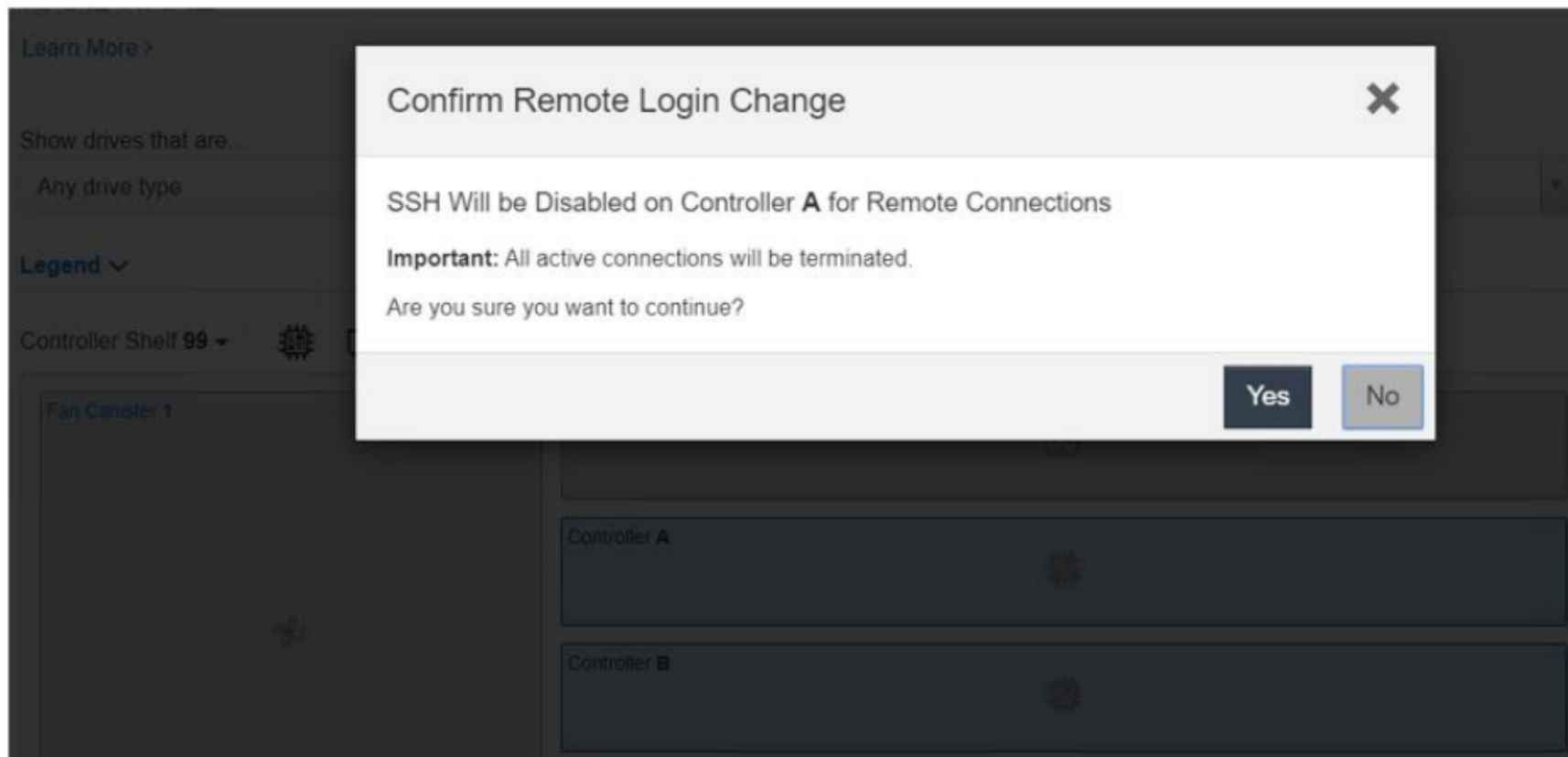
Step ①—②—③ 📄

MIB file

For DE Series storage array SNMP alerts, users can configure the Management Information Base (MIB) variables that appear in SNMP traps. These variables can return the storage array name, array location, and a contact person.

To download the DE Series array MIB file, go to the system's Lenovo Support page, and select Driver & Software for download links. (A system serial number will be required.) Click HERE to see an example.

For more information about how to define MIB variables for SNMP traps, refer to the following DE Series documentation:

https://thinksystem.lenovofiles.com/help/index.jsp?topic=%2Fthinksystem_system_manager_11.50.0%2F42399351-6DD9-4F8A-B625-D6BAC7A8F722_.html

MIB file

For DE Series storage array SNMP alerts, users can configure the Management Information

Drivers & Software

← Back to Downloads

DE4000H (ThinkSystem)

Enter Serial Number ⓘ

↻ Change Product

🏠 Product Home

⬇ Drivers & Software

📄 Documentation

🛡 Warranty

🔧 Repair Status

Lenovo ThinkSystem DE2000/DE4000 MIB

ⓘ File Naming Guide

Individual Downloads	Operating System	Version ▾	Released ▾	Size	Severity ⓘ	Download
lnvgy_sw_mib_08.51.00.00-2000-4000_anyos_noarch.chg #⁀ CHECKSUM	OS Independent	1.01	04 Mar 2019	3 KB	Recommended	🔒
lnvgy_sw_mib_08.51.00.00-2000-4000_anyos_noarch.txt #⁀ CHECKSUM	OS Independent	1.01	04 Mar 2019	5 KB	Recommended	🔒
lnvgy_sw_mib_08.51.00.00-2000-4000_anyos_noarch.zip #⁀ CHECKSUM	OS Independent	1.01	04 Mar 2019	3 KB	Recommended	🔒

Recommended practices for DE Series configuration

- Use the most recent version of TSM.
- Create an even number of LUNs on both storage controllers.
- For iSCSI Ethernet ports, use large frames with a maximum transmission unit (MTU) of 9000.

Lenovo

Reference

For more information about configuring DE Series storage arrays, refer to the DE-Series systems documentation on Lenovo storage pubs site:
https://datacentersupport.lenovo.com/tw/en/storagepubs

Changing the host ports protocol – overview

For controller HIC ports on non-SAS ports controller models, users can change the controller ports protocol – for example, from Fibre Channel to iSCSI – by downloading the feature activation key from the Lenovo Features on Demand (FoD) website: https://fod.lenovo.com/. Changing the host ports protocol does not require an additional license fee.
Each DE Series storage controller contains the submodel ID, which defines the host ports protocol for the controller. Locate the submodel ID through the System Manger to determine the current host ports protocol for the controller.

Lenovo

How to locate the submodel ID

Drive media types:	SSD
Number of controllers:	2
Controller board ID:	5700
Current sub-model ID:	432
Controller firmware version:	98.50.00.05
Controller NVSRAM version:	N5700-841834-D01

Click each number in turn to see the procedure used to locate the submodel ID on the storage system.

Step **1**—**2**—**3**

Lenovo

How to locate the submodel ID

Log in to System Manager and go to **Support** → **SUPPORT CENTER**.

Step ①—❷—❸
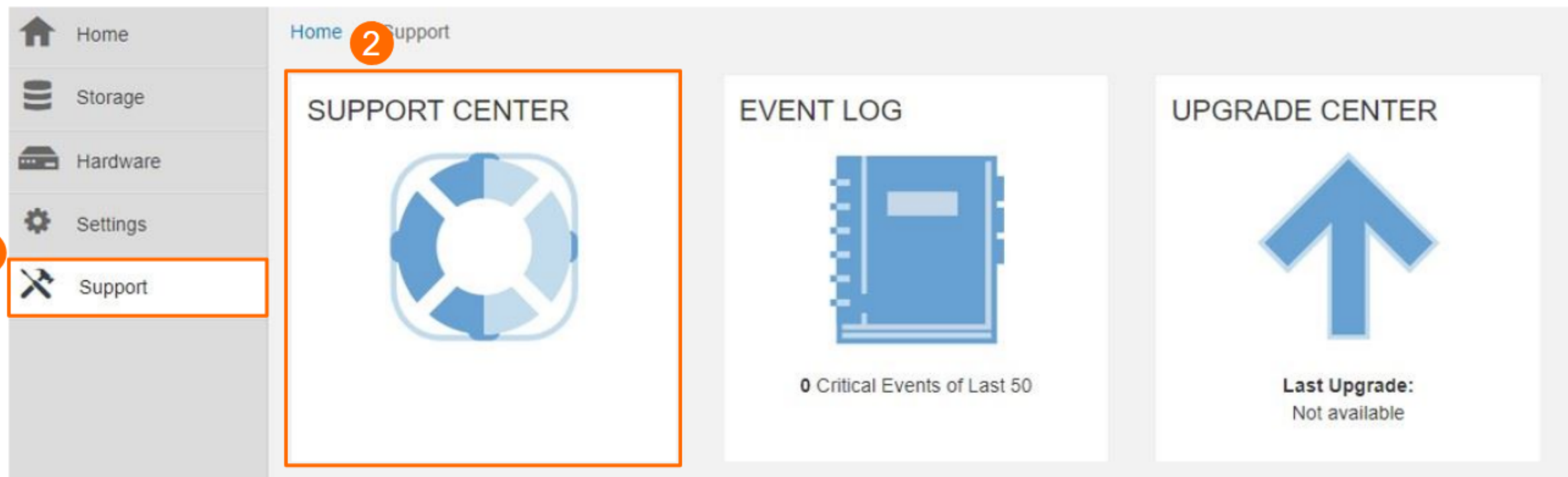
How to locate the submodel ID

In the SUPPORT CENTER, go to the **Support Resources** tab.

Step ①—②—③

Lenovo
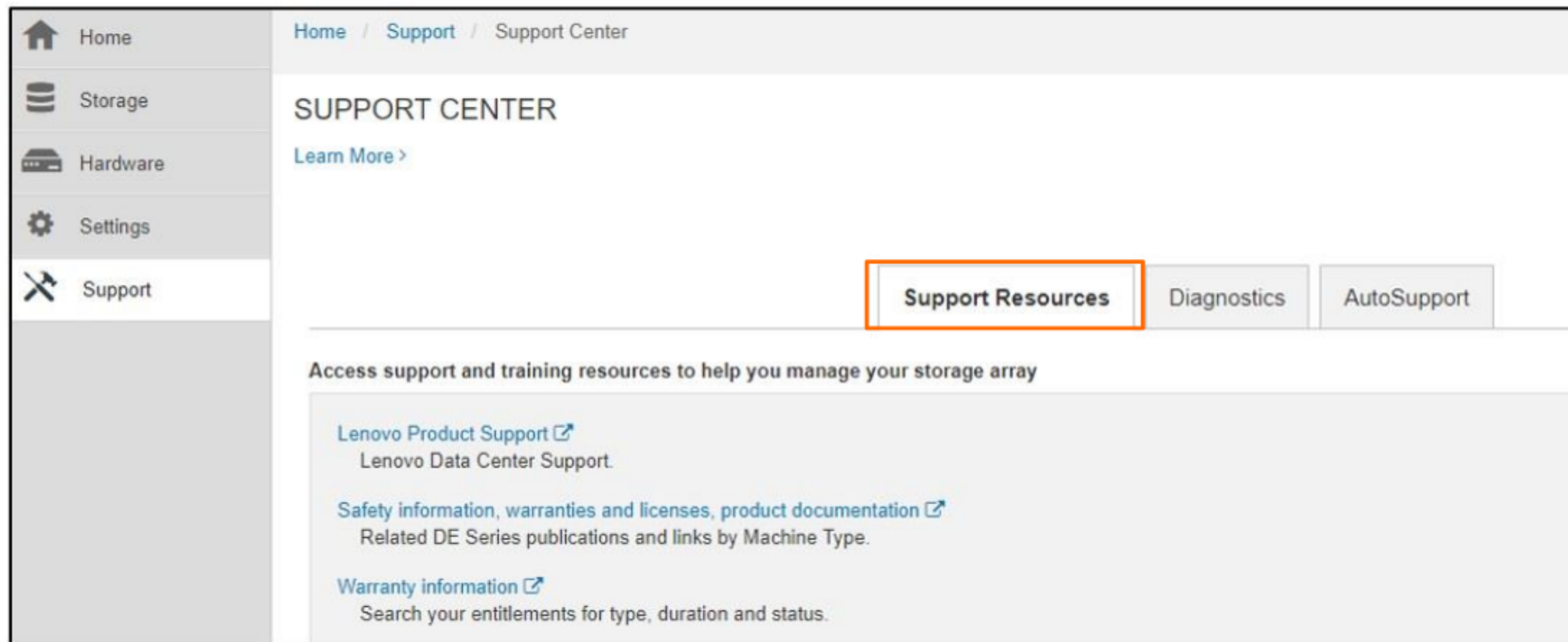
How to locate the submodel ID

The sub-model ID is located in the **View top storage array properties** section.
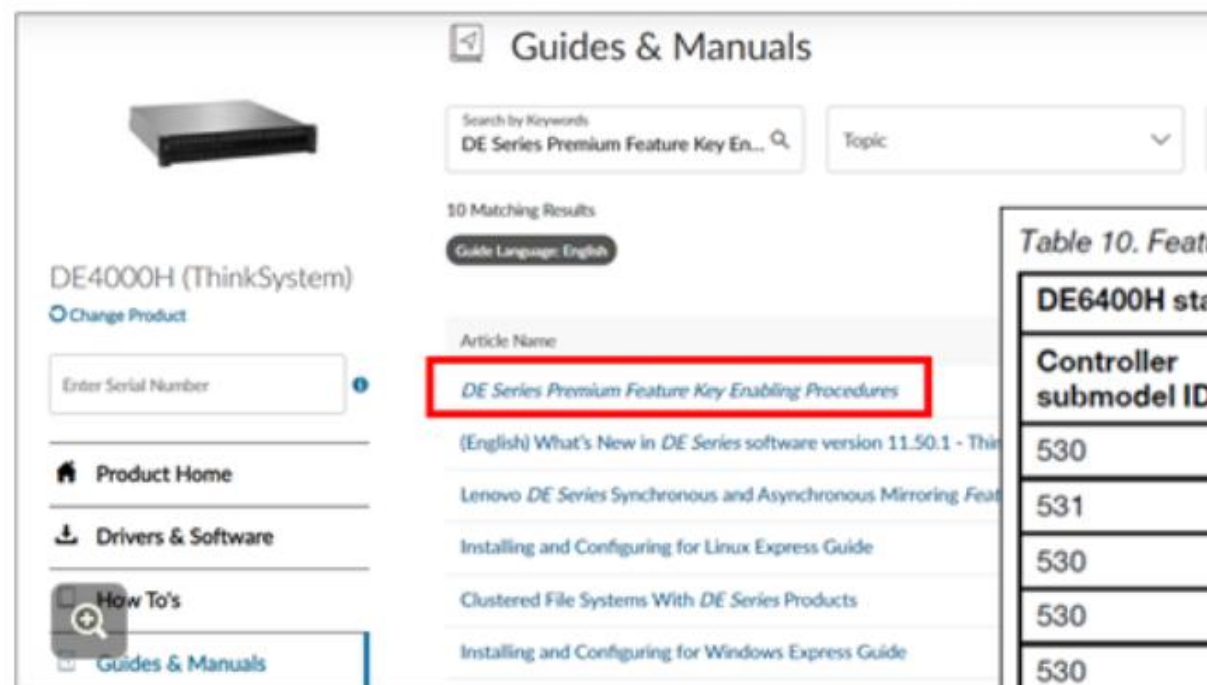
View top storage array properties

Storage array world-wide identifier (ID):	600A098000D66454000000005B57D91C
Chassis serial number:	721820500149
Number of shelves:	1
Number of drives:	24
Drive media types:	SSD
Number of controllers:	2
Controller board ID:	5700
Current sub-model ID:	432
Controller firmware version:	98.50.00.05
Controller NVSRAM version:	N5700-841834-D01
Automatic load balancing:	Disabled
System Manager version:	91.50.0G54.0002

Step **1**—**2**—③

Lenovo

DE Series submodel IDs and feature codes

For the latest DE Series submodel ID and feature code list, refer to the *Premium Feature Key Enabling Procedure* document on the Guides and Manuals page of the DE Series Product Support Site: https://datacentersupport.lenovo.com/products/storage/DEseries.
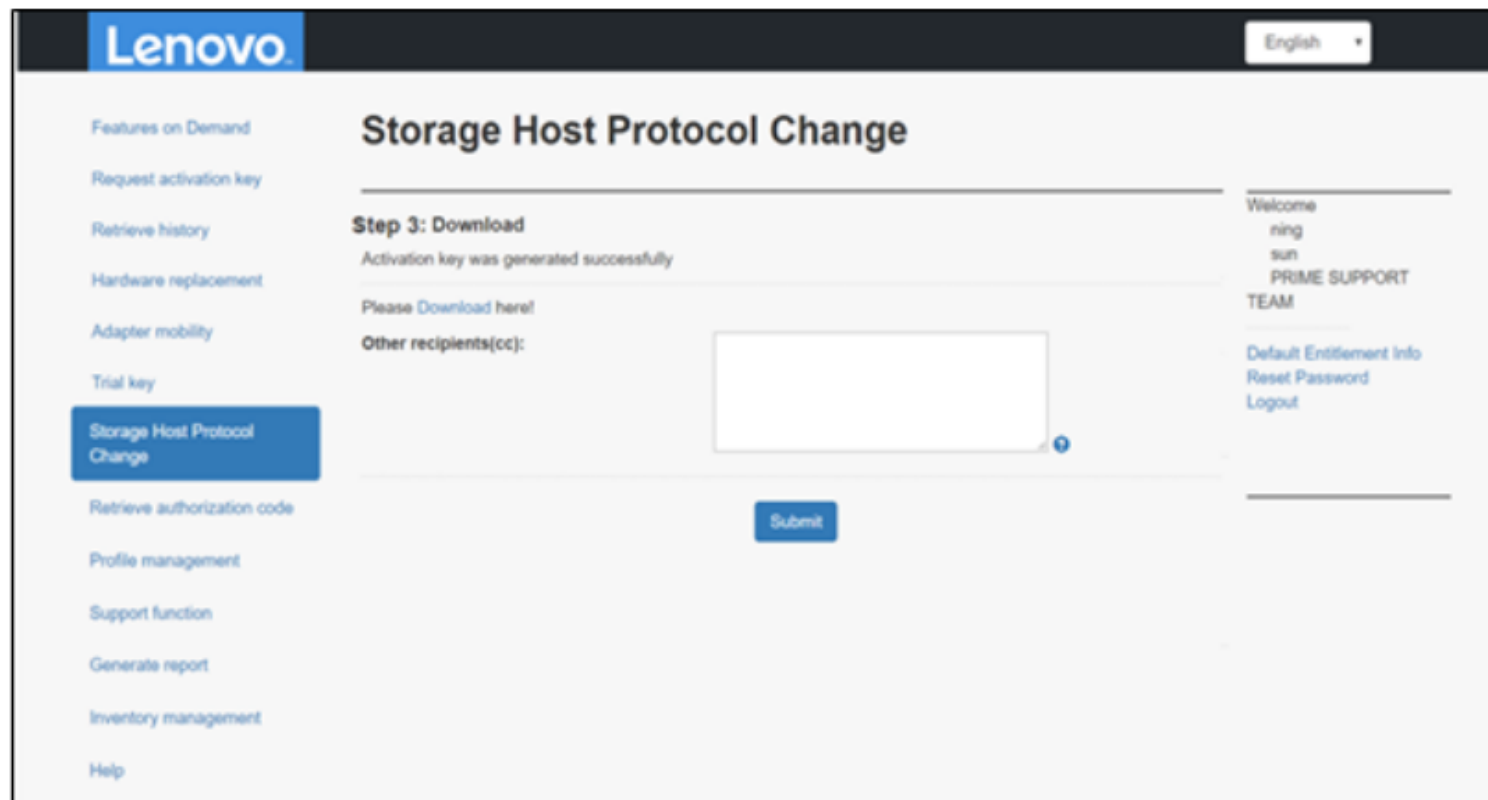

Table 10. Feature codes for DE6400H (7DB6CTO2WW)

DE6400H starting configuration		DE6400H ending configuration		Feature code
Controller submodel ID	HIC ports	Controller submodel ID	HIC ports	
530	FC	531	NVMe/FC	BT7H
531	NVMe/FC	530	FC	BT7J
530	NVMe/RoCE	531	NVMe/IB	BS87
530	NVMe/RoCE	532	iSER	BS88
530	NVMe/RoCE	533	SRP	BS89
531	NVMe/IB	530	NVMe/RoCE	BSV1
531	NVMe/IB	532	iSER	BSV2
5	NVMe/IB	533	SRP	BSV3
532	iSER	530	NVMe/RoCE	BSV4

Changing the host ports protocol through System Manager

Click each number in turn to see the processes used to obtain the feature code from the Lenovo FoD site and change the host ports protocol with the feature code.

Step ❶—❷—❸—❹—❺

Changing the host ports protocol through System Manager

Log in to https://fod.lenovo.com/ and go to the **Storage Host Protocol Change** page. Enter the necessary information to get the feature pack key file.

Click **HERE** for more details about how to locate the UID (Feature enable identifier) in System Manager.

Step ①—②—③—④—⑤

Changing the host ports protocol through System Manager

Go to **Settings → SYSTEM**.

The Feature Enable Identifier is under the **Add-ons** section.

Home / Settings

- Home
- Storage
- Hardware
- Settings
- Support

ALERTS

Alerts have not been configured

SYSTEM

Automatic Load Balancing: **Disabled**

Add-ons

Enable Premium Feature

Enable a premium feature by obtaining a key file using the Feature Enable Identifier listed below.

Feature Enable Identifier: 35303431383835303431393835AFE8A77

Step ① — ❷ — ❸ — ❹ — ❺

Lenovo
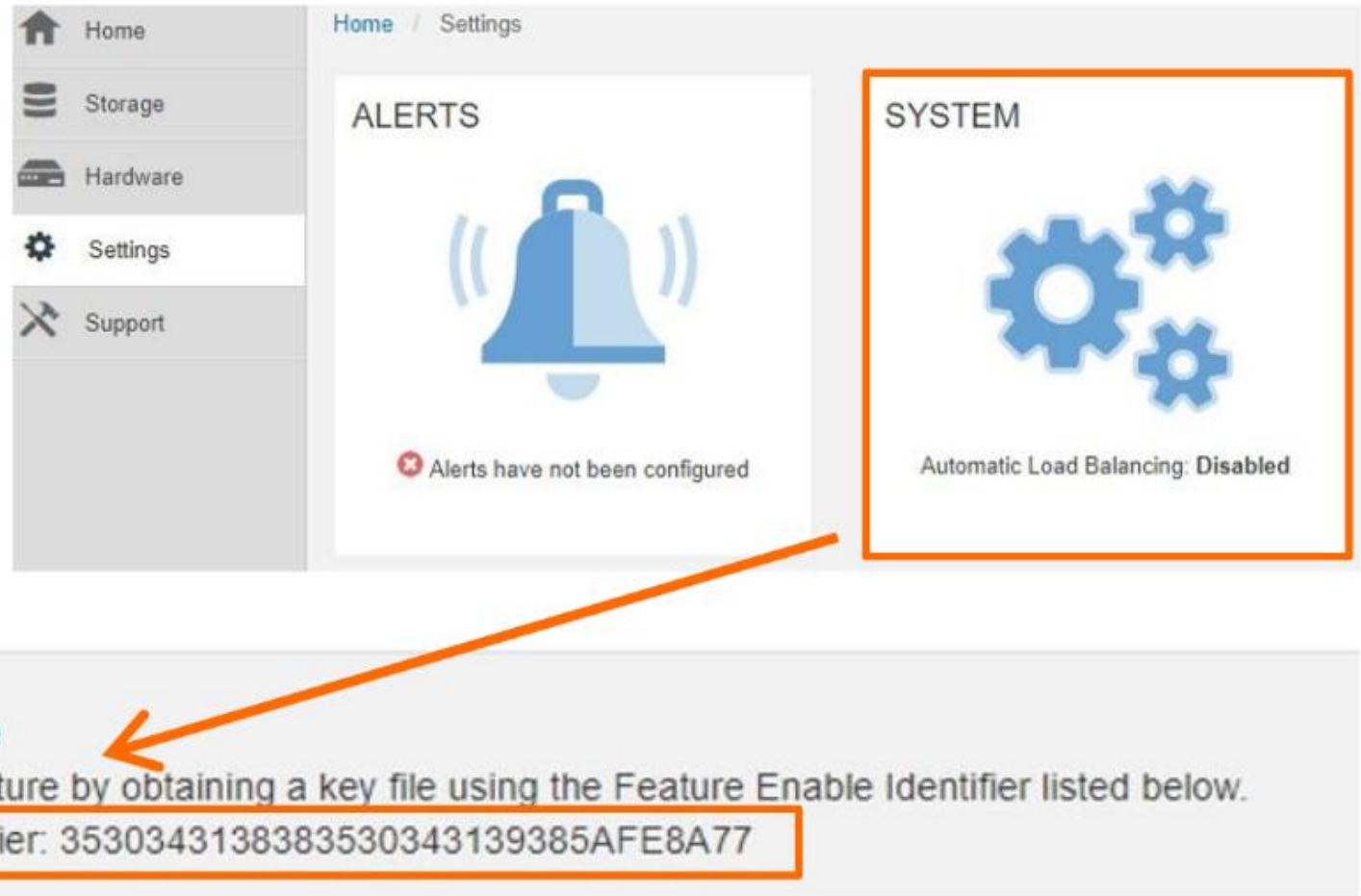
Changing the host ports protocol through System Manager

Users must stop all I/O operations through System Manager before converting the protocol of the host ports. Users cannot access data on the storage array until the controller successfully completes the host ports protocol conversion.
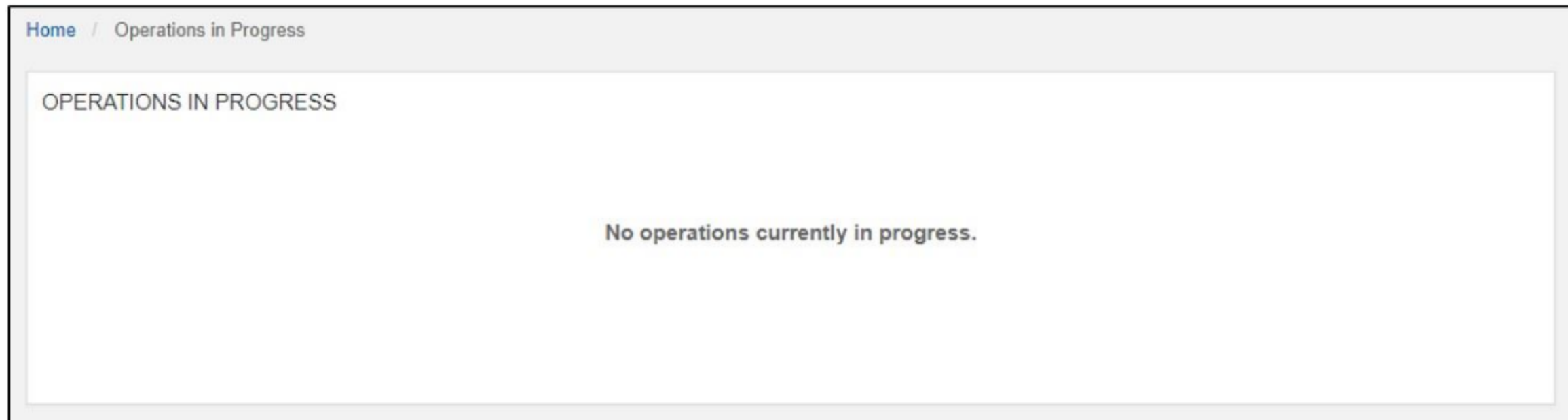
Home / Operations in Progress
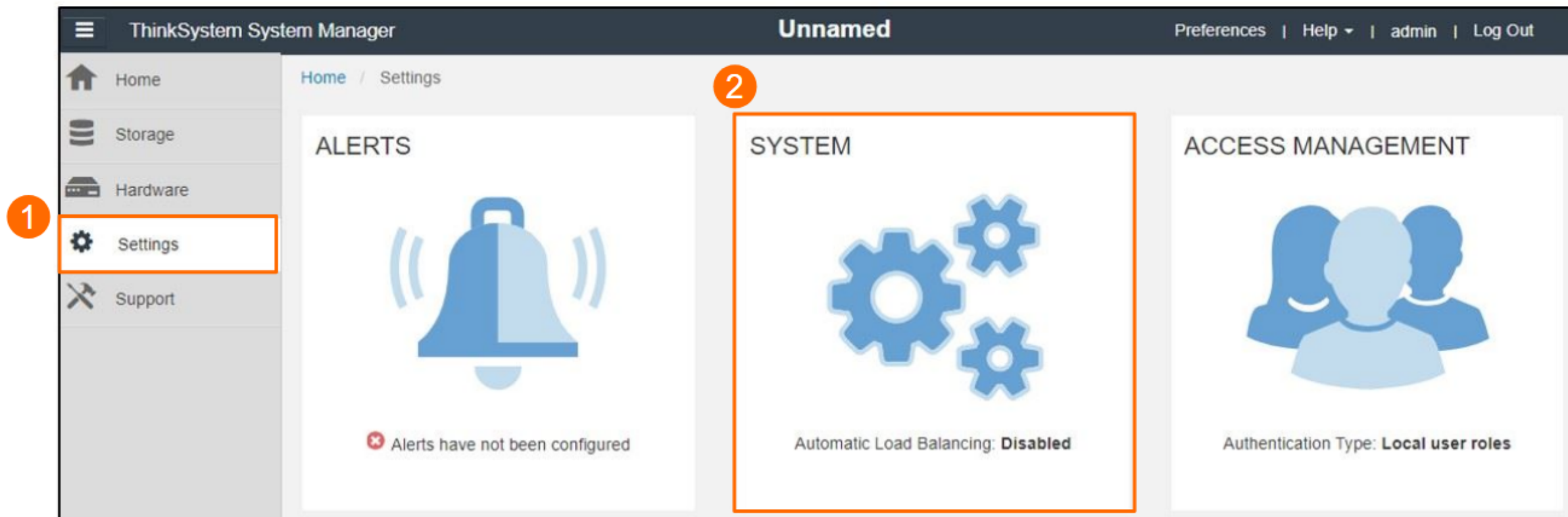
OPERATIONS IN PROGRESS

No operations currently in progress.

Step ①—②—③—④—⑤

Lenovo

Changing the host ports protocol through System Manager

Log in to System Manager, and go to **Settings** → **System page**.

Step ❶─❷─③─❹─❺

Lenovo

Changing the host ports protocol through System Manager

Select **Change Feature Pack**, and then browse and select the downloaded feature pack key to change the host ports protocol.

Add-ons

Enable Premium Feature
Enable a premium feature by obtaining a key file using the Feature Enable Identifier listed below.
Feature Enable Identifier: 35303431383835530343139385AFE8A77

Change Feature Pack
Change the feature pack that is currently installed by obtaining a feature pack file using the Feature Enable Identifier listed below.
Feature Enable Identifier: 35303431383835530343139385AFE8A77

Step ①—②—③—④—⑤

Changing the host ports protocol through System Manager

Go to the **Hardware** page, and then go to **Controller → Host Interfaces** to verify that the change has been made.

Step ①—②—③—④—⑤
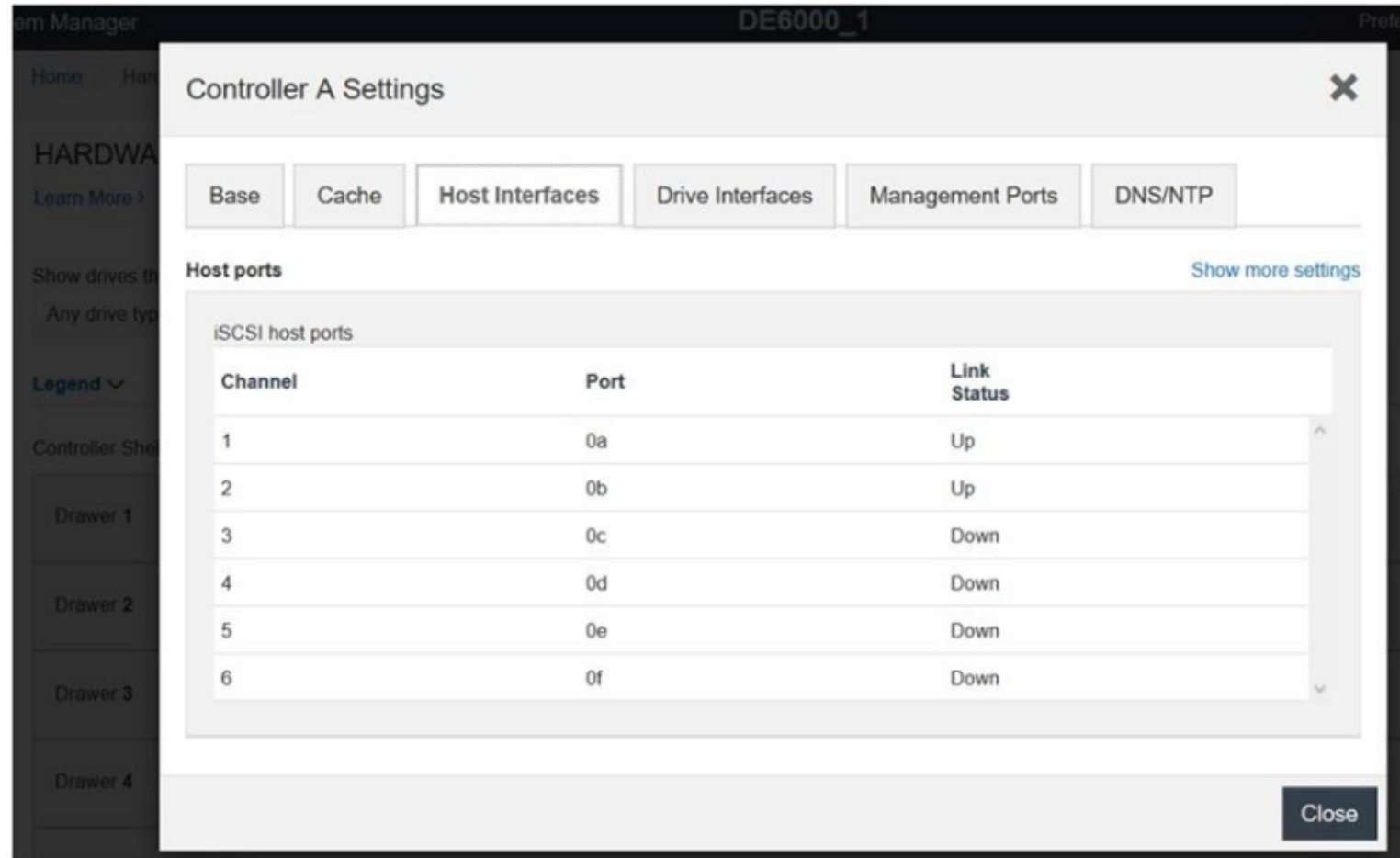
Premium feature key overview

Some capabilities of the DE Series storage array can be expanded with optional licensed functions. Optional licensed functions include:

- Snapshot upgrade: Increases the supported number of snapshot targets.
- Synchronous mirroring: Provides storage system-based, online, real-time data replication between the storage systems containing primary (local) and secondary (remote) volumes by using synchronous data transfers over Fibre Channel communication links. (Both storage systems must have licenses for synchronous mirroring.)
- Asynchronous mirroring: Provides storage system-based data replication between the storage systems containing primary (local) and secondary (remote) volumes by using asynchronous data transfers over iSCSI or Fibre Channel links at set intervals. (Both storage systems must have licenses for asynchronous mirroring.)
- DE6000H only: Increases maximum drive count from 240 to 480 drives.

Note: Async Mirroring on DE4200/DE4800 supports Fibre Channel protocol only.

Lenovo

How to enable premium features

> **Add-ons**
>
> **Enable Premium Feature**
> Enable a premium feature by obtaining a key file using the Feature Enable Identifier listed below.
> Feature Enable Identifier: 35303431383835530343139385AFE8A77

Click each number in turn to see the procedures used to obtain the premium feature key from the Lenovo FoD site and enable the key through System Manger.
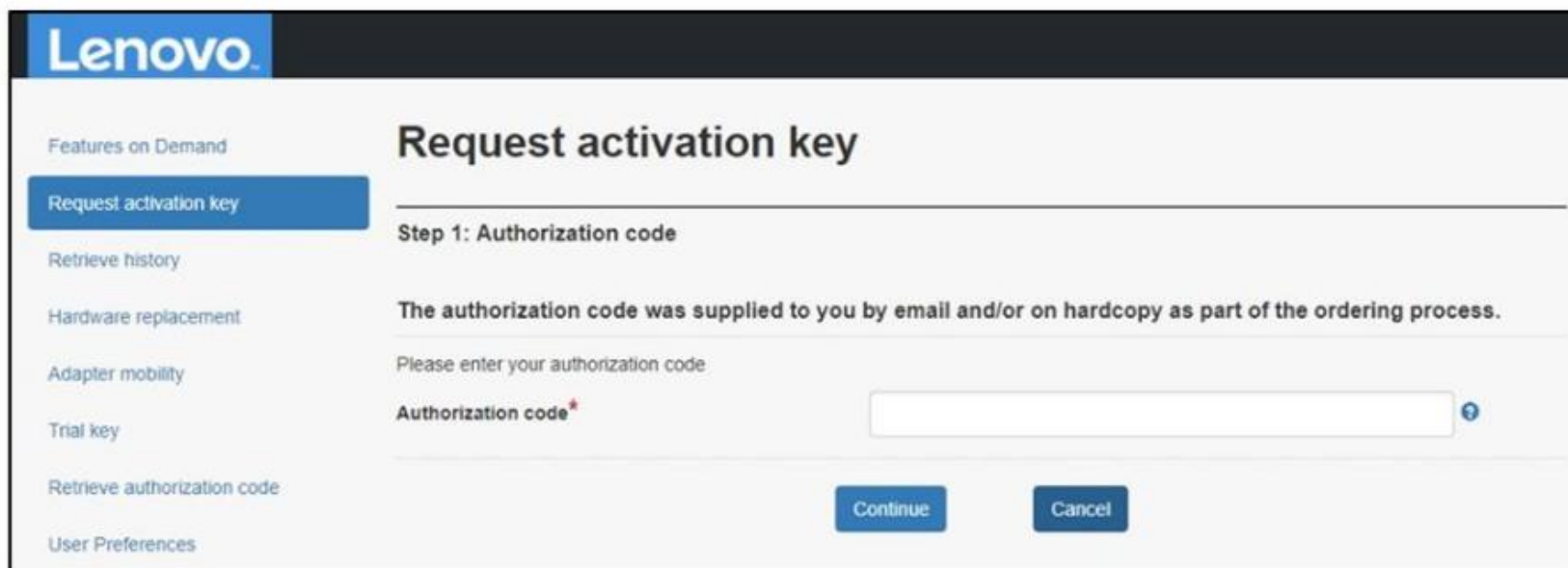
Step **1**—**2**—**3**—**4**

How to enable premium features

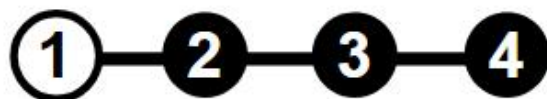Log in to the Lenovo FoD website https://fod.lenovo.com. Click **Request activation key** and follow the instructions on the screen to enter the authorization code and other information needed to obtain the premium feature key.
The premium feature key can be downloaded or sent to a specified email address after the authorization process is completed on the Lenovo FoD website.
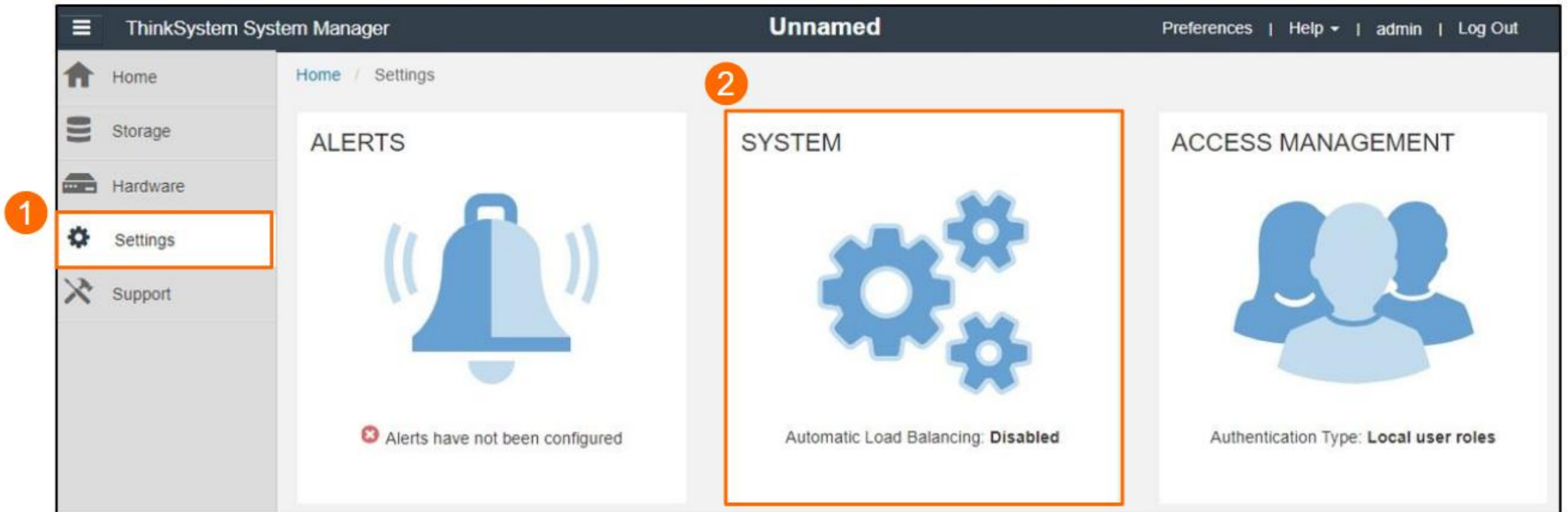

Step ①—②—③—④

Lenovo

How to enable premium features

Log in to System Manager, and go to **Settings → System**.

How to enable premium features

Go to the Add-ons section, select **Enable Premium Feature**, and then browse and select the downloaded premium feature key file to enable the premium feature on the storage array.

Add-ons

Enable Premium Feature

Enable a premium feature by obtaining a key file using the Feature Enable Identifier listed below.
Feature Enable Identifier: 35303431383835530343139385AFE8A77

Change Feature Pack

Change the feature pack that is currently installed by obtaining a feature pack file using the Feature Enable Identifier listed below.
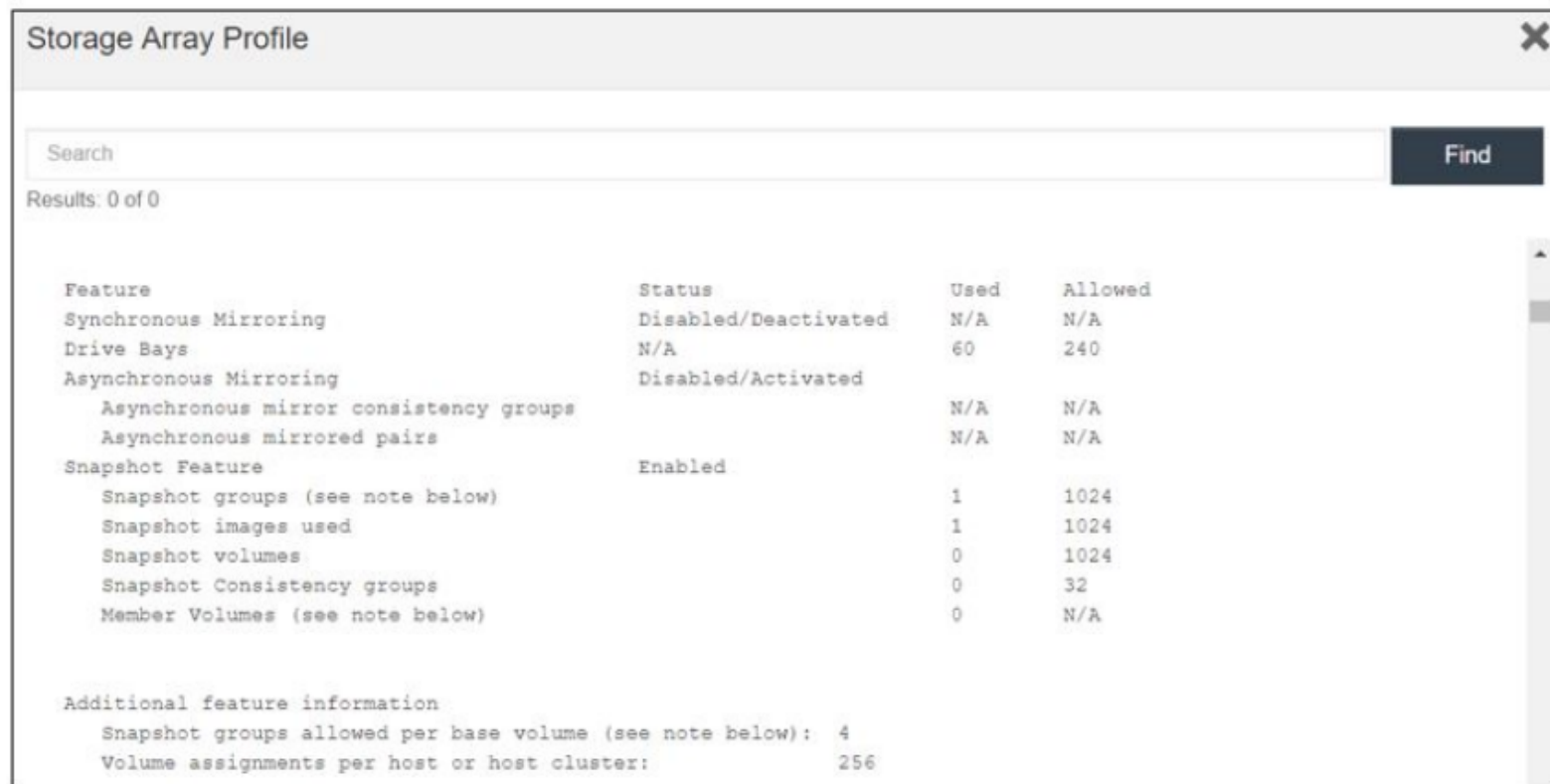Feature Enable Identifier: 35303431383835530343139385AFE8A77

Step ❶—❷—③—❹

Lenovo

How to enable premium features

Go to **Support → SUPPORT CENTER → Support Resources → Launch detailed storage array information → Storage Array Profile** to verify that the premium feature key has been enabled.

Storage Array Profile			✕

Search	Find

Results: 0 of 0

Feature	Status	Used	Allowed
Synchronous Mirroring	Disabled/Deactivated	N/A	N/A
Drive Bays	N/A	60	240
Asynchronous Mirroring	Disabled/Activated		
Asynchronous mirror consistency groups		N/A	N/A
Asynchronous mirrored pairs		N/A	N/A
Snapshot Feature	Enabled		
Snapshot groups (see note below)		1	1024
Snapshot images used		1	1024
Snapshot volumes		0	1024
Snapshot Consistency groups		0	32
Member Volumes (see note below)		0	N/A

Additional feature information
    Snapshot groups allowed per base volume (see note below): 4
    Volume assignments per host or host cluster: 256

Step ①—②—③—④

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