



Voltaire® Grid Director™ 4200

Fourth Generation InfiniBand Switch Brings QDR (40 Gb/s) Performance to Mid-Size Clusters



Scaling-Out Data Centers with 40 Gb/s InfiniBand

Faster servers combined with high performance storage and applications are causing data center bandwidth requirements to spiral upward. Voltaire's fourth generation Grid Director 4000 series of switches addresses the growing size and complexity of clusters by providing high interconnect bandwidth, advanced carrier-class management and unique scalable architectures.

The Voltaire Grid Director 4200 is a high performance, ultra-low latency InfiniBand switch for high performance clusters. With configurations of up to 162 ports of 40 Gb/s per port InfiniBand connectivity, the Voltaire Grid Director 4200 delivers 11.52 Tb/s of bandwidth and between 100 and 300 nanoseconds of port-to-port latency.

As a result, I/O bottlenecks are removed, allowing applications to operate at maximum efficiency. As a mid-size 40 Gb/s switching solution, the Grid Director 4200 is designed to provide an excellent price-performance ratio for mid-size clusters, along with the reliability and manageability expected from a director-class switch.

Use Smart Switches to Create Smart Clusters

Voltaire's fourth generation InfiniBand switches are equipped with a variety of capabilities that maximize performance as well as efficiency:

Advanced port and signal optimization

With an increase to 40 Gb/s per port speeds comes faster signaling rates. Voltaire's smart switch design leverages advances in cabling technology in concert with the Grid Director 4200's advanced port and signal optimization capabilities in order to determine the optimal settings for the connected QSFP cable. This makes the selection of cables more flexible and

provides for simpler and faster cluster deployments without errors caused by degraded signal integrity. The Grid Director 4200 supports active and passive copper InfiniBand cables as well as fibre optic InfiniBand cables, extending the reach of high performance computing systems and increasing data center scalability.

On-board device and fabric management

The Voltaire Grid Director 4200 on-board device and fabric management provides a simple interface for deploying, troubleshooting, maintaining and upgrading the switch. The embedded SM (subnet manager) provides an easy out-of-the-box experience for a quick, smooth deployment.

Advanced routing engine

The Voltaire Grid Director 4200 comes with the industry's most advanced routing engine and management features. The Grid Director 4200 works with Voltaire's Unified Fabric Manager (UFM) software, which automatically discovers, virtualizes, monitors and optimizes the fabric infrastructure and accelerates the active applications. UFM provides fast fabric bring-up by implementing leading-edge routing algorithms that maximize the use of available fabric bandwidth and enable the creation of scale-out clusters from tens to thousands of nodes.

Fabric optimization

To promote ultimate and flawless bandwidth and latency, Voltaire fabric optimization includes application-based QoS and isolation, advanced congestion management capabilities, and traffic aware routing to prevent degraded application performance.



- Removes I/O bottlenecks for extreme application performance
- Unlimited scalability across application, database and storage servers
- Ideal for scientific, commercial HPC and enterprise applications
- Ultra-low latency: between 100 and 300 nanoseconds port-to-port
- 162 x 40 Gb/s InfiniBand ports (QDR)
- Available bandwidth: up to 11.52 Tb/s
- Simple and fast device management
- Fully managed by Voltaire Unified Fabric Manager™ (UFM™) software
- Support for longer and more varied cable options
- Fast fabric bring-up and advanced routing algorithms
- Advanced congestion management
- Zero downtime guaranteed with no single point of failure and real-time fault notifications

Building Efficient Clusters & Grids

The Voltaire Grid Director 4200 is the industry's most cost-effective building block for deploying high performance clusters and data centers. Whether looking at price-to-performance or energy-to-performance, the Grid Director 4200 reaches new levels of achievement.

Voltaire's InfiniBand solutions have been at the top of both the TOP500 (www.top500.org) list of fastest supercomputers in the world and the Green500 (www.green500.org) list of "greenest" supercomputers for years, indicating recognized leadership in both performance and efficiency. The design of the Grid Director 4200 ensures that this leadership will be maintained in the QDR era.

Technical Specifications

Voltaire Grid Director 4200

- 9-slot, 19" rack mountable chassis, 11U height, configurable with redundant power supplies and fan units
- Each slot may accommodate one 4X QDR Line Board (sLB-4018). Per chassis: up to 9 Line Boards.
- Per chassis: 162 QDR (40Gb/s) ports; 144 ports fully non-blocking
- Aggregate data throughput: 11.52 Tb/s
- Port-to-port latency: Under 300 nanoseconds (under 100 nanoseconds between ports on the same line)
- 9 Virtual lanes: 8 data + 1 management
- MTU: 4096 Bytes (max.)

QDR Fabric Board

- Up to 4 QDR fabric boards supported per chassis
- Each fabric board includes 36 QDR ports

InfiniBand Ports (Line Boards)

- Per line: 18 x 40 Gb/s Quad Data Rate ports (40 or 20 or 10 Gb/s auto-negotiate)
- Total number of ports per chassis: 162
- IBTA 1.2 compliant
- Interconnect options: QSFP passive and/or active copper/fiber optic cables
- All ports are located on the rear panel

Management

- Two redundant management boards (sMB-CM)
- Physical Ports:
 - ▶ DB-9 for serial management (RS232)
 - ▶ RJ45 jack connector for 10/100/1000 Ethernet port
 - ▶ Chassis Reset Button on the front and rear panels
 - ▶ USB port for file transfer
- Device Management:
 - ▶ CLI (Local/Telnet/SSH)
 - ▶ Management over IPv4 or IPv6
 - ▶ SNMP v1/v2C/v3
 - ▶ RADIUS, TACACS+ Authentication
- Fabric Management
 - ▶ On-board SM for fabrics up to 648 nodes
 - ▶ Voltaire Unified Fabric Manager™ (UFM™) software

Indicators

- Line and Fabric Boards: Physical connectivity and logical connectivity LEDs per link port, PWR, RDY & Info LEDs
- Management Board: PWR, Info, Fan, PSU, Temp, Fabric Management, Device Management, ETH (Link & Act)
- Fan unit: Reset Button, Temp LED, sFU LED and PSU LED
- PSU LED indicator on the power supply

Power Requirements

- Up to 4 redundant hot-swappable load sharing power supplies (sPSU-40) with built in power inlet (for N:1 or N:N Redundancy)
- Power entry: 100 to 240 VAC, 50/60 Hz, auto-sensing
- Power consumption:
 - ▶ Maximum: 2243W
 - ▶ Typical: 1683W
 - ▶ Numbers relate to copper cables. For optic cables add 1.5W per port

Cooling

- Two fan units: a Horizontal Fan Unit (sFU- 42H) and a Vertical Fan Unit (sFU-42V) with internal redundancy
- Air flow: Front-to-rear
- Auto-heat sensing for silent fan operation

Physical Characteristics

- 11-inch rack-mountable chassis
- Dimensions (H x W x D): 18.98 in. (482 mm) x 19.25 in. (489 mm) x 26.69 in. (678 mm)
- Weight:
 - ▶ Basic configuration: 132 Lbs (60 Kgs)
 - ▶ Full configuration: 220 Lbs (100 Kgs)
- Cabling guide brackets kit designed for cable management

Environmental

- Operating
 - ▶ Ambient temperature: 32° to 113° F (0° to 45° C)
 - ▶ Humidity: 15 to 80%, non-condensing
 - ▶ Altitude: 0 to 9843 ft (3000m)
- Storage
 - ▶ Temperature: -13° to 158° F (-25° to 70° C)
 - ▶ Humidity: 5 to 90 non-condensing
 - ▶ Altitude: 0 to 15,000 ft (4570m)

Certifications

- Safety (Voltaire Typical)
 - ▶ UL60950-1
 - ▶ CB IEC60950
 - ▶ CSA-C22.2 No.60950-00
- EMC (Voltaire Typical)
 - ▶ 47CFR FCC part 15
 - ▶ EN55022-98/EN55024-98/EN61000-3-2:200/EN61000-3-3:95
 - ▶ VCCI

