

# Servicing the Lenovo ThinkSystem SR590 server



ES71791

November 2017



---

# Prerequisites

ES41758 – ThinkSystem servers architecture introduction

<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES41758>

ES51757 – Introducing ThinkSystem tools

<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES51757>

ES41759 – ThinkSystem problem determination

<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES41759>

ES51780 – Servicing the ThinkSystem storage controller

<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES51780>



---

# Objectives

After completing the course, you will be able to:

- Describe the Lenovo ThinkSystem SR590 server and components.
- List the Lenovo ThinkSystem SR590 server specifications.
- Describe the Lenovo ThinkSystem SR590 server configurations.
- Describe the problem determination steps and explain how to troubleshoot the ThinkSystem SR590.

# ThinkSystem SR590 product overview

The Lenovo ThinkSystem SR590 is a 2U dual-socket rack server. The SR590 supports Intel Xeon processors with Intel C620 series chipsets, hot-swap fans, NVMe drives, and up to 1 TB memory capacity. The SR590 is designed to handle proxy caching, cloud service, virtualization, media streaming, and database-driven Web service tasks.

The SR590 has two machine types with different warranties:

Machine type	Warranty
7X98	One year
7X99	Three years





# ThinkSystem SR590 product overview

Specification	Description
Form factor	2U
Processor	Up to two Intel Xeon Bronze, Silver, Gold, or Platinum processors: <ul style="list-style-type: none"><li>• Up to 26 cores</li><li>• Up to 3.6 GHz core speeds (4 cores)</li><li>• Two UPI links up to 10.4 GT/s each</li><li>• Up to 35.75 MB cache</li><li>• Up to 2666 MHz memory speed</li></ul>
Chipset	Intel C622
Memory slots	16 DIMM slots
Memory capacity	<ul style="list-style-type: none"><li>• Minimum: 8 GB</li><li>• Maximum: 512 GB with RDIMMs, or 1 TB with LRDIMMs</li><li>• DDR4 2666 MHz</li></ul>
Drive bays	<ul style="list-style-type: none"><li>• Up to eight 3.5-inch simple-swap SATA drives</li><li>• Up to eight 3.5-inch hot-swap SAS/SATA drives</li><li>• Up to twelve 3.5-inch hot-swap SAS/SATA/NVMe drives (NVMe drives are supported only in drive bays 8–11 if a 3.5-inch AnyBay backplane is installed)</li><li>• Up to sixteen 3.5-inch hot-swap SAS/SATA/NVMe drives (NVMe drives are</li></ul>

# ThinkSystem SR590 product overview

	<ul style="list-style-type: none"><li>• Up to sixteen 2.5-inch hot-swap SAS/SATA/NVMe drives (NVMe drives are supported only in drive bays 4–7 if a 2.5-inch AnyBay backplane is installed)</li><li>• Up to two 3.5-inch hot-swap SAS/SATA drives in the rear (supported only by server models with 12 drive bays in the front)</li><li>• Up to two M.2 drives</li></ul>
I/O slots	Up to six PCIe slots
Ports	<p>Front panel:</p> <ul style="list-style-type: none"><li>• One VGA port</li><li>• One Lenovo XClarity Controller USB connector</li><li>• One USB 3.0 port</li></ul> <p>Rear panel:</p> <ul style="list-style-type: none"><li>• One VGA port</li><li>• One Lenovo XClarity Controller network dedicated port</li><li>• One serial port (available on some models)</li><li>• Two USB 3.0 connectors</li><li>• Two Ethernet connectors</li><li>• Two Ethernet connectors on the LOM adapter (available on some models)</li></ul>
Cooling	Up to four hot-swap fans
Power supply	Up to two hot-swap power supplies for redundancy support

# ThinkSystem SR590 product overview

	Up to two M.2 drives
I/O slots	Up to six PCIe slots
Ports	<p>Front panel:</p> <ul style="list-style-type: none"><li>• One VGA port</li><li>• One Lenovo XClarity Controller USB connector</li><li>• One USB 3.0 port</li></ul> <p>Rear panel:</p> <ul style="list-style-type: none"><li>• One VGA port</li><li>• One Lenovo XClarity Controller network dedicated port</li><li>• One serial port (available on some models)</li><li>• Two USB 3.0 connectors</li><li>• Two Ethernet connectors</li><li>• Two Ethernet connectors on the LOM adapter (available on some models)</li></ul>
Cooling	Up to four hot-swap fans
Power supply	Up to two hot-swap power supplies for redundancy support
System management tools	Lenovo XClarity Controller Standard, Advanced, or Enterprise, light path diagnostics, Lenovo XClarity Provisioning Manager, Lenovo XClarity Essentials, Lenovo XClarity Administrator, Lenovo XClarity Energy Manager



## SR590 3.5-inch drive configurations

The SR590 supports the following 3.5-inch drive bay configurations on the front side.



Eight 3.5-inch simple-swap drives



Eight 3.5-inch hot-swap drives



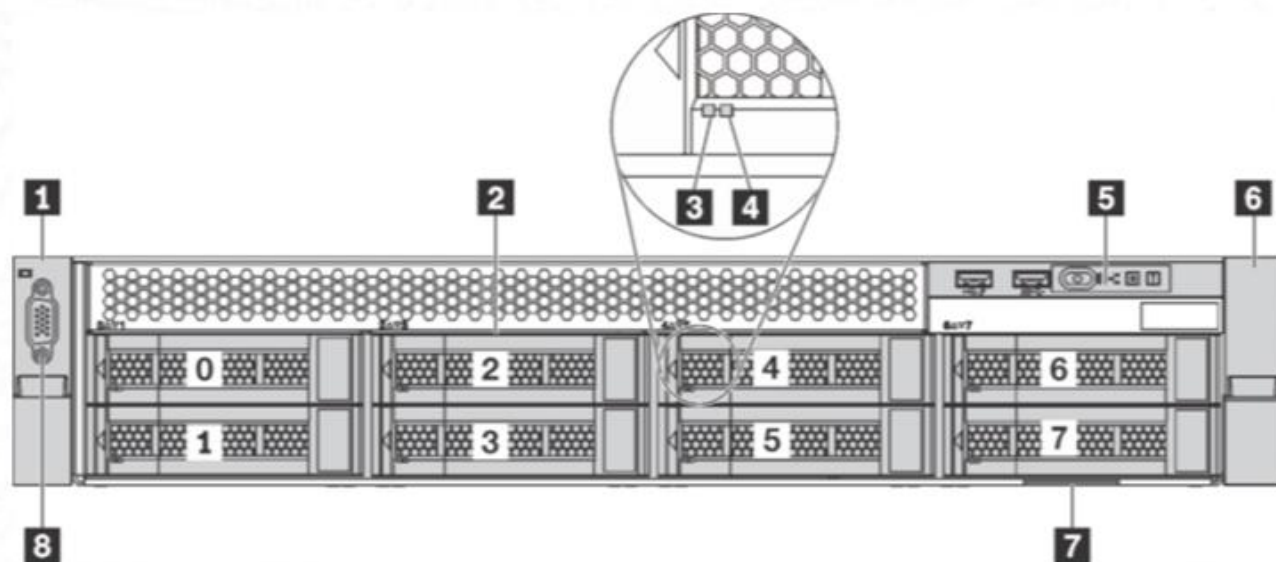
Twelve 3.5-inch hot-swap drives



Twelve 3.5-inch hot-swap drives  
with four AnyBay slots



## SR590 with eight 3.5-inch drives front view



**1** Rack latch (left)

**2** 3.5-inch drive bay 0-7

**3** Drive activity LED (green)

**4** Drive status LED (yellow)

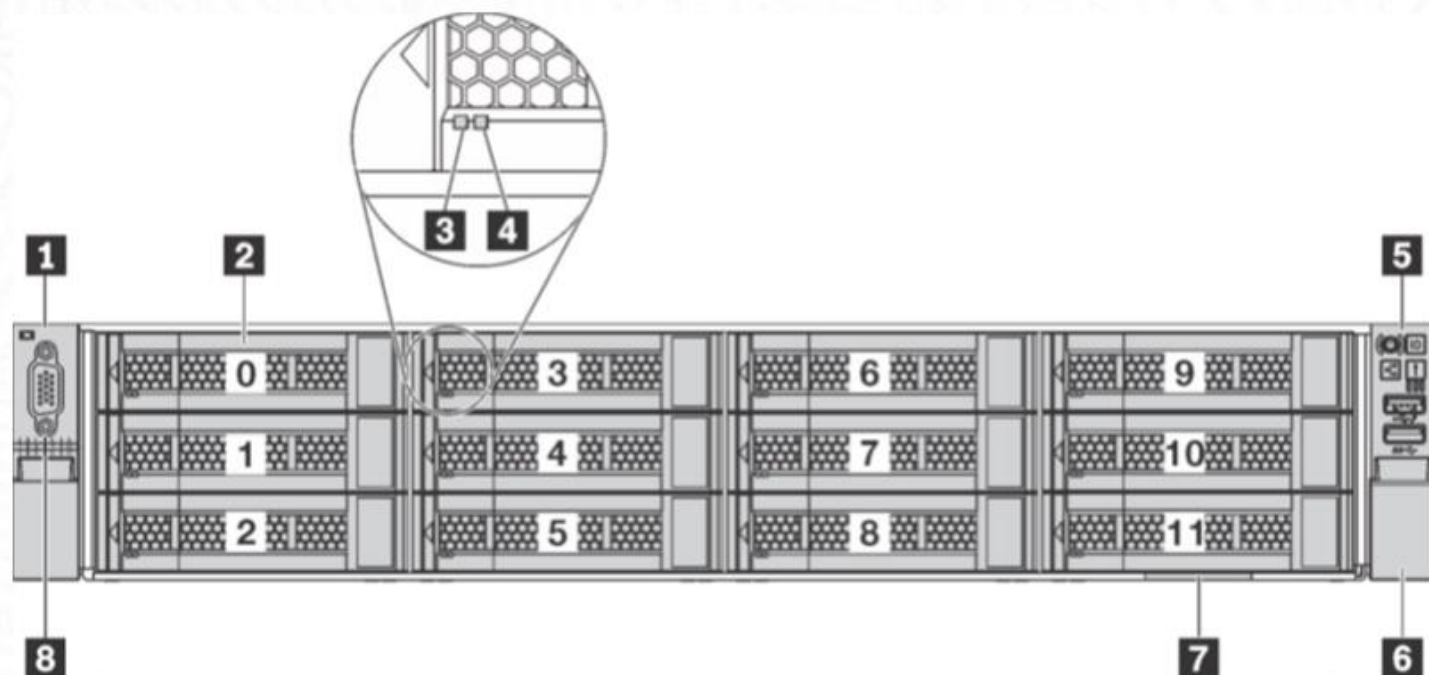
**5** Front I/O assembly

**6** Rack latch (right)

**7** Pull-out information tab

**8** VGA port (option)

## SR590 with twelve 3.5-inch drives front view



**1** Rack latch (left)

**2** 3.5-inch drive bay 0-11

**3** Drive activity LED (green)

**4** Drive status LED (yellow)

**5** Front I/O assembly

**6** Rack latch (right)

**7** Pull-out information tab

**8** VGA port (option)



## SR590 2.5-inch drive configurations



No backplane, no drives



Eight 2.5-inch drives



Sixteen 2.5-inch drives

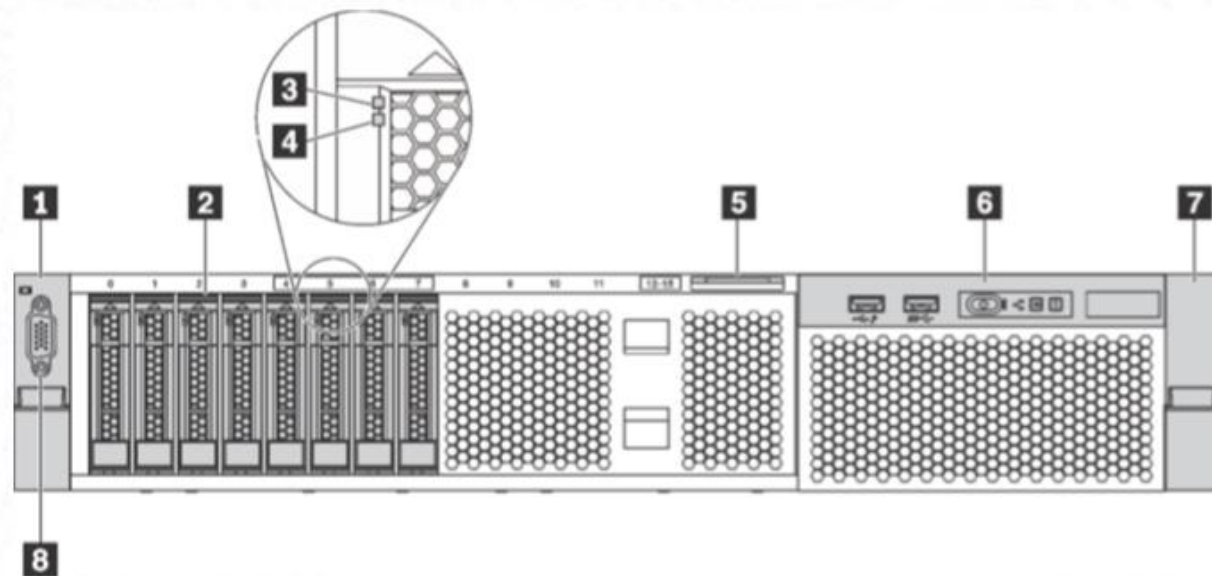


Eight 2.5-inch drives with four AnyBay slots



Sixteen 2.5-inch with four AnyBay slots

## SR590 with 2.5-inch drives front view



**1** Rack latch (left)

**2** 2.5-inch drive bays

**3** Drive activity LED (green)

**4** Drive status LED (yellow)

**5** Pull-out information tab

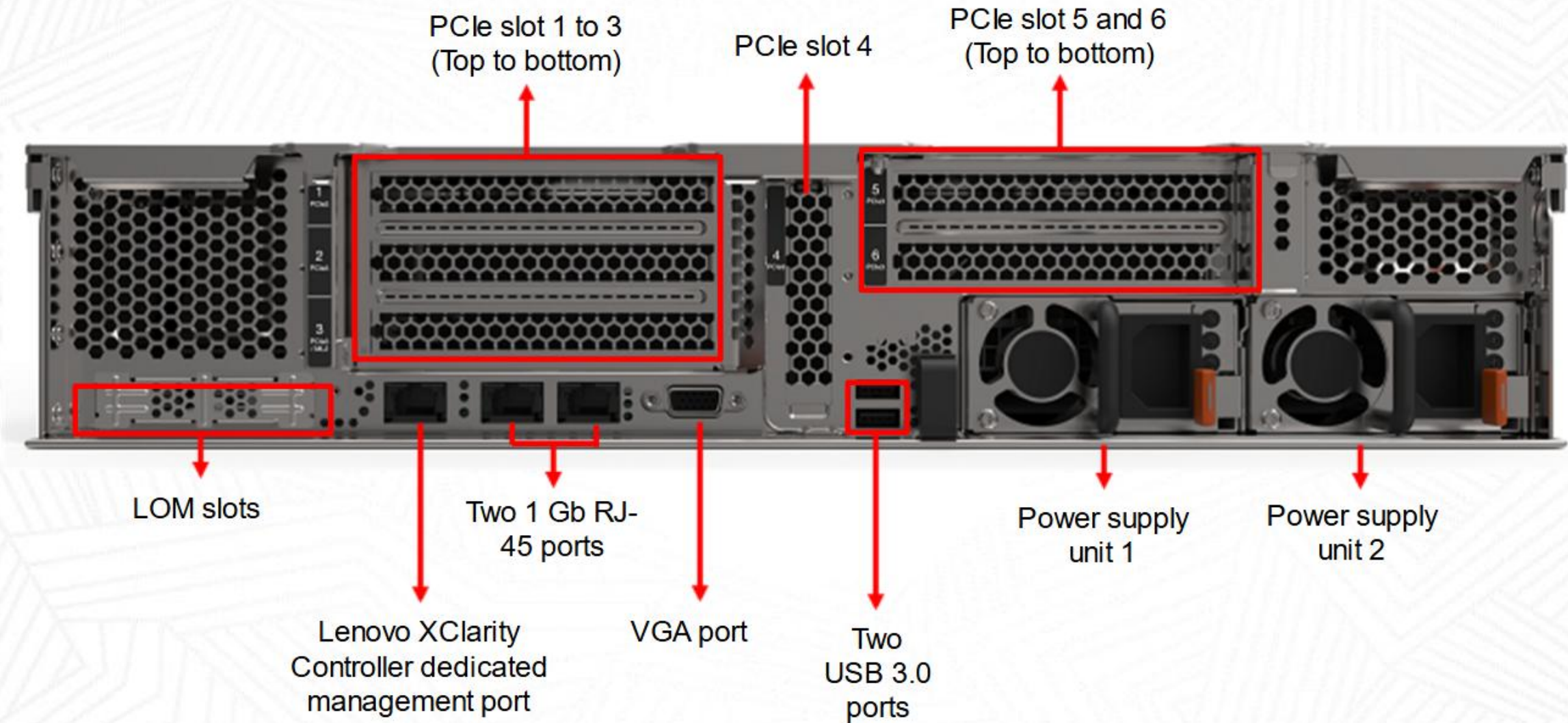
**6** Front I/O assembly

**7** Rack latch (right)

**8** VGA port (option)

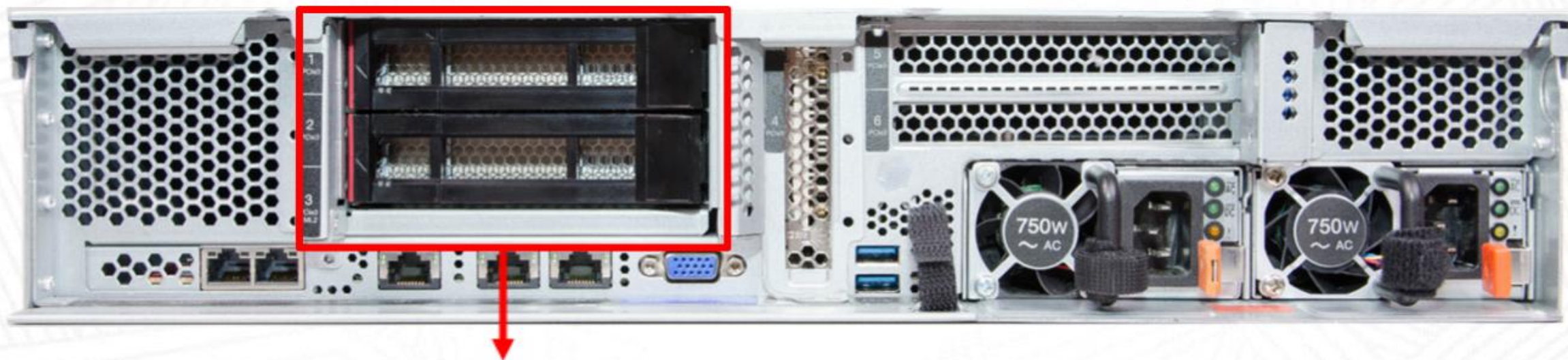


# SR590 rear view



## SR590 rear HDD assembly

The SR590 with twelve hot-swap 3.5-inch drives configuration supports the optional rear HDD assembly.

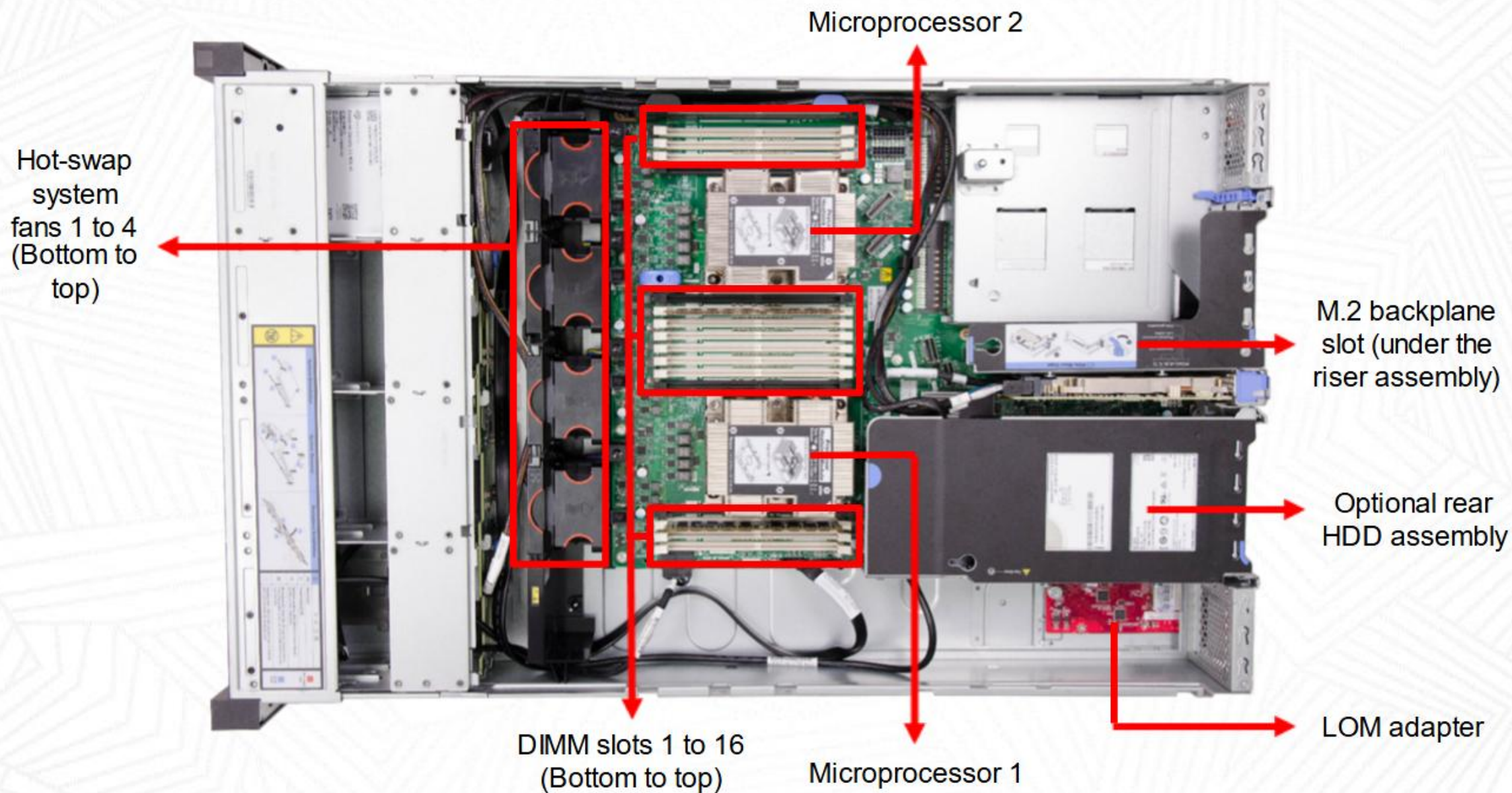


Rear HDD assembly

**Note:** The SR590 with 2.5-inch drive bays do not support the rear HDD assembly.



## SR590 inside view





## SR590 fan configuration rules

The SR590 supports up to four hot-swap fans with redundancy:

- One processor: three hot-swap fans (including one redundant fan)
- Two processors: four hot-swap fans (including one redundant fan)

For server models installed with Intel Xeon 5122, 6140, 6152, 8156, 8158, 8160, and 8164 processors, fan redundancy function is not supported. If one fan fails, the server performance will be degraded.

**Note:** If the system comes with only one processor, three system fans (fan 1 to fan 3) are adequate to provide proper cooling. However, you must keep the location for fan 4 occupied by a fan filler to ensure proper airflow.

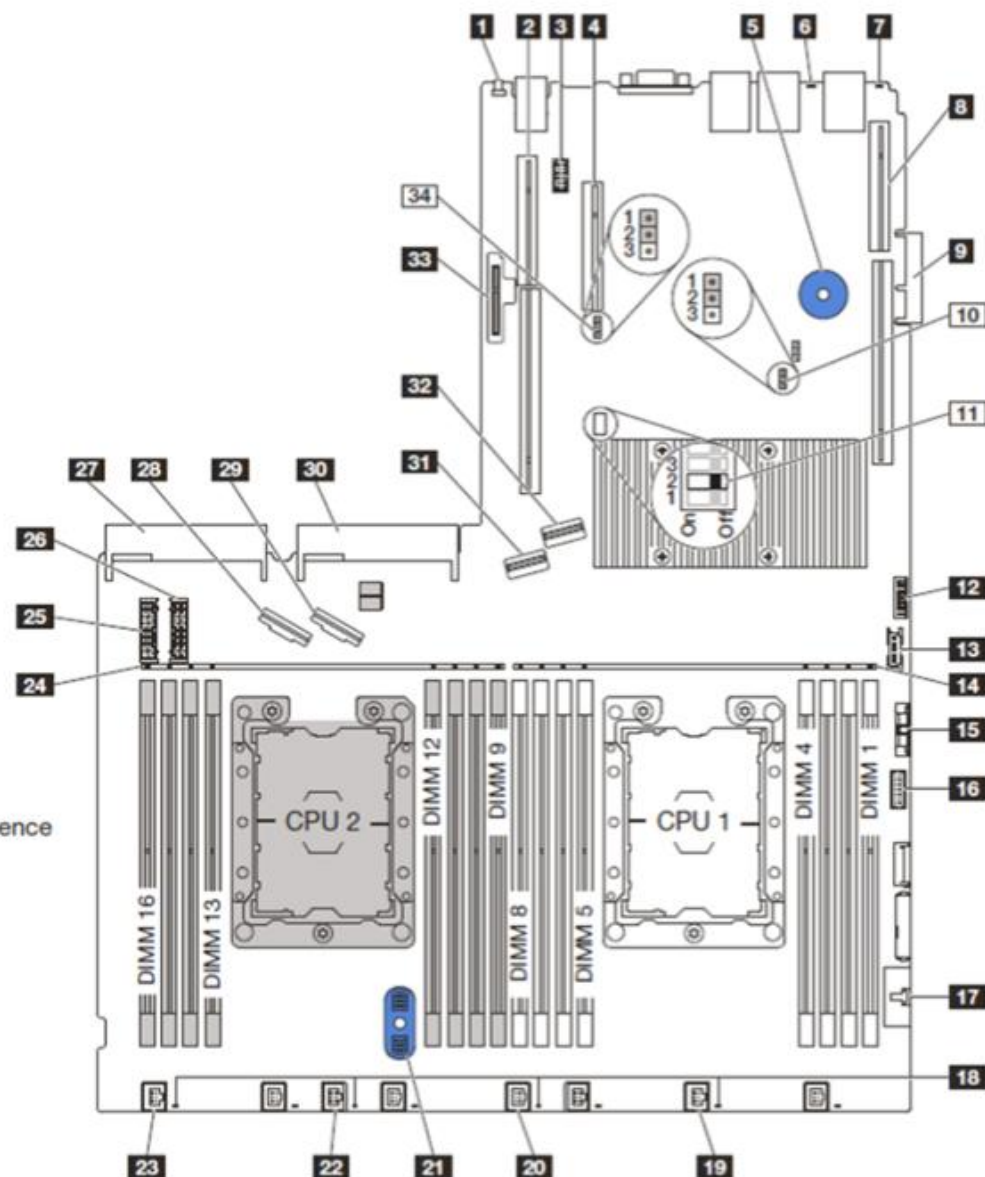


# SR590 system board details

- |  |  |
|--|--|
| <b>1</b> NMI Button  | <b>17</b> Front Panel Connector  |
| <b>2</b> Riser 2 Slot  | <b>18</b> System Fan 1-4 Error LEDs  |
| <b>3</b> Serial-Port-Module Connector  | <b>19</b> System Fan 1 Connector   |
| <b>4</b> PCIe Slot 4 (PCIe3 x8)  | <b>20</b> System Fan 2 Connector   |
| <b>5</b> System Board Lifting Handle   | <b>21</b> System Board Lifting Handle  |
| <b>6</b> System Error LED  | <b>22</b> System Fan 3 Connector   |
| <b>7</b> System ID LED   | <b>23</b> System Fan 4 Connector   |
| <b>8</b> Riser 1 Slot  | <b>24</b> DIMM 9-16 Error LEDs   |
| <b>9</b> LOM Adapter Connector   | <b>25</b> Backplane 1 Power Connector  |
| <b>10</b> Clear CMOS Jumper<br>Pins 1&2: Normal<br>Pins 2&3: Clear CMOS                      | <b>26</b> Backplane 2 Power Connector  |
| <b>11</b> Override Power-on Password Switch<br>Off: Normal<br>On: Override Power-on Password | <b>27</b> Power Supply 2 Connector   |
| <b>12</b> TPM/TCM Connector  | <b>28</b> NVMe 2-3 Connector   |
| <b>13</b> Front USB Connector  | <b>29</b> NVMe 0-1 Connector   |
| <b>14</b> DIMM 1-8 Error LEDs  | <b>30</b> Power Supply 1 Connector   |
| <b>15</b> CMOS Battery   | <b>31</b> SATA 4-7 Connector   |
| <b>16</b> Front VGA Connector  | <b>32</b> SATA 0-3 Connector   |
|  | <b>33</b> M.2 Backplane Connector (SATA/PCIe Slot 7)                                   |
|  | <b>34</b> TPM/TCM_PP Jumper<br>Pins 1&2: Normal<br>Pins 2&3: TPM/TCM Physical Presence |

Note: Before removing the system board, remove any components that are installed on the system board and put them in a safe, static-protective place.

Memory	
# CPUs installed	DIMM installation order – independent mode
1	3, 6, 2, 7, 1, 8, 4, 5
2	3, 11, 6, 14, 2, 10, 7, 15, 1, 9, 8, 16, 4, 12, 5, 13



## SR590 riser card types

Click each button to see the SR590 PCIe slots support types.

**PCIe slots 1 to 3 on riser 1 assembly**

**PCIe slots 4 on the system board**

**PCIe slots 5 and 6  
on the riser 2 assembly**



## SR590 riser card types



The SR590 supports three types of riser cards for riser 1 assembly:

- Type 1
  - Slot 1: PCIe x16 (x8, x4, x1), full-height, half-length
  - Slot 2: PCIe x16 (x8, x4, x1), full-height, half-length
  - Slot 3: PCIe x16 (x8, x4, x1), full-height, half-length
- Type 2
  - Slot 1: PCIe x16 (x8, x4, x1), full-height, half-length
  - Slot 2: PCIe x16 (x8, x4, x1), full-height, half-length
  - Slot 3: ML2 x8 (x8, x4, x1), full-height, half-length
- Type 3
  - Slot 1: PCIe x16 (x16, x8, x4, x1), full-height, half-length
  - Slot 2: Not available
  - Slot 3: PCIe x16 (x8, x4, x1), full-height, half-length

## SR590 riser card types

The PCIe adapter slot 4 on the SR590 supports PCIe x8 (x8, x4, x1), low-profile adapter.





## SR590 PCIe slots installation rules

- The SR590 supports slot 5 when two processors are installed.
- Do not install PCIe adapters with small form factor (SFF) connectors in the PCIe slot 6.
- Observe the following PCIe slot selection priority when installing an Ethernet adapter or a converged network adapter:

Number of installed processors	PCIe slot selection priority
One processor	4 > 2 > 6 > 3 > 1
Two processor	4 > 2 > 6 > 3 > 5 > 1

## System front LEDs

The SR590 front LEDs on the operator panel:



**1** Power button with power status LED

**2** Network activity LED

**3** System ID button with ID LED

**4** System error LED



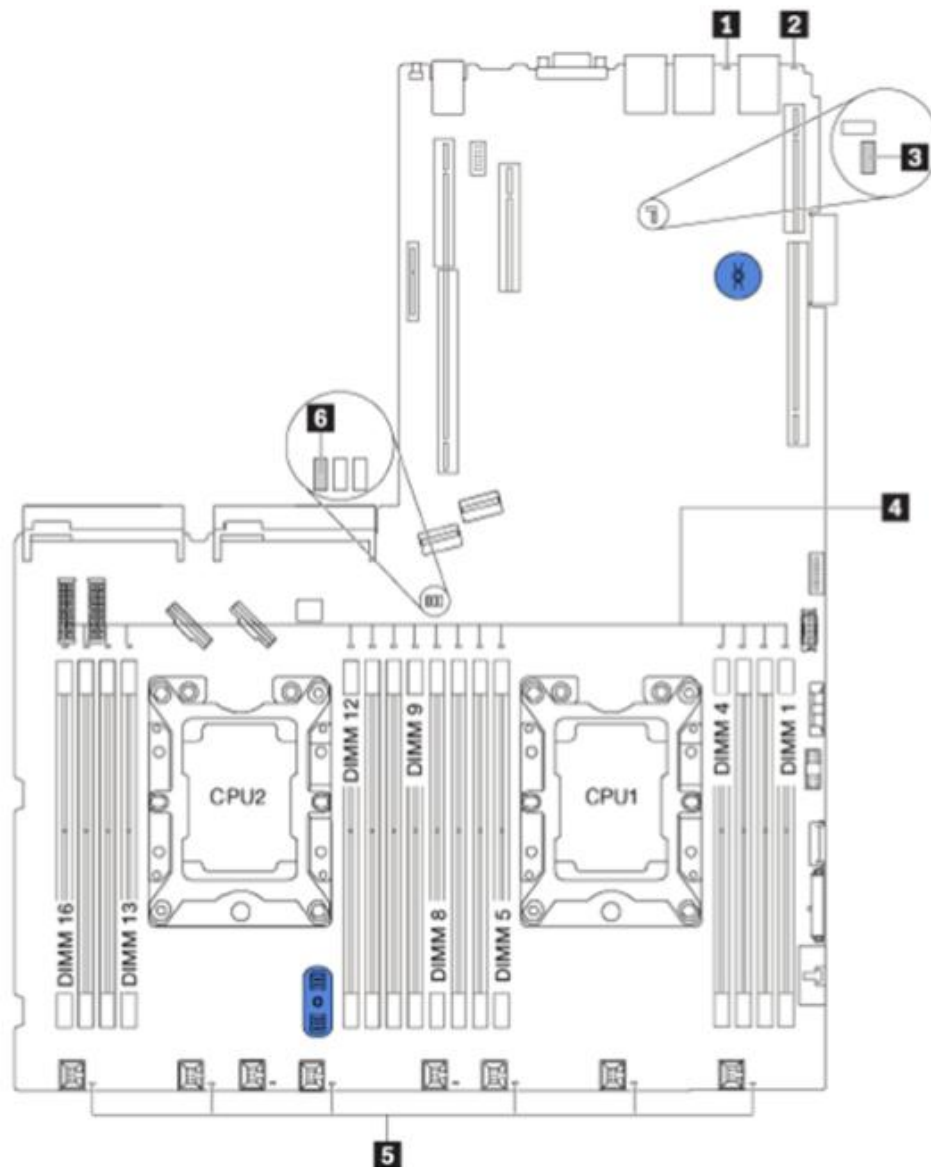
## System front LED status description

LED	Description
Power LED	<ul style="list-style-type: none"><li>• Solid green: The server is on and running.</li><li>• Slow flashing green (about one flash per second): The server is off and ready to be powered on (standby state).</li><li>• Fast flashing green (about four flashes per second): The server is off, but the Lenovo XClarity Controller is initializing, and the server is not ready to be powered on.</li><li>• Off: There is no ac power applied to the server.</li></ul>
Network activity LED	<ul style="list-style-type: none"><li>• Solid green: The server is connected to a network.</li><li>• Flashing green: The network is connected and active.</li><li>• Off: The server is disconnected from the network.</li></ul>
System ID LED	<ul style="list-style-type: none"><li>• Solid blue or flashing blue: The server is identified.</li><li>• Off: The server is not identified.</li></ul>
System error LED	<ul style="list-style-type: none"><li>• When this LED is lit, an error has been detected on the server. Check the event log to determine the exact cause of the error.</li><li>• The server is off or the server is on and is working correctly.</li></ul>

# System board LED

The SR590 system board LEDs locations:

- 1** System error LED
- 2** System ID LED
- 3** Lenovo XClarity Controller heartbeat LED
- 4** DIMM error LED
- 5** System fan error LED
- 6** System power LED



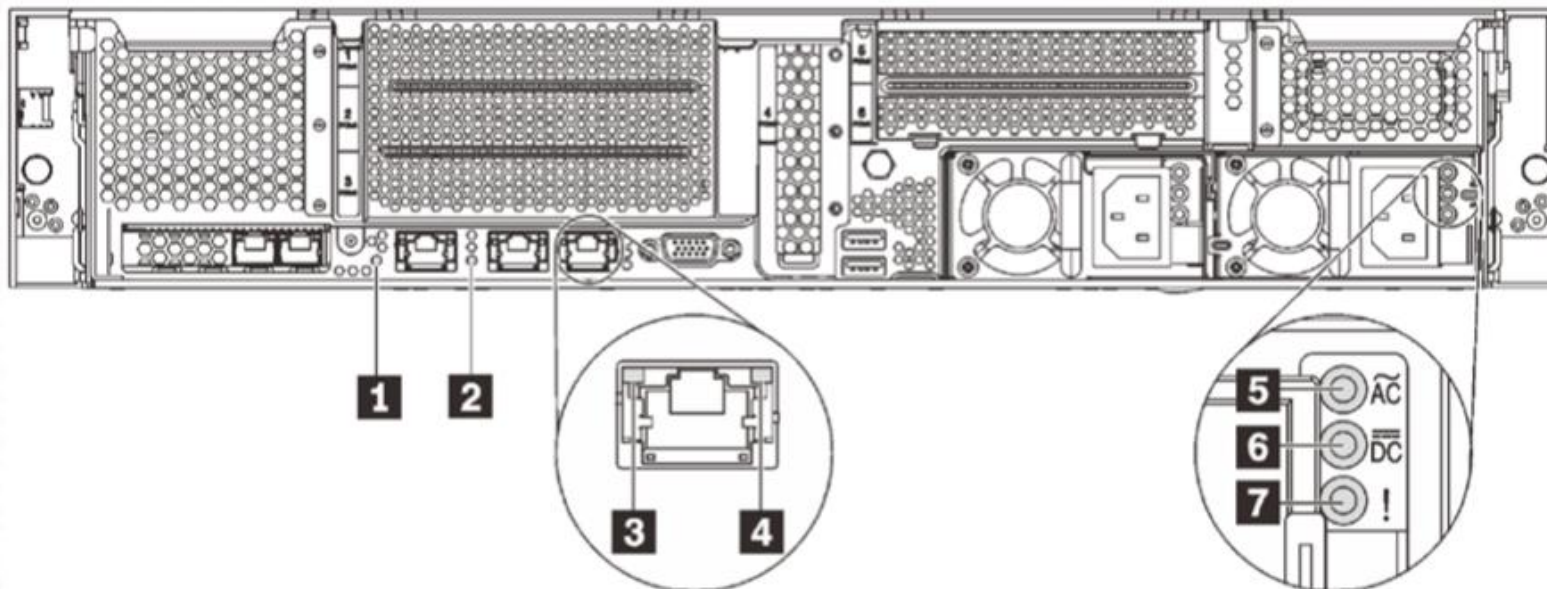


## System board LED status description

LED	Description
System error LED	<ul style="list-style-type: none"><li>• Yellow: An error has been detected on the server. Check the event log to determine the exact cause of the error.</li><li>• Off: The server is off or the server is on and is working correctly.</li></ul>
System ID LED	<ul style="list-style-type: none"><li>• Solid blue or flashing blue: The server is identified.</li><li>• Off: The server is not identified.</li></ul>
Lenovo XClarity Controller (XCC) heartbeat LED	<p>This LED indicates XCC heartbeat and boot process:</p> <ul style="list-style-type: none"><li>• Flashing green: XCC code is in the loading process.</li><li>• LED going off momentarily: XCC code has loaded completely.</li><li>• LED going off momentarily and then starts flashing slowly: XCC is fully operational. Users can now press the power-control button to power on the server.</li></ul>
DIMM error LED	<ul style="list-style-type: none"><li>• Yellow: An error has been detected on the DIMM.</li><li>• Off: The DIMM is working correctly.</li></ul>
System fan error LED	<ul style="list-style-type: none"><li>• Yellow: An error has been detected on the fan.</li><li>• Off: The fan is working correctly.</li></ul>
System power LED	When this LED is lit, it indicates that the server is powered on.

## System rear LED

The SR590 rear LEDs locations:



**1** System ID LED

**2** System error LED

**3** Ethernet link LED

**4** Ethernet activity LED

**5** Power input LED

**6** Power output LED

**7** Power supply LED



## System rear LED status description

LED	Description
System ID LED	<ul style="list-style-type: none"><li>• Solid blue or flashing blue: The server is identified.</li><li>• Off: The server is not identified.</li></ul>
System error LED	<ul style="list-style-type: none"><li>• When this LED is lit, an error has been detected on the server. Check the event log to determine the exact cause of the error.</li><li>• The server is off or the server is on and is working correctly.</li></ul>
Ethernet link LED	<ul style="list-style-type: none"><li>• Green: The network link is established.</li><li>• Off: The network link is disconnected.</li></ul>
Ethernet activity LED	<ul style="list-style-type: none"><li>• Flashing green: The network link is connected and active.</li><li>• Off: The server is disconnected from a LAN.</li></ul>
Power input LED	<ul style="list-style-type: none"><li>• Green: The server is powered on and the power supply is working normally.</li><li>• Off: The power supply is disconnected from the ac power source.</li></ul>
Power output LED	<ul style="list-style-type: none"><li>• Green: The server is on and the power supply is working normally.</li><li>• Flashing green: The power supply is in the zero-output mode (standby).</li><li>• The server is power off, or the power supply is not working normally and requires service actions.</li></ul>
Power supply error LED	<ul style="list-style-type: none"><li>• Amber: The power supply failed and requires service action.</li><li>• Off: The power supply is working normally.</li></ul>

## Problem determination and troubleshooting guideline

Use the LEDs on the system, Lenovo XClarity Controller, or other ThinkSystem tools to perform the problem determination and troubleshooting actions on the system. Refer to the following courses for more information.

- ES51757 – Introducing ThinkSystem tools  
<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES51757>
- ES41759 – ThinkSystem problem determination  
<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES41759>

If an error occurs on the system and requires parts replacement, refer to *ThinkSystem SR590 Maintenance Manual* on Lenovo's Support Web site or the instruction videos on this course's landing page on the LMS Web site to understand the parts-replacement procedure.



---

# Summary

This course enabled you to:

- Describe the Lenovo ThinkSystem SR590 server and components.
- List the Lenovo ThinkSystem SR590 server specifications.
- Describe the Lenovo ThinkSystem SR590 server configurations.
- Describe the problem determination steps and explain how to troubleshoot the ThinkSystem SR590.