Voltaire® Grid Director™ 4700

Fourth Generation Smart Switch Brings QDR (40Gb/s) Performance to InfiniBand Fabrics

Scaling-Out Data Centers with 40Gb/s InfiniBand

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

The Voltaire Grid Director 4700 is a high performance, ultra low latency and fully non-blocking InfiniBand switch for high performance clusters. With configurations of up to 324 ports or double-sided 648 ports of 40 Gb/s per port InfiniBand connectivity, the 4700 delivers an impressive 51.8 Tbps of non-blocking bandwidth with between 100 and 300 nanoseconds of port-to-port latency. Additionally the switch's 648 ports can be divided between two racks for weight distribution and greater ease of cabling.

The switch's HyperScale architecture provides a unique inter-switch link capability for stacking multiples of 324 ports to form highly scalable, cost effective, and low latency fabrics.

As a result, I/O bottlenecks are removed, allowing applications to operate at maximum efficiency. As the industry's largest QDR switching solution, the efficient Grid Director 4700's smart design provides unprecedented levels of performance and makes it easy to build clusters that can scale out to thousands of nodes.

Use Smart Switches to Create Smart Clusters

Voltaire's fourth generation InfiniBand switches add many new smart capabilities to meet the needs of next generation data centers. The Voltaire Grid Director 4700 also comes with new smart capabilities:

- As clusters continue to grow, Voltaire offers higher port densities enabled with new optical, pluggable (QSFP) interfaces.
- With an increase to 40Gb/s per port speeds comes faster signaling rates. Voltaire's smart switch design leverages advances in cabling technology in concert with the Grid Director 4700'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 4700 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.
- The Voltaire Grid Director 4700 on-board device management provides a simple interface for deploying, troubleshooting, maintaining and upgrading the switch.
- The Voltaire Grid Director 4700 comes with the industry's most advanced routing engine and management features. The Grid Director 4700 works with Voltaire's Unified Fabric Manager (UFM), 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.
- To promote ultimate and flawless bandwidth and latency, Voltaire fabric optimization includes advanced congestion management capabilities for detecting congestion with advanced multi-path and adaptive routing capabilities to prevent degraded application performance.

- Extreme application performance by removing I/O bottlenecks
- 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
- 324 QDR (40Gb/s) ports in a 19U switch
- 648 port option can be divided between two racks for weight distribution and greater ease of cabling
- Unique HyperScale™ architecture allows scaling to thousands of nodes with a single tier of switches (under 400 nanoseconds of latency)
- Available bandwidth: up to 51.8 Tbps of non-blocking bandwidth
- Simple and fast device management
- Fully managed by Voltaire Unified Fabric Manager (UFM)
- Support for longer and more varied cable options
- Fast fabric bring-up and advanced routing algorithms
- Advanced congestion management
- Zero down time guaranteed with no single point of failure and real-time fault notifications

Voltaire® Grid Director™ 4700

Building Efficient Clusters & Grids

The Grid Director 4700 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 4700 reaches new levels of achievement.

Voltaire's InfiniBand solutions have been at the top of both the Top500 (top500.org) list of fastest supercomputers in the world and the Green500 (green500.org) list of "greenest" supercomputers for years, indicating recognized leadership in both performance and efficiency. The design of the Grid Director 4700 ensures that this leadership will be maintained in the QDR era.

TECHNICAL SPECIFICATIONS

Voltaire Grid Director 4700

- 18-slot, 19" rack mountable chassis, 19U height, configurable with redundant Power Supplies and Fan Units
- Each slot may accommodate one 4X QDR Line Board (sLB-4018). Per chassis: up to 18 Line Boards.
- Per chassis: 324 QDR (40Gb/s) ports
- Aggregate data throughput: 51.8 Tbps (HyperScale Configuration)
- Port-to-port latency: Under 300 nanoseconds latency port–to-port (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 9 QDR Fabric Boards supported per chassis
- Each fabric board with 36 QDR ports – fully non-blocking

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: 324.
- IBTA 1.2 compliant
- Interconnect options: QSFP passive and/or active copper/fiber optic cables
- All ports are located on the rear panel

Management

- UFM for fabric management
- On-board device management
- Two redundant management boards (sMB-CM)
- Connectors (located on the rear panel):
  - DB-9 for serial management (RS232)
  - RJ45 jack connector for 10/100/1000 Ethernet port
  - USB port for file transfer
- Chassis Reset Button on the front and rear panels

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 6 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 (fully populated): 6.5W – 12W per port

Cooling

- Two fan units: a Horizontal Fan Unit (sFU-40H) and a Vertical Fan Unit (sFU-40V) with internal redundancy
- Air flow: Front-to-rear
- Auto-heat sensing for silent fan operation

Physical Characteristics

- 19-inch rack-mountable chassis
- Dimensions (H x W x D): 33.25 in. (844 mm) x 17 in. (432 mm) x 26 in. (660 mm)
- Weight:
  - Basic configuration: 145 Lbs (66 Kgs)
  - Full configuration: 340 Lbs (154.5 Kgs)
- Optional 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
    - CB IEC60950
    - CSA-C22.2 No.60950- 00
  - **EMC (Voltaire Typical)**
    - 47CFR FCC part 15
    - EN55022:98/EN55024:98/EN61000-3- 2:00/ EN61000-3-3:95
    - VCCI

VOLTAIRE

Contact Voltaire to Learn More

1.800.865.8247
info@voltaire.com
www.voltaire.com

P/N: 00558 Rev. A01