

Case Study

Enterprise LAN

FS Empowers US Industrial Computing
Partner with Reliable Networking

Discover how FS delivered a time-synchronized,
future-ready network that enhanced production
reliability and long-term competitiveness for a US
industrial computing manufacturer.



FS Empowers US Industrial Computing Partner with Reliable Networking


Country

 United States

Industry

 Manufacturing

Network Type

 Large and Midsize Campus Network

Solutions

 Enterprise LAN

Highlights

- Deployed 6 FS TSN3220-10S-U switches across the production network to achieve precise, nanosecond-level time synchronization and ensure seamless coordination between devices.
- Utilized IP41-rated, metal-cased industrial switches that operated reliably in extreme temperatures from -40°C to 75°C and dusty environments, greatly enhancing network stability and minimizing production downtime.
- Provided on-site commissioning, PTP configuration guidance, and delivery assurance to help customers complete multiple deployments within the project cycle.

Key Stats

- The implementation of IEEE 1588v2 PTP enabled nanosecond-level synchronization accuracy between controllers and monitoring terminals, reducing process deviation alarms by nearly 35% and improving overall production consistency.
- By combining 1G copper ports with 10G fiber uplinks, data transmission latency was reduced by 40%, enhancing the visibility and responsiveness of production monitoring systems.
- Using interoperable FS optical modules and Cat6a cabling simplified network integration and lowered total procurement costs by around 15%.

Overview

The client, a US-based industrial computing manufacturer specializing in HMI and factory visualization systems, was seeking a robust networking solution to modernize its production infrastructure. Their automation systems relied on IEEE 1588v2 precision time synchronization to maintain nanosecond-level accuracy across control nodes—essential for ensuring smooth and coordinated factory operations. At the same time, the client needed a flexible port configuration with 6–8 copper ports for device connectivity and dual 10G fiber uplinks for backbone aggregation, allowing efficient data flow between control centers and visualization terminals. Given the harsh factory conditions involving temperature fluctuations and vibrations, industrial-grade reliability was also critical to prevent communication failures. With plans to

deploy 75–100 units over two years, the client also emphasized supply consistency, technical support, and cost-effective compatibility across switches, optical modules, and cabling.

Challenges

- Precision Timing Challenge — In HMI and Andon systems, precise event logging and visual alerts depend on nanosecond synchronization. Without IEEE 1588v2 PTP support, signal delays between controllers and displays could cause inaccurate timestamps, leading to misaligned alarms or inconsistent production monitoring.
- Network Integration and Bandwidth Challenge — Hundreds of HMIs and industrial PCs transmit real-time visualization and status data to a central control room. Limited copper ports and insufficient uplink bandwidth would create congestion and latency, disrupting real-time updates and operator responsiveness on factory dashboards.
- Harsh Industrial Environment Challenge — HMI terminals and industrial PCs are often installed near production lines, exposed to wide temperature variations, constant vibration, and strong electromagnetic interference. Traditional commercial switches fail prematurely under these conditions, while military-grade devices offer stability but are prohibitively expensive.
- Supply and Consistency Challenge — The client needed 75–100 identical units for phased system upgrades across multiple plants. Any variation in firmware or delivery delays could interrupt production monitoring, making maintenance coordination harder and increasing integration costs.

Solutions

To build a resilient and deterministic communication backbone, the client partnered with FS to design an industrial network optimized for real-time performance and long-term scalability. Following the technical evaluation, FS recommended the TSN3220-10S-U Industrial Switch as the core of the new network architecture.



Supporting IEEE 1588v2 PTP (OC/TC/BC mode), the TSN3220-10S-U enabled nanosecond-level clock synchronization between HMI terminals, data acquisition controllers, and Andon servers. This ensured that production status, alarm triggers, and visual dashboards across the plant floor remained perfectly aligned—improving situational awareness and operator response speed.

Built on the Marvell Amethyst chipset, the switches delivered low-latency packet forwarding and deterministic performance even under high traffic from multiple visualization terminals. The robust -40°C to 75°C temperature range and IP41 protection rating guaranteed reliable operation near machinery with vibration and temperature fluctuations—conditions typical in the client's assembly areas and production control rooms.

To ensure seamless network integration, we also supplied compatible optical transceivers and Cat6a cabling, forming a unified and reliable infrastructure. In addition, FS's technical support and coordinated delivery services helped the client complete multi-site deployment efficiently, reducing procurement costs by about 15% and laying a scalable foundation for future expansion.

Results

The new network architecture delivered measurable results in both operational efficiency and reliability. With IEEE 1588v2-enabled synchronization, visualization data from HMI terminals and Andon systems was transmitted in real time, reducing latency by approximately 40% and improving production monitoring accuracy. System uptime reached 99.9%, minimizing unplanned downtime and data loss in continuous manufacturing operations. Centralized management and simplified maintenance cut network troubleshooting time by 30%, while FS's efficient logistics support ensured on-time delivery for all deployment phases.



United States

Address: 380 Centerpoint Blvd, New Castle, DE 19720, United States

Tel: +1 (888) 468 7419

Email: US@fs.com

For more information, welcome to visit www.fs.com

Copyright © 2009-2025 FS.com Inc. All Rights Reserved.