HPE Networking

Family guide

HPE Storage Switch M-series

High-performance Ethernet connectivity between storage and compute

HPE GreenLake

Modern connectivity for storage and compute

The future of modern business belongs to IT. Success or failure will depend on its ability to help extract value from data. This is not a simple task, however. The way data is stored, managed, and accessed is changing while IT is making significant investments in data storage, security, and analytics. Large, expensive, scale-up storage is no longer the best or only option. Scale-out storage is rapidly supplanting scale-up storage due to its ability to linearly scale both performance and storage. Scale-out storage is a more flexible and more cost-efficient solution for many workloads; but a scale-out approach changes the storage model from centralized to distributed, which also shifts the burden to the network.

In a centralized storage model, a SAN was almost solely Fibre Channel. In a distributed storage model, the modern SAN is now Fibre Channel and Ethernet. The combination of distributed storage infrastructure and the view that data is a strategic asset make choosing between Ethernet and Fibre Channel a strategic decision. Much faster raw speeds, new lossless configuration capabilities, cost efficiency, scalability, and networking administrator familiarity make Ethernet a viable alternative. To unlock the value of data using tools such as artificial intelligence (AI) and advanced analytics, the network between compute and storage must be fast, reliable, and designed to handle modern, distributed workloads. Ethernet is the best protocol choice in many cases.

Distributed workloads using high-speed distributed storage can strain a network. Bursts of traffic can quickly saturate storage fabrics. Ethernet switches deal with congestion and absorb the traffic spike by using their buffer. This helps ensure that frames and packets are not lost. However, buffering increases latency, and high latency in a storage network slows the workload down. Switches that split its buffer across some ports and switches with deep buffers can greatly increase latency in certain situations.

HPE Storage Switch M-series is built for storage workloads. Buffers are architected differently than other Ethernet switches and perform better when certain conditions are present. HPE Storage Switch M-series comes in seven different base models that are optimized for storage traffic and can be configured into more than 50 million combinations of 400, 200, 100, 50, 40, 25, 10, and 1 Gbps port speeds.

Boost storage performance and unlock flash ROI

Flash storage within storage arrays and hyperconverged infrastructure (HCI) offers significant advantages over HDDs. A transition to flash results in faster read/write operations, enhancing overall performance. However, it's essential to consider potential bottlenecks. The bottleneck may have shifted from the storage device to the network, impacting the expected performance gains from a flash upgrade. Without a performant network capable of ultra-low latency port-to-port and large, fully shared buffers, the advantages of a flash storage implementation may be lost.

HPE Storage Switch M-series helps maximize storage performance and unlock the value of flash with:

- Ultra-low latency of 300 ns for half-width switches and 500 ns or less for full-width switches.
- A fully shared packet buffer that provides a fair, predictable, and high bandwidth data path to absorb traffic spikes in environments with bursty, powerful data transfers.

Deliver high-performance connectivity and reduce per-port costs

Inside a data center, assets such as servers, storage, data protection, and HCI will span multiple generations requiring multispeed network connectivity. The latest storage device might connect at 100 Gbps, but a legacy device might connect at 10 Gbps. To handle both connections, a network switch with a large degree of backward compatibility and plenty of optical and cable options is required. As old IT assets are retired or existing assets are upgraded, optics and cables can be reused in other devices and connected to switches at appropriate speeds without impacting existing connections. Without flexible switching technology capable of a vast array of port combinations that are backward compatible at a large number of speeds, connectivity costs per port rise.

HPE Storage Switch M-series is designed to deliver high-performance connectivity and reduce per-port costs with:

- Predictable and consistent throughput regardless of frame size, even in a mixed port speed configuration
- Wire-rate performance with zero packet loss across all frame sizes while moving data across both layer 2 and layer 3
- Switches that come unpopulated with all ports active to deliver a high level of configuration options at low per-port costs

Ideal for demanding enterprise data center and storage environments

The paradigm shift to a distributed storage model has coincided with the changes to where data is generated, stored, and used. Today's data landscape spans the edge, traditional data centers, colocation facilities, and the cloud, with IT responsible for access, protection, and security everywhere. The reality of introducing new storage platforms into IT coupled with new locations has created more complexity while massively increasing the amount of traffic between compute and storage. Without an Ethernet switching infrastructure capable of handling layers 2 and 3 and the rising level of east-west traffic, the network will struggle or fail.

HPE Storage Switch M-series is ideal for demanding enterprise data center and storage environments because it has:

- Feature-rich layer 2 and layer 3 forwarding including superior equal-cost multipath (ECMP) flexibility and efficiency to deliver balanced workloads
- Lossless Ethernet configuration capabilities with Data Center Bridging (DCB), Priority-based Flow Control (PFC), and Explicit Congestion Notification (ECN) support
- Flexible management and monitoring options from CLI and toolsets, which provide ease of use, configuration, and monitoring of the switch

Why choose HPE Storage Switch M-series?

HPE Storage Switch M-series combines performance, scalability, ease of management, and affordability. As a reliable foundation for storage networking, these switches consistently deliver optimal performance, whether supporting critical applications or managing substantial data transfers. From small businesses to large enterprises, the switches provide tangible value by enabling seamless connectivity, agility, and cost-effectiveness.

Predictable performance and zero packet loss

HPE Storage Switch M-series is designed to deliver consistent and reliable performance. Whether you're building a modern server or storage network, these switches provide wire-speed layer 2 and layer 3 features across all ports and packet sizes. Their hallmark lies in predictable throughput and zero packet loss, facilitating smooth data flow even during peak loads. Whether you're running critical applications or handling massive data transfers, these switches maintain consistent performance. This predictability is essential for mission-critical applications and workloads.

Scalable and storage optimized

HPE Storage Switch M-series is scalable and storage optimized. They are suitable for various storage-related deployments across the data center. The switches are designed to adapt to evolving network needs from expanding your block, file, and object storage infrastructure to supporting high-performance workloads. Whether you need more ports or need to run mixed port speeds, these switches can scale seamlessly across layer 2 and layer 3. Their high availability and scalability make them a solid choice for primary storage, secondary storage, HCI, or AI / machine learning (ML) workloads in the data center.

Economic efficiency

Networks built on HPE Storage Switch M-series strike a balance between performance and affordability. These switches are cost-effective without compromising on quality. As your business grows, the switches grow with you. Whether it's expanding your data center or accommodating new services, this switch series' flexibility provides long-term investment protection. The switches offer an attractive ROI for companies in a variety of sectors using a multitude of workloads. Their efficient design and enterprise-level performance make them a smart choice for organizations seeking value.

HPE Storage Switch M-series technology

The HPE Storage Switch M-series offers high performance, scalability, and manageability, which makes them ideal for modern data centers and demanding storage workloads. They utilize the powerful NVIDIA® Spectrum® ASIC to provide high switching capacity and low latency. The ASIC supports various port speeds, ranging from 1GbE to 400GbE, providing efficient data forwarding within data centers. Telemetry capabilities are integrated, enabling monitoring, troubleshooting, and performance optimization. Consistent low latency is maintained across the switches, meeting demands of modern workloads. Each switch has its unique characteristics and use cases, but these common features form the foundation of the HPE Storage Switch M-series, including:

Performance

NVIDIA Spectrum ASIC:

- HPE Storage Switch M-series utilizes the powerful NVIDIA Spectrum ASIC.
- The Spectrum ASIC provides high switching capacity, low latency, and advanced features.
- It enables wire-speed forwarding and supports various port speeds (ranging from 1GbE to 400GbE).

Layer 2 and layer 3 forwarding

- HPE Storage Switch M-series supports both layer 2 and layer 3 forwarding.
- This versatility allows them to handle complex networking requirements.

Consistent low latency

- Low latency is maintained to meet demanding application needs in every HPE M-series switch.
- Whether in leaf or spine configurations, latency remains minimal.

Scalability

High availability and density

- The SN2000 series provides high-availability options in space-constrained environments.
- The SN3000 and SN4000 series provide high-port density for efficient rack connectivity.

Unique buffer architecture

- HPE Storage Switch M-series incorporates dynamic, flexible, and shared buffers.
- These buffers adapt to varying workloads and traffic patterns to optimize utilization.
- The fully shared packet buffer helps ensure fair, predictable, and high-performance data paths.

Management and automation

Telemetry and visibility

- HPE Storage Switch M-series offers telemetry capabilities for monitoring, troubleshooting, and performance optimization.
- Features like What Just Happened (WJH) dramatically reduce mean time to issue resolution by providing answers to questions such as when, what, who, where, and why.
- In-band network telemetry (INT) provides detailed insights into network behavior.

Open architecture and standards based

- HPE Storage Switch M-series includes the NVIDIA Cumulus® Linux® network operating system (NOS).
- It is an open NOS that includes standards-based protocols and features for complete interoperability across the data center.

Programmability and customization

- Cumulus Linux is built with advanced automation capabilities for continuous integration and continuous delivery (CI/CD) workflows.

- Network administrators experience the liberty to customize network behavior programmatically through CLI or web interfaces.

Choose your size and speed

HPE Storage Switch M-series is offered in one of two sizes: half width and full width. Half-width switches are designed for cost-efficient, high-availability in space-constrained environments. Full-width switches are designed to increase port configuration options or overall port speeds in environments that aren't space constrained.

Half-width Ethernet switches

HPE Storage Switch M-series offers some of its switches in a half-width size, which allows redundant units to be placed side-by-side in one rack unit. A half-width switch is the optimal balance among density, high availability, and affordability and is ideal for organizations needing to save space or costs on their primary, secondary, or HCI storage connectivity.

Table 1. Compare key features of half-width Ethernet switches

	 HPE SN2010M	 HPE SN2100M
Connectors	18 ports 25GbE (SFP28) 4 ports 100GbE (QSFP28)	16 ports 100GbE (QSFP28)
Max. 100GbE ports	4	16
Max. 50GbE ports	8	32
Max. 40GbE ports	4	16
Max. 25GbE ports	34	64
Max. 10GbE ports	34	64
Max. 1GbE ports	34	64
Switching capacity	1.7 Tbps	3.2 Tbps
Processing capacity	1.26 Bpps	2.38 Bpps
Latency	300 ns	300 ns
Packet buffer	16 MB	16 MB
System memory	8 GB	8 GB
SSD memory	16 GB	16 GB
1GbE management ports	1 RJ45	1 RJ45
Serial ports	1 RJ45	1 RJ45
USB ports	1 mini USB 2.0	1 mini USB 2.0
Power supplies	2 (1+1 redundant) not replaceable	2 (1+1 redundant) not replaceable
Fans	2 fans not replaceable	2 fans not replaceable
Airflow	Power-to-Connector (P2C) airflow	P2C airflow
Power supplies	Frequency: 50 Hz–60 Hz Input range: 100 VAC–264 VAC Input current: 4.5A–2.9A	Frequency: 50 Hz–60 Hz Input range: 100 VAC–264 VAC Input current: 4.5A–2.9A
Typical power (ATIS)	66W	74W
Size (H x W x D)	1.72" x 7.87" x 20" (43.9 mm x 200 mm x 508 mm)	1.72" x 7.87" x 20" (43.9 mm x 200 mm x 508 mm)
Weight	4.54 kg (9.9 lb)	4.54 kg (10 lb)

For a full list of supported options and details, see the HPE Storage Switch M-series QuickSpecs at hpe.com/info/qs.

Full-width Ethernet switches

HPE Storage Switch M-series offers most switches in a full-width size that comes in either 1U or 2U rack units. A full-width switch is the optimal balance between ports and port speed and is ideal for organizations needing the maximum number of server or storage connections per switch or the fastest switch technology.

Table 2. Compare key features of full-width Ethernet switches

	 HPE SN3420M	 HPE SN3700cM	 HPE SN3700M	 HPE SN4600cM	 HPE SN4700M
Rack unit	1U	1U	1U	2U	1U
Connectors	48 ports 25GbE (SFP28) 12 ports 100GbE (QSFP28)	32 ports 100GbE (QSFP28)	32 ports 200GbE (QSFP56)	64 ports 100GbE (QSFP28)	32 ports 400GbE (QSFP-DD)
Max. 400GbE ports	-	-	-	-	32
Max. 200GbE ports	-	-	32	-	64
Max. 100GbE ports	12	32	64	64	128
Max. 50GbE ports	24	64	128	64	128
Max. 40GbE ports	12	32	32	64	64
Max. 25GbE ports	96	128	128	128	128
Max. 10GbE ports	96	128	128	128	128
Max. 1GbE ports	96	128	128	128	128
Switching capacity	4.8 Tbps	6.4 Tbps	12.8 Tbps	12.8 Tbps	25.6 Tbps
Processing capacity	3.58 Bpps	4.76 Bpps	8.33 Bpps	8.4 Bpps	8.4 Bpps
Latency	425 ns	425 ns	425 ns	500 ns	500 ns
Packet buffer	42 MB	42 MB	42 MB	64 MB	64 MB
System memory	8 GB	8 GB	8 GB	8 GB	16 GB
SSD memory	32 GB	32 GB	32 GB	30 GB	60 GB
1GbE management ports	1 RJ45	1 RJ45	1 RJ45	1 RJ45	1 RJ45
Serial ports	1 RJ45	1 RJ45	1 RJ45	1 RJ45	1 RJ45
USB ports	1 Type A USB 3.0	1 Micro USB 2.0	1 Micro USB 2.0	1 Type A USB 2.0	1 Type A USB 2.0
Power supplies	2 (1+1 redundant)	2 (1+1 redundant)	2 (1+1 redundant)	2 (1+1 redundant)	2 (1+1 redundant)
Fans	5 (N+1 redundant)	4 (N+1 redundant)	6 (N+1 redundant)	3 (N+1 redundant)	6 (N+1 redundant)
Airflow	P2C airflow	P2C airflow	P2C airflow	P2C airflow	P2C airflow
Power supplies	Frequency: 50 Hz–60 Hz Input range: 100 VAC–264 VAC Input current: 7.1A–2.8A	Frequency: 50 Hz–60 Hz Input range: 100 VAC–264 VAC Input current: 13A–7A	Frequency: 50 Hz–60 Hz Input range: 100 VAC–264 VAC Input current: 13A–7A	Frequency: 50 Hz–60 Hz Input range: 100 VAC–264 VAC Input current: 10A–6A	Frequency: 50 Hz–60 Hz Input range: 100 VAC–264 VAC Input current: 15A–10A
Typical Power (ATIS)	202W	242W	250W	466W	630W
Size (H x W x D)	1.72" x 17.24" x 18.29" (44 mm x 438 mm x 464.6 mm)	1.72" x 16.84" x 22" (44 mm x 428 mm x 559 mm)	1.72" x 16.84" x 22" (44 mm x 428 mm x 559 mm)	3.46" x 16.85" x 22.3" (88 mm x 428 mm x 568.5 mm)	1.72" x 16.85" x 22.3" (44 mm x 428 mm x 568.5 mm)
Weight	8.5 kg (18.8 lb)	14 kg (30.9 lb)	14 kg (30.9 lb)	14.64 kg (32.3 lb)	11.6 kg (25.6 lb)

For a full list of supported options and details, see the HPE Storage Switch M-series QuickSpecs at hpe.com/info/qs.

NVIDIA Cumulus Linux

HPE Storage Switch M-series is powered by NVIDIA Cumulus Linux, which is a powerful, customizable, and efficient open NOS designed for modern data centers. Cumulus Linux follows the guiding principles of easy implementation, management, customization, and scalability. It's based on Linux, which is supported by a broad ecosystem of engineers and tools. Some of its key benefits include:

- **Complete standardization:** Streamlines operations and helps ensure seamless compatibility throughout the entire data center.
- **Network protection:** Offers exclusive security enhancements beyond industry-standard features, providing robust protection.
- **Flexible open architecture:** Allows for the design of expansive and adaptable networks empowered by industry-standard protocols, harmonized with the flexibility of Linux.
- **Reduced OpEx:** Gives IT the ability to leverage Linux-based management tools and skilled personnel, which can result in the allocation of more switches per engineer.
- **Faster IT delivery:** delivers seamless integration capabilities and tools for automating, monitoring, and analyzing the network.

HPE Storage Switch M-series comes with Cumulus Linux factory installed. The software integrates with the switching hardware to deliver a unique set of features, including:

- **Unnumbered interfaces:** Simplified IP approach for Border Gateway Protocol (BGP) and Open Shortest Path First (OSPF)
- **Redistribute neighbor (RDNBR):** VM and host mobility without reconfiguration
- **Prescriptive Topology Manager (PTM):** Efficient verification of connections
- **Virtual routing and forwarding:** Traffic isolation and network segmentation
- **Ethernet Virtual Private Networks (EVPNs):** Advanced layer 3 capabilities for legacy layer 2 applications
- **NVIDIA User Experience (NVUE):** CLI object model for advanced programmability
- **Disaggregation:** Open architecture with a Linux operating model
- **Native security:** Secure switches from OpenSSH to authentication
- **Unified stack across compute and networking:** Reduce complexities and achieve high levels of interoperability

Warranty

(3-3-3) hardware warranty; 3-year parts; 3-year on-site (standard business hours, next-business-day response), and 3-year labor.

Note

The hardware warranty covers firmware. For extended hardware support and installation information, see the "HPE Services" section.

HPE Services

No matter where you are in your transformation journey, you can count on HPE Services to deliver the expertise you need when, where, and how you need it. From planning to deployment, ongoing operations, and beyond, our experts can help you realize your digital ambitions.
hpe.com/services

Consulting services

No matter where you are in your journey to hybrid cloud, experts can help you map out your next steps. From determining what workloads should be used, to handling governance and compliance, to managing costs, our experts can help you optimize your operations.
hpe.com/services/consulting

HPE Managed Services

HPE runs your IT operations, providing services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.
hpe.com/us/en/services/remote-infrastructure-monitoring.html

Operational services

Optimize your entire IT environment and drive innovation. Manage day-to-day IT operational tasks while freeing up valuable time and resources. Meet service-level targets and business objectives with features designed to drive better business outcomes.
hpe.com/services/operational

Recommended services

HPE Tech Care Service

HPE Tech Care Service is the operational support service experience for HPE products. The service goes beyond traditional support by providing access to product-specific experts, an AI-driven digital experience, and general technical guidance to not only reduce risk but also constantly search for ways to do things better. HPE Tech Care Service delivers a customer-centric, AI-driven, and digitally enabled customer experience to move your business forward. HPE Tech Care Service is available in three response levels. Basic, which provides 9x5 business hour availability and a 2-hour response time. Essential, which provides a 15-minute response time 24x7 for most enterprise-level customers, and Critical, which includes a 6-hour repair commitment where available and outage management response for severity 1 incident.
hpe.com/services/techcare

HPE Complete Care Service

HPE Complete Care Service is a modular, edge-to-cloud IT environment service designed to help optimize your entire IT environment and achieve agreed upon IT outcomes and business goals through a personalized experience. HPE Complete Care Service is delivered by an assigned team of HPE Services experts, who provide:

- A complete coverage approach — edge to cloud
- Modular and fully personalized engagement
- Enhanced incident management experience with priority access
- Digitally enabled and AI-driven customer experience

hpe.com/services/completecare

Other related services from HPE Services

HPE Installation and Startup Service

Provides the hardware installation and startup of HPE Storage Switch M-series with the operating system, according to the product specifications. The HPE service delivery technician assists you in bringing your new hardware into operation in a timely and professional manner.

hpe.com/psnow/doc/a00025816enw?from=app&section=search&isFutureVersion=true

HPE Hardware Installation

Provides the basic hardware installation of HPE Storage Switch M-series to assist you in bringing your new hardware into operation in a timely and professional manner.

hpe.com/psnow/doc/5981-9356enw?from=app&section=search&isFutureVersion=true

HPE Lifecycle Services

HPE Lifecycle Services provide a variety of options to help maintain your HPE systems and solutions at all stages of the product lifecycle. A few popular examples include:

- **Lifecycle install and startup services:** Various levels for physical installation and power on, remote access setup, installation and startup, and enhanced installation services with the operating system
- **HPE Firmware Update Analysis Service:** Recommendations for firmware revision levels for selected HPE products, taking into account the relevant revision dependencies within your IT environment
- **HPE Firmware Update Implementation Service:** Implementation of firmware updates for selected HPE server, storage, and solution products, taking into account the relevant revision dependencies within your IT environment
- **Implementation assistance services:** Highly trained technical service specialists to assist you with a variety of activities, ranging from design, implementation, and platform deployment to consolidation, migration, project management, and on-site technical forums
- **HPE Service Credits:** Access to prepaid services for flexibility to choose from a variety of specialized service activities, including assessments, performance maintenance reviews, firmware management, professional services, and operational best practices. For a list of the most frequently purchased services using service credits, see hpe.com/psnow/doc/4aa4-3393enw?from=app&section=search&isFutureVersion=true

hpe.com/services/lifecycle

HPE Education Services

Training and certification designed for IT and business professionals across industries. Broad catalog of course offerings to expand skills and proficiencies in topics ranging from cloud and cybersecurity to AI and DevOps. Create learning paths to expand proficiency in a specific subject. Schedule training in a way that works best for your business with flexible continuous learning options.
hpe.com/services/training

Defective media retention

An option available with HPE Complete Care Service and HPE Tech Care Service and applies only to disk or eligible SSD / flash drives replaced by Hewlett Packard Enterprise due to malfunction. Consult your HPE sales representative or authorized channel partner of choice for any additional questions and service options.

Parts and materials

HPE provides HPE supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements. Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

AI-powered and digitally enabled support experience

Achieve faster time to resolution with access to product-specific resources and expertise through a digital and data-driven customer experience. Sign into the HPE Support Center experience, featuring streamlined self-serve case creation and management capabilities with inline knowledge recommendations. You will also find personalized task alerts and powerful troubleshooting support through an intelligent virtual agent with a seamless transition when needed to a live support agent.

support.hpe.com/hpesc/public/home/signin

Consume IT on your terms

HPE GreenLake edge-to-cloud platform brings the cloud experience directly to your apps and data wherever they are — the edge, colocations, or your data center. It delivers cloud services for on-premises IT infrastructure specifically tailored to your most demanding workloads. With a pay-per-use,* scalable, point-and-click self-service experience that is managed for you, HPE GreenLake platform accelerates digital transformation in a distributed, edge-to-cloud world.

- Get faster time to market
- Save on TCO, align costs to business
- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and cloud

Learn more about services and how to purchase

To learn more about HPE Services, contact your HPE sales representative or HPE authorized channel partner. Contact information for a representative in your area can be found at hpe.com/us/en/contact-hpe.html. Services are sold by HPE and HPE authorized service partners:

- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools
- Customers purchasing from a commercial reseller can find services at ssc.hpe.com/portal/site/ssc/

* May be subject to minimums or reserve capacity may apply.

Learn more at

HPE.com/services
HPE.com/us/en/storage/networking.html

Visit **HPE GreenLake**

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