CORNELIS® CN5000 OMNI-PATH® SUPERNIC

The world's highest performance scale-out network for AI and HPC.

Network-Led Application Acceleration for AI and HPC

Maximum Performance at Any Scale

The CN5000 SuperNIC delivers unmatched scalability through dynamic adaptive routing, traffic flow optimization, and credit-based flow control. It supports lossless and congestion-free data transmission using fine-grained adaptive routing and dynamic lane scaling—ensuring low tail latency, high throughput, and robust data integrity even in the most demanding environments.

With these architectural features, including optimized link protection, the CN5000 SuperNIC maximizes compute efficiency, improves system reliability, and lowers total cost of ownership across AI and HPC deployments at scale.

Telemetry for Precision Control

The CN5000 SuperNIC is equipped with advanced telemetry engines, delivering real-time insights and granular network visibility to optimize AI and HPC workloads. The CN5000 SuperNIC continuously monitors traffic patterns and enables automated congestion mitigation and real-time traffic adjustment, reducing manual troubleshooting and improving workload stability.

With industry-leading, real-time telemetry and precision network intelligence, CN5000 SuperNICs ensure unparalleled visibility, efficiency, and control by delivering high-performance networking across compute environments at any scale.

Reliability and Adaptability for Maximum Efficiency

In AI and HPC, consistent and reliable network performance is crucial for maximizing computational efficiency. The CN5000 SuperNIC features advanced error correction and dynamic network function placement, ensuring maximum network efficiency.

The CN5000 SuperNIC offers maximum resiliency to ensure uptime even during failures and no error-driven retries. These innovations deliver superior reliability and adaptability for evolving AI and HPC environments, minimizing downtime, reducing retransmissions, and helping ensure high system availability for mission-critical workloads.

Advanced Networking for Generative and Agentic AI and HPC Workloads

Designed for demanding AI and HPC workloads, the CN5000 SuperNIC provides 400G bidirectional bandwidth, maximizing data throughput across the fabric. Its architecture prioritizes ultra-low latency and high message rates with sub-1μs MPI latency, ensuring timely inferencing and accelerated AI model training.
The CN5000 SuperNIC optimizes real-time inferencing, shortens feedback loops, and reduces time-to-results. Its robust and efficient design makes it the ideal choice for highly parallelized applications at any scale.

Omni-Path Architecture

CN5000 Architecture delivers lossless and congestion-free data transmission with credit-based flow control and dynamic fine-grained adaptive routing. It is designed for maximum performance, reliability, scalability, and data integrity with dynamic lane scaling and optimized link protection.

CN5000 SUPERNIC HIGHLIGHTS

Benefits

- Performance that scales with your cluster
- Real-time network visibility and control
- Supports >100K node clusters

Performance

- Single or dual port 400G
- > 800 million packets/s
- < 1 us MPI latency

Key Features

- Supports MSI-X interrupt handling
- Enhanced resource scaling
- Optimized send and receive buffer management for high message rate applications
- Supports Single Root I/O Virtualization (SR-IOV)
- Supports industry standard management interfaces
- Single and dual port adapter options
- Configurable from one to four VLs plus one management
- Configurable MTU size of 2 KB, 4 KB, 8 KB, or 10 KB VL
- PCI Express Base Specification 5.0 compliant
- Air and liquid cooling options

Advanced Features

- Advanced Congestion Management
- Fine-Grained Adaptive Routing (FGAR)
- Static Dispersive Routing (SDR)

Management Features

- Optimized for scalable MPI and SHMEM message rate and latency
- Includes support for standard telemetry protocols (PLDM, MCTP, Redfish) to streamline system integration and firmware updates
- Integrated management processor supports host monitoring, query, and updates. Supported interfaces include:
  - MCTP over SMBus
  - PLDM for Platform Monitoring and Control
  - PLDM for Firmware Update
  - PLDM for Redfish Device Enablement (RDE) support

Specifications

Bandwidth	400G	Cooling Options	Air- and Conduction-Cooled	Weight	
Port Options	Single x4 lane	**Power Consumption (Typ/Max)**		***Air-Cooled, Standard***	0.37 lb
	Dual x8 lane	***Passive Copper Cable***	1-Port: 24/26.4 W		0.166 kg
PCI Express Low	2.713 x 6.6 in.		2-Port: 27.5/30.2 W	***Air-Cooled, Low Profile***	0.35 lb
Profile Card (HxL)	6.89 x 16.76 cm	***Active Copper Cable***	1-Port: 25.1/27.5 W		0.157 kg
Bracket included	Low-Profile (installed)		2-Port: 29.6/32.3 W	***Conduction-Cooled, Low***	0.48 lb
	Standard (in package)	***Active Optical Cable***	1-Port: 32.1/34.5 W	***Profile***	0.216 kg

Name	Number	Description
980074	CN5HFA2D5ALS	Dual Port, QSFP-DD, x16 PCIe Gen 5, Air-Cooled, Low Profile, Single
980075	CN5HFA1Q5ALS	Single Port, QSFP, x16 PCIe Gen 5, Air-Cooled, Low Profile, Single
980176	CN5HFA1Q5NLS	Single Port, QSFP, x16 PCIe Gen 5, Conduction-Cooled, Low Profile, Single

Operating Conditions

Temperature

Operating: 0 to 55 ºC
(derated 1 ºC/175 m above 900 m)

Storage: -40 to 70ºC

Humidity

Operating: 10% to 85% non-condensing

Storage: 5% to 95% non-condensing

Altitude

Operating: 0 to 3,200 m

Storage: 0 to 12,000 m

Emissions/Immunity

US	FCC Part 15, Subpart B, Class A,
Canada	CAN ICES-3(A)/NMB-3(A) Issue 7
Europe	EN55032 (CISPR32)
	EN55035 (CISPR35)
	EN61000-3-2
	EN61000-3-3
Japan	VCCI, Class A
AS/NZ	CISPR 32, Class A
Korea	
Emissions	KS C 9832 Class A
Immunity	KS C 9835
Taiwan	BSMI (CNS 15936), Class A

Safety

US/Canada	TUV NRTL 62368-1, CSA 22.2. No. 62368-1
Europe	TUV EN62368-1
International	CB Scheme: IEC 62368-1

Environmental

RoHS	RoHS Directive 2011/65/EU2, RoHS Directive 2015/863
REACH	REACH Regulation (EC) No 1907/2006

The Cornelis CN5000 Omni-Path product family includes the Switch, Director Class Switch, and SuperNIC; cables; and open-source Host and Management OPX Software all offering flexible, high-performance networking solutions for diverse infrastructure needs.