

Festo creates blueprint for manufacturing excellence with Cisco Ethernet to the Factory solution



Executive Summary

Customer Name

- Festo AG

Industry

- Manufacturing, Automation Technology for the factory and process automation

Business Challenge

- Drive productivity and create new efficiencies by connecting the global IP voice and data network with real-time information from the factory floor
- Optimise production environment – with increased network security, uptime and throughput
- Customer support services – engineering and production on demand

Solution

- Cisco Ethernet to the Factory (EttF)
- Cisco Service-Orientated Network Architecture (SONA)

Business Results

- 100 per cent uptime over last 12 months
- Effective management of security threats with minimal disruption to production
- 360-degree view enables improved strategic decision making and planning
- Enhancement of manufacturing, sales, customer service and IT processes and capabilities

Festo has broken through the barrier of separate corporate and production networks – so often the nemesis of manufacturing – to transform its global capabilities with real-time information from the factory floor. Not only that, the company has achieved the ‘holy grail’ of 100 per cent uptime and introduced advanced technology – such as network virtualisation – to mitigate security threats and enhance manufacturing, sales, customer service and IT.

Business Challenge

Festo is a global leader and pioneer of automation technology. The Group manufactures and ships more than 23,000 different products – drawing on its renowned expertise in pneumatic and electric components and systems – to more than 250 locations worldwide. These innovative solutions, backed with a 24-hour collection and delivery service, keep the automotive, electronics, food and packaging, and many other major factory and process automation industries moving.

The foundation for this success is a robust e-business model – run over a Cisco Unified Communications network – which provides a single global IP platform that connects 35 locations in Germany and 60 sites worldwide, bringing together 11,500 employees and supporting Festo’s e-sales and customer service operations. The global network also offers wireless LAN (WLAN) capability, enabling mobile employees, such as technical and project consultants, to connect to the corporate LAN via public access points located in airports, stations, shops and other public areas.

Despite this, one important piece of the jigsaw was still missing. Albrecht Salm, Network and Telecommunications Manager at Festo takes up the story: “In an average day we will handle over 29,000 orders and dispatch over 70 tonnes of products worldwide. The next stage of our strategy was to drive productivity and create new efficiencies – not just in manufacturing, but also in sales, customer service and IT – by connecting our global network with real-time information from the factory floor.”

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Festo

Solutions

Within the manufacturing industry, production networks and office networks have traditionally evolved as separate infrastructures, offering little or no integration between stand-alone systems and applications. This 'siloed' environment makes it extremely difficult to share information, optimise decision making and achieve the economies of scale that are needed to win in today's competitive markets.

To help to overcome these barriers and bring about this transformation, Festo turned to Cisco Systems. Albrecht Salm explains: "Cisco is part of our eco-system of business partners. This extends beyond simply buying point products, like switches and routers. It means that we shared a technology vision that is supported by aligned business processes, for example with procurement and regular information exchanges."

The realisation of this shared vision was delivered by the Cisco Ethernet to the Factory (EttF) solution – an architectural framework that connects the corporate office and production plant, allowing organisations to make strategic decisions that are supported by real-time data from the factory floor.

A major IT project was launched to plan, design and implement the solution – which included the installation of 250 Cisco Catalyst 2955 Series Industrial Ethernet Switches – at Festo's HQ and key production plants in Esslingen and St. Ingbert, in Germany, and in Budapest, in Hungary.

Ethernet is one of the least expensive high-speed LAN alternatives, offering superior bandwidth and cost reduction advantages over other network technologies, such as broadband. With a reach of up to 5,000 feet, the Cisco Catalyst 2955 Series Switches enable the deployment of productivity enhancing applications across an existing infrastructure, thereby avoiding the expense of rewiring.

Migration from the old hub network design to the new EttF switched environment has provided Festo with many advantages and new technical capabilities. Under the old design machines were connected to hubs and effectively had to share available bandwidth. This sometimes created 'bottlenecks' and resulted in a slow down in the production process. Direct connection to switches has eliminated this problem and dramatically increased throughput to the production floor from 10 Mbps to 100 Mbps.

Crucially, the Cisco Catalyst switches support the deployment of virtual LANs (VLANs) that can be used to segment the network into many logical networks. The foundation for this is a Service-Orientated Network Architecture (SONA) that focuses on the network interactive services layer – the link between the networked infrastructure (of clients, servers and storage) and the applications layer – to enable the infrastructure to enhance collaboration tools and business applications.

Albrecht Salm explains the significance: "By directly connecting PCs to plant machinery, the risk to manufacturing from security threats is greatly increased. VLANs allow us to mitigate this risk, by grouping applications and areas of production into specific partitions of the network. That way, if we do encounter worms or viruses we can instantly contain the problem and deal with it – rather than risk widespread exposure and, ultimately, catastrophic production downtime."

The EttF solution also provides important inter-operability with CiscoWorks LAN Management Solution – Festo's existing management system and suite of tools that simplify the configuration, administration, monitoring and troubleshooting of its network.



Business Results

By connecting the global network with real-time information from the manufacturing plant – enabled by the Cisco Ethernet to the Factory solution – Festo is able to use this 360-degree view of the business to optimise performance and create many new efficiencies.

Seamless integration between the office and factory networks has helped to improve collaboration and streamline operations – harnessing the power of real-time information to enhance manufacturing processes and boost productivity.

The new VLAN environment provides the flexibility to change orders or specifications on request, without compromising existing production processes. For example, the status of the machine and configuration set-up can be checked remotely, before receiving the relevant CAD data from design. The machine operator can then recheck the geometrics against the order, and, if incorrect, input a simple workaround on the machine that automatically resends the data back to update the CAD system.

With the capability to now link to the production network – in real-time – sales and customer service, like engineering and production on demand, are able to deal efficiently and effectively with enquiries and provide accurate information back to customers. Improved visibility across the factory floor also helps strategic decision-making and capacity planning.

Network gains delivered by the solution have also made a big difference. Migration to a switched design means that production machines are no longer competing for bandwidth. While increased throughput – from 10 Mbps to 100 Mbps – has helped to speed the transfer of data to better support operations and processes for both standard and customised products.

Increased network security and availability – industry imperatives – have also made a major impact. The VLAN environment means that any potential security attack is restricted and cannot penetrate the factory floor. The threat can then be isolated centrally by IT – using CiscoWorks software – while ensuring production continues by reverting back to manual commands at the machine, until the problem is resolved.

A measure of success is provided by the fact that Festo has achieved the manufacturer’s ‘holy grail’ of 100 per cent availability with no downtime incurred over last 12 months.

Looking ahead, the company has the opportunity to extend the virtual network environment to optimise performance further still. For example, by moving to a Demand-Driven Supply Chain (DDSC) where all the various points of the supply chain operation are provided with connection to real-time information.



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Technology Blueprint

A component of the Cisco Intelligent Networked Manufacturing (INM) vision, the Cisco Ethernet to the Factory solution delivers both visibility and flexibility by bridging the gap between the office and the production floor. This allows organisations to turn their manufacturing plants into strategic business assets.

The Festo network includes 250 Cisco Catalyst 2955 Series Switches which extend intelligent Ethernet connectivity – via fixed 10/100/1000 ports – to plant floor devices, combined

with network virtualisation features, using tunnelling and segmenting technologies based on the Cisco SONA. This architectural framework allows enterprises to pragmatically transform an existing infrastructure – with all its interconnected components – into a single, integrated system that unites disparate networks, applications and databases.

CiscoWorks LAN Management Solution (LMS) allows the automation of device manageability tasks, visibility to the network’s health and capability, as well as the capabilities



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