Problem determination and troubleshooting

Error report areas and AutoSupport configuration

Lenovo

Problem determination and troubleshooting overview

Before starting the problem determination process, identify:

- Has the system worked properly in the past? Have there been any recent hardware or software changes?
    - If possible, return the system to the condition it was in before the problem occurred.
    - If any hardware, software, or firmware was changed before the problem occurred, reverse those changes if possible.
- Confirm the supported firmware levels on the current system.
- Have there been any location changes?
    - Make sure that the cables are functional and seated correctly.
    - If possible, shut down the system and reseat the server components. These components may vibrate and shift during a relocation.

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Physical single points of failure

A physical single point of failure represents the failure of hardware components that can lead to loss of data access or potential loss of data. The following graphic shows the possible physical single points of failure that might lead to a loss of data access.
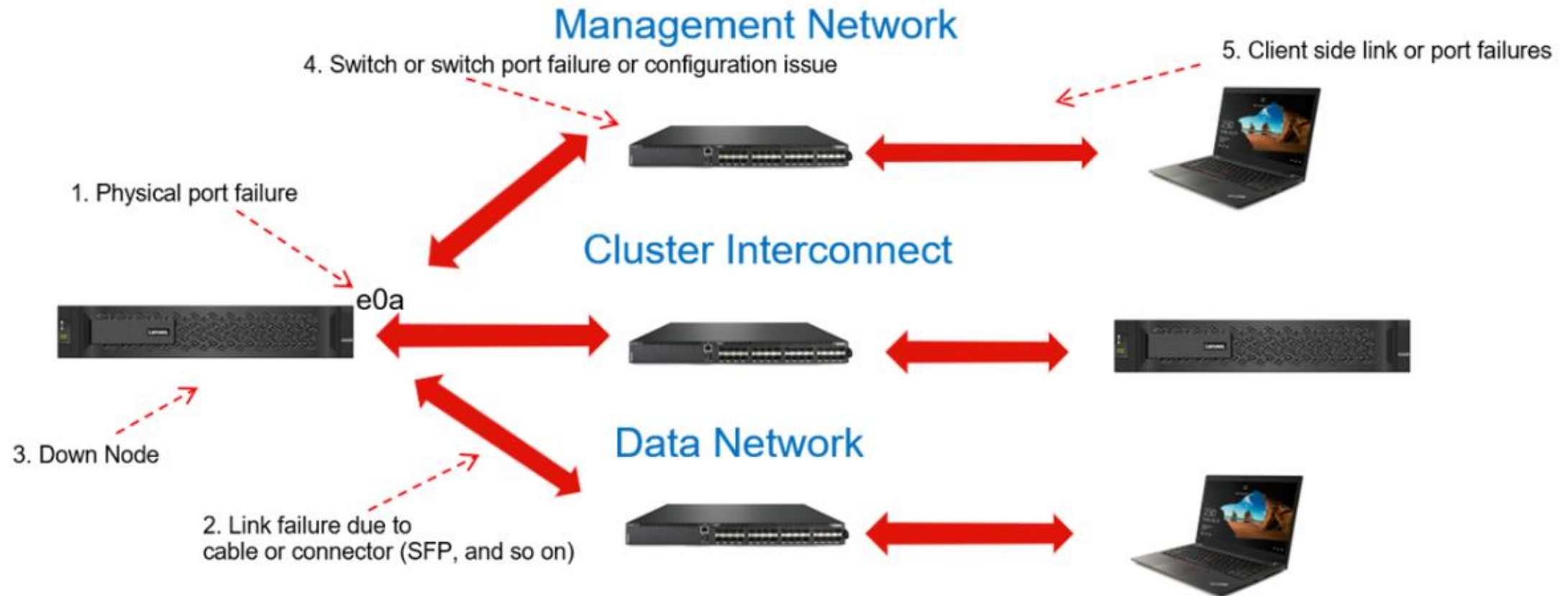
Error report areas

Users can inspect error report areas to collect objective information for the DM Series:
- The status of external LEDs on the system chassis or components
  - Chassis
  - Controller
  - IOM
  - Power supply
  - Disk
- Event messages and system alerts from ThinkSystem Storage Manager
- Use SP to display all available information
- Use CLI commands to gather system health information
- AutoSupport log
  - AutoSupport (ASUP) is an important troubleshooting tool that can be used to service DM Series storage systems. It allows the system to directly send messages to Lenovo technical support. Messages can also be sent to specific contacts, including the customer's internal support organization and support partner.
  - By default, AutoSupport messages are directed to technical support, but you still need to set the correct options and have a valid mail host to have messages sent to your internal support organization. Only the cluster administrator can perform AutoSupport management.

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Chassis front panel LEDs

The front control panel LEDs can be used to determine the operating status of the system.
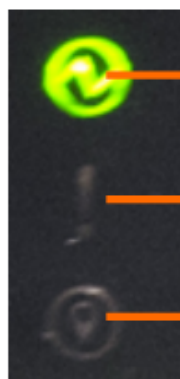
System power LED

System attention LED

Location LED

Depending on your DM Series model, the operator display panel looks different; however, the three LEDs are arranged in the same way.

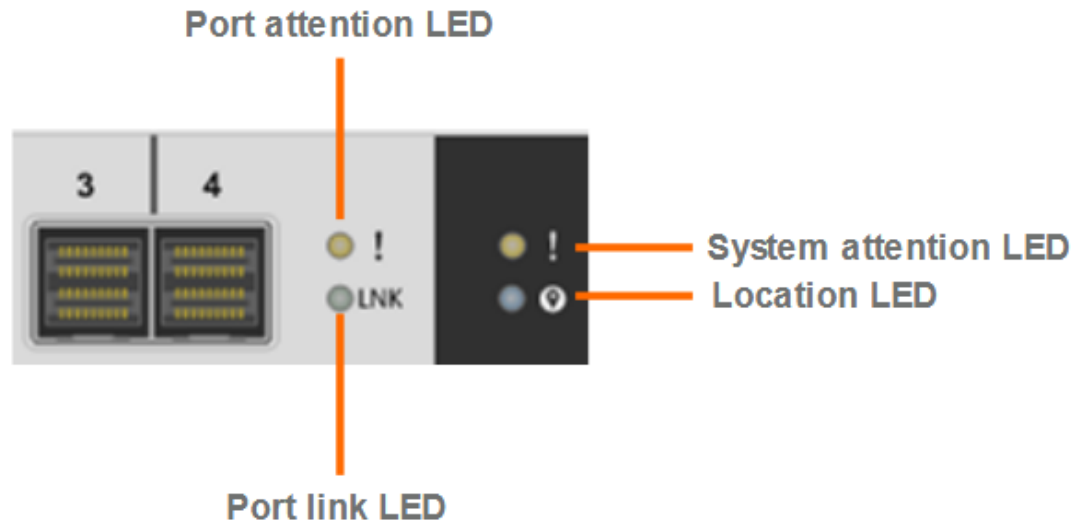| LED name	State	Description
System power LED	Solid green	On: the system is on Off: the system is off
System attention LED	Solid amber	There has been key component failure with the function of one of more FRUs: the expansion enclosure, disk drives, IOM12 modules, controller, or power supplies. Check event messages to determine corrective action to take.
	Blinking amber	The enclosure ID is in a pending state. Power cycle the expansion enclosure for the enclosure ID to take effect.
Location LED	Solid blue	The system administrator activated this LED function to aid in physically locating the expansion enclosure requiring service. **Note:** The location LED on the operator display panel and both IOM12 modules illuminates when this LED function is activated. Location LEDs automatically turn off after 30 minutes.

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Controller LEDs

The controller has four LEDs, and they can be used to determine the operating status of the system. The system power LED, system attention LED, and location LED functions are the same as those on the front panel. The only difference is the NVRAM LED.

System power LED

System attention LED

Location LED
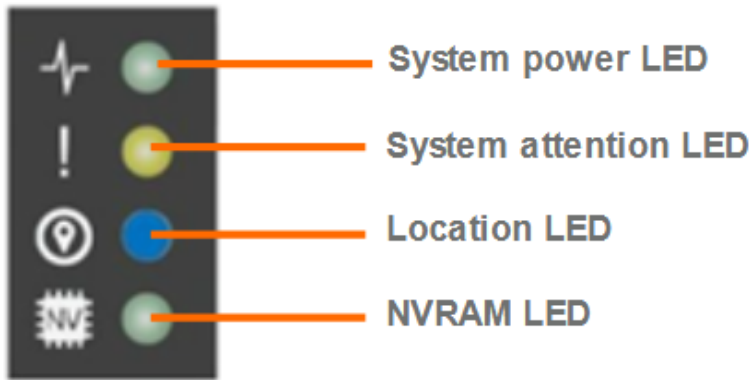
NVRAM LED

LED name	State	Description
NVRAM LED	Solid green	Unwritten data is stored on NVRAM. This typically occurs during an uncontrolled shutdown after ONTAP has successfully booted.
	Blinking green	If power is lost without a clean shutdown, the NVRAM LED blinks until the de-stage is complete, and then the LED turns off.
	Off	The system is running normally.

IOM module LEDs

The LEDs on the IOM module indicate whether the module is functioning normally, whether it is ready for I/O traffic, and whether there are any problems with the hardware. The system attention LED and location LED functions are the same as those on the front panel.
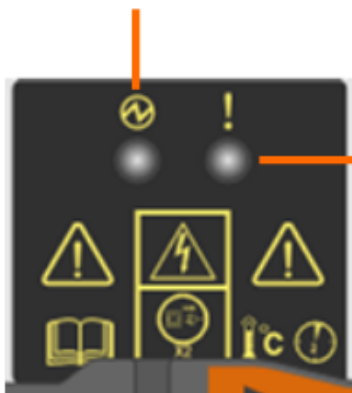

LED name	State	Description
Port link	Solid green	One or more of the four SAS lanes established a link (with either an adapter or another expansion enclosure).
Port attention	Solid amber	Less than all four SAS lanes established a link (with either an adapter or another expansion enclosure). Check event messages to determine corrective action to take.

Power supply LEDs

The LEDs on the power supply indicate whether the power supply is functioning normally or if there are hardware problems.

Port attention LED

Attention LED

LED name	State	Description
Power	Solid green	The power supply is functioning correctly.
	Off	The power supply failed, the ac switch is turned off, the ac power cord is not properly installed, or electricity is not being properly supplied to the power supply. Check event messages to determine corrective action to take.
Attention	Solid amber	An error occurred with the function of the power supply. Check event messages to determine corrective action to take.

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Disk drive LEDs

The LEDs on the disk drive indicate whether it is functioning normally or if there are hardware problems.

Activity LED

Attention LED

900GB

LED name	State	Description
Activity	Solid green	The disk drive has power.
	Blinking green	The disk drive has power and I/O operations are in progress.
Attention	Solid amber	An error occurred with the function of the disk drive. Check event messages to determine corrective action to take.

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Events and system alerts from ThinkSystem Storage Manager

Events are notifications that are generated automatically when a predefined condition occurs or when an object crosses a threshold. These events enable you to take action to prevent issues that can lead to poor performance and system unavailability. Users can decide what kinds of severity level event message they want to receive. The severity levels are as follows:

- EMERGENCY (the cluster is unusable)
- ALERT (action must be taken immediately to prevent system failure)
- ERROR
- NOTICE (a normal but significant condition has occurred)
- INFORMATIONAL
- DEBUG

Each event message consists of the following elements:

- Message name
- Sequence Number
- Description
- Corrective action, if applicable

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Accessing event messages in ThinkSystem Storage Manager

Log in to ThinkSystem Storage Manager, and then select **Events & Jobs –> Events**. The events are listed in chronological order.

Select severity level

The **Details** section contains a description of a selected event and corrective actions.

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Accessing system alerts in ThinkSystem Storage Manager

The **System Alerts** page displays the number of unresolved alerts that are generated for each subsystem in the system. Alerts are generated based on the status of the following subsystems:

- Volumes
- LUNs
- Qtrees
- Network Interfaces
- SVMs
- Aggregates
- Disks
- Ethernet Ports

Resolving system alerts in ThinkSystem Storage Manager

When there is a system alert, select the alert and check the **Cause Description** and **Possible Effect**.
Then, follow the **Corrective Actions** to resolve the issue.

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Using Service Processor to display all available information

Service Processor (SP) is a system-independent computer within the system controller module. It functions even when the system is offline as long as the chassis has power. It runs its own operating system, so it is independent of the ONTAP software. These capabilities make SP a primary system tool for servicing and troubleshooting.

Click each step in turn to see the procedure

Step **1**—**2**

Using Service Processor to display all available information

Connecting to SP

You can connect to SP through a local serial console session or a network SSH session.
- Serial console:
  - To switch to SP, press **Ctrl+G** in the ONTAP CLI or at the LOADER prompt.
  - To switch back to the ONTAP CLI or the LOADER prompt, press **CTRL+D**.
- SSH session:
  - Use an SSH session to connect to the SP's IP address and use the cluster admin's login credentials.
  - `ssh admin@<SP_IP_address>`, or
  - `ssh <SP_IP_address> -l admin`

You can use the `system service-processor show` command from the local console to get the SP's IP address. Click here to view the example.

Step ①—❷ 🗎

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Using Service Processor to display all available information

Service-related SP commands

The following commands are useful for collecting data and perform troubleshooting:

- To list all system FRUs and their IDs: `Click here to view the sample output`
  - ○ `SP> system fru list`
- To display product information for a specific FRU: `Click here to view the sample output`
  - ○ `SP> system fru show fru_ID`
- To display the FRU data history log (requires advanced privileges):
  - ○ `SP> priv set advanced`
  - ○ `SP*> system fru log show`
- To display the status of environment sensors:
  - ○ `SP> system sensors show`
- To display the status details of a specific sensor:
  - ○ `SP> system sensor get sensor_name`
- To power on, power off, power cycle a system (use only when ONTAP is unavailable):
  - ○ `SP> system power {on|off|cycle}`

Step ①—② 🗎

Lenovo
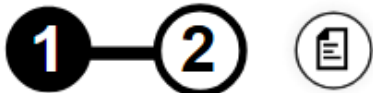
Using Service Processor to display all available information

`system fru list`

```
SP> system fru list
   FRU ID            Name

   =================================

      0             Controller

      1             Midplane1

      2             Midplane2

      3             Fan1

      4             Fan2

      5             Fan3

      6             PSU1

      7             PSU3
```

Step ① — ②

Using Service Processor to display all available information

```
system fru show <fru_id>
```

```
SP> system fru show 3

'Fan1' inventory data:


*** Product Info Area ***

Mfg name            Lenovo

Product Name        FAN

Product PartNum     441-00058

Product Version     A1

Product SerNum      031629000553
```

Step ❶—② 🗎

Use CLI commands to gather information

Use the following CLI commands to gather detailed information from the healthy node. These commands should be issued in the clustershell at the advanced privilege level.

```
::> set –privilege advanced (or set adv)
```
The following command prints the history of storage controller's memory errors since boot:
```
::*> system node show-memory-errors
```
Sample output

The following command displays the sensor state that is abnormal:
```
::*> system node environment sensors show –state !normal
```
Sample output

The following command displays the sensor state on the specified node:
```
::*> system node environment sensors show –node <nodename>
```
Sample output

The following command displays the storage shelf information that is in error status.
```
::*> storage shelf show –errors
```
Sample output

Lenovo

system node show-memory-errors

```
a300::*> system node show-memory-errors
Correctable ECC Memory Errors:

Node: a300-1

DIMM        CECC   Multiple Err
Name        Count  Same Address
-------     -----  ------------
DIMM-1         0   false
DIMM-2         0   false
DIMM-3         0   false
DIMM-4         0   false
Node: a300-2

DIMM        CECC   Multiple Err
Name        Count  Same Address
-------     -----  ------------
DIMM-1         0   false
DIMM-2         0   false
DIMM-3         0   false
DIMM-4         0   false
8 entries were displayed.
```

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`system node environment sensors show -state !normal` ✕

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```
a300::*> system node environment sensors show -state !normal
There are no entries matching your query.

a300::*>
```

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`system node environment sensors show -node <nodename>` ✖

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```
a300::*> system node environment sensors show -node a300-1
Node Sensor              State  Value/Units Crit-Low Warn-Low Warn-Hi Crit-Hi
---- --------------------- ------ ----------- -------- -------- ------- -------
a300-1
     PSU2                 normal
                                  GOOD
     PSU1                 normal
                                  GOOD
     Fan3                 normal
                                  GOOD
     Fan2                 normal
                                  GOOD
     Fan1                 normal
                                  GOOD
     SP Status            normal
                                  IPMI_HB_OK
     mSATA Status         normal
                                  OK
     mSATA Pres           normal
                                  PRESENT
     CPU0 Temp Margin     normal
                                  -61 C        -        -       -10      0
     In Flow Temp         normal
                                  30 C         0        5        50     55
     Out Flow Temp        normal
                                  37 C         0        5        65     75

Node Sensor              State  Value/Units Crit-Low Warn-Low Warn-Hi Crit-Hi
---- --------------------- ------ ----------- -------- -------- ------- -------
a300-1
     PCI Slot Temp        normal
                                  36 C         0        5        60     70
     Smart Bat Temp       normal
                                  33 C         0        5        60     70
     CPU0 Error           normal
                                  NORMAL
     CPU0 Therm Trip      normal
                                  NORMAL
     CPU0 Hot             normal
                                  NORMAL
     Memory0 Hot          normal
                                  NORMAL
```

Partial output

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Lenovo

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storage enclosure show -errors

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```
a300::*>
a300::*> storage shelf show -errors
There are no entries matching your query.

a300::*> storage shelf show

                                                    Module Operational
        Shelf Name Shelf ID Serial Number   Model    Type   Status
        ------------------ -------- ------------------ ------------ ------ -----------
                  1.0          0 SHFGD1822000106 DS224-12   IOM12  Normal

a300::*>
```

Commands to check system alerts

Use the following CLI commands to view system health alerts. These commands can be issued in the clustershell at the admin privilege level.

The following command displays the alerts that are compromising the system's health:

`::> system health alert show` **Sample output**

Take corrective action to resolve the problem as described by the `Corrective Actions` field in the alert.

Use the following command to verify that the system health status is OK after you have taken corrective action:

`::> system health status show` **Sample output**

Lenovo

system health alert show

```
cluster1::> system health alert show
                    Node: node1
                Resource: Shelf ID 2
                Severity: Major
                    Tags: quality-of-service, nondisruptive-upgrade
          Probable Cause: Disk shelf 2 does not have two paths to controller
                          node1.
         Possible Effect: Access to disk shelf 2 via controller node1 will be
                          lost with a single hardware component failure (e.g.
                          cable, HBA, or IOM failure).
       Corrective Actions: 1. Halt controller node1 and all controllers attached to disk shelf 2.
                          2. Connect disk shelf 2 to controller node1 via two paths following the rules in the Universal SAS and ACP Cabling Guide.
                          3. Reboot the halted controllers.
                          4. Contact support personnel if the alert persists.
```

system health status show

```
cluster1::> system health status show
Status
---------------
ok

cluster1::>
```

Network troubleshooting commands in the clustershell

Use the following CLI commands to verify networking issue. These commands can be issued in the clustershell at the admin privilege level.

- To show all logical interfaces (LIFs) in the cluster:

  `::> network interface show` Sample output

- To show the failover information of all the LIFs:

  `::> network interface show -failover` Sample output

- To show all ports in the cluster – the command output indicates any inactive links and lists the reason for the inactive status: .

  `::> network port show` Sample output

- To trace the route that the IPv4 packets take to a network node:

  `::> network traceroute –node <nodename> -destination <Remote Internet address> -m <integer>` Sample output

- To test whether a node can reach hosts in the network:

  `::> network ping -node <nodename> -destination <Remote Internet address>` Sample output

Lenovo

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network interface show ✕

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```
cluster1::> network interface show
            Logical     Status      Network              Current         Current  Is
  Vserver   Interface   Admin/Oper  Address/Mask         Node            Port     Home
  --------- ----------- ----------- -------------------- --------------- -------- ----
  cluster1

            cluster_mgmt
                        up/up       192.0.2.1/192        node0           e0M      true
            node0_mgmt1
                        up/up       192.0.2.2/192        node0           e0M      true
            node1_mgmt1
                        up/up       192.0.2.3/192        node1           e0M      true
  Cluster
            node0_clus1
                        up/up       192.0.2.66/192       node0           e0a      true
            node0_clus2
                        up/up       192.0.2.67/192       node0           e0b      true
            node1_clus1
                        up/up       192.0.2.68/192       node1           e0a      true
            node1_clus2
                        up/up       192.0.2.69/192       node1           e0b      true
```

output

Lenovo

Ne

network interface show -failover

```
cluster1::> network interface show -failover
            Logical          Home                  Failover          Failover
Vserver     Interface        Node:Port             Policy            Group
--------    --------------   -------------------   --------------    -----------
cluster1
            cluster_mgmt     node0:e0M             broadcast-domain-wide
                                                                     Default
                             Failover Targets: node0:e0M,
                                               node0:e0d,
                                               node0:e0e,
                                               node0:e0f,
                                               node1:e0M,
                                               node1:e0d,
                                               node1:e0e,
                                               node1:e0f
            node0_mgmt1      node0:e0M             local-only        Default
                             Failover Targets: node0:e0M,
                                               node0:e0d,
                                               node0:e0e,
                                               node0:e0f
            node1_mgmt1      node1:e0M             local-only        Default
                             Failover Targets: node1:e0M,
                                               node1:e0d,
                                               node1:e0e,
                                               node1:e0f
Cluster
            node0_clus1      node0:e0a             local-only        Cluster
                             Failover Targets: node0:e0a,
                                               node0:e0b
            node0_clus2      node0:e0a             local-only        Cluster
                             Failover Targets: node0:e0b,
                                               node0:e0a
            node1_clus1      node1:e0a             local-only        Cluster
                             Failover Targets: node1:e0a,
                                               node1:e0b
            node1_clus2      node1:e0a             local-only        Cluster
                             Failover Targets: node1:e0b,
                                               node1:e0a
```

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network port show

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```
cluster1::> network port show

                                                              Speed (Mbps)
Node      Port    IPspace    Broadcast Domain    Link    MTU    Admin/Oper
------    ------  ---------  ----------------    -----  ------- -------------
node0
          e0a     cluster    clus                up      9000   1000/1000
          e0b     cluster    clus                up      9000   1000/1000
          e0c     default    data1               up      1500   1000/1000
          e0d     default    data1               up      1500   1000/1000
          e0M     default    mgmt                up      1500   1000/1000
node1
          e0a     cluster    clus                up      9000     10/1000
          e0b     cluster    clus                up      9000     10/1000
          e0c     default    data2               up      1500     10/1000
          e0d     default    data1               up      1500     10/1000
          e0M     default    mgmt                up      1500   1000/1000
node2
          e0a     cluster    clus                up      9000   auto/1000
          e0b     cluster    clus                up      9000   auto/1000
          e0c     default    data2               up      1500   auto/1000
          e0d     default    data1               up      1500   auto/1000
          e0M     default    mgmt                up      1500   auto/1000
node3
          e0a     cluster    clus                up      9000   auto/1000
          e0b     cluster    clus                up      9000   auto/1000
          e0c     default    data2               up      1500   auto/1000
          e0d     default    data2               up      1500   auto/1000
          e0M     default    mgmt                up      1500   auto/1000
```

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```
network traceroute -node <nodename> -destination
<Remote Internet address> -m <integer>
```

Use the `-m (maxttl) <integer>` parameter to specify the maximum number of hops (time-to-live) setting used by outgoing probe packets. The default is 30 hops.

```
cluster1::> traceroute -node node1 -destination 10.98.16.164 -maxttl 5
   1    10.68.208.1 <10.68.208.1> 0.307 ms 293 ms 305 ms
   2    152.164.13.205 <152.164.13.205> 3.754 ms 3.722 ms 3.981 ms
   3    68.137.122.222 <68.137.122.222> 25.603 ms 24.947 ms 24,565 ms
   4    * * *
   5    * * *

traceroute to 10.98.16.164, 5 hops max, 52 byte packets
```

for

> –

output

Ne

```
network ping -node <nodename> -destination <Remote
Internet address>
```

```
cluster1::> network ping -node xena -destination 10.98.16.164
(network ping)
10.98.16.164 is alive
```

AutoSupport configuration

Work through the following procedure to configure AutoSupport.

Click each step in turn to see the procedure

Step ①—②—③—④—⑤

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AutoSupport configuration

Log in to ThinkSystem Storage Manager, and then click the "gear" icon in the upper panel.

Step ①—②—③—④—⑤

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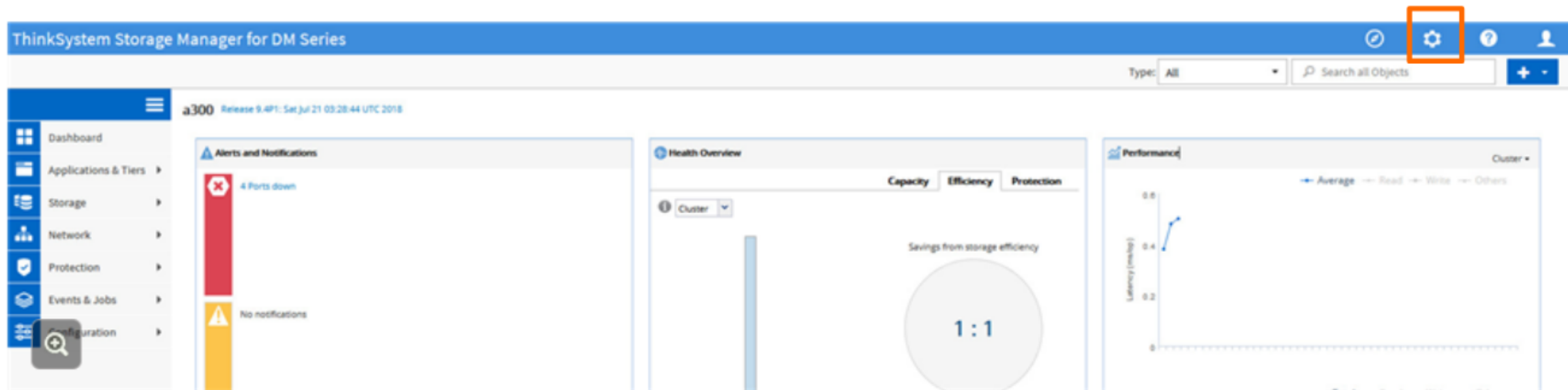
AutoSupport configuration

Select **AutoSupport** from the left panel.

Step ①──②──③──④──⑤

AutoSupport configuration

🏠 **Home**

Management
Users
Roles

Setup
General
AutoSupport
Date and Time
LDAP
SNMP

AutoSupport

| ✅ Enable | ❌ Disable | ✏️ Edit | ▶ Test | 🖥 AutoSupport Request ▼ | 🔄 Refresh |

Node Name	▼	Configuration Enabled
a300-1		true
a300-2		true

Select **Edit** to open the **Edit AutoSupport Settings** window.

Step ➊—➋—③—➍—➎

Lenovo
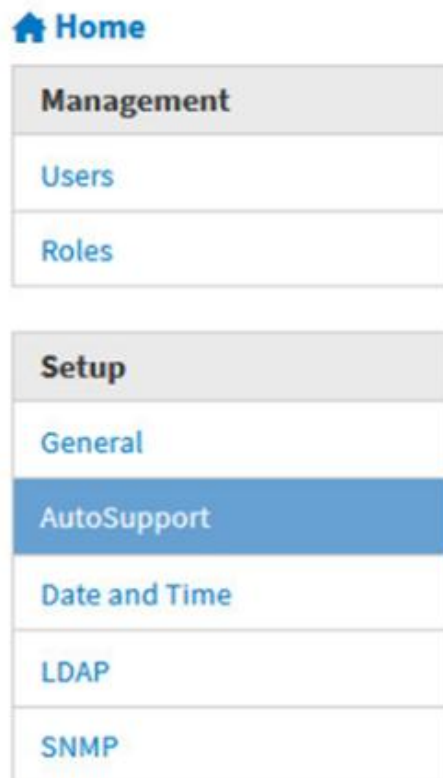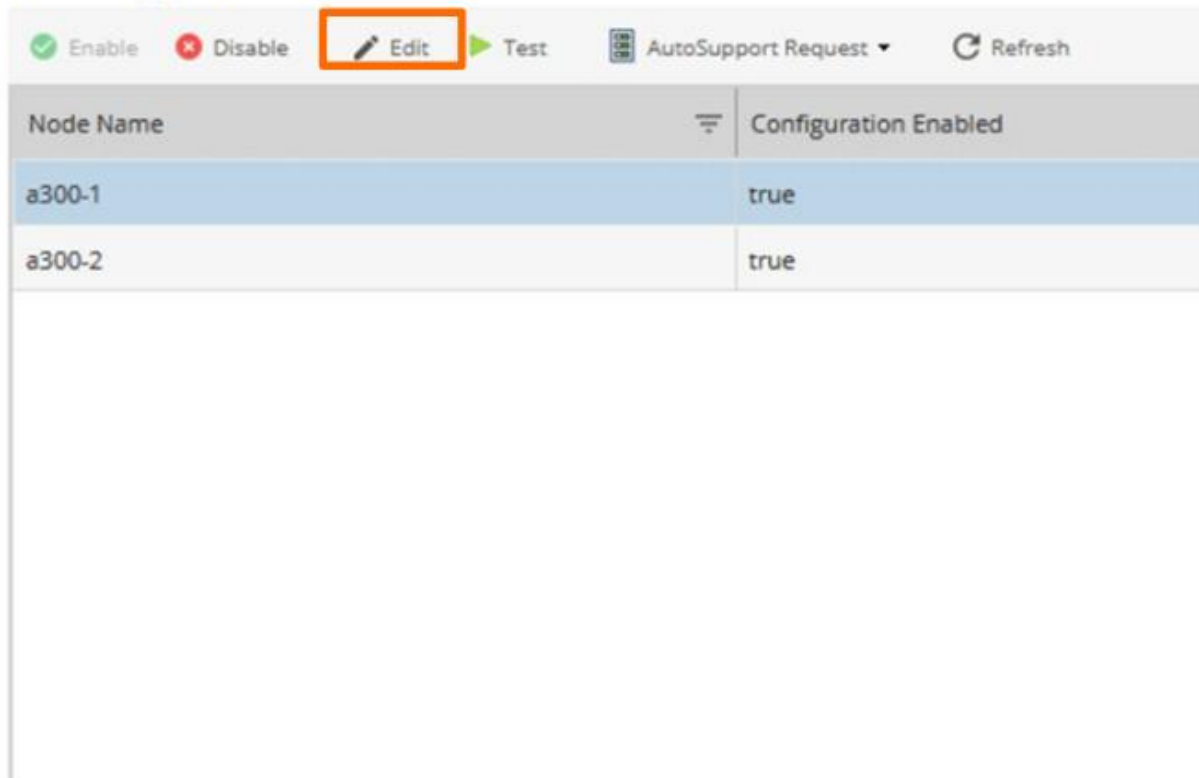
AutoSupport configuration

In the **Email Recipient** section:

- Postmaster is the default setting for the **From Email Address** field. The format is Postmaster@xxx, where the xxx is the name of the system.
- In the **Email Recipients** field, select **Add** to define both the list of recipients who will receive AutoSupport email notifications and the message content.
- In the **Mail Hosts** section, select **Add** to define up to five mail hosts by IP or name. The specified mail hosts will be used to send AutoSupport messages.

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

AutoSupport configuration

In the **Others** section:

- You can select HTTP, HTTPS, or SMTP in the **Transport Protocol** field.

  - AutoSupport uses SMTP (Port 25), HTTP (Port 80), or the default protocol HTTPS (Port 443) to transmit AutoSupport messages.
  - It is useful to use SMTP when troubleshooting transmission of ASUP notifications.

- To use HTTP or HTTPS to send AutoSupport messages, configure an HTTP or HTTPS proxy.

Step ①—②—③—④—⑤

Lenovo
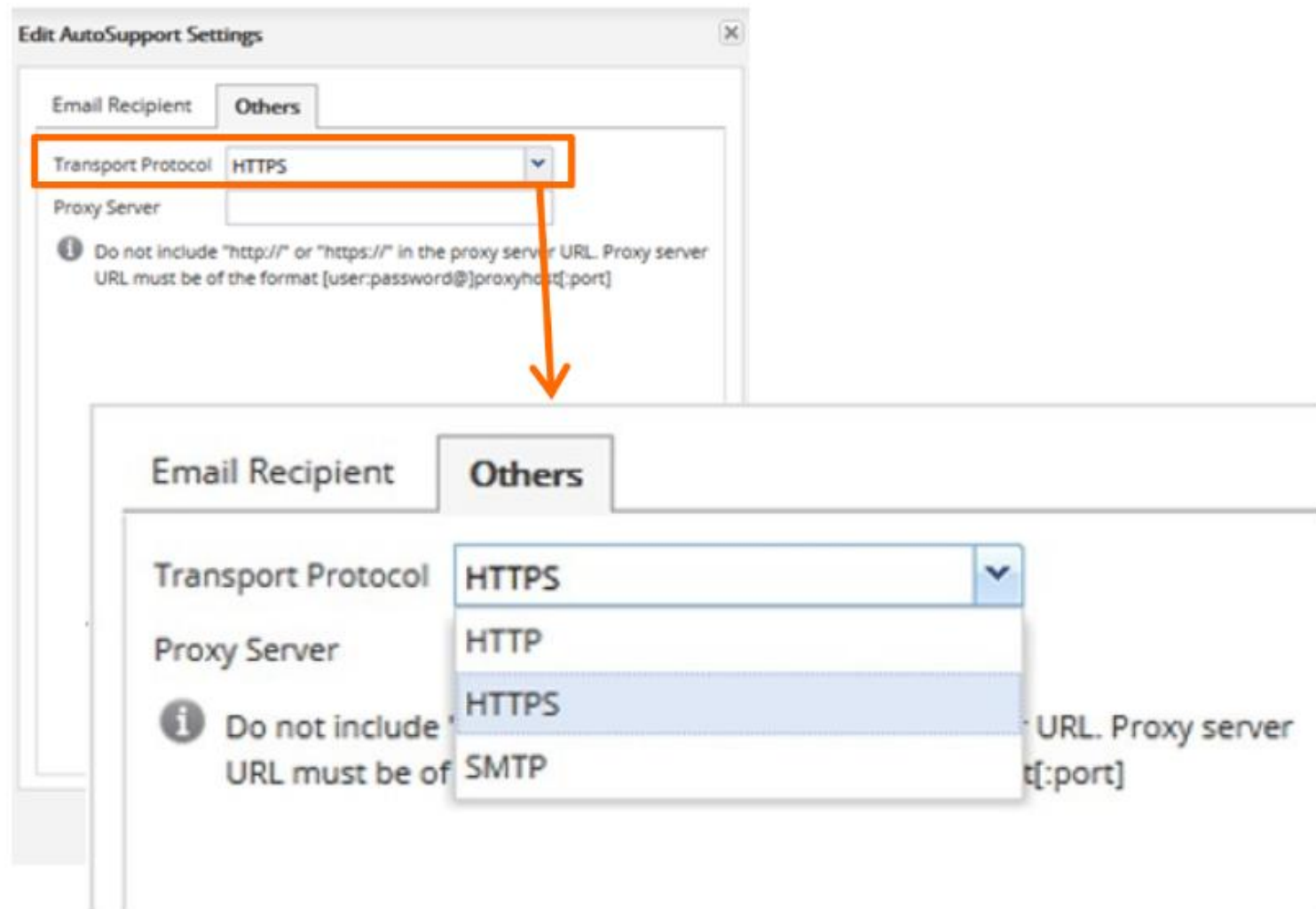
Testing AutoSupport

In the AutoSupport window, you can select **Test** to tell the AutoSupport feature to send an AutoSupport notification immediately.
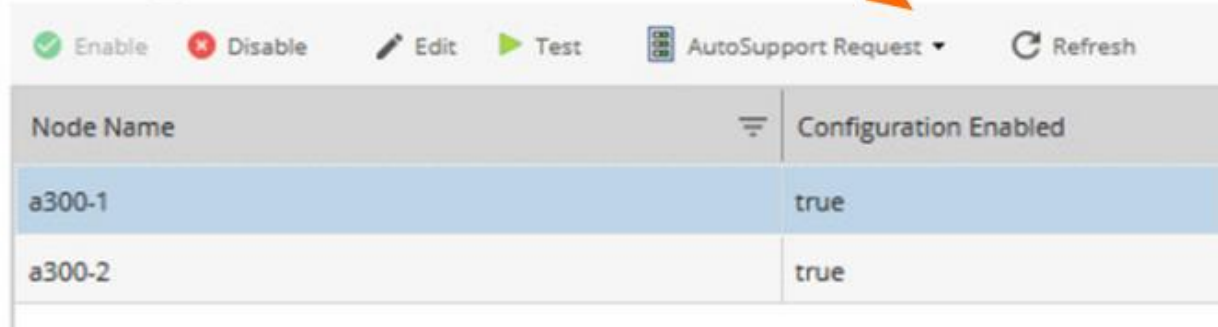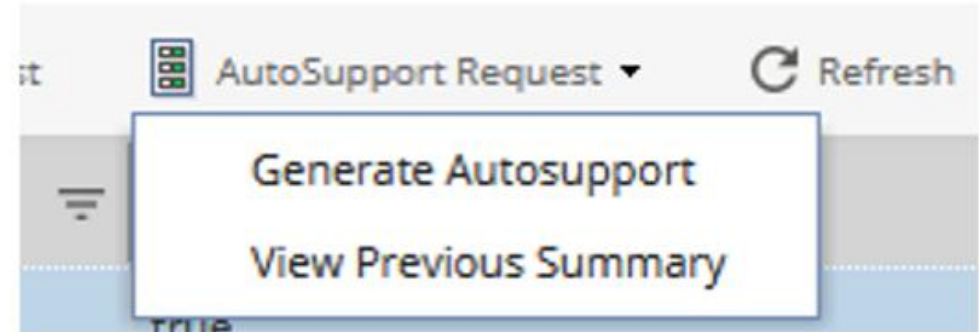
Forcing AutoSupport
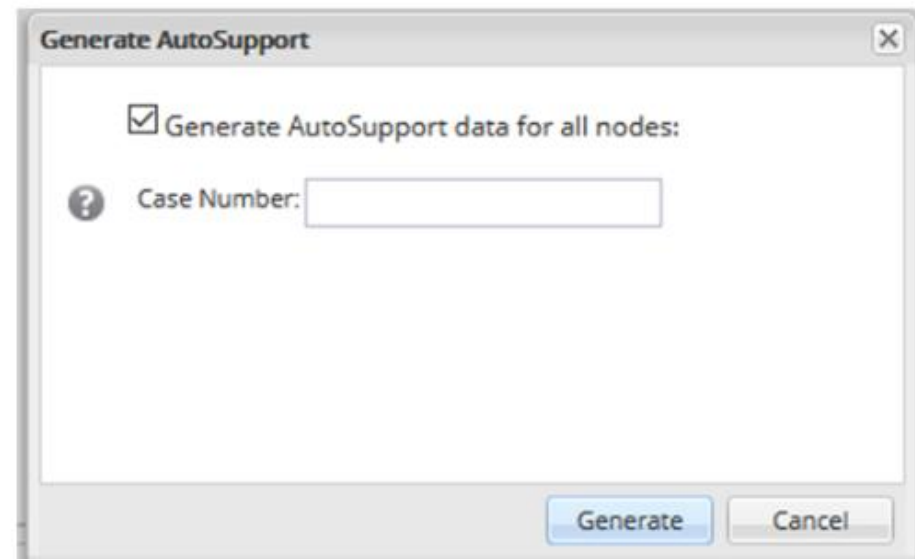
Servicers can force AutoSupport by selecting **AutoSupport Request –> Generate AutoSupport**, filling in the case number in the **Case Number** field, and then selecting **Generate**.

AutoSupport summary
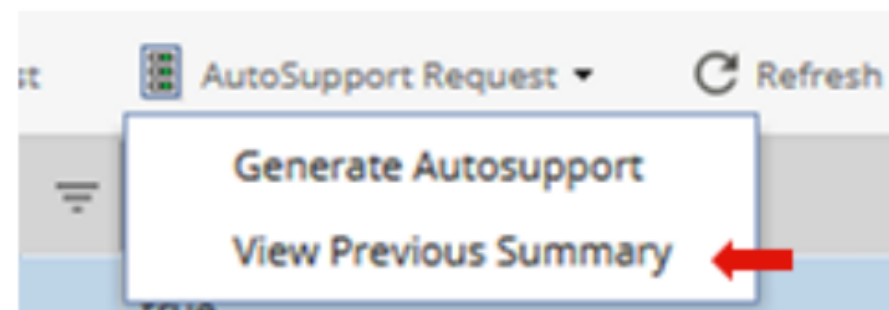
ThinkSystem Storage Manager enables you to check the status and details of all the previous AutoSupport data in order to review the data that has been sent to technical support. You can also check the information to understand the health and performance of your storage system. Select **AutoSupport Request –> View Previous Summary**. The Autosupport data for all the nodes will be displayed.

Troubleshooting AutoSupport

The following commands can be used to verify and troubleshoot any issues related to the AutoSupport configuration and delivery.

- Use the `system node autosupport check show` command to display the overall status of the AutoSupport subsystem, such as the status of AutoSupport HTTP or HTTPS destination, AutoSupport SMTP destinations, AutoSupport OnDemand Server, and AutoSupport configuration.
- Use the `system node autosupport check show-details` command to display a detailed status of the AutoSupport subsystem, such as detailed descriptions of errors and the corrective actions.

Refer to the [Troubleshooting AutoSupport](#) Web site for more details.

Click the buttons to see sample outputs.

```
system node autosupport check show
```

```
system node autosupport check show-details
```

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system node autosupport check show ✕

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Cli

```
a300::> system node autosupport check show
                              On Demand
Node                HTTP/HTTPS Server        SMTP       Configuration
----------------    ---------- ----------    ---------- -------------
a300-1               failed     failed        failed     failed
Warning: status not "ok" for at least one check. Use the "check
show-details" command for additional information.

a300-2               failed     failed        failed     failed
Warning: status not "ok" for at least one check. Use the "check
show-details" command for additional information.

2 entries were displayed.
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system node autosupport check show-details

```
a300::> system node autosupport check show-details
Node:  a300-1
Category:  http-https
          Component:  http-put-destination
             Status:  failed
             Detail:  Delivery of all AutoSupport messages to your vendor's
                      technical support destinations is disabled.
   Corrective Action:  Run "system node autosupport modify -support enable
                       -node <node name>" to enable sending AutoSupport
                       messages to your vendor's technical support destinations.
          Component:  http-post-destination
             Status:  failed
             Detail:  Delivery of all AutoSupport messages to your vendor's
                      technical support destinations is disabled.
   Corrective Action:  Run "system node autosupport modify -support enable
                       -node <node name>" to enable sending AutoSupport
                       messages to your vendor's technical support destinations.
Category:  smtp
          Component:  mail-server
             Status:  failed
             Detail:  Delivery of all AutoSupport messages to your vendor's
                      technical support destinations is disabled.
   Corrective Action:  Run "system node autosupport modify -support enable
                       -node <node name>" to enable sending AutoSupport
                       messages to your vendor's technical support destinations.
Node:  a300-1
Category:  on-demand
          Component:  ondemand-server
             Status:  failed
             Detail:  Delivery of all AutoSupport messages to your vendor's
                      technical support destinations is disabled.
   Corrective Action:  Run "system node autosupport modify -support enable
                       -node <node name>" to enable sending AutoSupport
                       messages to your vendor's technical support destinations.
Category:  configuration
          Component:  configuration
             Status:  failed
             Detail:  Delivery of all AutoSupport messages to your vendor's
                      technical support destinations is disabled.
   Corrective Action:  Run "system node autosupport modify -support enable
                       -node <node name>" to enable sending AutoSupport
                       messages to your vendor's technical support destinations.
```

Summary

This course enabled you to:
- Describe ThinkSystem DM Series storage systems and their components
- List the features and specifications
- Describe how to cable DM Series storage systems
- Explain the power on and power off procedures
- Explain how to connect the console and use command lines
- Describe how to replace FRUs
- Describe how to update firmware using the CLI and ThinkSystem Storage Manager
- Describe the problem determination steps and explain how to troubleshoot issues with ThinkSystem DM Series storage systems

Lenovo