Providing Services to Users Through Data Networks: A Case Study of a Credit Reporting Company

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Providing credit information about people to corporate customers is a growth business in the U.S. We discuss the network of a company that collects information about the credit history of customers and provides it to lending and credit companies, life and health insurance companies, property and casualty insurance companies. The accuracy of the information is critical and also speed is essential in responding to queries. This company has developed a technology center to capture, process, and distribute this information. This company has been expanding and modifying its network to place itself in the forefront with regards to information technology.

Telecommunications and networking are increasingly recognized as important strategic areas in businesses. Planning and implementing telecommunications systems was recently evaluated as the 10th most important issue by 104 MIS executives (Niederman et al., 1991). As information becomes more and more critical to companies in gaining and sustaining competitive advantage, the flow of that information within and across companies hinges upon dependable, adaptable networks. The purpose of this paper is to discuss how a service company has used its network to add to its competitiveness. The paper discusses the business of the company, its network structure, and its future plans. It also contrasts this network design with networks used by travel agencies and banks (Clemons and Row, 1991; Clemons and Weber, 1990).

End-Users of the Company's Information Products

A company that delivers credit information to corporate customers is trading a product that is in essence information. The company's major role is to collect accurate information from many sources, assemble it, and send it to customers. Table 1 shows how the firm assembles data into products for its corporate customers.

Typical corporate customers of consumer information are:

Lending and Credit Companies - Credit information is provided to credit and lending companies to verify past credit worthiness, and is used for insurance purposes for predicting potential fraudulent claims.

Life and Health Insurance Companies - When an individual applies for insurance, the insurance company may verify the applicant's habits with co-workers/family members, and provide claims history information from previous insurance carriers. This information is used by the insurance company for better risk assessment.

Property and Casualty Insurance Companies - When a consumer applies for automobile or home owner's insurance, the insurance company can be supplied with the applicant's motor vehicle report, past claims histories submitted to previ-

An earlier version of this manuscript originally appeared in *Emerging Information Technologies for Competitive Advantage and Economic Development*, the Proceedings of the 1992 Information Resources Management Association International Conference.

PRODUCT NUMBER	PRODUCT DESCRIPTIONS
1	A database of automobile claims history information. Used by property and casualty insurance companies for assessing new insurance applicants.
2	A database of drivers and addresses. Used by property and casualty insurance companies to identify all possible drivers in a household.
3	A database of health claims history information. Used by life and health claims processors to identify possible fraudulent claims.
4	A database of all drivers in a state including the drivers' accidents and violations.
5	A copy of all medical records for an applicant obtained from the physician. Used to identify any pre-existing conditions.
6	A collection of physical measurements and body fluids. These are analyzed to determine any high risks applicants such as those with high blood pressure.
7	A report verifying information given to an insurance company applicant. The report may include information obtained through a phone.

Table 1: Examples of Services Offered

ous insurance carriers, a listing of all potential drivers in a household, and inspection information concerning the property being insured.

High Risk Employers - Employee background checks are done for companies that require high security such as nuclear plants, government research agencies, air lines, etc. The information can include past public records, post-graduate degree verification, drug screening, and reference checking.

Much emphasis is placed on the accuracy of the information delivered. Simultaneously, the speed with which requests can be received, processed and returned to customers is also important. Therefore, an excellent network and telecommunications architecture is essential to the bottom-line success of this company. This company retains development teams who are responsible for developing mainframe and personal computer (PC) software that customers use to order and receive information. Since this company is critically dependent on internal and external networks, it has to continuously modify networking and communications facilities to fit business needs.

The Company's Network

The company's home office is located in a major metropolitan center with 53 regional offices responsible for performing regionalized, manual data collection. A technology center was recently completed that houses all system hardware, programmers and support personnel for the network. The network links the regional offices to the home office and provides field offices with similar systems and support. The home office network includes connectivity to the mainframe system that houses the database products. Five regional data centers support the communications between the regional offices and the home office.

The network is based on DecNet adapted in-house with DEC VAX and Micro-VAX equipment. DEC was chosen as the main vendor because when the network was first conceptualized, DEC was only company that had the equipment appropriate for linking together the large number of offices.

Processing of Customer Queries

For many years, the information supplied to this company's customers was gathered on an as needed basis where field representatives would talk directly to consumers and report their findings to the original requestor. With automation, information is solicited from insurance companies and credit lenders via tape, and the consumer information is stored for easier management and acquisition.

Two VAX machines are located in the data center in the main office and are used for sending and receiving information from customers. When a customer requests a report from any of the databases, the orders are created by one of two methods:

(1) A software package (SP), has been created so that it runs on either a mainframe or PC. The order information is keyed in by the user and transmitted from the customer location to a VAX machine in the home office. If the PC software is used, the SP software communicates via a Hayes asynchronous modem into one of six phone lines connected to the Vax. If mainframe software is used, the SP software can communicate with a number of bisynchronous communication protocols, and the order information is sent to the VAX.

(2) Customers also have the option of creating their own

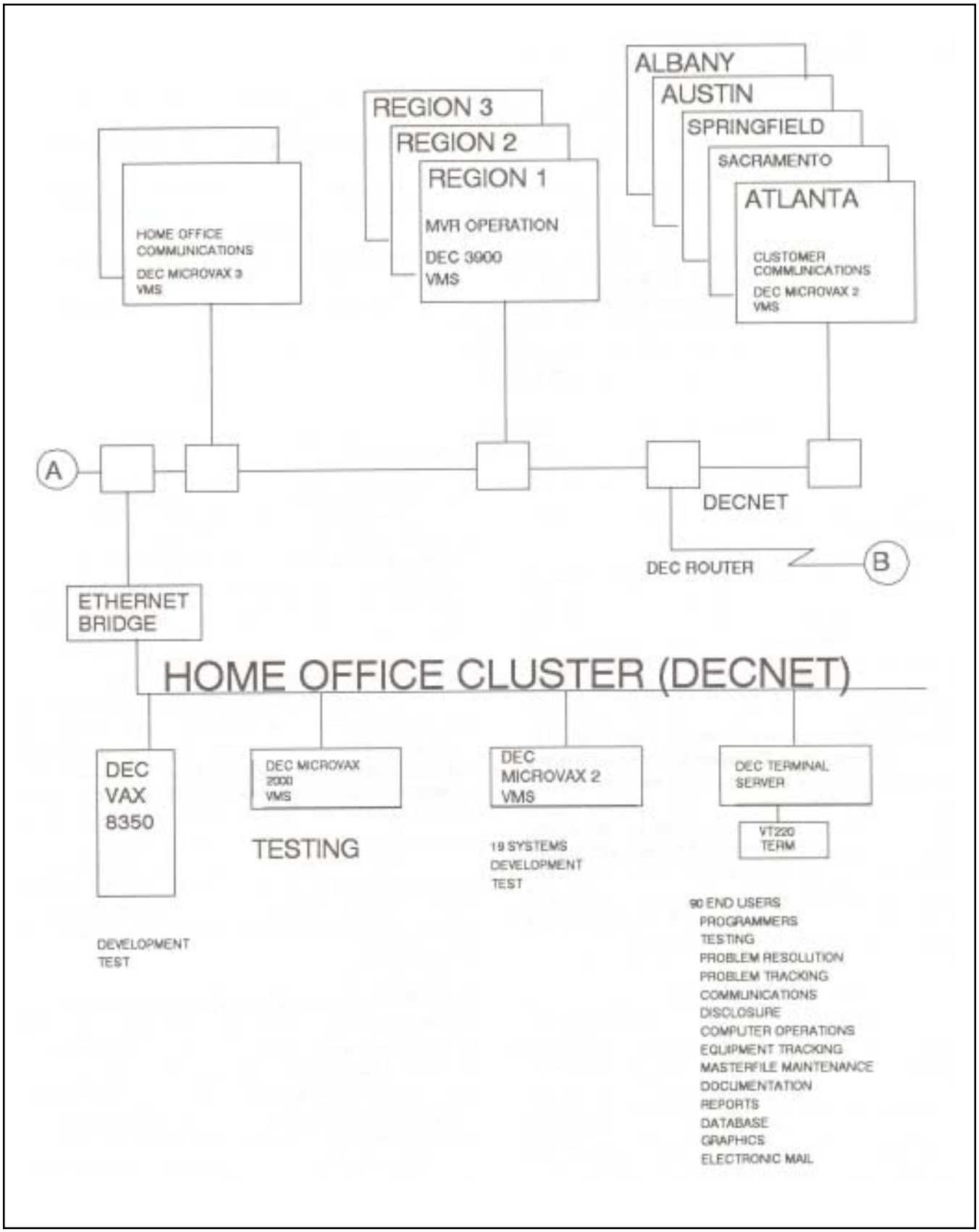
ALBANY
AUSTIN
SPRINGFIELD
SACRAMENTO
ATLANTA
CUSTOMER COMMUNICATIONS
DEC MICROVAX 2
VMS
REGION 3
REGION 2
REGION 1
MVR OPERATION
DEC 3900
VMS
HOME OFFICE COMMUNICATIONS
DEC MICROVAX 3
VMS
A
DECNET
DEC ROUTER
B
ETHERNET BRIDGE
HOME OFFICE CLUSTER (DECNET)
DEC VAX 8350
DEVELOPMENT
TEST
DEC MICROVAX 2000
VMS
TESTING
DEC MICROVAX 2
VMS
19 SYSTEMS
DEVELOPMENT
TEST
DEC TERMINAL SERVER
VT220 TERM
90 END USERS
PROGRAMMERS
TESTING
PROBLEM RESOLUTION
PROBLEM TRACKING
COMMUNICATIONS
DISCLOSURE
COMPUTER OPERATIONS
EQUIPMENT TRACKING
MASTERFILE MAINTENANCE
DOCUMENTATION
REPORTS
DATABASE
GRAPHICS
ELECTRONIC MAIL

Figure 1

software programs for ordering and receiving information. Data specifications are supplied to customers. Communications can be either via the VAX or mainframe.

Once the request is received into the home office, it is routed to the mainframe for processing. All return information is routed back to the VAX and received by the customer. The processing of requests is overnight batch.

The routing system is used for editing and routing customer requests that are processed through the regional offices. A customer again uses SP for creating orders. The orders are transmitted to the VAX and then routed to the mainframe. The routing program first edits the order information, then determines which regional office should receive the request.

For example, if an insurance company receives an application for life insurance from John Doe who lives in Chicago, the application is processed through the home office underwriting department. If the underwriter requests a consumer inspection report which includes an applicant interview, the requests should then be routed to Chicago. The order is sent from the customer's home office to the firm's main office. The routing program examines the zip code of the applicant and routes the request to the regional office in Chicago. The process is batch overnight.

In another example, motor vehicle information (MVR) is located at each state's Department of Motor Vehicles (DMV). Therefore, when a customer needs an MVR, the request first comes to one of three DEC 3900's. These machines have connectivity with certain state DMV offices depending upon the state. The MVR information is received from the state, formatted and then transmitted back to the customer.

Also, connected to the Decnet/IBM Connector is an Ethernet Bridge that connects the outside world to the home office DEC network. This network includes the following:

- One DEC VAX 8350 used for development testing
- One DEC Microvax 2000 used for program testing
- One DEC Microvax 2 used for system development
- A DEC terminal server connecting VT220 Terminals to any of the development and testing machines.

The users of these machines are responsible for testing, support, tracking, development, file maintenance, communications, and other applications, as listed in Figure 1.

Home Office Mainframe System and Network

In the home office, an IBM 3090 mainframe is used for 1) storing and manipulating the database information, 2) processing customer billing, 3) processing requests for field work, and 4) communications. The operating system is MVS-XA and CICS is used for screen programming. The mainframe has connectivity to IBM's Information Network (IBM-IN). Connected to the mainframe are two additional systems, an IBM 3745 Front End Processor (FEP) and DEC/IBM gateway connector.

IBM 3745 FEP

The FEP is basically used to connect a terminal access controller, feed a data/voice terminal system, and connect a Local Area Network (LAN) which all require access to the mainframe programs and data. The FEP is connected to the mainframe via an SDLC link which is also used to connect the other systems to the mainframe.

Davox Controller

The Davox Controller is used for telephone audit reports. When property and casualty insurance companies re-evaluate their current business, there is a need to verify the number of drivers on a policy, the number of cars in the household, and changes in driving information such as distance to/from work and home, or a vehicle used for work purposes. The evaluation of this information helps to determine if premiums need to be raised or lowered. The insurance company will prepare a tape containing policy information. The tape is mailed to the home office, and the data from the tape is loaded to the mainframe. Depending upon where the insured lives, the requests are either processed at a center in the home office or an office in Cleveland.

Each center has approximately 20 case workers. Through the Davox controller, the case worker has access to the insured's name, current insurance information and telephone number. The Davox system interacts with an in-house developed phone system called ATIC (Automated Telephone Interview Communications) that automatically dials the phone number and prompts the case worker with questions to ask the insured concerning the current insurance information. The insured's responses are captured via data entry into ATIC, and a report is generated and mailed back to the insurance company. The data are all stored on the mainframe and eventually archived to tape. The network for this system uses the mainframe, FEP, Davox controller and SDLC links to the regional centers. The Davox system is not used by any home office personnel.

Local Area Network

The front end processor (FEP) and an IBM Token Ring Network are used to connect the main frame to the home office personnel for communications and programming. Employees at three separate locations are connected to the network. These employees are located at a data center, the home office building, and an office building housing additional

marketing and sales support functions and departments. The network is accessed by approximately 400 users or personal computers (PC). Management decided to implement a local area network mainly for sharing software, electronic mail, and terminal emulation. Through the LAN, users can access the mainframe and the VAX network. Most VAX and mainframe programmers do not use the LAN for programming purposes. The mainframe connection is used mainly by operations support, marketing and quality assurance testing. During mainframe or VAX development projects, marketing and testing teams may be asked to review/approve screens and system functionality. The LAN connections allow for 3270 terminal emulation and decrease the need for additional hardware for users who do not need terminal access on a frequent basis.

For PC development, the LAN is used for access to shared software development tools and program testing. The PC programming group is responsible for customer software development that is used for accessing mainframe database products and communicating information orders to the regional offices.

A recycling program and paper reduction campaign have been introduced and they have greatly increased the use of the LAN and reduced paper memorandum correspondence. Also, illegal software copies are strictly prohibited, and strict penalties are enforced on employees utilizing illegal software copies. LAN resource sharing is growing as more and more departments begin using PCs.

IDEA Controller

The third system connected to the mainframe is an IDEA controller which controls 3270 terminals and IDEA PCs with multiple system connectivity. The 3270 terminals are used by approximately 230 end users for programming, customer service and support, testing, and monitoring. These programmers are responsible for the mainframe database products. The controller also supports IDEA terminals that allow users to have multiple sessions with connections to the VAX and LAN network. The mainframe is also connected to the VAX network.

DEC Vax System

As stated previously, a regional office network connects remote offices with the home office network system. This network is based on a modified DEC system. The network consists of local and remote VAX machines used for communication, routing and information processing. As shown in Figure 2, a DecNet/IBM connection is used to connect VAX machines with each other and allow routing to the mainframe.

Regional Data Centers

Five regional data centers (RDC) are networked to the mainframe and support the tasks performed at the regional offices. Each RDC has at least 1 Microvax 2 or 3. A DEC Terminal server is used to connect VT220 terminals via DecNet to the Microvax machines. The regional offices are not connected to each other directly but can be accessed by home office or an RDC. If any problems occur at a regional office, the first line of support is the RDC, and the second line of support is the home office support units. For routing purposes, all customer requests are routed to the regional offices via the RDC. Should an RDC machine have problems, either home office or one of the other RDC machines can handle support and routing.

The regional office network was established for processing customer requests that require manual intervention. For example, an insurance company may need a photocopy of a applicant's medical history, blood and urine sample, and an interview with three associates of the applicant. These all require some type of human contact. The regional office system helps the case workers manage and process the customer requests. Each regional office has either a Microvax 2 or 3 with an Ethernet connection for VT220 terminals. Approximately 5-15 users access the regional office system. This system generates two customer products that can be electronically transmitted back to customers. These include inspection report information and status information concerning any delays in processing requests. These results are sent back to the home office VAX system and transmitted to the customer.

The regional office also has an IBM PS/2 model 60 system that is used for processing of mortgage loan requests. The system uses asynchronous communication to access credit reports on-line. The credit information is then verified, and the reports are faxed to customers.

Support and Security

This company has established a special support unit that is concerned with all questions, problems, and support issues. The HELP line is a phone system that directs the user to the appropriate support unit. Internal users and outside customers are provided 24 hour support.

The mainframe uses Netview and Netspy to manage the network. The LAN uses a package called Sniffer that helps detect problems. There is no similar software used on the DEC network because all communications are performed in a batch mode. Basically, if a file is sent from point-to-point, it is monitored to assure that it reaches the destination. If it does not, it is retransmitted.

All the customers are set up on the masterfile and accounting systems. Customers have node identification and passwords that are associated with their account numbers. The header of messages contains the valid node ID, password, and account number. If there is a problem with the header data, it will be rejected and not forwarded within the organization. The database products have additional passwords that

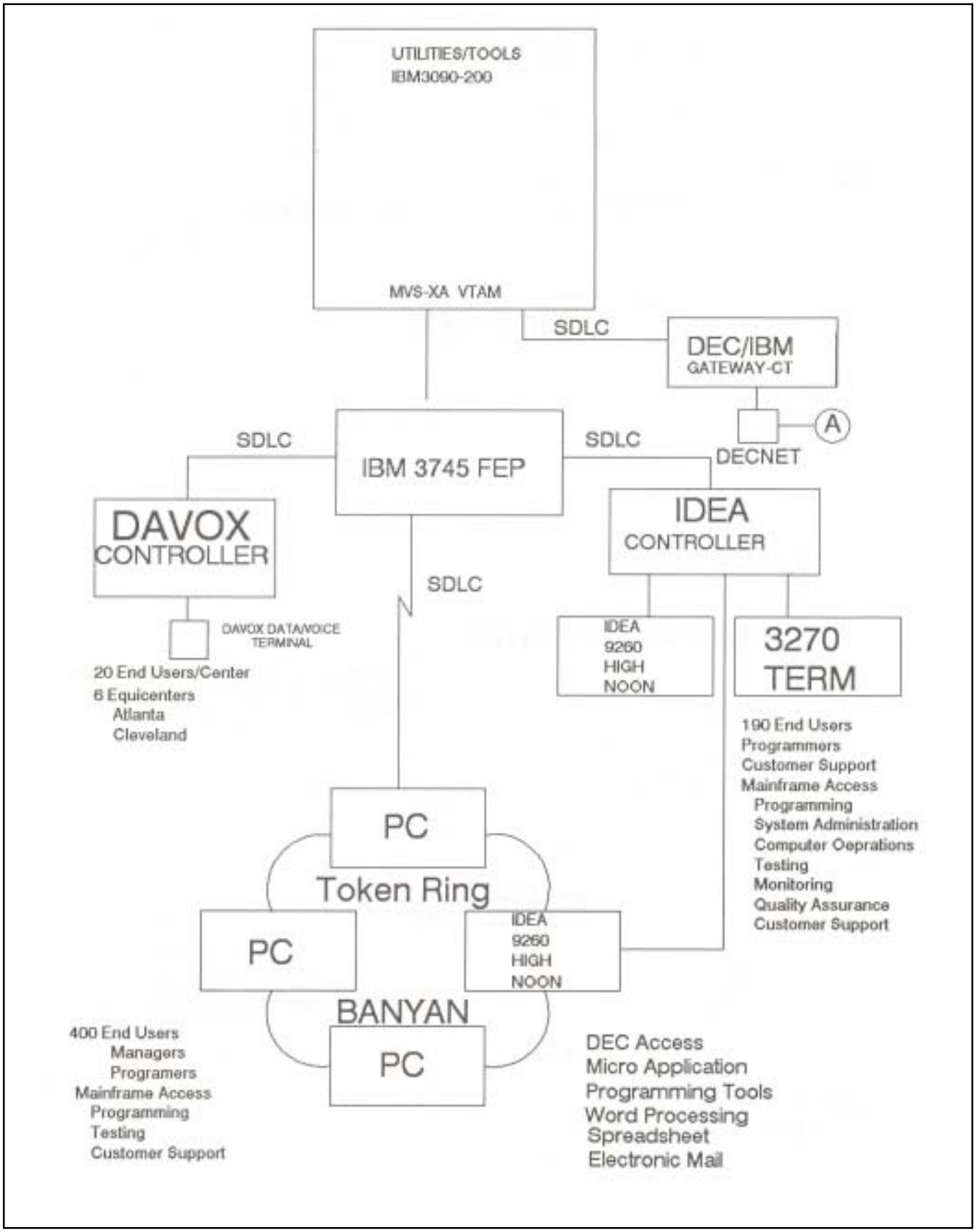
UTILITIES/TOOLS
IBM3090-200
MVS-XA VTAM
SDLC
DEC/IBM
GATEWAY-CT
A
DECNET
SDLC
IBM 3745 FEP
SDLC
DAVOX
CONTROLLER
IDEA
CONTROLLER
SDLC
DAVOX DATA/VOICE
TERMINAL
20 End Users/Center
6 Equicenters
Atlanta
Cleveland
IDEA
9260
HIGH
NOON
3270
TERM
190 End Users
Programmers
Customer Support
Mainframe Access
Programming
System Administration
Computer Oeprations
Testing
Monitoring
Quality Assurance
Customer Support
PC
Token Ring
PC
IDEA
9260
HIGH
NOON
BANYAN
PC
400 End Users
Managers
Programers
Mainframe Access
Programming
Testing
Customer Support
DEC Access
Micro Application
Programming Tools
Word Processing
Spreadsheet
Electronic Mail

Figure 2

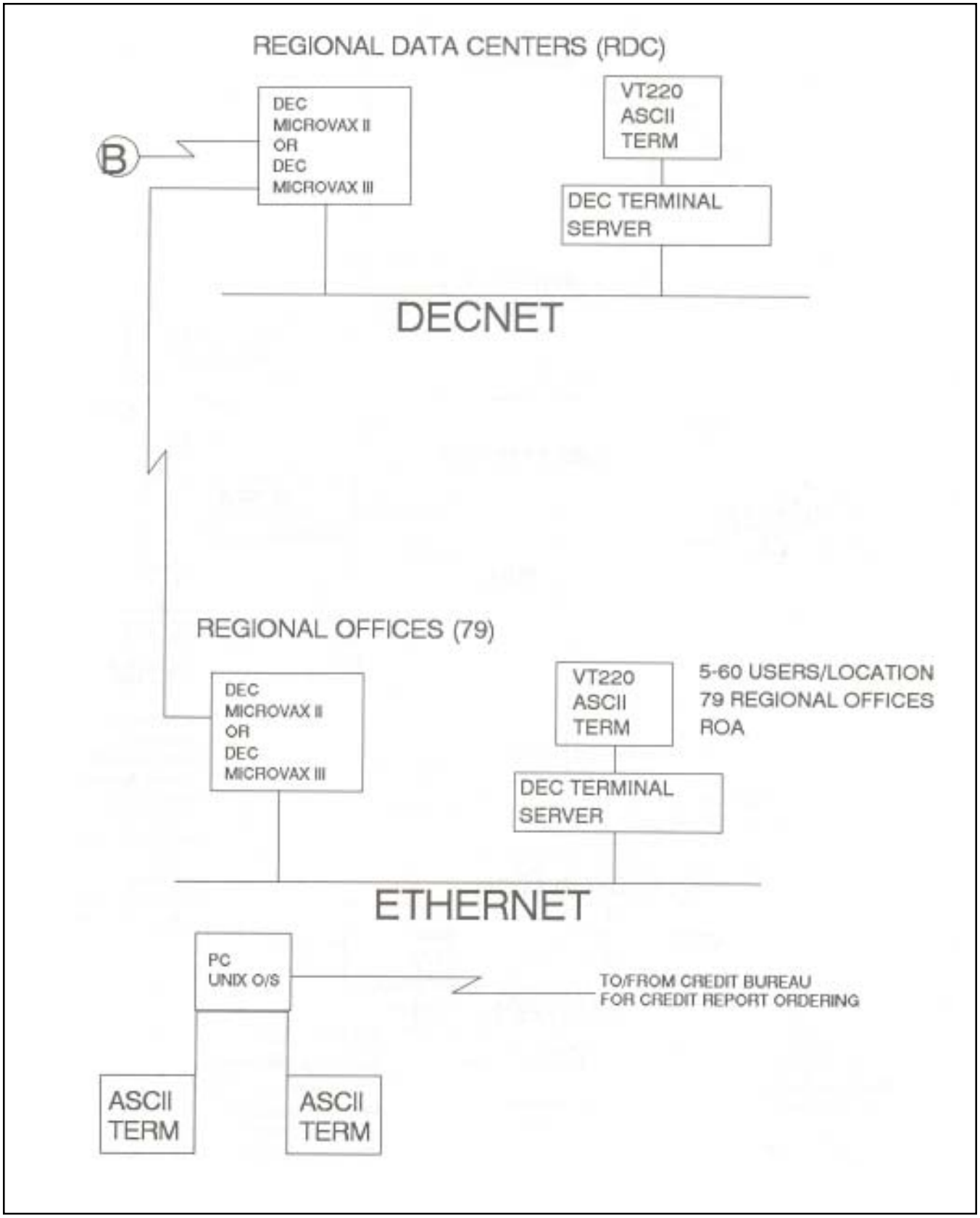
REGIONAL DATA CENTERS (RDC)
B
DEC
MICROVAX II
OR
DEC
MICROVAX III
VT220
ASCII
TERM
DEC TERMINAL
SERVER
DECNET
REGIONAL OFFICES (79)
DEC
MICROVAX II
OR
DEC
MICROVAX III
VT220
ASCII
TERM
5-60 USERS/LOCATION
79 REGIONAL OFFICES
ROA
DEC TERMINAL
SERVER
ETHERNET
PC
UNIX O/S
TO/FROM CREDIT BUREAU
FOR CREDIT REPORT ORDERING
ASCII
TERM
ASCII
TERM

Figure 3

must be provided before any searches could be performed on them.

User Satisfaction

Internal and external customer satisfaction with the products are measured using a quality program. The internal users and employees are asked to rate various departments such as Support, Customer Service, and Communications. These surveys are analyzed and the results shared with each department Vice President and Senior Vice President. When areas need improvement, a plan is put together that addresses these needs. The departments then are reviewed every month until improvements are made.

No studies have been performed on improving productivity with regard to the network. A current study analyzes the amount of money that is saved when customers transmit orders electronically versus using mail or fax. Only 30% of all life insurance companies use electronic mail to order and receive information. A major project is to determine what volume level customers should be pursued to get either PC or mainframe order capabilities installed.

Comparison to Other Networks

The network used by this company compares well with the networks used by banks and insurance companies; it is different from systems used by reservation agencies. The First National Bank of Maryland successfully integrated their voice and data networks to serve their branches in Maryland and Virginia (Brown, 1990). In addition, they used this network to let the customers dial in to obtain information about their accounts. The data network used by this bank uses an AT&T Paradyne Multiple Virtual Modem at each branch site. The modem combines data from the branches and delivers it to a multidrop analog leased line. The traffic from the analog leased lines is ultimately delivered to the main data center. The bank has a total of 30 multidrop circuits with each circuit supporting an average of six branches.

Neither the company studied in this paper nor the banks enjoy the advantages travel agencies derive from alliances with airline reservation systems. Rosenbluth Travel has developed many innovative applications based on the infrastructure provided by Covia's Apollo. They have been aggressive in exploiting the available capability and are building proprietary systems that exploit and build on current technology (Clemons and Row, 1991).

Each industry seems to differ in using telecommunications networks and MIS to obtain competitive advantage. The unique feature of the company under study is the way the regional centers are tied into the main office. Although the regional offices are decentralized, their reports to customers have to be mailed after processing through the mainframe at the home office. Thereby, a strategy has been adopted to make the home office serve as the only conduit of electronic information between the company and its external customers. This may be an important strategy in this industry due to the high value of the data to the corporate customers.

Latest Changes to Network Architecture

A major change has taken place recently in this company. All regional data centers have been closed and these machines have been brought to the main office. This was done to ensure that customers received the best support possible and to eliminate the number of escalation points for support. With the old design, a customer would call the regional office for support. That call could be answered by the regional office, regional data center, or the main office. Now, customers call an 800 number for any support issues. The issues have been broadened to include systems problems or just questions concerning their reports. The support unit takes the call and determines which product group or support department should handle the call. The problems are logged into a support tracking system and a support person is notified via E-mail that they need to call a customer. If the support person is not available, he/she will call the customer within 30 minutes.

Also, some of the service requests require direct contact with corporate customers. In many instances, the customer may be in a remote areas that is not easily accessible by an employee at the regional office. District offices with 1 to 4 employees have been set up in the remote area. These offices do not have any automated systems at this time. Within the next 2 months, ten of the district offices will be receiving hardware and new software that will be used to automate their operations. For example, a customer request may be routed from the main office to the regional district office. With the new system, the case information will be transferred electronically from the main office system to the district office system. The hardware platforms at the district offices are Sun PC Unix based systems with 414 MB of Storage space, 24 MB memory configured with VT 220 terminals connected to them. The system will be very similar to that used in the regional offices. When the report is completed, the case information will be transmitted to the regional office and then to the main office. This will allow all business to be handled and traced through the corporate DEC network.

Future Plans

Because of the vastness of the company's network and importance of getting information to customers in a timely manner, new technologies are continuously explored. With the continual growth in the use of PC based networks, the use of a PC network in the regional offices is being investigated. Also, being considered is the centralization of

support for the regional offices. With travel and hotel expenses continually increasing, use of teleconferencing is being encouraged. The network includes satellite transmission of training sessions, executive meetings and conferences. The teleconferencing system is being evaluated based on cost savings, training effectiveness, and user response.

With the addition of new database products, many customers have requested on-line access. The company is now determining what communications network would be best suited to allow on-line access and processing as opposed to batch processing.

A project is under way to investigate the use of phone aided interview systems at the regional office locations. Currently the VAX software provides report tracking and word processing capabilities. New systems are being evaluated that could gather information from consumers at the regional office locations.

Conclusions

This company places much emphasis on quality service and information. To ensure that customers receive accurate information in a timely manner, a dependable system and communications network is imperative. The network described in this paper was conceptualized over 10 years ago, but it continues to expand in size and incorporate new technology. This company thus has established itself as a leader in using telecommunications technology to improve its day-to-day operations.

The pioneering use of the telecommunications network for competitive advantage by this information services firm could serve as a model for other companies. The firm has recognized the critical nature of its network and the need for continuous evaluation and modification in order to maintain its leadership position in a dynamic marketplace.

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