



## NVIDIA QUANTUM-2 SCALING OUT DATA CENTERS WITH NDR 400G INFINIBAND SMART SWITCHES



### Accelerate Research, Innovation, and Product Development with Greater Data Capacity and In-Network Computing

As high-performance computing (HPC) and artificial intelligence (AI) applications become more complex, the demand for the most advanced high-speed networking is critical for extreme-scale systems. NVIDIA Quantum™-2 is the industry-leading switch platform in power and density, with NDR 400 gigabit per second (Gb/s) InfiniBand throughput that provide AI developers and scientific researchers with the highest networking performance available to take on the world's most challenging problems.

### ADVANCED COMPUTING NEEDS ADVANCED NETWORKING

The NVIDIA Quantum-2-based QM9700 and QM9790 switch systems deliver an unprecedented 64 ports of NDR 400Gb/s InfiniBand per port in a 1U standard chassis design. A single switch carries an aggregated bidirectional throughput of 51.2 terabits per second (Tb/s), with a landmark of more than 66.5 billion packets per second (BPPS) capacity. Supporting the latest NDR technology, NVIDIA Quantum-2 brings a high-speed, extremely low-latency and scalable solution that incorporates state-of-the-art technologies such as Remote Direct Memory Access (RDMA), adaptive routing, and NVIDIA Scalable Hierarchical Aggregation and Reduction Protocol (SHARP)™.

Unlike any other networking solution, NVIDIA Mellanox® InfiniBand provides self-healing network capabilities, as well as quality of service (QoS), enhanced virtual lane (VL) mapping, and congestion control to provide the highest overall application throughput. As an ideal rack-mounted InfiniBand solution, the QM9700 and QM9790 NDR InfiniBand edge switches allow maximum flexibility, as they enable a variety of topologies, including Fat Tree, SlimFly, DragonFly+, multi-dimensional Torus, and more. They're also backwards compatible to previous generations and include expansive software ecosystem support.

# THE ERA OF DATA-DRIVEN COMPUTING

Today's complex research demands ultra-fast processing of high-resolution simulations, extreme-size datasets, and complex, highly parallelized algorithms that need to exchange information in real time. The QM9700 NDR InfiniBand switches extend NVIDIA In-Network Computing technologies and introduce the third generation of NVIDIA SHARP technology, SHARPV3. Creating virtually unlimited scalability for large data aggregation through the network, SHARPV3 enables support for up to 64 parallel flows—32X higher AI acceleration power compared to the previous generation. SHARPV3 dramatically boosts application performance of complex computations while data moves through the data center network, participating in the application's runtime and reducing the amount of data needed to traverse the network.

## STREAMLINING NETWORK DESIGN AND TOPOLOGIES

By implementing NVIDIA port-split technology, the QM9700 and QM9790 switches provide a double-density radix for 200Gb/s (NDR200) data speeds, reducing the cost of network design and network topologies. Supporting up to 128 ports of 200Gb/s, NVIDIA delivers the densest top-of-rack (TOR) switch available on the market. The QM9700 family of switches enables small to medium-sized deployments to scale with a two-level Fat-Tree topology while reducing power, latency, and space requirements.

## ENHANCED MANAGEMENT

The internally managed QM9700 switch features an on-board subnet manager that enables simple, out-of-the-box bringup for up to 2,000 nodes. Running the NVIDIA Mellanox MLNX-OS® software package, the subnet manager delivers full chassis management through command-line interface (CLI), web-based user (WebUI), Simple Network Management Protocol (SNMP), or JavaScript Object Notation (JSON) interfaces.

The externally managed QM9790 switch can utilize the advanced NVIDIA Mellanox Unified Fabric Manager (UFM®) feature sets to empower data center operators to efficiently provision, monitor, manage, preventatively troubleshoot, and maintain the modern data center fabric, to realize higher utilization and reduce overall opex.

ORDERABLE PART NUMBER (OPN)	DESCRIPTION
MQM9700-NS2F	64-ports NDR, 32 OSFP ports, managed, power-to-connector (P2C) airflow (forward)
MQM9700-NS2R	64-ports NDR, 32 OSFP ports, managed, connector-to-power (C2P) airflow (reverse)
MQM9700-NS2FS	64-ports NDR, 32 OSFP ports, managed, P2C airflow (forward), secure boot
MQM9700-NS2RS	64-ports NDR, 32 OSFP ports, managed, C2P airflow (reverse), secure boot
MQM9790-NS2F	64-ports NDR, 32 OSFP ports, unmanaged, P2C airflow (forward)
MQM9790-NS2R	64-ports NDR, 32 OSFP ports, unmanaged, C2P airflow (reverse)
MTEF-PSF-AC-J	NVIDIA power-supply unit, 2,000W AC, P2C airflow; for QM97xx switches, power cord included
MTEF-PSR-AC-J	NVIDIA power-supply unit, 2,000W AC, C2P airflow; for QM97xx switches, power cord included
MTEF-FANF-L	400G 1U systems fan module with P2C air flow
MTEF-FANR-L	400G 1U systems fan module with C2P air flow

Learn more about [NVIDIA Mellanox InfiniBand switches](#).

Learn more about [NVIDIA Mellanox UFM software](#).

## SYSTEM SPECIFICATIONS

Performance	<b>400Gb/s per port</b>
Switch radix	<b>64 NDR non-blocking ports with aggregate data throughput up to 51.2Tb/s</b>
Connectors and cabling	<b>32 octal small form-factor pluggable (OSFP) connectors; passive or active copper or active fiber cable; optical module</b>
System power usage	<b>Maximum power with passive cables: 1,084W</b> <b>Maximum power with optical cables (with each port consuming 18.5W): 1,720W</b>
Power supply	<b>1+1 redundant and hot-swappable power</b> <b>Input range: 200-240Vac</b> <b>80 Gold+ and ENERGY STAR certified</b>
Cooling	<b>Front-to-rear or rear-to-front</b> <b>Cooling option: hot-swappable fan unit</b>
Management ports	<b>1x USB 3.0 x1</b> <b>1x USB for I2C channel</b> <b>1x RJ45</b> <b>1x RJ45 (UART)</b>
CPU	<b>x86 Coffee Lake i3</b>
System memory	<b>Single 8GB, 2,666 mega transfers per second (MT/s), DDR4 SO-DIMM</b>
Storage	<b>M.2 SSD SATA 16GB 2242 FF</b>
Software	<b>MLNX-OS</b>
System weight	<b>14.5kg</b>
System dimensions	<b>Height: 1.7in (43.6mm)</b> <b>Width: 17.0in (438mm)</b> <b>Depth: 26.0in (660.4mm)</b>
Rack mount	<b>1U rack mount</b>
EMC emissions	<b>Temperature:</b> > operating 0°C to 40°C > non-operating -40°C to 70°C <b>Humidity:</b> > operating 10% to 85% non-condensing > non-operating 10% to 90% non-condensing <b>Altitude: Up to 3050m</b>
Product safety compliant/certified	<b>RoHS, CB, cTUVus, CE, and CU</b>
Warranty	<b>1 year</b>