DATA SHEET

BROCADE
A Broadcom Inc. Company

Brocade® G620 Switch

HIGHLIGHTS

- Provides high scalability in an ultra-dense, 1U, 64-port switch to support high-density server virtualization, cloud architectures, and flash-based storage environments
- Increases performance for demanding workloads across 32 Gbps links and shatters application performance barriers with up to 100 million IOPS
- Enables pay-as-you-grow scalability—with 24 to 64 ports—for on-demand flexibility
- Provides proactive, non-intrusive, real-time monitoring and alerting of storage IO health and performance with IO Insight, the industry's first integrated network sensors
- Enables Virtual Machine (VM) visibility in a storage fabric to monitor VM performance, identify VM anomalies, and optimize VM performance
- Simplifies end-to-end management by automating repetitive daily management tasks
- Leverages Brocade® Fabric Vision® technology to simplify administration, quickly resolve problems, increase uptime, and reduce costs
- Simplifies troubleshooting with real-time and historical visibility via a single dashboard

Ultra-dense, Highly Scalable, Easy-to-Use Enterprise-Class Storage Networking Switch

Today's mission-critical storage environments require greater consistency, predictability, and performance to keep pace with growing business demands. Faced with explosive data growth, data centers need more IO capacity to accommodate the massive amounts of data, applications, and workloads. In addition to this surge in data, collective expectations for availability continue to rise. Users expect applications to be available and accessible from anywhere, at any time, on any device.

To meet these dynamic and growing business demands, organizations need to deploy and scale up applications quickly. As a result, many are moving to higher Virtual Machine (VM) densities to enable rapid deployment of new applications and deploying flash storage to help those applications scale to support thousands of users. To increase agility, reduce expenses, and realize the full benefits of these architectures, organizations need the network to deliver the performance required by today's server and storage environments. In addition, storage networks are becoming increasingly important to application performance, which means that they also must become easier to administer and manage. By treating the network as a strategic part of a highly virtualized environment, organizations can increase optimization and efficiency even as they rapidly scale their environments.

The Brocade G620 Switch meets the demands of hyper-scale virtualization, larger cloud infrastructures, and growing flash-based storage environments by delivering market-leading Gen 6 Fibre Channel technology and capabilities. It provides a high-density building block for increased scalability, designed to support growth, demanding workloads, and data center consolidation in small to large-scale enterprise infrastructures. Delivering unmatched 32 Gbps performance, industry-leading port density, and integrated network sensors, the Brocade G620 accelerates data access, adapts to evolving requirements, and drives always-on business.

GEN 6 FIBRE CHANNEL

Brocade Gen 6 Fibre Channel is the purpose-built network infrastructure for mission-critical storage, delivering breakthrough performance, increased scalability, and operational stability. The Brocade G620 Switch with Gen 6 Fibre Channel and Brocade Fabric Vision technology delivers unmatched 32 Gbps performance, industry-leading port density, and integrated network sensors. These next-generation storage networking technologies and capabilities enable the Brocade G620 to accelerate data access, adapt to evolving requirements, and drive always-on business operations for hyper-scale virtualization, larger cloud infrastructures, and growing flash-based storage environments.

The Brocade G620 is built for maximum flexibility, scalability, and ease of use. Organizations can scale from 24 to 64 ports with 48 SFP+ and 4 Q-Flex ports, all in an efficient 1U package. In addition, a simplified deployment process and a point-and-click user interface make the Brocade G620 easy to use. With the Brocade G620, organizations gain the best of both worlds: high-performance access to industry-leading storage technology and "pay-as-you-grow" scalability to support an evolving storage environment.

Maximize Performance for Application and Solid State Storage Architectures

Faced with unpredictable virtualized workloads and growing flash storage environments, organizations need to ensure that the network does not become the bottleneck. The Brocade G620 delivers increased performance for growing and dynamic workloads through a combination of market-leading throughput and low latency across 32 Gbps. With Gen 6 ASIC technology providing up to 566 million frames switched per second, the Brocade G620 Switch shatters application performance barriers with up to 100 million IOPS to meet the demands of flash-based storage workloads. At the same time, port-to-port latency is minimized to < 780 ns (including FEC) through the use of cut-through switching at 32 Gbps. With 48 SFP+ ports and 4 Q-Flex ports, each providing four 32 Gbps connections, the Brocade G620 can scale up to 64 device ports for an aggregate throughput of 2 Tbps. Moreover, each Q-Flex port delivers device or ISL connectivity, enabling administrators to consolidate and simplify cabling infrastructure.

Administrators can achieve optimal bandwidth utilization, high availability, and load balancing by combining up to eight ISLs in a 256 Gbps framed-based trunk. This can be achieved through eight individual 32 Gbps SFP+ ports or two 4×32 Gbps QSFP ports. Moreover, exchange-based Dynamic Path Selection (DPS) optimizes fabric-wide performance and load balancing by automatically routing data to the most efficient, available path in the fabric. This augments Brocade ISL Trunking to provide more effective load balancing in certain configurations.

To realize the full benefits of flash, organizations will need to transition their high-performance, latency-sensitive workloads to flash-based storage with NVMe. The Brocade G620 is NVMe-ready, allowing organizations to seamlessly integrate Brocade Gen 6 Fibre Channel networks with the next generation of flash storage, without a disruptive rip and replace. The simplicity and efficiency of NVMe over Fibre Channel enable significant performance gains for flash storage. Also, NVMe allows users to achieve faster application response times and harness the performance of solid state drives for better scalability across virtual data centers with flash. Leveraging the efficiency of NVMe over Fibre Channel, combined with the high performance and low latency of Brocade Gen 6 Fibre Channel, organizations can accelerate IOPS to deliver the performance, application response time, and scalability needed for next-generation data centers.

Simplify Scalability and Management Complexity

The Brocade G620 features up to 64 Fibre Channel ports in an efficiently designed 1U form factor, delivering industry-leading port density and space utilization for simplified scalability and data center consolidation. With this high-density design, organizations can pack more into a single data center with a smaller footprint, reducing costs and management complexity.

Designed for maximum flexibility and value, this enterprise-class switch offers pay-as-you-grow scalability with Ports on Demand (PoD). Organizations can quickly, easily, and cost-effectively scale from 24 to 64 ports to support higher growth.

Brocade G620 ports are available for device port or ISL port connectivity. As such, Q-Flex ports can be used as ISLs to provide simple build-out of fabrics, with more switching bandwidth. In addition, flexible, high-speed 32 Gbps and 16 Gbps optics allow organizations to deploy bandwidth on demand to meet evolving data center needs. Brocade G620 Q-Flex ports currently support both 4×32 Gbps and 4×16 Gbps QSFPs for ISL connectivity. The 4×32 Gbps and 4×16 Gbps feature breakout cable support for additional flexibility.

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*
- *Take advantage of non-intrusive, real-time monitoring and alerting of storage IO 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 percent 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 IO performance for each VM, and identify performance anomalies to facilitate fault isolation and troubleshooting*

Dramatically reduce costs:

- *Eliminate nearly 50 percent 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 IO metrics to optimize storage performance and increase ROI*

Along with providing best-in-class scalability, the Brocade G620 simplifies end-to-end network management by automating monitoring and diagnostics through Brocade Fabric Vision technology. The switch is easy to deploy with the Brocade EZSwitchSetup wizard and provides validation prior to deployment with the Brocade ClearLink® Diagnostic Ports (D_Ports) feature. For maximum flexibility, the switch also features dual airflow direction options to support the latest hot aisle/cold aisle configurations.

Gain Control and Insight to Quickly Identify Problems and Meet Critical SLAs

The Brocade G620 with Gen 6 Fibre Channel technology and integrated network sensors helps organizations achieve greater control and insight to quickly identify the root cause of problems at the storage or VM tier. This reduces time to resolution so critical Service Level Agreements (SLAs) can be met. The IO Insight capability non-disruptively and non-intrusively gathers IO statistics from any storage port, then feeds them to a monitoring policy that sets thresholds and generates alerts. VM Insight applies IO Insight visibility for each VM. Integrated VM and storage-level IO latency and IOPS monitoring enables administrators to set baseline application performance and identify the VM or physical layer responsible for the degraded performance. Integrated network sensors provide IO performance management that is designed to avoid dependence on invasive and disruptive physical taps. Additional features include:

- Provides proactive, non-intrusive, real-time monitoring and alerting with visibility into storage IO health and performance for each VM
- Monitors individual VM, host, or storage devices to gain deeper insight into the performance of the network in order to maintain SLA compliance
- Obtains IO latency and IOPS metrics for individual storage devices used with each VM in order to diagnose IO operational issues
- Enables organizations to provision and plan storage networks based on application/VM requirements

Forward Error Correction (FEC) capabilities further increase resiliency by automatically detecting and recovering network transmission errors. To ensure predictable performance prior to deployment, organizations can validate infrastructure with Brocade ClearLink Diagnostics and Flow Generator features, and set baseline storage performance using IO Insight.

Simplified Management and Robust Network Analytics

Brocade Fabric Vision technology provides a breakthrough hardware and software solution that helps simplify monitoring, maximize network availability, and dramatically reduce costs. Featuring innovative monitoring, management, and diagnostic capabilities, Fabric Vision technology enables administrators to avoid problems before they impact operations, helping their organizations meet SLAs. Fabric Vision technology includes:

- **IO Insight:** Proactively monitors IO performance and behavior through integrated network sensors to gain deep insight into problems and ensure service levels. This capability non-disruptively and non-intrusively gathers IO statistics for both SCSI and NVMe traffic from any device port on a Gen 6 Fibre Channel platform, then applies this information within an intuitive, policy-based monitoring and alerting suite to configure thresholds and alarms.
- **VM Insight:** Seamlessly monitors VM performance throughout a storage fabric with standards-based, end-to-end VM tagging. Administrators can quickly

determine the source of VM/application performance anomalies, as well as provision and fine-tune the infrastructure based on VM/application requirements to meet service-level objectives.

- **Monitoring and Alerting Policy Suite (MAPS):** Provides an easy-to-use solution for policy-based threshold monitoring and alerting. MAPS proactively monitors the health and performance of any SCSI or NVMe storage infrastructure to ensure application uptime and availability. By leveraging prebuilt rule-/policy-based templates, MAPS simplifies fabric-wide threshold configuration, monitoring, and alerting. 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. With Flow Vision and VM Insight, administrators set thresholds for VM flow metrics in MAPS policies in order to be notified of VM 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. In addition, they can ensure settings do not drift over time with COMPASS configuration and policy violation monitoring within Brocade Network Advisor dashboards.
- **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 non-disruptive 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 IO response time, IO completion time, the number of pending IOs, 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 IO statistics for each VM.
  - **Flow Learning:** Enables administrators to non-disruptively discover all flows that go to or come from a specific host port or a storage port, or traverse ISLs/IFLs or 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:** Provides the ability to non-disruptively 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 device connections and ISLs, enhancing transmission reliability and performance.
- **Credit Loss Recovery:** Helps overcome performance degradation and congestion due to buffer credit loss.

Improve Efficiency with Fabric 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 Inc. 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, Brocade offers a

broad range of choices to enable any SAN management solution. IT organizations that couple Brocade'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.
- Quickly integrate systems with open source PyFOS, a Python language, to simplify common SAN management practices.
- Leverage Ansible to easily scale automation and orchestration across the entire infrastructure.

Brocade Network Advisor

Brocade Network Advisor simplifies Gen 6 Fibre Channel management and helps organizations proactively diagnose and resolve issues to maximize uptime, increase operational efficiency, and reduce costs. The wizard-driven interface dramatically reduces deployment and configuration times by allowing fabrics, switches, and ports to be managed as groups. Customizable dashboards graphically display performance and health indicators out of the box, including all data captured using Brocade Fabric Vision technology. To accelerate troubleshooting, administrators can use dashboard playback to quickly review past events and identify problems in the fabric. Dashboards and reports can be configured to show only the most relevant data, enabling administrators to more efficiently prioritize their actions and maintain network performance.

A Building Block for Virtualized, Private Cloud Storage

The Brocade G620 provides a critical building block for today's highly virtualized and cloud environments. It simplifies server virtualization and meets the high-throughput demands of flash storage. The Brocade G620 also supports multitenancy in cloud environments through Virtual Fabrics, Quality of Service (QoS), and fabric-based zoning features. In addition, it provides efficient link utilization with up to 64 Gbps of in-flight data compression and up to 64 Gbps of in-flight data encryption over ISLs. Organizations can have up to four ports at 16 Gbps of in-flight data compression per Brocade G620 Switch. Furthermore, internal fault-tolerant and enterprise-class RAS features help minimize downtime to support mission-critical cloud environments.

Brocade Access Gateway Mode

The Brocade G620 can be deployed as a full-fabric switch or as a Brocade Access Gateway, which simplifies fabric topologies and heterogeneous fabric connectivity (the default mode setting is a switch). Brocade Access Gateway mode utilizes N_Port ID Virtualization (NPIV) switch standards to present physical and virtual servers directly to the core of SAN fabrics. This makes it transparent to the SAN fabric, greatly reducing management of the network edge. The Brocade G620 in Brocade Access Gateway mode can connect servers to NPIV-enabled Brocade B-Series, or other SAN fabrics.

Organizations can easily enable Brocade Access Gateway mode via Brocade Network Advisor or a CLI. Key benefits of Brocade Access Gateway mode include:

- Improved scalability for large or rapidly growing server and virtual server environments
- Reduced management of the network edge, since Brocade Access Gateway does not have a domain identity and appears transparent to the core fabric
- Support for heterogeneous SAN configurations without reduced functionality for server connectivity

Global Support

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 performance of their overall network.

Maximizing Investments

To help optimize technology investments, Brocade, A Broadcom Inc. 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.

Brocade G620 Switch Specifications

System Architecture	
Fibre Channel ports	Switch mode (default): Minimum of 24 ports and maximum of 64 ports configuration. Port numbers above minimum are enabled through 12-port SFP+ increments via Ports on Demand (PoD) licenses and through one 4-port QSFP PoD, providing 16-port increments through a Q-Flex license; E_Ports, F_Ports, D_Ports, EX_Ports. Brocade Access Gateway default port mapping: 40 SFP+ F_Ports, 8 SFP+ N_Ports
Scalability	Full-fabric architecture with a maximum of 239 switches
Certified maximum	6,000 active nodes; 56 switches, 19 hops in Brocade Fabric OS® fabrics; larger fabrics certified as required
Performance	Fibre Channel: 4.25 Gbps line speed, full duplex; 8.5 Gbps line speed, full duplex; 14.025 Gbps line speed, full duplex; 28.05 Gbps line speed, full duplex; auto-sensing of 4, 8, 16, and 32 Gbps port speeds. 10 Gbps optionally programmable to fixed port speed. Auto-sensing of 4×32/4×16/4×8/4×4 Gbps speeds on the QSFP ports with Brocade FOS v8.2.0.
ISL trunking	Frame-based trunking with up to eight 32 Gbps SFP+ ports per ISL trunk or up to two 128 Gbps QSFP ports per ISL trunk. Exchange-based load balancing across ISLs with DPS included in Brocade Fabric OS.
Aggregate bandwidth	2 Tbps
Maximum fabric latency	Latency for locally switched ports is < 780 ns (including FEC); compression is 1 µs per node
Maximum frame size	2,112-byte payload
Frame buffers	15,360 dynamically allocated
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	D_Port (ClearLink Diagnostic Port), E_Port, EX_Port, F_Port, AE_Port; optional port-type control Brocade Access Gateway mode: F_Port and NPIV-enabled N_Port
Data traffic types	Fabric switches supporting unicast
Media types	128 Gbps: Brocade G620 requires Brocade hot-pluggable QSFP, MPO connector; 128 Gbps SWL 32 Gbps: Brocade G620 requires Brocade hot-pluggable SFP+, LC connector; 32 Gbps SWL 16 Gbps: Brocade G620 requires Brocade hot-pluggable SFP+, LC connector; 16 Gbps SWL 10 Gbps: Brocade G620 requires Brocade hot-pluggable SFP+, LC connector; 10 Gbps SWL Fibre Channel distance subject to fiber-optic cable and port speed.
USB	One USB port for system log file downloads or firmware upgrades
Fabric services *Note: Some fabric services do not apply or are unavailable in Brocade Access Gateway mode.*	Monitoring and Alerting Policy Suite (MAPS); Flow Vision; Brocade Adaptive Networking (Ingress Rate Limiting, Traffic Isolation, QoS); Fabric Performance Impact (FPI) Monitoring; Slow Drain Device Quarantine (SDDQ); Brocade Advanced Zoning (default zoning, port/WWN zoning, broadcast zoning, peer zoning, target-driven zoning); Dynamic Fabric Provisioning (DFP); Dynamic Path Selection (DPS); Brocade Extended Fabrics; Enhanced BB Credit Recovery; FDMI; Frame Redirection; Frame-based Trunking; FSPF; Integrated Routing; IPoFC; Brocade ISL Trunking; Management Server; NPIV; Time Server; Registered State Change Notification (RSCN); Reliable Commit Service (RCS); Simple Name Server (SNS); Virtual Fabrics (Logical Switch, Logical Fabric); Read Diagnostics Parameter (RDP)
Extension	Fibre Channel, in-flight compression (Brocade LZO); integrated optional 10 Gbps Fibre Channel for DWDM MAN connectivity

Brocade G620 Switch Specifications *(continued)*

Management	
Supported management software	HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), SSH; Auditing, Syslog; NTP v3; Brocade Advanced Web Tools; Brocade Network Advisor SAN Enterprise or Brocade Network Advisor SAN Professional/Professional Plus; EZSwitch; Command Line Interface (CLI); SMI-S compliant; REST API; Administrative Domains; trial licenses for add-on capabilities
Security	DH-CHAP (between switches and end devices), FCAP switch authentication; HTTPS, IPsec, IP filtering, LDAP with IPv6, OpenLDAP, Port Binding, RADIUS, TACACS+, user-defined Role-Based Access Control (RBAC), Secure Copy (SCP), Secure RPC, Secure Syslog, SFTP, SSH v2, SSL, Switch Binding, Trusted Switch
Management access	10/100/1000 Mbps Ethernet (RJ-45), in-band over Fibre Channel, serial port (RJ-45), and one USB port
Diagnostics	ClearLink optics and cable diagnostics, including electrical/optical loopback, link traffic/latency/distance; flow mirroring; built-in flow generator; POST and embedded online/offline diagnostics, including environmental monitoring, FCping and Pathinfo (FC traceroute), frame viewer, non-disruptive daemon restart, optics health monitoring, power monitoring, RAStrace logging, and Rolling Reboot Detection (RRD)
Mechanical	
Enclosure	Front-to-back airflow; non-port-side exhaust; power from back, 1U Back-to-front airflow; non-port-side intake; power from back, 1U
Size	Width: 440.00 mm (17.32 in.) Height: 43.90 mm (1.73 in.) Depth: 355.60 mm (14 in.)
System weight	7.73 kg (17 lb) with two power supply FRUs, without transceivers
Environment	
Operating environment	Temperature: 0°C to 40°C/32°F to 104°F Humidity: 10% to 85% (non-condensing)
Non-operating environment	Temperature: -25°C to 70°C/-13°F to 158°F Humidity: 10% to 90% (non-condensing)
Operating altitude	Up to 3,000 m (9,842 ft)
Storage altitude	Up to 12 km (39,370 ft)
Shock	Operating: Up to 20 G, 6 ms half-sine Non-operating: Half-sine, 33 G 11 ms, 3/eg axis
Vibration	Operating: 0.5 g sine, 0.4 grms random, 5 to 500 Hz Non-operating: 2.0 g sine, 1.1 grms random, 5 to 500 Hz
Heat dissipation	64 ports at 716 BTU/hr

Brocade G620 Switch Specifications *(continued)*

Power	
Power supply	Dual, hot-swappable redundant power supplies with integrated system cooling fans
AC input	90 V to 264 V ~3.5 A
AC input line frequency	47 Hz to 63 Hz
AC power consumption	204 W with all 64 ports populated with 48×32 Gbps SFP+ SWL optics and 4× (4×32 Gbps) QSFP SWL optics 85 W for empty chassis with no optics

For information about supported SAN standards, visit
www.broadcom.com/support/fibre-channel-networking/san-standards.

For information about hardware regulatory compliance, visit
www.broadcom.com/support/fibre-channel-networking/san-standards/regulatory-compliance.

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