

Chapter 1. Introduction

DEFINING TERMS

On October 26, 1993, President Clinton signed an Executive memorandum requiring Federal agencies to implement the use of electronic commerce in Federal purchases as quickly as possible. As the initial step the President's Management Council (PMC) Electronic Commerce Task Force (ECTF), chaired by the Administrator, Office of Federal Procurement Policy (OFPP), chartered the Federal Electronic Commerce Acquisition Team (ECAT) to complete the first milestone of the President's memorandum. The PMC gave ECAT the task of defining the architecture for the government-wide electronic commerce acquisition system and identifying the executive departments or agencies responsible for developing, implementing, operating, and maintaining the Federal electronic system. The ECAT prepared this report to identify the architecture and recommend actions that each agency should take.

Before defining the architecture, we must establish a common understanding of two important terms used in this report: electronic commerce (EC) and electronic data interchange (EDI). Those two terms are often used interchangeably when describing the computer-to-computer exchange of data transactions to support business functions. The following subsections present the ECAT definitions of those two phrases and defines how they are used within this report.

ELECTRONIC DATA INTERCHANGE

Electronic data interchange is the computer-to-computer exchange of routine business information in a standard format. The standard formats used must be agreed to by the parties exchanging information or selected from a set developed by a recognized standards body [e.g., American National Standards Institute (ANSI) or the International Standards Organization (ISO)]. EDI is the primary technology used to support EC. Purchase orders, quotations, invoices, and other paper forms have been successfully replaced with standard EDI transactions.

Like other technologies, EDI is not a target in and of itself. When properly used, it provides many of the immediate benefits already attributed to information technology: lower data entry costs, more accurate information, faster communications, and decreased paperwork, and that leads to more effective decision making.

¹ Federal Register / Vol. 58, No. 207 / Thursday, October 28, 1993, 58095 / Presidential Documents, Memorandum of October 26, 1993, "Streamlining Procurement Through Electronic Commerce," Memorandum for the Heads of Executive Departments and Agencies [and] the President's Management Council

ELECTRONIC COMMERCE

The process of government acquisition includes the procurement of supplies and services in support of all functions of the government. The term “electronic commerce” is used to describe a new approach to performing those functions using information systems technology.

Electronic commerce is the paperless exchange of business information using EDI, electronic mail (E-mail), electronic bulletin boards, electronic funds transfer (EFT), and other similar technologies. Those technologies are normally applied in high-payoff areas, recognizing that mailing and other paper-handling activities usually increase expenses without adding value. The EC initiative seeks to achieve both direct and indirect benefits by building electronic information bridges within the trading community.

Electronic data interchange was developed for a high-volume exchange of commercial documents in standardized electronic format between the automated business processes of trading partners. In contrast, E-mail is the exchange of less structured correspondence in electronic format between and among people.

Since the prospective vendor community is made up of businesses of various sizes and technological capabilities, many EC initiatives propose the use of both EDI and E-mail to ensure that the existing barriers to doing business with the government are lowered or that the barriers are not raised by the inappropriate application of technology where it does not add value.

To realize the true benefits, EC initiatives must seek to automate the generation, processing, coordination, distribution, and reconciliation of business transactions. However, EC means more than merely automating manual processes and eliminating paper transactions. It can and will help to move the Federal procurement and financial processes into a fully electronic environment and fundamentally change the way organizations operate.

THE INFORMATION AGE IS UPON US

This report presents a new approach to the process of government acquisition — one that will be mutually beneficial to both the government and its suppliers. Because of Federal budget reductions and calls for improved quality, organizations can no longer operate as they did in the past. Information-processing technology is the multiplier needed to improve operating efficiency and effectiveness within today's funding constraints.

Each day we face new technological realities that we could only imagine yesterday: a national information infrastructure, the information superhighway with on ramps and

off ramps in every home, wireless communications, and more. Each day it seems we must change our behavior and adapt to such new information-dominated technologies as automatic teller machines, debit cards, the Internet, and interactive television. In moving to the information age, humankind is putting itself through a technological revolution reminiscent of shifts from hunting and gathering to agriculture and from an agrarian economy to a manufacturing one.

Today's shift is as profound as those that presaged major transitions in the past. It is a shift from a culture that organizes and regulates its society around modeling, recording, managing, and maintaining fundamental business processes in paper document form. In contrast, the information age is a shift to a culture in which information technologies will make every form of humanly intelligible information available globally, instantaneously, and inexpensively where and in whatever form individuals need.

The global business community has already embraced the latest technology in this revolution. It needs the new technologies in order to stay healthy and grow in the competitive marketplace whose imperatives are defined by others who exploit information and other technologies. Members of the global business community refer to the new ways of doing business as "electronic commerce," or "EC."

What does this all mean? Industry is rapidly leveraging the new environment of advanced communications technologies and material support systems to achieve a competitive advantage. The Federal government must keep pace to take advantage of lower costs for goods and services it buys. It must eliminate unnecessary layers, streamline processes, and use available technology to the fullest. But technology alone will not yield the required improvements; basic business processes must also change if we are to realize all the benefits of paperless operations. Within government acquisition, we must program new applications emphasizing technological flexibility, "deprogram" our traditional thought processes, and learn to deal effectively with the dynamics of marketplace change or suffer the consequences in the receptivity we experience throughout the business community

THE NEED FOR STANDARD ELECTRONIC COMMERCE IN GOVERNMENT

The increased dependence on computers in our society is also triggering major changes in the organization of work within the Federal government. Paper-driven processes are being reengineered to capture the benefits of doing business electronically. Businesses are implementing EC to meet the imperatives of an increasingly competitive world, and those business trends are being mirrored in the Federal government by many individual agency actions. The need for such action within the Federal government is clearly stated in the National Performance Review (NPR). The "carrot" of increased productivity and effectiveness is being reinforced by the "stick" of an increasingly limited Federal budget.

Some agency managers have recognized the advantages of EC and have implemented it in portions into their operations. They find that processes and procedures need to be designed from scratch, and each organization invents a slightly different version of what other organizations have done. Compounding this problem, the trading partners often have to deal with a new way of doing business for each organization. The Federal government must move quickly to standardize its move to EC before a deluge of ad hoc implementations makes progress more difficult. The President's memorandum recognizes this fact and directs that a unified government-wide approach to EC be established and implemented.

All government agencies are now moving to infuse the latest information technology in their business practices in order to meet reduced budgets, added responsibilities, and an increasing internal and external awareness that things can and ought to be done differently. That awareness is, in part, the genesis of the Administration's ongoing NPR.

NATIONAL PERFORMANCE REVIEW

The NPR began on March 3, 1993, when President Clinton announced an intensive 6-month review of the Federal government. It seeks to create a government that works better and costs less. The NPR was conducted by a team of experienced Federal employees from all departments of the government. Their report is merely the first product of a continuing commitment to change. In that report, they describe about 100 actions and recommendations they consider most imperative to improve government.

The NPR report specifically identifies major, readily obtainable savings that will result from systematic reform of the Federal government's acquisition process. Acquisition is a highly complex process through which all the products and services the government consumes — about \$200 billion each year — are acquired.

Using EC to reform the acquisition process has benefits for the government and its suppliers. Benefits to the government include

- lower prices,
- increased competition,
- increased buyer productivity,
- better management information,
- reduced acquisition times and costs, and
- better inventory control.

² Vice President Al Gore, *From Red Tape to Results, Creating a Government That Works Better & Costs Less*, Report of the National Performance Review, September 7, 1993.

Benefits to suppliers include:

- improved profitability and cash flow,
- increased opportunity to participate in government acquisition,
- increased operating efficiencies, and
- improved payment process.

PRESIDENT'S MEMORANDUM

In the Executive memorandum of October 26, 1993³, President Clinton noted that moving to an EC system to simplify and streamline the acquisition process will promote customer service and cost-effectiveness. The electronic exchange of acquisition information between the private sector and the Federal government (i.e., the use of EC) will increase competition. It will do so by improving access to Federal contracting opportunities for the more than 300,000 suppliers currently doing business with the Federal government, particularly small businesses and many other suppliers who find access to bidding opportunities difficult under the current system.

To these ends, the President set forth the following objectives for EC:

- Exchange acquisition information electronically between the private sector and the Federal government to the maximum extent practicable
- Provide businesses, including small, small disadvantaged, and women-owned businesses, with greater access to Federal acquisition opportunities
- Ensure that potential suppliers are provided simplified access to the Federal government's EC system
- Employ nationally and internationally recognized data formats that serve to broaden and ease the interchange of data⁴
- Use agency and industry systems and networks to enable the government and potential suppliers to exchange information and have access to Federal acquisition data.

To implement EC and to achieve his objectives for EC, the President set forth the following four milestones:

³ See footnote 1 above.

⁴ The Federal government supports a recent ANSI Accredited Standards Committee (ASC) X12 initiative to align itself with United Nations EDI for Administration, Commerce, and Transport (UN/EDIFACT). In that regard, we will continue to participate in both the ASC X12 and UN/EDIFACT standards-making processes and migrate to the use of UN/EDIFACT when it is feasible and practical to do so, consistent with the capabilities and migration patterns of our trading partners. (ASC X12 and UN/EDIFACT standards provide the design rules for electronically exchanging business information. ASC X12 is a national standard, while UN/EDIFACT is an international standard for exchanging business information.)

- By March 1994, define the architecture for the government-wide EC acquisition system and identify executive departments or agencies responsible for developing, implementing, operating, and maintaining the Federal electronic system.
- By September 1994, establish an initial EC capability to enable the Federal government and private suppliers to exchange standardized requests for quotations (RFQs), quotes, purchase orders, and notice of awards and begin government-wide implementation.
- By July 1995, implement a full-scale Federal EC system that expands initial capabilities to include electronic payments, document interchange, and supporting data bases.
- By January 1997, complete government-wide implementation of EC for appropriate Federal purchases, to the maximum extent possible.

This schedule is aggressive. However, the President noted that the schedule should be accelerated where practicable.

The OFPP tasked the ECAT to develop a comprehensive plan for implementing an EC capability within 120 days. The OFPP defined the initial capability as a standardized EC capability for acquisition⁵ to be implemented throughout the Federal government. In consultation with ECAT, the OFPP Administrator agreed that focusing the initial capability on small purchases for commercial products would facilitate implementation.

MEETING THE PRESIDENT'S DIRECTIVE

THE BUSINESS CASE - THE NECESSARY PARADIGM

Government traditionally manages those business functions related to the acquisition process as a series of independent and unrelated activities. However, current market forces are so compelling that we can no longer accept worn-out variations of the same basic approach. Clearly, we must adopt a new business model, a paradigm shift, treating our overall acquisition operation as an "extended enterprise." We must adopt a process view of all the acquisition elements, cross traditional boundaries, and manage the entire operational flow from start to finish. In so doing we seek to enhance our customer relationships, achieve leverage in the marketplace, reduce costs and the need to retain large inventories, and obtain faster and more reliable deliveries of material and services.

We draw heavily from industry's experience to enforce our position on change. We must channel our efforts through business process reengineering while retaining a focus

⁵Hereafter in this report, we use the term "acquisition" to include the closely related terms of "procurement" and "finance."

on our core competencies. Automation alone is not sufficient. We must use information technology as the “engine” driving our initiatives to streamline and transform relationships with both our customers and suppliers or trading partners.

THE INTEGRATED ORGANIZATION

Our vision for Federal government acquisition focuses on process simplification through the reworking of the paper-oriented processes to be more efficient. We must eliminate the steps that the use of automation technology makes unnecessary; we must look at the value of old rules and safeguards in the face of the new technology; and we must recognize the need for, and the value of, dynamically linking the various processes of requisitioning, buying, transporting, receiving, paying for, and managing material and services as the means of achieving the quality imperative: doing everything in the Federal government smarter, better, faster and more cost- effectively.

Integration involves three aspects. First, we must review and improve our processes and enhance those improvements by utilizing technology where appropriate. Second, we must integrate across the improved business functions. In doing so, we must carefully identify the information needs for each process. Third, we must integrate common business functions, application program interfaces, and data bases across Executive departments and agencies. That integration will ensure department and agency users have access to common data bases that are government-wide, shared, relational, and distributed, rather than relying on “stovepipe” data bases that are specific and proprietary, with complex data management and unnecessary bottlenecks.

We must look beyond the traditional organization boundaries to integrate our processes and data with those of our customers, suppliers, other business partners, and regulatory agencies. We must carefully consider the inevitable transformation that such integration will have on our traditional relationships as we move from an adversarial position to one of mutual cooperation.

A PROCESS MODEL

In our model, functional specialists continue to operate in their various organizations. The marketplace continues to thrive. However, organizations in both the public and private sectors continue to require more time to perform a series of specialized tasks than is necessary. These delays are associated with both specialization and excessive paperwork. The new EC relationship offers the potential for efficiencies by encouraging changes in the way in which information is exchanged.

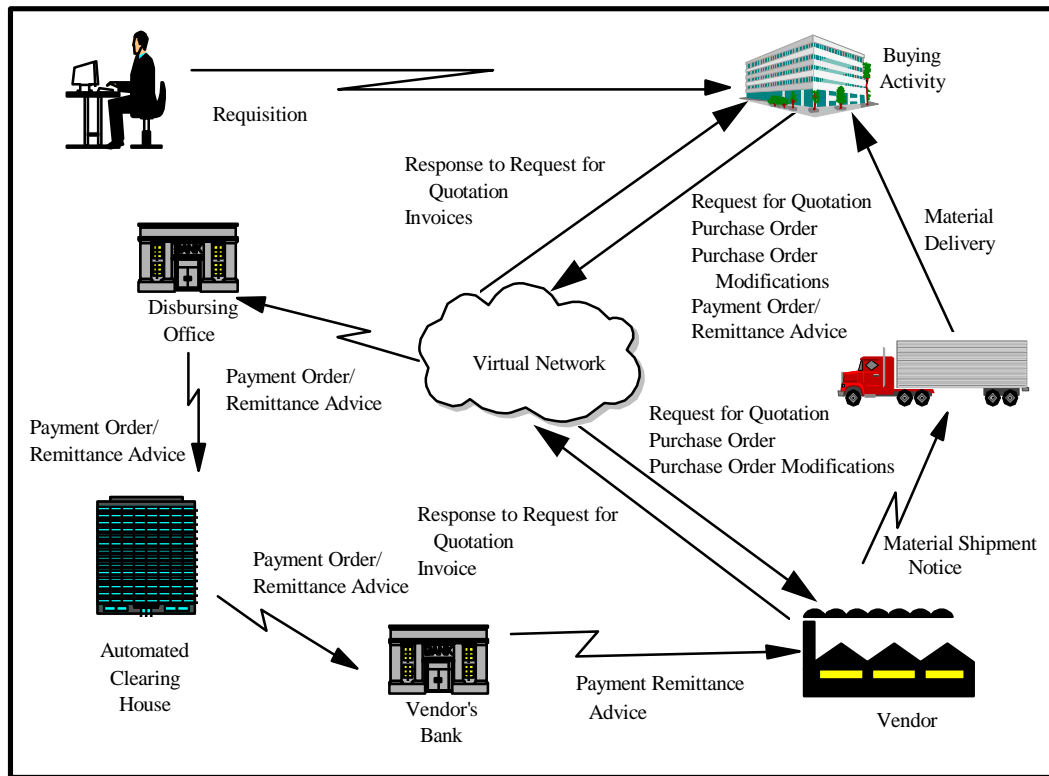


Figure 1-1. A Process Model

Figure 1-1 reflects our vision of the public sector/government integrated organization: requirements for supplies and services are identified to a buying organization, orders are placed with a supplier, material and services are provided to the government, invoices are compared to receipt information and certified for payment or are eliminated altogether, and funds are disbursed as payment for the goods and services.

All transactions are processed electronically through integrated application programs that recognize the incoming order, receipt, and acceptance of the product. Many of the routine evaluation and processing decisions are conducted by our application programs. Individual contracting officers need no longer concern themselves with administrative paperwork processes. Rather, within the context of a streamlined acquisition operation, they can focus on quality, evaluation, and award.

IMPERATIVES

Implementation of EC in the Federal government must meet the following five imperatives:

- The Federal government must present one face to industry.

- Transactions must be standardized, timely, accurate, and reliable.
- The Federal government must use established commercial practices and products where effective.
- Federal, international, and national standards must be used.
- Processes must be automated.

Effective commerce between the Federal government and the private sector must be completed accurately and reliably, using accepted standard business transactions. Potential suppliers often have little incentive to deal with the Federal government's inefficient paper-based procurement systems. The private sector perceives these existing systems as antiquated, cumbersome, slow to react, and slower still in paying for delivered goods and services.

In today's environment of distributed data bases and inexpensive, instant telecommunication, suppliers should be able to register one time for all Federal government acquisitions. For the same reason, appropriate department and agency acquisition information required by suppliers should be readily available to them. Implementing these fundamental changes will make possible full-and-open competition and access by all businesses to the government's \$200 billion annual market.

"A blizzard of paper" barely describes the volume and variety of paper documents that are currently used to transact business between the government and its suppliers. The labor and time required to key and re-key information into computer systems, file, and store all the paper is substantial. That mostly human-processed information system accounts for the single, largest source of excess time spent in the acquisition process. Implementing EC will encourage organizations to examine their acquisition processes carefully and reengineer them to eliminate many unnecessary steps and automate many of those that remain.

KEY RECOMMENDATIONS

With this report we begin three years of intensive effort to change how we do business in the Federal government's acquisition process. For this effort to be successful, executive departments and agencies must commit the necessary resources and get the government's work force and the supplier base involved. We must transform the habits, culture, and performance of all Federal government acquisition activities. To this end, we propose five key recommendations. All Federal government executive departments and agencies should take the following actions:

- Coordinate and harmonize appropriate portions of their policies, practices, procedures, and systems so that they provide a "single face" to the private sector for all aspects of Federal government acquisition.

- Pursue EC implementation in two phases: first, a near-term approach to implement an initial EC core capability and use EC to conduct some business by September 30, 1994, and second, implement EC throughout the Federal government so that by January 1997 EC is used for all appropriate Federal government purchases.
- Organize and use their resources to conduct acquisition and related financial transactions over a “virtual network” that will link all appropriate buyers and sellers in an electronic marketplace.
- Participate with the OFPP and the President’s Management Council Electronic Commerce Task Force by developing individual agency plans for implementing EC in acquisition in accordance with the President’s memorandum of October 26, 1993.
- Participate in and provide resource support to the Federal Electronic Commerce for Acquisition Program Management Office (ECA-PMO) that will be established. The ECA-PMO will be tasked to facilitate, coordinate, and monitor the implementation of electronic commerce as outlined in this report, provide assistance to agencies on implementation within their acquisition processes, and monitor and report on the individual agency plans for implementing electronic commerce. The ECA-PMO will report to the Administrator, OFPP

The report provides a description of the actions needed to implement EC along with specific recommendations to achieve that functionality. It also describe in nontechnical terms the “standard EC infrastructure” that represents a new or reengineered business model for conducting EC. In adopting this model, departments and agencies will retain and enhance their acquisition mission capability in anticipation of tomorrow’s limited staff resources.

FUNCTIONAL REQUIREMENTS

In addressing the functional requirements essential to our objective, we consider all related business processes as well as the necessary supporting infrastructure. Federal acquisition must be conducted within the context of sound business practices as supported by enabling technology. Accordingly, the requirements specified in the following subsections must be satisfied if we are to meet the objectives of the President’s October 26, 1993, memorandum. We begin with a general description of the “single face to industry” followed by specific recommendations that will enable the departments and agencies to implement EC within the Federal government.

We must simplify and standardize the process of conducting business with the Federal government by eliminating the need for suppliers to deal with numerous buying office processes, complete a variety of forms, and comply with differing rules and processing specifications.

Many departments and agencies have already implemented or begun to implement EC. Each organization invents a slightly different version of what the other organizations have already implemented. In doing so private-sector trading partners have to do business with each of these organizations in slightly different ways. The overall benefits of developing a standard approach to electronic commerce for the Federal government and its trading partners will far outweigh any adjustments required to existing systems and practices.

The Federal government must eliminate procedural ambiguities and provide efficiency opportunities to all trading partners by adopting the following:

- A single way and time for a supplier to register to do business
- A standard minimum set of electronic acquisition transactions
- A standard set of guidelines defining the data to be used in electronic transaction exchanges
- A standard trading partner agreement for use with all trading partners
- A single method of providing RFQs to trading partners and allowing access to all Federal government RFQs through one entry point using value-added networks (VANs)
- A standard VAN agreement and certification testing
- A consistent outreach program to industry.

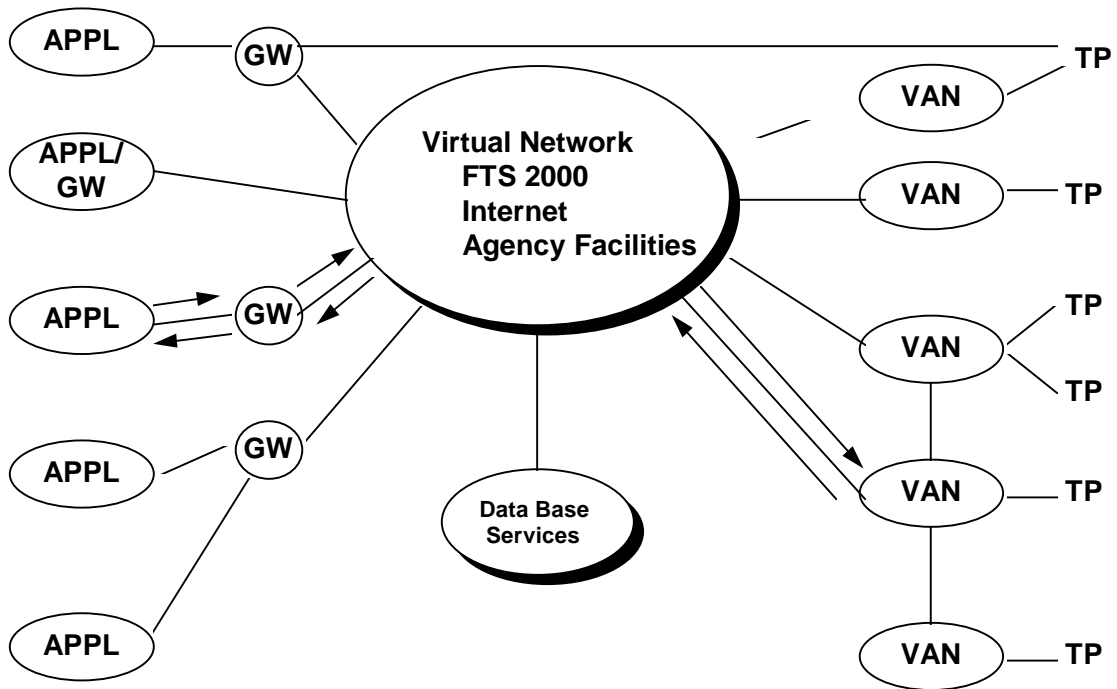
TECHNICAL INFRASTRUCTURE

The technical architecture required to support EC must include a telecommunication capability that is efficient, reliable, and capable of accommodating the anticipated increasing volume of EC traffic. The technical architecture must ensure easy and equitable access for all agencies and trading partners alike. The access to standard common data bases, such as those for trading partner registration, with the appropriate levels of security is a critical component of the technical architecture.

The Federal EC technical architecture includes the interface to/from agencies and their applications, EDI gateway services, the “virtual network” (communications services), VANs, and trading partners and their applications. The “virtual network” includes services and functions provided by interconnected, currently available networks that are in use by the agencies.

The Federal-wide technical architecture must provide gateways and network entry points (NEPs) that serve as high-speed telecommunications links with commercially operated VANs, which ensure universal access to appropriate information and data. The technical architecture should take action to interconnect currently available networks within the Federal government.

Figure 1-2 is a representation of the major components of the EC architecture for the Federal government acquisition process.



Notes: APPL = agency application, GW = gateway, VAN = value-added network, and TP = trading partner.

Figure 1-2. Technical Architecture - Electronic Commerce for Acquisition

The EC architecture was developed on the five guiding principles of

- A single face to industry;
- Standards-based open system;
- Best commercial practices;
- Security based on need; and
- A cost-effective transition.

Our ultimate goal for the architecture is to free the government from proprietary agency EC systems and help it make the transition to a single interconnected, interoperable, standards-based internetworking environment.

To implement an EC infrastructure, we must establish NEPs to exchange transactions with the VANs used by trading partners. Trading partners may use any of

the VANs that have been EDI-certified by the government, or the trading partner may choose to become EDI-certified as a VAN in its own behalf.

Trading partners will send and receive information to and from NEPs via their EDI VAN. Executive departments and agencies will transmit data to the NEPs, which will forward the data to the appropriate VAN. The EC infrastructure will support all distribution requirements for transactions sent to each participating VAN via an NEP. VANs will make these public transactions available to all interested subscribers.

CONCLUSION

This is the time for leadership. We must embrace technology and look to the process of developing the necessary architecture for only in that way can we be sure to manage our acquisition processes in a healthy, competitive environment. The paradigm shift demands that we carefully examine our business processes, reengineer them as necessary, and review existing procedures, strategies, and systems if we are to meet our imperatives: to create a process that works better and costs less. Process standardization and the expectations of accurate, timely and quality data should be our watchwords. Finally, we must put in place a responsible organization and empower it with the authority and resources to manage the change process.

REPORT STRUCTURE

This report consists of five chapters. This chapter is an introduction to our study. Chapter 2 defines electronic commerce as it applies to the government's procurement and finance business processes. Chapter 3 covers the key functional requirements needed to implement EC in terms of technologies and technical support. Chapter 4 covers, in detail, the mutually-agreed-upon technical architecture that the executive departments and agencies must acquire and articulate to provide the functional requirements described in Chapter 3 and to meet the President's goal of complete government-wide implementation of EC for appropriate Federal purchases, to the maximum extent possible by January 1997. Chapter 5 presents the results of the ECAT's work as findings, conclusions, and recommendations.