Hitachi Vantara

Cisco and Hitachi Future-proof Architecture for Mission-Critical Applications

Accelerating business performance at scale and at reduced risk whilst ensuring mission-critical mainframe applications continue to be available 24/7.

Strategic imperative to increase business agility, accelerate innovation, and mitigate risks.

Enterprises must modernize block storage and SAN networks to support AI, real-time analytics, and always-on operations while reducing complexity and boosting agility. Legacy, siloed infrastructure cannot keep up with rising performance, security, and efficiency demands. Organizations require an integrated storage and networking foundation that simplifies operations, scales efficiently, and provides actionable visibility across environments.

Mainframes have been critical to the running of mission-critical, high-volume transaction processing and data management applications for many decades, and they remain the backbone for global finance and infrastructure. The technology has shifted from large, dedicated hardware to compact, energy-efficient, and highly virtualized systems that integrate with cloud computing and AI. Today modern mainframes are enabling the modernization of legacy applications while retaining immense processing power for high-volume, real-time analytics.

Mainframes primarily process and store massive volumes of highly structured business data, typically organized in records, files, and databases. Storage Area Network (SAN) technology is heavily used for highly structured data in mainframe environments. While SANs are common in open-system data centers using FCP (Fibre Channel Protocol), they are also fundamental to the IBM z Systems mainframe ecosystem, specifically using a specialized protocol known as FICON (Fibre Connection). Cisco MDS 9000 Series ensures seamless integration and easy adoption for mixed FCP/FICON environments. Native FICON allows mainframes to connect to SAN directors, switches, and storage controllers, ensuring high reliability and high performance.

Modern SAN infrastructure based on Cisco MDS 9000 Series, is designed to provide the "High Integrity Fabric" required by mainframe hosts, ensuring 99.9999% availability. Hitachi Vantara VSP One Block High End Storage is also designed with high availability in mind combining with Cisco MDS 9000 Series for a perfect match for the 99.999999% availability requirements of the z17 mainframe.

It is worth noting that our solutions adhere to IT industry standards hence providing a consistent framework for products, services, and security, that ensures they are always "fit for purpose".

Mission-Critical Industry Applications

- **Banking:** Core banking systems such as transaction processing, deposit accounting, and online banking.
- **Credit Card Processing:** High-volume, real-time authorization and clearing for major credit card networks.
- **Insurance Policy Management:** Claims processing and insurance policy administration for the world's top insurers.
- **Airline Reservation Systems:** Global booking and scheduling systems (e.g., SABRE).
- **Healthcare Data Management:** Processing sensitive patient records, compliance, and insurance claims.
- **Government Tax and Census Processing:** Large-scale, high-security bulk data processing.
- **Retail Inventory Control:** Managing massive inventory systems, supply chains, and transaction data.
- **Automotive Manufacturing Management:** Supply chain, production, and bill of materials management.
- **Utility Billing Systems:** Processing high-volume billing for telecom and energy companies.

Core Benefits of Standards

Interoperability and Compatibility
Standards act as a common language that ensures physical devices and software from different manufacturers can communicate seamlessly.

Enhanced Security and Risk Management
Standards based security frameworks assist organisations identify security gaps thereby reducing the risk of data breaches, and theft or misuse of sensitive information.

Cost Efficiency
Standards reduce time spent on "trial and error" efforts and lowers acquisition costs through volume purchasing. It also minimises maintenance complexity for the future.

Global Market Access
Internationally recognised standards remove technical barriers to trade, and services allowing companies to compete globally and gain trust with international partners and customers.

Innovation
Standards allow innovation to focus on new differentiating features rather than reinventing basic compOnents building on a solid ratified foundation of technical specifications.

Customer Trust and Credibility
Certification serves as independent proof of quality, giving customers confidence that products are safe and reliable.

Solution Profile

Cisco and Hitachi Future-proof Architecture for Mission-Critical Applications

Cisco MDS 9000 is the optimal FCP/FICON SAN connectivity choice

The IBM z17 is a 32Gbps platform. The Cisco MDS 9000 offers the only FICON solution that allows z17 to connect to both 32Gbps and 64Gbps director and fabric switches. Thus, giving organizations the choice to remain on 32Gbps rather than being forced onto a more expensive 64Gbps SAN.

Physical FC speeds supported on the IBM z17 mainframe are:

- FICON Express 32-4P supports link data rates up to 32 Gbps.
- FICON Express16SA supports link data rates up to 16 Gbps.
- Switching Fabric: Modern MDS platforms use specialized hardware for near-instantaneous forwarding, minimizing internal delays to microseconds or even nanoseconds.
- Port Speeds: Higher port speeds e.g., 32G, 64G Fibre Channel inherently have lower serialization delay compared to slower Ethernet, contributing to overall low latency.
- Non-Blocking Architecture: Ensures consistent performance, even under heavy load, preventing bottlenecks and maintaining low latency.
- SAN Analytics: Hardware engines can measure I/O metrics at line rate, helping pinpoint latency issues.

Data Security is key to safeguard your business

Cisco MDS in addition to standards-based data security also delivers quantum-resistant encryption (AES-256) with no performance impact and advanced congestion isolation (DIRL). Hitachi Vantara VSP One Block High End Storage adds end-to-end encryption, secure boot, FIPS 140-3, Common Criteria, immutable snapshots, ransomware detection, and a Cyber Resilience Guarantee for clean recovery.

Cisco MDS 9000 Series

- Secure Boot
- Fibre Channel Security Protocol, FC-SP and DH-CHAP.
  - FC-SP capabilities provide switch to switch and hosts to switch authentication.
  - DH-CHAP is an FC-SP protocol that provides authentication between Cisco MDS 9000 Family switches and other devices.
  - Cisco TrustSec FC Link Encryption that is an extension of the FC-SP feature.
  - AES (Advanced Encryption Standard) is a symmetric cypher algorithm that provides high level of link level security.
- Port Security prevents unauthorized access to a switch port by binding specific world-wide names (WWNs) to specific switch ports.
- Fabric Binding ensures Inter-Switch Links (ISLs) are enabled only between specified switches.
  - Fabric binding is mandatory for FICON deployments.
- IP access control lists (ACLs) provide basic network security on the out-of-band management Ethernet interface and the in-band IP management Interface.

3 reasons why Hitachi Vantara VSP One Block High End Storage is the best option for the z17

Simple -

Strategic Modernization

- Leverage next-gen Intel CPUs (Sapphire Rapids) and all-flash NVMe storage for both Open Systems and Mainframe.
- Built on the latest Intel architecture with DDR5 memory and PCIe Gen 4 backend for high-speed data access.
- IFCES compatibility insuring the future.
- Most powerful storage on the market allowing large consolidation.

Secure -

Trustworthy Digital Core

- Protect what matters most with enterprise-grade security and resilient data infrastructure. Hitachi Vantara VSP One Block High End Storage is the only standalOne storage to offer 8 9s of availability in the market.
- Ensure business continuity with advanced drive protection and RAID support for up to 288 high-density NVMe SSDs (3.8TB to 60TB).
- Built-in safeguards protect against drive failures and data loss at scale.
- Meet strict compliance and regulatory standards with FIPS 140-3 Level 2 certified infrastructure, Common Criteria and hardware root of trust.
- Secure sensitive data across environments with robust, built-in encryption and protection.

Sustainable -

Growth-Oriented Outcomes

- Flexible architecture scales from 4 to 12 controllers.
- High-speed, energy-efficient connectivity options like 32Gbit FICON, 100Gbit TCP, 64Gbit FC, 25Gbit iSCSI, and zHyperLink to come to support modern workloads.
- Clear Sight reporting delivers visibility into energy use and actionable guidance to meet ESG goals.

Solution Profile

Cisco and Hitachi Future-proof Architecture for Mission-Critical Applications

Hitachi Vantara VSP One Block High End Storage Data Security

- VSP One Secure Boot a zero-trust ensuring startup software is trusted
- Data-at-rest encryption
- Support for z-series encryption
- Hardware root of trust
- TLS 1.3, 1.2
- Secure firmware update
- FIPS 140-3 Level 2
- Common criteria (ND cPP)
- IFCES support

Cisco MDS 9000 Series security is addressing quantum threats through features like TrustSec Fibre Channel Link Encryption, using algorithms like AES-256 (strong against Grover's algorithm) and supporting quantum-safe methods, future-proofing storage area networks (SANs) against powerful quantum computers that could break current encryption, with a vision for future post-quantum cryptography (PQC) standards integration into hardware. It's about securing data in transit on SANs with strong, scalable encryption, preparing for the "post-quantum" era.

Key Aspects of Cisco MDS Quantum Security:

TrustSec FC Link Encryption: This is the primary mechanism, providing end-to-end encryption for data moving across Fibre Channel networks.

- **Quantum-Resistant Algorithms:** Uses AES-256 in GCM/GMAC modes, which offers strong defense against attacks from future quantum computers, notes Hi-network.com.
- **Future-Proofing:** Designed to remain secure well past 2030, adhering to standards like ETSI GR QSC 006, helping customers transition to post-quantum security.
- **Software & Hardware Integration:** Cisco is embedding quantum-safe measures in software first and plans to integrate them into hardware (ASICs) as standards evolve, ensuring a layered defense.
- **PKI & Standards:** Supports Public Key Infrastructure (PKI) and integrates with emerging standards for secure key exchange and management, mentions Cisco Systems.

Why It Matters - The Quantum Threat:

- Powerful quantum computers could eventually break current public-key cryptography, posing a significant risk to data security.

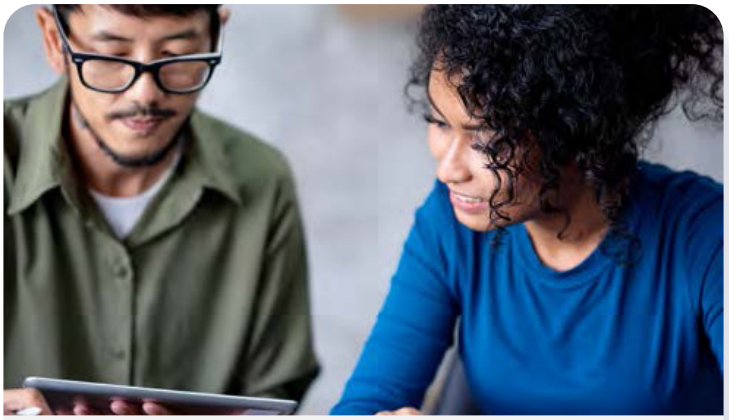
Cisco's approach helps protect sensitive data in storage networks (SANs) from these future threats, ensuring data confidentiality and integrity.

Total Cost of Ownership running Mission-Critical workloads

The Total Cost of Ownership (TCO) model in IT was developed by Gartner. The model goes beyond initial purchase prices to encompass all direct and indirect expenses, such as maintenance, support, training, and down-time. The TCO modelling provides a comprehensive financial assessment designed to calculate the total cost of an asset or system, such as hardware, software, or cloud services, over its entire lifecycle. Being able to ascertain the real costs of introducing next generation solutions into your compute environments are critical. Hitachi Vantara and Cisco are continually working on reducing TCO for customers.

Cisco MDS 9000 Series

- The Cisco MDS SAN solutions support existing 32G FICON SAN customers moving to z17.
- The Cisco MDS SAN family is also qualified for 64G FICON on the z17 platform. This gives mainframe customers the choice to remain on 32G which z17 supports, without the costly burden of a mandatory 64G SAN refresh.
- SFP support for legacy environments.
- Longterm benefits include:
    - The use of standard cables with LC connectors.
    - Reuse existing Cisco optics.
    - Reuse older-generation Cisco line cards alongside new line cards in Cisco MDS SAN Directors.
    - No need to replace the Cisco MDS chassis.



Mission-Critical Industry Applications

- **Performance** – Faster transactions, reduced latency for AI/analytics and core apps enable consistent throughput and deterministic latency across the SAN.
- **Risk** – Strong cyber resilience, early-warning analytics, automated congestion isolation and standards certifications reduce operational and compliance risk.
- **Reliability** – Proven lifecycle protection, data-in-place upgrades, unified observability and director-class availability minimize downtime and protect ROI.

Solution Profile

Cisco and Hitachi Future-proof Architecture for Mission-Critical Applications

Hitachi Vantara VSP One Block High End Storage Data Security

- The Hitachi Vantara VSP One Block High End Storage solution is qualified with z17.
- Hitachi Vantara VSP One Block High End Storage is engineered for evolution, as an example of this flexibility, the backend supports PCIe 5 and the controllers have been engineered to support faster processors.
- Hitachi is participating in the Japanese initiative to reduce the carbon footprint and always have independent certification of the green gas emissions. As such Hitachi Vantara VSP One Block High End Storage is very efficient in energy consumption, and this is supported by published value and not vendor claims.

Primary Joint Use Cases

Accelerate AI & Analytics Pipelines
Pair Hitachi VSP One Block High End all-flash NVMe and scalable controllers with Cisco MDS 64G NVMe/FC to feed GPUs and AI services with consistent low-latency access to proprietary data, while SAN Analytics prevents slow-drain and congestion.

Assure Mission-Critical Application Continuity
Achieve predictable performance for ERP, databases, and core payments with non-oversubscribed switching and 1B+ IOPS per line card on MDS, alongside Hitachi snapshot/replication and secure, active-active protection to minimize downtime.

Modernize at Lower TCO & Carbon Footprint
Scale capacity and performance without disruptions using Hitachi data-in-place upgrades and Cisco director backward compatibility. Use transceiver power management and adaptive data reduction to cut energy and space while consolidating workloads.

Reference Architecture Overview

- Front-end: Cisco MDS 9000 64G Fibre Channel fabric providing non-oversubscribed, centralized switching for NVMe/FC and FCP.
- Storage: Hitachi Vantara VSP One Block High End Storage with all-flash NVMe drives, multi-controller scale-out, and integrated security.
- Operations & Observability: Cisco Intersight and Nexus Dashboard for cross-domain visibility; Hitachi VSP 360 and AIOps for fleet-wide management.
- Security: AES-256 quantum-resistant options in SAN, end-to-end encryption and HRoT in storage, immutable snapshots and cyber resilience guarantees.

Performance & Connectivity

Cisco MDS offers 64Gb FC line rate performance with no oversubscription today and supports NVMe/FC to dramatically increase IOPS. Hitachi Vantara VSP One Block High End Storage delivers all-flash NVMe speed, Intel CPUs, PCIe architecture, and high-density NVMe capacity to sustain mission-critical workloads.

Operations & Observability

Unified management with Cisco Intersight and Nexus Dashboard complements Hitachi VSP 360 and AIOps-powered observability. Together they provide fleet-wide visibility, zero-touch setup, guided workflows, mobile insights, and SAN analytics for every frame and flow.

Security & Resilience

Cisco MDS delivers quantum-resistant encryption (AES-256) with no performance impact and advanced congestion isolation (DIRL). Hitachi Vantara VSP One Block High End Storage adds end-to-end encryption, secure boot, FIPS 140-3, Common Criteria, immutable snapshots, ransomware detection, and a Cyber Resilience Guarantee for clean recovery.

Sustainability & Lifecycle Value

Hitachi's dynamic carbon reduction and energy dashboards, combined with Cisco's transceiver power-off controls and decade-long chassis reuse, enable lower energy consumption and extend asset life without forklift upgrades.

Summary

Together, Hitachi Vantara VSP One Block High End Storage and Cisco MDS 9000 Series deliver a unified, future-ready foundation for AI and mission-critical workloads. Count on this joint solution to deliver uncompromised performance, deep visibility, strong security, resilient operations and sustainable economics — all with investment protection.

Contact your Hitachi Vantara and Cisco teams to design a joint reference architecture and migration plan tailored to your data center strategy.

Learn more →