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CASE STUDY

Semiconductor Manufacturer Powers a Fast-Growth Business Through Digital Transformation

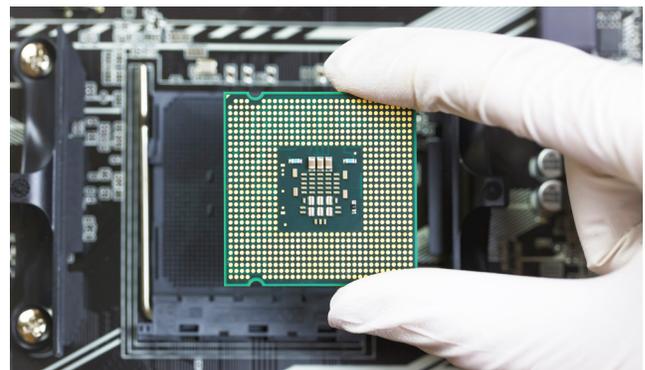## Complex Portfolio and Large-Scale Production

This case study features a leading manufacturer of complex electronic components, with a portfolio that includes tens of thousands of products ranging from high-volume, general-purpose semiconductors to the most complex, application-specific components. The company supplies virtually all industries — including industrial, medical, automotive, communications, computing, consumer, aerospace and defense. It sells directly to manufacturers and also through major distributors, with a significant portion of sales coming from the Asia-Pacific region. Its global manufacturing and supply chain footprint includes over 200 large-scale production sites, and annual revenues exceed $5 billion.

Manufacturing Complexity, Siloed Data, Lack of Transparency

The company has been growing quickly through acquisitions, which provided access to new customers and markets and also improved product scalability. However, each acquisition heightened manufacturing complexity. For instance, the manufacturing execution systems (MESs) used by the acquired companies differed from each other and from the semiconductor company's system, leading to silos of disparate and latent data. This data challenge, coupled with legacy reporting and analytics that clouded where products were within the manufacturing and testing cycle, made it difficult for the company to make informed business decisions. There were also issues caused by a

dramatic increase in transaction volumes. For instance, the number of transactions had nearly doubled in the preceding five years, resulting in strained employee and system workloads.

An additional challenge was the large number of lots moving through the network. Semiconductors are especially challenging to manufacture and routinely require close to a dozen moves between manufacturing facilities — both internal and external — to arrive at a finished product. Each of these moves must be tracked for quality purposes and to minimize excess and obsolete inventory. To efficiently meet its growth goals, the company would need to see the entire network — external partners and extended arms of internal operations — with complete transparency. It was also important to track the lot attributes at all critical stages of the manufacturing process, carrying lot attribution to downstream operations sites while maintaining genealogy. With this capability, it would be far more efficient to ensure product quality and quickly locate specific products if quality issues arose.

The manufacturer was on a rapid growth plan and expected its already high volumes to increase exponentially in the future. It had an existing MES solution to automate the individual factories, but this did not provide cross-factory visibility or traceability. Therefore, as part of a parallel effort to modernize the existing enterprise resource planning (ERP) system, the semiconductor company planned to replace the current MES system — which had been in place for over 30 years and required an immense amount of support and expense to maintain — with a solution to provide end-to-end, internal and external network visibility, enable multi-tier collaboration between parties, provide inherent component track and traceability, and manage quality throughout every manufacturing phase with scale and speed.

Why e2open®?

To achieve its strategic goals, the company was looking for an operating platform that could provide laser- focused lot visibility across all facilities and track the lot from conception to fruition. The new system would have to onboard new manufacturing sites seamlessly and quickly, enable end-to-end quality checks and balances and reduce inventory costs.

The company evaluated several possible solutions, including a newer version of the existing MES plus two other custom-developed systems. However, e2open provided everything it was looking for, including lot tracking and genealogy, component track and traceability, and logistics visibility as products move through the company's complex manufacturing and test processes. One of the differentiators was the ability to horizontally integrate the manufacturing sites to carry lot attributes to downstream manufacturing sites.

In addition, e2open could connect the various data sources required to automatically assemble production, inventory and quality information from across the company's entire supply network. The system would then dynamically construct multi-level lot and serial number genealogy and usage histories from all supply chain sources, enabling real-time responses to any quality issues during production and better service for the company's growing product lines and customer base.

Through their evaluation process, the semiconductor company found ERP systems unfit for their requirements since, among other reasons, these systems do not support dual units of measure, which is required for semiconductor operations. E2open met those needs and the general needs of the supply chain operations and quality teams, which the ERP systems could not.

Rapid Connections for End-to-End Visibility

The ultimate goal of the project was to improve inventory tracking visibility, accuracy and speed of reporting. These, in turn, would improve customer service and the operational efficiency of the internal and external manufacturing network. The new system would sit between the disparate, site-specific MESs and the semiconductor company's ERP and other systems. It would gather and harmonize end-to-end supply chain operations and logistics data from internal and external sites. It would also maintain detailed, attribute-rich lot information for robust analytics and action.

E2open Application

To enable this complete manufacturing visibility and control, increase the company's production performance and improve the overall power of their supply chain, the company chose e2open's Manufacturing Visibility application.

Phased Rollout Approach

The semiconductor company kicked off its global digital manufacturing transformation using a phased approach and developed a sound business plan with e2open to ensure timeliness and success. The first phase of the project was driven by the need to retire the legacy, hard-to-maintain mainframe platform — a process the teams planned to complete in under two years. Internal manufacturing sites were quickly onboarded to e2open's network, resulting in significant cost savings. During the second phase, all of the more than 200 internal and external sites were directly connected to e2open's network and converted to attribute-based tracking and tracing.

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Better, Faster Quality Assurance and Lower Costs

As a result of the system unification, the semiconductor company has achieved its business goals for this phase of the project. It now has access to a detailed history of the manufacturing process associated with every lot, including how products were built and tested at every step, the materials used and the quality records for each lot. This visibility reduces quality risks, protects brand integrity and lowers costs. Collaborating on a single platform with two-way communication also significantly reduces manufacturing errors and communication delays. The company also now has accurate stock information for both internal and external production, reducing the capital invested in inventory across the entire manufacturing network.

The new system enables the company to execute phased onboarding of multiple sites without impacting day-to-day operations. This has already provided a quicker time-to-value and ongoing productivity gains. This rapid onboarding capability will also remain valuable during potential future acquisitions and growth.

About e2open

At e2open, we're creating a more connected, intelligent supply chain. It starts with sensing and responding to real-time demand, supply and delivery constraints. Bringing together data from customers, distribution channels, suppliers, contract manufacturers and logistics partners, our collaborative and agile supply chain platform enables companies to use data in real time, with artificial intelligence and machine learning to drive smarter decisions. All this complex information is delivered in a single view that encompasses your demand, supply and logistics ecosystems. E2open is changing everything. Visit www.e2open.com.

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