

Problem determination and troubleshooting

How to perform troubleshooting actions on the ThinkSystem DE Series storage arrays

Lenovo

Problem determination and troubleshooting overview

Before starting any troubleshooting steps on the DE Series storage arrays, perform the following actions:

- Inquire about the event that occurred before the suspected system problem. If possible, return the system to the previous state.
- Confirm the supported firmware on the current storage array.
- Record the symptoms including poor performance and error messages from System Manager.
- Determine whether the problem is repeatable.

Service actions

Data collection is the primary step in determining the correct service action to perform to resolve a client's issue. Whether the data collected is verbal about the client system (“...the LED on the front is flashing...”) or a diagnostic data file from a specialized application, all information that is collected is useful toward identifying one of the four available service actions that you can perform.

The four actions are:

- Update: firmware and management software
- Reconfigure: parameter values, cabling, component reseats, and system restarts
- Replace: hardware components
- Escalate to the next service level: go to the System Manager → Support → SUPPORT CENTER → Diagnostic page, and use Collect support data for further escalation.

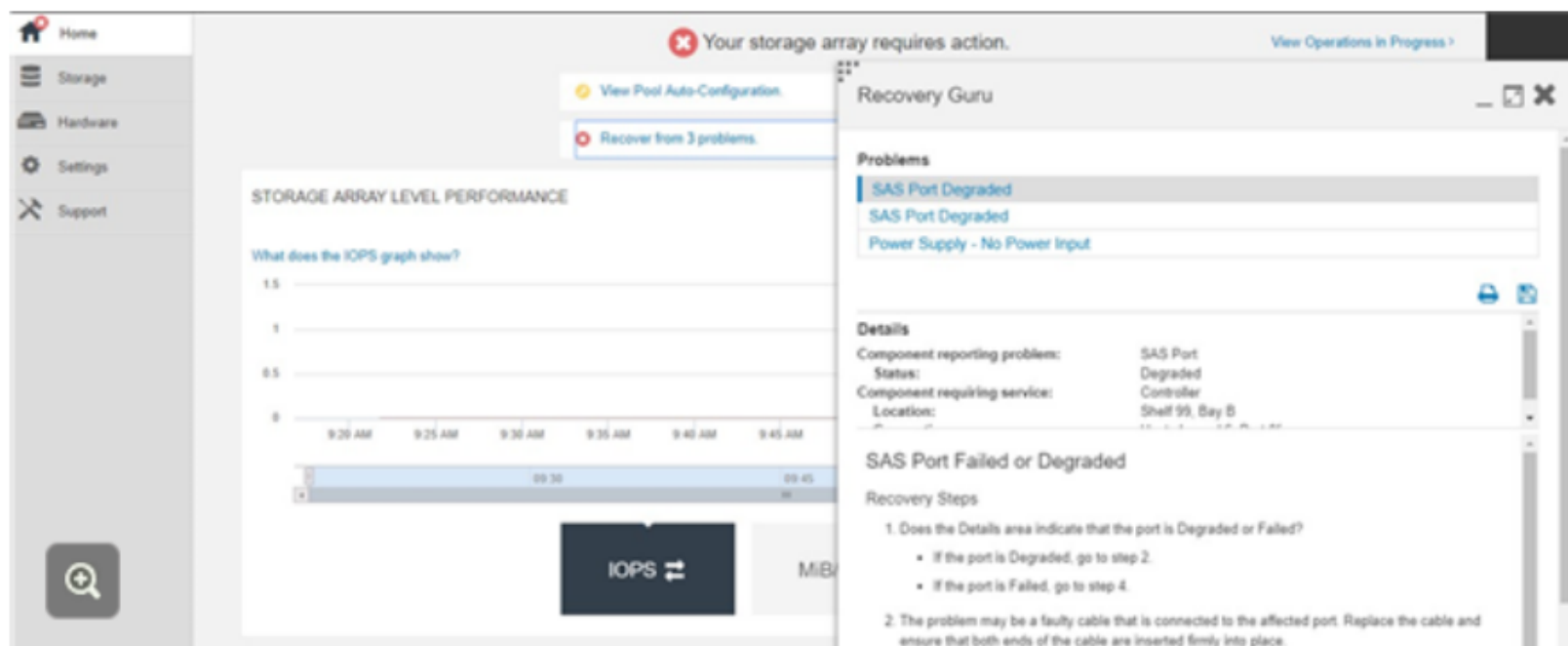
Firmware update tips

To update the firmware on DE Series storage arrays, servicers must follow the rules in the DE Series interoperability matrix to install the proper version of firmware on storage arrays (it depends on the host systems' HBA, OS, and storage arrays' HIC configurations). Installing the incorrect versions of firmware on the storage array may cause unexpected issues.

To download the latest interoperability matrix Excel file, go to the Lenovo website: <https://lenovopress.com/lp0584-lenovo-storage-interoperability-links>.

Recovery Guru in System Manager

If the controller detects an error on the storage array, an error message is displayed at the top of the System Manager Home page. Click the message to open the Recovery Guru. The Recovery Guru shows the problem details and recommended recovery steps. Refer to the Recovery Guru for the troubleshooting actions.



DE Series front panel LEDs







Click the buttons for information about each enclosure's front panel LEDs.

DE 2U model

DE 4U model

DE Series front panel LEDs



Components	Status	Description
 Power LED	Solid green	One or more power supplies are delivering power to the shelf.
	Off	The storage array is shut down.
 Attention LED	Solid amber	There is an error with the function of one or more of the following: shelf, drives, I/O modules, power supplies, or fans.
	Off	The system is operating normally.
 Location LED	Solid blue or flashing blue	The shelf location LED is manually activated to help locate the shelf. The location LED turns off automatically after 30 minutes.
	Off	The location LED is not activated.
 Shelf ID	Number displayed	Display the digital shelf ID.





DE 2U model

DE 4U model



DE Series front panel LEDs



Components	Status	Description
 Power LED	Solid green	One or more power supplies are delivering power to the shelf.
	Off	The storage is shut down.
 Attention LED	Solid amber	There is an error with the function of one or more of the following: shelf, drives, I/O modules, power supplies, or fans.
	Off	The system is operating normally.
 Location LED	Solid blue or flashing blue	The shelf location LED is manually activated to help locate the shelf. The location LED turns off automatically after 30 minutes.
	Off	The location LED is not activated.
 Shelf ID	Number displayed	Display the digital shelf ID.

DE 2U model

DE 4U model



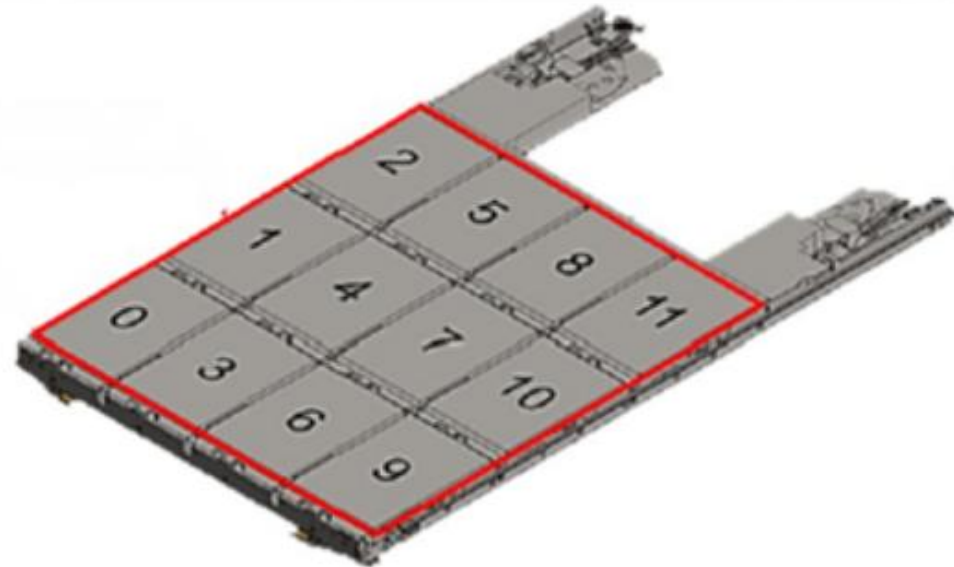
DE Series drive LEDs

Click the buttons for information about the drive LEDs.

2.5-inch drive

3.5-inch drive

4U drive drawer



DE Series drive LEDs

Click the buttons for information about the drive LEDs.

2.5-inch drive

3.5-inch drive

4U drive drawer



Components	Status	Description
1 Activity LED	Solid green	The drive has power.
	Flashing green	The drive has power, and I/O is in process.
2 Attention LED	Amber	An error occurred with the functioning of the drive.
	Off	The drive is working normally.

DE Series drive LEDs

Click the buttons for information about the drive LEDs.

2.5-inch drive

3.5-inch drive

4U drive drawer



Components	Status	Description
1 Activity LED	Solid green	The drive has power.
	Flashing green	The drive has power, and I/O is in process.
2 Attention LED	Amber	An error occurred with the functioning of the drive.
	Off	The drive is working normally.

DE Series drive LEDs

Click the buttons for information about the drive LEDs.

2.5-inch drive

3.5-inch drive

4U drive drawer



Components	Status	Description
1 Activity LED	Amber	The drawer or a drive in the drawer requires service actions.
	Off	The drawer and all drives in the drawer are operating normally.
	Flashing amber	When a locate operation for a drive in the drawer is in progress.
2–13 Attention LED	Green	The power is turned on and the drive is operating normally.
	Off	The power is turned off.
	Flashing green	Drive I/O activity is taking place.

Click the arrow for more
information about the drawer LEDs.



DE Series drive LEDs

Click the buttons for information about the drive LEDs.

2.5-inch drive

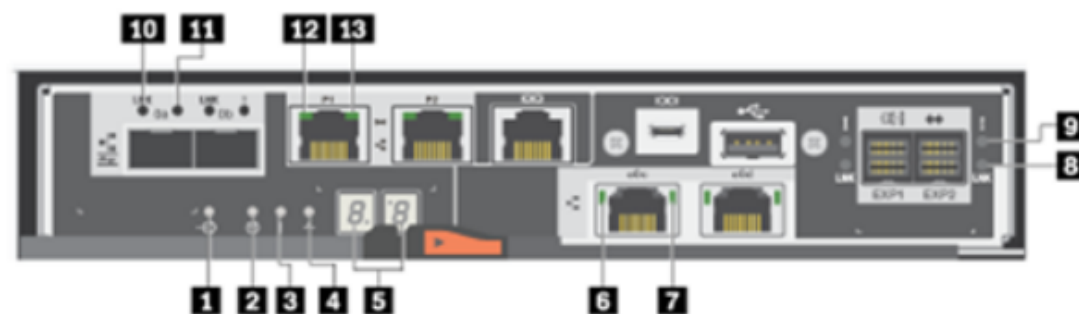
3.5-inch drive

4U drive drawer

Within a drive drawer, there are 12 drive slots numbered 0 through 11. Each drive uses an amber Attention LED. If the drive requires operator attention, the Attention LED turns to amber.



Rear controller status LEDs



DE2000 controller with dual-port HIC

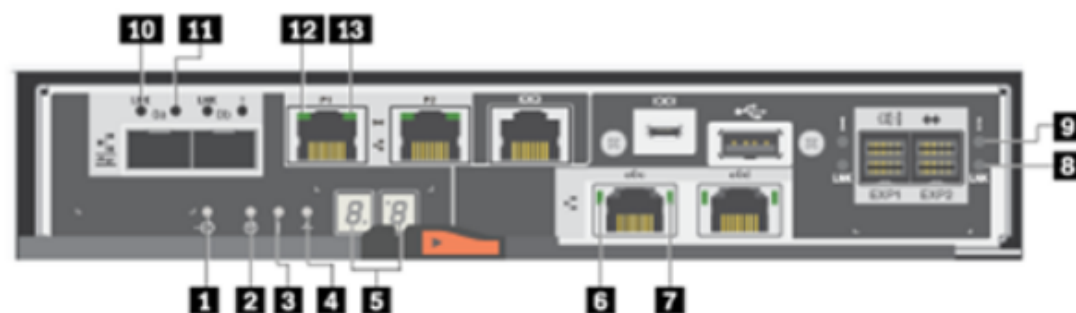


Click the arrow to see different storage model LED layouts.

Scroll down for more information.

Components	Status	Description
1 Cache active LED	Solid green	The drive has power.
	Flashing green	The drive has power, and I/O is in process.
2 Location LED	Blue	There is an active request to physically locate the controller.
	Off	The drive is working normally.
3 Attention LED	Amber	The controller is faulty and requires operator attention, and the faulty component is serviceable.
	Off	The controller is operating normally.
4 Activity LED	Flashing green	The controller is active.
5 Seven-segment display LED	Character displayed or off	See Seven-segment display LED slide for more details.

Rear controller status LEDs



DE2000 controller with dual-port HIC

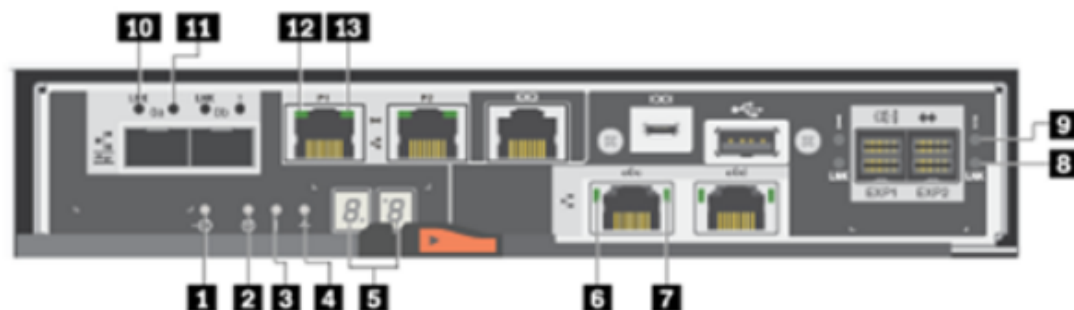


Click the arrow to see different storage model LED layouts.

Scroll down for more information.

6 HIC Host Port Link Status LED (SFP host port, FC, or iSCSI)	Green	<p>The link is up (Fibre Channel).</p> <ul style="list-style-type: none"> If the LED is solid, the link is up, but there is no activity (iSCSI). If the LED is flashing, the link is up and there is activity (iSCSI). If the LED is off, the link is down.
7 HIC Host Port Link attention (SFP host port, FC, or iSCSI)	Amber	The port requires operator attention.
8 SAS expansion port link status LED	Green	Link is established.
	Off	No link is established.
9 SAS expansion port link fault	Amber	Port is degraded (one or more PHYs in the port is down).
	Off	Port is optimal (all PHYs in the port are up or all PHYs in the port are down since the LED is off if no cables are

Rear controller status LEDs



DE2000 controller with dual-port HIC

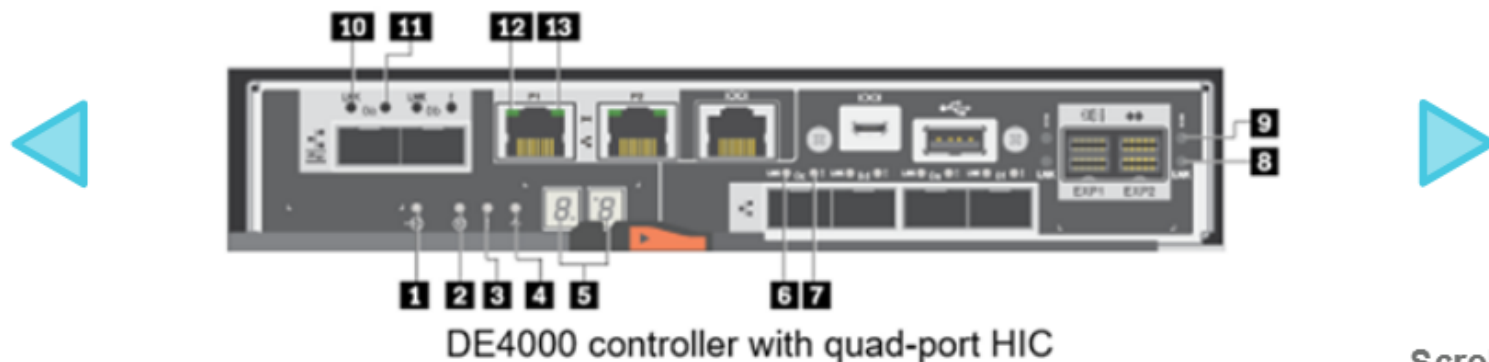


Click the arrow to see different storage model LED layouts.

Scroll down for more information.

10	Base host ports link status	Green	The link is up (Fibre Channel). <ul style="list-style-type: none"> • If the LED is solid, the link is up, but there is no activity (iSCSI). • If the LED is flashing, the link is up and there is activity (iSCSI). • If the LED is off, the link is down.
11	Base host ports link attention	Amber	The port requires operator attention.
12	Ethernet link status LED (left)	Green	Link is established.
		Off	No link is established.
13	Ethernet activity (right)	Green	The link between the management port and the device to which it is connected (such as an Ethernet switch) is up.
		Off	There is no link between the controller and the connected Ethernet port.

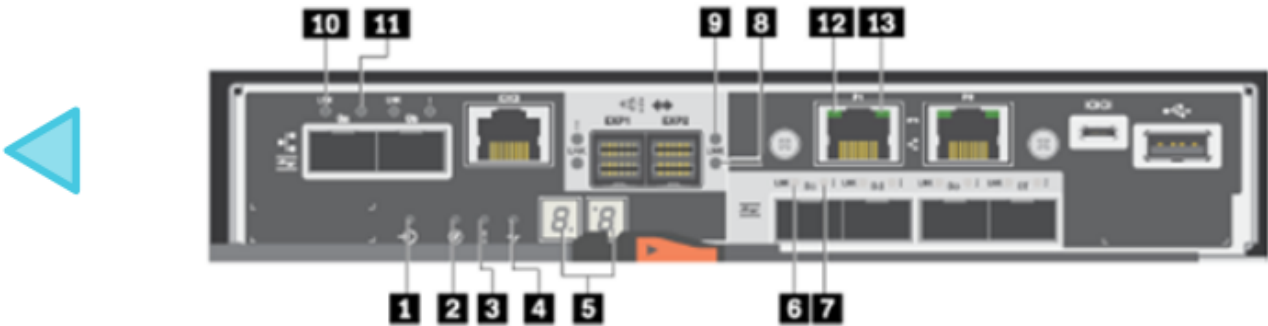
Rear controller status LEDs



Scroll down for more information.

Components	Status	Description
1 Cache active LED	Solid green	The drive has power.
	Flashing green	The drive has power, and I/O is in process.
2 Location LED	Blue	There is an active request to physically locate the controller.
	Off	The drive is working normally.
3 Attention LED	Amber	The controller is faulty and requires operator attention, and the faulty component is serviceable.
	Off	The controller is operating normally.
4 Activity LED	Flashing green	The controller is active.
5 Seven-segment display LED	Character displayed or off	See Seven-segment display LED slide for more details.

Rear controller status LEDs

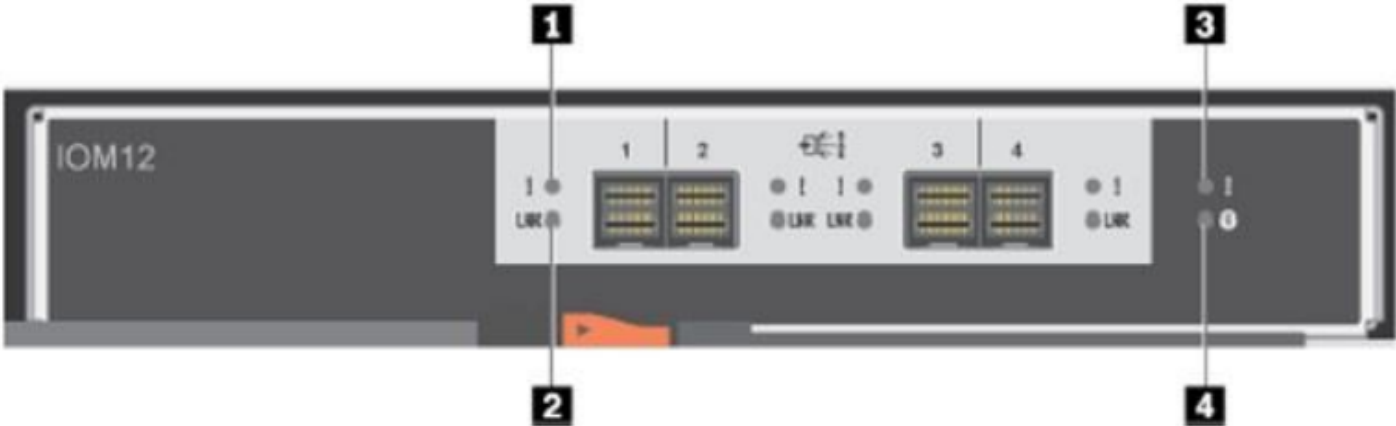


DE6000 controller with quad-port HIC

Scroll down for more information.

Components	Status	Description
1 Cache active LED	Solid green	The drive has power.
	Flashing green	The drive has power, and I/O is in process.
2 Location LED	Blue	There is an active request to physically locate the controller.
	Off	The drive is working normally.
3 Attention LED	Amber	The controller is faulty and requires operator attention, and the faulty component is serviceable.
	Off	The controller is operating normally.
4 Activity LED	Flashing green	The controller is active.
5 Seven-segment display LED	Character displayed or off	See Seven-segment display LED slide for more details.

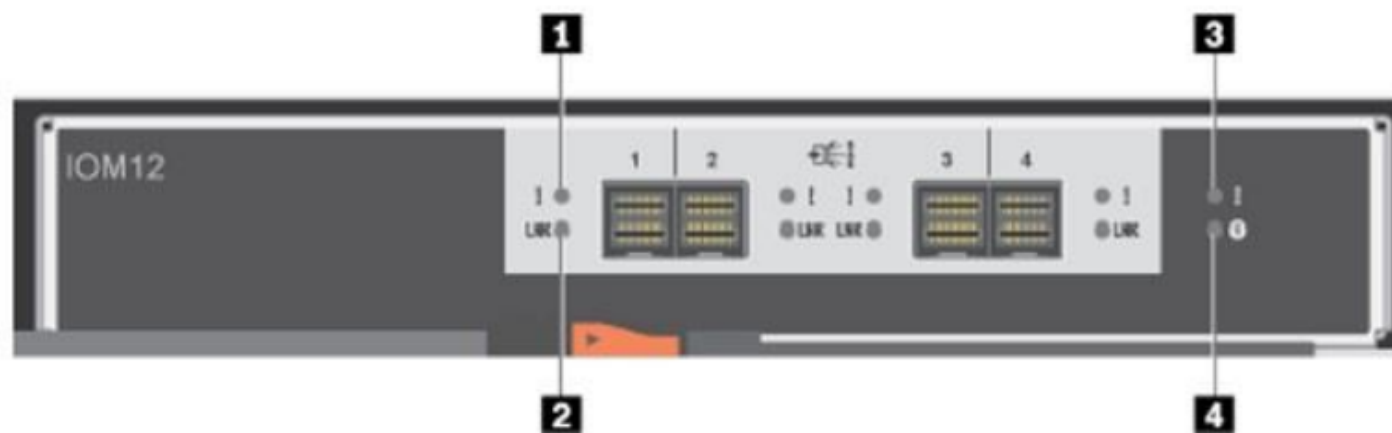
Expansion enclosure I/O module LEDs



Scroll down for more information.

Components	Status	Description
1 SAS port attention LED	Amber	One or more of the links in the port are not working normally.
	Off	The port is optimal and no error has occurred.
2 SAS port link LED	Green	The SAS port established a link (with either a controller or another drive shelf).
	Off	No link is established to another SAS port.
3 IOM attention LED	Amber	The IOM is not working normally.
	Off	The IOM is working normally.

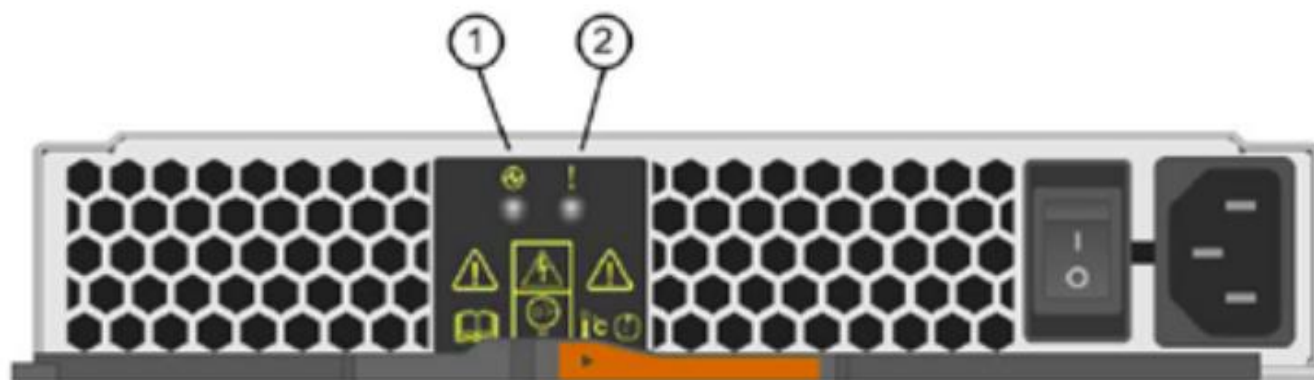
Expansion enclosure I/O module LEDs



Scroll down for more information.

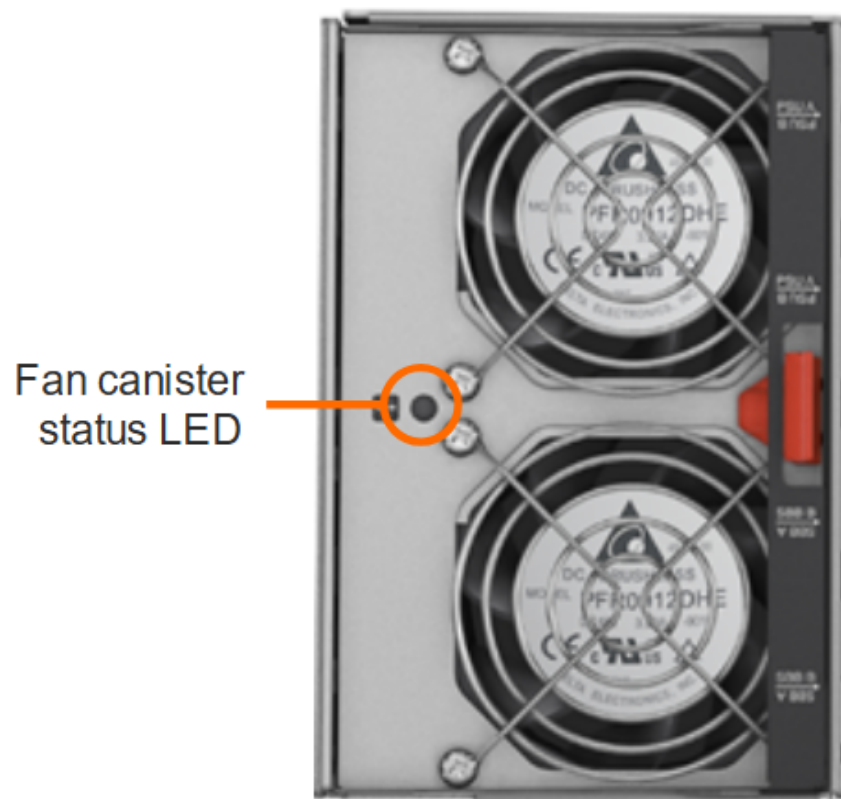
2 SAS port link LED	Green	The SAS port established a link (with either a controller or another drive shelf).
	Off	No link is established to another SAS port.
3 IOM attention LED	Amber	The IOM is not working normally.
	Off	The IOM is working normally.
4 Locate	Blue	The IOM location LED is manually activated to help locating the IOM. The location LED turns off automatically after 30 minutes.
	Off	There is no active request to locate the drive shelf.

Power supply LEDs



Components	Status	Description
① Power LED	Green	The power supply is functioning normally.
	Off	The storage array is shut down or the power supply failed.
② Attention LED	Amber	The power supply requires the service actions.
	Off	The power supply is functioning normally.

Fan canister LED (4U chassis only)



Components	Status	Description
Fan canister status LED	Amber	The fan canister has a fault.
	Off	The fan canister works correctly.

Seven-segment display LEDs on the controller



Components	Status	Description
① Power LED	Blinking green	The LED indicates normal activity.
② Tray ID / Diagnostic code LED	Green	The LED shows the ID of the controller shelf when the controller works correctly. If the controller is not operating normally and the ③ Diagnostic LED is on, the diagnostic code is displayed instead. For the complete diagnostic code list, refer to the <i>Hardware Installation and Maintenance Guide</i> of the storage array.
③ Diagnostic LED	Green	The seven-segment display LED shows the diagnostic code.
	Off	The storage array works correctly.

Critical Major Event Log events

When an error occurs on the storage array, a critical Major Event Log (MEL) event might be generated on the storage controller, and the embedded SNMP agent will deliver a storage array alert trap to all configured trap destinations.

The MEL contains a six-character log number, for example:

MEL_EV_DFC_ALT_LOOP_DIAG_FAIL - 0x150E

The MEL describes the storage failure scenario, such as a hardware failure, or detected incorrect configuration. Refer to the *Hardware Installation and Maintenance Guide - Critical Events Reference* section of the storage array for each MEL description.

InfiniBand configuration problem escalation

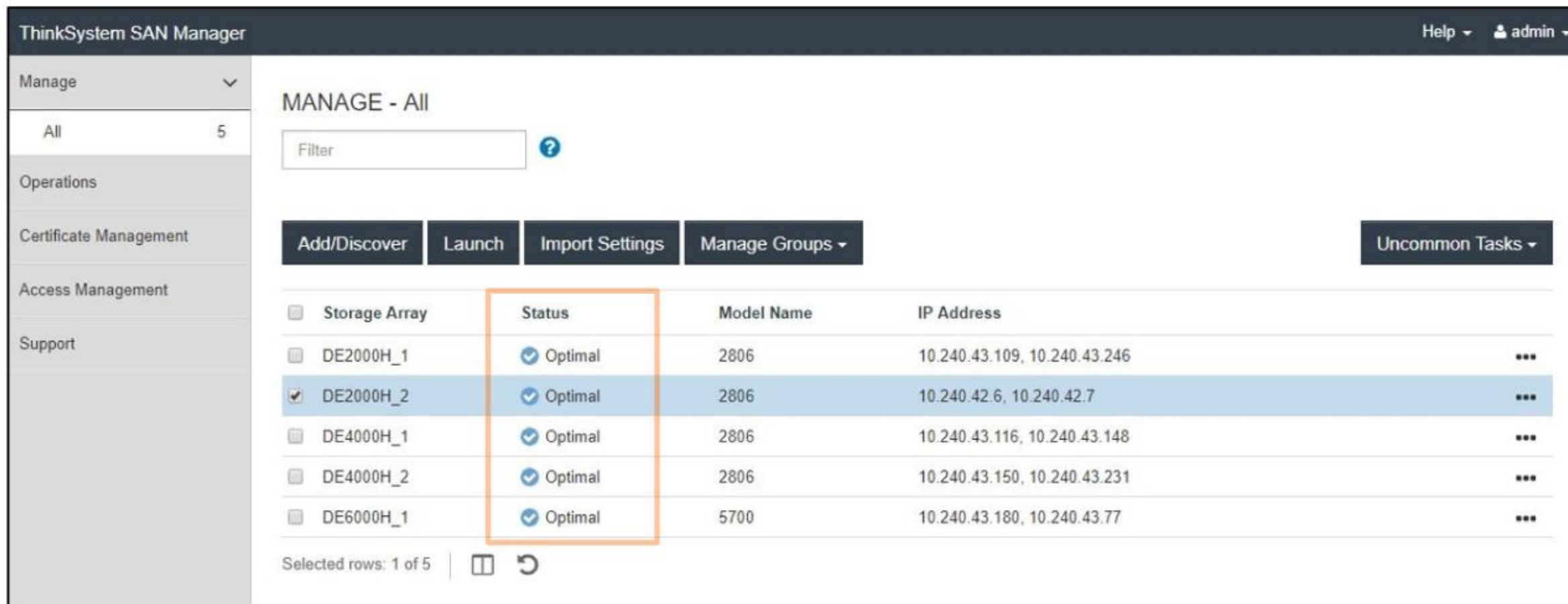
Collect the following logs for DE Series Storage Arrays with InfiniBand configuration problem escalation:

- Support data and trace buffers from ThinkSystem System Manager
- Switch logs (Fabric environment only)
- FFDC logs from Lenovo servers
- Linux logs
 - /etc/multipath.conf
 - /var/log/messages
 - Output of the `dmesg` command

For more information, refer to the InfiniBand SRP Data Collection and Problem Determination on DE Series Storage Arrays article on the [GLOSSE website](#).

Monitoring storage arrays with SAN Manager

If SAN Manager manages the storage arrays, go to the Manage page to check whether the status of the arrays is optimal.



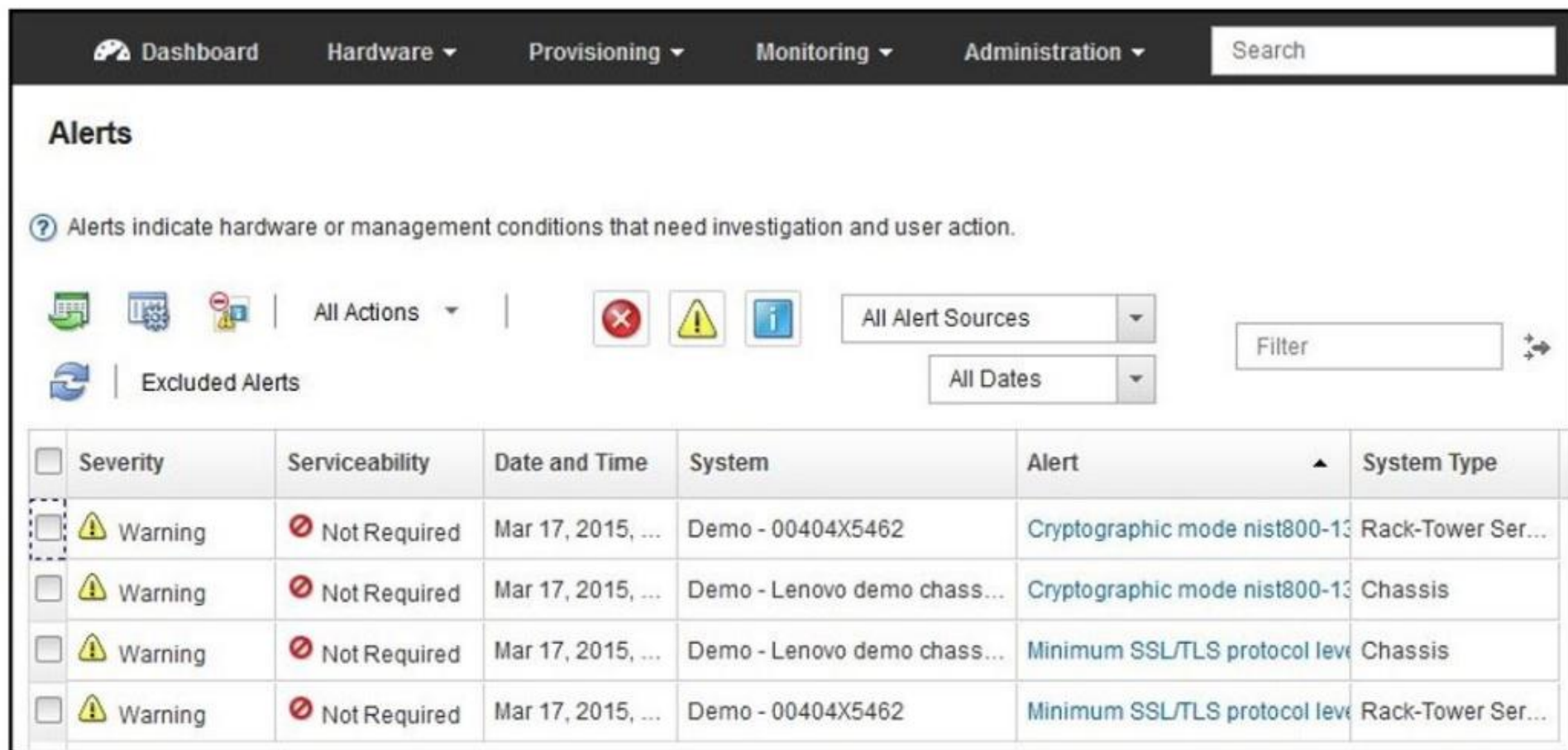
The screenshot displays the ThinkSystem SAN Manager web interface. The left sidebar contains navigation links: Manage, Operations, Certificate Management, Access Management, and Support. The main content area is titled 'MANAGE - All' and includes a search filter box. Below the filter are four action buttons: Add/Discover, Launch, Import Settings, and Manage Groups. An 'Uncommon Tasks' button is also present. A table lists the managed storage arrays, with the 'Status' column highlighted by an orange box. The table shows five arrays, all with an 'Optimal' status. The selected row is DE2000H_2.

Storage Array	Status	Model Name	IP Address
DE2000H_1	Optimal	2806	10.240.43.109, 10.240.43.246
DE2000H_2	Optimal	2806	10.240.42.6, 10.240.42.7
DE4000H_1	Optimal	2806	10.240.43.116, 10.240.43.148
DE4000H_2	Optimal	2806	10.240.43.150, 10.240.43.231
DE6000H_1	Optimal	5700	10.240.43.180, 10.240.43.77

Selected rows: 1 of 5

Monitoring DE Series storage with XClarity Administrator

If XClarity Administrator manages the storage arrays, go to the **Monitoring** → **Alert** page to check for any DE storage warning or error messages.



The screenshot shows the XClarity Administrator interface. The top navigation bar includes links for Dashboard, Hardware, Provisioning, Monitoring, and Administration, along with a search bar. The main section is titled 'Alerts' and includes a help icon and text: 'Alerts indicate hardware or management conditions that need investigation and user action.' Below this, there are filters for 'All Actions' (with icons for error, warning, and info) and 'All Alert Sources'. There is also a 'Filter' input field and an 'Excluded Alerts' link. The main content is a table of alerts.

<input type="checkbox"/>	Severity	Serviceability	Date and Time	System	Alert	System Type
<input type="checkbox"/>	Warning	Not Required	Mar 17, 2015, ...	Demo - 00404X5462	Cryptographic mode nist800-13	Rack-Tower Ser...
<input type="checkbox"/>	Warning	Not Required	Mar 17, 2015, ...	Demo - Lenovo demo chass...	Cryptographic mode nist800-13	Chassis
<input type="checkbox"/>	Warning	Not Required	Mar 17, 2015, ...	Demo - Lenovo demo chass...	Minimum SSL/TLS protocol leve	Chassis
<input type="checkbox"/>	Warning	Not Required	Mar 17, 2015, ...	Demo - 00404X5462	Minimum SSL/TLS protocol leve	Rack-Tower Ser...