

## Product Brief



### Highlights

- Adapt to storage growth and demanding workloads with the industry's highest-density 128-port 32G Gen 6 Fibre Channel switch.
- Optimize performance and ensure reliability with enhanced monitoring for NVMe.
- Integrate NVMe-ready solutions without a rip-and-replace.
- Accelerate operations with simple and open automation that increases productivity.
- Simplify end-to-end management of large-scale environments by automating repetitive administrative tasks.
- Provide proactive, real-time monitoring and alerting of storage I/O health and performance with integrated network sensors.
- Enable virtual machine (VM) visibility in a storage fabric in order to monitor VM performance, identify VM anomalies, and optimize VM performance.

# Brocade<sup>®</sup> G630 Switch

## Accelerate Business Operations with NVMe and Automation

### Overview

Data centers are under pressure to deliver maximum performance, business intelligence, and operational efficiency to address exponential data growth and dynamic business demands. To gain the performance required, organizations are transitioning to the all-flash data center, which requires a modern storage network that can keep pace with innovations in compute and storage resources. By modernizing the SAN, organizations will be able to maximize productivity and increase the efficiency of their storage investments, even as they rapidly scale their environments. Moreover, the addition of automation technology to Gen 6 Fibre Channel will transform SAN management by simplifying operations and freeing up resources to focus on business optimization and revenue opportunities.

The Brocade<sup>®</sup> G630 Switch provides the tools to optimize NVMe storage and automate SAN management tasks. It is a high port density building block with a management platform designed to support application, data, and storage growth. As an NVMe-ready switch, the Brocade G630 allows organizations to seamlessly integrate Brocade Gen 6 Fibre Channel networks with the next generation of flash storage, without a disruptive rip-and-replace. In addition, the Brocade G630 features integrated network sensors for advanced monitoring of NVMe workloads, helping to ensure optimal performance.

The Brocade G630 Switch also delivers new automation capabilities that enable DevOps resources to automate and orchestrate SAN resources through open APIs and the Ansible automation engine. With Brocade automation, organizations can quickly and reliably perform resource-intensive tasks, such as provisioning, and operationalize the continuous monitoring of the network, so that tasks can be completed in a fraction of the time. By combining Broadcom's robust set of data collecting capabilities with automation, organizations can automate repetitive daily tasks and deliver consistent performance by eliminating human error.

With the Brocade G630, organizations can seamlessly transition to an all-flash data center and build a foundation to support future innovation and operational efficiency.

## Gen 6 Fibre Channel

Brocade Gen 6 Fibre Channel is the purpose-built network infrastructure for mission-critical storage, delivering NVMe-ready performance, advanced automation, and comprehensive management to accelerate application performance and drive always-on business operations. The Brocade G630 Switch with Gen 6 Fibre Channel and Brocade Fabric Vision technology delivers unmatched 32G performance, industry-leading port density, and automated operations to support storage growth, demanding workloads, and data center consolidation.

## Simplify and Consolidate Cabling with Flexible Q-Flex Ports

Q-Flex ports are available for flexible Inter-Switch Link (ISL) and device connectivity with industry-leading 32G speeds. These ports are designed to support single QSFP connections or fan out to four standard SFP+ connections, enabling administrators to simplify cabling infrastructure. The Ports on Demand (PoD) feature of the Brocade G630 gives organizations the flexibility to mix and add Q-Flex ports at any time.

## Brocade Fabric Vision® Technology

Brocade Fabric Vision® technology with IO Insight and VM Insight provides unprecedented insight and visibility across the storage network. Its powerful, integrated monitoring, management, and diagnostic tools enable organizations to:

- Simplify monitoring:
  - Deploy more than 20 years of storage networking best practices with a single click.

## Simple and Elegant Scalability with Industry-Leading Port Density

The Brocade G630 enterprise-class switch delivers industry-leading port density with 128 Fibre Channel ports in an elegant 2U form factor. Organizations can both increase scalability and optimize space utilization. With 96 32G SFP+ ports and 8 4×32G Q-Flex ports, the compact design of the switch enables data centers to scale efficiently and deliver more connectivity with fewer switches. Built to support maximum flexibility and dense Fibre Channel fabrics, the Brocade G630 Switch offers cost-effective pay-as-you-grow scalability, expanding from 48 to 128 ports with Ports on Demand (PoD).

Each Q-Flex port can support 4×32G Fibre Channel for device or Inter-Switch Link (ISL) connectivity with MTP/MPO cables, MTP/MPO to LC breakout cables, or patch panels, enabling administrators to consolidate and simplify cabling infrastructure. Each Q-Flex port is capable of 4×32G, 4×16G, 4×8G, or 4×4G Fibre Channel speeds. Q-Flex ports can be used to form dense, high-performance ISLs between the Brocade G630 and the Brocade FC32-64 high-density port blade in the Brocade X6 Director, freeing up SFP+ ports for device connectivity. The switch also provides ISL trunking with up to eight 32G ports between a pair of switches to form a single logical ISL.

In addition to offering 128 32G ports, the Brocade G630 delivers Gen 6 Fibre Channel performance to support growing and dynamic workloads. It achieves this level of performance through a combination of market-leading low latency and up to 566 million frames switched per second—shattering application performance

barriers with up to 200 million IOPS. At the same time, port-to-port latency can be as low as <780 ns (including FEC) through the use of cut-through switching. As a result, the Brocade G630 provides both elegant scalability and powerful performance to stay ahead of the demands of flash storage workloads.

To support higher data volumes over long distance, the Brocade G630 Switch delivers in-flight encryption and data compression to optimize bandwidth and minimize the risk of unauthorized access. It delivers up to 384Gb/s of combined in-flight encryption and 192Gb/s of in-flight compression. Moreover, internal fault-tolerant and enterprise-class RAS features help minimize downtime to support growing mission-critical environments.

## Increase Productivity with Simple and Open Automation

IT organizations spend nearly half of their time performing repetitive daily management tasks, such as zoning, inventory reporting, and operational validation checks. By automating these repetitive tasks, IT organizations can significantly improve their efficiency and dramatically decrease the risk of operational mistakes. Automation in large-scale IT environments integrates diverse infrastructure components with consistency and predictability to deliver greater operational efficiency and agility. With more than 20 years of storage networking experience, Brocade, a Broadcom company, understands the nuances that go into infrastructure management and the tasks that can benefit from automation. By introducing REST APIs directly into its switch and management products, Broadcom

## Brocade Fabric Vision Technology (cont.)

- Take advantage of nonintrusive, real-time monitoring and alerting of storage I/O health and performance with key latency and performance metrics.
- Gain comprehensive visibility into the fabric using browser-accessible dashboards with drill-down capabilities.
- Increase operational stability:
  - Avoid 50% of common network problems with proactive monitoring.
  - Identify hot spots and automatically mitigate network problems—before they impact application performance.
  - Monitor and set baselines on I/O performance for each VM, and identify performance anomalies to facilitate fault isolation and troubleshooting.
- Dramatically reduce costs:
  - Eliminate nearly 50% of maintenance costs through automated testing and diagnostic tools.
  - Save up to millions of dollars on CapEx costs by eliminating the need for expensive third-party tools through integrated network sensors, monitoring, and diagnostics.
  - Tune device configurations with integrated I/O metrics to optimize storage performance and increase ROI.

offers a broad range of choices to enable any SAN management solution. IT organizations that couple Broadcom's robust data collecting capabilities with automation and orchestration tools (such as Ansible) gain the ability to automate configuration tasks and the visibility to monitor and detect any performance or health changes. Brocade automation solutions are based on these pillars:

- Make standard REST APIs available directly from the switch in order to automate repetitive daily tasks, such as fabric inventory, provisioning, and operational state monitoring.
- Leverage Ansible to easily scale automation and orchestration across the entire infrastructure.

## Enhanced Operational Stability for Always-On Business Operations

The Brocade G630 with Brocade Fabric Vision technology delivers a breakthrough hardware and software solution that helps simplify monitoring, increase operational stability, and dramatically reduce costs. Fabric Vision technology includes IO Insight and VM Insight, which provides organizations with deeper visibility into both SCSI and NVMe traffic. This enhanced visibility enables administrators to quickly identify the problem and accelerate root-cause analysis for faster time to resolution. The Brocade G630 also optimizes the performance of NVMe over Fibre Channel by leveraging integrated, nonintrusive, real-time network monitoring and alerts. This proactive monitoring of NVMe traffic provides administrators with key insights for maintaining optimal network health and performance.

IO Insight proactively monitors I/O performance and behavior through integrated network sensors, providing deep insight into problems and helping to ensure service levels. This capability nondisruptively and nonintrusively gathers I/O statistics from any device port, then feeds them to a monitoring policy that sets thresholds and generates alerts. VM Insight applies IO Insight visibility for each virtual machine (VM). Integrated VM, application-level, and device-level I/O latency and IOPS monitoring enables administrators to set the baseline for application performance and identify the VM or physical layer responsible for the degraded performance.

Innovative Fabric Vision monitoring, management, and diagnostic capabilities enable administrators to avoid problems before they impact operations. Additional Fabric Vision capabilities include:

- Monitoring and Alerting Policy Suite (MAPS): Simplifies fabric-wide threshold configuration, monitoring, and alerting with prebuilt, rule-based or policy-based templates. Administrators can configure the entire fabric (or multiple fabrics) at one time using common rules and policies, or customize policies for specific ports or switch elements. In addition, administrators can use IO Insight metrics to set thresholds in MAPS policies in order to be notified of application, VM, and storage I/O performance degradation.

- Fabric Performance Impact (FPI) Monitoring: Leverages predefined MAPS policies to automatically detect and alert administrators to different latency severity levels, and to identify slow drain devices that could impact network performance. This feature identifies various latency severity levels, pinpointing exactly which devices are causing or are impacted by a bottlenecked port, and quarantines slow drain devices automatically to prevent buffer credit starvation.
- Dashboards: Provides integrated dashboards that display an overall SAN health view, along with details on out-of-range conditions, to help administrators easily identify trends and quickly pinpoint issues occurring on a switch or in a fabric.
- Configuration and Operational Monitoring Policy Automation Services Suite (COMPASS): Simplifies deployment, safeguards consistency, and increases operational efficiencies of larger environments with automated switch and fabric configuration services. Administrators can configure a template or adopt an existing configuration to seamlessly deploy a configuration across the fabric.
- Brocade ClearLink® Diagnostics: Ensures optical and signal integrity for Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics. ClearLink Diagnostic Port (D\_Port) is an advanced capability of Fibre Channel platforms.
- Flow Vision: Enables administrators to identify, monitor, and analyze specific application flows in order to simplify troubleshooting, maximize performance, avoid congestion, and optimize resources. Flow Vision includes:
  - Flow Monitor: Provides comprehensive visibility, automatic learning, and nondisruptive monitoring of a flow's performance. Administrators can monitor all flows from a specific host to multiple targets or volumes, from multiple hosts to a specific target/volume, or across a specific ISL. Additionally, they can perform volume-level monitoring of specific frame types to identify resource contention or congestion that is impacting application performance. With the IO Insight capability, administrators can monitor first I/O response time, I/O completion time, the number of pending I/Os, and IOPS metrics for a flow from a specific host to a target or volume running SCSI or NVMe over Fibre Channel traffic. With VM Insight, administrators can monitor network throughput and I/O statistics for each VM.
  - Flow Learning: Enables administrators to nondisruptively discover all flows that go to or come from a specific host port or a storage port, or traverse ISLs/IFLs (inter-fabric links) or Fibre Channel over Internet Protocol (FCIP) tunnels, to monitor fabric-wide application performance. In addition, administrators can discover top and bottom bandwidth-consuming devices and manage capacity planning.
  - Flow Generator: Provides a built-in traffic generator for pretesting and validating the data center infrastructure for robustness—including route verification and integrity of optics, cables, ports, back-end connections, and ISLs—before deploying applications.
  - Flow Mirroring: Enables administrators to nondisruptively create copies of specific application and data flows or frame types that can be captured for in-depth analysis.
- Forward Error Correction (FEC): Enables recovery from bit errors in a data stream, enhancing transmission reliability and performance. FEC is mandatory in Gen 6 links with more robust error recovery to support 32G performance.
- Credit Loss Recovery: Automatically detects and recovers buffer credit loss at the virtual channel (VC) level, providing protection against performance degradation and enhancing application availability.

### Brocade SANnav™: Next-Generation SAN Management

Brocade SANnav™ Management Portal and SANnav Global View empower IT administrators by providing comprehensive visibility across the entire SAN, from a global view down to local environments. These tools streamline management workflows to accelerate the deployment of new applications, switches, hosts, and targets. They also increase operational efficiencies with a modernized graphical user interface (GUI) that enables enhanced monitoring, faster troubleshooting, and advanced analytics.

Brocade Gen 6 Fibre Channel hardware includes integrated network sensors that nondisruptively gather millions of real-time metrics that SANnav Management Portal uses to identify, monitor, and analyze the overall health and performance of the SAN. SANnav Management Portal contextualizes this data into visual dashboards, enabling administrators to quickly detect and isolate points of interest for both troubleshooting and performance optimization.

## Brocade Global Support

Brocade Global Support has the expertise to help organizations build resilient, efficient SAN infrastructures. Leveraging 20+ years of expertise in storage networking, Global Support delivers world-class technical support, implementation, and migration services to enable organizations to maximize their hardware and software investments, accelerate new technology deployments, and optimize the overall performance of their network.

## Maximizing Investments

To help optimize technology investments, Brocade, a Broadcom company, and its partners offer complete solutions that include professional services, technical support, and education.

For more information, contact a Brocade sales partner or visit: [www.broadcom.com/brocade](http://www.broadcom.com/brocade)

For information about supported SAN standards, visit: [www.broadcom.com/sanstandards](http://www.broadcom.com/sanstandards)

## Brocade G630 Switch Specifications

System Architecture	
<b>Fibre Channel Ports</b>	96 SFP+ ports capable of operating at 4, 8, 16, 32G Fibre Channel auto-sensing speeds; 8 QSFP ports capable of operating at 4x32, 4x16, 4x8, 4x4G Fibre Channel speeds. Offers a base configuration of 48 ports, two 24-port SFP+ PoD (Ports on Demand), and one 32-port QSFP PoD. The switch has a total of eight 32G QSFP ports. This allows users to grow from 48 ports to 128 ports. Supports F/E/EX_Port, M_Port, and D_Port types on the SFP+ ports and only F/E/EX_Port and D_Port types on the QSFP ports with Brocade Fabric OS® (FOS) v8.2.0.
<b>Scalability</b>	Full-fabric architecture with a maximum of 239 switches
<b>Certified Maximum</b>	Single fabric: 56 domains, 7 hops MPR fabric: 19 hops
<b>Performance</b>	Fibre Channel: 4.25Gb/s line speed, full duplex; 8.5Gb/s line speed, full duplex; 14.025Gb/s line speed, full duplex; 28.05Gb/s, full duplex; auto-sensing of 4, 8, 16, 32G port speeds. Auto-sensing of 4x32, 4x16, 4x8, and 4x4G speeds on the QSFP ports with Brocade FOS v8.2.0.
<b>ISL Trunking</b>	Frame-based trunking with up to eight 64G SFP+ ports per ISL trunk; up to 512Gb/s per ISL trunk; up to two (4 x 32G) QSFP ports per ISL trunk. Exchange-based load balancing across ISLs with DPS included in Brocade Fabric OS software.
<b>Aggregate Bandwidth</b>	4Tb/s
<b>Maximum Fabric Latency</b>	Latency for locally switched ports is <780 ns; latency between port groups is 2.6 µs, cut-through routing at 32G between locally switched groups. Encryption/compression is 1 µs per node.
<b>Maximum Frame Size</b>	2112-byte payload
<b>Frame Buffers</b>	15K frame buffers with dynamic buffer sharing capability across ports
<b>Classes of Service</b>	Class 2, Class 3, Class F (inter-switch frames)
<b>Port Types</b>	D_Port (ClearLink Diagnostic Port), E_Port, EX_Port, F_Port, AE_Port, optional port-type control
<b>Data Traffic Types</b>	Fabric switches supporting unicast
<b>Media Types</b>	32G FC SFP+ LC connector: SWL, LWL, ELWL 16G FC SFP+ LC connector: SWL, LWL, ELWL 10G FC SFP+ LC connector: SWL, LWL 4x32G FC QSFP+ MPO connector: SWL 4x32G FC QSFP+ SMF LC connector: 2 km (fixed at 4x32G only) 4x16G FC QSFP+ MPO connector: SWL  All Brocade transceivers are PC/UPC compatible.
<b>USB</b>	One USB port for system log file downloads or firmware upgrades
<b>Fabric Services</b>	BB Credit Recovery; Brocade Advanced Zoning (Default Zoning, Port/WWN Zoning, Peer Zoning); Congestion Signaling; Dynamic Path Selection (DPS); Extended Fabrics; Fabric Performance Impact Notification (FPIN); Fabric Vision; FDMI; Flow Vision; F_Port Trunking; FSPF; Integrated Routing; ISL Trunking; Management Server; Name Server; NPIV; NTP v3; Port Decommission/Fencing; QoS; Registered State Change Notification (RSCN); Target-Driven Zoning; Virtual Fabrics (Logical Switch, Logical Fabric); VMID and AppServer.
<b>Extension</b>	Fibre Channel, in-flight compression (Brocade LZ0) and encryption (AES-GCM-256 encryption on FC ISLs [E_Port]); integrated optional 10G Fibre Channel for DWDM MAN connectivity.

Management	
Management	HTTP/HTTPS; SNMP v1/v3 (FE MIB, FC Management MIB); SSH; Brocade Advanced Web Tools; Brocade SANnav Management Portal and SANnav Global View; Command Line Interface (CLI); RESTful API; trial licenses for add-on capabilities.
Security	DH-CHAP (between switches and end devices), FCAP switch authentication; HTTPS, IP filtering, LDAP with IPv6, OpenLDAP, Port Binding, RADIUS, TACACS+, user-defined Role-Based Access Control (RBAC), Secure Boot, Secure Copy (SCP), Secure Syslog, SFTP, SSH v2, SSL, Switch Binding, Trusted Switch. The Brocade G630 Switch provides up to 12 in-flight encryption and compression ports.
Management Access	10/100/1000Mb/s Ethernet (RJ-45), serial port (RJ-45), and one USB port.
Diagnostics	Active Support Connectivity (ASC) and Brocade Support Link (BSL); built-in flow generator; ClearLink optics and cable diagnostics, including electrical/optical loopback, link traffic/latency/distance; Fabric Performance Impact Monitoring (FPI); flow mirroring; Forward Error Correction (FEC); frame viewer; IO Insight for SCSI and NVMe monitoring; Monitoring and Alerting Policy Suite (MAPS); nondisruptive daemon restart; optics health monitoring; POST and embedded online/offline diagnostics, including environmental monitoring, FCping and Pathinfo (FC traceroute); power monitoring; RAStrace logging; Rolling Reboot Detection (RRD); Syslog/Audit Log; VM Insight.
Mechanical	
Enclosure	Front-to-back airflow; non-port-side exhaust; port-side intake; 2U Back-to-front airflow; non-port-side intake; port-side exhaust; 2U
Size	Width: 440.00 mm (17.32 in.) Height: 86.70 mm (3.41 in.) Depth: 609.60 mm (24.00 in.)
System Weight	19.05 kg (42.00 lb) with two power supplies, fans, without transceivers 21.73 kg (47.91 lb) with two power supplies, fans, fully populated with transceivers
Environment	
Operating Environment	Temperature: 0°C to 40°C/32°F to 104°F Humidity: 10% to 85% (noncondensing)
Nonoperating Environment	Temperature: -25°C to 70°C/-13°F to 158°F Humidity: 10% to 90% (noncondensing)
Operating Altitude	Up to 3000m (9842 ft)
Storage Altitude	Up to 12 km (39,370 ft)
Shock	Operating: Up to 20G, 6 ms half-sine Nonoperating: Half sine, 33G 11 ms, 3G axis
Vibration	Operating: 0.5g sine, 0.4 grms random, 5 Hz to 500 Hz Nonoperating: 2.0g sine, 1.1 grms random, 5 Hz to 500 Hz
Heat Dissipation	128 ports at 3512 BTU/hr
Power	
Power Supply	Two power supply FRUs with integrated power module, voltage range of 90V to 264V AC. 80 Plus Platinum.
Fans	Three fan FRUs with two fans each.
AC Input	100V to 240V nominal, 90V to 264V range. Maximum input current: 12A.
AC Input Line Frequency	50 Hz to 60 Hz nominal, 47 Hz to 63 Hz range.
AC Power Consumption (System)	Maximum 942W with all 128 ports operating at 32G (96 ports populated with 32G SWL optics and 8 QSFP ports populated with 4x32G SWL optics). Maximum of 495W for empty chassis with no optics in idle configuration.