

Introduction

Georgia Tech is undertaking an exciting project with several industry partners (Lucent, Intel, DEK, Fuji, Celestica, MAPICS and others) to define the next generation framework for electronics manufacturing. This project will address the long-standing problem of communication incompatibilities among equipment and applications that exist on the factory floor. These incompatibilities cost manufacturers untold millions through wasteful activities and lost opportunities. The participants in this project will build upon the successes of the NEMI Plug and Play Project. By participating in the Framework Implementation Project, your company can make use of new technologies as they are developed, beating your competition to market.

Background, NEMI Plug and Play Project

A strong conclusion of the past few National Electronics Manufacturing Initiative (NEMI) roadmaps is that factory information systems are **too expensive** and are **too inflexible** to adapt to the accelerating change in electronics manufacturing. Consequently, several members of NEMI--including Celestica, Solectron, Compaq, Delco, Intel, Lucent, Universal and GenRAD--launched *The NEMI Plug and Play Factory Project* which was conducted from December 1997 to December 1999. The purpose of the project was to develop a framework that would **reduce costs** and **decrease cycle time** by fostering interoperability among software applications and equipment.

The needs of the corporate participants were compiled, and technological solutions were recommended, developed, and tested on the Surface Mount Technology (SMT) lines at Georgia Tech. The results were fed back to the project team, and new recommendations were made based upon the feedback. Please see figure 1.

Results of the NEMI Plug and Play Project

The NEMI project team investigated six different sets of framework technologies. Whenever possible, current standards were used and industry practices observed.

It is envisioned that a framework making use of message-oriented middleware (MOM) that passes XML messages by HTTP will be the technological building blocks of a future framework. The NEMI project has spawned several international IPC committees that are currently standardizing the messages that will be exchanged.

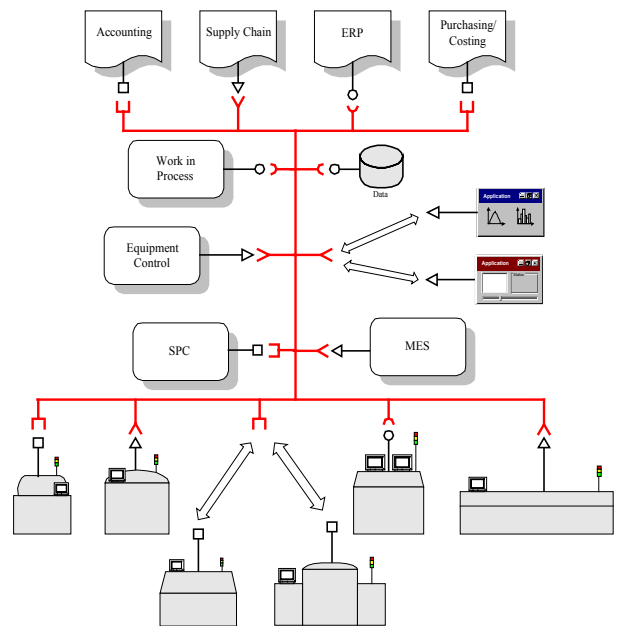


Figure 1 An interoperable framework for electronics manufacturing.

Motivation for the Framework Implementation Project

The job of defining a standards-based framework for electronics assembly is a large one. Although the NEMI project made a great deal of progress, significant questions have yet to be addressed. The purpose of the *Framework Implementation Project* is to further define the basic technologies recommended by the NEMI project so that a complete framework solution can be developed. If this work is not undertaken, a complete solution will not be realized, and the same resource-draining incompatibilities will continue to plague the industry.

Some of the issues to be addressed through this project include:

- How do applications and equipment (entities) connect to the framework?
- How do entities initialize themselves and communicate with other entities?
- Should framework services be centralized or distributed?
- Can current commercial products be adapted to accomplish the framework?
- Are the proposed technologies cost effective?
- Is there a reasonable labor pool to build, maintain and upgrade the software required to accomplish the framework?
- How are information-passing priorities determined and implemented?
- What throughput is required, and can the recommended technologies support this requirement?
- How is fault tolerance addressed?
- What about security issues? What level is appropriate?
- How is communication accomplished outside the framework?
- How will the results be standardized and commercialized?

The team will recommend solutions to these challenges, test them on Georgia Tech's SMT lines, demonstrate the concepts and document the results.

Benefits of the Framework Implementation Project to Your Company

When you invest in this project, your contributions will join the investments of other project members. By leveraging the investments made by all participants, each project member will receive significantly more value than if the resources were invested independently.

You'll also receive results that have been preliminarily tested at Georgia Tech. Hence, your technical risk of implementing these recommendations will be greatly reduced since researchers at Georgia Tech will have already found--and solved--many of the challenges associated with the new technologies.

The biggest benefit of participating in the project, however, is time. By participating in this project, you'll gain a significant advantage over your competitors. You'll be able to quickly implement the project's results in your business plans, enabling you to enhance your products well in advance of your competitors.

To Get Involved

For more information, please contact Andrew Dugenske at (404) 894-9161 or andrew.dugenske@marc.gatech.edu. This document can be found at www.fis.marc.gatech.edu.