

# Solectron

## The Virtual Factory — How Solectron Manages Its Worldwide Trading Partners



### Key highlights

#### Company

Solectron Corporation

#### Industry/Market

Electronics manufacturing services (EMS)

#### Applications

Integrated supplier relationship management

#### Solution Requirements

Create virtual factory floor, leveraging leading supplier application and services into Web applications, making them available to a global customer base.

#### Key Solution Components

- Sun Enterprise™ 10000 server (Baan ERP)
- Sun Enterprise 6500 server (Teradyne SFDM shop floor management system running on Oracle)
- Sun Enterprise 4500 (Master administration server)
- StorEdge™ T3 and StorEdge A5200
- Solaris™ 8 Operating Environment
- Java Technology

#### Business Results

Bring virtually every aspect of manufacturing floor onto the Web, making a virtual factory continuously available to global development and product teams.

- 50% reduction in production time, increasing throughput and improving return on investment
- Initial product failures dropped to zero. Improved quality resulted in more satisfied customers.
- Near realtime reporting and analysis of production line metrics, decreasing reaction time

*“Providing efficient, flexible and responsive solutions to our customers is the key to Solectron’s success. MyFactory@SLR.com embodies these principles by enabling unprecedented collaboration between Solectron’s worldwide resources and our customers to improve product quality, yield and time to market.”*

*Keith McDonald, Corporate Vice President,  
WW Global Accounts and Relationship Management,  
Solectron*

A factory at your fingertips, with more capabilities and collaboration than ever before—even though people and resources are spread all over the globe. Solectron has created the virtual factory and embodied the principles of the Sun™ Open Net Environment (Sun™ ONE) platform. Rock solid availability and reliability, open 24x7, because someone, somewhere is always working with the data on the line. Solectron’s MyFactory@SLR.com offers many advantages over traditional outsourced manufacturing data exchanges. Collaboration and communication tools help product team members bring products to market faster, with higher quality, and less investment. Data from every aspect of production enables insight like never before. Tools and infrastructure allow original equipment manufacturers (OEMs) to manage suppliers and trading partners. All this is running today, built by Solectron—the world’s largest electronics manufacturing services (EMS) company.

Solectron’s business is built on a firm foundation of manufacturing excellence. As the only Malcolm Baldrige National Quality Award for Manufacturing winner in the EMS industry—and the only two-time winner of the Baldrige Award for Manufacturing ever—the company is known for its commitment to quality and customer service. Their end-to-end technology services and expertise span the entire product life cycle, providing solutions for everything from early product design through global distribution and post-manufacturing services. Solectron offers its customers access to advanced manufacturing and supply-chain technologies. Their customers can take advantage of the benefits of shortened time-to-market, reduced total cost-of-ownership, and effective asset utilization.

# Solectron is constantly working to improve manufacturing efficiencies, helping their customers.

Solectron is constantly working to improve manufacturing efficiencies, helping their customers. One of their approaches involves tighter integration between their customers and suppliers. This can help to lower costs and reduce time to market.

Tighter integration is difficult to implement. Working with global customers, which typically have distributed operations, means working through the policies and procedures of many different geographic operations.

### Building the Virtual Factory

Solectron has addressed these issues by developing a virtual factory floor — MyFactory@SLR.com — based on Internet technologies. By Web-enabling all essential applications and services, team members anywhere have full-time visibility into all aspects of the manufacturing process through a personalized portal. This comprehensive system has improved communication, planning, sourcing, procurement, and collaboration between its customers and Solectron’s worldwide resources and global capabilities.

Customers and suppliers now have direct access to the data and information relevant to their product line. OEMs can have personnel from any of its functions — marketing, sales, engineering, design, production — participate in almost any part of the manufacturing process. Access to specific data and services is controlled by strong security protocols and technologies, restricting access to authorized users only. Applications and information are

made available according to a team role. As well, users can customize their portal with additional information and services, providing a more integrated desktop environment.

Users have direct access to shop floor applications. Among other things, they no longer need to wait for others to generate and distribute reports. Instead of weekly updates — which are just snapshots of some portion of the supply chain — MyFactory@SLR.com enables real-time status and analysis. This type of outsource manufacturing model is much more responsive to customer needs.

In addition to the application portal, MyFactory@SLR.com collects and stores data from virtually every aspect of the manufacturing process. This is collected into a central repository, which is used to analyze the characteristics and components of the product line. The data warehouse capabilities have proven to be of tremendous value to Solectron and its customers and suppliers.

For example, by analyzing test results at various steps in the manufacturing process, Solectron is able to decrease the amount of time it takes to manufacture a product. There was even a 50% reduction of test time in one product line. Not only does this lower the cost of manufacturing and improve return on investment, but it increases the responsiveness of the overall line.

Product quality has improved too with initial product failures dropping to a remarkable zero on one MyFactory@SLR.com line. This has reduced field support costs and increased customer satisfaction.

Another benefit is the ability to see how individual components from different manufacturers perform against each other. If defect or failure rates are different, this information can be used in negotiating with the component supplier. Solectron makes all relevant data available to each supplier and customer to help improve overall product quality and performance.

### Solectron Suppliers

One of the strengths of MyFactory@SLR.com is Solectron’s global supplier base. Solectron uses rigorous methodology to maintain high standards in its supply chain. Key suppliers participate in a global supplier performance management program, which includes an



Sun ONE Architecture Enables Solectron Global Supply Chain

objective, data-driven evaluation against such criteria as price competitiveness, delivery, quality, supply-chain integration, and technology. These suppliers receive regular feedback on performance.

Solectron offers its suppliers tools and applications, such as qPro and Web Pro, which can increase collaboration and efficiency. In addition to reducing procurement cycle time and increasing buyer productivity, Solectron expects to lower costs by 30% by conducting purchasing and other related supplier business over the Web.

### Infrastructure

Solectron's MyFactory@SLR.com integrates the many shop floor applications running on hundreds of servers, worldwide. At the core of the system are Sun servers: a Sun Enterprise™ 10000 runs Baan ERP, a Sun Enterprise 6500 with Teradyne SFDM on Oracle performs shop floor management, and a Sun Enterprise 4500 hosts the master administration functions. Java™ technology is used by Solectron to develop much of the middleware that ties together the various applications and network services. All Sun servers run the Solaris™ 8 Operating Environment. Data is stored on multiple Sun StorEdge™ T3 and StorEdge A5200 units. The StorEdge D240 Media Tray is expected to be integrated in the near future.

### Why Sun?

Worldwide product development, manufacturing, and service require a 24x7x365 presence. With customers and facilities in Europe, Asia, and the Americas, there's always someone working somewhere. The IT assets that enable MyFactory@SLR.com need the highest reliability and availability in order to deliver services and information anytime, day or night.

Solectron's MyFactory@SLR.com embodies the principles of the Sun Open Net Environment (Sun ONE) platform. This highly scalable and secure architecture is an open, standards-based environment for rapidly developing and

deploying applications and services to the Web. The Sun ONE platform can be used to connect legacy applications into Web applications, presenting them to users in customized portals.

According to Sam Jonaidi, Director of Manufacturing at Solectron, "Sun products demonstrate excellent management and resiliency in a stressful environment. For example, the servers carry a good load and perform for long periods. For our installation, Sun has unprecedented uptime."

Solectron chose Sun products for a number of reasons—data storage, Web, and networking capabilities were the principle ones. As Solectron designed the specification, they realized each supplier could easily generate multiple gigabytes of data, and there are thousands of suppliers. The ability to store and analyze terabytes of data is an essential capability, unlocking savings and manufacturing efficiencies.

The ability to provide a solid foundation for building and delivering dynamic e-commerce Web applications is another factor in Solectron's decision to choose Sun products. Sun's Web capabilities are scalable, standards-based, and secure, offering Solectron and its customers the features they need.

The ability to network with hundreds of existing servers is also important to Solectron. Existing shop floor applications are hosted on many different architectures and operating systems. Sun products are used at MyFactory@SLR.com to integrate and manage these systems.

There were additional reasons for Solectron's selection of Sun hardware and software. Sun products are based on open standards with published APIs, which interoperate with existing systems now and new functionality in the future. Sun's robust security capabilities can provide the appropriate levels of privacy, integrity, and authentication needed by Solectron, its customers, and suppliers. Security is integrated throughout Sun hardware and software.

Java technology is also a core capability for MyFactory@SLR.com. According to Jonaidi, "MyFactory@SLR.com must work with thousands of suppliers and customers, and they have almost every kind of system. Java technology is the only way to go to make sure we can work with all of them. It was a very strategic decision for us."

### Online Factory Results in Bottom Line Benefits

Solectron's virtual factory extends its manufacturing network to its supply chain entities. This enables Solectron to both streamline the manufacturing process and better manage both suppliers and customers. This provides a number of benefits:

- **Improved product quality and performance:** Analyzing the data from constant monitoring of the manufacturing process highlights problems, and where potential improvements can be made. This information is also used to manage supplier relationships.
- **Higher service levels:** Product teams have access to their virtual factory floor, and the associated data, on a 24x7 basis. Customers can quickly monitor performance and manage their production line over the network.
- **Better reporting:** There is a faster and more concise information flow. Weekly reports have given way to real-time monitoring. Wherever customers are, they can get the information they need when they need it.
- **Improved ROI:** Data mining and analysis has shortened by 50% the time it takes to manufacture and test systems. This reduces the level of investment needed to manufacture at the forecasted level, and improves overall ROI.

Solectron enables OEMs to leverage their virtual factory to deliver high-quality products to their customers in the fastest time possible at the lowest total cost. Simply put, Solectron's MyFactory@SLR.com embodies the concept of Sun ONE, and helps turn great ideas into products.

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