



Plant-to-enterprise convergence is driving change in manufacturing organizations, systems, and networks. As silos of information and collaboration are broken down, manufacturing companies are gaining a tremendous opportunity to reduce costs and transform operations through innovative new business processes. However, this convergence can present a number of challenges. Globalizing manufacturers must be able to rely on architectures that not only support integration of industrial automation and enterprise-level systems, but also meet the security and performance requirements of industrial automation and control applications.

The Cisco® Ethernet to the Factory (EttF) open-standard networking solution helps manufacturing companies successfully connect plant and business systems to achieve business objectives. This enables a more flexible, responsive system that encompasses both real-time data from the production floor and information from business applications.

Based on Cisco's secure, resilient network platform using standard technologies such as Ethernet and IP, the EttF solution is designed to meet the needs of IT and industrial applications and is validated with actual industrial and automation control system devices and applications.

The Challenges of Connectivity in the Plant

Today's manufacturers face new connectivity challenges as they re-engineer operations and management processes to work more effectively in a global environment. These challenges include:

- Reducing the costs associated with production, management, and plant operations
- Balancing production with demand to optimize material usage and asset utilization across a broad marketplace
- Meeting increasingly exacting customer requirements and metrics for on-time delivery

- Managing complex, disparate plant networks based on inconsistent standards, interconnecting neither with each other nor with business systems
- Ineffective linkages between business and plant metrics and KPIs
- Plant infrastructures unable to support new manufacturing applications, resulting in poor performance and system downtime

Achieving the goals of globalization and operations excellence requires increased connectivity between plant and business systems for real-time visibility to information and effective collaboration. This helps to ensure consistent quality and performance across global operations, and reduces the cost of design, deployment, and support of distributed manufacturing and IT systems.

Deploying Ethernet and IP in the Factory

To become more cost-effective, manufacturers are increasingly adopting Ethernet and IP-based automation and control systems. Open-standard networking enables more resilient and efficient automation networks, improved connectivity and collaboration for remote workers and partners, and efficient plant-to-business convergence. However, the unique characteristics of plant systems must be considered. Increased connectivity and COTS technology drives an increased focus on security and patch management. Ethernet and IP based Industrial automation and control networks also need to support the unique performance demands of automation networks.



The Cisco Ethernet-to-the-Factory Solution

The Cisco EttF solution is based on an end-to-end architecture designed and validated to provide the predictable performance and system resiliency needed for industrial applications and networks. It supports industrial automation and control applications to provide the predictable performance, low latency and jitter, and high reliability needed for real-time applications. It is also highly secure to protect plant equipment, enterprise data transactions, collaboration systems, and wireless network. This flexible and efficient solution can be managed and integrated with easy-to-use tools for Ethernet and IP-enabled technologies.

Industrial Ethernet Switching

The Cisco IE 3000 Series of industrial Ethernet switches offers industrial design and compliance, integrated network security, and tools for ease-of-use, management, and deployment, as well as DIN rail mounting and support for leading industry protocols. The Cisco IE 3000 Series switch is also available in a version that provides Layer 3 routing. Cisco has also worked closely with strategic alliance partner Rockwell Automation to develop the Allen-Bradley Stratix 8000 series of switches, which combines Cisco switching features with seamless integration into the Rockwell Automation Integrated Architecture.

LAN Switching

Cisco switching and routing technologies create a network foundation for connecting Ethernet and IP-based factory automation networks to the rest of the enterprise, business partners, and the Internet. These switching platforms, including the Cisco Catalyst® 2960, 3750, and 4500 Series, include consistent features, software, and management tools, and have integrated security features to help ensure system uptime and availability.

Security Solutions

The EttF architecture implements appropriate security solutions to provide integrated, defense-in-depth security without compromising the performance of automation systems. Key security elements include the Cisco ASA5500 Series adaptive security appliance, which combines firewall, IPS/IDS, and VPN (SSL and IPsec) capabilities, network and host-based IPS/IDS, and a security management toolkit.

Cisco and Rockwell Automation's Strategic Alliance

Cisco maintains a strategic alliance with Rockwell Automation, a leader in developing industrial automation and control systems. The two companies have created the Converged Plantwide Ethernet solution, which combines Cisco Ethernet to the Factory and the Rockwell Automation Integrated Architecture. This architecture has been designed, tested, and documented to meet the specifications of Rockwell applications, including communication cycle times, traffic patterns, and convergence requirements.

Business Benefits of the EttF Solution

The EttF solution and Cisco's strategic alliance with Rockwell Automation provide real value to manufacturers, helping them achieve their business objectives by:

- Reducing capital expenses through use of common management tools, multi-application networks, and simplified design and deployment **of industrial automation and control networks**
- Lowering operating costs through ease-of-use tools that reduce training requirements, common features and Cisco IOS® Software, and simplified integration with manufacturing applications

- Reducing risk through integrated security and system-level validated design, resulting in improved uptime and **availability**.
- Improving productivity through remote access capabilities, the use of familiar tools, and improved information access
- Transforming business processes and achieving objectives such as providing real-time performance information across global operations, improving demand and production visibility to optimize production and tighten scheduling cycles, improving inventory management, and improving overall asset utilization

Cisco Smart+Connected Manufacturing

Manufacturers that harness the power of information have greater visibility into their operating environments and a strong advantage in today's global marketplace. The integration of information and business processes gives organizations secure visibility and collaboration that enables strategic business decisions backed by real-time information. The Cisco EttF solution supports a true vision of Smart+Connected Manufacturing, providing a suite of solutions that enable manufacturers to improve responsiveness across the entire value chain.

To learn more about the EttF solution and its strategic alliances, as well as other Smart+Connected Manufacturing solutions, visit: www.cisco.com/go/manufacturing