

"Electronic Commerce for the Electronics Industry"

Presented by:

Barbara L. Maia Goldstein

ELECTRO INTERNATIONAL 1994
Hynes Convention Center
Boston, MA

May 10-12, 1994

Abstract

This paper discusses the potential impact of an electronic marketplace on the electronics industry, the enabling technology needed to effectively migrate current business practices to take full advantage of such a highly networked environment, a few of the organizations participating in the creation and promotion of these technologies, and some of the challenges to migration.

What is meant by "Electronic Commerce" (or, Not everything is electronic commerce)

Electronic commerce is a term that has become so broadly used that it is often left undifferentiated from other current trends which rely on automation, such as concurrent engineering and just-in-time manufacturing. This paper proposes the following attributes to characterize the vision of electronic commerce:

Broader than a single business: Automation of a single factory floor or a set of business processes within a single company would not represent electronic commerce. Electronic commerce in its broadest sense implies the existence of a national, shared network available for commerce, although two businesses interacting over a private network using proprietary protocols could still be considered as engaging in electronic commerce. Unless otherwise stated, this paper assumes the broader sense of the term electronic commerce.

Shared infrastructure: Businesses would be able to interact over a shared national network without previous private arrangements. This implies that such a network is easily accessible and available to businesses of any size, that businesses adhere to common protocols for business transactions, and that standards are adhered to which enable information transmitted over the network to be interpretable by the receiver without pre-arranged interpretation agreements. This nationally available infrastructure is commonly referred to as the National Information Infrastructure (NII).

Electronic partnering: Services would not only be advertised over the NII, but where possible, be directly procurable via that network. Businesses would be able to use the network to locate and to establish business relationships with potential subcontractors and trading partners. Electronic commerce also implies the ability to process cost transactions where applicable.

Potential Electronic Commerce Applications

If a shared national network available for commercial transactions existed together with a commonly adapted set of protocols suitable for commerce, the following are examples of new business opportunities for the electronics industry:

On-line catalogs of component information: Of particular interest to the electronics industry is the ability to access current electronic component information via the NII. The component information needed to support Computer-Aided Engineering (CAE) tools within the design process is typically passed between component suppliers and component users through printed data books. As a result of publication delays, printed sources of component information are characteristically out of date even before they are available for use. In addition, component information users must invest significant resources to (re)enter this information into an electronic form that is usable by their CAE tools. The result is information that is late, very expensive, and suspect in quality -- despite its critical importance to engineering organizations throughout the product design cycle. The ability to replace printed data books with on-line versions would represent a tremendous savings to the entire industry.

Electronic Data Books: While the above application would be an improvement over current practices, it could be satisfied by merely replacing paper documents with digital documents -- a solution which does not take full advantage of the emerging NII. There are several companies which already market an on-line service for scanned-in information sheets (data sheets) from data books. Of greater benefit to the electronics industry are solutions that provide on-line component information in a format readily understood by CAE systems. Another enhancement to the traditional data book that the NII enables is the ability to provide immediate access to new forms of information, such as executable simulation models, timing and footprint information, and CAE-sensible symbol libraries.

This expanded vision of the current data book is promoted by the CAD Framework Initiative (CFI), and is referred to as an electronic data book (EDB). The Component Information Representation (CIR) technical subcommittee of the CFI has developed a conceptual model of an EDB, and is pursuing a Proof-of-Concept project with industry to strengthen their model prior to proceeding with standardization.

There are two organizations working in coordination with the CFI CIR in promoting this vision. The Pinnacles Group is a funded effort using the standard SGML to describe the information found on data sheets. This neutral description will form the basis of computer-sensible exchange of component information, and will be contributed to the CFI CIR. The Pinnacles Group is composed of four major semiconductor manufacturers: Intel, National Semiconductor, Philips and Texas Instruments. An initial release of their SGML specification is expected in mid-1994.

The second effort working towards this common vision is the Electronic Commerce of Component Information (ECCI) program of the National Initiative of Product Data Exchange. This joint government/industry consortium uses current technology to show how the information captured within an EDB could be brokered over the NII. The ECCI program provided demonstrations at the Design Automation Conference and at CALS Expo in 1993.

"intelligent indexes"(or "All roads lead to Rome"):
The information referred to by an electronic data book should be accessible via a variety of interfaces. One could envision an engineer's interface accessible directly from a CAE tool, as well as an interactive on-line technical journal which enables access to any level of detailed information by navigating a series of links which begins with a product advertisement. The ECCI program demonstrated the above interfaces in 1993, and has developed an example of an on-line journal which will eventually be linked to detailed, CAE-sensible technical information. This demonstration is available over the World Wide Web at <http://www.eit.com/demos/asiceda/>.

Flexible partnering arrangements: In today's marketplace, it is not unusual to have 12 or more companies collaborating to develop and manufacture new products. Supporting this collaboration via on-line services and communications is a critical aspect of electronic commerce. Similarly, once the appropriate infrastructure is in place, partners should be able to negotiate teaming arrangements and contract out services over a national network. Over-burdened factories should be able to subcontract manufacturing jobs to alternate facilities that have advertised their availability over the NII.

Enabling Technology

The following is a partial list of standards and specifications required to support the applications described above:

Information modeling and encoding: Electronic Data Interchange Format (EDIF), VHSIC Hardware Description Language (VHDL), Initial Graphics Exchange Specification (IGES), Standard for the Exchange of Product Model Data (STEP - ISO 10303), Institute for Interconnecting and Packaging Electronic Circuits (IPC) D35x series, ISO 13584 - Part Libraries, ISO 8879 - Standard Generalized Markup Language (SGML), and CFI CIR's Electronic Data Book specifications.

Information Commerce Transactions: ANSI X12 - Electronic Data Interchange (EDI) and the related EDIFACT standard, smartcard technology and the Digital Encryption Standard.

Network Protocols: X.400, X.500 ISDN, TCP/IP, and Internet protocols such as World Wide Web, Archie, WAIS and FTP.

Challenges

Although the NII addresses the creation of a "national" network for enabling electronic commerce, current efforts and prototypes indicate that the network will be global in nature. With so many international trading partners, US industry requires a world-wide infrastructure. Is US industry poised to compete globally in an electronic marketplace? Is the US poised to compete for the construction of the NII?

The creation of the NII, although assisted by the government, is being led by industry. The Internet, often considered an NII prototype, is a network of networks that has grown organically as opposed to being hierarchically directed. Similarly, there are several volunteer regionally-focused networking projects, primarily based on the Internet, that consider themselves NII prototypes. There is currently little coordination among these front-runners, and the fear is that several solutions for universal, coordinated access to information will be promoted simultaneously, resulting in roadblocks to communication.

References

"CAD Framework Initiative Component Information Representation Electronic Data Book Proof of Concept", Version 5C3, June 16, 1993.

"IC vendors pursue data-book standard", Electronic Engineering Times, June 28, 1993.

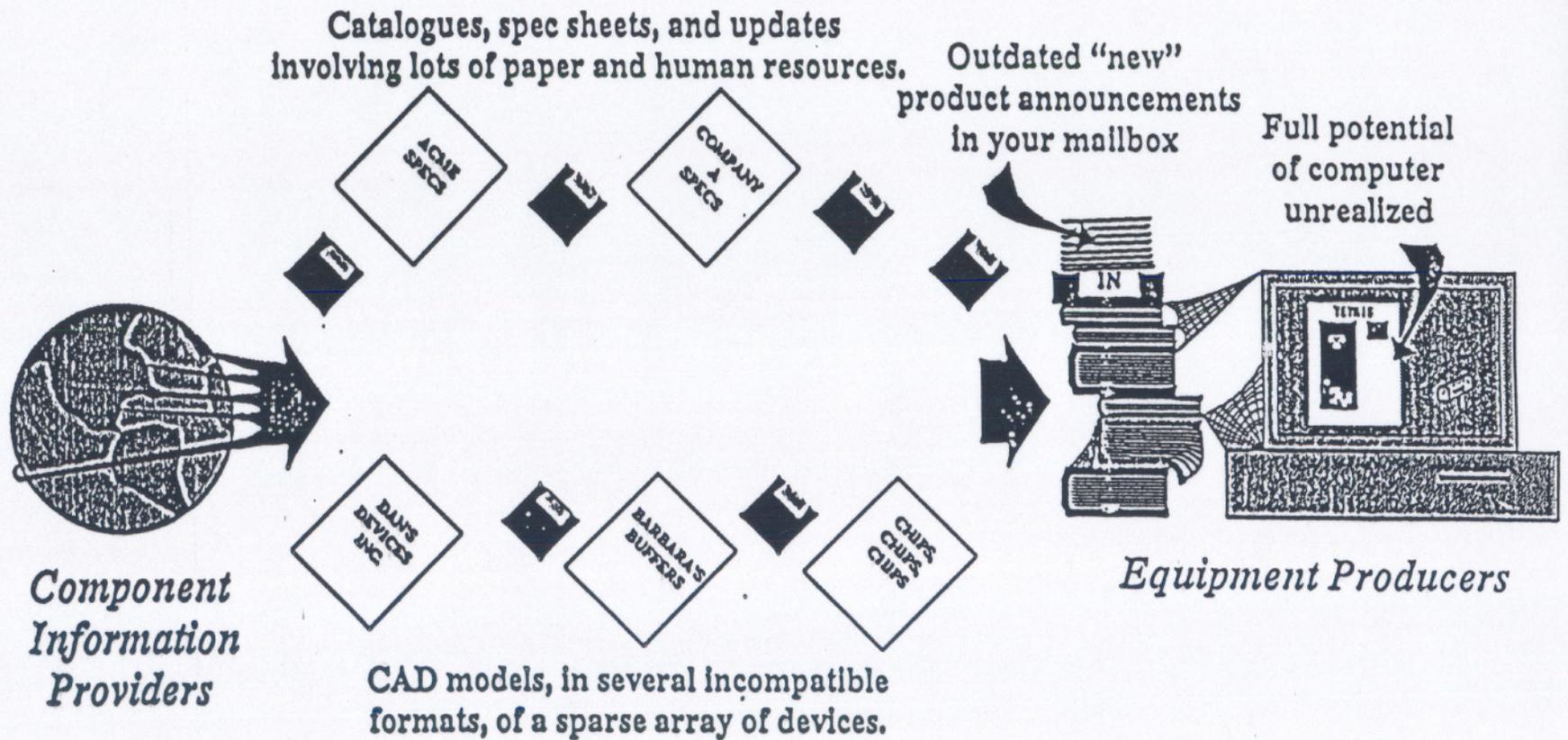
"The National Information Infrastructure: Agenda for Action", Information Infrastructure Task force, September 15, 1993.

"White Paper on the Electronic Commerce of Component Information (ECCI) Program", distributed at CALS Expo, November 1993.

Electronic Commerce of Component Information

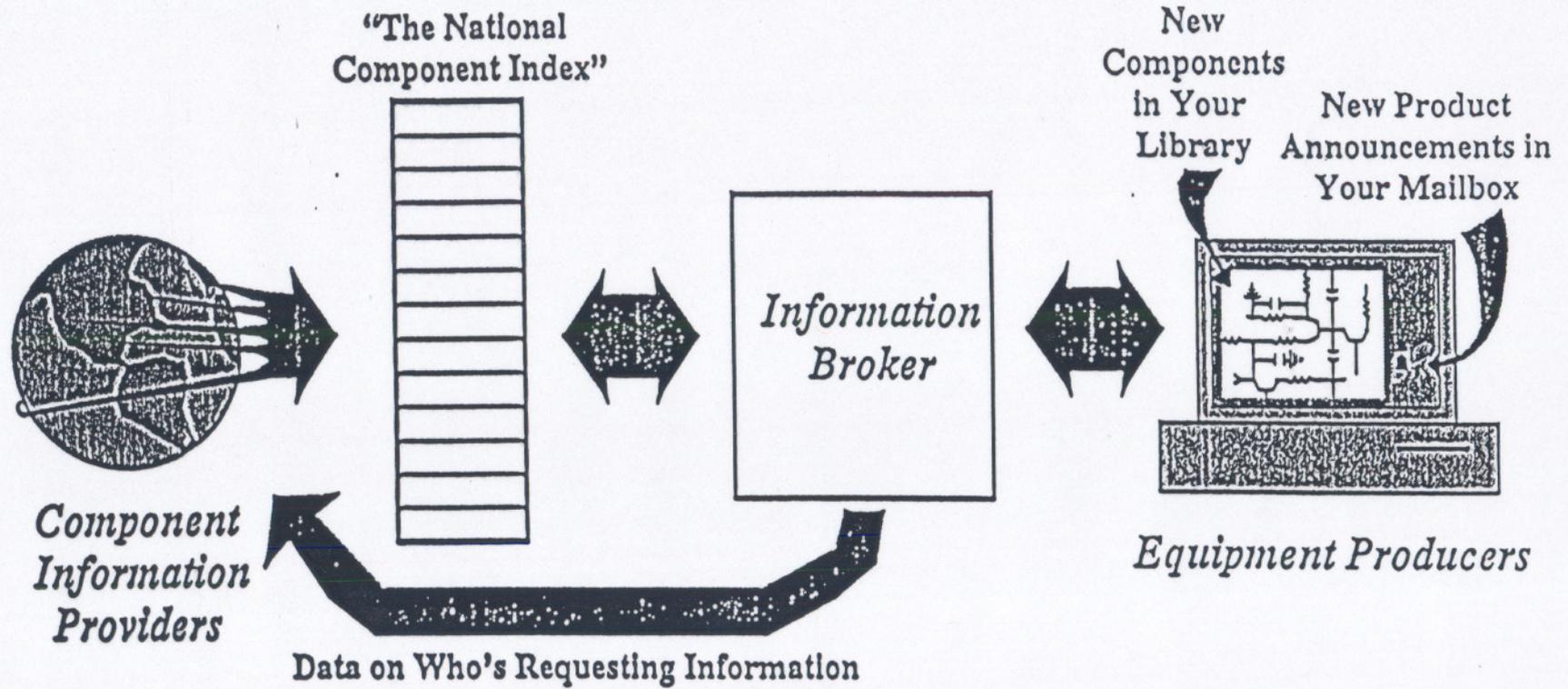
THE PROBLEM

Component information is suspect in quality and timeliness, despite its critical importance to engineering organizations throughout extensive phases of the design cycle.



Electronic Commerce of Component Information

THE VISION



Data Interchange Protocols:

- SGML
- IGES
- STEP

•
•

Business Protocols:

EDI

Transmission Protocols:

- Electronic Mail
- World Wide Web

•
•