Case Study

Data Center Networking Solution

FS 100G-400G Open Standard Solution for Cloud Security Evolution

A U.S. cloud security provider partnered with FS for a 100G to 400G upgrade. By replacing proprietary legacy setups with IEEE 802.3cm-based open standard solutions, FS enabled stable connectivity across different devices and created a clear upgrade path toward 800G networking.

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FS 100G-400G Open Standard Solution for Cloud Security Evolution

Country

United States

Industry

Technology

Network Type

Hyperscale and Cloud Data Centers

Solutions

Internet Data Center

Highlights

- Adopting the 400G SR4.2 to 4x 100G SR1.2 open standard architecture to replace legacy proprietary links, achieving seamless connections between different equipment generations without altering existing fiber cabling.
- Transitioning from a closed, proprietary SRBD architecture to a fully standardized IEEE 802.3cm solution. This ensures complete interoperability between FS, Arista, and Cisco hardware, effectively eliminating vendor lock-in risks.
- Providing visualized design and practical technical guidance to assist the client in rapid testing and establishing sustainable network upgrade roadmaps across multiple new data center projects.

Key stats

- Beyond meeting the immediate 400G upgrade needs of 7 data centers, the solution establishes a standardized KP-FEC communication foundation, securing a seamless technical path for future upgrades to 800G networks.
- The standardized KP-FEC technology delivers stronger signal reliability and a lower Bit Error Rate (BER). Verified through rigorous testing, this solution provides superior stability and lower latency compared to proprietary legacy designs, ensuring peak performance for high-throughput traffic.
- Rigorously verified through 14 professional test categories and 72-hour compatibility validation with NVIDIA, Arista, Cisco, and Mellanox, ensuring the long-term stability of 400G core links in mixed-brand environments.

Overview

A U.S.-based cloud security service provider specializing in network security, internet security, and Zero Trust architecture, delivering secure access services to users worldwide. Since early 2025, the client has been continuously acquiring other security companies to accelerate expansion and drive product innovation, aiming to optimize and upgrade its overall security architecture.

With this rapid growth, the existing 100G network could no longer support the client's surging business volume. To ensure a seamless global experience, they planned to build seven new 400G data centers at core nodes. However, ensuring "seamless connectivity" between the cutting-edge 400G core and hundreds of legacy equipment became a major hurdle for business continuity. Facing the dilemma of conflicting technical standards, the company turned to the experienced experts at FS to solve this complex challenge.

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Facing evolution challenges posed by coexisting technical standards, FS technical experts conducted in-depth link analysis and practical testing, helping the client recognize the constraints of their legacy architecture during cross-generation expansion. FS customized a standardized evolution plan based on open standards, ultimately achieving a smooth architectural upgrade in a complex environment where new and legacy devices coexist.

Challenge

Compatibility Barriers

Existing 100G SRBD links rely on brand-specific technical designs that create barriers when interconnecting with standard 400G networks, increasing the complexity of future upgrades.

Protocol Algorithm Mismatch

Differences between Legacy FEC and the industry-standard KP-FEC prevent stable connection setup, resulting in connection limitations or signal instability.

Operational Complexity in Mixed-Vendor Environments

During simultaneous multi-center construction, ensuring long-term stable compatibility between different generations and vendor platforms is a critical challenge for business continuity.

Solutions

The client's existing 100G SRBD optics were built using a vendor-specific Legacy FEC mechanism, which only works within that vendor's own ecosystem. When the client attempted to directly upgrade these 100G links to an IEEE-standard 400G network, the links could not establish a stable connection due to incompatibility at the physical layer. This showed that the upgrade from 100G to 400G was not just a speed increase, but was constrained by the original technical design. If the existing architecture were kept unchanged, future network upgrades would continue to face limited flexibility.

Based on a full review of the client's current network and future expansion plans, FS recommended adopting an open-standard solution from a long-term data center planning perspective. For the seven new data center deployments, the FS technical team recommended using 400G SR4.2 transceivers, connected to 100G SR1.2 transceivers via a standardized 1-to-4 breakout design. This solution uses the industry-standard KP-FEC mechanism, which is better suited for stable 400G PAM4 transmission. Compared with vendor-specific algorithms, this approach is more reliable in real deployments, involves lower operational risk, and enables easier interoperability across different platforms.

Although the benefits of upgrading to 400G were clear, the client was cautious during the early decision stage. Reducing the use of existing 100G SRBD modules in new data center projects required careful cost and operational evaluation. The client's key concern was whether the standardized solution could deliver better stability and long-term reliability without introducing additional operational risk.

The turning point came from FS's practical solution design and technical validation. FS provided clear logical topology diagrams and detailed guidance on effective upgrade paths from 100G to 400G networks, enabling the cloud security service provider to gain a clear understanding of deployment planning and move forward with greater assurance in data center construction. In parallel, FS validated the solution in a test environment built with the client's actual switching hardware and under high-traffic conditions. The successful test results gave the client the confidence to move forward.

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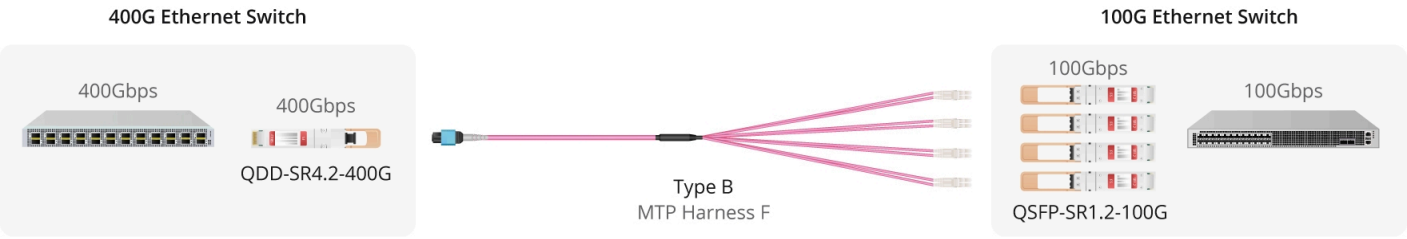

In the end, the client adopted a phased upgrade strategy: existing data centers remained unchanged to protect previous investments, while all new data centers consistently deployed the standardized 400G solution. By moving to an open-standard approach, the client avoided dependence on proprietary technologies, gained greater flexibility for future expansion, and established a solid foundation for a smooth transition to 800G networking.

Through comprehensive validation, the solution ensures stable operation of 400G core links in mixed-vendor environments. It resolves the immediate 100G-to-400G upgrade challenges and provides a clear, practical foundation for future expansion, supporting the long-term growth of the client's cloud security services.

Results

By adopting the FS 100G–400G open standard solution, the client moved away from a vendor-specific design and established a standardized 400G architecture. The upgrade delivered a fourfold increase in bandwidth while avoiding large-scale hardware replacement, helping protect existing switching platforms and cabling investments.

Product List

Product	ID	FS P/N	Description
400G Module	199403	QDD-SR4.2-400G	Arista QDD-400G-SRBD Compatible 400GBASE-SR4.2 QSFP-DD PAM4 850nm 100m MPO-12/UPC MMF Optical Transceiver Module, Breakout to 4 x 100G-SR1.2
100G Module	201879	QSFP-SR1.2-100G	Arista Compatible 100GBASE-SR1.2 QSFP28 BiDi 850/910nm 100m DOM Duplex LC/UPC MMF Optical Transceiver Module

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