



U.S. Department of the Treasury
Financial Management Service

The FMS Electronic Data Interchange Guidebook

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1. EXECUTIVE SUMMARY

Public and private sector organizations have traditionally conducted business using paper documents and preprinted forms to exchange information with each other. These documents were sent by mail and manually processed by the recipient. Over the years, the number of these paper-based exchanges, and the amount of associated data, increased dramatically, forcing organizations to seek a more expedient way of communicating and processing business data.

Electronic Data Interchange (EDI) emerged in the late 1960's when industry groups such as railroads, airlines, motor carriers, and shipping companies realized that processing the large volume of paper documentation accompanying the shipment of goods resulted in significant delays in settlement and product deliveries. Since then, companies in industries of all kinds have found that EDI makes economic sense. The Data Interchange Standards Association (DISA) estimates that more than 15,000 companies around the world currently conduct business using EDI. The list of industries in which EDI is actively used includes shipping, retail, grocery, apparel manufacturing and textiles, warehousing, aerospace, chemicals, construction, automotive, financial, electrical and electronics, utilities, health care, petroleum, pharmaceutical, metals, paper, entertainment, and higher education. This list continues to grow and, in recent years, Federal, state, and local governments have begun to conduct business electronically as well.

This guidebook presents a methodology for planning and implementing EDI-based systems, and contains information on relevant functional and technical topics, including software, networks, financial EDI, procurement, and trading partner strategy. It is intended for use by Federal agencies, particularly smaller civilian agencies.

This section presents an executive summary of the following topics:

- ◆ Definitions of Electronic Data Interchange (EDI) and Electronic Commerce (EC)
- ◆ Components of an EDI system
- ◆ EDI and EC in the Federal government
- ◆ The use of EDI in different functional areas, including procurement, financial applications, and credit management
- ◆ Trading partner strategy
- ◆ Planning an EDI implementation
- ◆ Implementing an EDI pilot
- ◆ Conducting Cost/Benefit Analyses for EDI applications

These subjects are discussed in greater detail in the remainder of the guidebook.

1.1. DEFINITION OF ELECTRONIC DATA INTERCHANGE (EDI) AND ELECTRONIC COMMERCE (EC)

EDI is defined as:

"The electronic exchange of business documents (purchase orders, invoices, application forms, etc.) from one organization's computer to another organization's computer in standard data formats."

EDI is based on a set of standard formats that define transaction sets (or messages) that can be used to send basic business data from one computer to another. These transaction sets replace paper documents such as purchase orders, invoices, and bills of lading.

EC is defined as:

"The paperless exchange of business information using Electronic Data Interchange (EDI), electronic mail (E-mail), computer bulletin boards, facsimile (fax), Electronic Funds Transfer (EFT), and other similar technologies in the process of government acquisition including the procurement of and payment for supplies and services."

EDI and EC help organizations and their trading partners become more efficient and improve client service. Some of the benefits of EDI include speed of exchanging data, elimination of manually performed tasks, reduction in costs, and the availability of resources that were previously dedicated to the manual processing of paper-based documents.

1.2. COMPONENTS OF AN EDI SYSTEM

The four main components of an EDI system are:

- ◆ **EDI Standards:** EDI is based on a set of standard formats that define transaction sets that can be used to exchange business documents between organizations. The standards eliminate the need for human intervention in the interpretation of incoming and outgoing data. Today, there are primarily two sets of standards used by organizations to perform EDI - the American National Standards Institute, Accredited Standards Committee (ANSI ASC) X12 standard and the United Nations EDI for Administration, Commerce, and Trade (UN/EDIFACT)

standard. Organizations may customize these standards within certain guideline and develop their own Implementation Conventions.

- ◆ **Application Systems:** Application systems process the data to be sent to or received from trading partners. Such systems include an agency's procurement, receiving, and financial management systems, and the vendor's order management system.
- ◆ **EDI Gateway:** The EDI gateway converts application system data into a standard format and sends and receives messages to and from trading partners. A typical EDI gateway consists of a computer hardware platform and EDI translation software that maps, translates, and communicates data to trading partners. There are many Commercial Off The Shelf (COTS) EDI translation software packages available today, and organizations generally evaluate the packages and select one that meets their needs.
- ◆ **Communication Network:** A communication network is used in EDI to electronically transmit standard business documents between trading partners. Communication network options for EDI messages include commercial Value Added Networks (VANs), Value Added Services (VASs), the Federal Acquisition Computer Network (FACNET), the Internet, and point-to-point communications. As with software packages, organizations evaluate the available options and select one that meets their technical and functional needs.

1.3. EDI AND EC IN THE FEDERAL GOVERNMENT

In 1993, President Clinton issued a memorandum that mandated the use of EDI and EC in the Federal acquisition process. This action caused the beginning of the movement towards EDI implementation in the Federal government. The Federal Acquisition Streamlining Act (FASA), passed in 1994, contained several reforms to the current Federal acquisition process. It used a "carrot and stick" approach to the implementation of EC in that it raised the threshold for small purchases from \$25,000 to \$100,000 for Federal agencies that implemented EDI, as opposed to \$50,000 for agencies that did not. FASA offers Federal agencies the potential to realize significant cost savings in their procurement function. As a result, many agencies started implementing EDI-based procurement applications.

The Federal Acquisition Reform Act (FARA), passed into law in 1996, raises the threshold for simplified acquisitions to \$100,000 for all agencies until December 31, 1999; after this date the limit will be dropped to \$50,000 for agencies that have not implemented EDI programs. While FARA has removed the element of urgency for the immediate implementation of EDI in the Federal government, most agencies have realized that EDI offers an excellent opportunity to reduce costs and streamline their procurement process, and they are continuing their efforts to implement this technology.

1.4. THE USE OF EDI IN DIFFERENT FUNCTIONAL AREAS

There are many functional areas in which EDI can be used to increase efficiency and reduce processing costs. This document examines three functions - procurement, financial applications, and guaranteed loan management - for the potential use of EDI.

1.4.1 PROCUREMENT

In the Federal government, EDI and EFT are most widely used in the process of procuring goods and services and paying for them. The use of EC for all small purchases was mandated by FASA, and later modified by FARA until 1999. However, many agencies have realized that EC is efficient and cost effective, and are therefore, continuing their efforts to implement EDI-based programs. While FACNET and Central Contractor Registration (CCR) are operational at this point in time, their use to date has been limited, and agencies are trying to determine how they will be utilized and administered in the future.

In addition, there are a number of new initiatives in the Federal procurement function, including:

- ◆ **GSA Advantage!:** GSA has set up a new EDI-based system called GSA Advantage!, which uses both FACNET and the Internet for communications. Vendors can place their price lists on this system, and agencies can browse through the products and place orders directly with the vendor using traditional ordering methods or credit cards, or can place orders through GSA.
- ◆ **Interational Merchants Purchase Action Cards (IMPAC):** The Federal government is promoting the use of government credit cards, known as IMPAC, for micro purchases under \$2,500 in value. EDI may be used for receiving statements from and making payments to credit card companies.

In implementing EC, Federal agencies have found that small PC-based EDI gateways and a combination of network options provide the optimum functionality. FACNET can be used for RFQs that need to be broadcast to a large number of vendors, VANs are most effective for direct communications with individual vendors, and the Internet is a good source for product and vendor information.

1.4.2 FINANCIAL APPLICATIONS

Electronic Funds Transfer (EFT) has traditionally been used to move money electronically between parties doing business together. However, it is very cumbersome to move remittance data through EFT, and paper-based methods have to be used instead, causing reconciliation problems for the payee. Financial EDI which is defined as “the movement of payments and payment related information via EDI” allows organizations to move funds and data together through the banking system using the ANSI ASC X12 820, Payment Order/Remittance Advice, transaction set and the ACH CTX, Corporate Trade Exchange, format.

The Department of the Treasury, Financial Management Service (FMS) has developed a

number of EDI and EFT-based systems for the agencies that FMS collects and disburses funds for. Some of these initiatives are described below:

- ◆ **Vendor Express:** Vendor Express is a payment program that allows agencies to make electronic payments with accompanying data to companies and individuals. It utilizes both the Case Concentration or Disbursement Plus Addenda (CCD+) (one payment/one invoice) and the CTX (one payment/many invoices) ACH formats and specifications for the ANSI X12 820 Payment Order/Remittance Advice.
- ◆ **Automated Standard Application for Payments (ASAP):** ASAP is an all-electronic payment and information system that allows recipients of Federal assistance to electronically request and receive pre-authorized funds through the U.S. Treasury.
- ◆ **Remittance Express (REX):** REX is an electronic funds transfer system that allows Federal agencies to use the ACH network to receive payments from the public.
- ◆ **Electronic and ACH-only Lockboxes:** Electronic and ACH-only lockbox operators automatically collect and deposit payments received from the public into Treasury's account at the Federal Reserve Bank. The deposit data is available to the agency through via FMS's CASH-LINK system.
- ◆ **Direct Payment/Recurring Pre-Authorized Debits (PAD):** PAD is an electronic transfer of funds authorized in advance by the remitter, and initiated by the agency.

1.4.3 CREDIT MANAGEMENT

Several Federal agencies offer government guaranteed and direct loan programs to the public, including the Department of Veteran's Affairs, Department of Housing and Urban Development, and the Small Business Administration. The process of loan management involves several phases, and EDI and EFT can be used to increase the efficiency and control, and reduce the cost of each phase of loan management, as described below:

- ◆ **Lender Management:** This phase includes those functions necessary to certify and monitor lenders. EDI can be used to collect lender data and share it amongst the credit-granting agencies.
- ◆ **Loan Origination:** This phase includes the functions necessary to process, evaluate, and approve loan applications. Agencies can use EDI to collect loan application data in a fast, accurate, and efficient manner, and financial EDI may be used to expedite the receipt and deposit of guarantee fees.
- ◆ **Loan Servicing:** This phase includes functions required to service loans and monitor the performance of loan portfolios. Credit-granting agencies can effectively use EDI to collect status information on loans and to track defaulted loans.

- ◆ **Debt Collection:** This phase includes functions required to process claims and assignments, and perform other related collection tasks. Lenders can use EDI to send claim notices, and agencies can settle claims quickly and efficiently using EFT.

1.5. TRADING PARTNER STRATEGY

The success of an organization's EDI efforts is ultimately determined by the level of participation of its trading partners. Therefore, the recruitment of trading partners should be an integral part of the EDI implementation strategy. In preparation for implementing an EDI application, an organization should formulate a cohesive trading partner strategy that addresses, at a minimum, the following items:

- ◆ **Stratification of Trading Partners:** Stratification, or grouping, of trading partners assists in determining the order in which trading partners should be implemented on the new EDI application. Agencies should establish a timeframe for implementation trading partners and criteria for stratifying trading partners. Commonly used criteria include transaction volume, the technical sophistication of trading partners, and their ability and willingness to participate in an EDI program.
- ◆ **Trading Partner Outreach Program:** Agencies should develop a comprehensive outreach program to contact their trading partners and persuade them to implement the EDI application. The outreach program should include the following activities:

Establishing an Outreach Team that will be responsible for recruiting and implementing trading partners.

Providing assistance to trading partners in implementing the EDI application. Such assistance may include Trading Partner Kits with informational and educational materials, providing incentives such as free or inexpensive software and network services, help desk services for troubleshooting, and training in the form of trading partner conferences.

- ◆ **Trading Partner Registration:** Agencies should establish procedures for registering trading partners, including the exchange of the ANSI X12 838, Trading Partner Profile, transaction set, and CCR, if necessary.

Agencies should also establish a detailed step-by-step procedure that will be followed by the Outreach Team when contacting, recruiting, and implementing trading partners.

1.6. PLANNING AN EDI IMPLEMENTATION

Planning is a key to success in implementing an EDI application. It provides the

implementation team with a sound basis for the functional and technical design of the new application, as well as a clearly defined plan for its implementation. The planning phase of an EDI application consists of the following activities:

- ◆ Analyzing the current process
- ◆ Developing workflows for the EDI application
- ◆ Developing an EDI implementation plan

1.7. IMPLEMENTING AN EDI PILOT

Pilot EDI programs usually involve converting a small number (5 to 10) of trading partners to an EDI application with 1 or 2 transaction sets for a brief period of time (3 to 6 months). Pilot applications provide agencies with valuable technical knowledge and expertise and can be used to demonstrate the benefits of the EDI application. Implementing a pilot ED application involves the following steps:

1. Establish a project team
2. Determine functions to be included in the pilot
3. Redesign the process
4. Recruit pilot trading partners
5. Define pilot technical architecture
6. Acquire and install hardware and software
7. Arrange for network services
8. Build interfaces to in-house application systems
9. Train users and trading partners
10. Test pilot system
11. Implement pilot system
12. Evaluate pilot system

1.8. COST/BENEFIT ANALYSES FOR EDI APPLICATIONS

Cost/Benefit Analysis is a method of identifying and analyzing the net financial costs, cost savings, and benefits associated with changing a process or program. The primary purpose of a Cost/Benefit Analysis is to compare the cost of maintaining the current process to the initial investment and ongoing costs necessary to modify or replace that process, and determine whether the implementation of the modified or new process or system will be cost effective.

- ◆ **Costs:** Costs are additional expenditures, cash outlays, or losses that arise as a result of changing the current process or program. Some of the key cost categories that should be considered when implementing EDI-based applications are:

- Hardware for the EDI gateway
- Software (EDI translation software, communications software, etc.)
- Cost of modifying current application systems
- Telecommunications (VAN) charges
- Trading partner outreach program costs
- Ongoing support and maintenance costs

- ◆ **Cost Savings:** Cost savings are reductions in expenditures, cash outlays or losses that result from changing a current process or program. Some of the cost savings typically associated with the implementation of EDI-based applications are:

- Savings in labor costs (through the elimination of data entry, paper document handling, reconciliation and other manually performed tasks)
- Elimination of mailing costs
- Reduction of document management costs (on site and off site storage)

- ◆ **Benefits:** Benefits are advantages gained as a result of changes to the current process or program. Benefits may be quantifiable or non-quantifiable, and include:

- Reduction in data entry error rates
- Improved cash management, including increased interest from reduced cycle time for receiving payments electronically
- Elimination of communication lag time between agency and customer
- Improved customer service
- Expandability of the system to other functions (Using the same translation software for various applications such as procurement, collections, payments, etc.)

Agencies should use a structured methodology to collect and analyze the costs, cost savings and benefits of implementing an EDI application. Automated spreadsheet models may be used to analyze and present the results of the Cost/Benefit Analysis, which should include a Net Present Value Analysis and a Breakeven Analysis.

2. OVERVIEW OF ELECTRONIC DATA INTERCHANGE

This section presents an overview of Electronic Data Interchange (EDI) and Electronic Commerce (EC), the benefits of EDI and EC, and how the Federal government currently uses these tools to conduct business.

2.1. DEFINITION OF ELECTRONIC DATA INTERCHANGE (EDI)

EDI is defined as:

"The electronic exchange of business documents (purchase orders, invoices, application forms, etc.) from one organization's computer to another organization's computer in standard data formats."

EDI is based on a set of standard formats that define transaction sets (or messages) that can be used to send basic business data from one computer to another. These transactions sets replace paper documents such as purchase orders, invoices, loan applications, and loan default reports.

EDI is not a "fax" transmission, in which unstructured data is sent from one facsimile machine to another. Fax transmissions expedite the transfer of information, yet require re-keying by the recipient before the data can be used by automated systems. It should also be noted that EDI is not electronic mail (e-mail). Though e-mail is a computer-to-computer exchange of information, the data that it contains requires editing and re-keying before it can be processed by an automated system. With EDI, the data is transmitted in a precise, structured format so that it is machine-processable without any human intervention.

2.2. DEFINITION OF ELECTRONIC COMMERCE (EC)

EC is defined as:

"The paperless exchange of business information using Electronic Data Interchange (EDI), electronic mail (E-mail), computer bulletin boards, facsimile (fax), Electronic Funds Transfer (EFT), and other similar technologies in the process of acquisition including the procurement of and payment for supplies and services."

This definition of EC is extremely broad in that it encompasses a number of electronic means to

accomplish the procurement of goods and services. However, in this document, EC has been used to denote EDI-based procurement applications.

2.3. HISTORY OF EDI

Public and private sector organizations have traditionally conducted business on paper, often using preprinted forms to exchange information with each other. Over the years, the number of these paper-based exchanges (and the amount of associated data) increased dramatically, forcing organizations to seek a more expedient way of communicating and processing business data.

EDI emerged in the late 1960's when industry groups such as railroads, airlines, motor carriers, and shipping companies realized that processing the large volume of paper documentation accompanying the shipment of goods resulted in significant delays in settlement and product deliveries. Early electronic interchanges used proprietary formats agreed upon between two trading partners (commercial entities that conduct business with each other electronically). While this was a step in the right direction, the end result was that organizations needed to maintain a different set of standards for each of their trading partners. This additional effort mitigated some of the benefits gained by conducting business electronically, and led to an agreement to jointly develop standards for EDI messages.

Since then, companies in industries of all kinds have found that EDI makes economic sense. The Data Interchange Standards Association (DISA) estimates that more than 15,000 companies around the world currently conduct business using EDI. The list of industries in which EDI is actively used includes shipping, retail, grocery, apparel manufacturing and textiles, warehousing, aerospace, chemicals, construction, automotive, financial, electrical and electronics, utilities, health care, petroleum, pharmaceutical, metals, paper, entertainment, and higher education. This list continues to grow and, in recent years, Federal, state, and local governments have begun to conduct business electronically as well. According to a recent study, the number of companies using EDI is projected to quadruple by the year 2001.

2.4. COMPONENTS OF AN EDI SYSTEM

EDI architecture is generic in that it is not dependent on any specific computer hardware, software, communications protocol, or processing environment. However, it does require that the trading partners agree upon a common set of standards and have a means for formatting their data into these standards and communicating the information to each other. The components of an EDI system include:

- ◆ EDI Standards

- ◆ Application Systems
- ◆ EDI Gateway

- ◆ Communication Network

These components and how they interact with each other in the transmission of EDI messages have been graphically depicted in Exhibit 2-1, Components of an EDI System, and are explained below.

2.4.1 EDI STANDARDS

Standards define the structure, format, and content of EDI documents, including the data fields

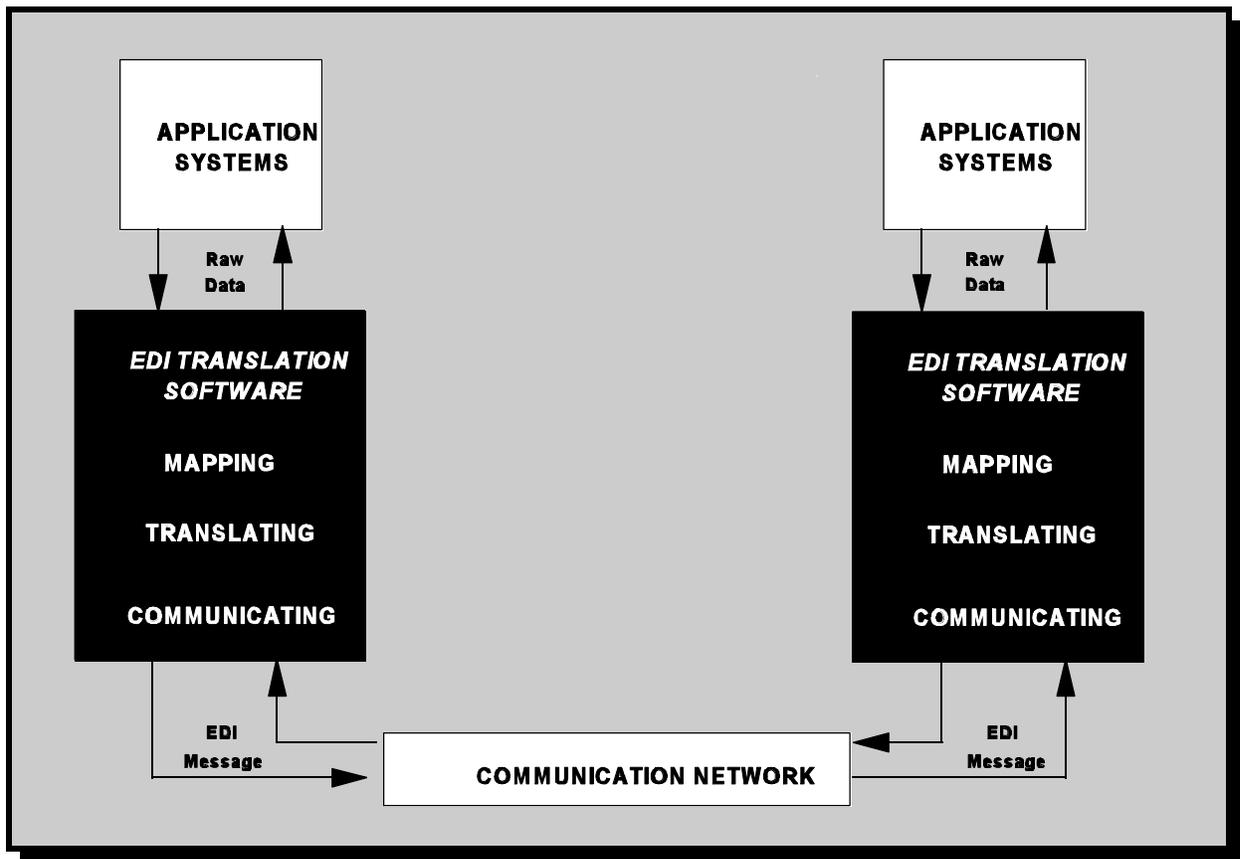


Exhibit 2-1: Components of an EDI System

that may be included in a document, the sequencing and format of fields, etc. These documents, known as transaction sets or messages, are used to exchange business information between organizations. EDI standards eliminate the need for human intervention in the interpretation of incoming and outgoing data.

Today, there are primarily two sets of EDI standards used by organizations. They are:

- ◆ **ANSI ASC X12:** ANSI ASC X12 is a set of EDI message standards developed and maintained by the American National Standards Institute, and is widely used within the U.S.

- ◆ **UN/EDIFACT:** UN/EDIFACT is a set of EDI message standards developed and maintained by the United Nations, and is widely used internationally.

2.4.2 APPLICATION SYSTEMS

Application systems are used by organizations to process business transactions. In an EDI-based application, these systems are also used to process the data to be sent to or received from trading partners. Such systems include an agency's procurement, receiving, and financial management systems, and the vendor's order management system.

2.4.3 EDI GATEWAY

The purposes of an EDI gateway are to convert application system data into a standard format and to send messages to and receive messages from trading partners. A typical EDI gateway consists of a hardware platform and EDI translation software. These two components are described below:

- ◆ **Hardware:** Consists of a host system (e.g., a personal computer, midrange computer, or mainframe computer) and communications equipment (e.g., modems and communication lines)
- ◆ **EDI Translation Software:** A specialized piece of software that performs three basic functions:

Mapping: Outgoing data is reformatted from an organization-specific format to an EDI standard format

Translating: Standard enveloping and delimiter protocols are added to the mapped data enabling the EDI message to be routed properly to a trading partner

Communicating: EDI message is sent to a trading partner via a communication network

2.4.4 COMMUNICATION NETWORK

A communication network is used in EDI to electronically transmit standard business documents between trading partners. Each communication network is typically used by a number of business entities, and often linked to other networks to enable them to transfer EDI messages to each other.

2.5. BENEFITS OF EDI

EDI helps organizations and their trading partners become more efficient, reduce transaction

costs, and improve client service. Some of the benefits of EDI include:

- ◆ **Speed:** Exchanging data electronically reduces or eliminates communication lag time between entities.
- ◆ **Elimination of Data Entry:** EDI is the computer-to-computer exchange of data and it eliminates or reduces the need for manual data entry.
- ◆ **Reduction of Errors:** EDI eliminates the possibility of data entry errors or sending documents to the wrong party.
- ◆ **Standardized Data:** By using EDI message formats, business entities can standardize the data that they exchange with each other.

Certain other consequential benefits can also be realized through an EDI implementation, such as:

- ◆ **Reduction in Costs:** EDI will eliminate manual, labor-intensive activities associated with the creation, verification, reconciliation, and handling of paper documents. In addition, the cost of postage and storage will also be eliminated.
- ◆ **Information Availability and Integrity:** Organizations will be able to provide better customer service as a result of having access to information that is more accurate and up-to-date.
- ◆ **Availability of Resources:** EDI will allow resources to be diverted from performing manual, labor-intensive activities to areas that may require additional personnel.

2.6. EDI AND EC IN THE FEDERAL GOVERNMENT

In recent years, the Federal government has become one of the largest users of EDI. Federal agencies interact not only with thousands of businesses in various industries, but with individual citizens as well. For example, the Internal Revenue Service (IRS) receives tax returns from businesses and individuals, the Department of the Treasury sends payments for goods and services to large and small businesses, and the Bureau of the Census collects statistical information from corporations. While most of these transactions currently take place via paper forms and the U.S. Mail, the Federal government is fast realizing that there are enormous cost and time savings to be gained through the implementation of electronic methods of transferring data and funds.

Actually, Federal agencies such as the Department of Defense and Department of Veterans Affairs began implementing EDI programs as early as fifteen years ago. However, the widespread use of EDI in the Federal government began fairly recently, prompted by the issuance of the final report

of the National Performance Review team and the Presidential memorandum of 1993.

The following sections provide a brief description of some significant actions taken by the Federal government to further the use of EDI.

2.6.1 THE NATIONAL PERFORMANCE REVIEW AND THE PRESIDENTIAL MEMORANDUM OF 1993

Soon after taking office, President Clinton announced that one of the priorities of his administration would be "to create a government that works better and costs less." An intensive six-month review - known as the National Performance Review - was launched with Vice President Gore leading a team comprised of staff drawn from a number of Federal agencies. In their final report, "From Red Tape to Results, Creating a Government that Works Better and Costs Less" issued in September 1993, the NPR team made a number of recommendations that focused on streamlining the Federal acquisition process. The use of EDI was prominent in this list.

In October 1993, President Clinton issued a memorandum that mandated the use of EDI and EC in the Federal acquisition process and set forth the following milestones:

- ◆ Definition of a government-wide EC system architecture by March 1994
- ◆ Establishment by Federal agencies of initial EC capabilities for electronically exchanging procurement-related documents by September 1994
- ◆ Implementation by Federal agencies of full-scale EC by July 1995
- ◆ Use of EC by the entire Federal government for the exchange of all procurement-related documents by January 1997

Currently, the Federal acquisition process involves the procurement of and payment for more than \$200 billion of goods and services consumed by the Federal government annually, through more than 2,400 procurement offices around the country. The Federal vendor community consists of 400,000 suppliers ranging from large corporations to small, single owner operations. These numbers clearly demonstrate the potential impact of the NPR team's recommendations on the use of EDI in the Federal government.

There were two other important outcomes resulting from the issuance of the presidential memorandum. First, the Electronic Commerce Acquisition Team (ECAT) was established to facilitate the implementation of EC throughout the Federal government. Second, Congress enacted the Federal Acquisition Streamlining Act in October 1994 and the Federal Acquisition Reform Act in February 1996.

2.6.2 "A SINGLE FACE TO INDUSTRY"

To assist agencies in fulfilling the mandate issued under the presidential memorandum, the ECAT Program Management Office (ECA/PMO) has established technical and functional standards to be used by both defense and civilian agencies in implementing EC. These standards will allow the government to present “a single face to industry”, and vendors who previously had to deal with each agency separately will be able to utilize a single source to learn about and respond to Federal procurement opportunities. The functional and technical measures proposed by the ECA/PMO include:

- ◆ **The Federal Acquisition Computer Network (FACNET):** FACNET is a communications network that is designed to allow Federal agencies to inform the public about federal contracting opportunities, permit electronic submission of bids and proposals, and facilitate responding to questions regarding solicitations.

- ◆ **Central Contractor Registration (CCR):** CCR is a database of registered government vendors. It also contains lists of disbarred, suspended, or ineligible vendors. CCR tracks vendor performance, and maintains this information in a location that all Federal agencies would have access.

- ◆ **Federal Implementation Conventions:** If vendors are to be able to accept and correctly interpret EDI messages from all Federal agencies, a common set of usage rules, or implementation conventions, will need to be established. To address this issue, the Office of Federal Procurement Policy (OFFP) has created the Federal EDI Standards Management Coordinating Committee (FESMCC). FESMCC has set up a number of workgroups with representatives from different agencies that are responsible for developing implementation conventions for Federal government use.

2.6.3 THE FEDERAL ACQUISITION STREAMLINING ACT (FASA) AND THE FEDERAL ACQUISITION REFORM ACT (FARA)

The Federal Acquisition Streamlining Act (FASA), passed into law in 1994, contains several reforms to the current acquisition process. It used a "carrot and stick" approach to the implementation of EC in that it raised the threshold for small purchases from \$25,000 to \$100,000 for Federal agencies that implemented EDI, as opposed to \$50,000 for agencies that did not. FASA offered Federal agencies the potential to realize significant cost savings in their procurement function, and as a result, many agencies started implementing EDI-based procurement applications.

However, due to technical difficulties in establishing the necessary government-wide technical architecture and the large number of vendors involved, many agencies experienced difficulty in meeting the target dates set forth in the Presidential Memorandum. Subsequently, in 1996, Congress enacted the Federal Acquisition Reform Act (FARA) which amended the provisions of FASA. FARA states that the threshold for simplified acquisitions will be raised to \$100,000 for all agencies until December 31, 1999. After this date the limit will be dropped to \$50,000 for agencies that have not implemented EDI programs.

While FARA has removed the element of urgency for the immediate implementation of EDI in the Federal government, most agencies have realized that EDI offers them an excellent opportunity to reduce costs and streamline their procurement process, and are continuing their efforts to implement this technology.

3. EDI MESSAGE STANDARDS

The success of EDI is based upon the existence of standards that govern the way data is transmitted from one trading partner to another. These standards explicitly define the way paper-based documents should be structured into electronic messages. In addition, they define the contents of each message and provide a finite list of codes that can be used to describe individual entries within the message. This section describes the history of EDI standards and provides an introduction to the most popular standards in use today.

3.1. THE NEED FOR EDI MESSAGE STANDARDS

Traditionally, business data has been exchanged between entities using paper documents and forms. However, the need for an alternative to these paper-based methods emerged as businesses sought to reduce the personnel costs associated with processing paper documents. Around the same time, businesses also started looking for ways to reduce the time needed to process information in order to respond more quickly to customers' needs. As a result, in the early 1960s, companies like K-Mart and Sears began to develop proprietary formats for electronic documents designed to replace the paper-based documents.

During the next decade, an increasing number of companies began sending and receiving electronic documents. However, as each of these companies developed its own proprietary standards, it became necessary for organizations to support multiple standards for transmitting the same types of information to different trading partners.

With the demand to conduct business electronically growing each year, it became increasingly apparent that companies could not continue to support multiple sets of proprietary standards. As a result, several industries developed standards for the most common electronic transactions used within that industry. For example, the automotive industry developed the Automotive Industry Action Group (AIAG) standards, and the transportation sector developed the Transportation Data Coordination Committee (TDCC) standards. However, by the late 1970s, businesses again found themselves supporting multiple sets of standards due to the necessity of transmitting documents across different industries.

This support of multiple standards led to the development and adoption of the following two public standards:

- ◆ **ANSI ASC X12:** ANSI ASC X12 is a set of EDI message standards developed and maintained by the American National Standards Institute, and is widely used within the U.S.
- ◆ **UN/EDIFACT:** UN/EDIFACT is a set EDI message standards developed and maintained by the United Nations, and is widely used internationally.

These standards are described in further detail in Section 3.3, ANSI ASC X12 Standards for EDI Messages and Section 3.4, UN/EDIFACT Standards for EDI Messages. It is important to note

that ANSI ASC X12 and EDIFACT standards has been adopted for use by Federal agencies implementing EDI, according to the Federal Information Processing Standards Publication (FIPS) 161.

Over a period of time other standards have evolved for EDI and electronic messages. Some of these standards are described below.

- ◆ **X.400:** The X.400 standard is an Open-System Interconnection standard for electronic mail and provides the means to send and receive interpersonal messages and formatted business transactions, using a basic transfer system for storing and forwarding messages. Later versions have added communications services for the open-system environment transmissions of EC transactions.
- ◆ **X.435:** The X.435 standard has been established to provide the EDI-specific message addressing for the X.400 “envelope” and thus allowing EDI messages to be routed over an X.400 backbone. The X.435 standard contains interchange control numbers and EDI document types that would improve security and audit trail capabilities. The X.435 also allows the trading partners involved in EDI transactions to provide notification of receipt and forwarding, and status reports to both the previous and the subsequent transport agents.
- ◆ **X.500:** The X.500 standard is also an Open-System Interconnection standard for directory services. The X.500 standard provides services to store and retrieve directory information with access control and replication of distributed data services. The X.500 directory services are available to X.400 users and provide electronic mail-addressing information, including EC trading partner and VAN address information.

3.2. COMPONENTS OF A STANDARD EDI MESSAGE

A complete ANSI ASC X12 EDI message consists of data elements grouped into segments. Segments are placed in transaction sets, that are then placed in functional groups. Functional groups are placed in interchanges. These terms are explained briefly below.

- ◆ **Data Elements:** Data elements are the smallest unit of information in an EDI message, and represent a single piece of information (e.g., unit price, item description).
- ◆ **Data Segments:** Data segments consist of strings of related data elements in a specific order. For example, an address data segment may be composed of city, state, and zip code data elements.
- ◆ **Transaction Sets:** A transaction set, consisting of data segments in a specific order, is the equivalent of a complete paper document (e.g., purchase order, invoice). Transaction sets are bounded by mandatory header and trailer segments.
- ◆ **Functional Groups:** A functional group is a group of similar transaction sets (e.g.,

multiple purchase orders or invoices). Functional groups are also bounded by special header and trailer segments.

- ◆ **Interchanges:** An interchange is a complete EDI message from one trading partner to another, that can include multiple functional groups and transaction sets. Interchanges are enveloped within interchange control segments which specify among other things, the sender and receiver of the interchange and their respective electronic addresses.

A graphical representation of the components of a standard EDI message is depicted in Exhibit 3-1.

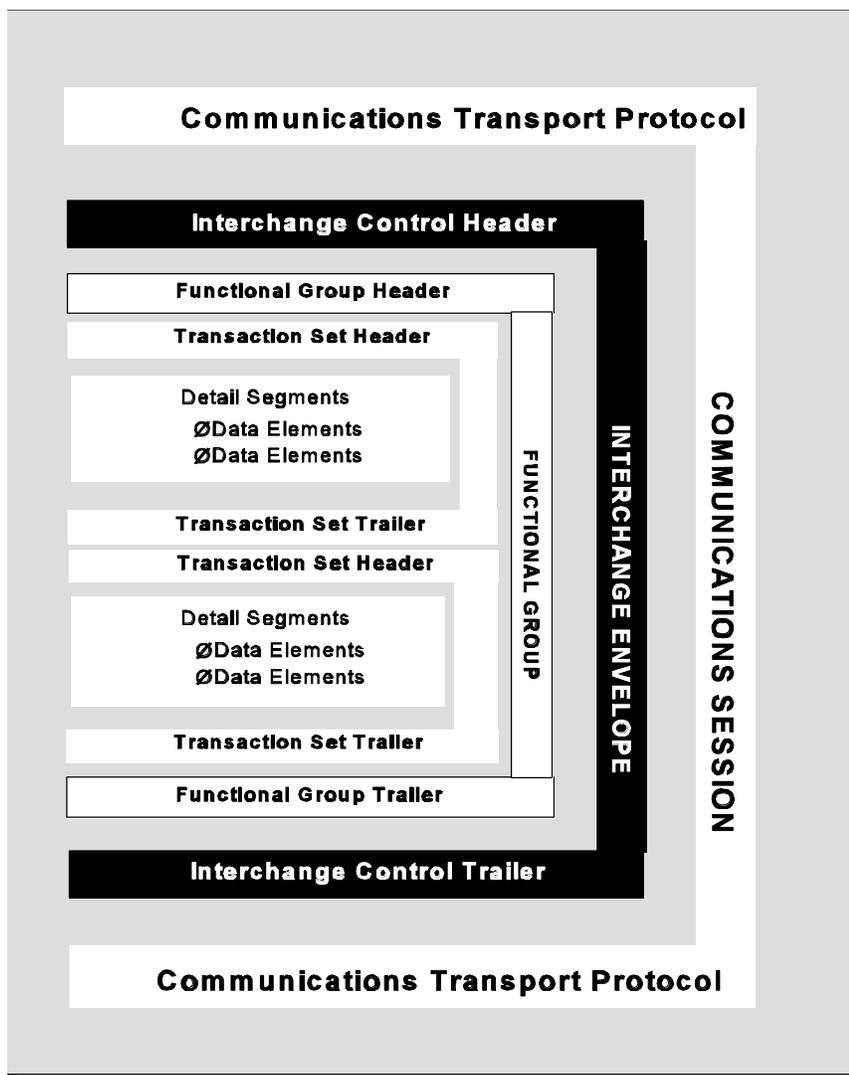


Exhibit 3-1: Components of an EDI Message

3.3. ANSI ASC X12 STANDARDS FOR EDI MESSAGES

The American National Standards Institute (ANSI) was founded in 1918, to serve as the coordinator for national standards in the United States. This voluntary standards system consists of a large number of standards developers who write and maintain several sets of national standards. Each year, thousands of individuals and companies, labor, consumer, and industrial organizations, and government agencies voluntarily contribute their knowledge, talent, and effort to standards development.

In 1979, ANSI chartered a new committee, known as the Accredited Standards Committee (ASC X12), to develop uniform standards for electronic interchange of business transactions, relating to functions such as order placement and processing, shipping and receiving, invoicing, and payment application, etc.

3.3.1 STANDARD ANSI ASC X12 DOCUMENTS AVAILABLE

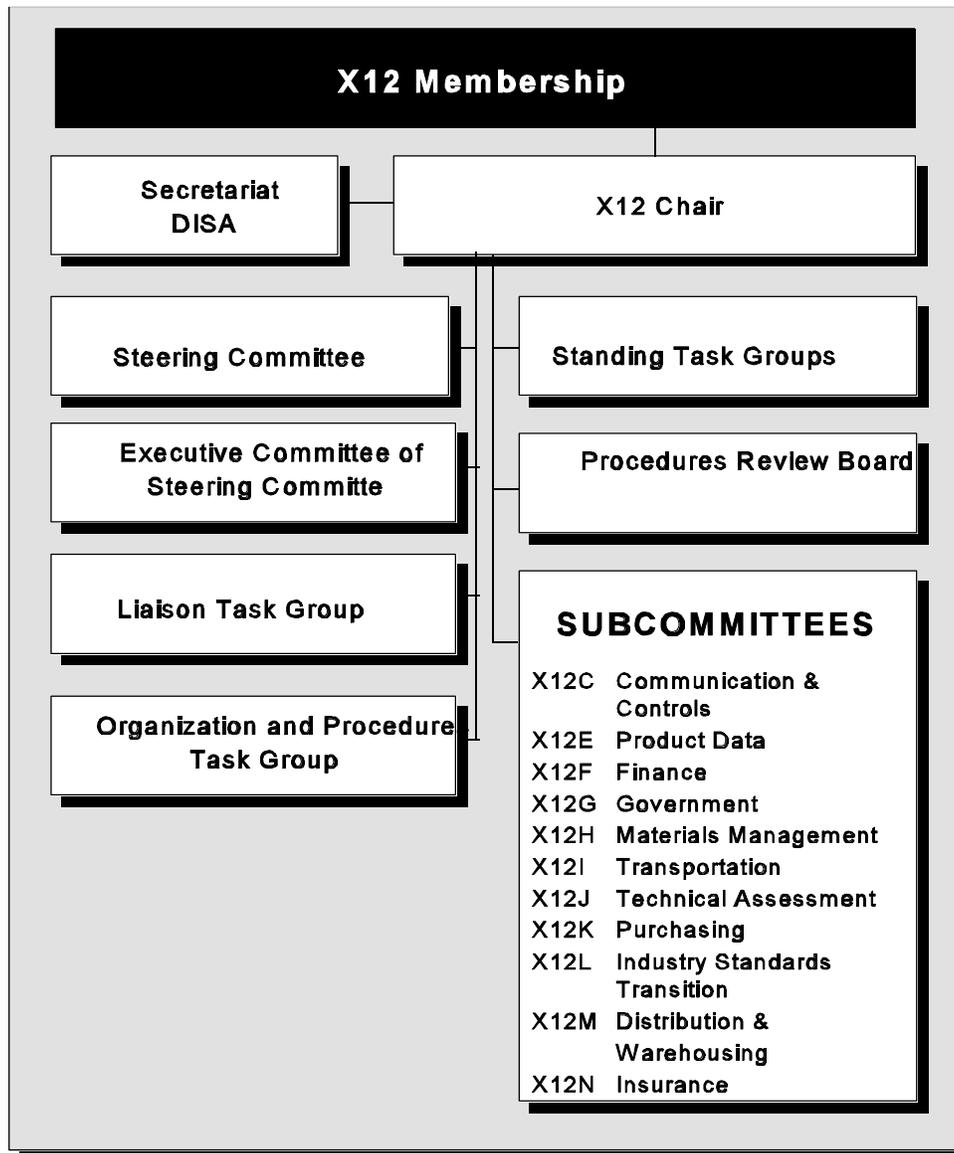
Currently, there are over 200 documents available within the ANSI ASC X12 standards. The standards include common business documents like purchase orders and invoices, as well as special purpose documents such as student loan applications.

3.3.2 STRUCTURE AND ORGANIZATION OF ASC X12

The work of ASC X12 is conducted primarily by subcommittees and task groups who are responsible for the development of new standards and the maintenance of existing standards. Their recommendations are presented to the complete ASC X12 membership for ratification. The Data Interchange Standards Association (DISA) is the secretariat for ASC X12. Described below are three subcommittees that are of significance to the Federal government Electronic Commerce initiative.

- ◆ **X12F - Finance:** The primary responsibility of the X12F subcommittee is the development and maintenance of EDI standards and guidelines associated with remittance or banking functions, including invoices, payment transactions, bank reporting, and credit instruments.
- ◆ **X12G - Government:** The primary responsibility of the X12G subcommittee is to develop and maintain EDI standards and guidelines for use within the government, between governmental departments, and between the government and private sector. They also review and comment on standards and changes proposed by other subcommittees, that relate to transaction sets used by governmental agencies.
- ◆ **X12K - Purchasing:** The primary responsibility of the X12K subcommittee is the development and maintenance of EDI standards and guidelines associated with the procurement and acquisition of products and services and related pricing information.

Exhibit 3-2, ANSI AC X12 Organization, presents a pictorial view of the organization of X12.



3.3.3

Exhibit 3-2: ANSI X12 Organization

ASC
12

**X
STANDARDS DEVELOPMENT ACTIVITIES**

The family of ASC X12 standards is constantly expanding as a result of the activities of the members of ASC X12 and standards users. ASC X12 members vote on technical issues by letter

ballots that are conducted by DISA. Administrative issues may be voted on by letter ballot or at general sessions during ASC X12 meetings.

Subcommittee votes are conducted according to procedures specified in each subcommittee's constitution, though typically, members who are active in a particular subcommittee are eligible to vote.

Exhibit 3-3 graphically illustrates the ASC X12 Standards Approval Process.

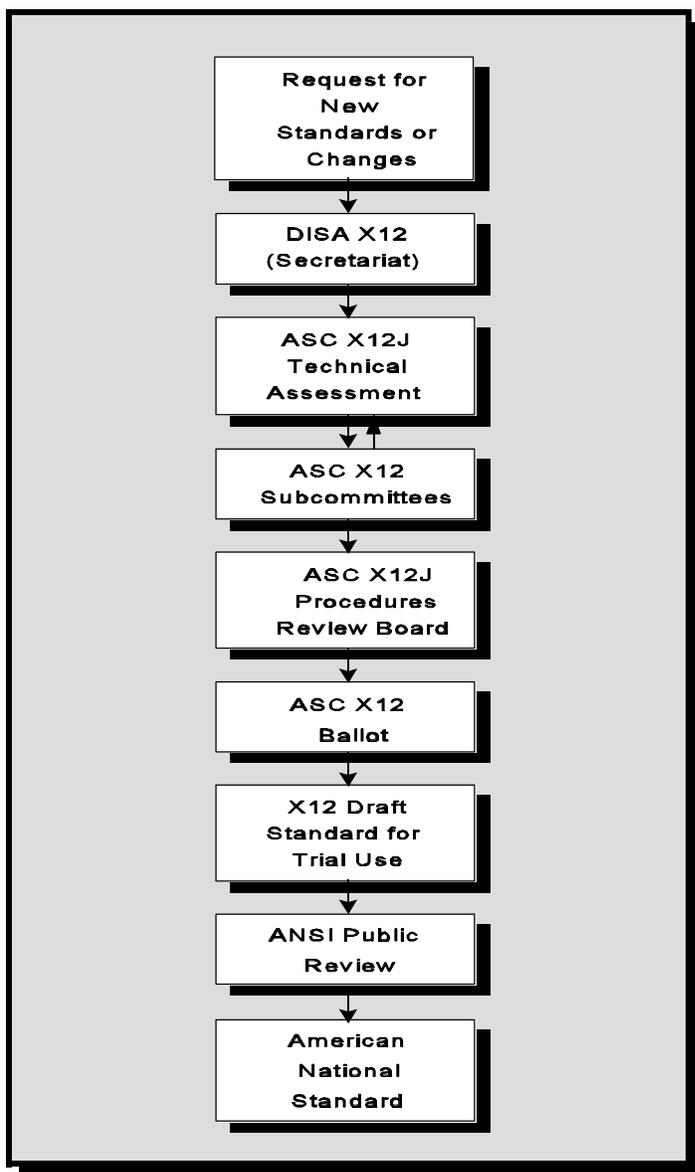


Exhibit 3-3: ANSI ASC X12 Standards Approval Process

3.3.4 ASC X12 PUBLICATION SCHEDULE

Each year, DISA publishes the entire set of ASC X12 standards in draft format, in what is known as a version/release. Each version/release includes revisions to previously published draft transaction sets and new draft transaction sets that were approved by ASC X12 during that year, and is uniquely numbered. The following is an example of the manner in which ASC X12 releases are numbered:

◆	Version 2, Release 0	ANSI 1986	(002000)	superseded
◆	Version 2, Release 1	X12	08/87	(002001)
◆	Version 2, Release 2	X12	08/88	(002002)
◆	Version 2, Release 3	X12	04/89	(002003)

It should be noted that different releases are not necessarily upward or downward compatible, and it is important to determine the version and release of the standards that will be used, before embarking on an EDI implementation effort.

At three-year intervals, the latest release is reviewed by the ASC X12 subcommittees, who select appropriate draft standards and submit them to ANSI to begin the national public review process for their elevation to American National Standards. Standards that pass public review and are approved by ANSI, are published as American National Standards.

DISA also separately publishes other documents, such as ASC X12 technical reports and guidelines.

3.4. UN/EDIFACT STANDARDS FOR EDI MESSAGES

In 1986 the United Nations Economic Commission for Europe (UN/ECE) began developing the United Nations EDI for Administration (Government or Public Administration), Commerce and Transport (UN/EDIFACT) standards. These standards comprise of a set of internationally agreed-upon messages, directories, and guidelines for the electronic interchange of structured data that relates, in particular, to the trade of goods and services.

3.4.1 STANDARD DEVELOPMENT AND APPROVAL PROCESSES

The UN/ECE is responsible for all activities relating to the development and approval of EDIFACT standards. The UN/ECE includes countries of Eastern and Western Europe, several Asian republics, as well as the United States and Canada. Other members of the UN are entitled to participate in this process under Article 11 of the UN Charter. Within the UN/ECE's Committee on the Development of Trade, trade facilitation activities are undertaken by the Working Party on Facilitation of International Trade Procedures (WP.4), and within WP.4, the

GE.1 group (UN/ECE WP.4 Experts on Data Elements and Automatic Data Interchange) is responsible for the development of the global UN/EDIFACT standards.

Standard setting activities are executed by a group of rapporteurs who are nominated by country governments and appointed by WP.4. These rapporteurs are required to set up the appropriate machinery and facilities in their regions, including the appointment of a local Rapporteur's Team secretariat.

The Pan American EDIFACT Board (PAEB), one of six regional EDIFACT Boards in the world, is the official coordinating body of UN/EDIFACT activity in the Pan American Region. The Delegate Liaison Task Group (DLTG) coordinates Pan American UN/EDIFACT standards developments, proposals, and comments. Members are official representatives of national EDI standard setting bodies within Pan America and are authorized to act as official spokespersons for the organizations they represent. The DLTG has 13 message Design Groups dedicated to standards development and maintenance in the following areas:

- ◆ JMD Name
- ◆ JM1 Material Management
- ◆ JM2 Purchasing
- ◆ JM3 Product & Quality Data
- ◆ JM4 Transport
- ◆ JM5 Customs
- ◆ JM6 Finance
- ◆ JM7 Construction
- ◆ JM8 Statistics
- ◆ JM9 Insurance
- ◆ JM10 Travel,, Tourism,, Leisure
- ◆ JM11 Health Care
- ◆ JM12 Social Administration/Employment
- ◆ JM13 Network Administration

3.5. IMPLEMENTATION CONVENTIONS

While the ANSI and EDIFACT standards establish the basic structure of EDI messages, they do not specify the exact contents of a message between two trading partners. For example, in a purchase order, the standards allow for a product to be identified through the use of a product identification code, but do not specify which code should be used. Such decisions are left to individual trading partners. Therefore, trading partners adapt standard transaction sets to their specific needs through the development of Implementation Conventions (ICs).

An IC is a subset of ASC X12 or EDIFACT standards that represents agreement among EDI trading partners on how transaction sets will be used in a specific business context. ICs also adapt the standards to the specific needs of an industry. For example, the ANSI ASC X12 810, Invoice, transaction set may be adapted for use as a Commercial Invoice, a Progress Payment Invoice, or a

Public Voucher. The segments and data used in each of these contexts may be different.

3.5.1 FEDERAL IMPLEMENTATION CONVENTIONS

The Office of Federal Procurement Policy (OFFP) has set up a committee, known as the Federal EDI Standards Management Coordinating Committee (FESMCC), with representatives from a number of agencies. FESMCC is charged with developing implementation conventions and delineating the government interpretation and usage of standards in all functional areas. FESMCC is also responsible for representing government interests at ANSI ASC X12 meetings.

To carry out its role, FESMCC chartered functional workgroups to provide a focal point for the development and maintenance of standards. Currently, there are three functional workgroups:

- ◆ **Financial Functional Workgroup (FFWG):** The Financial Functional Workgroup is an interagency committee that coordinates the development and maintenance of Federal ICs for transaction sets relating to financial activities, such as the 820, Payment Order and the 810, Invoice.
- ◆ **Procurement Functional Workgroup (PFWG):** The Procurement Functional Workgroup is an interagency committee that coordinates the development and maintenance of Federal ICs for transaction sets relating to procurement activities, such as the 850 Purchase Order.
- ◆ **Materials Management Workgroup (MMWG):** The Material Management Workgroup is an interagency committee that coordinates the development and maintenance of Federal ICs for transaction sets relating to supply, logistics and other administrative functions, such as the 870, Order Status Report.

To date, these three workgroups have developed Federal ICs for 14 transaction sets. A list of these sets is presented in Appendix B, Federal Implementation Conventions.

4. EDI TRANSLATION SOFTWARE

An essential component of any EDI implementation is the EDI translation software package, which converts data from a proprietary application system format to a standard EDI format and transmits it to the trading partner. EDI translation software also converts standard EDI messages received from trading partners into a file that can be used to update in-house application systems.

In the process of creating and transmitting EDI messages to trading partners, EDI translation software typically performs the following three functions:

- ◆ **Mapping:** The EDI translation software maps outgoing data from an organization-specific format to an EDI standard format.
- ◆ **Translating:** The EDI translation software converts the mapped data to a format that can be sent to an trading EDI partner, adding all standard enveloping and delimiter protocols.
- ◆ **Communicating:** The EDI translation software dials the network and sends the mapped and translated EDI message to the trading partner.

For incoming messages, the EDI translation software performs the same three functions in reverse. Exhibit 4-1, EDI Translation Process, depicts the process of sending and receiving EDI messages.

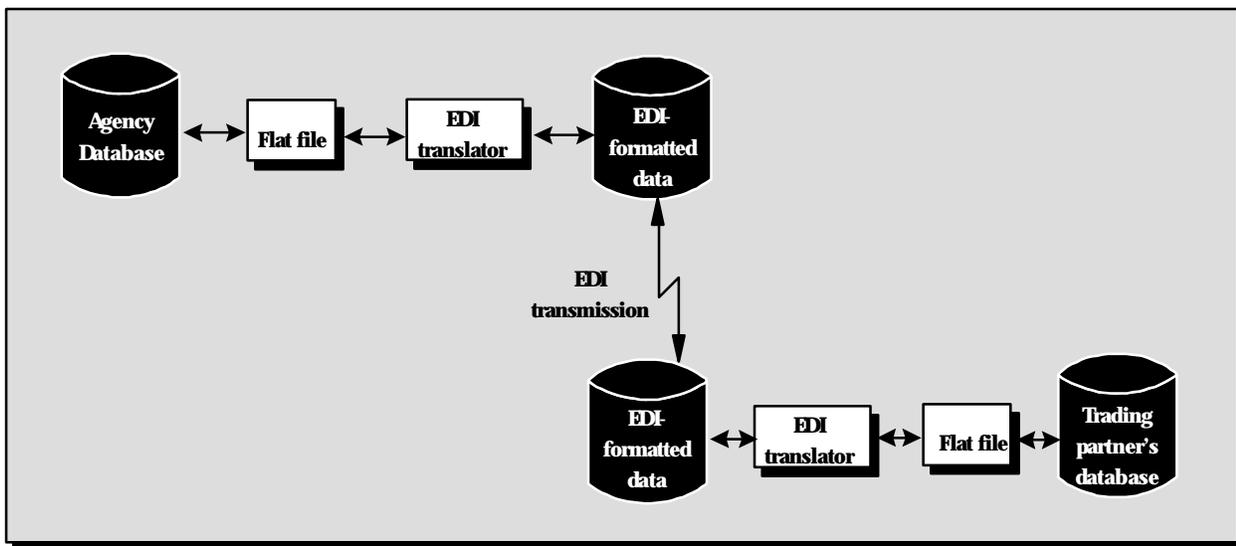


Exhibit 4-1: EDI Translation Process

4.1. EDI Translation Software Alternatives

There are three options available for EDI translation software:

- ◆ **Commercial Off-The-Shelf (COTS) Software:** As the demand for EDI applications has grown in recent years, both the quantity and quality of COTS software packages available today have notably increased. These software packages typically provide full mapping, translation, and communication capabilities and include ANSI ASC X12, EDIFACT, and other EDI standards.

The advantages of using a COTS software package are that these packages are readily available, easy to use, and relatively inexpensive. Software vendors also provide additional services, such as training, if required. However, in-house application systems may need to be modified to accommodate the transfer of data to and from the EDI translation software.

- ◆ **Custom-Developed Software:** The use of custom-developed software has long been the traditional answer to implementing applications at large organizations and government agencies. The development of custom software can be performed internally, outsourced to a third party vendor or consultant, or completed by a combination of internal and external resources.

The main advantage of custom-developed EDI translation software is that it can be created to exactly meet the functional and technical needs of the organization. Moreover, it can incorporate all of an organization's specific business rules and procedures.

The main disadvantage of custom-developed EDI translation software is that the organization will need to devote a considerable amount of financial and human resources to its development. Also, as a custom software development effort must evolve through the entire system development lifecycle, it will take several months longer to implement a custom-developed EDI translation software solution than a COTS software package. The organization will also be responsible for maintaining and enhancing the software when ANSI ASC X12 standards change and if additional transaction sets are needed in future EDI applications.

- ◆ **Integrated EDI Module Available with Application Systems:** With the increasing use of EDI, many third party software vendors have developed EDI modules that are integrated with their procurement, receiving, and financial management software packages. These EDI modules automatically extract the required data from in-house application systems, map and translate it into ANSI ASC X12 transaction sets, and transmit the transaction sets to vendors. Similarly, when vendors send EDI messages, the EDI module accepts the messages from a network, edits and validates the data received, and updates their in-house application systems.

The main advantage of this option is that the EDI module will be integrated with in-house application systems which will simplify the exchange of information with external entities. As such, the organization will not have to incur the cost of modifying its in-house application systems to send and receive data from EDI messages.

However, the cost of acquiring and implementing an application system with an integrated EDI modules can be prohibitive. In addition, not all vendors offer integrated EDI modules with their procurement, receiving, and financial management software packages and, therefore, the organization will have a limited choice of packages to meet its functional and technical requirements.

An organization should, above all, consider the functional and technical requirements of the EDI application being implemented to determine the best alternative.

4.2. EVALUATING AND SELECTING AN EDI TRANSLATION SOFTWARE PACKAGE

The following four-step approach is recommended for evaluating and selecting an EDI translation software package:

1. **Identify EDI Translation Software Requirements and Evaluation Criteria:** The first step in selecting an EDI translation software package is to determine the functional and technical requirements that the package will need to meet. Once a list of requirements has been determined, the organization can compare software packages against it and thereby determine the best alternative.

A list of key features that are typically sought in EDI translation software packages is presented in Section 4.3, Features of EDI Translation Software Packages. An organization should tailor this list to suit the EDI application being implemented.

2. **Identify EDI Translation Software Packages Available:** The next step in selecting a package is to identify all software packages available for the EDI implementation. The source of such lists would depend upon whether a COTS package or an application package with an integrated EDI module is to be implemented. Popular magazines, such as EDI World, and the Logistics Management Institute (LMI) periodically publish lists of software vendors.
3. **Develop Short List of EDI Translation Software Packages:** As the preliminary list of possible EDI translation software packages tends to be fairly long, it would be an extremely time consuming task to evaluate all the packages on this list. Therefore, the preliminary list should be shortened using predetermined criteria. The recommended criteria for this purpose are described below:
 - **Platform:** The organization should first determine on what hardware/technical platform the EDI translation software will run. The choice of platform is generally a function of volume and speed requirements, and system integration needs. A small pilot application may be easily and inexpensively implemented on a Personal Computer (PC) based platform, but data will have to be transferred back and forth to application systems. A UNIX- or mainframe-based package will be much more

expensive and may provide more power and functionality than necessary for a small EDI implementation. The organization should, ensure that the selected hardware platform has adequate processing capacity to handle their peak volumes. There should also be an easy path for upward migration on both the hardware and the EDI translation software.

- **Mapping, Translating, and Communicating:** The EDI translation software package should, at the very least, provide mapping, translating, and communication functionality. Some packages do not have communications capabilities and require the purchase of a separate software package for this purpose.
- **Installed Base:** The installed base is the number of copies of the software package that are currently in use. A high installed base provides an indication of the stability and soundness of both the vendor and the EDI translation software package.

The organization should contact software vendors to obtain the above listed information from them. The results of the short listing process may be documented using a table such as the one presented in Exhibit 4-2, Sample EDI Translation Software Package Short List.

Vendor Name	Software Package Name	Operating Systems Supported	Mapping, Translating, Communicating	Installed Base	Notes
Vendor 1	Package 1	DOS, UNIX	YES	750	
Vendor 2	Package 2	Windows	YES	25	UNIX version in test
Vendor 3	Package 3	DOS, Windows	YES	4,500	Migration path available from DOS/Windows version to UNIX
	Package 4	UNIX	YES	2,500	

Exhibit 4-2: Sample EDI Translation Software Package Short List

4. **Compare EDI Translation Software Packages and Make Final Selection:** The organization should then undertake a more detailed evaluation of the EDI translation software packages remaining on the short list based on the requirements determined in Step 1. Vendors should be contacted to obtain literature and evaluation copies of their packages. The results of this analysis should be documented in a table such as the one presented in Exhibit 4-3, Sample EDI Translation Software Package Evaluation Matrix. The organization should select and implement the EDI translation software package that best meets their requirements.

Vendor Name	Vendor 1	Vendor 2	Vendor 3	Vendor 4	
Software Package Name	Package 1	Package 2	Package 3	Package 4	Package 5
Hardware Platforms Supported					
User Friendly					

Vendor Name	Vendor 1	Vendor 2	Vendor 3	Vendor 4	
Software Package Name	Package 1	Package 2	Package 3	Package 4	Package 5
EDI Standards - ANSI ASC X12 - EDIFACT					
Mapping and Translating - Code conversion - Non-standard codes - Constants - Computed fields - Multiple maps - Speed - Error handling					
Different Maps for Each Trading Partner					
Communications - Communications Capability - VAN compatibility - Multiple VANs - FACNET					
Data Edits and Validations					
Message Routing					
Flat File Interfaces					
Screen Interface					
Data Edits and Validations					
Document Turnaround					
Message Routing					
Encryption					
Trading Partner Profiles					
Document Validation, Acknowledgment, and Reconciliation - FA creation - FA reconciliation					
Security					
Archiving - Automatic - Retrieve Outgoing - Retrieve Incoming					

Vendor Name	Vendor 1	Vendor 2	Vendor 3	Vendor 4	
Software Package Name	Package 1	Package 2	Package 3	Package 4	Package 5
Unattended Mode - Data transmission - Mapping/translating - Archiving					
Reports - Translation - Trading Partner - Unattended operations					
Documentation					
Installed Base					
Vendor Services - Software support - 800 number - Standards upgrades					
Price - Package price - Annual maintenance fee - Standards Upgrades - Cost of platform Upgrades - Vendor training charges - Vendor support charges - Vendor support includes					
Available through GSA Schedule					

Exhibit 4-3: Sample EDI Translation Software Package Evaluation Matrix

4.3. FEATURES OF EDI TRANSLATION SOFTWARE PACKAGES

Presented below are key features that an organization should consider when comparing and evaluating EDI translation software packages:

1. **Hardware Requirements:** EDI translation software can operate on a variety of platforms such as a PC, UNIX-based system, and mainframe. An organization should carefully assess its current and future information needs to determine its hardware requirements. Many software vendors will offer assistance in this task.
2. **User Friendly:** EDI translation software should be user friendly and easy to use for both experienced and inexperienced users.
3. **EDI Standards:** The EDI translation software should have the ability to support the following standards at a minimum:
 - ANSI ASC X12 (multiple versions)
 - EDIFACT (multiple versions)
4. **Mapping and Translating:** The EDI translation software should be capable of mapping and translating application system data to and from EDI standard transaction sets.
5. **Different Maps for Each Trading Partner:** The EDI translation software should be able to maintain and translate documents using different maps for each trading partner. This feature is particularly important when trading partners use different implementation conventions for the same transaction set.
6. **Communications:** The EDI translation software should have the ability to communicate with trading partners through a leased line or dial up connection via the following:
 - Major commercial Value Added Network (VANs)
 - Federal Acquisition Computer Network (FACNET) through Network Entry Points (NEPs)
7. **Data Entry Interfaces:** The EDI translation software should have the following data entry interface capabilities:
 - **Flat File Interface:** The EDI translation software should have the ability to accept data from in-house application systems as a flat ASCII file and reformat it into a standard EDI transaction set. Similarly, it should be able to accept incoming EDI messages from trading partners and translate them into a flat ASCII file for use by in-

house application systems. The organization should be able to specify the layout of the flat ASCII files for incoming and outgoing EDI message data.

- **Screen Interface:** The EDI translation software should allow users to enter data through formatted data entry screens. The data should be edited according to user specifications and converted to the appropriate standard EDI transaction sets. The EDI translation software should also allow users to view incoming messages using formatted screens.
- 8. Data Edits and Validations:** The EDI translation software should be able to validate both incoming and outgoing (screen-entered and flat file data) against ANSI ASC X12 formats and user-defined data edits. Such edits may include checking code qualifier fields against a subset of the ANSI ASC X12 codes and calculated fields.
 - 9. Document Turnaround:** The EDI translation software should have the capability to use data from an incoming transaction set to create a new outgoing transaction set. For example, the user should be able use data from an incoming response to request for quotation transaction set to automatically fill in similar fields on an outgoing purchase order. The EDI translation software should also allow the user to add data, such as the ship to address, to the new transaction set as necessary.
 - 10. Message Routing:** The EDI translation software should have the ability to route both incoming and outgoing messages to their proper destination. For example:
 - An incoming invoice transaction set should automatically be routed to the finance system, while a ship notice transaction set should be routed to the receiving system.
 - The user should be able to specify that a purchase order is to be sent to a single vendor via a VAN, or broadcast to the entire vendor community via FACNET.
 - 11. Encryption:** The EDI translation software should be able to encrypt outgoing messages using appropriate government or user-specified standards. It should also allow users to receive encrypted messages and decipher them correctly.
 - 12. Trading Partner Profiles:** The EDI translation software should be able to accept trading partner profile information via a flat file interface. This is particularly important if a large number of trading partners are to be set up within the software.
 - 13. Document Validation, Acknowledgment, and Reconciliation:** The EDI translation software should be able to check the syntax of an incoming transmission for compliance with the appropriate EDI standards, and automatically send and receive functional acknowledgments. It should also be able to produce simple reports listing outgoing and incoming transmissions with functional acknowledgments, so that users can identify messages that have not been acknowledged.

- 14. Security:** The EDI translation software should allow organizations to create IDs and passwords to control access to the software. The EDI translation software should also allow organizations to control access to specific functions within the software, such as setting up new trading partners and printing reports.
- 15. Archiving:** The EDI translation software should allow users to archive received and transmitted documents or files for a user-defined period of time. The EDI translation software should also allow archived files to be easily retrieved, updated, and retransmitted in the event of a system failure.
- 16. Unattended Mode:** The EDI translation software should be able to map, translate, send, and receive data using a predefined schedule without support staff present during non-business hours.
- 17. Reports:** The EDI translation software should have the ability to produce formatted or ad hoc hardcopy reports of outgoing and incoming transmissions. Users should be able to print reports of partially updated transaction sets, as well as transaction sets that have been sent or received. These reports should also list any errors and exceptions with an appropriate message.
- 18. Documentation:** User manuals should be provided by the vendor along with the EDI translation software. The user manuals should provide information on how to perform all functions, as well as how to investigate and resolve errors.
- 19. Installed Base:** The installed base is the number of copies of the software package that are currently in use. The organization should select a package with a reasonably high installed base as this provides an indication of the stability and soundness of both the vendor and the software.
- 20. Vendor Services:** The vendor should provide the following services:
 - **Training:** Training includes classroom education sessions, online tutorials, workbooks, and any other materials requested by the organization. While most PC-based packages are fairly simple to install and use, it would be desirable to have training available.
 - **Support:** The support services provided by the vendor should include trained personnel to assist in solving software-related problems via telephone or on-site visits.
- 21. Price:** The organization should purchase EDI translation software that meets their functional and technical requirements at the best possible price. The following information should be considered in determining the total cost of an EDI translation software package:
 - Government or commercial (as appropriate) list price for a single copy license

- Annual maintenance fees
- Cost of standards upgrades
- Cost of upgrades (e.g., from a PC-based platform to a UNIX environment)
- Vendor training and support changes
- Other miscellaneous costs

22. Availability through GSA Schedule: The EDI translation software should be available through a GSA schedule, if the organization is a government agency.

An organization should examine each of the features described above, and determine which ones are required for their particular EDI application. It should also classify the selected features as mandatory or desirable. EDI translation software packages that do not have one or more of the mandatory features may then be eliminated from further analysis, and the remaining packages can be compared on the availability of desirable features.

5. COMMUNICATION NETWORKS

EDI documents are transmitted electronically through phone or data lines from one computer to another. If two entities are to successfully exchange electronic documents with each other, they must conform to a mutually acceptable set of communication conventions. In this section we will discuss the communications options available. A discussion of those options is presented below, along with relative advantages and disadvantages for each one.

5.1. COMMUNICATION NETWORK ALTERNATIVES

There are five options available for transmitting EDI documents:

- ◆ **Direct Connect:** Organizations may communicate EDI messages by providing direct connects to their systems for their trading partners. In this case, a trading partner would dial directly into an organization's EDI gateway and transmit their EDI transaction sets.

The advantage of this option is that the start up cost is low, provided that existing equipment can be used. However, if more than a few trading partners use direct connects, the cost of additional manpower, equipment, and technical expertise necessary to install, maintain, and support the trading partners would be significant.

- ◆ **Value Added Networks (VANs):** A third party network, also known as a value added network or VAN, serves as an intermediary between trading partners. A VAN is an electronic service provider that receives, stores, and transmits EDI and other electronic messages for trading partners. VANs support multiple types of communications hardware and software configurations, thereby reducing an organization's burden to establish individual computer connections with each of its trading partners.

There are many advantages to using a VAN. First, an organization will only have to implement one connection to the VAN through which all messages will be sent and received. Second, VANs are considered to be extremely reliable and secure for EDI transmissions, and are readily available through several large firms on a 24-hour basis. These firms offer a variety of protocols and speeds for connecting to their networks, and provide procedures and personnel to handle routine maintenance, problems, and user support.

The disadvantage of using a VAN is that even though the cost is relatively low, small trading partners may still find it to be financially burdensome.

- ◆ **Value Added Services (VASs):** A VAS is similar to a VAN, except that a VAS provides additional services, such as consulting and training. VASs vary widely both in terms of the services they provide and their fee structures.

VASs offer all the advantages of VANs, as described above. Furthermore, the consulting and training offered by VASs enable smaller organizations to implement EDI in a more timely manner. However, it should be noted that the cost of using a VAS is higher than that of a

VAN. While all organizations may not need the level of assistance and service provided by a VAS, they would be required to pay for it regardless.

- ◆ **The Federal Acquisition Computer Network (FACNET):** FACNET is a communications network that is designed to allow Federal agencies to inform the public about federal contracting opportunities, permit electronic submission of bids and proposals, and facilitate responses to questions regarding solicitations. FACNET is accessible to registered vendors via a personal computer (PC) and modem. FACNET consists of two subcomponents - Network Entry Points (NEPs) through which Federal agencies would transmit their documents, and third party communication networks (VANs and VASs) from whom vendors would retrieve these documents.

The advantage of using FACNET is that Federal agencies are currently being charged \$1,500 each month for communicating through FACNET, regardless of their volume of transactions. This makes FACNET a relatively inexpensive method of communication, especially as an agency's transaction volume increases. In addition, a Central Contractor Registration (CCR) database has been established to maintain information on registered government vendors. There are currently over 2,500 vendors listed in the CCR database, and the user will have the ability to broadcast RFQs to, and obtain competitive price quotes from, this vendor base.

The disadvantage of using FACNET is that it is designed for acquisition-related messages and may not be suitable for other types of EDI transmissions. Also, recent issues have been raised as to the reliability of transmissions through FACNET. FACNET users have found that the NEPs are often not accessible and that messages are sometimes misdirected or dropped. In addition, users have to contact the NEP, which in turn contacts the VAN, thus adding an extra layer of support requirements and time to solve problems. Finally, it should be noted that FACNET may not be cost effective for agencies with low volumes of transactions, and that some of the networks participating in FACNET levy higher fees on government trading partners utilizing their services than their private sector customers.

- ◆ **Internet:** The Internet is an open, global network with over 70,000 participating networks that transfer messages to each other. The Internet supports a wide range of applications such as electronic mail, bulletin boards, file transfer, database searches, and the World Wide Web. The individual networks are owned and managed by educational and commercial institutions for the most part, but there is no supervision of the Internet as a whole.

The advantages of using the Internet are that the cost of transmitting messages over the Internet is relatively low, and that the Internet has a wide outreach as there are currently over 2 million Internet users in North America. In addition, there are many third party service providers (e.g., CompuServe, America Online) who enable users to connect to the Internet. These services can be accessed through a variety of protocols and typically require only a simple communications software package.

The disadvantages of using the Internet are that it does not use ANSI X12 message and envelope standards, and therefore, only a few organizations use it for transmitting EDI

messages. The Internet does not enforce any uniform standard of security across participating networks, and data that is transmitted over the Internet can be accessed by unauthorized parties. Special security measures, such as firewalls and encryption, are needed for transmitting EDI messages over the Internet. Moreover, as there is no single entity that manages and operates the Internet, the reliability of transmissions tends to be low, and there is no accountability for dropped or misdirected messages.

5.2. EVALUATING AND SELECTING A COMMUNICATION NETWORK

The following four-step approach is recommended for evaluating and selecting a communications network to transmit EDI documents:

- 1. Identify Communications Network Requirements and Evaluation Criteria:** The first step in selecting a communications network is to determine the functional and technical requirements that the network will need to meet. Once the requirements have been determined, the organization can compare networks against them and determine the best alternative.

A list of key features that are typically sought in a communication network is presented in Section 5.3, Features of Communications Networks. This list should be tailored to suit the EDI application being implemented.

- 2. Select Network Option:** The next step in selecting a communication network is to identify and analyze the different network options that are available. The preceding section provided some information on the major network options that are available to organizations implementing EDI. These options should be compared to the functional and technical requirements of the EDI application and the organization should select the most suitable alternative.
- 3. Develop List of Network Service Providers:** Once the network option has been decided upon, the agency should identify the sources from which network services may be obtained. Popular EDI magazines, such as EDI World, periodically publish lists of VANs.
- 4. Compare Network Service Providers and Make Final Selection:** The user should then undertake a more detailed evaluation of the network service providers based on the requirements determined in Step 1. The service providers should be contacted to obtain literature and other relevant materials. The results of this analysis should be documented in a table such as the one presented in Exhibit 5-1, Sample EDI Network Evaluation Matrix. The network service that best meets the organization's requirements should be selected for the EDI implementation. The service provider should then be contacted and appropriate arrangements should be made to subscribe to the service. Most network service providers will have a sign-up form that will have to be completed. In addition, the user should ensure that a data confidentiality agreement is executed with the network service provider.

Vendor Name	Vendor 1	Vendor 2	Vendor 3	Vendor 4
Network Name	Network 1	Network 2	Network 3	Network 4
EDI Standards Supported - ANSI ASC X12 - EDIFACT				
Communications Protocols Supported - Asynch (9600 - 28,800 bps) - Bisynch				
Accessibility - Local number - Toll-free number				
Availability				
Reliability				
Security - User IDs and passwords - TP authorization - Encryption standards supported - B2 security supported				
Data Confidentiality				
Network Used by Trading Partners				
Network Use for Similar Applications				
Connections to Other Networks				
Backup and Recovery				
Reports - Message Transmission Log - Message Receipt Log - Authorized Trading Partner List				
Translation Services				
EDI-to-Fax Service				
Network Users				
Vendor Services - Help Desk Hours - Toll-free number access				
Price - Set-up fees - Mailbox fees - Interchange transmission charge - Character transmission charge - Translation service charge - EDI-to-fax charge - Vendor support includes				

Vendor Name	Vendor 1	Vendor 2	Vendor 3	Vendor 4
Network Name	Network 1	Network 2	Network 3	Network 4
Available through Federal Contract				

Exhibit 5-1: Sample EDI Network Evaluation Matrix

5.3. FEATURES OF COMMUNICATION NETWORKS

Presented below are key features that need to be considered when comparing and evaluating communications networks.

1. **EDI Standards Supported:** The communications network should have the ability to support the EDI standards (e.g., ANSI ASC X12, EDIFACT) selected for the application. This will enable the user to address and transmit messages from within the translation software package.

2. **Communications Protocols Supported:** The communications network should have the ability to support, at a minimum, the following communications protocols:
 - Asynchronous (1200 to 28800 bps)

 - Bisynchronous (2400 to 9600 bps)

 - Synchronous (9.6 to 56 kb)

3. **Accessibility:** The communications network should be accessible through a local phone number or a toll-free number. This will eliminate agencies and their trading partners having to pay an additional long-distance charge for using the network.
4. **Availability and Reliability:** The communications network should be available 24 hours a day, 7 days a week for sending and receiving EDI messages. The service provider should provide information on scheduled downtime, as well as the amount of unscheduled downtime for the past year. The communications network should also be reasonably reliable, in that messages should reach the recipient intact, within a period of time acceptable to the user. The user should be able to trace messages as they travel over the network and obtain confirmation of receipt if desired.
5. **Security:** The communications network should provide security features that meet the needs of the EDI application being implemented. At a minimum, access to the network should be restricted to authorized users through the use of identification numbers and passwords. The communications network should also allow the agency to specify who it may exchange messages with to avoid "electronic junk mail". If the EDI application being implemented has a higher level of security requirements, the agency should define such requirements clearly and ensure that the network can meet them.
6. **Data Confidentiality:** If the data contained in the EDI messages being exchanged is subject to the Freedom of Information Act or the Privacy Act, the agency should ensure that the communications network is capable of protecting the confidentiality of the data. This is also a very important consideration for EDI applications that involve the transfer of money.
7. **Connections to Other Networks:** The communications network should have the ability to connect with other networks, so that messages can be sent to and received from trading partners who already subscribe to other networks.
8. **Networks Used By Trading Partners or for Similar Applications:** If a large number of the agency's trading partners use a particular communications network, the user should consider selecting the same network, thus saving it the effort and cost of establishing connections between networks. The agency should also poll other organizations with similar EDI applications to determine whether a particular communications network is mandated or considered highly suitable for that application.
9. **Backup and Recovery:** The communications network should provide adequate backup and recovery of EDI messages while they are in transit over the network or being stored for subsequent retrieval by trading partners. These features indicate the extent to which the network is fault tolerant, the amount of downtime it has, and whether it has sound backup and recovery procedures in place to deal with unexpected problems.
10. **Reports:** The communications network should provide users with reports and logs to assist them in resolving problems, tracing EDI messages, and tracking costs. These

reports and logs should be easily accessible in electronic or hardcopy format, upon demand by the user.

11. **Translation Services:** The communications network should provide translation services to allow smaller organizations to implement the EDI application without having to acquire their own EDI translation software packages. The communications network would convert EDI messages destined for a small organization into a flat file that the organization could download. Conversely, the communications network would receive and convert a flat file from a small organization into EDI messages to be sent to its trading partners.
12. **EDI to Fax Services:** The communications network should allow the user to transmit messages to a trading partner's fax machine upon demand. This is a particularly important feature if many of the trading partners are smaller organizations that are not EDI-capable.
13. **Number of Communications Network Users:** The number of communications network users is the number of users or mailboxes that are currently using the network. The user should select a communications network with a large number of users, as this provides an indication of the reliability and robustness of the network.
14. **Vendor Support Services:** The communications network service provider should maintain a help desk that has trained personnel who can assist in solving network related problems. The help desk should be accessible by telephone 24 hours a day, 7 days a week. The vendor should provide information on help desk call volumes, and the amount of time it takes to respond to calls and to resolve problems.
15. **Cost:** There are fees and charges associated with EDI network services that vary among service providers. Presented below are some of the common fees and charges associated with VANs and VASs:
 - Set up fees (or one-time fees)
 - Mailbox charges
 - Interchange or message transmission fee
 - Transmission cost

- Translation service charge
- EDI-to-Fax Charge

The above list is not exhaustive, and network service providers should be contacted directly to obtain a complete and current price list.

- 16. Availability Through a Government Contract:** The agency should check previously executed government contracts, such as FTS2000, to determine if it is possible to obtain EDI network services through them at a reasonable cost. This will save the agency the effort of negotiating and executing their own network contract.

The agency should examine each of the features described above, and determine which ones are required for their particular EDI application. They should also classify the selected features as mandatory or desirable. Communications networks that do not have one or more of the mandatory features may then be eliminated from any further analysis, and the remaining networks can be compared on the availability of desirable features.

6. EDI IN THE PROCUREMENT PROCESS

As stated in previous sections of this document, EDI and EFT are most widely used by Federal agencies in the process of procuring and paying for goods and services. The Federal Acquisition Streamlining Act (FASA) of 1994 mandated the use of EDI for exchanging information with vendors, and agencies started to acquire and implement EDI within their procurement functions. While many of these agencies have been successful in implementing small pilot systems with a few of their vendors, the main barrier to the growth of EDI usage is the vast number of vendors with whom the government conducts business. Most agencies have been unable to get beyond pilot implementations, as they find that ramping up thousands of trading partners is a daunting task that they lack resources to undertake. This is further complicated by the fact that many of the vendors that the government deals with are technically unsophisticated, small businesses, that require a great deal of assistance to become EDI-capable.

In 1996, Congress passed the Federal Acquisition Reform Act (FARA), which states that all Federal agencies may use simplified acquisition procedures for purchases under \$100,000 from August 26, 1996 onwards, but will have until December 31, 1999 to implement EC. While this has caused some agencies to put their EDI and EC programs on hold, others have realized that EDI offers them an excellent opportunity to reduce costs and streamline their procurement process, and are continuing their efforts to implement this technology.

This section presents some of the recent trends in the use of EDI and EFT in the Federal procurement process, and a recommended technical approach for implementing EC.

6.1. TRENDS IN THE USE OF FACNET

The Federal Acquisition Computer Network (FACNET) was described in detail in Section 5, Communication Networks. FACNET was seen as providing the Federal government with a simple means of reaching a larger vendor community and strengthening competition for goods and services procured by the different agencies. FASA mandated the use of FACNET, and only those agencies that complied were allowed to use simplified acquisition procedures for purchases between \$50,000 and \$100,000 in value.

FACNET provides agencies with a number of advantages. They receive an increased number of responses that are more competitively priced. In addition, agencies benefit from the reduction in paperwork, data entry effort, and mailing costs. Under the old process of contacting three sources to obtain adequate competition, agencies often had to follow up with the three sources to obtain responses. However, agencies that transmit RFQs through FACNET typically receive 10 to 50 responses, eliminating the need for any manual follow up actions. Also, as vendors are able to respond much faster, the incidence of late bids is expected to decrease.

However, agencies and vendors have encountered a number of problems in trying to exchange acquisition-related documents through FACNET. Some agencies and vendors have reported

that quotes that were sent through FACNET were not delivered to the agency, and award notifications were transmitted to the wrong party. In addition, agencies find that FACNET opens small procurement opportunities to bidders who are unknown to Contracting Officers and who do not perform adequately after the contract is awarded to them.

As a result of these problems and the terms of FARA, agencies are now increasingly using Value Added Networks (VANs) to communicate directly with their vendors, instead of using FACNET. In addition, the Federal Telecommunications Service (FTS2000) contract has been modified to include EDI network services, and agencies can now choose between two commercial VANs (AT&T and Sprint) under this contract.

6.2. CENTRAL CONTRACTOR REGISTRATION (CCR)

Central Contractor Registration (CCR) is a facility by which vendors can register to become Federal government trading partners, and receive and respond to Federal procurement opportunities via FACNET. Vendors use the ANSI X12 838, Trading Partner Profile, transaction set, to send basic information regarding themselves (e.g., name, address, SIC code, and banking information) to a single location, which accepts and maintains vendor information on behalf of all Federal agencies. In the future, it is anticipated that the CCR facility will also track vendor performance, and maintain centralized lists of suspended and debarred vendors that all Federal agencies can access.

CCR provides agencies with the advantage of accurate and up-to-date information on a large number of vendors. It also eliminates the need for vendors to contact each agency separately and provide them with the necessary information.

The Electronic Commerce Information Center (ECIC) provides assistance to vendors in registering with the CCR. Vendors can use their own software to create the 838, Trading Partner Profile, transaction set, or register through World Wide Web (WWW) pages provided by some of the FACNET-certified VANs such as Simplex. The Department of Defense (DoD) is also in the process of developing a means for vendors to register through its WWW home page, and to provide vendors with a diskette-based system that will allow them to fill out the required information using an electronic form and transmit it to the CCR facility.

Currently, there are approximately 2,600 vendors who have registered with the CCR. This only represents a small percentage of the 300,000 vendors who supply goods and services to the Federal government. However, given the uncertainties with the future use of FACNET and Federal EC, many of the CCR-related initiatives have been placed on hold. Agencies that are continuing to pursue the use of EDI for procurement-related activities are relying mainly upon information obtained directly from their vendors.

6.3. GSA ADVANTAGE!

In 1995, GSA established a World Wide Web site on the Internet and implemented the GSA Advantage! system. Authorized vendors can place catalogs of their products and price lists on

the GSA Advantage! Web site using 832, Price/Sales Catalog, and 864, Text Message, transaction sets transmitted to GSA via FACNET. Purchasers in Federal agencies can access GSA Advantage! and browse through the vendor catalogs. They can then download the information to their application systems, place an order online through GSA Advantage! or place an order through their own purchasing system. Orders that are placed through GSA Advantage! are transmitted to vendors as EDI transaction sets via FACNET. The vendor will ship the items to the appropriate agency and send an EDI invoice to GSA via FACNET, or charge the ordering agency's credit card if authorization has been granted by the agency. Agencies that choose to place their own orders can use either EDI or traditional paper documents.

To date, GSA has contacted vendors who have products on the following schedules and implemented them on the GSA Advantage! system:

- ◆ Schedule 70 A and 70 B, Computers/Software
- ◆ Schedule 58 V A, Disks, Media
- ◆ Schedule 56 IV A, Construction and Building Materials

GSA plans to contact vendors on the remaining 100+ schedules and transition them to the GSA Advantage! System during Fiscal Years 1997 and 1998.

In addition, GSA has developed a software package, GSA Advantage! In a Box, and started distributing it to agencies in August 1996. This software will enable agencies to browse through vendor catalogs and price lists, and order products, but will use a phone line to access the GSA Advantage! system, and not the Internet.

6.4. CREDIT CARD PURCHASES

The Federal government is currently promoting the use of government issued credit cards, known as International Merchants Purchase Action Card (IMPAC), for micro purchases (acquisitions under \$2,500 in value), over the more traditional ordering methods, including EDI. This is an extremely significant occurrence, as micro purchases currently account for over 85% of the Federal government's buying activity.

EDI and EFT may be used effectively in receiving monthly statements from credit card companies, and issuing payments to them. The ANSI X12 811, Consolidated Invoice/Service Statement, was created specially for this type of transaction.

6.5. RECOMMENDED TECHNICAL COMPONENTS FOR THE ELECTRONIC COMMERCE MODEL

The technical components of EDI systems, application systems, EDI gateways, and networks, were discussed in earlier sections of this document. Given the uncertainties with the future use of FACNET and CCR, agencies have been seeking alternative technical paths for implementing EC.

This section presents a recommended technical approach to implementing EDI within the Federal procurement function.

- ◆ **Application Systems:** Agencies should select procurement, receiving, and financial management systems that have the capability to interface with EDI systems. They should, at the very least, be capable of sending data to and receiving data from the EDI gateway through file transfers. This will save agencies from having to make a substantial investment of financial and human resources in developing automated interfaces between application systems and their EDI gateways.
- ◆ **EDI Gateway:** If the volume of transactions in the procurement process is typically low, it is recommended that the agency install a PC-based EDI gateway, with a Pentium-based hardware platform and a high speed (28.8K) modem. If the agency has a large volume of procurement transactions, or wants to implement EDI for other functions, it should consider installing a more powerful UNIX or mainframe-based gateway.
- ◆ **Communications Networks:** It is recommended that agencies utilize a combination of communication network options for transmitting procurement-related documents, as described below:

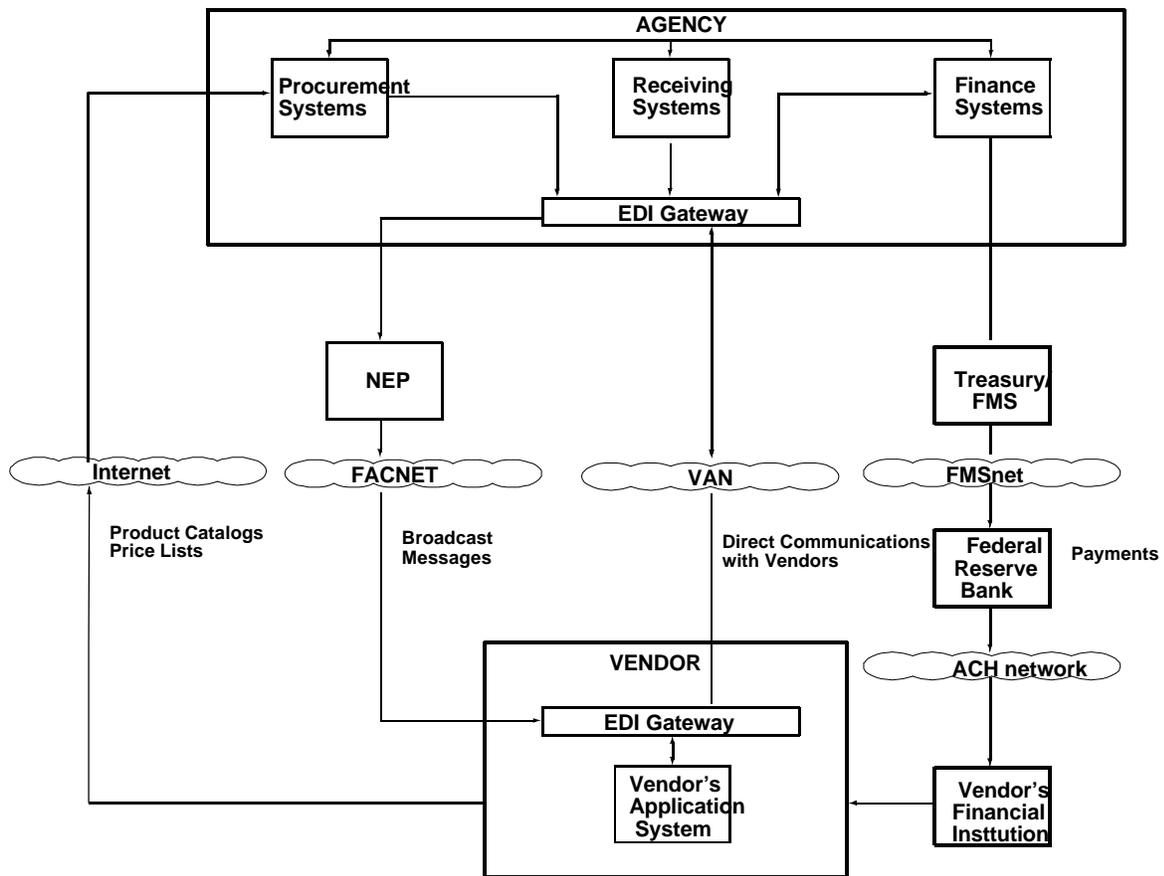
FACNET: FACNET should be used to broadcast RFQs that require competitive bids from a large vendor base.

VANs: VANs should be used for direct communications with individual vendors.

Internet: The Internet should be used for accessing vendor catalogs and price lists.

These network options will provide an optimum combination of speed, reliability, and the ability to reach out to a large vendor community.

Exhibit 6-1, Recommended Components of an EC System, graphically depicts these components.



7. FINANCIAL EDI

There has been a growing trend among private and public sector organizations to complete the electronic business loop by converting their payment and collection systems to financial EDI.

Financial EDI is defined as:

"The electronic transmission of funds and related data through the banking system, using standard formats."

This section provides an overview of electronic funds transfer and financial EDI, Financial Management Service (FMS) financial EDI initiatives, and guidance for implementing financial EDI applications.

7.1. ELECTRONIC FUNDS TRANSFER

Electronic Funds Transfer (EFT) has been used in the public and private sector for many years to transfer funds between organizations, with their financial institutions serving as intermediaries. There are five primary parties involved in an EFT transaction, as described below:

- ◆ **Originator:** The originator is the person or the organization that requests or authorizes the transfer of funds via EFT. Originators authorize their financial institutions to transmit credit or debit entries to the deposit account of the receiver. An example of an originator of an EFT transaction is an organization that initiates payments to a vendor against invoices received.
- ◆ **Originating Depository Financial Institution (ODFI):** The originator's designated financial institution is known as the ODFI in an EFT transaction. In the above example, the organization's bank would be the ODFI. FMS's Regional Financial Centers serve as the ODFI for Federal agencies that make payments through the Department of the Treasury.
- ◆ **Automated Clearing House (ACH) Operator:** The Automated Clearing House (ACH) is a nationwide electronic funds transfer system used by financial institutions, corporations, and consumers. It serves as a central distribution and settlement point for wire transfers and other electronic items exchanged between financial institutions. The ACH has several regional clearing houses that serve member banks and financial institutions in their respective regions. The National Automated Clearing House Association (NACHA) is the regulatory body for the entire ACH system. The Federal Reserve functions as the ACH operator for the U.S. Treasury.
- ◆ **Receiving Depository Financial Institution (RDFI):** The receiver's designated financial institution is known as the RDFI in an EFT transaction. In the above example, the vendor's bank is the RDFI.

- ◆ **Receiver:** The receiver is the person or organization that has authorized an originator to initiate a credit or debit entry, via EFT, to their deposit account. An example of a receiver is a vendor who receives EFT payments into his bank account against invoices sent to a Federal agency

The two options for transferring funds electronically are wire transfer and Automated Clearing House (ACH). These options are described below:

- ◆ **Wire Transfer:** Wire transfer is an electronic payment mechanism that allows quick (same day) funds transfer for corporations and individuals. It is an online, real time, payment system designed primarily to handle large-dollar, time critical, non-repetitive payments or account transfers. This option is designed to move funds and only very limited accompanying information. International and domestic networks offering wire transfer services include CHIPS (Clearing House Inter-bank Payments System) offered by the New York Clearing House Association, and FEDWIRE, provided by the Federal Reserve system.
- ◆ **Automated Clearing House (ACH) Funds Transfer:** ACH funds transfer is a next-day funds settlement system originally designed to handle low-dollar repetitive payments, electronically on a batch basis. ACH funds transfer can accommodate the movement of both funds and information and has become recognized as the most appropriate payment mechanism for financial EDI. Exhibit 7-1, Electronic Funds Transfer, presents a pictorial overview of the manner in which funds are transferred using the ACH funds transfer option.

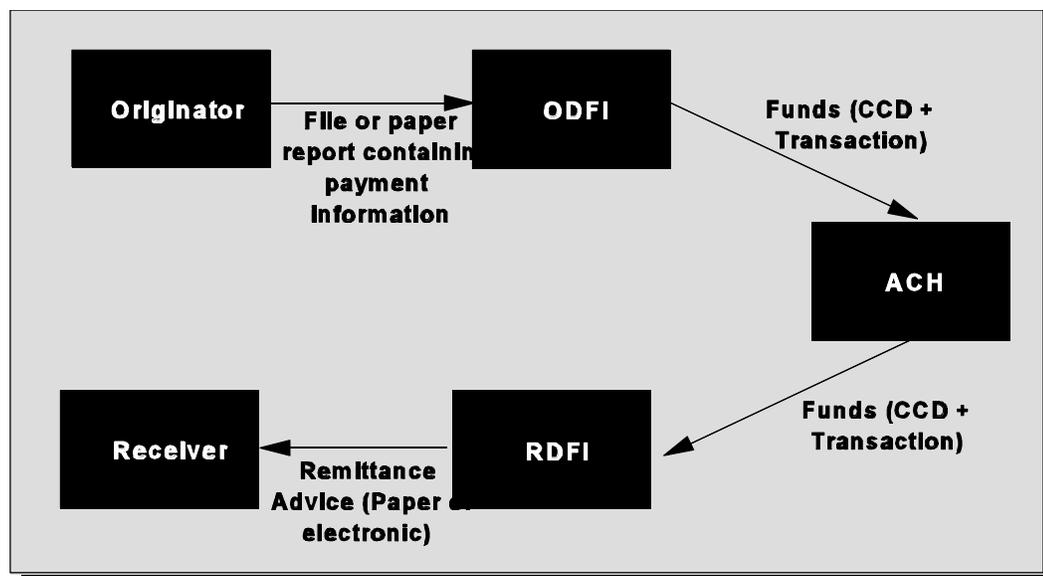


Exhibit 7-1: Electronic Funds Transfer

NACHA maintains and operates an automated network for the transfer of funds and related data. There are a number of formats that can be used to transmit payment transactions over the ACH network, including the following:

- | | | | |
|-------|-------------------------------------------------------------------------------|-------|---------------------------------------|
| ➤ ADV | Automated Accounting Advice | ➤ MTE | Machine Transfer Entry |
| ➤ CCD | Cash Concentration and Disbursement | ➤ POS | Point of Sale Entry |
| ➤ CIE | Customer Initiated Entry | ➤ PPD | Prearranged Payment and Deposit Entry |
| ➤ COR | Automated Notification of Change and Automated Refused Notification of Change | ➤ RET | Automated Return Entry |
| ➤ CTX | Corporate Trade Exchange | ➤ SHR | Shared Network Transaction |
| ➤ DNE | Death Notification Entry | ➤ TRC | Truncated Entry |
| ➤ ENR | Automated Enrollment Entry | ➤ TRX | Truncated Entries Exchange |
| | | ➤ XCK | Destroyed Check Entry |

As this section deals with payments to and collections from commercial entities, only a small subset of the above transactions have been referred to in subsequent subsections. A more detailed description of the relevant transactions is presented below.

- **Cash Concentration or Disbursement (CCD):** The CCD is a credit or debit entry initiated to consolidate or disburse funds and for inter-corporate payments that require minimal descriptive information.
- **Cash Concentration or Disbursement With Addenda (CCD+):** The CCD+ is a CCD payment with a single addendum record of 80 characters. This addendum record is used to communicate payment related information, such as invoice number.
- **Corporate Trade Exchange (CTX):** The CTX is a relatively new format, and is a debit or credit entry initiated by an organization to effect the transfer of funds to or from the deposit account of that organization or another organization. The transfer of funds may be accompanied by up to 9,999 addenda records that relay information formatted in accordance with ANSI ASC X12.5 and X12.6 syntax, an ANSI ASC X12 transaction set containing a BPR or BPS data segment (such as the 820, Payment Order/Remittance Advice), or payment related UN/EDIFACT syntax.

Initially, only the CCD and the CCD+ transactions were used to effect the transfer of funds electronically. But, over a period of time, as EFT usage became more prevalent, organizations found that they were severely limited by the amount of payment information that they were able to attach to the actual payment itself. Many of these organizations began to send payment information separately, by mail or fax, to their payees. This practice, however, resulted in two primary problems - payments could not be processed for several days by the payee until the remittance information reached them and a great deal of manual effort was required to reconcile payments and associated data. Therefore, financial EDI evolved as a solution to these problems.

7.2. FINANCIAL EDI MODELS

As stated earlier, financial EDI transactions involve two components - the transfer of funds and the transfer of related remittance data. There are two models of financial EDI - one where the payment and remittance information are transmitted separately, and another where the two are transmitted together. These two models are described in further detail below.

7.2.1 MODEL 1 - DOLLARS AND DATA SEPARATE

In this financial EDI model, the payor transmits funds through the banking system and the ACH network and sends payment information separately to the payee in an ANSI ASC X12 820, Remittance Advice, transaction set, via a Value Added Network (VAN). The Originator of the payment usually places a key piece of information in the addendum record of the ACH transaction which enables the Receiver to match the payment to its corresponding EDI payment information transaction set. Exhibit 7-2, Dollars and Data Separate, presents a graphical representation of this financial EDI model.

7.2.2 MODEL 2 - DOLLARS AND DATA TOGETHER

Organizations that implemented the “Dollars and Data Separate” model soon realized that, while the payment information arrived in a timely manner and contained enough information to be able

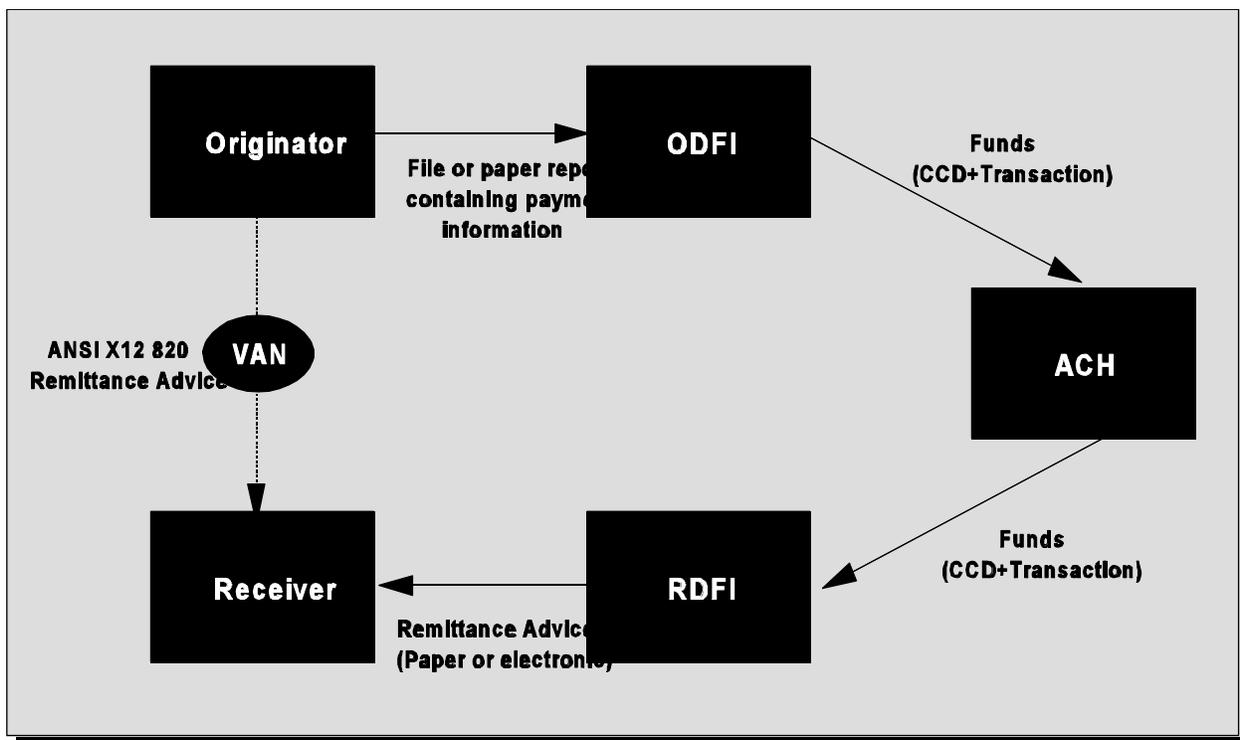


Exhibit 7-2: Model 1 - Dollar and Data Separate

to match it to the payment itself, they still had to make the effort of reconciling the two. This problem gave rise to the second financial EDI model - “Dollars and Data Together”. In this

model, the payor sends a payment along with complete payment information through the banking system and the ACH network. To do this, the payor sends an ANSI ASC X12 820, Payment Order/Remittance Advice, transaction set, to their ODFI via a VAN. The ODFI would use this transaction set to create a CTX transaction, and transmit it to the RDFI through the ACH network. The RDFI would receive and process the CTX transaction, credit the account of the payee and forward the remittance advice to the payee, electronically or by paper. Exhibit 7-3, Dollars and Data Together, presents a graphical representation of this model.

While the “Dollars and Data Together” model represents the ideal method of effecting an electronic funds transfer, it should be noted that many financial institutions are currently unable to handle the addenda records that accompany the CTX transaction and pass the information along to the receiver. However, several vendors have recently released software packages that will enable banks to send, receive and process CTX transactions, and with the availability of these packages, more banks will be able to implement the “Dollars and Data Together” model of

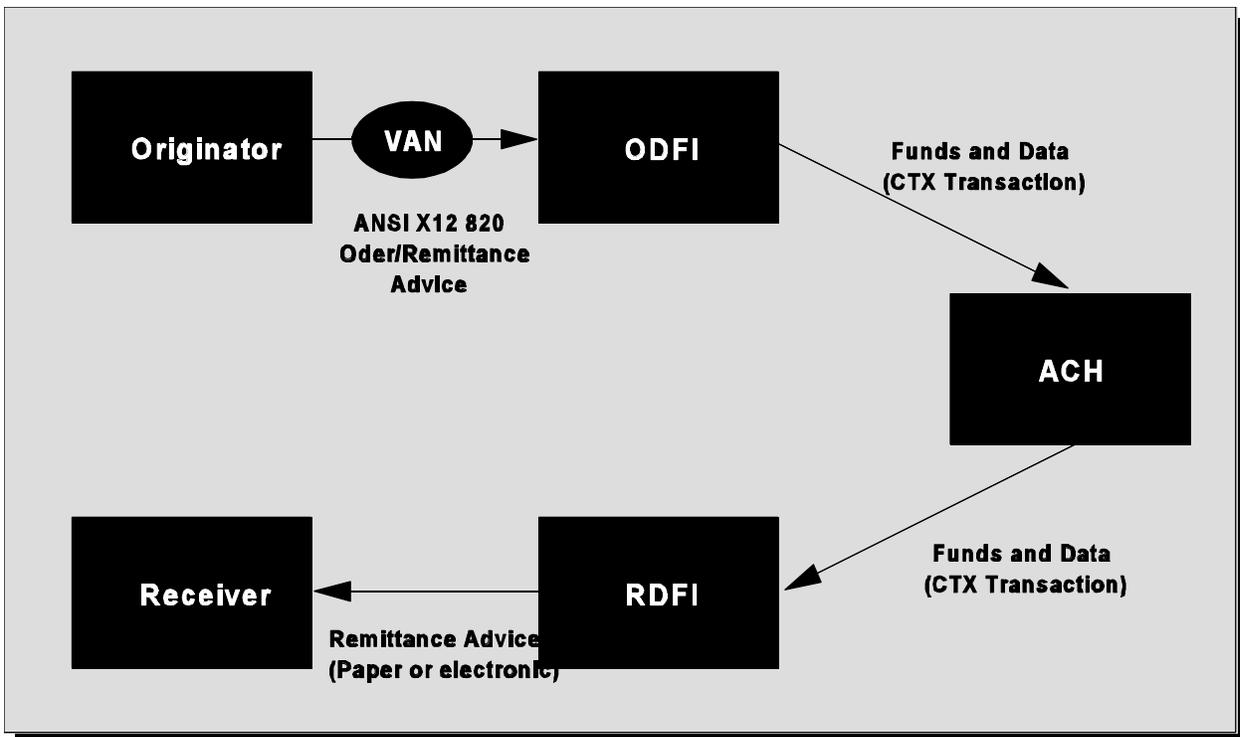


Exhibit 7-3: Model 2 - Dollar and Data Together

financial EDI.

7.3. BENEFITS OF FINANCIAL EDI

An agency or organization has the opportunity to streamline its payment and collection processes by implementing financial EDI. The benefits of using financial EDI are:

- ◆ **Reduced Data Entry Costs and Increased Data Accuracy:** If organizations implement financial EDI and send and receive payment data electronically, manual data entry

of remittance advice information will be reduced or eliminated. This will result in a reduction of data entry errors and lower the cost of processing payments and collections.

- ◆ **Reduced Costs:** Financial EDI will reduce other costs, such as handling, processing, and mailing, associated with paper checks. The Department of the Treasury, Financial Management Service has estimated that the cost of processing a paper check is approximately 40 - 43 cents, while the cost of an ACH payment is approximately 2 to 2.5 cents.
- ◆ **Reduced Document Reproduction and Storage:** Financial EDI will reduce the paperwork involved in payments and collections. For example, by using financial EDI, agencies will no longer be required to produce five (5) part paper SF215 deposit tickets and four (4) part SF 5515 debit vouchers, or store the same for 6 ½ years.
- ◆ **Automation of Reconciliation Process:** As payment information is received in an electronic format in financial EDI, organizations will be able to automate the reconciliation of incoming payments and remittance data to open items in their in-house Accounts Receivable application systems.
- ◆ **Reduced Prompt Pay Interest Payments and Increased Funds Availability:** Decreased data entry and mail float can reduce interest payments if files are generated and submitted at least one day prior to settlement. Reduced or eliminated mail float coupled with fewer processing steps will give agencies quicker access to funds and better data on funds collected.

As a result of these benefits, organizations that incorporate financial EDI in their payments and collection functions will be able to improve control of their investment income and forecast disbursements more accurately.

7.4. FINANCIAL EDI IN THE FEDERAL GOVERNMENT

The Federal government collects and disburses over \$1 trillion annually through 13,000 financial institutions. Multiple collection, payment, and banking systems are currently being used to process agency receipts and payments and capture relevant accompanying data.

In April 1996, the **Debt Collection Improvement Act** was passed by Congress and signed into law by President Clinton. This Act includes a provision for a two-phase implementation of EFT, with Phase One beginning on July 26, 1996. In Phase One, new eligible recipients of Federal payments are required to receive payments by EFT and must provide agencies with the necessary bank account information to effect payments electronically. Phase Two is the all-encompassing implementation of the law, and requires that all Federal payments, with the exception of Internal Revenue Service tax refunds, be made by EFT by January 1999. This law will virtually eliminate the use of paper checks as a payment mechanism by the turn of the century, but will require aggressive implementation programs if agencies are to meet the stated deadlines.

The following sections provide more detailed information on electronic payment and collection mechanisms for Federal agencies, as well as step-by-step approaches for the implementation of these mechanisms.

7.4.1 PAYMENTS

Payments are made by Federal agencies, directly or through the Department of the Treasury, Financial Management Service (FMS), using the following mechanisms:

- ◆ Paper checks
- ◆ Electronic payments

All payments are certified by an authorized Certifying Officer, typically using the Electronic Certification System (ECS), a PC-based stand alone system developed and distributed by FMS. (A more detailed description of ECS is presented in Section 7.4.1.1, Electronic Payment Products and Systems.) Information may be entered manually into ECS or transferred via a diskette from the agency's financial management system. Agencies may choose to enter complete payment detail into ECS, or send payment details to FMS separately via magnetic tape or by FMSnet. In the first case, ECS will produce a certified detail payment file and transmit it to FMS via a dial-up line. In the second case, the agency will make a summary entry into ECS which references the payment detail file that was sent separately to FMS. ECS will produce a summary schedule certification and transmit it to FMS via a dial-up line. In rare instances, agencies also send paper SF1166s, Payment Schedule and Vouchers, requesting and certifying payments.

If the payment and certification files are sent separately, FMS will match the summary schedule certification to the payment file before issuing the payment. Payments are then issued, according to the preferences of the agency, as paper checks that are mailed to the recipients, or as ACH transactions, that are transmitted to the Federal Reserve Bank via FMSnet. A description of FMSnet is presented in Appendix D, Financial Management Service Network Standards Document. It is important to note that FMS acts as the ODFI in these transactions and the Federal Reserve Bank acts as the ACH operator, serving as the entry point into the ACH system.

Exhibit 7-4, Federal Agency Payment Process, presents a pictorial overview of how payments are made by Federal Agencies.

7.4.1.1. ELECTRONIC PAYMENT PRODUCTS AND SYSTEMS

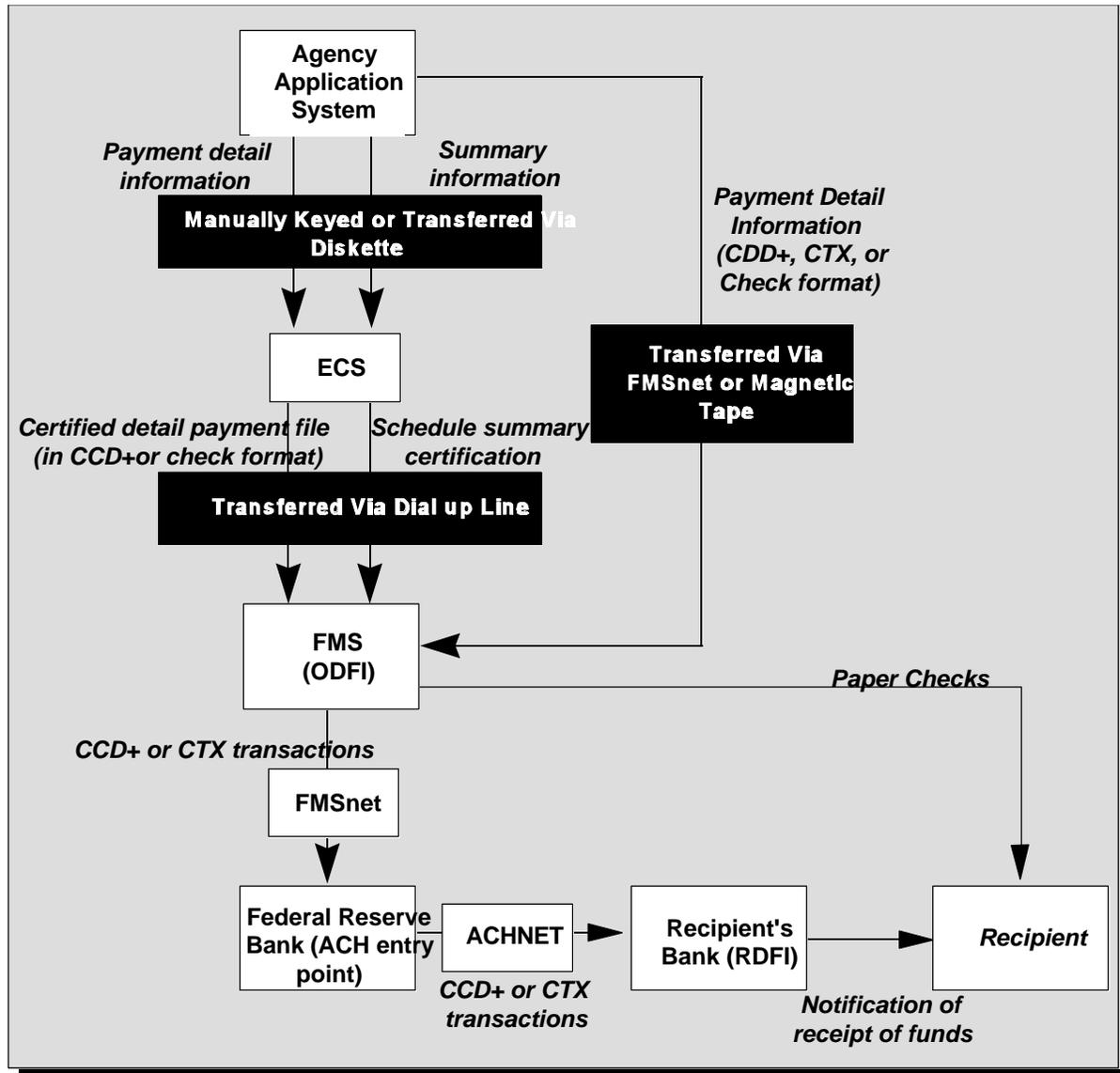


Exhibit 7-4: Federal Agency Payment Process

In an effort to streamline the payment process, FMS has introduced a number of financial EDI products that are designed to decrease the time and cost associated with this function. Presented below are brief descriptions of some of these products.

- ◆ **Electronic Certification System (ECS):** ECS is an automated system for voucher preparation, certification, transmission and verification that replaces the manual OCR paper voucher and signature process. ECS uses a microcomputer to generate voucher schedules, electronically certify the vouchers and transmit them via a dial-up telephone line to a mainframe host computer at the agency's servicing Treasury Regional Financial Center.

Agencies can enter either detail or summary payment information into ECS. If detail payment data is entered, ECS will produce a certified detail payment file. If summary information is entered into ECS, then detailed payment information is sent via a separate file to FMS and the summary in ECS contains a reference to the appropriate file. In this case, ECS will produce a summary schedule certification which is transmitted to FMS via a dial up line. It should be noted that ECS can only process payment detail information in CCD+ format at the current time. Agencies that wish to use the CTX payment format should transmit payment detail information separately to FMS and produce a summary schedule certification using ECS.

The primary advantage of ECS is that it allows agencies to create, certify, and send payment data on a timely basis to FMS and reduces delays associated with mailing of paper forms. It provides positive identification of the certifying officer who authorizes the voucher for payment, and ensures the authenticity of the transmitted data. ECS also detects deliberate or inadvertent manipulation, modification, and loss of data between the time the voucher is certified in the Federal Program Agency microcomputer and the time it is verified by the servicing RFC host computer. At the current time, almost all civilian agencies are using ECS to certify payments.

- ◆ **Vendor Express:** Vendor Express is a payment program that allows Federal agencies to make electronic payments with accompanying remittance data to companies and individuals who provide goods or services to the government, or receive grants or program funds from the Federal government. Agencies using Vendor Express send payment data to FMS, which converts the payments to ACH transactions and transmits them to the Federal Reserve Bank via FMSnet. The Federal Reserve Bank transmits the payments through the ACH network to the payee's financial institution. Remittance data that is placed in the addenda records of the ACH payment transaction is forwarded to the payee by the payee's financial institution.

In the past, Vendor Express utilized the CCD+ payment format. However, due to the fact that this format only allows for one addendum record with 80 characters of remittance information, Vendor Express payments were limited to single invoices. Subsequently, Vendor Express has been enhanced to accommodate the CTX payment format, enabling agencies and FMS to send one CTX payment to cover multiple invoices.

In addition to the methods described in the previous section, FMS can accept payment data as ANSI ASC X12 820, Payment Order/Remittance Advice, transaction set. Payment data is sent to FMS via FMSnet and the certification for the payment is sent using ECS. If an agency is not EDI capable, but desires to issue one payment to cover multiple invoices, it can electronically transmit a flat file, built to the specifications of the 820 transaction set, to FMS. FMS can then use this file to produce a CTX payment transaction.

- ◆ **Automated Standard Application for Payments (ASAP):** ASAP is an all-electronic payment and information system aimed at providing a single point of contact for recipients of Federal domestic assistance monies. The recipients of these funds can electronically request

and receive agency pre-authorized funds through the U.S. Treasury. Approved requests for same day payment are paid within minutes via the Federal Reserve's FEDWIRE system, and approved requests for next day payments are paid the next day via the ACH system. ACH payments are made using the CTX format with complete ANSI X12 820 transaction sets embedded in the addenda records of each payment transaction.

7.4.1.2. IMPLEMENTING ELECTRONIC PAYMENT SYSTEMS IN THE FEDERAL GOVERNMENT

There are several differences between implementing non-financial and financial EDI applications. One is the participation of the trading partners' banks as parties to the transactions. ACH operators are also needed to conduct business via financial EDI.

Presented below is a list of steps that agencies must take in order to implement electronic payment systems.

- 1. Contact FMS:** The first step that an agency must take when implementing electronic payment systems is to contact the Customer Assistance Staff (CAS) at its servicing Regional Financial Center (RFC). The CAS will assist the agency in selecting and implementing a suitable payment system option. CAS contact information is provided in Appendix C.
- 2. Determine Payment Transaction Format:** The agency should then examine its payments and decide whether it will use the CCD+ format, the CTX format, or both, for its payments. This determination should be made taking the following factors into consideration:
 - **Multiple Payments:** If an agency typically issues multiple payments to a single vendor on the same day, it may wish to consolidate the payments and issue a single CTX transaction that covers the multiple payments.
 - **Amount of Remittance Information:** If the amount of data that accompanies the payment is typically more than 80 characters, the agency may choose to issue a CTX transaction that can accommodate larger amounts of data than the CCD+ transaction format.
 - **Capabilities of Receivers and RDFIs:** While agencies should utilize the CTX format to the maximum extent possible, it may become necessary to utilize the CCD+ format in cases where receivers and RDFIs are not capable of processing CTX transactions.
- 3. Install Electronic Certification System (ECS):** Since the purpose of EDI is to replace manual processes with electronic ones, all payment files should be certified electronically using the ECS system. The agency should therefore, install ECS as a prerequisite to implementing financial EDI and EFT in its payment processes. It should also modify its

financial management systems to enable it transfer payment data, in detail or summary format, to ECS via a diskette.

4. **Determine Method of Data Transfer to FMS:** As mentioned earlier, payment data can be transferred to FMS in the following ways:
 - Payment detail data and certification can be sent to FMS together via ECS. This can only be done for CCD+ payments.
 - Payment detail data can be sent to FMS via FMSnet and a summary schedule certification can be sent separately to FMS via ECS. The payment detail data may be formatted as ANSI ASC X12 820, Payment Order/Remittance Advice transaction sets, or as a CCD+ or CTX compatible file. Layouts for these files are available from the FMS CAS. If the agency decides to transmit ANSI ASC X12 820 transaction sets, it will need to acquire and install EDI translation software and interface it with its in house application systems.
5. **Prepare for CTX Payments:** If the agency decides to issue CTX payments, it should complete the following steps:
 - **Complete EDI/CTX Customer Profile:** The agency must complete and submit an EDI/CTX Customer Profile to the FMS's Austin Financial Center (AFC). This will enable the AFC to begin working with the agency to prepare for financial EDI implementation.
 - **Consolidate Multiple Invoices to a Vendor in a Single Payment:** The primary advantage of using CTX is that complete remittance advice can be transmitted with a single payment for multiple invoices. To do this, it is necessary that the agency be able to identify all invoices from a particular vendor scheduled to be paid on the same date, and this may necessitate programming changes to the agency's financial system.
6. **Use FMSnet to Transmit Payment Files:** The agency should make arrangements to transmit payment files, if necessary, over FMSnet.
7. **Identify Vendors for Initial Conversion to Electronic Payments:** The agency must select a few vendors or payees with whom it would like to begin implementing EFT. The agency must ensure that these vendors and their banks are proficient in receiving and processing EFT payments. The selected vendors should complete SF 3881, ACH Vendor/Miscellaneous Payment Enrollment Form, and submit it to the agency. This form will provide both parties with banking information necessary to send and receive EFT payments.
8. **Test Electronic Payment Application:** Once an agency has completed steps 1 through 8, it should begin testing its electronic payment application. This process should include dummy transactions (or prenotes) and acceptance tests of the payment transactions with the servicing RFC or the AFC, the vendor's bank, and the vendor.

- 9. Implement Electronic Payments Application:** Once the agency has completed testing the new application, it should implement selected vendors. At this point all payments to these vendors should be made electronically, and the use of paper checks should be discontinued.

- 10. Launch Trading Partner Outreach Program:** Once the new electronic payment application has been tested and implemented with a few vendors or payees, the agency should develop and launch a trading partner outreach program that will enable it to implement electronic payments with all its payees. It should also contact industry groups and obtain their support and endorsement of the new electronic payment application. A detailed approach to stratifying and implementing trading partners and developing outreach programs is presented in Section 9, Trading Partner Strategy.

7.4.2 COLLECTIONS

The Federal government's revenue is collected through the following organizations and mechanisms:

- ◆ Treasury General Accounts (international and domestic)
- ◆ Lockboxes*
- ◆ Plastic Card Collection Network
- ◆ Fedwire Deposit System
- ◆ Federal Reserve Bank (FRB) Deposits
- ◆ Commodity Credit Corporation (CCC)
- ◆ Farmers Home Administration (FmHA)
- ◆ Remittance Express*

* EDI capable mechanisms

Each of the above collection methods results in the use of a paper deposit ticket (SF 215) and/or debit voucher (SF 5515) for posting to the Treasury General Account. The Federal Reserve and commercial financial institutions are required to make deposit reports through CASH-LINK. (A more detailed description of CASH-LINK is presented in Section 7.4.2.1, Electronic Collection Products and Systems.)

7.4.2.1. ELECTRONIC COLLECTIONS PRODUCTS AND SYSTEMS

In an effort to streamline the collections process, FMS has introduced a number of financial EDI and EFT products that are designed to decrease the time and cost associated with this function. Presented below are brief descriptions of some of these products:

- ◆ **CASH-LINK:** CASH-LINK is FMS' world wide financial reporting and cash concentration system. Exhibit 7-5, CASH-LINK Deposit Reporting Process, presents an overview of CASH-LINK.

The Federal Reserve and commercial institutions are required to make deposit reports through

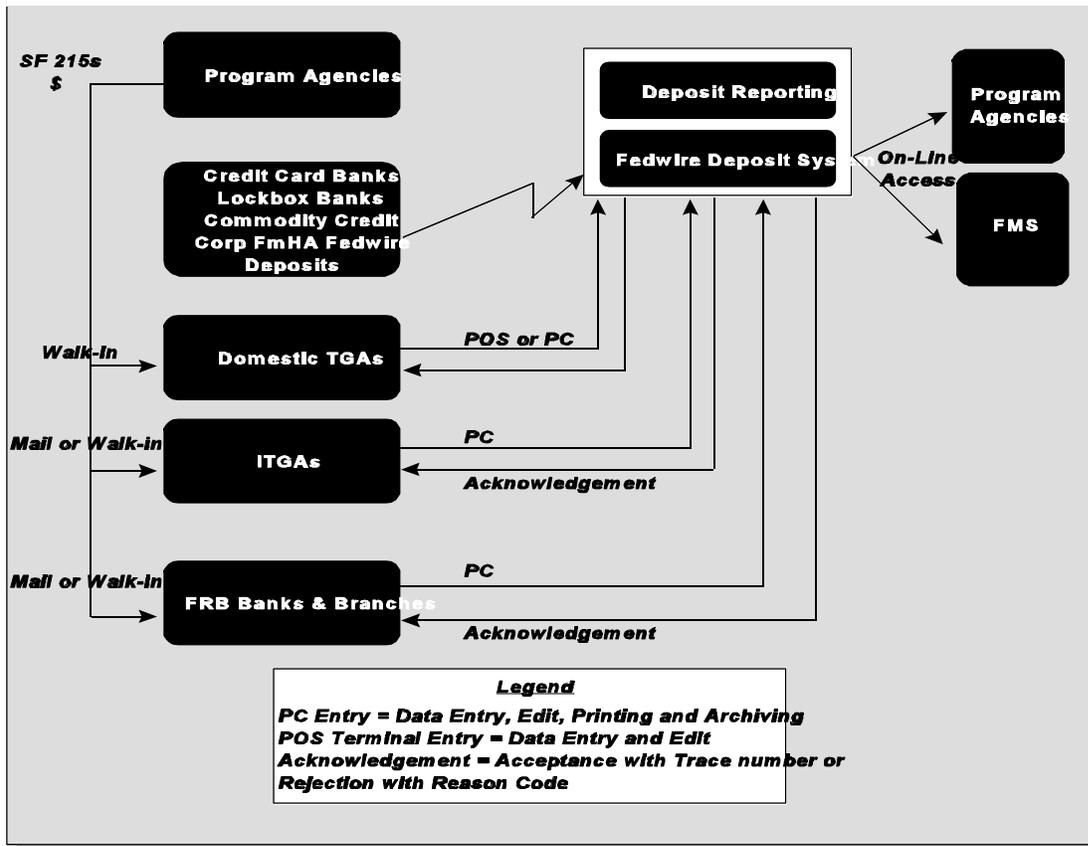


Exhibit 7-5: CASH-LINK Deposit Reporting Process

CASH-LINK. The purpose of CASH-LINK is to consolidate information from the different collection systems

and create a single database of deposit details. This database is available to all agencies to assist them in deposit reconciliation and enhance their cash forecasting. CASH-LINK receives deposit and accounting information from financial institutions, CCC, and FmHA, provides information to initiate funds transfer to Treasury's account at the Federal Reserve Bank New York, and provides detailed accounting information to the government-wide accounting system.

- ◆ **Remittance Express (REX):** REX is an electronic funds transfer system that allows Federal agencies to use the ACH network to receive payments from the public. Organizations or individuals making payments to the government can transmit them via the ACH network through their respective financial institutions. The Federal Reserve Bank will receive the payments, and send notification of the receipt of funds and accompanying data to the appropriate agency through FMS's CASH-LINK financial reporting and cash concentration system.

REX is designed to accept formats approved by NACHA, and supports the use of both CCD+ or CTX formats, to accommodate the needs of different agencies.

- ◆ **Electronic Lockboxes:** An electronic lockbox is a wholesale or retail lockbox that combines paper and electronic remittances. Remitters can make payments through the ACH network, wire transfers, or paper checks. The electronic lockbox operators will automatically collect and deposit all transactions and wire the funds to Treasury's account at the Federal Reserve Bank of New York for credit to the appropriate agency's account. Agencies can obtain deposit information via the CASH-LINK system.
- ◆ **ACH-Only Lockbox Bank:** FMS has selected a financial institution to provide agencies with all types of ACH and EDI services. This ACH-only bank will also provide the following services:
 - **Voice Response System:** The voice response system will allow agencies to initiate debits to remitter's accounts, and remitters to initiate debits to their own accounts for making payments to Federal agencies.
 - **ACHeive:** ACHeive is a personal computer-based software package designed to meet the needs of agencies with small to moderate ACH volumes.
 - **Mainframe to mainframe ACH Transmission:** This service is designed for agencies that process large volumes of ACH transactions.

- ◆ **Direct Payment/Recurring Pre-Authorized Debits (PAD):** PAD is an electronic transfer of funds authorized in advance by the remitter. Recurring PADs allow Federal agencies to collect payments automatically on a predetermined date. FMS can either build and maintain remitter databases for participating agencies or provide agencies with software for maintaining their own databases. The agencies will then transmit information to FMS for ACH origination. Agencies can obtain deposit information via the CASH-LINK system.

7.4.2.2. IMPLEMENTING ELECTRONIC COLLECTION SYSTEMS IN THE FEDERAL GOVERNMENT

Presented below is a list of steps that agencies must take in order to implement electronic collection systems.

1. **Contact FMS:** The first step that an agency must take when implementing electronic collections systems is to contact the Customer Assistance Staff (CAS) at their servicing Regional Financial Center (RFC), or the Product Promotion Division of FMS. The CAS or Product Promotion Division staff will arrange an informational session to educate the agency on financial EDI, EFT, and FMS initiatives, and assist the agency in selecting and implementing a suitable option. A list of RFCs with CAS contact information is provided in Appendix C.
2. **Analyze Collection Process:** The agency, with FMS' assistance, should conduct an analysis of its collections workflows and the entities from which it collects funds. This two level analysis will assist the agency in selecting the most appropriate mechanism and system to utilize in implementing electronic collections applications.
3. **Select Collection Mechanism and Systems:** After the agency has completed the workflow analysis, it should then select a collections mechanism and system that is suited to its needs. Some of the factors that should be taken into consideration in the selection process are listed below:
 - **Initiator of the Transaction:** If the remitter prefers to initiate the transaction to the Federal agency, then a credit-based mechanism such as REX or an electronic lockbox would be desirable. However, if the remitter prefers to have their account debited, then a debit-based mechanism such as PADs should be selected.
 - **Previous Collection Method:** Remitters and agencies that previously used lockboxes to collect paper checks may find it convenient to transition to an electronic lockbox or REX.
 - **Technical Sophistication of Remitters:** The agency should analyze the characteristics of its remitters and select an electronic collection system that would suit

their capabilities. This will assist in a smooth and speedy implementation of the new system.

- **CTX Capability:** When selecting REX for collections that are accompanied by large amounts of information, the agency should ensure that the remitters are capable of originating CTX transactions.

4. Prepare for REX Implementation: If the agency has decided to implement REX, then it should complete the following steps:

- **Complete REX Set Up Form:** The agency should complete the REX set up form and submit it to FMS.
- **Process REX Form:** FMS will process the information and assign an account number to the agency. FMS will then forward the form to the REX service provider. The service provider will set the agency up in REX and assign a date when “live” transactions can be processed through REX.
- **Sign Memorandum of Understanding (MOU):** The agency will then need to sign a MOU with FMS.
- **Modify In House Application Systems:** The agency should then make any changes necessary to its in house application systems to enable them to retrieve deposit information from CASH-LINK.

5. Prepare for Electronic Lockbox Implementation: If the agency has decided to implement electronic lockboxes, then it should complete the following steps:

- **Develop Statement of Work for Lockbox Services:** Agency and FMS representatives should meet with the lockbox operator and determine implementation procedures for processing EFT collections. A Statement of Work (SOW) should be developed jointly by these parties describing the workflow and processing of these transactions. The SOW should be signed by the agency and the lockbox operator.
- **Determine Pricing:** The lockbox operator will then determine the pricing for the services requested in the Statement of Work. This information will be sent to FMS.
- **Sign Memorandum of Understanding (MOU):** The agency will then need to sign a MOU with FMS and the lockbox operator.
- **Modify In House Application Systems:** The agency should then make any changes necessary to its in house application systems to enable them to retrieve deposit information from CASH-LINK, or from an electronic file provided by the lockbox operator. In some cases the lock box operator may be able to assist the agency with making the necessary modifications to their systems. Alternately, the lockbox operator

may be able to provide deposit information to the agency in paper report format. Agency staff will then have to be prepared to key in the data into their in house application systems.

6. **Prepare for PAD Implementation:** If the agency has decided to implement PAD, then it should complete the following steps:
 - **Meet With Agency's ODFI:** Agency and FMS representatives should meet with the agency's ODFI to discuss implementation and procedures to set up a PAD application.
 - **Sign Memorandum of Understanding (MOU):** The agency will then need to sign a MOU with FMS and a designated lockbox bank.
 - **Implement PAD Software:** The agency will need to acquire and install software that will enable it to originate PAD transactions.
 - **Modify In House Application Systems:** The agency should then make any changes necessary to its in house application systems to enable them to retrieve deposit information from CASH-LINK.
7. **Identify Remitters for Initial Conversion to Electronic Collections:** The agency should then select a few remitters with whom it can implement the new electronic collections application. The agency should ensure that these remitters and their banks can remit EFT payments.

If the new application is a PAD application, the selected remitters should complete SF5510, Authorization Agreement for Preauthorized Payments. The information from these forms should be entered into the PAD software master file.
8. **Test Electronic Collection Application:** Once the agency has completed steps 1 through 7, it should begin testing its electronic collection application. This process should include zero-dollar prenotifications and acceptance tests of the collection transactions, as necessary, with FMS, remitters, and the remitters' banks.
9. **Conduct Prenotifications:** For PAD applications the agency should conduct prenotifications. If necessary, corrections from the prenotifications should be entered into the PAD software master file.
10. **Implement Electronic Collection Application:** Once the agency has completed testing the new application, it should implement selected remitters. At this point all collections from these remitters should be made electronically, and the use of paper checks should be discontinued.
11. **Launch Trading Partner Outreach Program:** Once the new electronic collection application has been tested and implemented with a few remitters, the agency should develop

and launch a trading partner outreach program that will enable it to implement electronic collections with all remitters. It should also contact industry groups and obtain their support and endorsement of the new electronic collection application. A detailed approach to stratifying and implementing trading partners and developing outreach programs is presented in Section 9, Trading Partner Strategy.

7.5. GOALS, OPAC AND EDIPAC

GOALS is a telecommunications network by which Federal agencies transmit and receive their financial data. OPAC is a component of GOALS which establishes a standardized interagency billing and collection procedure via a telecommunications network.

Recently, OPAC was enhanced to incorporate Electronic Data Interchange (EDI) technology into the OPAC process. This enhancement to OPAC, the Electronic Data Interchange/Payment and Collection (EDIPAC) module, will provide Federal Program Agencies with the capability to transmit detail data along with payment/collection information. The internal structure of OPAC will remain the same as it is today, except that new fields will be added to the database structures to conform with agency-proposed OPAC data requirements.

The enhanced OPAC system will give the user community a unique combination of services. Agencies currently using OPAC will be able to do so without adding EDI capability. Those agencies that are not using OPAC but are using EDI, will be able to now take advantage of the OPAC interface to FMS for the first time. OPAC users who wish to convert to EDI may do so at any time without any loss of OPAC functionality.

The EDIPAC module uses the EDITRAN translator software to perform the following two tasks:

- ◆ Accept files in a predefined format from non-EDI-capable agencies through the GOALS Gateway process, convert it into the appropriate ANSI ASC X12 transaction sets (810 or 820), and transmit them to EDI-Capable agencies.
- ◆ Accept ANSI ASC X12 transactions as input, and prepare an output file that can be used to update the main OPAC database. Non-EDI-capable agencies can then query the main OPAC database and retrieve reports on transactions that affect them even if they were originated by EDI-capable agencies.

EDIPAC utilizes the following ANSI ASC X12 transaction sets:

- ◆ 810 - Invoice/Collection - has both standard business practice functionality and standard OPAC functionality.
- ◆ 820 - Payment Remittance Advice - consistent with ECA/PMO conventions

- ◆ 812 - Debit/Credit Adjustment - follows OPAC operation setup; i.e., only the receiver of an 810 or 820 can use the 812 to adjust.
- ◆ 824 - Application Advice - provides OPAC application advice if transaction is accepted. The 824 is sent to the originator with Date/Time Stamp and reference number. If the original transaction is rejected, the 824 provides rejection codes.

7.6. FEDERAL AGENCY FINANCIAL EDI GROUPS

There are a number of groups that have been established to support Federal agencies in the implementation of EFT and financial EDI programs. These groups include the following:

- ◆ **Financial Implementation Team for Electronic Commerce (FITEC):** FITEC was chartered by the Chief Financial Officers' (CFO) Council, and is sponsored by the Office of the Federal Financial Management (OFFM), OMB. The mission of FITEC is to develop plans and policies in the following four Financial Electronic Commerce areas:
 - Communication
 - Planning and Execution
 - Policy and Coordination
 - Training
 - ◆ **Financial Functional Work Group (FFWG):** The Federal EDI Standards Management Coordinating Committee (FESMCC) chartered the Financial Functional Work Group (FFWG) to provide a focal point for the development of Implementation Conventions for financial EDI transactions sets. The FFWG has over 60 members with representation from approximately 20 agencies. To date, the group has played a role in the development of ICs for the 810, Invoice, and 820, Payment Order/Remittance Advice, transactions sets and is currently working on the 811, Consolidated Service Invoice/Statement.
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8. USE OF EDI AND EFT IN THE MANAGEMENT OF GOVERNMENT GUARANTEED AND DIRECT LOAN PROGRAMS

The Federal government lends money to individuals and organizations for a number of reasons, including education, loans to foreign governments, etc. It also guarantees business, agricultural, and housing loans made by banks, guarantee agencies, and other lending institutions. The agencies that administer these loan programs are:

- ◆ U.S. Department of Education (ED)
- ◆ U.S. Department of Veterans Affairs (VA)
- ◆ U.S. Department of Housing and Urban Development (HUD)
- ◆ U.S. Small Business Administration (SBA)
- ◆ Farmer's Home Administration (FmHA)
- ◆ U.S. Agency for International Development (US AID)
- ◆ Export-Import Bank

In addition, there are Government Sponsored Entities (GSEs), such as Freddie Mac, Fannie Mae, Sallie Mae, and Ginnie Mae that buy and resell government guaranteed loans into the secondary market

The Department of the Treasury, Financial Management Service (FMS) has government-wide oversight of guaranteed loan and other credit programs, which has been delegated to FMS by the Office of Management and Budget (OMB). In this capacity, FMS seeks to increase the efficiency by which they are managed, thereby reducing risk for the Federal government.

8.1. THE USE OF EDI AND EFT IN LOAN MANAGEMENT

Credit granting agencies have to maintain and store information on hundreds of thousands of loans, lenders and borrowers. This information has to be collected from and disbursed to thousands of individuals, financial institutions and other organizations on a daily basis. Moreover, funds are received from these entities for loan guarantee fees and premiums, loan repayments, etc. Agencies also need to settle claims for bad loans. Given the volume and urgency of transmitting data and funds, EDI and EFT provide robust and cost effective technical solutions for the management of loan programs.

In Fiscal Year 1995, FMS determined that while the number of government direct and guaranteed loans were decreasing, the government's risk exposure appeared to be increasing. Recognizing the urgent need for more effective, accurate, and timely management of loan programs, FMS has

been advocating the use of EDI and EFT, and has undertaken a number of projects to assist the credit granting agencies in implementing these technologies.

This section presents some guidelines for the use of EDI and EFT in the management of government guaranteed and direct loan programs, along with examples of systems that have been implemented by the credit granting agencies.

8.2. THE GUARANTEED LOAN MANAGEMENT SYSTEM MODEL

In 1992, FMS commissioned the development of a Guaranteed Loan Management System (GLMS) Model that identified the key elements of an effective system for managing the entire guaranteed and direct lending process. The Model provides Federal agencies with a framework to follow in enhancing existing systems or developing new systems to manage their guaranteed loan portfolios by ensuring:

- ◆ Compliance with Federal policies and legislation regarding government guaranteed loan programs; specifically, OMB Circular A-129, the Credit Reform Act of 1990, and the Guaranteed Loan Management Assessment (GLMA)/OMB Bulletin 91-05
- ◆ Management of risk and mitigation of guaranteed loan losses
- ◆ Use of effective quality control/internal control measures
- ◆ Standardization of systems supporting similar programs across Federal agencies
- ◆ Use of current technology in automated systems

The GLMS Model is organized into five phases of the guaranteed loan lifecycle. These five phases are:

- ◆ Lender Management
- ◆ Loan Origination
- ◆ Loan Servicing
- ◆ Debt Collection
- ◆ Write-off

These five phases have been used in this section as a basis for examining the potential for EDI and EFT implementation.

8.2.1 LENDER MANAGEMENT

Lender management includes those functions necessary to certify and monitor lenders who originate loans guaranteed by Federal and external agencies. In this phase of loan management, agencies periodically receive information and fees from lenders. In recent years, agencies have attempted to set up cross-agency data stores that will enable them to exchange lender information amongst themselves, and judge the performance of lenders on a government-wide basis. However, due to the volume of information and the lack of cross-agency data standards, none of these efforts have progressed beyond an experimental status.

There is great potential for EDI and EFT to be applied in lender management functions to accurately and speedily exchange lender data and receive fee payments. Exhibit E-1, in Appendix E, Potential for EDI and EFT Usage in the Guaranteed Loan Management Lifecycle presents a list of these functions.

8.2.2 LOAN ORIGINATION

The loan origination phase of the guaranteed loan management lifecycle includes functions necessary to process, evaluate, and approve loan applications, and process guarantee fee billings. In this phase of loan management, agencies receive large volumes of information on new loans that have been made by lenders, including borrower property, and appraisal information. They also receive fees for the guaranty and other services that they provide. Traditionally information and fees have been sent via paper documents and checks that need to be manually processed and deposited into bank accounts. Given the volume of these transactions, there is a high potential for errors and processing delays. However, with the development of new transaction sets such as the 201, Residential Loan Application, and the 872, Mortgage Insurance Application, transaction sets, loan origination information can be easily exchanged using EDI. Similarly EFT and financial EDI can expedite the receipt and processing of monetary transactions.

Exhibit E-2, in Appendix E, Potential for EDI and EFT Usage in the Guaranteed Loan Management Lifecycle, presents a list of the functions in this phase in which EDI and EFT may be utilized to increase efficiency and reduce manual processing costs.

8.2.2.1. LOAN ORIGATION - SAMPLE EDI APPLICATION

Described below is an EFT-based application that assist a credit-granting agency in collecting funds in the loan origination phase.

◆ Electronic Loan Guaranty Fee Collection at SBA

SBA's mission is to help people get into business, to help people who are in business stay in business, and to help businesses flourish and grow. In fulfilling this mission, SBA provides government guarantees of up to 80% of loans made by the private lending sector. A fee of 0.25% to 3.875% of the guaranteed portion of the loan is levied by SBA in return for the guarantee.

Borrowers apply for SBA guaranteed loans from private lending institutions. After the lender and SBA approve the loan, the lender disburses the funds to the borrower and remits the loan guarantee fee to the SBA Office of Financial Operations (OFO) in Denver. Sometimes, lenders remit excessive or duplicate loan guarantee fees to SBA, or make mistakes in providing the SBA loan number with their payments, and refunds have to be made to them.

The objective of the new EDI loan guarantee fee application is to automate the exchange of loan guarantee fee payments and associated data between SBA and lenders. This will reduce the time and costs associated with manual processing, reconciliations, and data entry.

In the new application, lenders transmit an ANSI X12 820, Payment Order, transaction set to their financial institution via a Value Added Network (VAN). The lender's financial institution converts the 820 transaction set into either a CTX or CCD+ transaction, depending upon its financial EDI capabilities, and transmits it to the Federal Reserve Bank (FRB) via the ACH network. FRB receives the CTX or CCD+ transaction from the lender's financial institution, credits Treasury's account, and forwards the CTX or CCD+ transaction to Treasury's CASH-LINK deposit reporting system through a bulk data file transfer. OFO retrieves the transaction detail information (e.g., deposit amounts and remittance advice data) from CASH-LINK via a dial-up connection and updates its Loan Accounting and Cash Collection System (LACCS) with transaction detail information.

For refunds, OFO extracts information from LACCS and generates a payment file in CCD+ format. A separate payment certification summary file is created by the Electronic Certification System (ECS) when an SBA Certifying Officer approves the payments. OFO transmits the payment file via a leased line and the ECS file via a dial-up connection to FMS. FMS receives the two files, create a CCD+ transaction, and transmits it to FRB via FMSnet. FRB receives the CCD+ transaction from FMS, debits Treasury's account, and transmits the CCD+ transaction to the lender's financial institution via the ACH network. The lender's financial institution receives the CCD+ transaction, credits the lender's account, and forwards the remittance information from the CCD+ transaction to the lender.

Exhibit 8-1, SBA Electronic Loan Guarantee Fee Collection, presents a pictorial overview of the new collection and refund application.

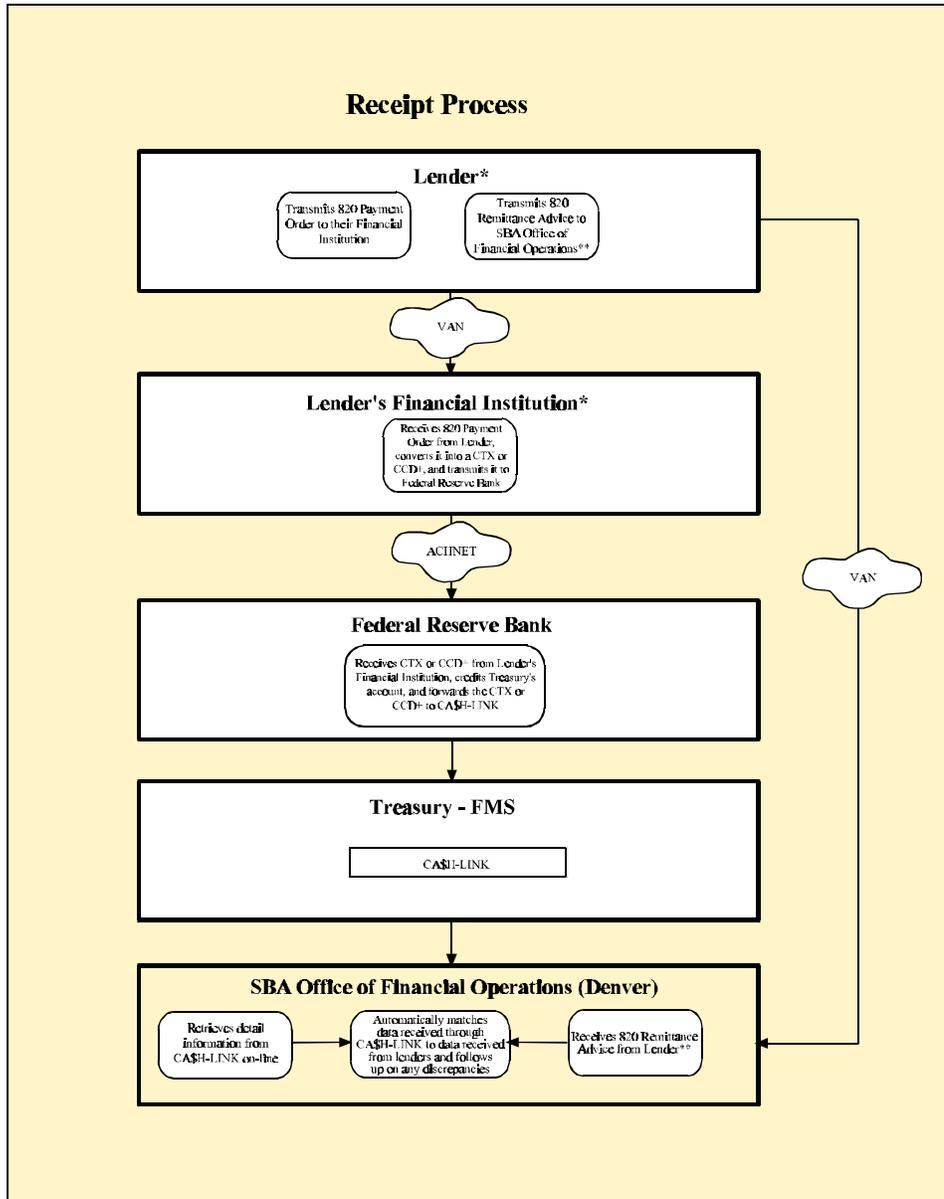


Exhibit 8-1: SBA Electronic Loan Guarantee Fee Collection

8.2.3 LOAN
SERVICING

The loan servicing phase of the guaranteed loan management lifecycle includes functions required to service loans and monitor the performance of loan portfolios. In this phase of loan management, agencies periodically obtain different types of information on their loan portfolios from lenders. For example, VA receives notification on loans that have gone into a default status, and SBA receives status information on all of its guaranteed loan portfolio on a monthly basis. As this information tends to be repetitive, and labor and paper-intensive to process, EDI presents a convenient and cost effective method of automating and exchange of loan servicing information.

Exhibit E-3, in Appendix E, Potential for EDI and EFT Usage in the Guaranteed Loan Management Lifecycle presents a list of the functions in this phase in which EDI and EFT may be utilized to increase efficiency and reduce manual processing costs.

8.2.3.1. \LOAN SERVICING - SAMPLE EDI APPLICATIONS

Described below are two EDI-based applications that assist organizations in collecting data in the loan servicing phase.

◆ Mortgage Loan Default Status Reporting at VA

Mortgage holders and servicers send notices of mortgage loan defaults to VA when four consecutive payments on a loan have been missed. VA then works with the veteran and the mortgage holder or servicer to try to cure the loan. During this interval, VA generates status inquiry reports that are mailed to mortgage holders and servicers of delinquent loans. Currently, the default loan status information is communicated to the VA by mortgage holders and servicers either through status letters (paper) or through magnetic tapes.

The objective of the new EDI default status reporting application is to automate the exchange of mortgage loan default status information between VA and mortgage holders and servicers. By automating the transfer of data, VA will be able to eliminate the time and costs associated with manual processing, data entry, and postage.

The mortgage holder or servicer will transmit ANSI X12 264, Mortgage Loan Default Status (Notice of Default), transaction sets to the VA Data Processing Center via a Value Added Network (VAN) when the borrower is in default. On a daily basis, the VA Data Processing Center will collect the notice of default transactions from their VAN mailbox and use them to automatically update their Liquidation and Claims System (LCS).

On a monthly basis, VA will automatically create 264, Mortgage Loan Default Status (Inquiry), transaction sets. These transaction sets will be transmitted to mortgage holders and servicers via a VAN. The mortgage holder or servicer will retrieve the inquiry transactions from their VAN mailbox, update the status of the loans in the message, and transmit 264, Mortgage Loan Default Status (Response), transaction sets back to VA. On a daily basis, the VA Data Processing Center will retrieve the response transactions from their VAN mailbox and use them to automatically update LCS.

Exhibit 8-2, VA's Electronic Mortgage Loan Default Status Reporting Process, presents a pictorial overview of the new EDI application.

◆ **Electronic Guaranty Loan Status System at SBA**

SBA obtains information relating to loan status from its participating lenders on a quarterly basis using a paper form (Form 1175) that is mailed from SBA to lenders, completed by lenders, and then mailed back to SBA. The information received from lenders on Form 1175 is manually entered by SBA into its Guaranty Loan Reporting System (GLRS).

The purpose of the new SBA Electronic Guaranty Loan Status System (EGLSS) is to automate

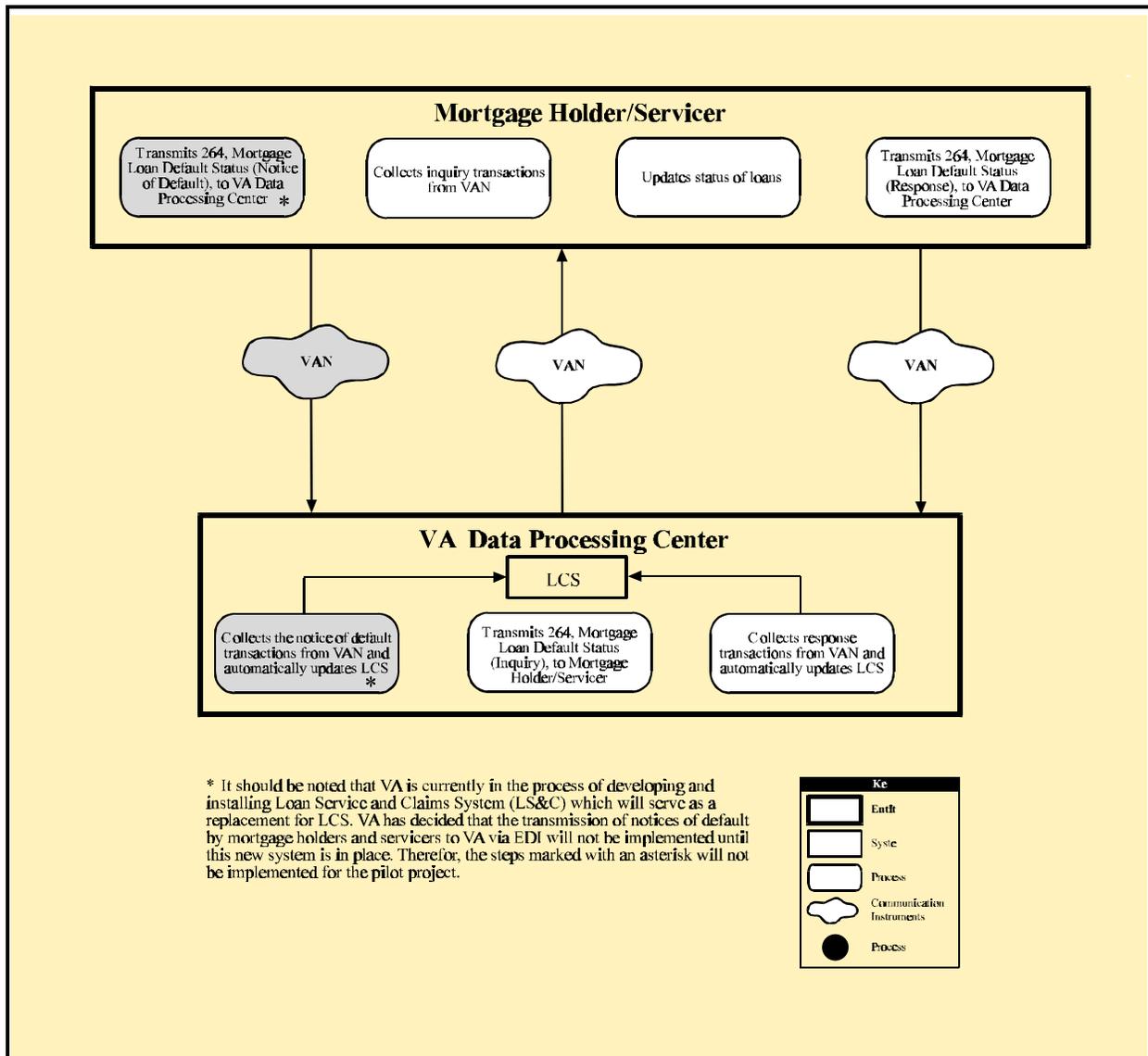


Exhibit 8-2: VA's Electronic Mortgage Loan Default Status Reporting Process

the current guaranteed loan status reporting process and eliminate the manual effort required to generate and mail Form 1175s and key in the responses received from lenders.

At the end of each month, SBA will automatically generate ANSI ASC X12 822, Customer Account Analysis "Loan Status Request", transaction sets and transmit them to lenders via a VAN. Lenders will receive the messages and send back ANSI X12 822, Customer Account Analysis "Loan Status Response", transaction sets to SBA by the fifth working day of the next month. On a daily basis, SBA will retrieve the response transactions from their VAN mailbox and use them to automatically update the GLRS. In addition, lenders will be required to identify secondary market loans and a copy of the 822, Response, transaction set for these loans will be sent directly to the fiscal transfer agent through the VAN.

Exhibit 8-3, SBA Electronic Guaranty Loan Status System, presents a pictorial overview of SBA's new electronic loan status reporting process.

8.2.4 DEBT COLLECTION

The debt collection phase of the guaranteed loan management lifecycle includes functions required to process claims and assignments, and perform other related collection tasks. In this phase of loan management, lenders send claim notices to the credit granting agencies who process them and transmit funds, as appropriate. EDI and EFT have the potential to increase the timeliness and efficiency of processing and settling claims, while lowering the processing cost to the agency.

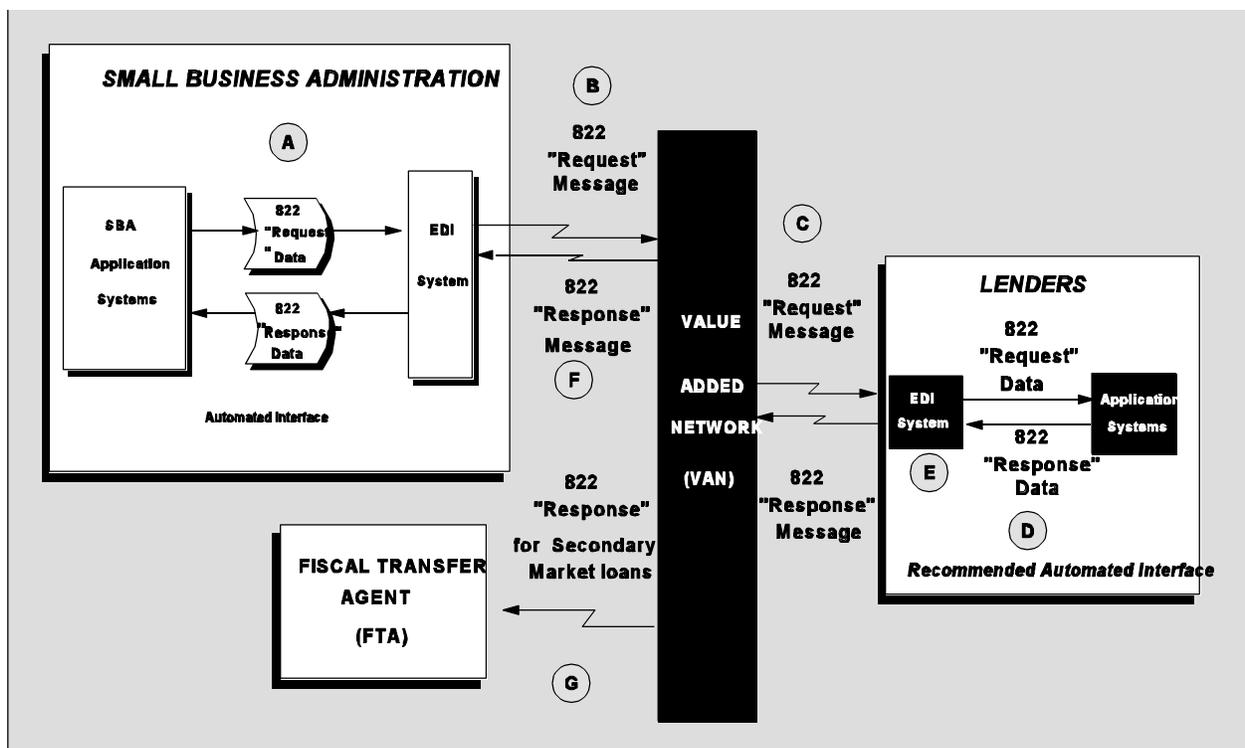


Exhibit 8-3: SBA Electronic Guaranty Loan Status System

Exhibit E-4, in Appendix E, Potential for EDI and EFT Usage in the Guaranteed Loan Management Lifecycle presents a list of the functions in this phase in which EDI and EFT may be utilized effectively.

8.2.4.1. DEBT COLLECTION - A SAMPLE EDI APPLICATION

Described below is an EDI and EFT-based application that assists a credit granting agency in collecting data and funds in the debt collection phase.

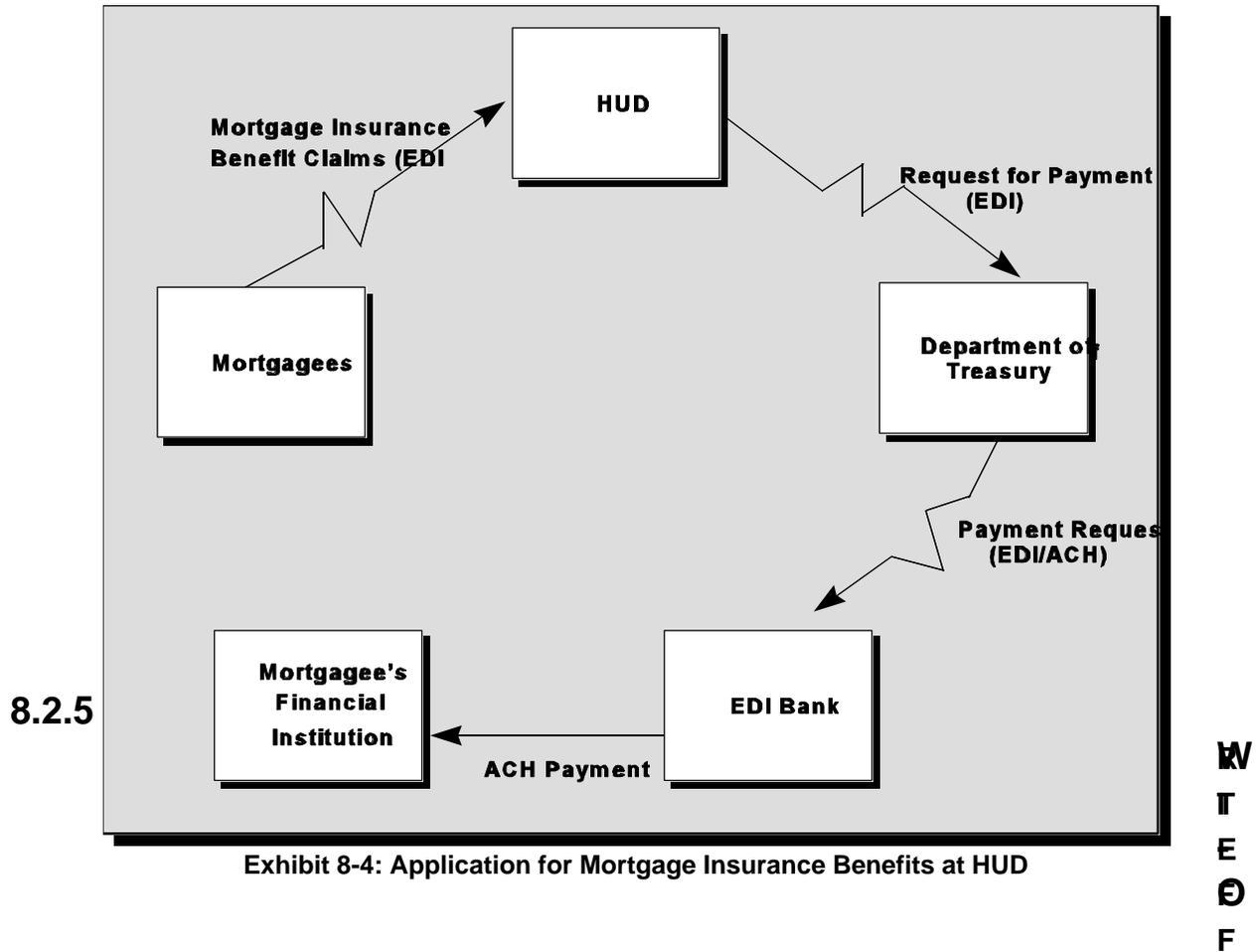
◆ Application for Mortgage Insurance Benefits at HUD

HUD is currently in the process of implementing an EDI application, Application for Mortgage Insurance Benefits, within its Single Family Insurance program. Currently, when homeowners default on HUD insured mortgages, the mortgagees submit hard copies of Mortgage Insurance Benefit claims to HUD, through the mail, for reimbursement. The claims are sorted, manually keyed, edited and processed for reimbursement. A magnetic tape containing eligible reimbursements is generated at HUD along with a report listing payment information. A HUD officer reviews the report and authorizes the payments. The magnetic tape then is sent to Department of the Treasury for disbursement of funds to claimants.

The objective of the new EDI application is automate the receipt of claims data to HUD and the disbursement of reimbursements to claimants. The new application involves the mortgagees electronically submitting Mortgage Insurance Benefit claims to HUD using EDI transactions. Mortgagees will transmit claims from their computers to HUD through a VAN. HUD will electronically receive claims data and automatically update its system. The claims will be processed for payment and reviewed by a certifying officer. Upon certification, a request for an ACH payment will be initiated using EDI transactions and transmitted to the Department of the Treasury. The Department of the Treasury will transfer the payment from an EDI capable bank to the claimant's bank via the ACH network.

By automating the transfer of data, HUD will be able to eliminate the time and costs currently associated with manual processing of claims. With EDI, HUD will be able to strengthen its risk management by ensuring the validity of claims in a more timely manner. Mortgagees have found that substantial financial savings are gained with the electronic transfer of claims data following foreclosure or assignment of a loan.

Exhibit 8-4, Application for Mortgage Insurance Benefits at HUD, resents a pictorial overview of the new EDI/EFT application being implemented at HUD.



The write-off phase of the guaranteed loan management lifecycle includes functions required to process loans written off and closed out. As most of these functions are performed within the agency and do not involve any communication with external entities. Therefore, there is no potential for EDI usage in this phase of loan management.

9. TRADING PARTNER STRATEGY

The success of an organization's EDI efforts will ultimately be determined by the level of participation of its trading partners. Therefore, the recruitment of trading partners should be an integral part of the EDI implementation strategy. In preparation for implementing an EDI application, an organization should formulate a cohesive trading partner strategy that addresses, at a minimum, the following items:

- ◆ Stratification, or grouping, of trading partners to determine implementation priority
- ◆ Development of a trading partner outreach program
- ◆ Registration of trading partners
- ◆ Process that should be followed when implementing trading partners

The sections that follow present detailed discussions of these topics.

9.1. STRATIFYING TRADING PARTNERS

Regardless of the size of its trading partner community, an organization should stratify its trading partners before implementing the EDI application. This will allow the organization to proceed on an evenly spaced schedule.

To stratify its trading partners, an organization must establish a timeframe for implementation as well as a set of criteria to differentiate the trading partners. Some suggested criteria are:

- ◆ **Current Transaction Volume:** An organization should consider the volume of business it conducts with each of its trading partners. By implementing trading partners with higher volumes, the organization can recoup its investment in EDI in a shorter timeframe.

Exhibit 9-1, Sample Level 1 Stratification - Current Transaction Volume, presents an example of how this criteria can be applied. In this example 1,200 trading partners have been stratified by transaction volume over an implementation period of two years.

Current Transaction Volume	IMPLEMENTATION TIME PERIOD							
	Year 1				Year 2			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
200 - 500	10	20	20	60	70	70	30	10
100 - 200		10	20	20	60	60	20	10
50 - 100			10	10	20	40	30	20
1 - 50				10	20	50	50	30
TOTAL	10	30	50	100	170	220	130	70

NOTE: The data in this exhibit is fictitious and is intended as an example only.

Exhibit 9-1: Sample Level 1 Stratification - Current Transaction Volume

- ◆ **Data Processing Facilities:** Trading partners who perform their data processing activities in-house are strong candidates to be implemented first as they are more likely to already have the technical infrastructure necessary to implement an EDI application. Large service bureaus that provide data processing services to multiple trading partners should also be targeted for early implementation, as they will be able to bring several trading partners on board for little or no additional effort.

Exhibit 9-2, Sample Level 2 Stratification - Data Processing Facilities, continues the example of the 1,200 trading partners further stratified using the second criteria.

Current Transaction Volume	IMPLEMENTATION TIME PERIOD											
	Year 1											
	Q1		3rd Party Srvcs.	Q2		3rd Party Srvcs.	Q3		3rd Party Srvcs.	Q4		3rd Party Srvcs.
	Technically Capable?	Yes		No	Technically Capable?		Yes	No		Technically Capable?	Yes	
200 - 500	5	0	5	5	5	10	5	10	5	20	20	20
100 - 200				10	0	0	10	5	5	5	10	5
50 - 100							5	5	0	5	5	0
1 - 50										5	5	0
TOTAL	5	0	5	15	5	10	20	20	10	35	40	25

NOTE: The data in this exhibit is fictitious and is intended as an example only.

Exhibit 9-2: Sample Level 2 Stratification - Data Processing Facilities

- ◆ **Willingness to Participate:** While the above two criteria provide an organization with target numbers of trading partners to schedule for implementation over a given period of time, the third criteria should be used to identify specific trading partners within each implementation

time period. Trading partners who are ready and willing to participate in the EDI implementation should be implemented first. If a trading partners is resistant to the EDI application, they should be brought onboard after some initial success has been achieved with other trading partners.

Many organizations have found that conducting a survey is the most effective method of determining the willingness of trading partners to participate in an EDI program. Suggested topics to be covered in a trading partner survey are listed below:

- General information on trading partner, e.g., name, address, business and technical contact personnel
- Transaction volume
- Hardware and communications capabilities
- Status of current EDI programs (if any) including standards, EDI translation software, and VAN information
- Amount of time required to implement the EDI application
- Willingness to participate in an EDI program

A sample survey is presented in Appendix F, Trading Partner Survey Questionnaire and Scoring Guide. In this sample, certain key factors that affect the ability and willingness to implement EDI are identified, along with a weight rating of 1 to 5. A weight of 5 for a specific factor indicates a high or favorable level in terms of the trading partner's ability or willingness, while a weight of 1 represents a relatively low level of preparedness. These weights were used to develop the scoring guide also presented in Appendix F. High scores represent trading partners who are ready and willing to implement EDI, and should be scheduled for implementation first. Lower scoring trading partners should be scheduled later in the implementation period as they would require a higher level of assistance.

For example, using the sample stratification provided in Exhibits 9-1 and Exhibit 9-2, a trading partner survey would allow an organization to develop a list of the 50 trading partners with over 1,000 transactions who would be implemented in the first quarter of Year 1.

By stratifying its trading partners, an organization will be able to implement the EDI application with its trading partners on a steady, manageable schedule. The EDI Project Team should set target percentages of trading partners who will be implemented by certain key dates and gear the trading partner strategy to achieve these targets. This will ensure a smooth transition to the EDI application for both the organization and its trading partners.

9.2. DEVELOPING A TRADING PARTNER OUTREACH PROGRAM

An organization should develop a comprehensive outreach program to contact their trading partners and persuade them to implement the EDI application. The outreach program should include the following activities:

- ◆ The establishment of an Outreach Team that will be responsible for recruiting and implementing trading partners
- ◆ Providing assistance to trading partners in implementing the EDI application

These activities are described in further detail in the following sections.

9.2.1 ESTABLISH AN OUTREACH TEAM

To successfully implement an EDI program, an organization should establish a trading partner Outreach Team and assign it the responsibilities of contacting trading partners, providing them with information regarding the EDI application, and signing them up to participate. Listed below are the steps required to establish an Outreach Team:

- ◆ **Determine Members of the Outreach Team:** Members of the Outreach Team should be carefully selected and include personnel from all departments affected by the EDI application. The Outreach Team members should understand that the implementation of trading partners will be their main priority, and that they should be prepared to devote a considerable amount of time to this effort.
- ◆ **Prepare and Distribute EDI Materials:** An information packet containing descriptive material on EDI and the EDI application should be prepared and distributed to the members of the Outreach Team.
- ◆ **Train Outreach Team Members:** A training session should be held to acquaint the Outreach Team with EDI technology, the application being implemented, the trading partner survey process, and the organization's implementation procedures.
- ◆ **Set Implementation Goals for the Outreach Team:** It is recommended that target percentages or goals for trading partner implementation be set for the Outreach Team. Team members should then be responsible for ensuring that these goals are met.

9.2.2 PROVIDE ASSISTANCE TO TRADING PARTNERS

There are several ways in which an organization can provide assistance to its trading partners, such as trading partner kits, incentives, a help desk, or a trading partner conference. Each of these is described in the sections that follow.

9.2.2.1. TRADING PARTNER KITS

The Outreach Team should prepare and mail Trading Partner Kits to trading partners who have agreed to implement the EDI application. The purpose of the Trading Partner Kits is to provide trading partners with the materials they need to facilitate a seamless transition to the EDI application. Some items that an organization may choose to include in the Trading Partner Kits are:

- ◆ Letter introducing the new EDI application
- ◆ Functional design specifications and process flow diagrams
- ◆ Implementation Conventions for the transaction sets being implemented
- ◆ Testing procedures and schedule
- ◆ Trading Partner Information (e.g., Identification Number)
- ◆ Trading Partner Agreement
- ◆ Information on EDI translation software and network services
- ◆ Other educational materials

A sample Trading Partner Kit is presented in Appendix G, Sample Trading Partner Kit.

A well-organized Trading Partner Kit will greatly assist trading partners in implementing the EDI application, and minimize the amount of future support they will require.

9.2.2.2. TRADING PARTNER CONFERENCES

All trading partners should be strongly encouraged to attend a trading partner conference before they begin implementing the EDI application. In addition to providing education and training, a trading partner conference allows an organization to:

- ◆ Meet with trading partners face-to-face and establish a communication channel
- ◆ Answer questions and concerns regarding the organization's EDI strategy
- ◆ Recruit and sign up trading partners to participate in the EDI program

Trading partner conferences should be held periodically in different parts of the country.

9.2.2.3. INCENTIVES

An organization should offer some incentives to its trading partners to induce them to implement EDI. Described below are some incentives that have been proven to be effective in persuading trading partners to implement an EDI application:

- ◆ Education, training, documentation, and technical assistance
- ◆ Free or inexpensive EDI translation software. (Software vendors may offer customized versions of their packages with limited functionality for the trading partners of a large EDI Hub.)
- ◆ Free or inexpensive network services. (VANs may offer lower rates for the trading partners of a large EDI Hub.)

The organization should highlight these incentives in letters sent to trading partners to introduce the EDI application, and in other promotional materials (e.g., pamphlets and announcements). The materials should state that the software, network services, and technical assistance will be offered to all trading partners who participate in the EDI project.

9.2.2.4. HELP DESK

Another means of assisting trading partners is to establish a help desk. It is common for many trading partners to be unfamiliar with EDI, and they are likely to encounter technical and functional questions or problems during the course of implementation and testing. An organization should consider arranging for a help desk or hotline to answer questions from its trading partners. The help desk staff should be trained to answer questions regarding:

- ◆ EDI technology
- ◆ ANSI X12 standards
- ◆ The EDI application
- ◆ Problems in data communication or message rejection

The help desk facility should be available to answer questions during planned business hours.

9.2.3 TRADING PARTNER REGISTRATION

Once a trading partner has committed to participating in an EDI program, they should transmit an ANSI X12 838, Trading Partner Profile, transaction set to the organization implementing EDI. The organization can use the information in this transaction set, including trading partner name and address, banking information, to set up their trading partner databases and begin exchanging documents electronically.

If the trading partner conducts business with a government entity, they may already be registered in the Central Contractor Registration (CCR) database. If so, the organization should simply download the trading partner information from the CCR and update their in-house application systems.

9.2.4 TRADING PARTNER IMPLEMENTATION PROCEDURES

To implement an EDI application with a large number of trading partners, the organization should follow a well defined series of steps, as described below:

- 1. Compile List of Trading Partners to be Implemented:** Periodically, the Outreach Team should compile a preliminary list of trading partners to be implemented. This list should contain each trading partner's name, address, and contact information, as well as their EDI readiness score (from the trading partner survey) and trading partner number.
- 2. Send Information Letter to Trading Partners:** The Outreach Team should draft a letter to trading partners, providing information on the EDI application and preparing them for a follow up phone call from the Outreach Team.
- 3. Contact Trading Partners:** The Outreach Team should contact trading partners and describe the EDI application to them. They should obtain a commitment from the trading partner to begin the implementation process, and schedule a date for training.
- 4. Send Trading Partner Kits:** The Outreach Team should mail complete Trading Partner Kits to the trading partners who have signed up to implement the EDI application. The contents of the kits were described previously in this section.
- 5. Install Software and Set Up Trading Partner Mailbox:** The trading partner should be responsible for installing their EDI translation software, and setting up their VAN mailbox. They should also perform necessary communications tests to ensure that their hardware, software, and communications systems are working correctly.
- 6. Establish Schedule for Trading Partner Conferences and Training Sessions:** The Outreach Team should set up trading partner conferences and training sessions, as necessary, for trading partners who are scheduled for implementation. The Outreach Team should ensure that the necessary personnel are available for conferences and training sessions and that the required training material is available for trading partners.
- 7. Conduct Conferences and Training Sessions:** The Outreach Team should conduct conferences and training sessions as necessary for trading partners. If training sessions are to be conducted, trading partners should ensure that they have access to their software and communications facilities during the training session. At the end of the training session, the trading partner should be proficient in using the EDI application, and comfortable with troubleshooting procedures for the EDI application.

8. **Set Up Test Schedule:** At the end of the training session, the Outreach Team should schedule the trading partner for dummy and acceptance tests.
9. **Set Up Test Mailbox:** The Outreach Team should coordinate the task of setting up trading partner relationships, if necessary, in the organization's test mailbox for trading partners who will begin the testing process.
10. **Prepare Dummy Data Test Messages:** The Outreach Team should create data required for dummy test messages and place them in the trading partner's mailbox prior to the commencement of testing.
11. **Conduct Dummy Data Test:** The Outreach Team should be responsible for conducting dummy transaction tests with trading partners. The dummy test should consist of one test message for each transaction set being sent to or received from trading partners. If the trading partner is unable to complete the tests successfully, the Outreach Team should conduct a series of follow up tests with the trading partner. Trading partners should be given sufficient time between each testing round to make any necessary changes to their systems and manual procedures.
12. **Conduct Acceptance Test:** The Outreach Team should be responsible for conducting acceptance tests with trading partners. The test transaction set should contain "live" data. If the trading partner is unable to complete the tests successfully, the Outreach Team should conduct a series of follow up tests with the trading partner.
13. **Set Up Production Mailbox:** The Outreach Team should be responsible for setting up the trading partner relationship in the organization's production mailbox for those trading partners who have completed testing.
14. **Implement Trading Partner on the EDI Application:** Once the rest of the steps have been completed, the trading partner should be implemented on the "live" EDI application. At this time, the trading partner should discontinue using any traditional paper-based process and rely solely on the EDI application.

The Outreach Team should set up a schedule for each of the above activities for each stratified group of trading partners. This schedule, along with other materials in the Trading Partner Kit, should be communicated to trading partners as soon as possible to give them adequate time to modify their in house application systems, acquire EDI translation software and network services, and establish the required internal processes. The organization should bear in mind that trading partners may require as little as a few weeks or as much as three months to implement an EDI program, and take this time lag into consideration in their implementation schedule.

10. PLANNING THE EDI IMPLEMENTATION

Planning is a key element to success in implementing an EDI application. It provides the implementation team with a solid basis for the functional and technical design of the new application, as well as a clearly defined plan for the actual implementation. The planning phase of an EDI application consists of the following activities:

- ◆ Analyzing the current process
- ◆ Developing workflows for the EDI application
- ◆ Developing an EDI implementation plan

This section presents a detailed discussion and a step by step approach to conducting the above activities.

10.1. ANALYZING THE CURRENT PROCESS

The first step to planning and implementing an EDI application is gaining a thorough understanding of the current process. Without such an understanding, it is impossible to accurately identify the problems that exist in the current process and determine whether EDI is an appropriate solution.

Once the scope of the EDI application has been defined, the implementation team should undertake an analysis of the current process, using the following steps:

- 1. Review Background Materials:** The implementation team should obtain and review all available background materials on the current process. These materials include operating procedures, documentation on automated systems, and the results of any previous process analyses. This information will also assist the team in preparing for interviews.
- 2. Identify Interviewees and Schedule Interviews:** The implementation team should identify the personnel who play key roles in the current process, both in the actual conduct of the work as well as in supervisory positions. The team should draw up a list of interviewees and schedule meetings with them well in advance. Interviews should be scheduled such that the team conducts no more than two interviews on any given day.
- 3. Develop Questionnaires and Interview Guides:** The implementation team should construct interview guides and questionnaires that can be used to conduct interviews. The questionnaires should be aimed at obtaining clear and accurate information on the current process, transaction volumes, and problems or processing difficulties that exist in the current process. A sample interview questionnaire is presented in Appendix H, Conducting Interviews. Questionnaires should be distributed to interviewees in advance, in order to allow them to collect information and prepare for their interviews.

- 4. Conduct interviews:** Interviews should be conducted by at least two implementation team members. One member should act as the interviewer, while the other member records the interview. Appendix H, Conducting Interviews, presents a list of items that the team should bear in mind during the course of each interview.

- 5. Document Current Process:** Based on the information collected in the interviews, the implementation team should develop flowcharts of the current process. The flowcharts should be accompanied by a narrative and information on transaction volumes. Exhibit 10-1, Sample Current Process Documentation, presents a sample flowchart for the process of receiving and accepting goods from a vendor. The documentation developed by the implementation team should include a section on problems that exist in the current process along with suggested solutions.

- 6. Verify Current Process Information:** The implementation team should then send copies of the current process documentation to the interviewees and ask them to verify that the information provided by them has been accurately represented. The documentation should be corrected and updated using their comments.

By the end of this analysis, all members of the implementation team should have a clear and thorough understanding of the current process and its inherent problems. They should then use this information in designing workflows for the new EDI-based application.

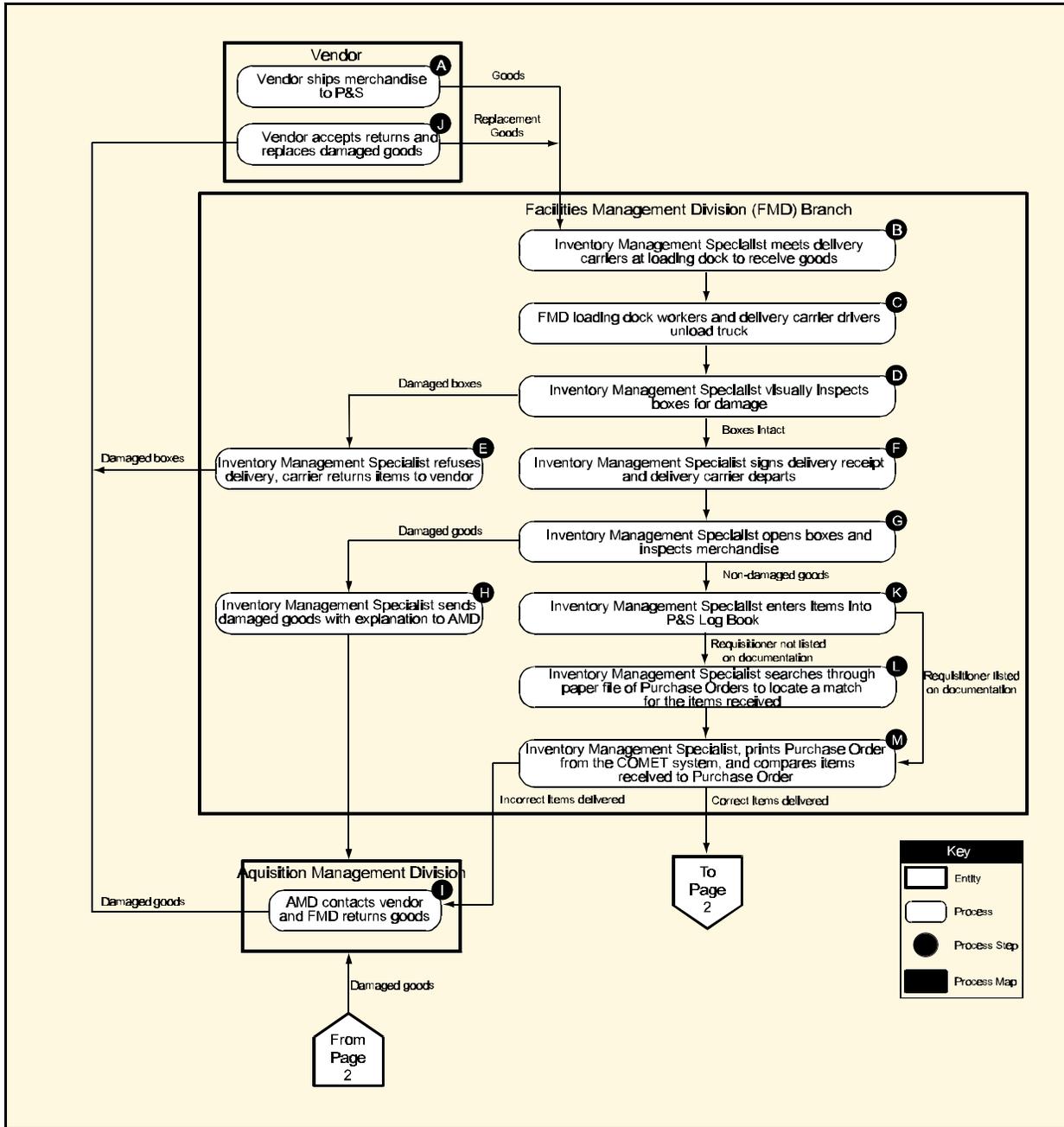


Exhibit 10-1: Sample Current Process Documentation (Page - 1)

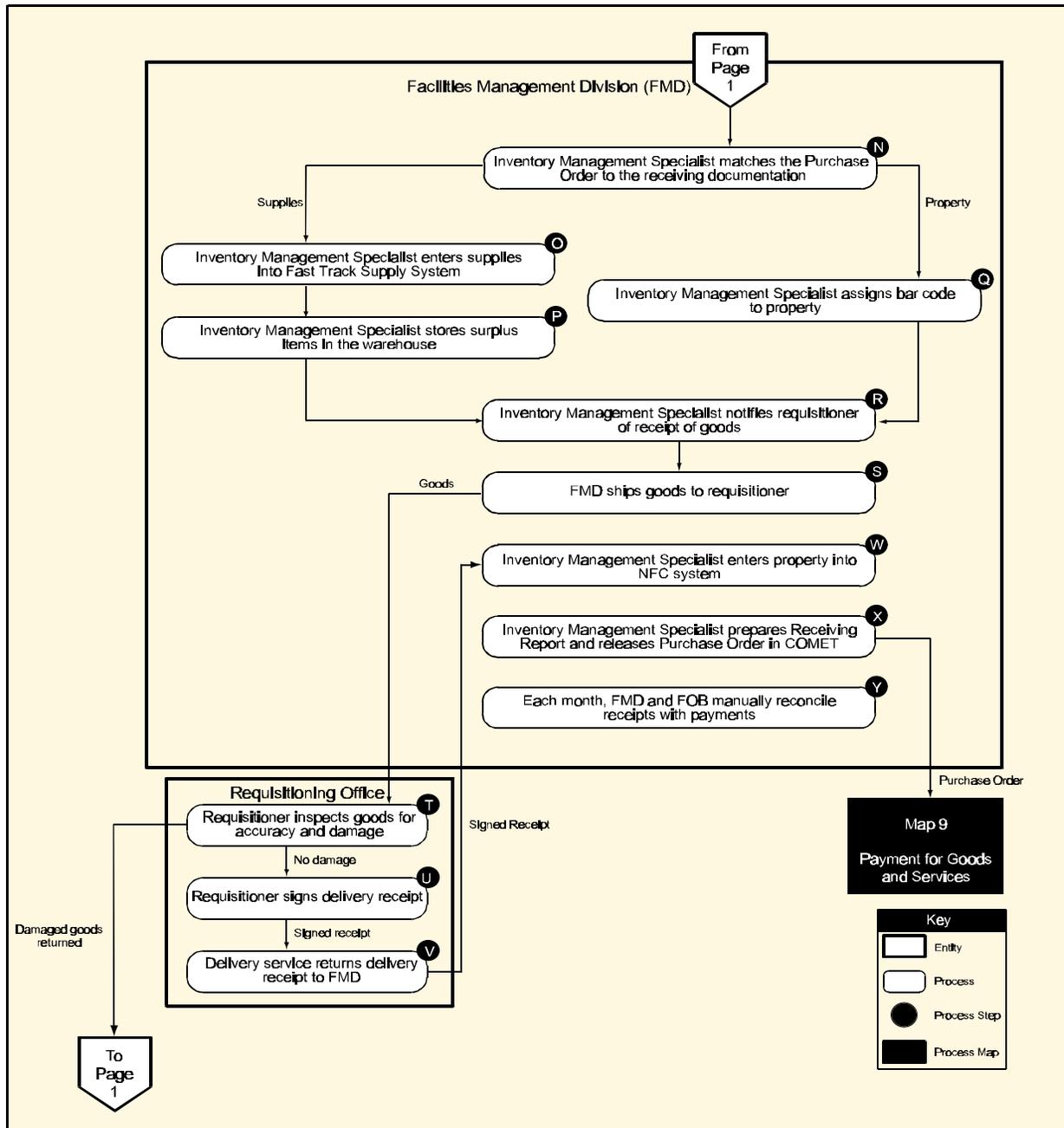


Exhibit 10-1: Sample Current Process Documentation (Page - 2)

10.2. DEVELOPING WORKFLOWS FOR THE EDI APPLICATION

After the current process has been documented, the implementation team should develop workflows for the EDI-based application. The new application should include not only EDI technology, but also other process improvements and changes that will increase efficiency and cost effectiveness of the function being performed.

To develop workflows for an EDI-based application, the implementation team should take the following steps:

- 1. Identify Documents and Transactions That Are Exchanged with External Entities:** EDI and EFT are used to exchange documents and funds with external entities. The implementation team should examine current process flows and identify all documents and transactions that are sent to or received from external entities, such as vendors and suppliers, and determine the data requirements for these transactions.
- 2. Identify EDI and EFT Transaction Sets:** Once the implementation team has identified the transactions that are to be converted to EDI or EFT, it should match these transaction sets to available EDI and EFT transactions. The data requirements gathered in the earlier step should be matched to the fields available in the transaction set, and implementation conventions should be developed. If there are no available transaction sets that match the business document, a new transaction set will have to be developed and approved by the appropriate ANSI ASC X12 committee. Section 3, EDI Message Standards, presents detailed information on available standards and developing implementation conventions.
- 3. Determine New Transaction Flow:** As a next step, the implementation team should determine how the electronic transactions will flow in the new application, including the originator and recipient of each transaction, the event that will trigger the transaction, and the timing or frequency of exchange of each transaction.
- 4. Identify Other Process Changes:** The implementation team should re-examine the problems that were identified with the current process and determine whether improvements or changes can be designed into the new application to prevent the same problems from occurring again. The changes should also attempt to streamline the function by eliminating non-value added steps.
- 5. Document New Process:** Based on the decisions made in the earlier steps, the implementation team should develop flowcharts for the new EDI-based application. The flowcharts should be accompanied by narratives and information on transaction sets that will be used volumes. Exhibit 10-2, Sample EDI-Based Process Documentation, presents a sample flowchart for a redesigned version of the process of receiving and accepting goods.

The implementation team should present the new EDI-based application to key staff and management from the functional area that will be affected by the application and obtain comments from them. The comments should be used to streamline the application design and in developing an implementation plan for the new application.

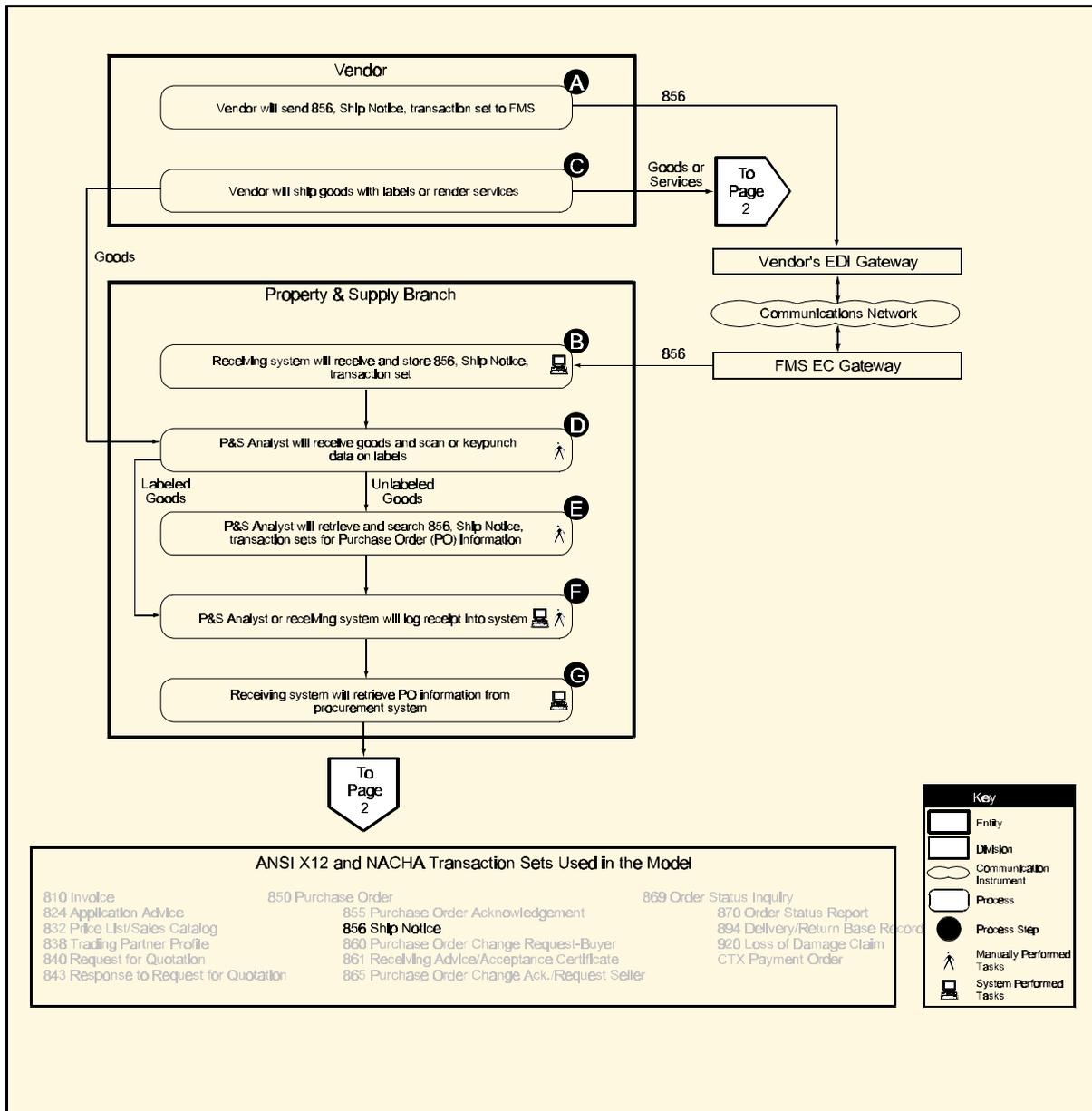


Exhibit 10-2: Sample EDI-Based Process Documentation (Page -1)

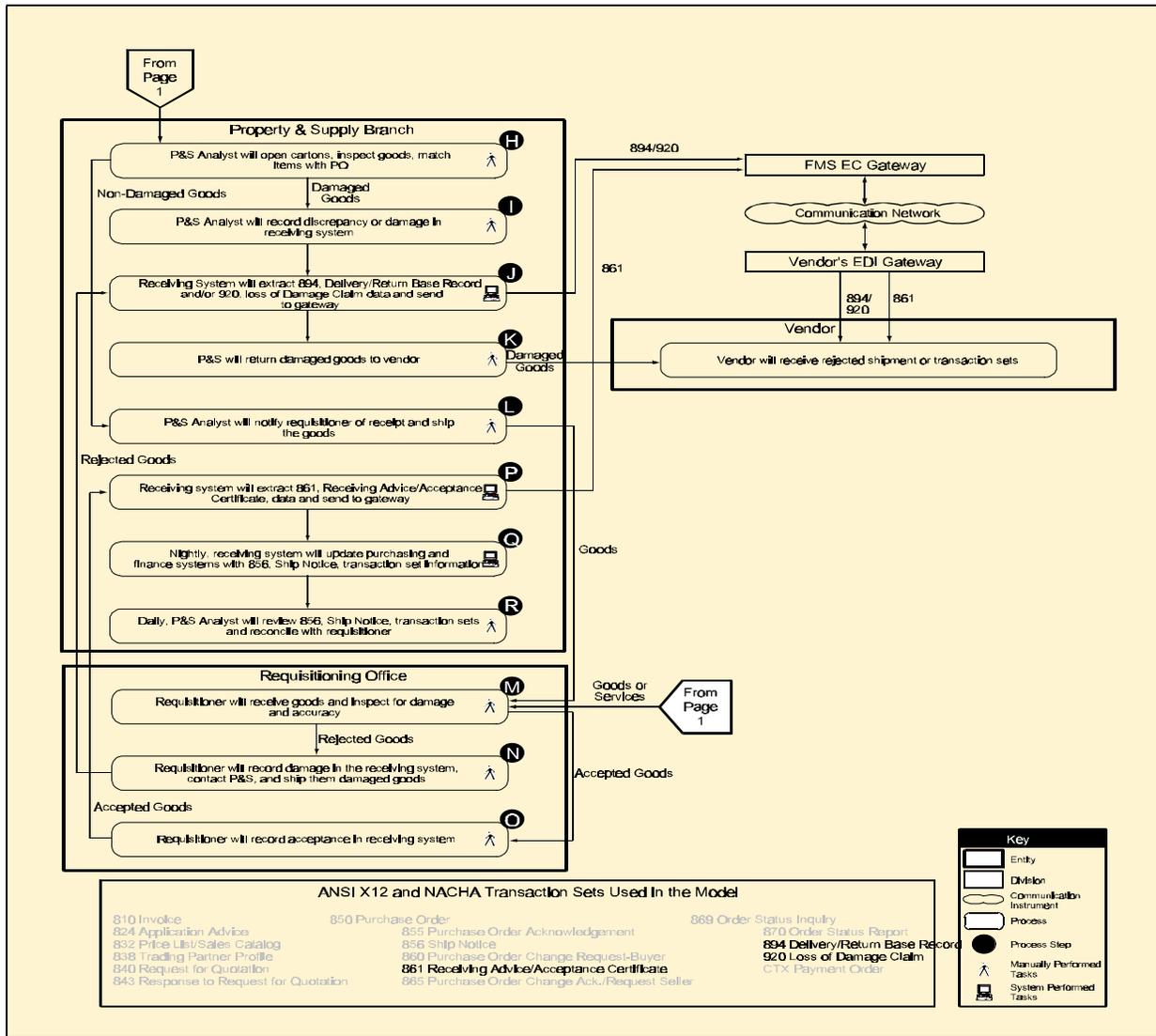


Exhibit 10- 2: Sample EDI-Based Process Documentation (Page 2)

10.3. DEVELOPING AN EDI IMPLEMENTATION PLAN DOCUMENT

Before implementation begins, an EDI implementation plan must be developed. This plan should guide the implementation team through implementation and should include the following:

- ◆ Current and new application process flows
- ◆ Implementation conventions for transaction sets in the application
- ◆ Timeline for each stage of the implementation

- ◆ Step-by-step plan for implementing a pilot project
- ◆ Full scale implementation considerations
- ◆ **Step-by-step approach for selecting and implementing trading partners for the pilot project**
- ◆ **Strategy for full scale trading partner implementation**

The implementation team should present the plan to the management of the departments affected by the EDI application, and obtain their approval to proceed with the implementation.

11. IMPLEMENTING AN EDI PILOT

Prior to implementing an EDI application with its trading partners, it is recommended that an organization conduct a small pilot of the application. In addition to the technical knowledge and experience gained, the initial success from a pilot effort is an important step in building the credibility of the EDI project team and the confidence of the users. A pilot implementation is also an effective vehicle for demonstrating to management the benefits of an EDI program, which are often strategic and difficult to quantify. A typical pilot involves converting 5 to 10 trading partners to an EDI application consisting of 1 or 2 transaction sets for a period of 4 to 6 months.

This section presents a detailed approach to implementing a pilot EDI application, using the steps listed below.

1. Establish project team
2. Determine functions to be included
3. Redesign the process
4. Recruit pilot trading partners
5. Define pilot technical architecture
6. Acquire and install hardware and software
7. Arrange for network services
8. Build interfaces to in-house application systems
9. Train users and trading partners
10. Test pilot system
11. Implement pilot system
12. Evaluate pilot system

Each of the above steps is described in further detail in the sections that follow.

1. Establish Project Team: In order to successfully implement an EDI pilot, an organization must have a solid support structure in place, and must commit dedicated resources, both in terms of staffing and funding, to develop and execute the EDI strategy. One of the first steps that an organization must take is to establish an EDI project team. Project team members should be drawn from all departments affected by the EDI pilot application. The EDI project team should be headed by a Project Leader who is knowledgeable and trained in EDI issues and is responsible for:

- Planning and implementing the EDI strategy
- Establishing project schedules
- Planning and tracking project budgets and estimates

- Defining the roles and responsibilities of team members
- Determining the cost of implementing the EDI program
- Obtaining funding from the responsible departments

In addition, an EDI Steering Committee composed of members from top management from the affected departments should be created. The Steering Committee should be responsible for reviewing and approving the actions of the EDI project team and authorizing funding as necessary for the project team's activities.

2. Determine Functions to be Included: The first step in designing and implementing a pilot EDI application is to determine the functions that will to be included within the scope of the pilot. The functions selected should meet the following criteria:

- Should be high volume, labor intensive, and paper-based, so that there will be substantial benefits in converting them to EDI
- Should be limited in number so that they can be accommodated within one or two EDI transaction sets

3. Redesign the Process: Substantial benefits from implementing EDI are usually not attainable without making fundamental changes to existing business processes that were originally designed for a paper-based environment. In preparing to implement an EDI pilot, an organization should explore the numerous opportunities available to them for redesigning their processes. This will result in greater cost savings while bolstering the credibility of EDI as an effective business solution.

Section 10, Planning the EDI Implementation, presents a detailed sequence of steps that an organization should follow when redesigning their processes.

4. Recruit Pilot Trading Partners: An organization should select 5 to 10 trading partners to participate in the pilot effort. These trading partners should represent a cross section of the parties with whom the organization conducts business. This will allow the organization to best observe the true impact of the EDI application on their trading partner community.

Section 9, Trading Partner Strategy, presents a discussion on how an organization should select and implement trading partners in an EDI pilot. Similar steps may be taken to select and recruit trading partners for the EDI pilot.

5. Define Technical Architecture: The EDI project team should define the technical architecture, consisting of the hardware, software, and telecommunications components, that will be used for the pilot system. The EDI technology infrastructure should support the organization's current needs, and at the same time, be flexible enough to permit future expansion to other functions.

The following are some of the factors that should be considered in selecting technical components for the pilot EDI application:

Hardware Platform: The following factors, along with cost, should be taken into consideration in selecting a hardware platform for the EDI gateway for the pilot system:

Processing Speed: The hardware should be capable of accommodating the volume of data the organization exchanges with its trading partners. Projected growth in the number of trading partners, increases in the number of EDI applications, and projected business growth should be taken into consideration in determining the desired processing speed.

Storage Capacity: The hardware selected should have adequate disk capacity to store historical information on outgoing and incoming data.

Data Transfer Capabilities: If the EDI translation software will not be located on the same hardware platform as the application system, the ease and reliability of transferring data should be taken into consideration in selecting a hardware platform for the EDI gateway.

Organizational Strategy: The organization's long-term hardware strategy should also be considered. For example, if the organization is converting all its systems to a client-server environment, then the hardware selected for the EDI gateway should probably be a UNIX-based system that can be integrated with future application systems.

Backup System: As use of the EDI application grows, a backup system should be available in case of hardware or software problems or failures.

Software: If the organization does not own an EDI translation software package, it will need to examine packages that are available in the commercial marketplace. If the organization already owns an EDI translation software package, it should ensure that the package will meet the requirements of the EDI application.

Section 4, EDI Translation Software, presents a detailed discussion on determining requirements for an EDI translation software, and the process of evaluating and selecting an EDI translation software package.

Telecommunications: The EDI project team should also determine the communications requirements for the pilot project and examine the options available for the EDI pilot application.

Section 5, Communication Networks, presents a detailed discussion on the available communication network options, and the process of evaluating and selecting a communication network.

Finally, an organization should ensure that the technical infrastructure selected will accomplish its intended purpose (i.e., the electronic exchange of business documents with trading partners) at a reasonable cost. It may be a sound idea to acquire a smaller and less powerful hardware and software platform for the pilot at a low cost, and later upgrade to a more powerful system for the full scale implementation.

- 6. Acquire and Install Hardware and Software:** Based on the technical architecture selected, it may be necessary for an organization to acquire and install hardware and software. The organization should ensure that these components are implemented in a timely manner for the pilot project. In addition, access to the EDI gateway should be restricted to authorized users through the use of identification numbers and passwords.
- 7. Arrange for Network Services:** To exchange EDI messages with its trading partners, an organization will need to acquire network services. Several VAN or network options exist and are described in Section 5.1, Communication Network Options. An organization should obtain the most current prices for the services required by their EDI application (e.g., mailbox, character, and messages costs) and select the best alternative.
- 8. Build Interfaces to In-House Application Systems:** The organization will need to modify its in-house application systems to transfer data between their EDI translation software and in-house application systems. To accomplish this, the organization will need to design and develop interfaces to perform the following functions:

Extract data from in-house application systems and reformat it into the flat file required as input to the EDI translation software.

Edit and validate data received from the pilot trading partners, produce an error listing (if necessary), and update the in-house application systems.

The organization should conduct a requirements analysis and develop system specifications for each of the interfaces, as well as code, test, and implement the interfaces. In addition, the organization should ensure that its EDI gateway is in place and ready for operation. Finally, the organization should confirm that the modifications to its in-house application systems have been completed and thoroughly tested, and that its in-house application systems are able to interface properly with the EDI gateway.

- 9. Train Users and Trading Partners:** The education and training of an organization's users and trading partners is vital to the success of the EDI application. Both parties should be educated as to why the organization is implementing EDI and what impact it will have on the current process. The training should cover, at a minimum, topics such as EDI technology and the EDI application, and enable both parties to operate and maintain the EDI application. Trading partners should also be provided with documentation that includes:

Functional design and processing flow specifications for the EDI application

Implementation conventions for the transaction set(s) being used

Suggested software and network options

Implementation and testing procedures for the EDI application

- 10. Test Pilot System:** The organization should conduct a series of dummy and acceptance tests with their pilot trading partners to ensure that the data being exchanged via the EDI application is both accurate and timely. First, a dummy transaction test, using fictitious data, should be performed to ensure that the data being passed between trading partners is formatted correctly and is being interpreted correctly by both parties.

Upon successful completion of dummy tests, acceptance tests should be conducted with the pilot trading partners. The tests should simulate actual transactions and should include messages that mirror recent production data. The organization should provide the pilot trading partners with detailed procedures for the acceptance tests in advance.

The tests should encompass all transactions that will be exchanged as part of the EDI application, and should include messages that mirror recent production data. The organization should provide the pilot trading partners with detailed procedures for the acceptance tests in advance.

- 11. Implement Pilot System:** After successfully completing the dummy and acceptance tests, each trading partner should be implemented on the pilot EDI application. At that point, the organization should rely solely on the EDI application and no longer perform the process(es) being replaced.

It is likely that many of an organization's trading partners will not be EDI capable. During the course of implementation and testing, they may encounter technical and functional questions or problems. Therefore, the organization should establish a Help Desk, staffed with personnel knowledgeable in all aspects of the EDI application, to answer any questions that trading partners may have.

- 12. Evaluate Pilot System:** The organization should perform an evaluation of the pilot EDI application after the pilot system has been operational for 4 to 6 months. The evaluation should include an assessment of the following items:

Ease of use for the organization and trading partners

Accuracy of exchanged data

Actual cost to transmit data

The organization should consider the results of this evaluation when planning for the full scale implementation of the EDI application.

In order to ensure a smooth transition from a pilot EDI application to one that can be used for all trading partners, the organization must develop a comprehensive strategy for full implementation. This strategy should address possible enhancements to the EDI application and technology infrastructure, as well as organization and management issues, all of which are highly interdependent. In addition, since the success of the EDI application will ultimately be determined by the level of trading partner participation, an organization must develop a strategy for recruiting and implementing their entire trading partner community.

12. CONDUCTING COST/BENEFIT ANALYSES FOR EDI APPLICATIONS

A Cost/Benefit Analysis is a method of evaluating the net financial costs, cost savings, and benefits associated with changing a process or program. The primary purpose of a Cost/Benefit Analysis is to compare the cost of maintaining the current process to the initial investment and ongoing costs necessary to modify or replace that process, and determine whether the implementation of the modified or new process or system will be cost effective.

This section presents a methodology that can be used to estimate and compare costs and cost savings for EDI-based applications. It also defines costs, cost savings and benefits specific to EDI-based applications.

12.1. DEFINITION OF COSTS, COST SAVINGS, AND BENEFITS

Presented below are definitions and lists of the costs, cost savings, and benefits that are typically associated with EDI-based applications. The implementation team should use these lists as a starting point for determining the costs, cost savings, and benefits that are likely to result from implementing the specific application under consideration.

- ◆ **Costs:** Costs are additional expenditures, cash outlays, or losses that arise as a result of changing the current process or program. Costs include both one-time and recurring expenditures. Some cost categories that should be considered when implementing EDI-based applications are:

- Hardware for the EDI gateway

- Software (EDI translation software, communications software, etc.)

- Cost of modifying current application systems

- Telecommunications (VAN) charges

- Trading partner outreach program costs

- Ongoing support and maintenance costs

- ◆ **Cost Savings:** Cost savings are reductions in expenditures, cash outlays or losses that result from changing a current process or program. Current processing costs are included in this category because they will no longer be incurred if the current process is terminated. Some of the cost savings that are typically associated with the implementation of EDI-based applications are:

Labor costs (from the elimination of data entry, paper document handling, reconciliation and other manually performed tasks)

Mailing costs

Document management costs (on site and off site storage)

- ◆ **Benefits:** Benefits are advantages that are gained as a result of changes to the current process or program. Benefits may be quantifiable or non-quantifiable, and include:

Reduction in data entry error rates

Improved cash management, including increased interest from reduced cycle time for receiving payments electronically

Elimination of communication lag time between agency and customer

Improved customer service

Expandability of the system to other functions (Using the same translation software for various applications such as procurement, collections, payments, etc.)

12.2. COST/BENEFIT ANALYSIS METHODOLOGY

Once the cost, cost saving, and benefit categories that are expected to arise from a particular application have been defined, the implementation team should conduct a Cost/Benefit Analysis using a well defined methodology. The methodology should provide guidelines for performing, at a minimum, a Cost/Benefit Analysis, Net Present Value Analysis, and Break-even Analysis.

Presented below are a series of steps that the implementation team can use in conducting a Cost/Benefit Analysis for an EDI-based application:

- 1. Define Objectives of the Cost/Benefit Analysis:** As a first step in conducting a Cost/Benefit Analysis, the implementation team should define the objectives of the analysis. The methodology used for the analysis should then be tailored to meet the defined objectives.
- 2. Develop Assumptions and Constraints of the Cost/Benefit Analysis:** It is likely that the implementation team will have to make a number of assumptions regarding certain aspects of the new application, such as the expected life of the system, implementation timeframes, etc. The implementation team should clearly define all these assumptions and document them as part of the analysis.

Exhibit 12-1, Assumptions Used in Cost/Benefit Analyses for EDI Applications, presents a list of assumptions that are commonly used in conducting cost/benefit analyses for EDI-based applications.

1. **Useful Life of the New System:** The useful life of the new application over which costs and cost savings will be projected. (OMB standards prescribe a 3 to 7 year period.)
2. **Development Period:** The period of during which there will be one time software and systems development costs, but no cost savings.
3. **Start Date:** The project start date that will be used discounting costs and cost savings in the NPV analysis.
4. **Discount Factor:** The rate that will be used to discount costs and cost savings in the NPV analysis. (OMB Circular A-94, prescribe a discount factor of 10%.)
5. **Constant Dollars:** Costs and cost savings should be based on current estimates, and no inflation rate should be added to labor and material costs over time (OMB Circular A-94).
6. **Government Costs and Cost Savings:** The CBA should only include costs and cost savings relevant to the government, and not include trading partner costs.
7. **Salary:** The GS salary schedule should be used to compute all labor costs with an appropriate percentage added to the base salary for benefits.

Exhibit 12-1: Assumptions Used in Cost/Benefit Analyses for EDI Applications

3. **Identify Changes to Current Processes or Systems:** In the planning phase of the EDI implementation, the implementation team should have developed workflows for the current process as well as for the proposed EDI-based application. (A description of the planning phase is presented in Section 10, Planning an EDI Implementation.) As part of the Cost/Benefit analysis, the implementation team should compare the two sets of workflows and identify changes that will result from implementing the new application, such as the elimination of manual data entry or paper-handling functions. The changes should then be used in estimating the costs, cost savings, and benefits of the implementation of the new system.
4. **Collect Data for Cost/Benefit Analysis:** Next, the implementation team should define the source and method of collection of data necessary for calculating each identified cost, cost saving, and benefit. Data can be collected in several ways, and from several sources including the following:

Data on current costs can be collected from the organization using questionnaires. A sample questionnaire is presented in Appendix I.

Data on hardware and software should be obtained from vendors.

Telecommunication costs should be calculated using current and projected transaction volumes and costs obtained from network service providers.

Systems development and ongoing support and maintenance costs should be calculated by estimating the time required for these tasks and multiplying it by an appropriate hourly labor rate.

Team members should divide up the data collection tasks and obtain the data necessary for calculating costs, cost savings, and benefits.

- 5. Prepare Cost/Benefit Analysis:** The implementation team should develop an automated spreadsheet model to analyze and display the quantifiable costs and cost savings that will result from implementing the new application. The model should be set up so that data can be entered as separate variables that can be easily changed to perform “what-if” analyses. The model should also calculate the Net Present Value of the application and provide a means for performing a Breakeven Analysis.

Exhibit 12-2, Sample Cost/Benefit Analyses Results, presents summary costs, summary cost savings, Net Present Value, and Breakeven charts for a sample Cost/Benefit analysis.

- 6. Prepare Cost/Benefit Report:** Once the analysis is complete, the project team should prepare a report to present and explain the output contained in the analysis. The report should contain a summary of the findings backed up by all the detailed analysis and calculations. The report should also contain a section stating the conclusions that may be drawn from the analysis.

The results of the Cost/Benefit analysis should be presented to the EDI Steering Committee and should be used as a basis for obtaining the approval and funding necessary to proceed with the implementation.

Cost Summary								
Cost Categories	Development Periods	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
1. Hardware	\$2,500	\$0	\$0	\$0	\$0	\$0	\$0	\$2,500
2. Software	\$3,000	\$800	\$800	\$800	\$800	\$800	\$800	\$7,800
3. Telecommunications	\$0	\$700	\$1,200	\$1,200	\$2,100	\$2,100	\$2,100	\$9,900
4. Development of Interface	\$10,000	\$0	\$0	\$0	\$0	\$0	\$0	\$10,000
5. Ongoing support and Maintenance	\$20,000	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	\$10,000	\$200,000
Total	\$35,500	\$41,500	\$42,000	\$42,500	\$42,900	\$12,900	\$12,900	\$230,200
Cost Savings Summary								
1. Data Entry	\$0	\$30,000	\$60,000	\$75,000	\$90,000	\$90,000	\$90,000	\$435,000
2. Reconciliation Labor	\$0	\$10,000	\$20,000	\$30,000	\$30,000	\$30,000	\$30,000	\$150,000
3. Mailing Costs	\$0	\$2,000	\$5,000	\$7,000	\$7,000	\$7,000	\$7,000	\$35,000
Total	\$0	\$42,000	\$85,000	\$112,000	\$127,000	\$127,000	\$127,000	\$620,000
Net Present Value Analysis								
Total Cost Savings	\$0	\$42,000	\$85,000	\$112,000	\$127,000	\$127,000	\$127,000	\$620,000
Total Costs	\$35,500	\$41,500	\$42,000	\$42,500	\$42,900	\$12,900	\$12,900	\$230,200
Net Cost Savings	(\$35,500)	\$500	\$43,000	\$69,500	\$84,100	\$114,100	\$114,100	\$389,800
Discount Rate @ 10%	1.000	0.9091	0.8264	0.7513	\$0.6830	0.6209	0.5645	
NPV of Net Cost Saving	(\$35,000)	\$455	\$35,537	\$52,216	\$57,441	\$70,847	\$64,406	\$245,403

NPB/Cost Ratio	- 100.00 %	\$1.20 %	102.38 %	163.5 3%	196.0 4%	884.5 0%	884.50 %	
Breakeven Analysis								
NP Value of Cost Saving	\$0	\$38,182	\$70,248	\$84,147	\$86,174	\$78,857	\$71,688	\$429,856
Net Present Value of Cost	\$35,500	\$37,727	\$34,711	\$31,931	\$31,931	\$8,010	\$7,282	\$184,462
Cumulative PV Cost Savings	\$0	\$38,182	\$108,430	\$192,577	\$192,577	\$358,177	\$429,856	
Cumulative PW Costs	\$35,500	\$73,227	\$107,938	\$139,869	\$169,170	\$177,780	\$184,462	
Breakeven Year			1998					

Exhibit 12-2: Sample Cost/Benefit Analyses Results

APPENDIX B

***LIST OF FEDERAL
IMPLEMENTATION CONVENTIONS***

This appendix presents a list of the Federal implementation conventions available to date. The National Institute of Standards and Technology (NIST) publication number, where available, has also been provided in parenthesis after the name of each transaction set.

SET NUMBER	TRANSACTION SET NAME	ANSI X12 VERSION
810	Invoice, including commercial and progress pay invoices (NIST Special Publications 881-10 and 881-xx)	3040, 3050
820	Payment Order/Remittance Advice (NIST Special Publication 881-11)	3040
824	Application Advice (NIST Special Publication 881-15)	3040, 3050
832	Price/Sales Catalog (NIST Special Publication 881-16)	3050
836	Contract Award (NIST Special Publication 881-9)	3040, 3050
838	Trading Partner Profile, including vendor registration and confirmation	3040
840	Request For Quotation (NIST Special Publications 881-8 and 881-18)	3040, 3050
843	Response to Request for Quotation (NIST Special Publication 881-7)	3040, 3050
850	Purchase Order/Award Instrument (NIST Special Publication 881-3)	3040, 3050
855	Purchase Order Acknowledgment (NIST Special Publications 881-6 and 881-12)	3040, 3050
860	Modifications to Award Instrument (NIST Special Publication 881-4)	3050
864	Text Message (NIST Special Publications 881-14 and 881-19)	3040, 3050
865	Purchase Order Change, Acknowledgment - Seller Initiated (NIST Special Publication 881-5)	3050
997	Functional Acknowledgment (NIST Special Publications 881-13 and 881-17)	3040, 3050

Federal implementation conventions may be obtained in the following ways:

Download from the World Wide Web site, <http://snad.ncsl.nist.gov/dartg/edi/fededi-info.html#sec-1994ic>, as Postscript, SEF, PDF, or ASCII files

Order by calling the NIST Public Inquiries Desk at (301) 975-3058, and providing them with the special publication number. The Inquiries Desk will provide information on how to order the publication from the Government Printing Office (GPO).

APPENDIX C

FMS CONTACT INFORMATION

This appendix provides addresses and phone numbers for FMS personnel who should be contacted for assistance with EDI implementation.

- ◆ Austin Regional Financial Center
1619 E. Woodward Street
Austin, TX 78741

CAS Manager: (512) 342-7200
EDI Manager: (512) 342-7212

- ◆ Birmingham Regional Financial Center
190 Vulcan Road
Birmingham, A 35201-2451

CAS Manager: (205) 290-7234

- ◆ Chicago Regional Financial Center
536 S. Clark Street
Chicago, IL 60605

CAS Manager: (312) 353-2364

- ◆ Kansas City Regional Financial Center
4241 NE 34th Street
Kansas City, MO 64117

CAS Manager: (816) 414-2100

- ◆ Philadelphia Regional Financial Center
13000 Townsend Road
Philadelphia, PA 19154

CAS Manager: (215) 516-8000

- ◆ San Francisco Regional Financial Center
390 Main Street
San Francisco, CA 94106

CAS Manager: (415) 744-7433

APPENDIX D

***FINANCIAL MANAGEMENT SERVICE
NETWORK STANDARDS DOCUMENT***

D R A F T

**FINANCIAL MANAGEMENT SERVICE
NETWORK STANDARDS DOCUMENT**

FOR

EXTERNAL NETWORK CONNECTIONS

May 10, 1996

**Mr. Wally Fung
Director, Network Management Division**

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Financial Management Service Network (FMSnet)

Introduction

To provide a modern integrated financial management system and to support its mission in providing a Government-wide Financial Management Infrastructure, FMS is consolidating its computing operations into three Regional Operation Centers (ROC) linked by a state of the art communications network. The communications network, FMSnet, is designed to be a highly reliable, available, and secure multi-purpose network in support of the evolving requirements of FMS and its customers. The Regional Financial Centers (RFC) are linked to the consolidated centers through four hubs. The hubs are located at Austin, Texas, Hyattsville, Maryland, and Philadelphia, Pennsylvania, and Kansas City, Kansas. (see figure 1)

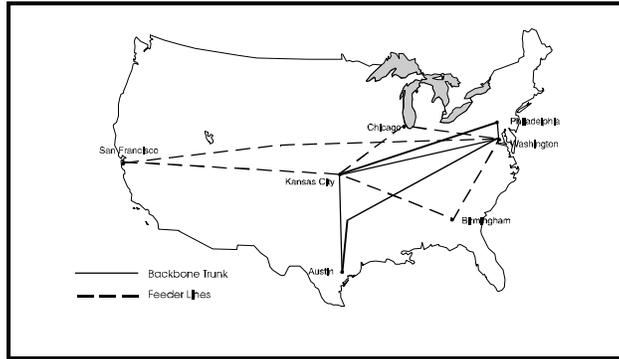


Figure 20

The hub sites will be connected to all of the other FMS sites. It is through these hub sites that information from the Federal Agencies, using the network, must pass in order to be directed to the appropriate FMS sites for processing (see figure 2). To support the requirement for high reliability, the hub sites are the most appropriate locations for these connections to occur.

Consequently, FMS is currently implementing a strategy requiring that a customer's network be connected with FMS's network via the Austin, Hyattsville, Philadelphia or Kansas City hub sites. Certain customers, who have large volumes of electronic file transfers with FMS, may want to connect with more than one site to maintain a higher state of reliability than with only one single physical connection into the network. The hub sites will have the most sophisticated telecommunications equipment within FMS and are best suited for directing the incoming data transmissions to its proper destination.

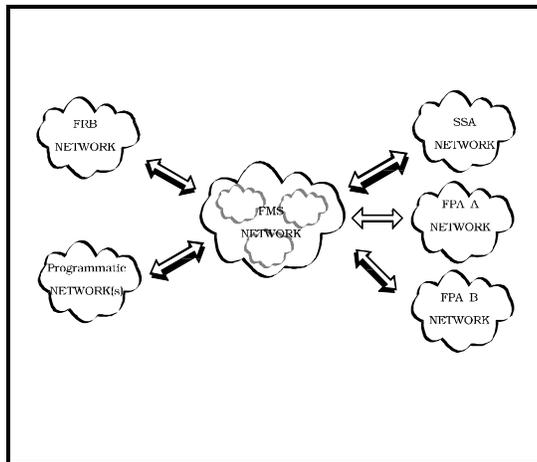


Figure 21

Purpose

The purpose of this document is to provide FMS customers with sufficient technical and operational information to support the physical as well as logical network- to-network implementation. It explains the business nature of FMS and the telecommunications architecture that supports and produces governmental financial data. This document contains the business as well as the network key players who will assist in finding solutions that will meet customer needs.

Once the link(s) to the FMSnet are established, an agency will be capable of electronically transmitting financial information. Both payments related as well as other program related data such as GOALS can be sent to the appropriate FMS and FMS contractor sites instantaneously, any time of the day. Customers who are interested in using telecommunications technology to improve information exchange capability with FMS are encouraged to consider network connection with FMSnet via the four identified hubs.

General

FMSnet SNA Architecture

We currently have three VTAMs serving as GWSSCPs (Gateway System Service Control Points) for our SNA network, located at Hyattsville, Austin, and Philadelphia. Our primary GWSSCP is FMSCDM06, secondary is FMSCDM63, and tertiary is FMSCDM85. Our preferred method for SNA connectivity with customer agencies is to utilize IBM's SNA Network Interconnect (SNI) back-to-back null network. Currently, FMS operates with VTAM 3.4.2 soon to go to VTAM 4.2 and NCP 5.4 soon to go to NCP 7.

The mainframes are located at Hyattsville, Austin, and Philadelphia are IBM 3090-600E mainframes with the MVS XA/ESA operating systems. The remainder of FMSnet connects to our Regional Financial Centers (RFCs) located in Birmingham, Chicago, Kansas City, and San Francisco. These RFCs all run the VSE operating System.

The FMSnet has three T1 SNA links into the Federal Reserve Banks (FRB); Philadelphia FRB, Richmond FRB, and Dallas FRB. These links exist for payment functions, payment related applications, digital check image retrieval process, interactive sessions, check MICR updates. The file transfer used for these applications is predominately Bulk Data, a FRB proprietary product.

FMS plans to offer value added services to support financial related businesses such as cross networking access for agency grants and Thrift Savings Plan (TSP) updates. These services along with more will be added in the near future.

FMSnet TCP/IP Architecture

In addition to the SNA network connection environment, FMSnet MVS TCP/IP connectivity is also available. **The network support for TCP/IP is a router based architecture. To support external customer network connectivity, FMS employs Cisco routers at the three ROC sites. Agencies desiring TCP/IP connectivity from a MVS, Unix, or Windows NT environment may do so. The three ROC sites will provide the TCP/IP connectivity entry point. Because of the security potential with the Internet access, connections into routers would have to be dedicated links to support file transfers using Connect:Direct and XCOM (see file transfer utility below).**

Host to Host File Transfer Utility Considerations

For host to host connectivity, there are two file transfer utility/software products supported by FMSnet, Sterling Commerce's Connect:Direct™ (formally Systems Center's Network Data Mover) and Computer Associates' XCOM™ (formally Legent Corporation). We currently have the Connect:Direct™ product installed and fully functional under MVS at our Hyattsville, Austin, and Philadelphia Regional Operations Centers (ROC) MVS sites and under VSE at each of our RFCs. XCOM is installed and fully functional under MVS at our ROC sites only.

Connect:Direct™ has been chosen as a standard for a number of reasons including the functionalities it provides as well as our current customer installed base. Connect:Direct™ provides a number of advanced functionalities including: (1) parallel sessions and data compression, (2) direct file-to-file transfers, (3) session establishment and session retry, (4) execution based on time, date and priority criteria, (5) synchronized submission, (6) checkpoint/restart, and (7) requests initiated by applications and batch jobs. Connect:Direct™ is available for a variety of operating systems including MVS, VM, VSE, Tandem, AS/400, VMS, OS/2, MS-DOS, and Unix.

Similar to Connect:Direct™, XCOM™ provides value added file transfer capabilities: (1) file transfer function, (2) remote report printing, (3) unattended file transfers, (4) data compression, (5) checkpoint/restart capability, (6) the ability to provide audit trails, and (7) job submission for cross-platform communications between mainframes, midranges, and workstations from all major manufacturers. XCOM™ supports data transport between host systems and all other major systems including: MVS, VM, VSE, VAX/VMS, AS/400, Stratus, Tandem, SUN OS, RS/6000, HP 9000, SCO UNIX, OS/2 PC-DOS, Windows and other platforms. XCOM™ supports SNA services and TCP/IP on a DOS and Unix platform. Computer Associates plans for XCOM™ to operate on MVS TCP/IP by mid 1996.

Although Connect:Direct™ and XCOM™ are our products of choice due to their robust nature, audit and control capabilities, and ease of operation in support of hundreds of mission critical transfer of payment data, we can provide as a short term interim solution **not to exceed twelve months** file transfer via Network Job Entry (NJE). Since the RFCs are currently operating under VSE, VSE/POWER PNET is available to communicate with other IBM operating systems. It communicates with VM RSCS or MVS with JES2 or JES3. Establishment of network communication links is assumed present. The networking capabilities of NJE/PNET allow transfer of files and jobs to and from other systems. The transfer is completed via card images by the use of system software or application programs that breakdown/buildup disk and tape files. JCL is stored in procs on the VSE mainframe and submitted by the transmitting operating system to run on the receiving mainframe.

PC-to-Host File Transfer Utility Considerations

Personal Computer (PC) version of Connect:Direct™ and XCOM™ are available for use by those customers whose transaction volume is small. (See attached Supplemental Network Guidance and Specifications)

Link Connection Considerations

Due to the sensitive nature of payment data, only dedicated digital link connections are being supported. Currently, FMS supports dedicated host-to-host SNA connections with our

customers using 9.6 KBPS, 19.2 KBPS, or 56 KBPS circuits via serial data line interfaces. TCP/IP connections will also be via dedicated circuits using Connect:Direct™ or XCOM™.

Circuit size will depend upon the volume of data sent and received. In order to estimate the circuit size, the volume and frequency of data in kilobytes is necessary as well as the frequency of transmission.

The following information is provided to assist customer agencies in ordering circuits:

(a) Regional Operation Center (HROC) at Hyattsville

Address: Financial Management Service
3700 East West Highway
Hyattsville, MD 20782

Local Telephone Exchange: (301) 436-XXXX
(301) 344-XXXX

Point of Contact for Installation:

Mike Greenfield (202) 874-9475
Rick Lemon (202) 874-7898

(b) Austin Regional Operations Center

Address: Austin Regional Operations Center
1619 E. Woodward St.
Austin, TX 78741

Local Telephone Exchange: (512) 448-XXXX

Point of Contact for Installation:

Ron Smith (512) 482-7236
Frank McReynolds (512) 482-7236

(c) Philadelphia Regional Operations Center

Address: Philadelphia Regional Operations Center
13000 Townsend Road
Philadelphia, PA 19154

Local Telephone Exchange: (215) 516-XXXX

Point of Contact for Installation:

Paul Dickel (215) 516-8085
Thomas Michalski (215) 516-8060

(d) Kansas City Regional Financial Center Hub

Address: Kansas City Regional Financial Center
4241 NE 34TH Street
Kansas City, MO 64117-0840

Local Telephone Exchange: (816) 414-XXXX

Point of Contact for Installation:

John Grissett (816) 414-2300
Ed Barlett (816) 414-2300

Security: Data Encryption Standard (DES) Considerations

Due to the sensitivity of all the financial data crossing the FMSnet, data encryption devices are required for transfer of payments related information. Encryptors are Racal models. Customer agencies may utilize their own DES encryption devices if keying and management control is to be retained by the customer. Otherwise encryption devices will be provided and supported by FMS. (See attached Supplemental Network Guidance and Specifications)

DCE Connectivity Considerations

All equipment provided by the customers (i.e., CSUs/DSUs, DES devices) and auxiliary equipment must be 19" rack or chassis mountable. **To ensure network operations and reliability, FMS's DCE standard is Racal DCE equipment. The customer agency has the responsibility to purchase the DCE equipment (DSU) for both ends of the circuit. For speeds up to 38.8kps the DCE interface may be either RS232 or V.35. For speeds greater than 38.8kps, the DCE MUST be V.35. When ordering please plan for yearly maintenance coverage for the remote (agency's) DCE. FMS recommends that the customer agency acquire Racal "installation" for their (remote) DCE. (See attached Supplemental Network Guidance and Specifications)**

Network Systems Operations

Our network/systems command center is staffed 24 hours per day 7 days a week and operations staff are always available to assist with any network or systems related problem. For network operations please call (202) 874-8725 between the hours of 7am to 11pm and (816) 414-2350 from 11pm to 7am. For systems operations please call (202) 874-8317 or 8130. A shift supervisor is available during every shift. Maintenance windows are every other payroll Sunday for VTAM/NCP changes beginning at 8am and ending no later than 11pm.

The NCP GEN required to establish the customers logical interface to the FMS mainframes will be done the first non-Federal salary weekend of the month (i.e., May 12, 1996, June 9, 1996, etc.). Testing of the circuit and the selected protocol must be done prior to cut over to production. In addition, a security package will be forwarded separately to document the customers facility status .

FMS uses IBM's Netview version 2.4 for managing all resources in a SNA's domain. Communications Management Configuration (CMC) using a single VTAM within FMSnet will manage cross domain communications. Backup CMCs exist at the other ROC sites.

In order to maintain current agency information, FMS would like the names, business address, and telephone numbers of the customer's network manager, circuit contact, applications contact, and VTAM/NCP contact. Also, please provide the hours of operation for operations and maintenance times along with those telephone numbers. Attached is a Customer Technical Profile worksheet to assist you in the completion of this information.

Products and Service Support Contracts

FMS has several contracts available to support agencies with network support services or file transfer products. These contracts include file transfer product offerings from two vendors: (1) Sterling Commerce, and (2) Computer Associates; and support services for the installation, customization, and testing of either file transfer product.

Agencies that desire the Connect:Direct product should use contract number T-FMS-95-28. Agencies that desire the XCOM product should use contract number T-FMS-95-29. Service support is available through M-Cubed, Inc. M-Cubed is an FMS contractor performing systems and network assistance. The contract number for the service support contract is T-FMS-95-14. COTR for the three contracts is Mr. Ken Bilbo at (202) 874-7957. Mr. Bilbo will assist any client with there special networking requests.

Summary

FMS customers are encouraged to contact their business partners at FMS to discuss innovative use of the telecommunications network to improve overall operational efficiency. Additional technical information and assistance is available from Mr. Wally Fung, Director of the Network Management Division, Ms. Sue McConnell, Manager of Platform Engineering and Integration Branch, or Mr. Kenneth Bilbo, Customer Liaison.

Mr. Fung can be reached at (202) 874-8862 or via E-mail

x.400 mail: N=Wally Fung/C=US/A=Telemail/P=GOV+FMS
Internet mail: WALLY.FUNG@FMS.SPRINT.COM

Ms. McConnell can be reached at (202) 874-7734 or via E-mail

x.400 mail: N=Sue McConnell/C=US/A=Telemail/P=GOV+FMS
Internet mail: Sue.McConnell@FMS.SPRINT.COM

Mr. Kenneth Bilbo can be reached at (202) 874-7957 or via E-mail

x.400 mail: N=Ken Bilbo/C=US/A=Telemail/P=GOV+FMS
Internet mail: Ken.Bilbo@FMS.SPRINT.COM



Supplemental Network Interface Guidance and Specifications:

DOS PC Platform Guidance/Specifications

When ordering the PC version, the software must include LU0 (Netsoft) software. Please acquire maintenance when purchasing either software product. An SDLC board must be purchased when using the PC version. A straight through 25 pin RS-232 cable is necessary to connect the SDLC card to the DSU.

The vendor that supplies FMS with an Adapcom SDLC adaptor card is Network Software Associates (NSA), 1916 Wilson Boulevard, Suite 300, Arlington, Virginia 22201, (703) 875-0444, approximate costs is \$187. Any SNA SDLC card from any vendor should work. The driver should be included.

DES Encryption Guidance/Specifications

Customers need to provide the following interfaces for DES connectivity:

For 56 kps circuit - V.35 DTE interface (industry standard 34-pin male Winchester) and a standard V.35 DCE interface (industry standard 34-pin female Winchester).

For low speed circuits below 56 kps - a standard RS-232 DTE interface (DB25 male) and a standard RS-232 DCE interface (DB 25 female).

DSU Guidance/Specifications

FMS recommends Excaliber Multirate models from Racal Datacom, Inc. For dedicated digital circuits at the remote (agency) site and FMS site use the following models:

Remote (agency) Site

"Excaliber Multirate 232/V35 Standalone DAP"

Racal order # EXDAP232V35

Host (FMS) Site

For V.35 interface - " Excalibur Multirate Central Site V35 DAP, Model C2 chassis"

Racal order # EXDAPV35C2

or

For RS232 interface - " Excalibur Multirate Central Site 232 DAP, Model C2 chassis"

Racal order # EXDAP232C2

If installation is not purchased for the "remote" (standalone) DAPs, customers have the responsibility to set the internal RS232/V.35 settings for the appropriate interface. The factory default is set for V.35.

Racal Datacom's current GSA (#GS00K95AGS7140) prices are as follows:

<u>Location</u>	<u>Order Number</u>	<u>Cost</u>
Agency	EXDAP232V35	\$ 865

" Installation \$ 149
" Maintenance \$ 10/month

FMS EXDAPV35C2 \$ 835
EXDAP232C2 \$ 803

All equipment comes with one year (factory return) warranty. The following Racal sales representative can assist you or direct you to a sales representative for your area:

**Steve Forsyth 1-800-733-4939 / 703-318-7718
(Home/Office) 410-461-8409**

OR

**Chris Payne 703-318-7718
(Sales Assistant)**

**Address: Racal Datacom, Inc
1821 Michael Faraday Drive
Suite 301
Reston, VA 22090**

APPENDIX E

POTENTIAL FOR EDI AND EFT USAGE IN THE GUARANTEED LOAN MANAGEMENT LIFECYCLE

This appendix lists the functions within the phases of the Guaranteed Loan Management Lifecycle in which EDI and EFT can be implemented to improve efficiency, cash management and risk management, and reduce processing costs. These functions are presented in the following exhibits:

Exhibit E-1, Potential for EDI and EFT Usage in the Lender Management Phase

Exhibit E-2, Potential for EDI and EFT Usage in the Loan Origination Phase

Exhibit E-3, Potential for EDI and EFT Usage in the Loan Servicing Phase

Exhibit E-4, Potential for EDI and EFT Usage in the Debt Collection Phase

Potential for EDI and EFT Usage in the Lender Management Phase

Process	Key Features With Potential for EDI and EFT Use
1. Certify Lenders	
1.1 Enter and Edit Lender Application	Receive lender statistics during the certification process, including net worth and financial strength, size, experience and expertise level, and verify that the lender is not currently delinquent on a government debt.
1.2 Process Lender Application Fee	Receive lender application fee and verify that it has been correctly calculated by the lender. Calculate and transmit any refunds due to overpayment of application fees.
1.3 Evaluate Lender Application	Receive and utilize cross-agency lender data to ensure lender is in good standing with other Federal agencies.
2. Recertify Lenders	
2.1 Identify Lenders for Recertification	Receive and utilize cross-agency lender data to ensure lender is in good standing with other Federal agencies.
2.2 Process Recertification Fee	Receive lender recertification fee and verify that it has been correctly calculated by the lender. Calculate and transmit any refunds due to overpayment of recertification fees.
3. Monitor Lenders	
3.1 Enter and Edit Lender Data	Receive updated lender data.
3.2 Process and Evaluate Lender Financial Data	Receive lender financial data on a quarterly basis. Receive lender financial data from external sources (e.g., Dun and Bradstreet) for use in the scoring of lender financial data.

Potential for EDI and EFT Usage in the Lender Management Phase

Process		Key Features With Potential for EDI and EFT Use
4. Conduct Lender Reviews		
4.1	Target Lenders for Review	Inform lenders of periodic on-site reviews.
4.2	Enter Review Results	Receive Corrective Action Data from the lender.
5. Conduct Quality Control Sampling Reviews		
5.1	Select Loans for Review	Generate and transmit Document Request requesting preferred lenders submit loan data (e.g., credit agency reports, verification of employment, appraisal) for a quality control review.
5.2	Determine Borrower Eligibility	Receive and edit loan data to determine whether the borrower meets the program's eligibility requirements (e.g., borrower income, loan purpose). Utilize cross-agency data to identify borrowers who have previously defaulted on Federal debt. Utilize cross-agency to identify borrowers with judgements outstanding for debt owed the United States.
6. Process Review Results		
6.1	Process Sanctions	Generate and transmit Sanction Notices informing lenders of the type of sanction and the reason it is being levied. Receive and verify amount of penalties from lenders found to be non-compliant with Federal Agency and program standards. Calculate and transmit any refunds due to overpayment of sanction fines.

Potential for EDI and EFT Usage in the Lender Management Phase

Process	Key Features With Potential for EDI and EFT Use
7. Support System Management Activities	
7.1 Update Cross-Agency Data Store	Update cross-agency lender data stores.

Potential For EDI and EFT Usage in the Loan Origination Phase

Process	Key Features With Potential for EDI and EFT Use
1. Process Loan Application	
1.1 Enter and Edit Loan Application Data	Receive of loan application data (e.g., borrower data, credit report data, appraisal data, employment and income verification data) from the lender.
2. Approve/Disapprove Loan Application	
2.1 Generate Decision Notice	Generate and transmit Decision Notices informing lenders of approval or disapproval of loan applications.
3. Process Loan Disbursement	
3.1 Receive Loan Disbursement Data	Receive loan disbursement data from lenders.
4. Process Guaranty	
4.1 Process Payment Of Up-front Guaranty Fee	Receive up-front guaranty fees and verify that it has been correctly calculated by lenders. Calculate and transmit any refunds due to overpayment of up-front guarantee fees.
4.2 Issue Loan Guaranty	Generate and transmit Guaranty Endorsements to lenders to confirm that the loan is guaranteed.
4.3 Cancel Guaranty Commitment	Generate and transmit Commitment Cancellation Notices to inform lenders that the guaranty commitment has been canceled and that any up-front guaranty fees will be refunded.

Potential For EDI and EFT Usage in the Loan Servicing Phase

Process	Key Features with Potential for EDI Use
1. Process Monthly Loan Status Updates	
1.1 Process Monthly Updates of Loan Status	Receive periodic loan status updates from lender, servicer, or guaranty agency.
1.2 Identify Missing Loan Status	Generate and transmit notices to lenders who have not submitted loan status updates.
2. Process Periodic Guaranty Fees	
2.1 Generate Bill for Periodic Fees	Generate and transmit bills for penalties assessed for late payment and periodic guaranty fee payments due from lenders.
2.2 Process Periodic Fee Payments	Receive periodic fee payments from lenders and verify that they have been calculated correctly by lenders. Calculate and transmit any refunds due to overpayment of periodic fee payments.
2.3 Assesses Penalties for Late Fee Payments	Generate and transmit notices to lenders with overdue fee payments.
3. Process Restructuring of Guaranteed Loans	
3.1 Enter and Edit Restructuring Request	Receive restructuring requests from lenders.

Potential For EDI and EFT Usage in the Loan Servicing Phase

Process	Key Features with Potential for EDI Use
4. Support Supplemental Servicing Activities	
4.1 Generate Supplemental Servicing Reports	Generate and transmit status inquiries to lenders on loans which have defaulted or become delinquent or have defaulted. Receive status updates from lenders on delinquent and defaulted loans.

Process	Key Features
1. Process Claim Proposal	
1.1 Enter and Edit Claim Proposal Data	Receive claim proposal data from lenders.
1.2 Process Claim Proposal Quarterly Updates	Receive quarterly progress reports from lenders. Generate and transmit notices to lenders on claim proposals for which quarterly progress reports have not been received.
2. Process Claim	
2.1 Enter and Edit Claim Application	Receive claim applications from lenders.
2.2 Process Authorized Claim for Payment	Calculate and transmit claim payments.

APPENDIX F

***TRADING PARTNER SURVEY
QUESTIONNAIRE AND SCORING GUIDE***

This appendix presents a survey that may be modified and sent out to potential trading partners to collect information regarding their size, technical capabilities, and their willingness to participate in an EDI program. It also presents a suggested guide for scoring survey responses.

Sample Cover Letter

Dear < **agency name**> Trading Partner:

The < **agency name**> is planning to implement a new system for < **application name**> , using Electronic Data Interchange (EDI) technology. This new system will allow you to transfer your information electronically to < **agency name**> , making it easier, faster and more efficient for you! It will eliminate much of the time, labor costs, and unavoidable errors associated with manually entering information into the current system or transcribing information onto the old pre-printed forms.

The < **agency name**> conducted a study on the cost savings to its trading partners and found that on the average a company that holds **xx** loans will save **\$xx** per year! A copy of the results of < **agency name**> study is attached for your information.

We are working with a number of vendors and service providers to design a user-friendly system that will be easy to implement and will make your processing as effortless as possible. To provide you with the technology necessary to implement this new system, < **agency name**> is planning to make arrangements for you to obtain **special low cost EDI translation software and network services!** Of course, you may use your own software or network if you are already doing EDI. In addition, the following services will be available to all our trading partners:

- ◆ Education and training
- ◆ Technical assistance and Help Desk facilities

To get the new EDI system off the ground and to ensure that our approach meets your needs, we are asking for your help. Enclosed is a brief survey to help us determine your current communications capabilities and data processing procedures.. **Please take a moment now to complete this short survey and return it to agency name> in the enclosed envelope by xx/xx/xx.** Your response will allow us to deliver the EDI savings to you even faster.

Please feel free to call us with any questions. Refer to the enclosed sheet for the name and phone number of the staff person designated to assist you. Thank you for your help in this important effort to improve our services to you, and we look forward to working with you to bring EDI to your organization soon.

EDI TRADING PARTNER PROFILE

1. Company Name: _____

2. Company ID Number: _____

3. Address: _____

4. Contact Information

Business Contact Name: _____

Title: _____ Phone: _____

MIS/Technical Contact Name: _____

Title: _____ Phone: _____

EDI Technical Contact Name: _____

Title: _____ Phone: _____

5. How many transactions do you currently perform each month with **<agency name>**?

6. Do you have a central reporting site for transactions performed with **<agency name>**?
Yes ____ No ____

If yes, please provide the following information on the central reporting site:

Name: _____

Address: _____

Contact name: _____

7. Do you have a Personal Computer (PC)?

Yes ____ No ____

8. What kind of communication capability do you currently have?

Modem Yes _____ No _____

Third Party Network (VAN) Yes _____ No _____

If Yes, what network do you use? _____

9. Do you do the Data Processing/MIS for your company:

Internally _____ Contract Out _____

a) If you do your own Data Processing, do you use automated systems that were developed internally? Yes _____ No _____

Or did you buy your software from a third party vendor? Yes _____ No _____

If yes, who is the software developer? _____

b) If you contract out, please provide the name, address, and phone number of your contractor:

10. Do you currently have an EDI translation software package that you are using to exchange EDI transactions with other trading partners?

Yes _____ No _____

11. Would you be interested in exploring immediate EDI opportunities with **<agency name>?**

Yes _____ No _____

TRADING PARTNER SURVEY SCORING GUIDE

Presented below are scores for each question on the sample trading partner survey. The total score will indicate the trading partner's readiness to implement EDI.

A. General Information (This category is informational and not intended for scoring purposes)

Company Name - No score
Company ID Number - No score
Address - No score
Contact Information - No score

B. Transaction Volume (This category is informational and not intended for scoring purposes)

5. How many transactions do you currently perform each month with **<agency name>**? No Score, but should be used to verify "Transaction Volume" that the trading partner has been placed in.

C. Centralized Reporting (This category is informational and not intended for scoring purposes)

6. Do you have a central reporting site - No score. This information may be used by the Outreach Team to determine the final number of trading partners, and who the appropriate contact persons are.

D. Technical Capability

7. Do you have a Personal Computer (PC)?
Yes = 2
No = 0

8. What kind of communication capability do you have?
Modem:
Yes = 4
No = 0

Third Party Network (VAN):
Yes = 2
No = 0

9. Do you do the Data Processing/MIS functions:

"Internally" and uses software developed in-house, score = 2

"Internally" and uses third party software, score = 1

"Contract out", score = 3

NOTE: If the third party software developer or contractor is known to handle other agency trading partners, and has already developed EDI capabilities, the trading partner score for this question should be increased to 5.

10. Do you currently have an EDI translation software package that you are using to exchange EDI transactions with other trading partners?

Yes = 5

No = 0

E. Trading Partner's Willingness to Implement EDI

11. Would you be interested in exploring immediate EDI opportunities with **<agency name>**?

Yes = 2

No = 0

APPENDIX H

CONDUCTING INTERVIEWS

This appendix presents additional information on conducting interviews for obtaining information on current processes.

1. Interview Guidelines

The following are a set of guidelines that should be used when conducting interviews.

1. Prepare questionnaires for the interviews. A sample questionnaire is presented a later section in this appendix.
2. The day before each interview, call the interviewee and confirm time and place of the meeting. Also, let the interviewee know how many people will be present at the interview.
3. Ensure that a minimum of two team members attend each interview. There should be a designated interviewer and recorder for each interview.

4. Take the following items to the interview:

- >> Questionnaire
- >> Business Issues Log
- >> Input Output Record
- >> Paper for taking notes

A sample Business Issues Log and Input Output Record are presented at the end of this appendix.

5. During the interview, periodically check the questionnaire to ensure that all the listed questions have been asked. If the interviewee needs to provide the team with additional information, set a follow up date to receive the information, and record this date.
6. Concentrate on those parts of the process that involve interaction with external entities (e.g. receiving documents from vendors/transportation agencies, telephone calls, sending documents to vendors).
7. Ensure that the team has obtained samples of all documents, reports, and forms mentioned at the interview. If not, set a date to collect them from the interviewee.
8. At the end of the interview, let the interviewee know what the next steps will be and schedule a date for the observation session, if necessary. If there is no need for an observation session, let the interviewee know when they should expect to hear back from the team and what will be required from them at that point. Also, confirm any dates set for follow up on missing information and documents.

9. After the interview, type up interview notes immediately, and fill out the Business Issues Log and Input/Output Record.
10. Draw a rough sketch of the process map and write the accompanying narrative. The team may need to wait until the observation session has been conducted to do this.
11. Have map and narrative reviewed by the interviewer and the rest of the project team.
12. Finalize the map and narrative, and have it checked once more by the interviewee.

2. Sample Interview Questionnaire

Presented below are a set of questions, that can be tailored by the implementation team and used in interviews to obtain information on current processes.

- 1) Please describe the workflow for the functions you perform with regard to < function name> .
- 2) Are there any major problems associated with the current process? Also do you have any suggestions for improving the process?
- 3) Are there any formal or informal Operating Procedures for these functions? If yes, please provide a copy.
- 4) Are there any formal or informal materials that are used to train new employees in these functions? If yes, please provide a copy.
- 5) What automated systems, if any, support these functions? Also provide any information you have on the hardware platform(s) and the software for each of these systems.
- 6) Are there user manuals or training materials for the above automated systems? If yes, please provide a copy.
- 7) Please provide the interview team with information on volumes of transactions processed each month for each function. (e.g. the number of requisitions received for approval, the number of shipments received, the number of invoices received, etc.)
- 8) Are there any seasonal fluctuations in the volumes of transactions processed? (i.e. are there times during the day/month/year when the volume of transactions processed is unusually high or low)
- 9) Are you aware of any anticipated increase or decrease in the volume of transactions processed over the next five years? If yes, please provide the information to the interview team.

- 10) Please provide the interview team with samples of any reports you receive. For each report please provide the following information:
 - >> Who the report is received from
 - >> How often the report is received
 - >> How the report is sent to you

- 11) Please provide the interview team with samples of any reports you produce. For each report please provide the following information:
 - >> How often the report is produced
 - >> Who the report is sent to and how it is sent

- 12) Please provide the interview team with samples of any forms or documents you receive. For each form or document please provide the following information:
 - >> Who the form or document is received from
 - >> How often the form or document is received
 - >> How the form or document is sent to you

- 13) Please provide the interview team with samples of any forms or documents you produce. For each form or document please provide the following information:
 - >> How often the form or document is produced
 - >> Who the form or document is sent to and how it is sent

3. Sample Business Issues Log

Presented below is a sample Business Issues Log. The interview team should create blank versions of this form and fill it out with information on business issues that have been gathered during interviews.

Business Issue Title: Information on vendors is maintained manually
Brief Description: Each Purchasing Agent maintains vendor information in manual forms, including business cards, product literature, and price catalogs. This practice causes the following problems: <ul style="list-style-type: none">➤➤ The catalogs and price lists may not be the latest version.➤➤ Three full size file cabinets are required to store the information.➤➤ Vendor information is not shared by Purchasing Agents in any formal manner. This results in redundant information being stored and causes processing delays.
Suggested Solution: Create a central database to store vendor information. In addition, the agency and vendors should use the following EDI transaction sets to request and obtain updated information: <ul style="list-style-type: none">➤➤ 140, Product Registration➤➤ 466, Rate Request➤➤ 832, Price/Sales Catalog <p>Purchasing Agents and Contracting Officers should be able to electronically access and query the central vendor information database.</p>

4. Sample Input Output Record

Presented below is a sample Input Output record. Interview teams should create blank versions of the input output record and fill them out with information on data exchanged between the agency and external entities.

Data Input/Output Name	Request for Quotation (RFQ)	
Brief Description	The RFQ is used to request price quotes from vendors.	
Originator	Recipient	Method of Communication
Agency Purchasing Agent	Vendor	Mail or Facsimile
Data Elements		
<ul style="list-style-type: none">➤ Product/Item Number➤ Product/Item Description➤ Quantity Required➤ Expected Delivery Date ➤ Buyer's Name and Address➤ Contact Person, Phone number, Facsimile number ➤ Vendor's DUNS Number➤ Vendor's Name and Address		

APPENDIX I

SAMPLE QUESTIONNAIRE FOR COST/BENEFIT ANALYSES

Presented below are some questions that are typically used to collect information on costs, cost savings, and benefits. These questions should be modified according to the specific agency and application for which the Cost/Benefit Analysis is being conducted.

1. What hardware platform(s) are you currently using to process transactions for <application name>? If you are using multiple hardware platforms, please explain how/when each one is utilized in the process.
2. Do your current hardware platform(s) have sufficient storage and processing capacity that could be used to run an EDI translation software package?
3. Are you currently using any EDI translation software? If yes, please list the systems and specify whether this software can be used for the <new application name>.
4. Do you currently have a Value-Added Network (VAN) contract for EDI communication? If yes, please list VAN name(s).
5. Can this VAN be used for the <new application name>? If yes, please provide a copy of the rate schedule for the VAN.

Repeat Questions 6 through 12 for each transaction or document that is to be converted to EDI or EFT.

6. How many <transaction or document name> were processed each month during the last fiscal year?
7. How many <list trading partners> did the agency exchange <transaction or document name> with?
8. List the data elements included in the <transaction or document name>.
9. How much time per year is currently spent in manually keying in or otherwise processing the data for the <transaction or document name>?
10. What are the labor costs (hourly rate or salary) for the above tasks?
11. How much time per year is currently spent in correcting data entry errors or resolving other problems associated with the above tasks?
12. What are the labor costs (hourly rate or salary) involved in correcting data entry errors or resolving problems?

13. How much time per year is currently spent handling documents (paper or electronic) sent or received from trading partners?
14. What are the labor costs (hourly rate or salary) involved in preparing and mailing documents?
15. What are the material costs (e.g., postage, paper forms, tapes, etc.) currently involved in receiving or sending data to trading partners?
16. How much time per year is currently spent in reconciliation tasks?
17. What are the labor costs (hourly rate or salary) involved in the reconciliation process?
18. What is the labor cost (hourly rate or salary) for IR system development and support staff?
19. What non-quantifiable benefits do you expect to realize from the implementation of EDI technology? (Please explain) This could include better quality information from trading partners, more timely information, etc.

