



Lenovo ThinkSystem NE10032 RackSwitch

Product Guide

The Lenovo ThinkSystem NE10032 RackSwitch that uses 100 Gb QSFP28 and 40 Gb QSFP+ Ethernet technology is specifically designed for the data center. It is ideal for today's big data, cloud, and enterprise workload solutions. It is an enterprise class Layer 2 and Layer 3 full featured switch that delivers line-rate, high-bandwidth switching, filtering, and traffic queuing without delaying data. Large data center-grade buffers help keep traffic moving, while the hot-swap redundant power supplies and fans (along with numerous high-availability features) help provide high availability for business sensitive traffic.

The NE10032 RackSwitch has 32x QSFP+/QSFP28 ports that support 40 GbE and 100 GbE optical transceivers, active optical cables (AOCs), and direct attach copper (DAC) cables. The QSFP+/QSFP28 ports can also be split out into two 50 GbE (for 100 GbE ports), or four 10 GbE (for 40 GbE ports) or 25 GbE (for 100 GbE ports) connections by using breakout cables.

The NE10032 RackSwitch is ideal for latency sensitive applications, such as high-performance computing clusters and financial applications.

The NE10032 RackSwitch is shown in the following figure.



Figure 1. Lenovo ThinkSystem NE10032 RackSwitch

Did you know?

With exceptional port density and flexibility with break-out cables, the NE10032 RackSwitch can support up to 128x 10 GbE / 25 GbE Ethernet connections, or a mix of 10 GbE / 25 GbE server and storage connections with 40 GbE or 100 GbE upstream network connections, or up to 32x 40 GbE / 100 GbE connections in a 1U rack form factor.

The NE10032 RackSwitch runs the Lenovo Cloud Networking Operating System (CNOS) that provides a simple, open and programmable network infrastructure with cloud-scale performance. It delivers a software-defined Ethernet solution that is simple to manage and easy to deploy using common management tools, and it enables support of automation and orchestration applications for tight integration into the data center ecosystem.

Key features

The NE10032 RackSwitch runs the Cloud NOS that provides a simple, open and programmable network infrastructure designed to scale for your business needs. Its intelligent, cloud-scale performance delivers a software-defined Ethernet solution that is simple to manage and easy to deploy using common management tools. Cloud NOS is based on open, industry standards for better data center interoperability, and it enables support of automation and orchestration applications for tight integration into the data center ecosystem.

With its high-performance architecture and support for an extensive set of routing protocols, Cloud NOS provides reliable, high-performance fabric for traditional, converged and hyperscale solutions. Cloud NOS can help you consolidate server and storage networks into a single fabric. Converged Enhanced Ethernet delivers value for your iSCSI and NAS enterprise storage environments.

The NE10032 RackSwitch is considered particularly suited for the following environments:

- Mixed 10 GbE, 25 GbE, 40 GbE, and 100 GbE server and storage connectivity and upstream aggregation
- Cloud and virtualization solutions with VM-aware network automation and integration into Lenovo and third-party IT and cloud infrastructure management tools
- Converged SAN and LAN network via NAS, iSCSI, or FCoE storage connectivity
 - Reduced I/O cost (CAPEX) with fewer adapters and cables to purchase
 - Reduced complexity (OPEX) with fewer components to manage and lower energy cost
- Accelerated communications with lower latency across clustered applications and storage arrays with RDMA over Converged Ethernet (RoCE)
- Web-scale and hyperconverged solutions

The NE10032 RackSwitch offers the following features and benefits:

- High performance
The 10 Gb/25 Gb/40 Gb/100 Gb Ethernet NE10032 RackSwitch provides a combination of low latency, non-blocking line-rate switching, and ease of management with 6.4 Tbps throughput.
- Lower power and better cooling
The front-to-rear or rear-to-front cooling design of the NE10032 RackSwitch reduces data center air conditioning costs by having airflow match the servers in the rack. In addition, variable speed fans help reduce power consumption.
- Layer 3 functionality
The NE10032 RackSwitch includes Layer 3 functionality, which provides security and performance benefits, as inter-VLAN traffic stays within the switch. This switch also provides the full range of Layer 3 protocols from static routes for technologies, such as Open Shortest Path First (OSPF) and Border Gateway Protocol (BGP) for enterprise customers.
- Network virtualization
The NE10032 switch supports VXLAN Gateway for VMware NSX integration. VMware NSX is a virtualized network software platform that offers a full set of networking services, such as logical switching, routing, firewall, load balancing, VPN, quality of service (QoS), and monitoring.
- Converged fabric
The NE10032 RackSwitch supports Converged Enhanced Ethernet (CEE) which helps enable customers to combine storage, messaging traffic, VoIP, video, and other data on a common data center lossless Ethernet infrastructure. As a result, customers can deploy a single server interface for multiple data types, which can simplify the deployment and management of server network connectivity while maintaining the high availability and robustness that is required for storage transactions.

- **Fault tolerance**
The NE10032 RackSwitch offers redundant hot-swap hardware components, learns alternate routes automatically, and performs faster convergence if there is a link, switch, or power failure.
- **Seamless interoperability**
RackSwitch switches perform seamlessly with other vendors' upstream switches.
- **Automated VM-aware network provisioning**
The Lenovo CNOS Network Policy Agent, a ThinkAgile Network Orchestrator feature, gives increased visibility of the Nutanix (AOS version 5.0.2 or higher [excluding 5.1.2]) and VMware vSphere virtual infrastructure, including VM and virtual network information. It provides automated VM-aware provisioning by automatically configuring VLANs in the physical network based on the auto-discovered virtual network topology. The agent also performs ongoing dynamic updates to the physical network configuration in response to new VMs, updated VMs, and deleted VMs and virtual networks, eliminating errors with manual configuration.
- **Pro-active congestion monitoring**
Telemetry enables continuous monitoring of networking devices to detect potential congestion problems, such as packets dropped by the switch when ports are being used close to their line rate or switch buffers are being temporarily overflowed (for example, in case of microbursts).
- **Zero Touch Provisioning**
Zero Touch Provisioning (ZTP) enables a switch to automatically provision itself using the resources available on the network, without manual intervention. ZTP automatically handles the process of upgrading the switch software image and installing configuration files.
- **Python Scripting**
Network administrators can create and execute local Python scripts on switches to make small programs that allow a switch to automatically provision itself, perform fault monitoring, upgrade the image files, or auto-generate configuration files. Administrators can also implement version control systems, automatically generate alerts, create custom logging tools, and automate the management of network devices.
- **REST API Programming**
The Lenovo REpresentational State Transfer (REST) Application Program Interface (API) enables network administrators to remotely configure and manage a Lenovo switch using REST and HyperText Transfer Protocol (HTTP). It also allows switch management integration into management applications, such as Lenovo XClarity.

Components and connectors

The following figure shows the front (port-side) panel of the NE10032 RackSwitch.

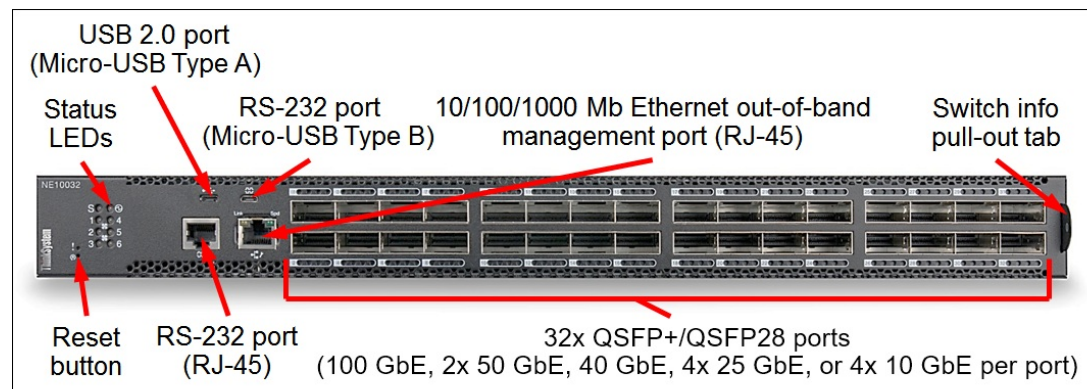


Figure 2. Front panel of the NE10032 RackSwitch

The front panel of the NE10032 RackSwitch includes the following components:

- 32x QSFP+/QSFP28 ports to attach QSFP+/QSFP28 transceivers, DAC cables and AOCs for 40 Gb or 100 Gb Ethernet connections or breakout cables for 4x 10 Gb Ethernet connections out of a 40 GbE port, or 2x 50 GbE or 4x 25 GbE connections out of a 100 GbE port.
- One RJ-45 10/100/1000 Mb Ethernet port for out-of-band management.
- One RJ-45 RS-232 console port that provides another means to configure the switch.
- One Micro-USB Type B RS-232 console port that provides another means to configure the switch.
- One Micro-USB Type A port for mass storage devices.
- LEDs that display the status of the switch and the network.
- Reset button.
- Switch information pull-out tab.

The following figure shows the rear (non-port-side) panel of the NE10032 RackSwitch.

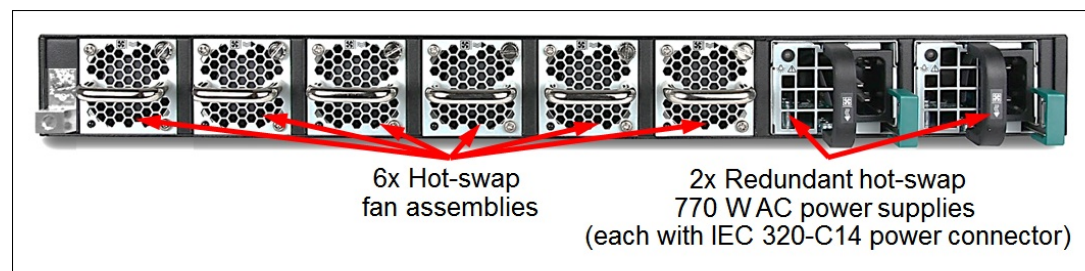


Figure 3. Rear panel of the NE10032 RackSwitch

The rear panel of the NE10032 RackSwitch includes the following components:

- Two redundant hot-swap 770 W AC power supplies (each with the IEC 320-C14 power connector).
- Six N+1 redundant hot-swap fan assemblies.

System specifications

The following table lists the NE10032 RackSwitch system specifications.

Note: The supported hardware options and software features listed in this product guide are based on the Lenovo Cloud Networking Operating System (CNOS) version 10.10. For details about specific CNOS software releases that introduced support for certain hardware options and software features, refer to the Release Notes for the particular software release that can be found at:

http://systemx.lenovofiles.com/help/topic/com.lenovo.thinksystem.ne10032.doc/ts_ne10032.html

Table 1. NE10032 RackSwitch system specifications

Attribute	Specification
Form factor	1U rack mount
Ports	32x QSFP+/QSFP28 ports
Media types	<p>100 Gb Ethernet QSFP28:</p> <ul style="list-style-type: none"> • 100 GbE short-range (SR4) QSFP28 transceivers • 100 GbE long-range (LR4) QSFP28 transceivers • 100 GbE QSFP28 to QSFP28 active optical cables (AOCs) • 100 GbE QSFP28 to 4x 25 GbE SFP28 active optical breakout cables • 100 GbE QSFP28 to QSFP28 direct attach copper (DAC) cables • 100 GbE QSFP28 to 4x 25 GbE SFP28 DAC breakout cables • 100 GbE QSFP28 to 2x 50 GbE QSFP28 DAC breakout cables (not supplied by Lenovo) <p>40 Gb Ethernet QSFP+:</p> <ul style="list-style-type: none"> • 40 GbE SR4 QSFP+ bi-directional (BiDi) transceivers • 40 GbE SR4/iSR4/eSR4 QSFP+ transceivers • 40 GbE LR4 QSFP+ transceivers • 40 GbE QSFP+ to QSFP+ active optical cables (AOCs) • 40 GbE QSFP+ to 4x 10 GbE SFP+ active optical breakout cables • 40 GbE QSFP+ to QSFP+ direct attach copper (DAC) cables • 40 GbE QSFP+ to 4x 10 GbE SFP+ DAC breakout cables
Port speeds	<ul style="list-style-type: none"> • 100 GbE QSFP28 DAC cables: 100 Gbps, 2x 50 [2x 25] Gbps, or 4x 25 Gbps • 100 GbE QSFP28 SR4 transceivers and AOCs: 100 Gbps or 4x 25 Gbps • 100 GbE QSFP28 LR4 transceivers: 100 GbE • 40 GbE QSFP+ SR BiDi/SR4/LR4 transceivers: 40 GbE • 40 GbE QSFP+ iSR4/eSR4 transceivers, DAC cables and AOCs: 40 GbE or 4x 10 GbE
Switching method	Cut-through.
Data traffic types	Unicast, multicast, broadcast.
Software features	<p>Lenovo Cloud Networking OS (CNOS):</p> <p>Layer 2 switching, Layer 3 switching, virtual local area networks (VLANs), VLAN tagging, spanning tree protocol (STP), link aggregation (trunk) groups (LAGs), virtual LAGs (vLAGs), Layer 2 failover, quality of service (QoS), IPv4/IPv6 management, IPv4/IPv6 routing, equal cost multiple paths (ECMP), IPv4/IPv6 virtual router redundancy protocol (VRRP), IPv4 policy-based routing (PBR), Converged Enhanced Ethernet (CEE), Fibre Channel over Ethernet (FCoE) transit switch operations, Network Policy Agent, VXLAN gateway, Python scripting, REST API programming, Telemetry agent.</p>
Performance	<p>Non-blocking architecture with wire-speed forwarding of traffic:</p> <ul style="list-style-type: none"> • 100% line-rate performance • Up to 6.4 Tbps switching throughput • As low as 490 ns port-to-port switching latency • Up to 2,702 Million packets per second (Mpps) (128-byte packets) • Up to 9,216-byte jumbo frames • Buffer size: 16 MB

Attribute	Specification
Scalability	<ul style="list-style-type: none"> • MAC address forwarding database entries: 104,000 • VLANs: 4,095 (3,999 user-configurable; 96 reserved) • Rapid Per VLAN Spanning Tree (RPVST) instances: 500 • Multiple STP (MSTP) instances: 64 • Link aggregation groups: 128 • Active ports in a link aggregation group: 32 • Ingress ACL entries: 3,072 • Egress ACL entries: 512 • Static routes (IPv4 / IPv6): 256 / 256 • Dynamic routes (IPv4 / IPv6): 15,870 / 6,143
Cooling	Six N+1 redundant hot-swap fans. Rear (non-port side) to front (port side) or front to rear airflow.
Power supply	Two load-sharing, redundant hot-swap 770 W AC (100 - 240 V) Platinum power supplies (each power supply has an IEC 320-C14 connector).
Hot-swap parts	QSFP+/QSFP28 transceivers, QSFP+/QSFP28 DAC cables and AOCs, power supplies, fans.
Management ports	1x 10/100/1000 Mb Ethernet port (RJ-45); 1x RS-232 port (RJ-45), 1x RS-232 port (Micro-USB Type B); 1x USB 2.0 port (Micro-USB Type A) for additional firmware, log, and configuration files storage.
Management interfaces	Industry standard command line interface (isCLI); SNMP v1, V2, and v3; REST API. Optional Lenovo XClarity for discovery, inventory, monitoring and events. Optional Lenovo Networking plug-ins for VMware vRealize Log Insight, VMware vRealize Orchestrator, and OpenStack-based environments. Ansible support for IT automation. Ganglia support for telemetry analytics.
Security features	Secure Shell (SSH); Secure Copy (SCP); Secure FTP (sFTP); user level security; Role-based Access Control (RBAC); LDAP/LDAPS, RADIUS, and TACACS+ authentication; access control lists (ACLs); port-based network access control (IEEE 802.1x); secure mode; Trusted Platform Module (TPM) 1.2.
Hardware warranty	Three-year (Machine Type 7159) Customer Replaceable Unit limited warranty with 9x5 Next Business Day Parts Delivered. Optional warranty service upgrades are available through Lenovo: onsite service, 24x7 coverage, 2-hour or 4-hour response time, 1-year or 2-year warranty and post-warranty extensions, basic installation services.
Software maintenance	Three-year software support and subscription is included in the base warranty. Optional 1-year and 2-year warranty extensions include software support and subscription.
Mean Time Between Failures	230,018 hours MTBF.
Dimensions	Height: 44 mm (1.7 in.); width: 441 mm (17.3 in.); depth: 487 mm (19.2 in.)
Weight	11.3 kg (24.9 lb).

Models

The following table lists the NE10032 RackSwitch models.

Table 2. NE10032 RackSwitch models

Description	Part number	Machine Type-Model	Feature code
Lenovo ThinkSystem NE10032 RackSwitch (Rear to Front)	7159D1X	7159-HE1	AV17
Lenovo ThinkSystem NE10032 RackSwitch (Front to Rear)	7159D2X	7159-HE2	AV18

The part numbers for the NE10032 RackSwitch models include the following items:

- One NE10032 RackSwitch with two power supplies and six fan assemblies (rear-to-front airflow or front-to-rear airflow)
- Generic Rack Mount Kit (2-post)
- Cable Kit that includes the following items:
 - DB-9 (plug) to RJ-45 (plug) serial console cable
 - Micro-USB Type B (plug) to USB Type A (plug) serial console cable
 - Micro-USB Type A (plug) to USB Type A (jack) data cable
- *Electronic Publications Flyer*

Configuration notes:

- Power cables are not included and must be ordered together with the switch (see [Power supplies and cables](#) for details).
- QSFP28 and QSFP+ transceivers and cables are not included and should be ordered together with the switch (see [Transceivers and cables](#) for details).

The NE10032 RackSwitch supports Features on Demand (FoD) license keys to enable additional features. The Advanced Instrumentation Tools FoD option enables access to low-level switch diagnostics for advanced troubleshooting.

The following table lists the FoD upgrade options for the NE10032 RackSwitch.

Table 3. FoD upgrade options

Description	Part number	Feature code
Lenovo ThinkSystem NE10032 RackSwitch Advanced Instrumentation Tools	7ZN7A04597	AXD7

Transceivers and cables

With the flexibility of the NE10032 RackSwitch, customers can choose the following connectivity technologies:

- For 10 GbE links, customers can split out four 10 GbE ports for each 40 GbE port by using QSFP+ to 4x SFP+ DAC or active optical breakout cables for distances up to 5 meters. The 40GBASE-iSR4 QSFP+ transceivers can be used for distances up to 100 meters on OM3 or up to 150 meters on OM4 MMF MPO-to-LC breakout cables. For longer distances, the 40GBASE-eSR4 transceivers can be used for up to 300 meters on OM3 or up to 400 meters on OM4 MMF MPO-to-LC breakout cables.
- For 25 GbE links, customers can split out four 25 GbE ports for each 100 GbE port by using QSFP28 to 4x SFP28 DAC breakout cables for distances up to 5 meters or active optical breakout cables for distances up to 20 meters. For longer distances, the 100GBASE-SR4 QSFP28 transceivers can be used for up to 70 meters on OM3 or up to 100 meters on OM4 MMF MPO-to-LC breakout cables.
- For 40 GbE links, customers can use the QSFP+ to QSFP+ DAC cables for distances up to 7 meters or QSFP+ to QSFP+ active optical cables for distances up to 20 meters. These DAC cables and AOCs have QSFP+ connectors on each end, and they do not need separate transceivers.

For longer distances, customers can use the 40GBASE QSFP+ bi-directional transceivers or 40GBASE-SR4/iSR4 QSFP+ transceivers for distances up to 100 meters on OM3 or up to 150 meters on OM4 MMF cables. The 40GBASE-eSR4 QSFP+ transceiver can be used for distances up to 300 meters on OM3 or up to 400 meters on OM4 MMF cables. The 40GBASE-LR4 QSFP+ transceiver can be used for distances up to 10 kilometers on SMF cables.

- For 50 GbE links, customers can split out two 50 GbE ports for each QSFP28 port by using the QSFP28-2xQSFP28 DAC breakout cables (not supplied by Lenovo).
- For 100 GbE links, customers can use the QSFP28 DAC cables for distances up to 5 meters or QSFP28 active optical cables (AOCs) for distances up to 20 meters. These DAC cables and AOCs have QSFP28 connectors on each end, and they do not need separate transceivers.

For longer distances, the 100GBASE-SR4 QSFP28 transceivers support distances up to 70 meters on OM3 or up to 100 meters on OM4 MMF cables. The 100GBASE-LR4 QSFP28 transceiver can be used for distances up to 10 kilometers on SMF LC cables.

The following table lists the supported cables and transceivers.

Table 4. Supported QSFP+/QSFP28 transceivers, AOCs and DAC cables

Description	Part number	Feature code	Maximum quantity
QSFP28 transceivers - 100 GbE			
Lenovo 100GBase-SR4 QSFP28 Transceiver	7G17A03539	AV1D	32
Lenovo 100GBase-LR4 QSFP28 Transceiver	7G17A03540	AV1E	32
Optical cables for 100 GbE QSFP28 SR4 transceivers			
Lenovo 5m MPO-MPO OM4 MMF Cable	7Z57A03567	AV25	32
Lenovo 7m MPO-MPO OM4 MMF Cable	7Z57A03568	AV26	32
Lenovo 10m MPO-MPO OM4 MMF Cable	7Z57A03569	AV27	32
Lenovo 15m MPO-MPO OM4 MMF Cable	7Z57A03570	AV28	32
Lenovo 20m MPO-MPO OM4 MMF Cable	7Z57A03571	AV29	32
Lenovo 30m MPO-MPO OM4 MMF Cable	7Z57A03572	AV2A	32

Description	Part number	Feature code	Maximum quantity
Optical breakout cables for 100 GbE QSFP28 SR4 transceivers			
Lenovo 1m MPO-4xLC Breakout OM4 MMF Cable	7Z57A03573	AV2B	32
Lenovo 3m MPO-4xLC Breakout OM4 MMF Cable	7Z57A03574	AV2C	32
Lenovo 5m MPO-4xLC Breakout OM4 MMF Cable	7Z57A03575	AV2D	32
QSFP28 active optical cables - 100 GbE			
Lenovo 1m 100G QSFP28 Active Optical Cable	4Z57A10844	B2UZ	32
Lenovo 3m 100G QSFP28 Active Optical Cable	7Z57A03546	AV1L	32
Lenovo 5m 100G QSFP28 Active Optical Cable	7Z57A03547	AV1M	32
Lenovo 10m 100G QSFP28 Active Optical Cable	7Z57A03548	AV1N	32
Lenovo 15m 100G QSFP28 Active Optical Cable	7Z57A03549	AV1P	32
Lenovo 20m 100G QSFP28 Active Optical Cable	7Z57A03550	AV1Q	32
QSFP28 active optical breakout cables - 100 GbE to 4x 25 GbE			
Lenovo 3m 100G to 4x25G Breakout Active Optical Cable	7Z57A03551	AV1R	32
Lenovo 5m 100G to 4x25G Breakout Active Optical Cable	7Z57A03552	AV1S	32
Lenovo 10m 100G to 4x25G Breakout Active Optical Cable	7Z57A03553	AV1T	32
Lenovo 15m 100G to 4x25G Breakout Active Optical Cable	7Z57A03554	AV1U	32
Lenovo 20m 100G to 4x25G Breakout Active Optical Cable	7Z57A03555	AV1V	32
QSFP28 direct attach copper cables - 100 GbE			
Lenovo 1m Passive 100G QSFP28 DAC Cable	7Z57A03561	AV1Z	32
Lenovo 3m Passive 100G QSFP28 DAC Cable	7Z57A03562	AV20	32
Lenovo 5m Passive 100G QSFP28 DAC Cable	7Z57A03563	AV21	32
QSFP28 direct attach copper breakout cables - 100 GbE to 4x 25 GbE			
Lenovo 1m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	7Z57A03564	AV22	32
Lenovo 3m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	7Z57A03565	AV23	32
Lenovo 5m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	7Z57A03566	AV24	32
QSFP+ transceivers - 40 GbE			
Lenovo 40GBase QSFP+ Bi-Directional Transceiver	00YL631	ATYW	32
Lenovo 40GBASE-SR4 QSFP+ Transceiver	49Y7884	A1DR	32
Lenovo 40GBASE-iSR4 QSFP+ Transceiver	00D9865	ASTM	32
Lenovo 40GBASE-eSR4 QSFP+ Transceiver	00FE325	A5U9	32
Lenovo 40GBASE-LR4 QSFP+ Transceiver	00D6222	A3NY	32
Optical cables for 40 GbE QSFP+ SR4/iSR4/eSR4 transceivers			
Lenovo 10m MPO-MPO OM3 MMF Cable	00VX003	AT2U	32
Lenovo 30m MPO-MPO OM3 MMF Cable	00VX005	AT2V	32
OM3 optical cables for 40 GbE SR QSFP+ BiDi transceivers			
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5	32
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6	32
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7	32
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8	32
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9	32
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA	32

Description	Part number	Feature code	Maximum quantity
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB	32
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC	32
OM4 optical cables for 10 GbE SR SFP+, 25 GbE SR SFP28, and 40 GbE SR QSFP+ BiDi transceivers			
Lenovo 0.5m LC-LC OM4 MMF Cable	4Z57A10845	B2P9	32
Lenovo 1m LC-LC OM4 MMF Cable	4Z57A10846	B2PA	32
Lenovo 3m LC-LC OM4 MMF Cable	4Z57A10847	B2PB	32
Lenovo 5m LC-LC OM4 MMF Cable	4Z57A10848	B2PC	32
Lenovo 10m LC-LC OM4 MMF Cable	4Z57A10849	B2PD	32
Lenovo 15m LC-LC OM4 MMF Cable	4Z57A10850	B2PE	32
Lenovo 25m LC-LC OM4 MMF Cable	4Z57A10851	B2PF	32
Lenovo 30m LC-LC OM4 MMF Cable	4Z57A10852	B2PG	32
Optical breakout cables for 40 GbE QSFP+ iSR4/eSR4 transceivers			
Lenovo 1m MPO-4xLC OM3 MMF Breakout Cable	00FM412	A5UA	32
Lenovo 3m MPO-4xLC OM3 MMF Breakout Cable	00FM413	A5UB	32
Lenovo 5m MPO-4xLC OM3 MMF Breakout Cable	00FM414	A5UC	32
QSFP+ active optical cables - 40 GbE			
Lenovo 1m QSFP+ to QSFP+ Active Optical Cable	7Z57A04256	AX42	32
Lenovo 3m QSFP+ to QSFP+ Active Optical Cable	00YL652	ATZ3	32
Lenovo 5m QSFP+ to QSFP+ Active Optical Cable	00YL655	ATZ4	32
Lenovo 7m QSFP+ to QSFP+ Active Optical Cable	00YL658	ATZ5	32
Lenovo 15m QSFP+ to QSFP+ Active Optical Cable	00YL661	ATZ6	32
Lenovo 20m QSFP+ to QSFP+ Active Optical Cable	00YL664	ATZ7	32
QSFP+ active optical breakout cables - 40 GbE to 4x10 GbE			
Lenovo 1m QSFP+ to 4xSFP+ Active Optical Cable	00YL667	ATZ8	32
Lenovo 3m QSFP+ to 4xSFP+ Active Optical Cable	00YL670	ATZ9	32
Lenovo 5m QSFP+ to 4xSFP+ Active Optical Cable	00YL673	ATZA	32
QSFP+ direct-attach copper cables - 40 GbE			
Lenovo 1m Passive QSFP+ DAC Cable	49Y7890	A1DP	32
Lenovo 3m Passive QSFP+ DAC Cable	49Y7891	A1DQ	32
Lenovo 5m Passive QSFP+ DAC Cable	00D5810	A2X8	32
Lenovo 7m Passive QSFP+ DAC Cable	00D5813	A2X9	32
QSFP+ breakout cables - 40 GbE to 4x 10 GbE			
Lenovo 1m Passive QSFP+ to SFP+ Breakout DAC Cable	49Y7886	A1DL	32
Lenovo 3m Passive QSFP+ to SFP+ Breakout DAC Cable	49Y7887	A1DM	32
Lenovo 5m Passive QSFP+ to SFP+ Breakout DAC Cable	49Y7888	A1DN	32
QSFP28 to SFP28 adapter			
Mellanox 100G QSFP28 to 25G SFP28 Cable Adapter	4G17A10853	B306	32

The network cables that can be used with the switch are listed in the following table.

Table 5. NE10032 network cabling requirements

Transceiver	Standard	Cable	Connector
100 Gb Ethernet			
100Gb SR4 QSFP28 (7G17A03539)	100GBASE-SR4	Up to 30 m with MPO-MPO fiber optic cables or up to 5 m with MPO-4xLC breakout cables supplied by Lenovo (see Table 4); up to 70 m with OM3 or up to 100 m with OM4 multimode fiber optic cables	MPO
100Gb LR4 QSFP28 (7G17A03540)	100GBASE-LR4	1310 nm single-mode fiber optic cable up to 10 km	LC
Active optical cable	100GBASE-SR4	QSFP28 to QSFP28 active optical cables up to 20 m; QSFP28 to 4x SFP28 active optical breakout cables up to 20 m for 4x 25 GbE connections out of a 100 GbE port (see Table 4)	QSFP28
Direct attach copper cable	100GBASE-CR4	QSFP28 to QSFP28 DAC cables up to 5 m; QSFP28 to 4x SFP28 DAC breakout cables up to 5 m for 4x 25 GbE connections out of a 100 GbE port (see Table 4)	QSFP28
50 Gb (2x 25 Gb) Ethernet			
Direct attach copper cable	25G/50G Eth. Consortium	QSFP28 to 2x QSFP28 DAC breakout cables (not supplied by Lenovo)	QSFP28
40 Gb Ethernet			
40Gb SR QSFP+ BiDi (00YL631)	40GBASE-SR BiDi	Up to 30 m with fiber optic cables supplied by Lenovo (see Table 4); up to 100 m with OM3 or up to 150 m with OM4 multimode fiber optic cable	LC
40Gb SR4 QSFP+ (49Y7884)	40GBASE-SR4	10 m or 30 m MPO fiber optic cables supplied by Lenovo (see Table 4); support for up to 100 m with OM3 or up to 150 m with OM4 multimode fiber optic cable	MPO
40Gb iSR4 QSFP+ (00D9865)	40GBASE-SR4	10 m or 30 m MPO fiber optic cables or MPO-4xLC breakout cables up to 5 m supplied by Lenovo (see Table 4); support for up to 100 m with OM3 or up to 150 m with OM4 multimode fiber optic cable	MPO
40Gb eSR4 QSFP+ (00FE325)	40GBASE-SR4	10 m or 30 m MPO fiber optic cables or MPO-4xLC breakout cables up to 5 m supplied by Lenovo (see Table 4); support for up to 300 m with OM3 or up to 400 m with OM4 multimode fiber optic cable	MPO
40Gb LR4 QSFP+ (00D6222)	40GBASE-LR4	1310 nm single-mode fiber optic cable up to 10 km	LC
Active optical cable	40GBASE-SR4	QSFP+ to QSFP+ active optical cables up to 20 m; QSFP+ to 4x SFP+ active optical break-out cables up to 5 m for 4x 10 GbE SFP+ connections out of a 40 GbE port (see Table 4)	QSFP+
Direct attach copper cable	40GBASE-CR4	QSFP+ to QSFP+ DAC cables up to 7 m; QSFP+ to 4x SFP+ DAC break-out cables up to 5 m for 4x 10 GbE SFP+ connections out of a 40 GbE port (see Table 4)	QSFP+
Management ports			
1 GbE mgmt. port	1000BASE-T	UTP Category 5, 5E, and 6 up to 100 meters	RJ-45
RJ-45 serial port	RS-232	DB-9 to RJ-45 cable (comes with the switch)	RJ-45

Transceiver	Standard	Cable	Connector
Micro-USB serial port	RS-232	Micro-USB (Type B) to USB (Type A) cable (comes with the switch)	Micro-USB (Type B)
Micro-USB storage port	USB 2.0	Micro-USB (Type A) to USB (Type A) cable (comes with the switch)	Micro-USB (Type A)

Software features

The NE10032 RackSwitch with Cloud NOS has the following software features and specifications:

- Scalability and performance:
 - Media access control (MAC) address learning with automatic updates
 - Static and LACP (IEEE 802.3ad) link aggregation
 - Broadcast and multicast storm control
 - IGMP snooping to limit flooding of IP multicast traffic
 - IGMP filtering to control multicast traffic for hosts participating in multicast groups
 - Configurable traffic distribution schemes over trunk links based on source or destination IP or MAC addresses, or both
 - Fast port forwarding and fast uplink convergence for rapid STP convergence
- Availability and redundancy:
 - IEEE 802.1D STP for providing L2 redundancy
 - IEEE 802.1s Multiple STP (MSTP) for topology optimization
 - IEEE 802.1w Rapid STP (RSTP) provides rapid STP convergence for critical delay-sensitive traffic, such as voice or video
 - Per-VLAN Rapid STP (PVRST) enhancements
 - Layer 2 Failover to support active/standby configurations of NIC teaming on servers
 - Forwarding Error Correction (FEC) for 25 Gbps, 50 Gbps, and 100 Gbps port speeds
- VLAN support:
 - Up to 4095 VLANs:
 - VLAN 1 is the default VLAN
 - VLAN numbers 2 - 3999 are user-configurable
 - VLAN numbers 4000 - 4095 are reserved for the use by the switch
 - Port-based VLANs
 - Private VLANs
 - 802.1Q VLAN tagging
 - 802.1Q encapsulation on Layer 3 routed ports
 - Ingress VLAN tagging to tunnel packets through a public domain without altering the original 802.1Q tagging information
- Security:
 - VLAN-based, MAC-based, and IP-based access control lists (ACLs)
 - 802.1x port-based authentication
 - Multiple user IDs and passwords
 - User access control
 - Radius, TACACS+, and LDAP/LDAPS authentication and authorization
 - Secure mode: Only secure communication protocols can be enabled
- Quality of Service (QoS):
 - Support for IEEE 802.1p, IP ToS/DSCP, and ACL-based (MAC/IP source and destination addresses and VLANs) traffic classification and processing
 - Traffic shaping and re-marking that is based on defined policies
 - Eight output Class of Service (COS) queues per port for processing qualified traffic
 - Weighted Random Early Detection (WRED) with Explicit Congestion Notification (ECN) to avoid congestion
 - Control Plane Protection (CoPP)
 - IPv4 ACL metering

- IP v4 Layer 3 functions:
 - Host management
 - Routed ports (Switch ports as Layer 3 interfaces)
 - IP forwarding
 - Network address translation (NAT)
 - IP filtering with ACLs
 - Virtual Router Redundancy Protocol (VRRP) for router redundancy
 - Static routes
 - Equal Cost Multiple Paths (ECMP)
 - Routing protocols (OSPF v2 and BGP-4)
 - Policy-based routing (PBR)
 - DHCP Relay and DHCP Snooping
 - IGMP snooping
 - DNS client
- IPv6 Layer 3 functions:
 - IPv6 host management
 - Routed ports (Switch ports as Layer 3 interfaces)
 - IPv6 forwarding
 - Virtual Router Redundancy Protocol (VRRP) for router redundancy
 - Static routes
 - Equal Cost Multiple Paths (ECMP)
 - Routing protocols (BGP-4)
 - DHCP Relay
 - DNS client
- Virtualization:
 - Virtual link aggregation groups (vLAGs)
 - Two switches (vLAG peers) act as a single virtual entity for a multi-port aggregation
 - vLAG Peer Gateway for improved usage of the link between the vLAG peers
 - Two-tier vLAGs with VRRP enables active/active VRRP to reduce routing latency
 - Data Center Interconnect (DCI) enables bridging of Layer 2 services across multiple locations over existing Layer 3 IP networks by using VXLAN high availability framework.
 - Virtual Routing and Forwarding (VRF) allows multiple instances (up to 64 for data traffic and one for management traffic) of a routing table to coexist and to work simultaneously on the switch to segment network paths.
 - Network Policy Agent gives increased visibility of the virtual infrastructure and automates VM-aware network provisioning and configuration updates for VLANs, virtual NICs, virtual networks, ACLs, and QoS based on the VM associations in a Nutanix (requires the AOS version 5.0.2 or higher [excluding 5.1.2]) or VMware vSphere environment.
 - VXLAN Gateway enables the communication between physical and virtual devices using the VXLAN protocol for VMware NSX integration.
 - Controller-less VXLAN for VMWare and Nutanix environments with the automated Layer 2 port provisioning provided by ThinkAgile Network Orchestrator.
- Converged Enhanced Ethernet:
 - Priority-Based Flow Control (PFC) (IEEE 802.1Qbb) extends 802.3x flow control to allow the switch to pause traffic that is based on the 802.1p priority value in each packet's VLAN tag.
 - Enhanced Transmission Selection (ETS) (IEEE 802.1Qaz) provides a method for allocating link bandwidth that is based on the 802.1p priority value in each packet's VLAN tag.
 - Data Center Bridging Capability Exchange Protocol (DCBX) (IEEE 802.1AB) allows neighboring network devices to exchange information about their capabilities.

- Fibre Channel over Ethernet (FCoE):
 - FC-BB5 FCoE specification compliant
 - FCoE transit switch operations
 - FCoE Initialization Protocol (FIP) support for automatic ACL configuration
 - FCoE Link Aggregation Group (LAG) support
 - 2,048 FCoE sessions with FIP Snooping by using Class ID ACLs
- Monitoring:
 - Switch LEDs for port status and switch status indication
 - Port mirroring for analyzing network traffic passing through switch
 - Change tracking and remote logging with syslog feature
 - Telemetry agent for real-time analytics: Forwarding table utilization and buffer, system, and interface statistics
 - sFlow agent for monitoring traffic in data networks (separate sFlow analyzer required elsewhere)
- Manageability:
 - Industry-standard command line interface (isCLI)
 - Simple Network Management Protocol (SNMP V1, V2, and V3)
 - Telnet interface for CLI
 - Secure Shell (SSH) v1 and v2 for CLI
 - Secure Copy (SCP) for uploading and downloading the configuration file via secure channels
 - Service Location Protocol (SLP)
 - Link Layer Discovery Protocol (LLDP) for discovering network devices
 - Serial interface for CLI
 - Scriptable CLI
 - Dynamic port mode for switching between 25 Gbps and 10 Gbps port speeds without rebooting
 - Dual software images
 - Firmware image update via TFTP, FTP, Secure FTP (sFTP), or USB storage
 - Network Time Protocol (NTP) for switch clock synchronization
 - Lenovo XClarity (optional) for discovery, inventory, monitoring and events
 - Lenovo Intelligent Network Controller (LINC) (optional) for Software-Defined Networking (SDN)
 - Third-party tools integration
 - Lenovo Networking Content Pack for VMware vRealize Log Insight (optional download) for automated log management
 - Integration with Nutanix Prism and VMware vCenter management via Network Policy Agent
 - Lenovo Networking Neutron Plugin to automate VLAN provisioning and configuration updates for OpenStack-based cloud environments
 - Integration with Ansible management
 - Ganglia plug-in for telemetry data analytics

Ethernet standards

The NE10032 RackSwitch supports the following Ethernet standards:

- IEEE 802.1AB Data Center Bridging Capability Exchange Protocol (DCBX)
- IEEE 802.1D Spanning Tree Protocol (STP)
- IEEE 802.1p Class of Service (CoS) prioritization
- IEEE 802.1s Multiple STP (MSTP)
- IEEE 802.1Q Tagged VLAN (frame tagging on all ports when VLANs are enabled)
- IEEE 802.1Qbb Priority-Based Flow Control (PFC)
- IEEE 802.1Qaz Enhanced Transmission Selection (ETS)
- IEEE 802.1x port-based authentication
- IEEE 802.1w Rapid STP (RSTP)
- IEEE 802.3 10BASE-T Ethernet
- IEEE 802.3ab 1000BASE-T copper twisted pair Gigabit Ethernet
- IEEE 802.3ad Link Aggregation Control Protocol
- IEEE 802.3ae 10GBASE-SR short range fiber optics 10 Gb Ethernet
- IEEE 802.3ba 40GBASE-SR4 short range fiber optics 40 Gb Ethernet
- IEEE 802.3ba 40GBASE-CR4 copper 40 Gb Ethernet
- IEEE 802.3ba 100GBASE-LR4 long range fiber optics 100 Gb Ethernet
- IEEE 802.3bj 100GBASE-CR4 copper 100 Gb Ethernet
- IEEE 802.3bm 100GBASE-SR4 short range fiber optics 100 Gb Ethernet
- IEEE 802.3cd 100GBASE-FR fiber optics 100 Gb Ethernet
- IEEE 802.3u 100BASE-TX Fast Ethernet
- IEEE 802.3x Full-duplex Flow Control
- SFF-8431 10 Gb SFP+ Direct attach copper cable
- SFF-8436 40 Gb QSFP+ Direct attach copper cable

Cooling

The NE10032 RackSwitch ships with six variable speed, hot-swap fan assemblies that provide N+1 cooling redundancy.

Power supplies and cables

The NE10032 RackSwitch supports up to two load-sharing, redundant hot-swap 770 W AC Platinum power supplies (two power supplies come standard with the switch).

The NE10032 RackSwitch ships without any power cables. The part numbers and feature codes to order the power cables (two power cables are required per switch) are listed in the following table.

Table 6. AC power cable options

Description	Part number	Feature code
Rack power cables		
1.5m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7937	6201
1.8m, 10A/100-250V, 2xC13PM to IEC 320-C14 Rack Power Cable	None*	6568
2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	None*	6311
2.8m, 10A/100-250V, C13 to IEC 320-C20 Rack Power Cable	39Y7938	6204
4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7932	6263
Line cords		
Argentina 10A/250V C13 to IRAM 2073 2.8m line cord	39Y7930	6222
Australia/NZ 10A/250V C13 to AS/NZ 3112 2.8m line cord	39Y7924	6211
Brazil 10A/125V C13 to NBR 6147 2.8m line cord	39Y7929	6223
China 10A/250V C13 to GB 2099.1 2.8m line cord	39Y7928	6210
Denmark 10A/250V C13 to DK2-5a 2.8m line cord	39Y7918	6213
European 10A/230V C13 to CEE7-VII 2.8m line cord	39Y7917	6212
India 10A/250V C13 to IS 6538 2.8m line cord	39Y7927	6269
Israel 10A/250V C13 to SI 32 2.8m line cord	39Y7920	6218
Italy 10A/250V C13 to CEI 23-16 2.8m line cord	39Y7921	6217
Japan 12A/125V C13 to JIS C-8303 2.8m line cord	46M2593	A1RE
Korea 12A/250V C13 to KETI 2.8m line cord	39Y7925	6219
South Africa 10A/250V C13 to SABS 164 2.8m line cord	39Y7922	6214
Switzerland 10A/250V C13 to SEV 1011-S24507 2.8m line cord	39Y7919	6216
Taiwan 10A/250V C13 to CNS 10917-3 2.8m line cord	00CG265	A53E
Taiwan 15A/125V C13 to CNS 10917-3 2.8m line cord	00CG267	A53F
United Kingdom 10A/250V C13 to BS 1363/A 2.8m line cord	39Y7923	6215
United States 10A/125V C13 to NEMA 5-15P 4.3m line cord	39Y7931	6207
United States 10A/250V C13 to NEMA 6-15P 2.8m line cord	46M2592	A1RF

* Available for factory-built custom configurations and solutions only.

Rack installation

The NE10032 RackSwitch ships with the 2-post rack mount kit.

For 4-post rack installations, the NE10032 RackSwitch supports the optional adjustable 19-inch, 4-post rail kit and the air inlet duct (optional for the 4-post rail kit; supported only with the models with rear to front airflow).

When the NE10032 RackSwitch (front to rear airflow) is installed in the Intelligent Cluster Rack (Machine Type 1410) or Enterprise Rack (Machine Type 9363) as a part of a NeXtScale System solution, the recessed 19-inch 4-post rail kit is required.

The following table lists rack installation options for the NE10032 RackSwitch switches with rear to front and front to rear airflow.

Table 7. Rack installation options

Description	Part number	Feature code
Rear to front airflow (7159-HE1)		
Lenovo RackSwitch Adjustable 19" 4 Post Rail Kit	00D6185	A3KP
Air Inlet Duct for 487 mm RackSwitch	00FM507	ASTN
Front to rear airflow (7159-HE2)		
Lenovo RackSwitch Adjustable 19" 4 Post Rail Kit	00D6185	A3KP
Lenovo RackSwitch Recessed 19" 4 Post Rail Kit	00CG089	A51M

Physical specifications

The NE10032 RackSwitch features the following physical specifications:

- Height: 44 mm (1.7 in.)
- Width: 441 mm (17.3 in.)
- Depth: 487 mm (19.2 in.)
- Maximum weight: 11.3 kg (24.9 lb)

Operating environment

The NE10032 RackSwitch is supported in the following operating environment:

- Temperature: 0 - 40 °C (32 - 104 °F).
- Relative humidity: 10 - 90% (Non-condensing)
- Altitude: Up to 2,000 m (6,561 feet)
- Acoustic noise: Less than 90 dB
- Airflow: Front-to-rear or rear-to-front cooling with variable speed fans for reduced power draw
- Electrical input: 50 / 60 Hz, 100 - 240 V AC auto-switching
- Power consumption
 - Typical: 212 W
 - Maximum: 436 W
- Heat dissipation
 - Typical: 723 BTU/hour
 - Maximum: 1488 BTU/hour

Warranty and maintenance

The NE10032 RackSwitch comes with a 3-year Customer Replaceable Unit (CRU) hardware limited warranty with 9x5 Next Business Day (NBD) Parts Delivered and includes a 3-year software license, which provides entitlement to upgrades over that period. The options that are installed in the switch assume the switch's base warranty and any Lenovo warranty service upgrade for the switch.

Some regions might have different warranty terms and conditions than the standard warranty. This is due to local business practices or laws in the specific region. Local service teams can assist in explaining region-specific terms when needed. Examples of region-specific warranty terms are second or longer business day parts delivery or parts-only base warranty.

If warranty terms and conditions include onsite labor for repair or replacement of parts, Lenovo will dispatch a service technician to the customer site to perform the replacement. Onsite labor under base warranty is limited to labor for replacement of parts that have been determined to be field-replaceable units (FRUs). Parts that are determined to be customer-replaceable units (CRUs) do not include onsite labor under base warranty.

If warranty terms include parts-only base warranty, Lenovo is responsible for delivering only replacement parts that are under base warranty (including FRUs) that will be sent to a requested location for self-service. Parts-only service does not include a service technician being dispatched onsite. Parts must be changed at customer's own cost and labor and defective parts must be returned following the instructions supplied with the spare parts.

Also available are Lenovo Services warranty maintenance upgrades and post-warranty maintenance agreements, with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

Lenovo warranty service upgrade offerings are region-specific. Not all warranty service upgrades are available in every region. For information about Lenovo warranty service upgrade offerings that are available in your region, refer to the following resources:

- Service part numbers in Lenovo Data Center Solutions Configurator (DCSC):
<http://dcsc.lenovo.com/#/services>
- Lenovo Services Availability Locator:
<https://lenovolocator.com/>

In general, the following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
 - 3, 4, or 5 years of warranty service coverage
 - 1-year or 2-year post-warranty extensions
 - Foundation Service: 9x5 service coverage with next business day onsite response
 - Essential Service: 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select regions)
 - Advanced Service: 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select regions)
- Basic Hardware Installation Services
Lenovo experts can seamlessly manage the physical installation of your server, storage, or networking hardware. Working at a time convenient for you (business hours or off shift), the technician will unpack and inspect the systems on your site, install options, mount in a rack cabinet, connect to power and network, check and update firmware to the latest levels, verify operation, and dispose of the packaging, allowing your team to focus on other priorities.

For service definitions, region-specific details, and service limitations, please refer to the following documents:

- Lenovo Statement of Limited Warranty for Data Center Group (DCG) Servers and System Storage
<http://pcsupport.lenovo.com/us/en/solutions/ht503310>
- Lenovo Data Center Services Agreement
<http://support.lenovo.com/us/en/solutions/ht116628>

Regulatory compliance

The NE10032 RackSwitch conforms to the following regulations:

- Argentina IEC60950-1
- AS/NZS CISPR 22, Class A
- Canada ICES-003, Issue 4, Class A
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, and EN61000-3-3)
- China CCC GB4943, GB9254 Class A, GB17625.1
- CISPR 22, Class A
- CSA C22.2 No. 60950-1
- FCC: Verified to comply with Part 15 of the FCC Rules, Class A
- IEC 60950-1 (CB Certificate and CB Test Report)
- Japan VCCI, Class A
- Korea KN22, Class A; KN24
- NOM-019
- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22, 51318.24, 51317.3.2, and 51317.3.3
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- TUV-GS (EN60950-1/IEC60950-1, EK1-ITB2000)
- UL/IEC 60950-1
- Reduction of Hazardous Substances (ROHS)

Network connectivity

The following table lists the network switches with rear-to-front airflow that are offered by Lenovo that can be used with the NE10032 RackSwitch for ThinkSystem and Flex System network connectivity.

Table 8. Network switches (rear-to-front airflow)

Description	Part number
10 Gb Ethernet switches	
Lenovo ThinkSystem NE1032 RackSwitch (Rear to Front)	7159A1X
Lenovo ThinkSystem NE1032T RackSwitch (Rear to Front)	7159B1X
Lenovo ThinkSystem NE1064TO RackSwitch (Rear to Front, ONIE)	7Z330O11WW
Lenovo ThinkSystem NE1072T RackSwitch (Rear to Front)	7159C1X
Lenovo RackSwitch G8272 (Rear to Front)	7159CRW
25 Gb Ethernet switches	
Lenovo ThinkSystem NE2572 RackSwitch (Rear to Front)	7159E1X
Lenovo ThinkSystem NE2572O RackSwitch (Rear to Front, ONIE)	7Z210O21WW
Lenovo ThinkSystem NE2580O RackSwitch (Rear to Front, ONIE)	7Z330O21WW
100 Gb Ethernet switches	
Lenovo ThinkSystem NE10032O RackSwitch (Rear to Front, ONIE)	7Z210O11WW

The following table lists the network switches with front-to-rear airflow that are offered by Lenovo that can be used with the NE10032 RackSwitch for NeXtScale System network connectivity.

Table 9. Network switches (front-to-rear airflow)

Description	Part number
10 Gb Ethernet switches	
Lenovo ThinkSystem NE1032 RackSwitch (Front to Rear)	7159A2X
Lenovo ThinkSystem NE1032T RackSwitch (Front to Rear)	7159B2X
Lenovo ThinkSystem NE1072T RackSwitch (Front to Rear)	7159C2X
Lenovo RackSwitch G8272 (Front to Rear)	7159CFV
25 Gb Ethernet switches	
Lenovo ThinkSystem NE2572 RackSwitch (Front to Rear)	7159E2X

For more information, see the list of Product Guides in the Top-of-rack Switches category:

<http://lenovopress.com/servers/options/switches#rt=product-guide>

Storage connectivity

The following table lists the external storage systems that are currently offered by Lenovo that can be used with the NE10032 RackSwitch for external NAS or iSCSI SAN storage connectivity.

Table 10. External storage systems: DE Series

Description	Part number	
	Worldwide	Japan
Lenovo ThinkSystem DE2000H 10GBASE-T Hybrid Flash Array LFF (16 GB cache)	7Y70A003WW	7Y701001JP
Lenovo ThinkSystem DE2000H 10GBASE-T Hybrid Flash Array SFF (16 GB cache)	7Y71A002WW	7Y711005JP
Lenovo ThinkSystem DE2000H iSCSI Hybrid Flash Array LFF (16 GB cache)	7Y70A004WW	7Y701000JP
Lenovo ThinkSystem DE2000H iSCSI Hybrid Flash Array SFF (16 GB cache)	7Y71A003WW	7Y711006JP
Lenovo ThinkSystem DE4000H iSCSI Hybrid Flash Array 4U60 (16 GB cache)	7Y77A000WW	7Y771002JP
Lenovo ThinkSystem DE4000H iSCSI Hybrid Flash Array LFF (16 GB cache)	7Y74A002WW	7Y74A002JP
Lenovo ThinkSystem DE4000H iSCSI Hybrid Flash Array SFF (16 GB cache)	7Y75A001WW	7Y75A001JP
Lenovo ThinkSystem DE4000F iSCSI All Flash Array SFF (16 GB cache)	7Y76A002WW	7Y76A002JP
Lenovo ThinkSystem DE4000F iSCSI All Flash Array SFF (64 GB cache)	7Y76A007WW	7Y76A00AJJP
Lenovo ThinkSystem DE6000H iSCSI Hybrid Flash Array 4U60 (32 GB cache)	7Y80A002WW	7Y801000JP
Lenovo ThinkSystem DE6000H iSCSI Hybrid Flash Array SFF (32 GB cache)	7Y78A002WW	7Y781000JP
Lenovo ThinkSystem DE6000F iSCSI All Flash Array SFF (128 GB cache)	7Y79A002WW	7Y79A002JP

Table 11. External storage systems: DM Series

Description	Part number
ThinkSystem DM3000H Hybrid Storage Array (2U12 LFF, CTO only)	7Y42CTO1WW
ThinkSystem DM3000H, 48TB (12x 4TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y421003EA*
ThinkSystem DM3000H, 48TB (12x 4TB HDDs), 10GBASE-T, ONTAP 9.5	7Y421007EA*
ThinkSystem DM3000H, 96TB (12x 8TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y421005EA*
ThinkSystem DM3000H, 96TB (12x 8TB HDDs), 10GBASE-T, ONTAP 9.5	7Y421001EA*
ThinkSystem DM5000H Hybrid Storage Array (2U24 SFF, CTO only)	7Y57CTO1WW
ThinkSystem DM5000H, 11.5TB (12x 960GB SSDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y571004EA*
ThinkSystem DM5000H, 11.5TB (12x 960GB SSDs), 10GBASE-T, ONTAP 9.5	7Y57100LEA*
ThinkSystem DM5000H, 14.4TB (12x 1.2TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y57100CEA*
ThinkSystem DM5000H, 21.6TB (12x 1.8TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y57100GEA*
ThinkSystem DM5000H, 23TB (24x 960GB SSDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y571006EA*
ThinkSystem DM5000H, 23TB (24x 960GB SSDs), 10GBASE-T, ONTAP 9.5	7Y57100NEA*
ThinkSystem DM5000H, 28.8TB (24x 1.2TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y57100EEA*
ThinkSystem DM5000H, 28.8TB (24x 1.2TB HDDs), 10GBASE-T, ONTAP 9.5	7Y57100VEA*
ThinkSystem DM5000H, 43.2TB (24x 1.8TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y57100JEA*
ThinkSystem DM5000H, 43.2TB (24x 1.8TB HDDs), 10GBASE-T, ONTAP 9.5	7Y571002EA*
ThinkSystem DM5000H, 46TB (12x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y571008EA*
ThinkSystem DM5000H, 46TB (12x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5	7Y57100QEA*
ThinkSystem DM5000H, 92TB (24x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y57100AEA*
ThinkSystem DM5000H, 92TB (24x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5	7Y57100REA*
ThinkSystem DM5000F Flash Storage Array (2U24 SFF, CTO only)	7Y41CTO1WW
ThinkSystem DM5000F, 11.5TB (12x 960GB SSDs), 10GBASE-T, ONTAP 9.5	7Y411002EA*
ThinkSystem DM5000F, 23TB (24x 960GB SSDs), 10GBASE-T, ONTAP 9.5	7Y411004EA*
ThinkSystem DM5000F, 46TB (12x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5	7Y411006EA*
ThinkSystem DM5000F, 92TB (24x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5	7Y411007EA*
ThinkSystem DM7000H Hybrid Storage Array (3U, CTO only)	7Y56CTO1WW
ThinkSystem DM7000F Flash Storage Array (3U, CTO only)	7Y40CTO1WW
ThinkSystem DM7100H Hybrid Storage Array (4U, CTO only)	7D26CTO1WW
ThinkSystem DM7100F Flash Storage Array (4U, CTO only)	7D25CTO1WW

* Preconfigured models that are available only in North America (part numbers that have NA at the end) or EMEA (part numbers that have EA at the end) and require Preconfigured support to be purchased with the storage system (See the respective product guide for details).

For more information, see the list of Product Guides in the Lenovo Storage category:

<http://lenovopress.com/storage/san/lenovo#rt=product-guide>

Rack cabinets

The following table lists the rack cabinets that are offered by Lenovo that can be used with the NE10032 RackSwitch in IT solutions.

Table 12. Rack cabinets

Description	Part number
25U S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072RX
25U Static S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072PX
42U S2 Standard Rack (1000 mm deep; 6 sidewall compartments)	93074RX
42U 1100mm Enterprise V2 Dynamic Rack (6 sidewall compartments)	93634PX
42U 1100mm Enterprise V2 Dynamic Expansion Rack (6 sidewall compartments)	93634EX
42U 1200mm Deep Dynamic Rack (6 sidewall compartments)	93604PX
42U 1200mm Deep Static Rack (6 sidewall compartments)	93614PX
42U Enterprise Rack (1105 mm deep; 4 sidewall compartments)	93084PX
42U Enterprise Expansion Rack (1105 mm deep; 4 sidewall compartments)	93084EX

For more information, see the list of Product Guides in the Rack cabinets category:

<http://lenovopress.com/servers/options/racks?rt=product-guide>

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo that can be used with the NE10032 RackSwitch in IT solutions.

Table 13. Power distribution units

Description	Part number
0U Basic PDUs	
0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord	00YJ776
0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord	00YJ777
0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord	00YJ778
0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord	00YJ779
Switched and Monitored PDUs	
0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord	00YJ781
0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord	00YJ780
0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord	00YJ782
0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord	00YJ783
1U 9 C19/3 C13 Switched and Monitored DPI PDU (without a line cord)	46M4002
1U 9 C19/3 C13 Switched and Monitored 60A 3Ph PDU with IEC 309 3P+Gnd cord	46M4003
1U 12 C13 Switched and Monitored DPI PDU (without a line cord)	46M4004
1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord	46M4005
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
Ultra Density Enterprise C19/C13 PDU Module (without a line cord)	71762NX

Description	Part number
Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord	71763NU
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
DPI C13 Enterprise PDU+ (without a line cord)	39M2816
DPI Single Phase C13 Enterprise PDU (without a line cord)	39Y8941
C19 Enterprise PDUs (6x IEC 320 C19 outlets)	
DPI Single Phase C19 Enterprise PDU (without a line cord)	39Y8948
DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord	39Y8923
Front-end PDUs (3x IEC 320 C19 outlets)	
DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord	39Y8938
DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord	39Y8939
DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8934
DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8940
DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8935
Universal PDUs (7x IEC 320 C13 outlets)	
DPI Universal 7 C13 PDU (with 2 m IEC 320-C19 to C20 rack power cord)	00YE443
NEMA PDUs (6x NEMA 5-15R outlets)	
DPI 100-127V PDU with fixed NEMA L5-15P line cord	39Y8905
Line cords for PDUs that ship without a line cord	
DPI 30a Line Cord (NEMA L6-30P)	40K9614
DPI 32a Line Cord (IEC 309 P+N+G)	40K9612
DPI 32a Line Cord (IEC 309 3P+N+G)	40K9611
DPI 60a Cord (IEC 309 2P+G)	40K9615
DPI 63a Cord (IEC 309 P+N+G)	40K9613
DPI Australian/NZ 3112 Line Cord (32A)	40K9617
DPI Korean 8305 Line Cord (30A)	40K9618

For more information, see the list of Product Guides in the Power Distribution Units category:
<http://lenovopress.com/servers/options/pdu?rt=product-guide>

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo that can be used with the NE10032 RackSwitch in IT solutions.

Table 14. Uninterruptible power supply units

Description	Part number
Worldwide models	
RT1.5kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA 5-15R 12A outlets)	55941AX
RT1.5kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A outlets)	55941KX
RT2.2kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA 5-20R 16A outlets)	55942AX
RT2.2kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x IEC 320 C19 16A outlets)	55942KX
RT3kVA 2U Rack or Tower UPS (100-125VAC) (6x NEMA5-20R 16A, 1x NEMA L5-30R 24A outlets)	55943AX
RT3kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x IEC 320 C19 16A outlets)	55943KX
RT5kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x IEC 320 C19 16A outlets)	55945KX
RT6kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x IEC 320 C19 16A outlets)	55946KX
RT8kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55948KX
RT11kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55949KX
RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55948PX
RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55949PX
ASEAN, HTK, INDIA, and PRC models	
ThinkSystem RT3kVA 2U Standard UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)	55943KT
ThinkSystem RT3kVA 2U Long Backup UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)	55943LT
ThinkSystem RT6kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)	55946KT
ThinkSystem RT10kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)	5594XKT

For more information, see the list of Product Guides in the Uninterruptible Power Supply Units category:
<http://lenovopress.com/servers/options/ups#rt=product-guide>

Lenovo Financial Services

Lenovo Financial Services reinforces Lenovo's commitment to deliver pioneering products and services that are recognized for their quality, excellence, and trustworthiness. Lenovo Financial Services offers financing solutions and services that complement your technology solution anywhere in the world.

We are dedicated to delivering a positive finance experience for customers like you who want to maximize your purchase power by obtaining the technology you need today, protect against technology obsolescence, and preserve your capital for other uses.

We work with businesses, non-profit organizations, governments and educational institutions to finance their entire technology solution. We focus on making it easy to do business with us. Our highly experienced team of finance professionals operates in a work culture that emphasizes the importance of providing outstanding customer service. Our systems, processes and flexible policies support our goal of providing customers with a positive experience.

We finance your entire solution. Unlike others, we allow you to bundle everything you need from hardware and software to service contracts, installation costs, training fees, and sales tax. If you decide weeks or months later to add to your solution, we can consolidate everything into a single invoice.

Our Premier Client services provide large accounts with special handling services to ensure these complex transactions are serviced properly. As a premier client, you have a dedicated finance specialist who manages your account through its life, from first invoice through asset return or purchase. This specialist develops an in-depth understanding of your invoice and payment requirements. For you, this dedication provides a high-quality, easy, and positive financing experience.

For your region-specific offers please ask your Lenovo sales representative or your technology provider about the use of Lenovo Financial Services. For more information, see the following Lenovo website:
<http://www.lenovofs.com>

Related publications and links

For more information about the NE10032 RackSwitch, see the following publications that are available at the RackSwitch InfoCenter:

http://systemx.lenovofiles.com/help/topic/com.lenovo.thinksystem.ne10032.doc/ts_ne10032.html

- *Lenovo ThinkSystem NE10032 RackSwitch Installation Guide*
- *Lenovo ThinkSystem NE10032 RackSwitch Application Guide*
- *Lenovo ThinkSystem NE10032 RackSwitch REST API Guide*
- *Lenovo ThinkSystem NE10032 RackSwitch Python Programming Guide*

The software for the NE10032 RackSwitch can be downloaded from Lenovo Data Center Support:
<http://datacentersupport.lenovo.com/us/en/products/networking/rackswitch/NE10032/downloads>

For more information about the following management plug-ins for the NE10032 RackSwitch, see Network Management:

<http://www3.lenovo.com/us/en/data-center/networking/networking-software/network-management>

- ThinkAgile Network Orchestrator
- Lenovo Networking Plug-In for VMware vRealize Orchestrator
- Lenovo Networking Content Pack for VMware vRealize Log Insight
- Lenovo Networking Bundle for VMware vRealize
- Lenovo Networking Plug-In for OpenStack Neutron
- Integration with Ansible
- Lenovo Telemetry Analytics Tool: Ganglia Plugins

For discussions on various Lenovo networking topics, visit the Data Center Networking Community Forum:
http://forums.lenovo.com/t5/Datacenter-Networking/ct-p/nh_eg

Related product families

Product families related to this document are the following:

- [100 Gb Ethernet Connectivity](#)
- [Top-of-Rack Switches](#)

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