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Analysis of Electronic Data Systems, Incorporated Credit Union Processing Division

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An Analysis of Electronic Data Systems, Incorporated Credit Union Processing Division

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ABSTRACT

Electronic Data Systems Incorporated (EDS) is an information processing company that has grown to one of the largest of its kind in the world. Part of the mission statement is to continue growth by providing new information management and communications capabilities, and to expand into new areas that build upon existing expertise and customer base. With this in mind, EDS assembled a professional staff, developed very large scale computer systems, and installed a state of the art telecommunications system.

In the early 1980s, EDS entered a new market by acquiring several of the largest credit union processors, eight acquisitions in five years. This strategy gave EDS a 25% market share, ten regional data processing centers, and more than twenty credit union processing packages. By 1985, EDS had determined there were no more processors as likely candidates for further acquisitions.

With the acquisiton phase over, what will be the strategic direction of the next phase for EDS's credit union processing products? One approach is to develop an entirely new credit union processing package and convert the existing customer base to it over the next five years. This would eliminate duplication of hardware resources and software services. It would also give EDS a new product platform to carry them into the next century.

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INTRODUCTION

What used to be called data processing is now known as information processing, a multi-billion dollar sector of our economy. One large information processor is Electronic Data Systems Incorporated (EDS), a wholly owned subsidiary of General Motors. EDS is competitive in a wide range of business lines; from engineering to manufacturing to government services to financial processing. It is with the latter that this case is concerned; specifically, the Credit Union Services Division (CUSD) of EDS.

EDS entered the credit union processing market in the early 1980's by acquiring several large processors. Late in 1985, EDS held about 25% of the credit union processing market share through eight acquisitions. EDS used these acquisitions to quickly position themselves in strategic market areas with future growth potential.

DESCRIPTION OF THE ORGANIZATION'S CURRENT SITUATION

EDS was founded as a company by Ross Perot in 1962 with a $1,000 investment. A former IBM computer hardware salesman, he started the company with of goal of developing the best data processing organization in the world. Starting from scratch and a few employees in 1962, the company grew into an organization that General Motors purchased for 2.3 billion dollars in 1983. Today, EDS is

one of the largest information processing companies with a strong performance record.

The company mission and business philosophy is to deliver the best services to customers while developing employees to their fullest potential. With this in mind, EDS has developed five specific objectives within their mission statement: (1) to provide information technology products and sevices of the highest quality and greatest value to our customers and to build long-term relationships characterized by mutual respect; (2) to continue outstanding growth by providing new information management and communications capabilities to markets currently served; and to expand into new areas that build upon existing expertise and customer base; (3) to develop EDS employees to their fullest potential, focusing on satisfaction and accomplishment, to recognize and reward individual performance, to ensure a safe and pleasant working environment; (4) to work together as a team, to promote trust and cooperation while working to achieve customer satisfaction and corporate growth; (5) to finance continued company growth and provide a return to stockholders (EDS, 1989a). This emphasis on customer service, people, and profitability led EDS to pioneer new approaches to the computer services industry. These new approaches such things as fixed-price contracts, fixed schedules and assured results. In an industry that was

used to 90-day contracts, EDS introduced long-term (averaging five to seven years) contracts. Long-term contracts provide financial stability for EDS and assure customers of realistic planning and pricing.

EDS also introduced the concept of facilities management (FM), in which total information processing services are provided under long-term, fixed-price agreements. Under an FM agreement, EDS assumes the entire information processing responsibility. This includes the physical facilities, security, hardware, software, and staffing. In 1963, EDS sold the first FM contract to Frito-Lay, Incorporated.

Also in 1963, EDS entered into its first insurance processing contract with Mercantile Security Life (EDS, 1989b). With the establishment of the Medicare and Medicaid programs in 1965, EDS initiated business with state and local government health insurance programs. In 1968, the company entered the financial services industry with its first banking customer, Exchange Bank located in Dallas, Texas. By 1972, EDS became the largest processor of commercial health claims with an automated health insurance processing system. During the late 1970s, EDS expanded into major federal government business and won the largest contract in the history of the computer services industry. A six hundred and sixty million dollar contract

to build a nationwide computer network for the U. S. Army, called project VIABLE.

Human Resources

One of the stated goals of the EDS business philosophy is to develop employees to their fullest potential. EDS currently employs about 53,000 people from a wide range of backgrounds. In an attempt to maintain high professional standards, each employee is required to sign and abide by a code of personal conduct and also to sign an employment non-compete agreement.

EDS also provides every employee with a professionally printed and bound handbook. Every year, each employee receives a printed booklet of compensation and benefits. EDS attempts to maintain a line of communication with its employees by use of corporate videos and a corporate televideo system. In addition, most employees regularly receive professionally printed journals and periodicals distributed by corporate headquarter's Technical Services Division. Every day there are bulletins and announcements on the internal electronic mail network. EDS has also instituted a written formal performance review procedure that everyone undergoes. Promotions are based on merit and accomplishment rather than longevity. All of this is part of EDS's attempt to establish an identity and to maintain a corporate culture.

EDS also maintains a very active internal education program to develop their employees to their fullest potential. EDS has located an education center at its corporate headquarters and spends some one hundred million dollars per year on continuing education (Annual Report, 1986). EDS conducts five technical development programs which cover services ranging from software programming to data center operations to systems engineering and network communications. For the year 1986, EDS employees received more than three million hours of technical training (EDS,1986a).

However, EDS, along with the rest of the technical industries, is experiencing a shortage of trained system engineers and expects that shortage to continue into the next century. According to the National Center of Educational Statistics, about 40,000 system analyst and programming jobs will become available every year through the early 1990s, but only 14,000 graduates with computer science and information degrees will be available to fill them (Wright, 1988). EDS has a standing offer of a one thousand dollar bonus to any current employee who can successfully recruit an experienced programmer. EDS has found it cannot recruit and train enough engineers to meet its growing needs. To combat this shortage, EDS is evaluating a number of options designed to stretch out the usage of their existing trained technical employees.

System Lifecycle Concept

In order to help achieve its goal of becoming a world class information processing company, EDS developed a methodology of information systems management called The Systems Life Cycle (SLC). The increasing demand for large computer systems offered EDS an opportunity to develop a standarized approach to systems management. The SLC provides a common vocabulary and a standard sequence of steps for a project team to follow. The SLC is organized into nine phases of activities: (1) information planning, (2) definition, (3) analysis, (4) business design, (5) technical design, (6) construction, (7) testing, (8) implementation, and (9) production support. The SLC methodology formalizes EDS's approach to the development, implementation, and maintenance of computer systems.

The SLC is a library of guide books and supporting courses developed in conjunction with EDS's technical experts. Every EDS office manager and system engineer (SE) manager has an SLC library. A company wide systems methodology improves efficiency and productivity. For example, SE efficiency is improved by focusing their efforts on the definition stage of system development, thus avoiding subsequent implementation problems. Any transfers between projects are easier because SEs do not have to learn a different systems approach for each project they work on. Because prospective customers can see exactly how

their new systems will be developed and implemented, the SLC serves as a marketing tool.

The life cycle consists of all the activities that are necessary for a system to be conceptualized, developed, implemented, and maintained in nine phases. The first phase is information planning, which describes how clients identify their needs. The next seven phases, definition through implementation, describe the actual systems development activities. The last phase is production support, which describes how systems are monitored and maintained. Throughout the life of a system, the life cycle may be repeated as the needs of the system are redefined and the system is modified.

The information planning phase is where information systems activities are brought into line with the business strategies. Increasingly, corporations are becoming aware of the need for long range strategic plans in developing their project implementations. This strategy determines what the direction of the business will be, what products are to be offered; and what procedures are to be used to develop, market, and distribute products. This strategy also includes procurement of facilities, skills, hardware, and software to support the application. Throughout the corporation, information systems will be needed to lead and support the business activity as it evolves through the

planning process. The plan must account for business needs, while being practical and cost effective.

The definition phase defines the scope of the project and develops the project plan to solve the problem. A project is any combination of activities to support, develop, or provide services to information systems organizations. The client describes his concept of what is wrong or missing from current operations, or what is at variance from expected results. This information is analyzed and described in relationship to known entities and events. Next, the causes of the problem, or source of the opportunity, are identified. The client then defines the criteria for solution selection and approves acceptable alternatives. Each corporation has its own tolerance for change, and policies that guide business practices. The output of the definition phase is a set of requirements detailed enough to develop project estimates and allow comparison of features of alternative solutions.

The analysis phase develops information about the client's business, staff, and organization. This information is documented into three categories: organizational, data, and functional. This activity establishes a link between EDS and the customer and produces a common set of documentation and vocabulary. Essential to the analysis phase is the data dictionary. The data dictionary defines all data elements, the object

to entity relationship, and the logical process of how the data would be accessed for use. Business functions are defined, indicating the timing, sequence, and volume of the functions. Business requirements are then documented using both text and models. A change control process is established to maintain the accuracy of the requirements. Any new requirements are reviewed for feasibility and practicality. All business requirements and functions must remain within the scope of the project.

The business design phase is the process of defining logical requirements to meet the client's business needs. The system behavior is determined and a model developed. All inputs and outputs are selected and logically defined. The completed model has all the information necessary to describe the interaction of the business requirements with the computer system. These requirements are used to determine the hardware and software needs for the system. The existing architecture, hardware, and skill are analyzed to determine the customer's investment. At the end of the business phase, the client knows exactly what is to be produced and what will be the impact on his business.

The technical design phase considers both the development and production environments. The goal is to balance technology with the client's current investments. The technical design phase describes all interfaces, system flows, and standards for the system. Usable programs,

hardware, and data from the old system are identified, and a conversion plan is developed to integrate the old system into the new system. The system behavior model, agreed to by the client during the business design phase, must be compatible with the technical design phase.

The construction phase produces computer programs and procedures, documentation, and training materials. Programs are written and documented on specifications developed in the technical design phase. Procedural documents are developed to guide maintenance programmers and computer operators. A comprehensive test plan is developed to outline the validation procedures. Once coded, programs are verified for completeness and adherence to standards and specifications.

The testing phase consists of the activities required to verify that the coded systems meets the design and specifications produced earlier in the SLC. The major concerns are system testing and user acceptance. Four types of system tests are conducted: integration, performance, parallel, and model office. Integration validates the functioning of system components. Performance testing measures the system for efficiency and economy. Parallel testing compares the outputs from the new system against those of the existing system. Model office testing simulates the production environment. The

final result of the testing phase is the formal acceptance of the system by the client.

The implementation phase is where the finished products are delivered to the client, and the client is trained to use the new system. A comprehensive plan is developed for procurement, migration, conversion, and training. This plan serves to lessen the impact on the client's business environment. A contingency plan is also developed in the event the implementation should fail. After installation, the new system is monitored for a predetermined period of time. During this period, the project team is kept assembled in case last minute modifications are required. At the end of the implementation phase, the system is formally turned over to the production support team.

The production support group operates and controls the system on a day to day basis. This includes incident reporting, the keeping of system statistics, and the delivery of system outputs. System efficiency is also a major concern of the production support group. Production problems or system enhancements may be identified by the production support group or the client. These requirements are fed back into the information planning phase, starting the System Life Cycle over again.

At first glance, the System Life Cycle might seem like a data processing department activity performed only by

programmers. However, EDS has expanded the role of this methodology to the business level of the corporation. These guides are not simply set on a shelf somewhere and forgotten about, EDS uses them in everyday business. It fits into the EDS business philosophy of integration, consolidation, and standardization. Within the SLC are marketing guides, quality assurance and organizational guides, and model office guides. The SLC is a method to produce repeatable and measurable results. The SLC allows EDS to draw on its expertise to maximize productivity and increase profitability.

Information Processing Centers

EDS was one of the first companies to pioneer the concept of large, integrated processing centers, known as IPCs (information processing centers). In a time when most of the industry was favoring the concept of distributed processing (where the data processing load is spread out over a number of small systems), EDS developed very large, concentrated systems. These facilities process enormous quantites of data at unmatched economies of scale. Today, EDS operates 21 inter-connected IPCs around the world with the power to process more than three billion instructions per second. The floor space of these centers covers more than 33 acres. With concentrated operation, these systems are able to run at 99.9% efficiency. These centers can

offer security, redundancy, and reliability that no regional data center can match for the price.

These centers help to eliminate the proliferation of hardware types and customized software. In addition, because of their size, they can offer increased bargaining power with vendors. These IPCs also reduce the number of licensed copies of operating systems, their maintenance contracts, and the computer memory and disk necessary to run them. They elimate the duplication of system staff services and the hardware necessary to maintain a computer room environment. One of the biggest advantages the IPCs offer is that upgrades of hardware and software are much easier. It is also less expensive to go through an upgrade on one system versus ten or more systems. Part of EDS's business philosophy is to take competitive advantage of the latest technology. These IPCs make the task managable of developing a platform to take EDS into the next generation of information processing systems.

EDS-NET

To operate the IPCs, EDS had to develop a reliable communications network to transmit data between the users and the IPCs and from one IPC to another IPC. This resulted in EDS-NET, the worlds largest privately owned digital communication network. EDS-NET handles voice, data, and video for over 200,000 users. This network utilizes state of the art technology and ties the computing power of

the company together. This network not only handles customer data, but provides EDS with a world-wide electronic link. Every office in EDS has an E-Mail link with corporate headquarters and with every other office in EDS.

Traditionally, telecommunications has been the weak link in computer systems. Only as far back as the mid-1970s regional data centers were a necessity, because the computer had to be as near to customers as possible. The computer terminals at the teller window of the credit union office were only capable of transmitting a short cryptic message of maybe thirty or forty characters to the computer for a transaction. Any transactions requiring more text had to be filled out on paper forms and submitted to the data center for processing. Any printed reports generated from the offline processing had to be delivered by courier. By 1980, telecommunications progressed to the point where thousands of characters could be transmitted back and forth per transaction. This enabled most transactions to be accomplished by the teller terminal; however, printed reports generally had to be delivered by courier. By 1985, telecommunications could quickly transmit huge volumes of data between users and computers in an interactive mode.

This new technology is what allowed EDS to develop the IPCs. For an example, the Sunday New York Times newspaper contains about five pounds of newsprint per edition. In the

middle 1970s, it would have taken several hours to transmit the text of one edition from the East Coast to the West Coast. By 1985, that same newspaper, including text and pictures, could be transmitted across the country in less than twenty seconds. Now the computer could be physically located any distance from the user without disruption in the flow of information.

Financial Analysis

For the year 1988, EDS had a net income of 384.1 million dollars, representing a 19% increase over 1987 (See appendix A for further detail). Their target growth is 20% increase in net earnings per year. Table 1 contains a brief statement of income over the past three years.

TABLE 1: A STATEMENT OF INCOME.

(in millions except per share amounts)

	Year Ended December 31,		
	1988	1987	1986
Income before taxes	589.4	524.3	464.0
Provisions for taxes	205.3	201.2	203.1
Separate Consolidated Income	384.1	323.1	260.9
Earnings per share	3.15	2.65	2.13

EDS had revenues of 4.8 billion dollars with an asset base of 3.4 billion dollars. Earnings per share also increased

19% to 3.15 dollars per share from the year 1987 to 1988. EDS's parent company, General Motors, accounted for 55% of revenues with fixed priced, multi-year contracts covering all areas of large scale manufacturing information processing. During the year of 1988, EDS was successful on more than half of their bids and maintained a contract renewal rate of 80% (EDS, 1988a).

Revenues from non-GM business increased 30% during 1988, reflecting major contract wins in all EDS lines of business. In the commercial market, EDS signed long term contracts with Enron, the leading natural gas company in the United States; Freeport-McMoRan Incorporated, a natural resources company; and Riser Foods, a leading retail grocery and wholesale distributor. EDS also signed a major plant automation agreement with Caterpillar, the worlds largest manufactor of heavy equipment (EDS, 1988b).

In the insurance market, EDS extended into the next century their facility management agreements with Security Mutual Life Insurance Company. EDS signed its largest financial agreement to date with the Bancorporation of Texas, Incorporated. At the federal level, EDS won contracts with all four branches of the U. S. military and with the U. S. Immigration and Naturalization Service. At the state level, EDS continued as the nations leading third party Medicaid fiscal agent and signed new agreements with several states. Internationally, EDS signed major

contracts with England, France, the Netherlands, Taiwan, and China. For the year 1988, EDS made gains on all business fronts, domestic and international. For the past three years, EDS had consistent growth in revenues, net income and earnings per share (EDS, 1988c).

Company Organization

The company is divided into eight functional groups, of which the Finance and Insurance Group (FIG) is one. For the year 1988, FIG generated about 1.3 billion of its 4.8 billion in revenues. It was the insurance claim processing contracts with the Blue Cross and Blue Shield companies that made EDS a national company.

The Credit Union Service Division (CUSD) is a division of the FIG. Currently, EDS offers 84 financial processing products, of which 23 process credit unions at ten regional data centers (See Appendix C). The current SE staff to maintain the code at these data centers is more than 200 people. All of the credit union packages accomplish the same kind of work, but usually they are not compatible with each other. The typical regional data center will process from 150 - 800 credit unions and employ 50 to 60 people. The hardware of the data center will be in the two to six million dollar range on lease agreements. Each credit union processing product at a data center will have about 125 programs and 500,000 lines of COBOL code and an SE staff of 5 - 25 people to maintain the code. The CUSD

currently has contracts with about 3,000 credit unions representing a membership of about 14 million people.

Programming Considerations

EDS estimates it owns about 300 million lines of program code, of which 85% is COBOL code. COBOL is an acronym from the words Common Business Oriented Language. It is a high level third generation language that has been implemented on a large number of medium and large scale computer systems (Spencer, 1981). It is a language well suited for business applications. COBOL is good at processing large data files and performing repetitive tasks. Also, COBOL is written in an English like syntax that is self documenting, making future changes easier to accomplish. With minor modifications, a COBOL program can be moved from one vendor's machine to another vendor's machine. However, complex COBOL programs can become quite large and difficult to maintain, even for very experienced programmers. Finally, COBOL is a well proven third generation programming language and is considered to be a mature product.

The information processing industry is also using the fourth generation languages. These are self-generating languages, which generate and maintain much of the code programmers formerly had to write. They provide on-line help for users and are fully self-documenting. Fourth

generation languages will be the competitive processing languages of the near future.

One of these languages EDS is very interested in is called PACBASE. PACBASE originated in France in 1972, moved through a number of developmental milestones, and is now ready to move into the commercial market. EDS is looking at PACBASE, because it fits into the System Life Cycle methodology very well. PACBASE is an application development system that uses a number of design, development, implementation, and conversion techniques. PACBASE uses a SE supplied component called the Specifications Dictionary to collect, store, and maintain all system description information. Using this dictionary, PACBASE automatically generates processing logic. This language has resulted in dramatic improvement in SE productivity, both in development and maintenance. Compared to traditional approaches, the time to create new report programs was reduced by at least 50% and the maintenance of existing programs was reduced by 50 - 70%. EDS's experience with PACBASE has shown that a group of SEs can complete a complex project in one-third of the time required for a more traditional approach (EDS, 1988d).

Another standard that has gained attention in the last few years is called object-oriented programming. In development for 20 years, it has now found commericial application in the personal computer and work station

market. Object-oriented programming introduces a fundamental change in the way software is structured and applications developed. The underlying concept is that systems can be developed of "objects" that incorporate both data and functions. Objects may respond to messages and may respond to each other. This approach leads to a modularity not supported by conventional programming techniques, especially COBOL. COBOL goes to great lengths to separate code from data. The object-oriented structure is advantageous for incorporating artificial intelligence techniques and concurrent processing. These will be the power processing languages of the future. EDS research is developing their own object-oriented programming language called EDS/OWL to explore the capabilities of this concept in large system environments.

Credit Union Industry

A Credit Union is a not for profit financial association of individuals linked by a common interest. Originally, common interest meant place of employment, but today, that definition has been loosened to the point where nearly anyone can join any credit union. Today, there are about 16,000 credit unions in the United States with 57.6 million members (See Appendix B). There are about 50 vendors offering credit union processing services in both service bureau or in-house modes. The average credit union spends about 10.97 dollars per member per year for data

processing costs (Credit Union Magazine, February, 1988). Table two shows the current breakdown of the household savings dollar. The credit union industry holds 6.2% of the household savings dollar (Newswatch, August 14, 1989).

TABLE 2: DISTRIBUTION OF HOUSEHOLD SAVINGS.

(in million dollars)

Distribution of Consumer Savings

	December, 1988		December, 1987	
	Outstanding	Market Share	Outstanding	Market Share
Commercial Banks	1,352.6	46.8 %	1,261.4	46.7 %
Savings & Loan	1,008.2	34.9 %	953.5	35.3 %
Credit Unions	178.5	6.2 %	166.0	6.1 %
MMMFs	239.6	8.3 %	221.1	8.2 %
Savings Bonds	109.2	3.8 %	100.6	8.6 %
Total	2,888.1	100.0 %	2,702.6	100.0 %

EDS processes about 14 million credit union members per year. This would generate for EDS revenues in the 154 million dollar range.

Originally, credit unions offered savings account and low cost personal loans to their members. Today, a full service credit union can offer nearly every service that a bank can offer. This would include ATM's, IRAs, share draft processing (checking accounts), debit card processing, mortgage loans, and many others. Credit unions are able to offer deposit insurance of up to $100,000 for

covered accounts with their National Credit Union Share Insurance Fund (NCUSIF). Their fund is currently the strongest of the three federal insurance funds (Kobliner, 1988). In 1987, it had 1.23 dollars per 100 dollars of insured deposits. In comparison, the Federal Deposit Insurance Corporation, which insures banks, had about 1.10 per 100 dollars of insured deposits. The ailing Federal Savings and Loan Insurance Corporation ran in the red with a minus 1.60 per 100 dollars of insured deposits.

Credit unions are regulated in a manner similiar to banks and savings and loan institutions. The recent restructing of savings and loan institutions by the Federal government will also mean a more controlled and restrictive operating environment for the credit unions. Regulatory compliance is a fact of life in the credit union industry. It is a cause of continuing changes made to the processing packages.

DESCRIPTION OF ORGANIZATION'S PROBLEM AND ALTERNATE SOLUTIONS

The problem for EDS is what will be the grand strategy of the CUSD over the next five to ten year period. The acquisition phase of market entry is over. How will the next phase of market growth proceed? EDS now owns about two dozen different credit union processing packages, some nearly twenty years old. These packages run on a variety of vendor hardware at nine regional processing centers. There is a high degree of duplication of hardware and software resources in the CUSD that requires a large SE maintenance population. Credit union processors operate in a mature market, and market share is gained at the expense of competitors. EDS has examined other large credit union processors and has determined there are no good candidates for near future acquisition.

The CUSD is operating in a slow growth market with strong competitors. This indicates that market share growth will rely heavily on product innovation, and higher profitability will rely on cost containment. Credit union processing packages are almost exclusively written in COBOL, a third generation language. While COBOL is a good business language for large files and repetitive tasks, it cannot compete with the processing power of fourth generation languages. Fourth generation languages will provide the product innovations necessary to increase

market share. Innovations such as image processing, voice recognition systems, and artificial intelligence systems will also offer competitive advantage to the CUSD products.

Another consideration of the CUSD near term strategy is profitability. In a slow growth market with strong competition, cost containment is a means of increasing profits. While fourth generation processing environments require more in terms of computing power and memory size, they do reduce manpower requirements from as much as one-third to one-half. In conjunction with this, hardware costs have steadily declined over the last decade while manpower costs have steadily increased. Cost containment can also be viewed in terms of reducing overhead. In a situation with ten regional data centers all producing more or less the same product, there is a high potential for duplication of resources and services. A strategy of CUSD consolidation to reduce unnecessary duplication would increase profitability.

Alternative One

The first strategy to would be to leave the CUSD much as it it now, each site running as cost centers under a regional management system. An environment of friendly competition with other EDS credit union processors could be established. This would offer a wide variety of products that support different vendors' hardware. If a potential customer could not find a desired feature with one package,

they would very likely be able to find it in another package somewhere in the CUSD. Each site would be responsible for maintenance, enhancement, and regulatory compliance of its products.

This choice would require a high degree of duplication in hardware resources and software services. Table three shows the projected earnings of CUSD under alternate one.

TABLE 3: ALTERNATE ONE ESTIMATED GROSS EARNINGS.

Number of regional data centers	10	
annual lease cost per year	5,000,000.00	
Total regional data center cost		(50,000,000.00)
Number of employees	500	
average salary and benefits per	52,000.00	
Total salary and benefits		(26,000,000.00)
Number of CU members processed	14,000,000.00	
average revenue per member	10.97	
Total revenue CUSD		153,580,000.00
Total earnings before taxes and corporate contribution		77,580,000.00

Each regional site would have to maintain a computer room environment with security, backup, and power supply. Each site would have to maintain its regional telecommunication system with concentrators and diagnostic equipment and people to run them. Every state or federal regulatory requirement would have to be installed in each processing

package. Each site would have its own operating system, maintenance contracts, and licensing fees. A programming staff would have to be maintained at each site. The information processing industry is about to move up to the fourth generation of processing environments, and it would cost about $7,500,000.00 to upgrade each of the ten data centers. (See Appendix D).

Alternative Two

Another possible strategic direction for the CUSD would be to decentralize the division and run each unit as a small business with a minimum of corporate overhead. Projected earnings of the CUSD under this plan are shown in table four.

TABLE 4: ALTERNATE TWO ESTIMATED GROSS EARNINGS.

Number of regional data centers	10	
annual lease cost per year	5,000,000.00	
Total regional data center cost		(50,000,000.00)
Number of employees	500	
average salary and benefits per	52,000.00	
Total salary and benefits		(26,000,000.00)
Number of CU members processed	14,000,000.00	
average revenue per member	10.97	
Total revenue CUSD		153,580,000.00
Total earnings before taxes and corporate contribution		77,580,000.00

The account manager would operate much as the president of a small business. This would move the decision making processes closer to the customer base and provide for a quicker response to new product demands. A leaner and more efficient operation would result, because each unit would run as a small business, responsible for profit and loss. Employee groups would share common goals of making their unit the best in the division.

Problems with this approach include duplication of services and resources across the division. Each site would have to maintain and upgrade its data center and programming staff. There would be a higher learning curve for new programmers coming on staff. This approach would not release any SE's back to EDS; in fact, it would probably require a higher SE population. There would be the likelihood of employee groups focusing on goals that are best for their site and not necessarily the best goals for the organization. There would also be a high degree of temptation to steal customers from other sites and cannibalize the market. Finally, the packages at the various sites would still be COBOL based products and would not be able to take advantage of economy of scale in EDS's IPCs and EDS-NET telecommunications.

Alternative Three

The third alternative would be to merge all the processing sites into two selected sites based on IBM and

Burroughs hardware types and to use the "black box" approach. Table five reflects the increase of earnings due to reduction of operating costs.

TABLE 5: ALTERNATE THREE ESTIMATED GROSS EARNINGS.

Number of regional data centers	02	
annual lease cost per year	5,000,000.00	
Total regional data center cost		(10,000,000.00)
Number of employees	500	
average salary and benefits per	52,000.00	
Total salary and benefits		(26,000,000.00)
Number of CU members processed	14,000,000.00	
average revenue per member	10.97	
Total revenue CUSD		153,580,000.00
Total earnings before taxes and corporate contribution		117,580,000.00

The "black box" approach involves writing intercept program modules to make any system changes transparent to the end user. For instance, these modules intercept a transaction coming from a teller terminal at a credit union and make it look like it came from a teller terminal of the selected system, and conversely, it performs the reverse action on the returning transaction. Overhead costs would be reduced as the number of regional data centers would be reduced to two. The only new programming development would be the intercept modules (the black boxes). All the other

programs would run with a minimum of changes. With this method, a wide product range could still be offered, and potential customer resistance would be minimized. In theory, customers would not even be aware of any change made to the processing systems.

On the negative side, "black boxes" usually do not work as well as intended, and they require a lot of extra programming effort to maintain. These modules become increasingly complex and inefficient as modifications and enhancements are made. The learning curve for any new SEs joining the programming team is high. The two selected sites would have to have their hardware upgraded with memory and disk to handle the extra processing load. Also, the regional communications networks would have to be improved to handle the new load. The end result would be an old COBOL package, with an additional layer of new modules, running at regional data centers.

Alternative Four

A fourth, and probably best choice, would be to develop a new PACBASE package of programs to process credit unions. The advantages of this approach would be a large reduction in the duplication of software services and hardware resources. All of the stand alone data centers would eventually be eliminated along with their support staffs. Table six shows this would amount to a possible

cost savings of $50,000,000.00 per year compared to projected earnings of table three.

TABLE 6: ALTERNATE FOUR ESTIMATED GROSS EARNINGS.

Number of regional data centers	0	
annual lease cost per year	5,000,000.00	
Total regional data center cost		(0.00)
Number of employees	500	
average salary and benefits per	52,000.00	
Total salary and benefits		(26,000,000.00)
Number of CU members processed	14,000,000.00	
average revenue per member	10.97	
Total revenue CUSD		153,580,000.00
Total earnings before taxes and corporate contribution		127,580,000.00

A new PACBASE product would fit into the system lifecycle methodology. A new PACBASE product would also fit into EDS's long term business strategy of standardization, consolidation, and information processing systems that offer current technology in software and hardware.

The new package would run in an IPC and utilize the EDS network for economy of scale savings. A PACBASE product would be quicker to develop and easier to maintain than a COBOL based package. Appendix D gives a breakdown of the estimated $7,500,000.00 development cost of a new PACBASE package. A number of training modules and online

help screens could be incorporated into the package to ease customer transition to the new product. This would release a significant number of needed SE's to other EDS projects. It would also move the product to a higher processing level and provide a platform to take the product to the fifth generation processing level.

Table seven briefly compares advantages and disadvantages of the four alternatives.

TABLE 7: ALTERNATIVE ADVANTAGES AND DISADVANTAGES.

Alternative	Advantages	Disadvantages
One	- No changes required - Wider product variety	- Requires ten data centers - Regulatory compliance harder to maintain - Written in COBOL
Two	- Decentralized decision making - Leaner, more efficient operation	- Likely to cannibalize market - Regulatory compliance harder to maintain - Written in COBOL
Three	- Eliminate overhead of eight data centers - Still support wide product variety	- Black box modules complex and difficult to maintain - Regulatory compliance harder to maintain - Written in COBOL
Four	- Written in PACBASE - Regulatory compliance easier to maintain - Fits into SLC - Has highest Net Present Value of four alternatives	- All CUSD processing into one product - Existing customers may not wish to change products

Also, Appendix H through Appendix I displays the calculated Net Present Value of the four alternatives.

Some disadvantages to this choice would be the normal resistance of closing existing regional data centers and transferring their employees to other EDS sites. There would also be a certain amount of customer resistance in moving to a new system. It is very likely some customers would have to purchase new equipment before their credit unions could run on the EDS-NET system. Also, as the new PACBASE product could not offer everything to everyone, there would be a decrease in the CUSD product breadth. Some of the features and functions now available on certain packages would have to be eliminated. Finally, EDS would be putting all their future credit union processing market share in one product that could be more easily matched feature by feature by their competitors.

THE RESOLUTION

The suggested resolution for this case would be to develop an all new PACBASE credit union processing product and convert the existing customer base to it. This will provide the means to remain competitive, reduce duplication, and build a product platform suited to the next generation of hardware and software. EDS has at its disposal all the hardware, software, and technical skill needed to complete this project in-house.

With the PACBASE products, it is possible to go from start to running product within two years with a 20 person SE team. With experience, EDS has developed some rule-of-thumb estimates in software development projects. For new COBOL developments, the rule-of-thumb is 25 lines of code per day per person. This is constructed, tested, and deliverable code. This would deliver 600 lines of code per person per month, or 12,000 lines of code per month with a 20 person SE team. To write a new COBOL credit union package of around 500,000 lines of code, 42 months of programming time would be required. Since new PACBASE software projects can be developed in about one third the time needed for COBOL projects, a PACBASE credit union processing product equivalent to 500,000 lines of COBOL code could be developed in 14 to 15 months.

A brief five year plan would start with one and one half years to develop the new package with a 20 person SE

team. The next two years would be spent converting the largest 20% of existing customers to the new system using an eighty person conversion team. The largest 20% of the credit unions would convert about 80% of the credit union members now being processed. An acceptable loss rate of customers unwilling to change would be 10%. The last year and a half would be used to convert all the remaining customers in groups of 50 or 60 at a time.

This package could be developed for about $7,500,000 with a simple payback of four to five years (See Appendix D and Appendix E). The package would run on an IPC and EDS-NET to take advantage of economies of scale. It would also fit into the SLC methodology. A team of about 20 SEs would be needed to maintain the new package for future enhancements and regulatory compliance.

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APPENDIX A

CONSOLIDATED STATEMENTS OF INCOME.

CONSOLIDATED STATEMENTS OF INCOME.

(in millions except per share amounts)

	Year Ended December 31,		
	1988	1987	1986
Revenues:			
Systems and other contracts:			
GM and subsidiares	2,837.0	2,833.3	3,915.1
Outside customers	1,907.6	1,444.8	1,127.7
Interest and other income	99.5	99.6	43.2
Total revenues	4,844.1	4,427.2	4,366.0
Cost and expenses:			
Cost of revenues	3,749.5	3,452.5	3,463.1
Selling, general and admin	500.0	447.0	434.8
Interest	5.2	3.9	4.1
Total cost and expenses	4.254.7	3,903.4	3,902.0
Income before taxes	589.4	524.3	464.0
Provisions for taxes	205.3	201.2	203.1
Separate Consolidated Income	384.1	323.1	260.9
Earnings per share	3.15	2.65	2.13

APPENDIX B

SELECTED CREDIT UNION STATISTICS

Selected Credit Union Statistics:

(in million dollars)

United States Credit Union Totals

	Number CUs	Number Members	Deposits	Loans	Reserves	Assets
1988	15,719	58,629,214	178,532	126,542	8,555	196,424
1987	16,277	56,476,329	166,018	110,764	7,707	181,735
1986	16,910	54,066,729	152,963	96,397	6,816	166,063
1985	17,581	51,721,709	125,512	85,139	5,330	137,168
1984	18,375	49,268,223	102,568	75,442	4,646	112,960

(in million dollars)

Distribution of Consumer Savings

	December, 1988		December, 1987	
	Outstanding	Market Share	Outstanding	Market Share
Commercial Banks	1,352.6	46.8 %	1,261.4	46.7 %
Savings & Loan	1,008.2	34.9 %	953.5	35.3 %
Credit Unions	178.5	6.2 %	166.0	6.1 %
MMMFs	239.6	8.3 %	221.1	8.2 %
Savings Bonds	109.2	3.8 %	100.6	8.6 %
Total	2,888.1	100.0 %	2,702.6	100.0 %

APPENDIX C

TYPICAL REGIONAL DATA CENTER

TYPICAL REGIONAL DATA CENTER

- Processes from 150 - 800 credit unions.
- Employees 50 - 60 people.
- Employees 5 - 25 SEs.
- A credit union processing package of 125 programs and 500,000 lines of COBOL code.
- A data center in 2 - 6 million dollar range.
- A regional telecommunications network
- Currently ten regional centers.
  1. Albany
  2. Charlotte
  3. Dallas
  4. Denver
  5. Memphis
  6. Norfolk
  7. Racine
  8. Salt Lake City
  9. San Antonio
  10. St. Louis

APPENDIX D

PACBASE DEVELOPMENT COSTS

PACBASE development costs adapted from SLC, marketing guide

20 person SE team programming 15 months = 300 person/months

Project component	Cost/person/month	Total Cost
IPC development	1,000.00	300,000.00
Technical design	500.00	150,000.00
Code Construction	1,500.00	450,000.00
System Testing	2,000.00	600,000.00
Stress Testing	2,000.00	600,000.00
Site Preparation	4,000.00	1,200,000.00
User Acceptance	4,000.00	1,200,000.00
Installation	10,000.00	3,000,000.00
Total estimated cost for PACBASE package		7,500,000.00

APPENDIX E

PACBASE FIVE YEAR PAYBACK PLAN

PACBASE 5 YEAR PAYBACK PLAN

Based on two year 7,500,000 project development cost, ten regional centers, and an average five year lease cost per center of 5,000,000.

year nr	development costs	conversion costs	lease costs	SE staff	lease savings
1	3,750,000		50,000,000	135	
2	3,750,000	2,080,000.00	50,000,000	135	
3	0	4,160,000.00	50,000,000	135	
4	0	4,160,000.00	25,000,000	68	25,000,000
5	0	2,080,000.00	0	0	50,000,000

APPENDIX F

ALTERNATIVE ONE NET PRESENT VALUE

Project Net Present Value using standard present value tables for five years at 10% discount.

(all money figures in millions of dollars)

	Present Value Discount Factor	Calculated Present Value	Relevant Cash Flows
Alternative One			
Recurring lease costs of ten data centers	3.791	(189.55)	(50.00)
Annual revenues	3.791	582.22	153.58
Net present value		392.67	

APPENDIX G

ALTERNATIVE TWO NET PRESENT VALUE

Project Net Present Value using standard present value tables for five years at 10% discount.

(all money figures in millions of dollars)

	Present Value Discount Factor	Calculated Present Value	Relevant Cash Flows
Alternative Two			
Recurring lease costs of ten data centers	3.791	(189.55)	(50.00)
Annual revenues	3.791	582.22	153.58
Net present value		392.67	

APPENDIX H

ALTERNATIVE THREE NET PRESENT VALUE

Project Net Present Value using standard present value tables for five years at 10% discount.

(all money figures in millions of dollars)

	Present Value Discount Factor	Calculated Present Value	Relevant Cash Flows
Alternative Three			
Recurring lease costs of two data centers	3.791	(189.55)	(50.00)
Development costs of "black boxes" in year one at 240 persons/mths	0.909	(005.45)	(06.00)
Annual revenues	3.791	582.22	153.58
Net present value		387.22	

APPENDIX I

ALTERNATIVE FOUR NET PRESENT VALUE

Project Net Present Value using standard present value tables for five years at 10% discount.

(all money figures in millions of dollars)

	Present Value Discount Factor	Calculated Present Value	Relevant Cash Flows
Alternative Four			
Recurring lease costs of ten data centers for three years	2.487	(124.35)	(50.00)
Lease cost of five data centers in year four	0.683	(017.07)	(25.00)
Development costs for two years	1.736	(006.51)	(03.75)
Conversion costs in year three	0.751	(003.12)	(04.16)
Conversion costs in year four	0.683	(002.84)	(04.16)
Conversion costs in year five	0.621	(002.58)	(04.16)
Annual revenues	3.791	582.22	153.58
		=======	
Net present value		425.75	