

Voltaire® Grid Director™ Switches

Scaling-Out Data Centers for Extreme Application Performance Using InfiniBand Fabrics



Overview

Voltaire is a leading provider of scale-out computing fabrics for data centers, high performance computing and cloud environments. Voltaire's family of Grid Director switches, in combination with the company's advanced management software, vastly improves the performance of mission-critical applications. Voltaire Grid Director switches address the growing size and complexity of clusters by providing high interconnect bandwidth, advanced carrier-class management, and unlimited scalability.

By combining industry standard InfiniBand technology with integrated Ethernet and Fibre Channel gateways, Voltaire Grid Director switches provide a scalable fabric for powering the world's largest and fastest high performance computing systems and next generation data centers.

Voltaire Grid Director 4700 — 40 Gb/s InfiniBand Switch

With configurations of up to 324 ports or double-sided 648 ports of 40 Gb/s per port InfiniBand connectivity, the Voltaire Grid Director 4700 delivers an impressive 51.8 Tbps of non-blocking bandwidth and the lowest latency in the industry. Its smart design provides unprecedented levels of performance and makes it easy to build clusters that can scale out to thousands of nodes. The Voltaire Grid Director 4700 is a high performance, ultra low latency and fully non-blocking InfiniBand switch for high performance clusters. 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.

Voltaire Grid Director 2036/4036 — 20/40 Gb/s InfiniBand Switch

The Voltaire Grid Director 2036/4036 is a high performance, low latency and fully non-blocking switch for high performance computing clusters. Perfect for use as an edge or leaf switch, it offers full bisectional bandwidth of 1.44/2.88 Tb/s. With built-in high availability and a design that is easy to maintain, the Grid Director 2036/4036 is a cost-effective alternative to proprietary interconnect technologies. With 36 20/40 Gb/s ports in a 1U chassis, the Grid Director 2036/4036 delivers high bandwidth and low latency at an affordable price.

Voltaire Grid Director 2012/2004 — 20 Gb/s InfiniBand Switches

The Voltaire Grid Director 2012 and 2004 switches are designed from the ground up to provide the next generation data center with a no compromise solution for building 20 Gb/s unified fabrics. The Grid Director 2012 provides up to 288 20 Gb/s links and 11.52 Tb/s of full bisectional bandwidth in a fat-tree (Clos) topology. The Grid Director 2004 provides up to 96 20 Gb/s links and 3.84 Tb/s of full bisectional bandwidth in a fat-tree (Clos) topology. The Grid Director 2012 and 2004

have the best signal integrity in the industry allowing the use of the longest cable lengths with the lowest error rates. With a state-of-the art design, the Grid Director 2012 and 2004 switches decrease energy consumption helping to green the data center.

Voltaire Grid Director 9024 — 20 Gb/s InfiniBand Switch

The Voltaire Grid Director 9024 is a high performance, low latency and fully non-blocking switch for high performance computing clusters. Perfect for use as an edge or leaf switch, it offers full bisectional bandwidth of 960 Gb/s. With built-in high availability and a design that is easy to maintain, the Grid Director 9024 is a cost-effective alternative to proprietary interconnect technologies. The Grid Director 9024 features 24 x 20 Gb/s ports in a 1U chassis, delivering high bandwidth and low latency at an affordable price.

Voltaire Switching & Software Solutions

Voltaire's family of server and storage fabric switches and advanced management software improve performance of mission-critical applications, increase efficiency and reduce costs through infrastructure consolidation and lower power consumption.

Voltaire Grid Director switches come with the industry's most advanced routing engine and management features. Users can also enhance the performance of the switches with Voltaire Unified Management Software™ (UFM™), which automatically discovers, virtualizes, monitors and optimizes the fabric infrastructure and accelerates the active applications.

Voltaire solutions are used by more than 30 percent of the Fortune 100 and other premier organizations across many industries, including many of the TOP500 supercomputers. Combined with integrated Ethernet and Fiber Channel routing capabilities, Voltaire's director-class switches and advanced management software provide unprecedented levels of performance.

Features and Benefits

- Extreme application performance by removing I/O bottlenecks
- Ability to build clusters that can scale-out to thousands of nodes
- Unlimited scalability across application, database and storage servers
- Ideal for scientific, commercial HPC and enterprise applications
- Simple and fast device management
- Lower power/cooling requirements
- Best price/performance solution with error-free 20 /40Gb/s fabrics



Grid Director 20 Gb/s and
40 Gb/s Family of Switches

Voltaire® Grid Director™ Switches

Voltaire Grid Director switches help to solve many important challenges for today's data centers

Eliminate Bottlenecks

With the trend toward multi-socket, multi-core environments, server I/O has become a major bottleneck. Voltaire Grid Director switches eliminate the imbalance by providing servers with up to a 40 Gb/s InfiniBand fabric with application latencies as low as 100 nanoseconds. Voltaire's integrated Ethernet and Fibre Channel connectivity lets you share the power of InfiniBand with your data center LAN and SAN networks to improve the performance of existing network infrastructure.

Reduce Complexity

Managing separate networks for storage, IPC and LAN based traffic is expensive and complicated. Voltaire Grid Director switches reduce complexity by providing seamless connectivity between InfiniBand, Ethernet and Fibre Channel based networks. You no longer need three separate network technologies with multiple network adapters to operate your data center fabric, which greatly simplifies the requirements on server hardware.

Improve Efficiency

Voltaire Grid Director switches accelerate application performance and enable scalability into the thousands of nodes. Moreover, with high bandwidths, low latencies and reliable packet delivery, application performance won't be harmed by packet retransmissions of lost information.

Reduce Environmental Costs

Improved application efficiency along with the need for fewer network adapters allows you to accomplish the same amount of work using fewer, more cost-effective servers. With improved cooling mechanisms come reduced power consumption and heat generation allowing data centers to reduce the costs associated with physical space, power and cooling.



Voltaire solutions work with a broad array of applications in various vertical markets.

How do I know which Voltaire Grid Director switch to choose?

The Voltaire Grid Director family of switches can be used as building blocks to deploy systems ranging from small high performance database applications to multi-teraflop HPC systems. For example, the Grid Director 9024 is best for a smaller cluster and can be used in combination with the larger Grid Directors to build clusters ranging into the thousands of nodes. The choice of switch is based upon the required fabric bandwidth, the number of total InfiniBand-based servers and the need for external connectivity to Ethernet and Fibre Channel networks.

	Grid Director 4700	Grid Director 4036/2036	Grid Director 2004/2012	Grid Director 9024
Rack Height	19U	1U	6U (2004) / 15U (2012)	1U
Rack Width	19"	19"	19"	19"
Switch Type	Core	Edge	Core	Edge
Backplane Bandwidth	51.8 Tb/s	2.88 Tb/s (4036) / 1.44 Tb/s (2036)	3.84 Tb/s (2004) / 11.52 Tb/s (2012)	480/960 Gb/s
Line Board	18	0	4 (2004) / 12 (2012)	0
Fabric Boards	9	0	4	0
Max # of InfiniBand Ports	324/648 40 Gb/s InfiniBand Ports	36 40 Gb/s InfiniBand Ports (4036) / 36 20 Gb/s InfiniBand Ports (2036)	96 20 Gb/s InfiniBand Ports (2004) / 288 20 Gb/s InfiniBand Ports (2012)	24 20 Gb/s InfiniBand Ports
Integrated IO	Yes (future)	No	Yes	No
Interface Type	4X 40 Gb/s (QDR) QSFP ports with support for optical adapters and cables	4X 40 Gb/s (QDR) QSFP ports (4036) / 4X 20 Gb/s (DDR) QSFP ports (2036) with support for optical adapters and cables	4X 20 Gb/s (DDR) CX4 ports with support for optical adapters and cables	4X 10/20Gb/s (SDR/DDR) CX4 ports with support for optical adapters and cables
Redundant Components	Power Supplies (sPSUs), Fan Units (sFUs), Management Boards (sMB)	Power Supplies	Power Supplies (sPSUs), Fan Units (sFUs), Management Boards (sMB)	Power Supplies



Contact Voltaire to Learn More

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