# Extranets and XML:
# The Next Internal Control Challenge

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## Abstract

*The purpose of this article is to describe the shift of business-to-business trading from Electronic Data Interchange (EDI) to extranets and to discuss some of the internal control challenges created by extranets and the eXtensible Markup Language (XML). This technology raises internal control issues because extranets use the World Wide Web to communicate and because XML is such a powerful and flexible programming language.*

## Introduction

*E*lectronic Data Interchange (EDI) has been a primary link in business-to-business e-commerce. Now, trading partners are shifting from relatively costly EDI to extranets using the new eXtensible Markup Language (XML) that holds promise of being less costly and more flexible way to transact business. However, this shift to new technology requires management to ensure that appropriate internal controls are incorporated. Accounting information system designers and auditors must understand the new technology and in some cases create new techniques for assessing the quality of financial statements.

The purpose of this article is to describe the shift of business-to-business trading from EDI to extranets and to discuss some of the internal control challenges created by extranets and XML.

### Electronic Data Interchange (EDI)

EDI has several inherent internal control strengths because of the formal relationship

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that must be established between two trading partners and the two partners and the communication provider. Before transactions begin to flow between two businesses using EDI there is a fairly structured period of negotiations during which software and communication protocols are agreed to (often dictated by one of the partners). Most EDI transactions flow through a Value Added Network (VAN) for which the trading partners pay service fees. The negotiations necessary to establish the EDI serve to establish good contacts between the internal auditors of the trading partners and the VAN, making it easy to implement audit modules or perform tests anywhere along the value chain.

The problem with EDI is that it is relatively expensive to operate and lacks uniform software or communication standards. As a result companies that trade with multiple EDI trading partners can be faced with the problem of being required to use different software and VAN for each partner. From an internal control perspective this raises concern about the ability of the information systems staff to simultaneously manage multiple, complex, EDI systems and whether the internal auditors can maintain sufficient expertise to properly evaluate the sys-

tems.

## Intranet and Extranet

The expense and complications of dealing with multiple EDI trading partners is leading companies to evolve their trading relations to Web based systems. This change to the Web is influenced by two factors, the expense and complexity of EDI already described, and the availability of new software. Here is how Dunn and Varano (1999) describe the recent evolution of Web-based transaction handling:

*...corporations have discovered that the Internet technologies, including the Web, Web browsers, and search engines that work so well on the Internet, can work just as well in-house, creating, for example, an internal private network that has the same look and feel as the Web, called an* **intranet.**

*The same technologies that work inside the company are just as effective supporting a business-to-business linking. From application files, to purchase orders, to design specifications, to payment instructions, all are easily implemented by an extended intranet. An extended intranet is a hybrid application which integrates internal corporate networks with the Internet, creating a new networking system called an* **extranet.**

A shift from EDI to extranet transactions for business-to-business trading partners has serious implications for internal control and auditors. The basic change is the replacement of the VAN intermediary with the much less controlled Web. Extranet trading partners often subscribe to Internet Service Provider (ISP) that can offer virtual private networks (VPN) which provide access to the Web and some security such as encryption, user authentication codes and audit access.

## Extensible Markup Language

Helping to push the move to Web-based

transactions is the creation of new software that greatly improves data handling along the Internet, intranets or an extranet. The eXtensible Markup Language (XML) is software that appears likely to greatly increase the shift of business transactions to the Web. XML is a language designed to easily create common information formats and share both the format and the data on the World Wide Web. Not only will XML ease the flow of business transactions but also it can make possible real-time access to corporate financial information for financial analysts and auditors. Improperly managed, XML can also open gaping holes in internal control structures.

XML is a way of standardizing data so that it can be understood and used by other programs without knowing (or caring) what program was originally used to create and format the data. In effect, each data item can tell the receiving program both what it is (net income), how much it is ($1,000,000) and how it should be formatted for printing. A financial analyst could send an intelligent agent (program) to a group of companies to pick up the standard XML financial data.(Hoffman) Accurate comparisons can be made because of the standardization. The intelligent agent could be established to periodically download specific data, a useful resource for internal and external auditors.

## Internal Control

The features of XML and intelligent agents that give financial analysts the ability to retrieve data and build controls into accounting information systems also can assist corporate spies, hackers and disgruntled employees if proper controls are not firmly in place.

The AICPA Special Committee on Assurance Services (AICPA, 1998) has pointed out that the speed and magnitude of Web-based transactions make real-time prevention of errors or fraud essential. Access and communication

controls are particularly important because there are so many potential entry points into a Web-based system. Strong password and the encryption systems are essential as are controls on program changes. "Real-time information systems must implement before-the-fact prevention strategy to make their output useful".

Web-based accounting requires real-time internal controls and audit procedures. Statement of Audit Standards No. 80 states that auditors of entities that transmit, process, maintain or access significant amounts of electronic information may be unable to reduce detection risk to an acceptable level by performing only substantive procedures, requiring them to normally perform tests of controls to obtain evidence to help achieve an assessed level of control risk sufficiently below the maximum. Certain electronic evidence may exist at a particular point in time but may not be available after a specified period, if files are changed and backup files do not exist. One of the strengths of XML will be the ability to imbed modules to gather audit data or to signal transaction anomalies on a real real-time basis.

While the technology opens new internal control concerns it also offers sophisticated new tools with which to strengthen internal controls:

*The advent of continuous accounting processes also will have secondary effects. An infrastructure of data collection, analysis and contingent action will develop, allowing for secondary processes to be performed at very small cost. For example, if certain repeated events are identified as patterns of fraud, then the existing infrastructure will allow for online real-time detection of fraud and the interruption of transaction processing prior to the completion of the fraud. Integration of processes across traditional systems facilitated by a common transaction-monitoring infrastructure will allow for improved understanding of relationships between successive processes in the value chain. The processes may be*

*integrated in an extranet without increased economic or fraud risk. (Casazza, 1998)*

Casazza and Magath (1998) go on to give a specific example of improvements in internal control possible in the Web-based environment:

*In response to increasing pressures to eliminate or restructure positions, organizations are forced to identify and implement controls to ensure that transactions are processed accurately, completely, and with the proper approvals and audit trails. One viable response to these challenges is the implementation of continuous monitoring systems that target financially significant risk areas, and subject transactions to reasonableness testing. Suspicious transactions are identified, recorded and forward to internal control areas for review and investigation. This " lights out" approach to monitoring provides a higher level of assurance than conventional sampling techniques by subjecting 100 percent of transactions to testing.*

One of the weakest links in the internal control chain between trading partners can be the Internet service provider. The AICPA and the Canadian Institute of Chartered Accountants (AICPA/CICA, 1999) are addressing the issue and in 1999 issued an Exposure Draft titled: *WebTrust-ISP Principles and Criteria for Internet Service Providers (ISP) in Electronic Commerce.* The principles presented in the draft are too lengthy to reproduce here but offer good specific benchmarks for evaluating ISP controls.

**Conclusion**

Electronic data interchange is being replaced by extranets using the extensible markup language for business-to-business transactions. This change in technology raises many internal control issues because extranets often use the World Wide Web to communicate and because XML is such a powerful and flexible programming language. Accounting information systems

designers and auditors need to ensure that proper internal controls are incorporated in every new Web based system.

**Suggestions for Future Research**

Extranets and XML offer, at least until the next technology shift, an opportunity for research in optimizing trading systems, internal control applications, creation of intelligent agents and creative new forms of presenting financial information.📖

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