

## AN UPDATE ON CORPORATE EFT

In October 1977 we reported on the status of corporate electronic funds transfer. Since that time, corporate EFT (also known as wholesale EFT) has progressed more rapidly than its counterpart, consumer (or retail) EFT. We decided it was time to revisit this field to find out how the field has changed, what new services are available or on the horizon, and how corporations are taking advantage of the new banking services.

Whittaker Corporation, with headquarters in Los Angeles, California, is a diversified international company with some 44 divisions and subsidiaries operating in five industries. The company's products range from railroad freight cars to electronic and hydraulic equipment, and from pleasure boats to specialty chemicals. One part of the company does consulting and provides health services internationally. Annual sales last year were almost \$900 million.

Because of these diversified and far-flung activities, the cash management function at Whittaker poses a challenge. So we talked with them about the automated cash management services they have been using from Chemical Bank of New York City for the past two years.

Chemical Bank's service, called ChemLink (which we discussed in our October 1977 issue), uses the General Electric Information Services network and processing facilities. Chemical Bank originally mar-

keted ChemLink to corporations, but for the past few years the bank has also been selling it to regional banks. There are now some 22 U.S. banks offering a ChemLink-based cash management service; together, they form a network called BankLink. This type of network is a new development in the banking industry, and it provides users with several benefits. For one thing, user corporations have a larger choice of banks at which they can have concentration accounts, where they can concentrate available funds. And since the reporting formats are standardized, banks and business units have a much easier time supplying needed information. Finally, all of the reported information can be consolidated, so that the corporate financial officers need fewer reports for keeping track of their banking operations.

Whittaker has taken advantage of these features by making good use of BankLink. Whittaker's business units are responsible for providing the corporate financial of-

ficers with forecasts of their short term cash receipts and disbursements, as well as daily deposit figures from their collection accounts. The units telephone the ChemLink processing center each day and report their available deposit information. Late each day, Whittaker's several concentration banks around the United States receive this deposit information from ChemLink and use it to automatically create depository transfer checks to transfer the funds to their Whittaker concentration accounts. The checks are put into the checking system that day and the money is available to Whittaker the next day.

The people at Whittaker say they could accomplish this same speedy concentration of their funds without BankLink, but they would have to subscribe to two or three cash management services, and these would be incompatible with each other. With BankLink, Whittaker not only has a wider choice of concentration banks to use, but it has one reporting format for all of its business units. And the system consolidates that information into daily, weekly and monthly reports. Accurate historical reports were difficult to create in the past, they told us.

On the disbursements side, Whittaker maintains a number of zero-balance accounts. Each day the banks call the ChemLink processing center and report the amount of the checks clearing on Whittaker's account that day. Whittaker financial officials retrieve this information through ChemLink, using terminals in their offices, on a carefully controlled schedule. Then they authorize wire transfers to be made from their central accounts to cover those disbursements. The bank then initiates the transfers, and the daily ChemLink report of wire transfer activities is used to verify that the transfers have indeed been made.

The corporate financial officers have three portable printing terminals that they use to obtain ChemLink status reports. They also use a high speed printer each day to obtain final copies of daily, weekly,

and monthly reports for reference purposes. In addition, the daily reports are used to verify the previous day's activities, and the weekly reports are used to verbally verify account balances with the business units.

Further, the monthly reports are used to create the input to their company's general ledger system. ChemLink's format was flexible enough to allow Whittaker to obtain report line items that coincide with its general ledger system's format. Thus, figures from the monthly ChemLink summary reports are easily entered onto data entry sheets for input to the general ledger. The financial officers like this one-to-one correspondence between the two systems. They also are pleased that they are better able to track and control their company's widespread financial activity with more accuracy and less turmoil than in the past, by using ChemLink and Bank Link.

## Sunmark Industries

Sunmark Industries is the marketing division of Sun Company, a large U. S. oil company. Sun Company is ranked as the twenty-third largest industrial corporation in the United States by *Fortune* magazine, with sales over \$7.4 billion. Sunmark sells heating and motor oil to retailers and consumers, it runs a chain of company-owned service stations, and it sells gasoline to independent dealers. It has headquarters in Philadelphia, Pennsylvania and expects sales in 1980 to reach \$4 billion.

Sun Company has created a company-wide cash management system that is controlled by the corporate financial officers. They use the automated Compulink service from Philadelphia National Bank. A main responsibility for the Sunmark cash resource manager is to collect payments as quickly as possible, deposit these payments in their field banks, move these funds into a corporate concentration account, and notify headquarters of the deposits.

Sunmark collects payments from a variety of sources—checks received at regional bank lock boxes, by drivers upon delivery, and at the credit card payment centers, as well as wire transfer payments from some large customers—and they even have arrangements for making automatic withdrawals from some customers' accounts!

To help the corporate cash managers predict rather than react to Sunmark's collections, the financial officers at Sunmark decided to install a *monthly* cash flow forecasting package. The package they chose is called CASHPLANNER, from Management Decision Systems (MDS) in Waltham, Massachusetts. So in late 1978, a team was formed of two consultants from MDS and one person from Sunmark. Their task was to determine the division's collection and disbursement patterns based on an analysis of the company's historical financial data.

The team identified seasonal collection patterns and growth trends for each product line. They determined cash flow relationships and specified cash flows by business function, such as payroll, sales collections, and accounts payables. This analysis took about six weeks, mainly because the division had never collected and consolidated financial data.

Once all of the factors were uncovered, the statistical analysis techniques to be used were chosen. Then, using the MDS EXPRESS system, Sunmark's cash planning model was built—and in just two weeks time! The model was installed on the Tymshare network and it is used by Sunmark financial managers via computer terminals.

The people at Sunmark have been impressed with how accurately the package has forecasted their *monthly* collections and disbursements. It typically comes within one to two percent of actual figures, except when prices or volumes fluctuate unexpectedly. These planners pass the monthly projections on to the corpo-

rate managers for their use in managing liquidity.

The division financial managers also use the package to help them in their own financial planning. Whenever their business assumptions change, such as anticipated fluctuations in prices and sales volumes of their products, they use the model to see how these changes will affect their monthly funds flow and balance sheets. They also use the package to help plan dividend payments.

Early this year Sunmark went one step further in forecasting their cash flows, by implementing MDS's *daily* cash forecasting package, CASHCASTER. This package helps them predict end-of-day cash balances over a thirty-day period. It generates a daily cash availability forecast by bank and by type of flow. And it permits the cash managers to analyze discrepancies from actual figures and adjust the model to eliminate sources of errors. The system gives both corporate and division cash managers even better short-term control of their cash flows and liquidity positions.

The people at Sunmark are pleased with their approach of analyzing and forecasting their division's cash flows. They find this is much more effective than reacting to after-the-fact actual figures.

## The changing world of banking

Judging from the comments of several speakers at the American Bankers Association's 1979 Operations and Automation Conference, the world of corporate banking is experiencing a period of dramatic change. Banks are positioning themselves for much greater competition in a new environment. This environment was described at the conference by Don Waite of McKinsey and Company (Reference 1a). We recount some of his points here; they relate mainly to U.S. banks.

In the past, commercial banks have depended upon the growth of their corporate customers to increase their own growth. But now, overall economic growth seems

to be slowing down. Some sectors of the economy will experience growth, of course, but in the years just ahead there probably will not be as widespread economic growth as in the past, said Waite. In many fields this slowdown is leading to heightened competition among corporations for larger shares of static markets. So prosperity, for corporations and their banks, will not be an easy matter.

U.S. commercial banks are also facing competition on several new fronts. It used to be that retail banks aimed at the *consumer* banking market. But now many of these banks are emphasizing their *commercial* banking business by offering expanded services to corporate customers. Some are establishing international branches. Thus they are competing head-on with established international commercial banks.

Also, U.S. banks are facing growing competition from foreign banks. Foreign banks in the United States grew a whopping 190% from 1972 to 1978, and their assets increased 400%. They still represent a small percentage in the total U.S. banking assets, but their growth rate is of great concern to U.S. bankers. We gather that the international commercial banking industry, as a whole, is becoming much more competitive in many countries, as banks compete for the business of multinational corporations.

The fluctuating world monetary situation is also causing totally new pressures on corporations (and their banks) to manage foreign investments much more carefully. Corporations can lose money simply because of the devaluation of one currency against another. In addition, surplus cash that can be concentrated and then invested for even a short time can reap substantial revenues in the course of a year, because of today's inflated interest rates.

And finally, reported Waite, commercial banks are receiving competition from the very people they serve—the corporate financial officers. These executives have been doing a better job of managing their

cash than in the past. This is reflected in a 24% decrease in corporate demand deposits in the U.S. from 1974 to 1978. Also, these managers are looking beyond banks for other forms of credit—such as commercial paper and private investments.

In our research, we also found that the world of banking is changing internally through the new automated cash management systems and funds transfer and message networks. In the past, corporate cash managers have used 'float' to keep their money as long as possible. They counted on postal service and bank processing delays, because between the time they mailed a check and the earliest time that they knew the check would clear, they kept the money in an investment earning interest. But the new electronic systems reduce bank processing delays and could eliminate the use of the mail service altogether—thus essentially eliminating float.

At the same time, these new services allow cash managers to find out their account balances (worldwide) sooner as well as to transfer surplus funds more rapidly. So while cash managers think they will "lose their float" with EFT, they could more than make up such losses by a speed-up in receipts and more rapid investment of funds. So say the EFT proponents.

The transfer of funds involves several fundamentals that we should review briefly. At the heart of the process is the concept of 'clearing' or 'netting'. Each work day, each bank receives as deposits many checks that are drawn on other banks. Between two banks in the same town, say, each will receive a good many checks drawn on the other. The clearing operation basically determines the net difference in the amounts each bank has received, and only this net difference need be transferred.

There are three main ways for performing the transferring of funds as a part of this clearing operation. One is by the 'correspondent bank' principle. Where two banks receive many checks, drawn on the

other, each will deposit funds with the other. On a given day, they will perform the netting operation, and the bank that ends up owing the other bank says, in effect, "Take that amount out of our account with you."

A second approach is through local clearing houses, for handling the clearing among banks that have not set up correspondent relationships. The basic idea is the same as above, with each bank having deposited funds with the clearing house.

The third approach is almost identical except that it operates on a national scale, through the Federal Reserve System. In this process, a bank's nearest Federal Reserve Bank acts as the clearing house. And because this is a national process, the Federal Reserve has established standard 'clearing' times for checks, ranging from one to three days, depending on the geographical separation of the banks, whether they are in major cities or not, etc.

The same type of process is used for the transfer of funds internationally.

The newer electronic banking network services do not alter these traditional banking relationships. They basically speed up transfer instructions by putting them in electronic form.

With this background, let us now look at what is happening with corporate cash management systems.

### **Cash management systems**

As we mentioned earlier, the corporate cash management market place is becoming very competitive. Every month in the business magazines, we see an increasing number of advertisements for cash management services offered by banks.

In the U.S., the field is growing in an interesting manner. Most of the services advertised by the banks are actually provided by a few third party organizations that handle all the data communications and processing. These companies sell their cash management products to banks. Each bank 'packages' that service by putting to-

gether the functions it desires. Then the bank offers the package to corporations under its own trade name.

In the U.S., the major third party suppliers of cash management services are ADP Network Services in Clifton, New Jersey; National Data Corporation in Atlanta, Georgia; General Electric Information Services, in Rockville, Maryland; and Rapi-data, Inc., in Fairfield, New Jersey.

Some third party suppliers sell directly to corporations, and some banks develop their own systems. But the major growth in the field appears to be in the bank/third party relationship, because the bank can handle the marketing and the third party can handle the processing. This split in responsibilities makes corporate financial officers feel more comfortable, because they do not want all of their financial records consolidated at one bank. Some organizations use several cash management services just to ensure this diversification.

In addition, a few major U. S. banks are now marketing their systems to regional banks, hoping to create information networks based on the standard formats of their packages. One of the major problems in the use of cash management systems (from the viewpoint of the reporting banks) is the plethora of reporting formats. These new networks reduce this problem. BankLink, which we mentioned earlier, is one such network. Also, Interactive Data Corporation, a subsidiary of Chase Manhattan Bank, offers a network service called Cash Line. It is based on that bank's Info Cash package.

Now let us consider the components of cash management, beginning with payment collection.

*Payment collection.* The objective in payment collection is to collect and deposit incoming payments as quickly as possible. Banks have offered lock box services for this purpose for some time, wherein customers mail their payments to designated regional banks, and bank personnel deposit the payments in the organization's local

account. Cash managers want to know the total deposited and how much of the deposit is available immediately (i.e. the checks are drawn on the same bank or from a correspondent bank with same-day clearing arrangements), and how much will be available for use in one, two or three days. Generally, lock box information is called into the processing center by the reporting banks. Corporate cash managers then obtain their reports on their terminals from the processing center.

Cash managers would like to know this information as soon as the money is deposited. To this end, all systems provide current day lock box reports, often updated a couple of times a day. There really is not much new in the payment collection process, since our 1977 report, except that some systems are providing cash managers with very up-to-date deposit information.

With the collections made at various regional bank locations, the next step for cash managers is to determine how much surplus cash is available, by looking at disbursements.

*Disbursements.* An organization may or may not use these same regional accounts for making disbursements. If they do, they will want to know withdrawal as well as deposit information. The cash management services offer several types of reports for this purpose, available via cash managers' terminals.

One is a daily balance report, which lists yesterday's collected balance and today's total available balance, by bank and by account. The report usually includes an exception report showing which locations have not reported for that day. A second report is the current day withdrawal and deposit (debit and credit) report. This gives details of debits and credits made so far today and their availability. A third report is a historical balance report, showing several months of daily balance information, by bank and by account.

For multi-national organizations, some systems provide international balance re-

ports. Banks report to the processing center using Telex, SWIFT (an international network we will describe later), telephone, or computer network.

Oftentimes companies want numerous disbursement accounts and yet have centralized control. Banks arrange this by having one central account from which the various disbursement accounts draw money to maintain the specified target balances. Most systems provide a target balance report to show cash managers how well they are doing in keeping the agreed-upon balances in their accounts. At least one system has automated this procedure by automatically performing funds transfers from the central account to the various disbursement accounts each day to cover the disbursements made that day.

For the reverse—moving funds to a concentration account—in most systems, if the account balance is over the target balance, the system will make a recommendation on how much to move to the concentration account. If the cash manager agrees, the transfer is initiated by the system.

From the balance information, cash managers can determine their surplus cash position, and concentrate that cash for investment purposes.

*Cash concentration.* Rather than leave the cash in these regional accounts, corporations want to concentrate it and then invest it, or use it to pay off outstanding loans. Again, the impetus is speed—speed in determining the amount of surplus cash available and speed in moving it to a concentration account.

One method of transfer is depository transfer checks (DTC). These are inter-bank checks. They go through the regular check clearing operation, just as personal and corporate checks do. Most cash management services have a DTC module that prompts the user in creating the transfer instructions. Banks normally create a batch of depository transfer checks in the afternoon after receiving the appropriate transfer instructions. The checks generally

make the money available the next day. One service we came across, however, gives same-day availability in some situations.

A speedier, and more expensive, way to move cash is by wire transfer. Here transfers are performed individually and immediately, usually with same day availability. Wire transfers generally are requested verbally by corporate employees (after adequate identification has been made) and then the wire transfer employees at the bank send the actual transfer messages. Recently some systems have allowed corporate employees to initiate the transfers electronically, either to pre-specified accounts (say, to a concentration account), or to any account (say, to pay a bill). The security provisions, which we discuss later, are particularly important in this latter case. Daily reports of both depository transfer checks and wire transfer activities are available from the services. These list transactions and verify that the transfers have been performed and that the money is available in the destination accounts.

And there is a third way to move money in the United States—by way of the automated clearing house network. This is a quite new method and as yet is used very little. But we know of one cash management service that recently implemented a new money transfer option that gives users a choice of using DTC, wire, or automated clearing house transfers.

*Investments.* With their surplus cash concentrated, corporate financial managers can decide whether to invest it, use it to pay off loans, or move it to a disbursement account. Should a company choose to invest the money, most of today's cash management systems offer investment aids. These do not help the manager do the actual investing; that is still done through brokerage houses and such. But these aids help the cash manager decide what the best investment appears to be.

To help slow inflation, the Federal Reserve Board has recently imposed some

constraints on certain types of short term investments, such as money market funds. This would seem to be a temporary measure. Cash managers still will have a variety of investment opportunities.

One investment aid is a short-term rate report. It shows the daily market rate on such things as federal funds, treasury bills, gold, repurchase agreements, the bank's prime lending rate and certificates of deposit, and so on.

A second report is a foreign exchange rate report. This report gives spot rates for a large number of foreign currencies. One system provides rates for 37 countries, updated three times daily. The exchange rates can be expressed in any of 18 base currencies. The report also provides daily and weekly market commentary and percentage changes of the exchange rates.

At least one system also provides a foreign exchange transactions function for organizations that often make non-negotiated and repetitive payments in a foreign currency. The module allows an official to create the transfer instructions from a terminal. The system will then calculate the exchange rate, request the transfer (in the destination currency), and create a debit to the organization's account (in its own currency). The module also provides a historical report of the past two month's activity.

A fourth report is a portfolio inventory, detailing the status of outstanding loans and purchased securities. This package may be quite sophisticated, such as including an analysis of earnings and interest accrued for each loan/security. Or it can be rather simple, providing only a listing of securities and/or outstanding loans. In some cases the report is not a true inventory listing but rather a report of security activities within, say, the past day, week, or month.

In many cases, organizations leave securities at their central bank in order to more easily move them around. An automated service for this function is a security movement instruction module. The

corporate officer uses this module to give instructions to bank personnel on receiving or delivering securities. This saves corporate personnel quite a bit of time and effort in contacting bank personnel by telephone (especially in a multi-national environment).

Now let's look at the communications side, and some banking network services that are in use today.

### **Banking network services**

Banking network services are used by banks to send various types of messages to each other and to send funds transfer instructions. Our description of these services is based on an article by Edwards (Reference 2) and on presentations at the 1979 National Computer Conference (Reference 3) and the ABA Automation and Operations Conference (Reference 1b).

*Fed Wire* is the best-known wire transfer system in the United States—well known outside banking circles perhaps because of several dramatic wire transfer frauds that have been perpetrated in recent years. Fed Wire is run by the U. S. Federal Reserve System for use by member banks. It is a star-type network that joins the twelve Federal Reserve district head offices to a switching center in Culpepper, Virginia. From these head offices, the network extends to the 29 Federal Reserve branch banks and thence to 460 member banks. Thirty-five of these member banks are connected to Fed Wire via computer; the others use computer terminals to send and receive messages. The communication speeds on the network are 2400 bps and higher. Fed Wire handles 58,000 transactions a day in Federal Reserve funds and government securities.

The Federal Reserve is currently planning a complete overhaul of the network. It is to be a distributed packet switched network between the Federal Reserve banks, and it is expected to take four years to complete.

As Edwards explains, a message originating in a commercial bank is forwarded to a Federal Reserve bank where it is transmitted either to another Federal Reserve bank or to a commercial bank. The account records are maintained at the Federal Reserve banks. This allows same-day settlement of transfers and generally same- or next-day availability of funds, depending upon the Federal Reserve's standard clearing times.

*BankWire* is a co-operative funds transfer system operated by Payment and Telecommunication Services Company. It was established in 1952 by thirteen U. S. banks to provide electronic transfer of immediately available funds, future dated funds, and administrative messages (such as daily account balances). It now has 188 member U. S. banks. Many of the member banks have a correspondent bank relationship with each other. BankWire executives are working with the Federal Reserve to provide same-day settlement of member accounts through the Federal Reserve system sometime this year.

BankWire transactions are performed individually and on-line. These transfers range in size from \$5000 to many millions of dollars, with the average transfer being one million dollars each. BankWire is most useful for transfers within the United States under ten million dollars. This accommodates most corporate transfers. Larger transfers generally go through Fed Wire. Member banks pay 60 cents for each transfer.

In 1978 BankWire II was installed. It was an appreciable improvement over the original BankWire system, because it increased communication line speeds and system capacity, allowed more types of interface devices, and provided better system backup. BankWire II has two operating centers, one in Virginia and one in Texas. Each center has dual C8562 Rockwell processors—one is operational and one is in a hot standby mode. The two centers are connected via 9600 bps trunk



lines and each center sends a duplicate of all of its messages to the other center. The system handles 19,000 transactions a day between some 280 devices connected to the system. These 'devices' range from low speed printer terminals to computer systems. Management at PTS has been surprised at the number of computers interfacing with the system. They had anticipated ten by 1980, but already there are 23 computers connected.

Their uptime for the system has been 99.4%, and there have been ten unsuccessful attempts at fraud using the system within the past year—all resulting from poor control procedures at the initiating banks. The average message is delivered in two minutes, with full accountability from entry to delivery.

*SWIFT*, which stands for Society for Worldwide Interbank Financial Telecommunications, is a non-profit co-operative international banking message system. Member banks transmit funds transfer instructions, foreign exchange transactions, and information on loans, deposits, and account balances.

SWIFT was founded in 1973 by banks in fifteen countries. It became operational in Europe in 1977, and it now links 727 banks in the United States, Canada, and nineteen European countries. In the coming few years it plans to add banks in several Far Eastern and South American countries, increasing the membership to 35 countries.

SWIFT has three switching centers on the network—in Belgium, The Netherlands, and a new one in the U.S. Each country has a concentrator center for its banks (a few smaller countries share one). The concentrator centers are connected to the switching centers by 9600 bps lines. All centers have fully redundant hardware and circuits. And all messages are encrypted between the concentrator centers. The system has had 99.9% uptime with their processors; the main problems have been with the communications circuits. They

have never lost any transactions, to their knowledge, but they have had work stoppages resulting in lost interest payments. Last year the Society's Board voted to insure all transactions against such interest losses. SWIFT has always been insured against loss of principal (loss of a transaction).

SWIFT has selected several vendors to market SWIFT interface devices (SID). The software for these is maintained by SWIFT. During the past two years, several other vendors have developed their own SIDs, which they maintain. SWIFT currently handles 150,000 transactions a day, double what it handled a year ago. And it expects to have 350,000 transactions a day by 1982.

So, as far as corporate EFT is concerned, progress is rapid in banking network services. The electronic transfer of a company's funds is closer to reality.

## Trends in the field

In our research we noticed several trends in the corporate cash management field. One is the trend toward integrating into one system the various functions we listed above. This approach gives cash managers the ability to use any part of the system from their office terminals. Several large banks have created integrated systems, but we were unable to find any corporations that yet use an entire package. That should come in the near future, we gather.

Another trend is toward current day reporting. As the banks and third party suppliers enhance their offerings, they are putting in more current-day reporting features, so that cash managers can see today's lock box deposits, money transfers, and disbursements *today*, rather than having to wait until tomorrow morning.

A third trend is the expansion of reporting from a national to an international scale. Companies with offices and bank accounts in foreign countries can now get more accurate and up-to-date account in-

formation from these far-flung operations. Most foreign operations report account information by Telex or voice telephone calls. However, the international SWIFT network has created some standard reporting formats that now make this option more attractive.

And finally, as we mentioned, the pace of banking is speeding up, with an associated decrease in float. This increased speed is in both bank processing and in communications among the banks. In some cases, float within the banking system has been eliminated altogether.

One question that comes to mind when thinking about automated banking services and funds transfer is: What kinds of security do these systems provide?

### **A sidelight: security**

Security measures are a big concern in banking, especially in funds transfer. John Atalla reported at the 1979 National Computer Conference (Reference 3) that there are six basic requirements for a secure wire transfer transaction.

A secure wire transfer first requires the positive identification of the originator and the recipient. Second, the funds transfer message must be secure against alteration throughout its life cycle. Third, the message can be good only once; it must be secure against unauthorized playback. Fourth, authorization to use the service must be controlled. Fifth, the file that contains the authorization information must be secure against unauthorized access and alteration. And sixth, the system must provide permanent and unrefutable audit trails.

The most sensitive transfer is unformatted funds transfer, which is transferring funds from one account to any other account. (A much less sensitive funds transfer is the pre-formatted one, wherein funds are transferred only to a pre-specified account.) For the unformatted transfer, the cash management services generally require the use of a number of passwords—

for logging on, for accessing the funds transfer module, and for actually requesting the transfer. Obviously, the originating organization must control the authorization to use the system as well as knowledge of these various passwords, or all other security measures in the system will be to no avail.

A major part of the security responsibility rests with the third party processing organizations (and their associated communication facilities). They are responsible for keeping the authorization database secure, so that unauthorized users cannot get into it. They also are responsible for the security measures used by all data processing centers—data security of customers' files, physical security of their centers, and audit trails of all transactions. They may also protect messages by using encryption. One third party organization that we talked with has consciously split up responsibilities for developing its cash management system among many employees, so that no one person has a total view of how the system functions.

If the funds transfer option of the service is used, then the third party organization acts as an intermediary, passing the transfer instructions on to the wire services—which have their own security procedures. Some services guarantee their systems against loss of transactions, while others do not.

Atalla stated that most current wire transfer operations provide only partial security solutions. They depend heavily on the honesty of people and the lack of knowledge by outsiders of how the operation works. He described a new system that his company (Atalla Technovations in Sunnyvale, California) has developed that he says provides total security in wire transfer operations. It is called the TRAC system. It consists of a central security mini-computer, containing the security software, disk and tape storage, plus any number of TRAC terminals at remote sending and receiving locations.

A sender uses the TRAC terminal to create a one-time TRAC number to authenticate a transfer. This number is generated by combining: (1) the sender's personal identification (a phrase of eight characters or more), (2) the important portions of the message (such as the transferred amount and account numbers), (3) the sequence number of the message, and (4) the terminal ID. This is encrypted using the U. S. Data Encryption Standard to produce the TRAC number. This number is sent to the data center via a clear-text message by voice telephone, terminal, or Telex, along with the transfer request message. There the number is deciphered and verified by comparing with the important parts of the message, etc. If it agrees, the process is repeated by the data center, for sending the message on to the recipient.

Atalla says the system provides the six basic funds transfer security requirements. For example, it guards against an attempt to use the number a second time because the second message should have a different sequence number; thus the TRAC number would not be validated by the system.

So security measures are provided, but they are not yet as good as they could be, especially at the originating locations where authorization and password control is essential.

The above discussion of cash management services and banking network services points out that facilities for corporate EFT are here, they are beginning to be marketed aggressively, and their use is growing quite dramatically. But a full EFT system also includes retail or consumer EFT services. So let us look at some developments toward full EFT.

## **Two approaches to full EFT**

In a full EFT system, we suppose there would be no paper or voice transfer of information and funds, only electronic data transfers. Additionally, there would be no float, since transactions entering the system would be settled and the money

would be available that same day. There are a number of efforts in various parts of the world toward this elusive goal. We describe two of them here.

### **Databank in New Zealand**

Databank is a consortium of the five commercial banks in New Zealand, which operates a national computerized banking network. It was formed in the mid-1960s to help stem the growing volume of payments by paper checks. New Zealand has one of the world's highest per capita usage of checks, and the growth was escalating dramatically.

As a first step with the new system, two central processing centers were established, one in Auckland and the other in Wellington. Each center handles one-half of the country's funds transfer processing. Initially, at the close of each banking day, couriers would pick up checks and other input from each branch and deliver them to one of the two centers. Output reports were delivered back to the branches before they opened the next morning. Also, at this time, a one-day float for transactions between accounts held in different processing centers was established. There was to be no float between accounts held in one center.

In 1969 the system was enhanced to include 'money transfer services'. These form the basis for a full EFT system by establishing the communication format between debtor, creditor, and banks. Databank provides three basic electronic payment services. The first is an automatic payment service. Single customer payments of a fairly consistent amount that are made on a pre-determined schedule can be pre-authorized to be transferred between two accounts. Examples of these are mortgage, rent, and insurance payments.

The second is a direct credits service. Direct credits are multiple payments that fall due on the same day, such as wages, salaries, pensions, and dividends. A schedule for the payments is set up at the Data-

bank center, along with the particulars, such as the accounts to be credited. This information is stored on a master file at the center. At payment time, the paying organization provides the center with the variable information, usually on magnetic tape, and the payments are made electronically.

The third is a direct debits service. Like the direct credits service, this is for multiple payments. But in this case, the collecting organization supplies a schedule of the collections to be made and credited to its account. Subscriptions for clubs and magazines, or utility bill payments, are examples of this type of payment. Obviously, prior arrangements for all of these transfers must be made between all parties.

Today about 16% of New Zealand's banking transactions are paperless (over 60 million a year). The people at Databank told us that they have been successful in getting customers to use the automatic payments and direct credits services. But they have been less successful in persuading customers to switch to electronic payment for direct debits and corporate-to-corporate payments. The direct debits service (for instance, the automatic payment of variable charges such as department store bills) has not been pushed by the banks, so it is not widely known or accepted by consumers. And corporations are slow to accept electronic corporate-to-corporate payments. One reason is that these payments are more complex than consumer payments; for example, several invoices, with varying discounts, could be paid by one transfer. And corporate financial managers are concerned about maintaining control over disbursement timing.

In 1975, the Databank operation was extended even further to include data communication capabilities. A network now connects the two processing centers with fifteen regional centers. These regional centers enter (and validate) checks and other input information for banks and then print out various reports for them. When

the communication capability was added, the one-day float between the processing centers disappeared. Thus, all transactions are processed and settled on the day they are input.

So in New Zealand, they have an electronic funds transfer system in place, and they expect it to at least slow the growth of check usage.

#### **Automated clearing houses in the U.S.**

In the mid-1960s the concept was initiated in the U.S. of using EFT and automated clearing houses (ACH) to alleviate the increasing volume of checks being processed. The system was envisioned to handle retail EFT—payroll, bill payments, and automated teller machine and point of sale transactions—as well as corporate EFT. The first ACH began operation in California in 1972. In 1974 the National Automated Clearing House Association was formed to oversee the system's operations. By 1978, 32 ACHs had been established in the U.S. All but the New York and Midwest clearing houses are operated by the Federal Reserve System; these two are run by private organizations.

The ACH system handles two types of payments. One is a payment *to* an individual account, such as a direct payroll deposit. The second type is a payment *from* an individual account, such as a mortgage payment. As it has developed, the current major user of the ACH system is the U.S. Government, for making social security and veteran payments. In the commercial sector, the system's use for company-to-individual disbursements (such as payroll) is expected to grow faster than its use for individual-to-company payments (such as paying department store bills). This latter use will require a re-orientation of consumer paying habits, because it requires them to initiate electronic payments. And so far, banks have not aggressively marketed this service.

To use the ACH system, the originating depository institutions—the banks, savings

and loans, and thrift institutions—prepare magnetic tapes of their transactions each day. These tapes are carried to the nearest ACH before the daily deadline. The information is sorted at the ACH and transmitted to the appropriate other ACHs. The system uses the Federal Reserve System to perform settlement among the banks.

In 1978, the 32 ACHs were linked via Fed Wire. This connection now allows Federal Reserve member banks to use the payment facilities of the ACH system. Late last year the system was handling four million transactions a month. With the new connection, the volume is expected to double by late this year.

So the United States now has in place an electronic payments network for handling retail and corporate payments.

As the use of computer technology spreads, corporate use of computerized special services, such as the cash management services we have discussed here, will grow. But end-user departments may *not* ask the data processing department for advice before acquiring these services, especially when they require only in-house ter-

minals and no special programming support.

We think you should know what is emerging in this area of cash management and funds transfer, because these systems will almost surely have to interface some of your application systems—for instance, the general ledger system. We hope this report will help avoid some of the ‘surprises’ that might otherwise occur.

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