

# Managing distributed development & NPI across global supply chains

This paper discusses the requirement for an engineering collaboration application software platform for the electronics and mechatronics industries to provide technology that allows users to work in a secure, global network from one single GUI. A common, unified interface allows seamless communication within design teams and suppliers, manufacturers, and other partners. The system provides a unique solution for engineering collaboration and is revolutionizing the manner in which supply chains manage their data streams.

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## Introduction

To remain competitive in the dynamic global economy, electronics OEMs must respond to business drivers such as increasing global competition, technological innovation, distributed operations, reduced time to market, improved processes and cost control and full product life cycle management (PLM). To effectively fulfill these requirements, organizations must develop procedures to coordinate their internal operations as well as their external business processes. This challenges the organization's internal infrastructure and processes, as it now requires colleagues to constantly exchange ideas and cooperate and communicate across different time zones and languages. In an effort to address these issues many organizations are broadening the focus of their business model to include synchronized collaboration among all contributors to their supply web.

Organizing all aspects of internal development, engineering and/or manufacturing processes, as well as external suppliers and distributors is an enormous effort and leads to an overwhelming rework of embedded processes

and structures. Collaboration strategies must encompass the complete product development process from initial concept, through prototyping and new product introduction [NPI], to manufacturing and distribution. Consequently such strategies must also take account of significant volumes of unstructured data such as e-mails, faxes, phone calls and voice mail messages. The typical supply chain seems just a simple linear chain of events that must occur in order to get a product to market. However, in the age of the internet many companies are adopting the dynamic supply web, in which many outsourced partners and suppliers participate. In the electronics and mechatronics industry, this supply chain comprises several stages, all of which rely on the previous stage to have the most accurate and up to date information on a particular product specified.

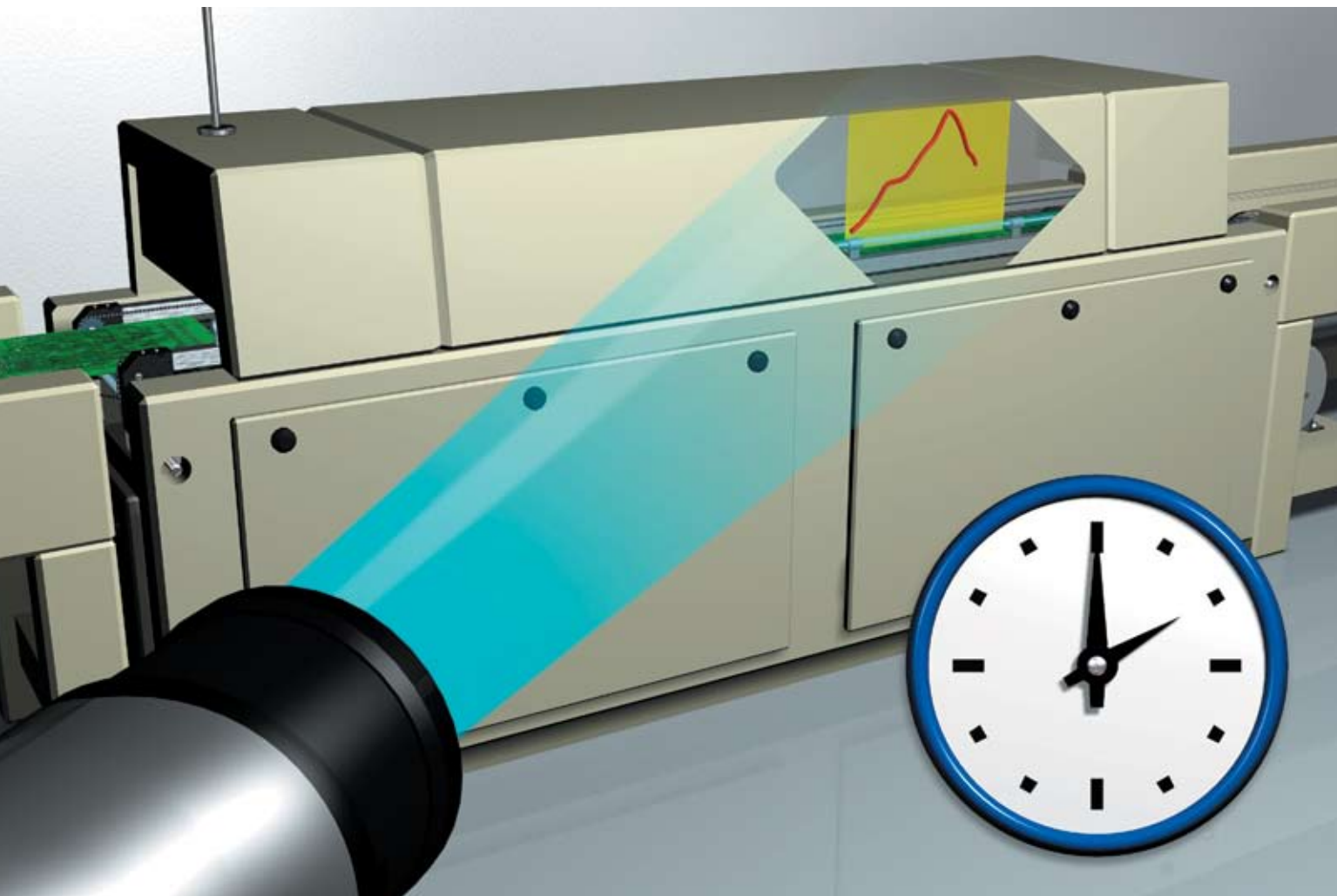
## Managing the chaos

Manufacturers recognize that NPI and ECO handling constitute their next major challenge. Even these organizations have only an ad hoc collection of tools and procedures to automate and manage the flow of information.



Figure 1. The engineer's desktop in CXInsight. From this desktop, the engineer sees only what is relevant for him/her in the projects.

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CEMs face additional issues as a result of some data being held and managed by their customers' systems. A key problem facing electronic supply chain partners is the lack of structured tools for collection and follow-up of design for manufacturing [DFM] issues. The resulting lack of control in this area can give rise to issues at any stage of the product life cycle such as bad selection of components, mismatch between the BOM and CAD data, improper placement of components for assembly, rework, mismatch between netlist and copper data, annular ring violations, line spacing violations, etc. Such errors are expensive and can adversely impact the quality or delivery of the final product. By providing a common, secure, internet based platform, facilitating secure data sharing and communication between design engineers, manufacturers and suppliers, an engineering collaboration strategy eliminates these deficiencies within the electronics supply chain web.

### The zero latency strategy

More than just a means to take time out of a business process, zero latency strategies establish techniques that link distributed processes in a tightly integrated manner. The goal of a zero latency tool set is to reduce information float (the time between data being captured in one location to when it becomes actionable at another).

As the trend toward global outsourcing increases, such a solution aims to facilitate zero latency collaboration by providing participants with tools to view information, redline capabilities, and promote discussion around the pertinent datasets passing between members of the supply chain. Business optimization systems enable corporations to achieve direct, internet based, real-time integration with all suppliers, distributors, CEMs, and other supply chain participants. An Engineering Collaboration Software solution is required in an environment where teams work together in real-time, in an online shared session to collaborate on specific projects. Information is made available throughout the supply web, subject to the appropriate authorizations. This enables project managers, design engineers, suppliers, and other participants to review and evaluate projects simultaneously, sharing ideas and solutions to conflicts. All events and transactions and change history are extensively logged and recorded in the project database. Supply web processes are streamlined creating a collaboration environment that fulfills the business drivers described above.

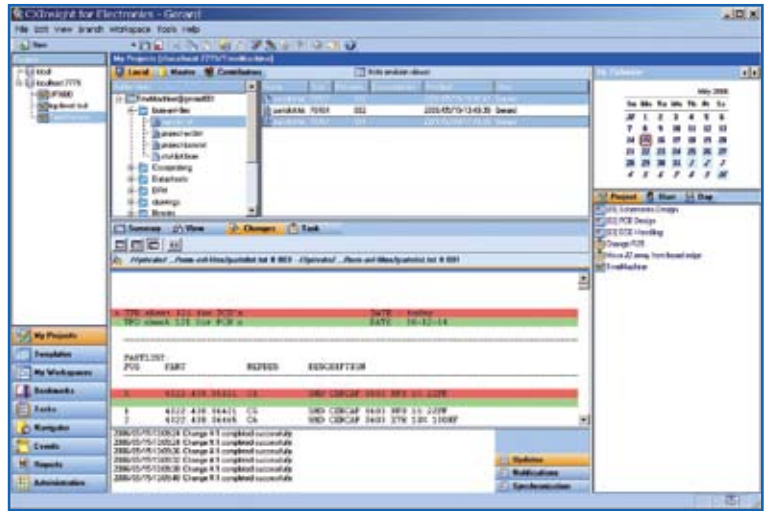


Figure 2. Version/revision comparison allows the engineer to easily examine differences between files.

### Bridging the supply chain gap

The process of outsourcing the engineering or manufacturing of an electronics product is a complicated exercise that requires a large set of constraints to be balanced. As industries move towards the full outsourcing model, the need for close collaboration between different companies across the supply chain (web) is rapidly growing. At the same time, the audience involved in the decision making process within each supply chain partner grows as well. In order to bring products to market faster, more accurately and with a higher quality, it is necessary to optimize collaboration between OEMs, CEMs, design service bureaus and other suppliers of different disciplines.

E-collaboration also offers communication benefits within an individual OEM. The most difficult challenge with this arena is the ability to effectively manage communication of all product information from conception to fruition. This includes project, task and content management as well as flexible product data management (PDM Light) and management of unstructured data (e-mail, fax, notes, etc), which is becoming increasingly important in the product realization process and life cycle management. Management of such data is difficult in less flexible formal PDM systems. The solution must enhance the capabilities of all members of the supply web, and offer an effortless but powerful solution for collaboration via the internet. It must use the latest internet based collaboration technologies to deliver a wide range of easy to use functions to enhance collaboration from product concept to completion, and serve as a

virtual meeting place for the project members within or outside the firewall.

Such a software tool enables high velocity, B2B engineering collaboration, and yields the following business values:

- Increasing revenue by improving team productivity through streamlining administrative procedures, eliminating non-value added work, simplifying approval processes and automating workflow.
- Facilitating data control by providing tight security (128Mb SSL) and a permanent audit trail of document access and decision making through the project life cycle.
- Eliminating geographic barriers by creating an interactive environment where all team members collaborate on project information regardless of location, time and language.
- Enhancing system integration with all members of the supply web creating favorable relationships with all internal and external collaboration partners.

An Internet B2B engineering collaboration application software connects workgroups, design teams, buyers and suppliers worldwide, and allows global design, engineering and manufacturing by anyone, anywhere, anytime.

### Engineering collaboration for all partners

The Enterprise Server allows an OEM and its supply chain partners to collaborate in a secure and compartmentalized environment (project rooms). OEM members access content and files from within their network while supply chain partners do the same through the Internet.

# MicrobondGecko – say good-bye to soldering and welcome to power sticking

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MicrobondGecko – welcome power sticking!

External partners interact with each of their customers separately, through a unique username and password and with different authorization levels and access rights for the different projects. Using the latest internet-based collaboration technologies, it delivers:

- Collaboration for product change management, DFM communication and sophisticated content management. This secure, web based technology serves as a virtual meeting place for the supply chain partners, facilitating all collaboration operations.
- The software platform also provides services for open data viewing in all different formats to review manufacturing issues during the electronic or mechanical design and NPI processes.
- The collaboration network is the single data access point where all members access content and files that are stored on the central server. This arrangement allows all members, whether OEM or fabricator, to communicate and share information. Supply chain partners receive a federated view of their collaborative landscape, able to seamlessly move between customer collaborations.

The system is based on a highly secure and organized set of workspaces, or containers for a rich set of objects, including data files, e-mail communication, discussion notes, tasks, calendars, and more. Workspaces facilitate data distribution, collaborative problem solving, and change notification enabling supply chain integration, concurrent product development and such. Workspaces can be created to handle a specific product, from large assemblies down to the single PCB.

A flexible notification mechanism provides the option to generate pre-emptive alerts to key project participants for a wide range of defined events. Such alerts are instrumental in avoiding wait time and expediting the design to manufacturing process.

Functionality to view, manipulate, and communicate 2D and 3D geometrical data and the associated descriptive information, is also provided making product change and collaboration easily attainable.

### A common platform and environment

An engineering collaboration platform provides:

- A common environment for defining and viewing all aspects of product data from CAD to BOM to AVL.

- Full control on ECO based project file changes.
- The ability to collaborate with the other members of the team, propose alternative solutions, comment on the changes or the implementation plan, and conduct an electronic approval process.
- A tracking mechanism for changes occurring throughout the product development process.
- Tools to analyze the impact of the proposed change, and browse other relevant information about the impacted products, parts, and documents,
- Detailed change history for any related parts or products.
- An easy way to implement these changes by updating the product master data at the source, in the database, to reflect the agreed to changes. A key part of this is the ability to publish the results in real time with all members of the supply chain.

Relevant structured datasets handled by CXInsight include:

- BOM (Bill of Materials)
- AVL (Approved Vendor List)
- SCH (Schematics)
- CAD-E/M (Computer Aided Design)
- Centralized CAD/CAM Libraries
- Component datasheets
- Product specifications
- Drawings
- Released production files (in formats like ODB++, GenCAD, GenCAM, IPC-356 netlist, etc.)

### A secure model

Access to a product workspace should utilize a 4 level security model.

- A unique user id and password assigned by the system administrator identifies a

user to the system and allows basic access.

- A project leader grants rights for a system user to access a specific project and the type of actions allowed within the project.
- Within a project individual files and folders can be further secured allowing a project leader full control over the data that each participant can access.
- Firewall rules further control access by controlling which external parties can connect to the server. For external data connections 128-bit SSL encryption is used for the client server connection.

### Summary

CXInsight, from Adeon Technologies, provides maximum benefit to companies seeking to improve the efficiency of their development and NPI processes. By sharing product data within the manufacturing enterprise and throughout the supply chain, companies may drastically reduce time and cost, resulting in increased revenue and improved quality.

CXInsight is a breakthrough engineering collaboration application software platform for the electronics and mechatronics industries providing technology that allows users to work in a secure, global network from one single GUI. This common, unified interface allows seamless communication within design teams and suppliers, manufacturers, and other partners. The system provides a unique solution for engineering collaboration and is revolutionizing the manner in which supply chains manage their data streams.

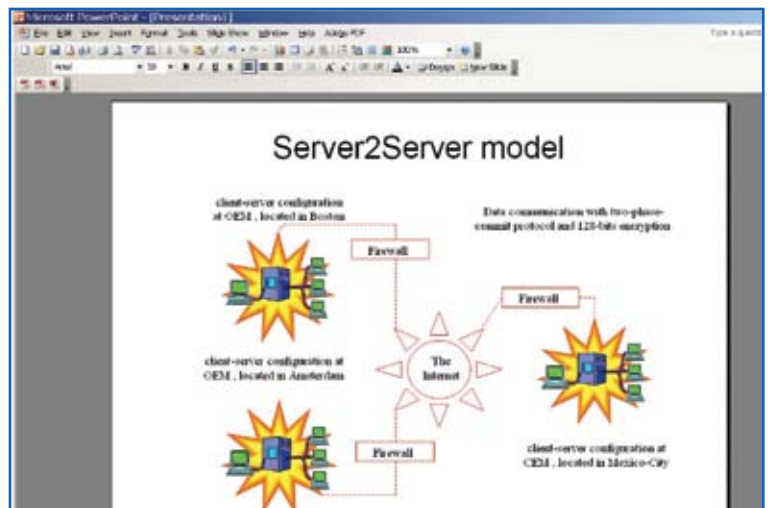


Figure 3. Server2server connectivity. Two companies, both using CXInsight, can share projects between the databases, in- or outside the firewall.