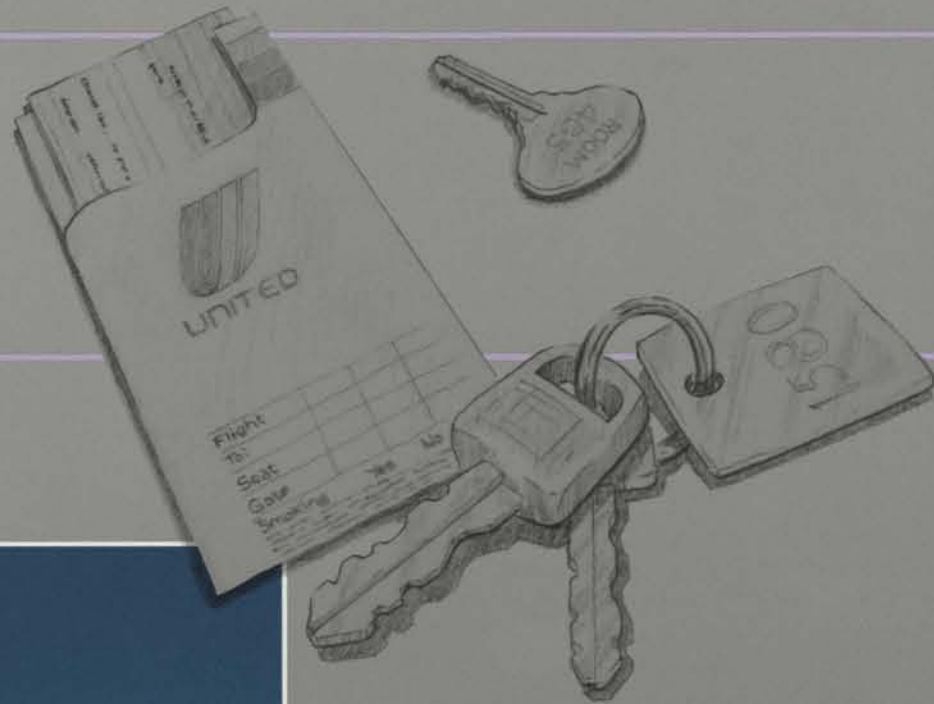


NETWORKING

T . O . D . A . Y

Tymnet's Public Data Network...

*the key to United Airlines'
Apollo Reservation
System.*



MCDONNELL DOUGLAS

Contents

3 Viewpoint

4 A Message from the President

5 Cover Story

Tymnet and Apollo Fly the "Friendly Skies"

Apollo Services is one of the most sophisticated computer reservations systems in the world. Apollo processes 300 million transactions daily. Two years ago, Tymnet and Apollo joined forces and the benefits of a vastly powerful reservation system became more far-reaching than ever before.



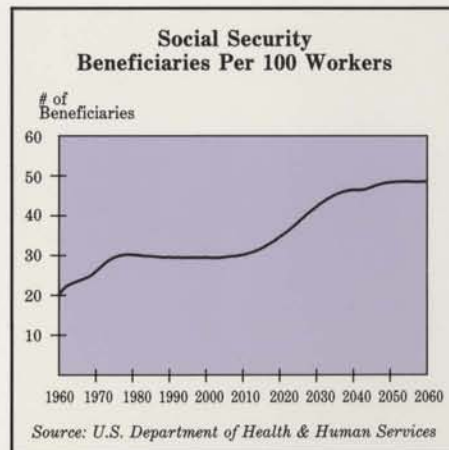
5

10 Feature Articles



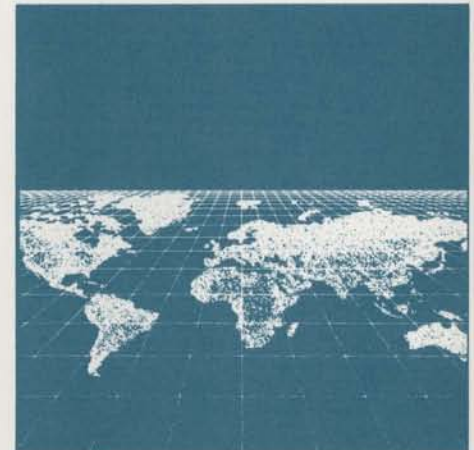
10 Banking of Tomorrow

Bank of America maintains one of the largest ATM networks in the world. Now the bank, with the help of Tymnet, has introduced another innovation of convenience.



16 Changing Times Challenge Employers

The provision of employee benefits has become a difficult task for employers. But thanks to Hewitt Associates and Tymnet, a system has been developed that simplifies the task for employers, while better serving the needs of employees.



21 Tymnet Maps Out Async Strategy

Tymnet customers will soon benefit from an aggressive async strategy planned for the late 1980s. A series of network enhancements including new services and expansion of existing services will soon be implemented.

Managing Editor: Linda Chaiko Please address all inquiries to Editor, Client Communications

Networking Today, published four times a year, reviews Tymnet's latest data communications and information technologies and presents customers' applications of those technologies. The magazine also features interviews with top industry leaders, general networking articles on the latest developments in data communications, and information and commentary on major industry issues. **Networking Today** is produced by Tymnet, McDonnell Douglas Network Systems Co., Marketing Communications, 2560 N. 1st Street, P.O. Box 49019, San Jose, CA 95161-9019.

Viewpoint

In this issue of **Networking Today** we feature three companies that have successfully utilized Tymnet to help better meet customer needs—United Airlines, Hewitt Associates and Bank of America.

While the specific industries and applications are quite different, they share a common thread—a need and ability to intelligently manage consumer choices in order to fulfill specific customer needs, and thereby improve competitive position.

Effective management of consumer choice is a national and international challenge. Diverse product choices are necessary to fulfill the unique needs of increasingly diverse consumers in a very complex and competitive world. Over the last century the evolution of consumer choice has been nothing less than spectacular. The days of limited product choice, such as the Model T available only in black, are long gone. Look around you—the automobiles on today's highways, the products in a large grocery store—the choices are mind boggling, and the trend will continue!

Through Tymnet communications and technology, each of our feature companies has effectively managed and offered product choices to their customers.

- United Airlines' "Corporate Apollo" brings Apollo Services, one of the world's most sophisticated computer reservations systems, to the corporate travel department. Corporations now have access to the Apollo data base which contains the schedules of 650 airlines, six million air fares, room availability for 17,000 hotels and car rental information for 20 car rental agencies with more than 5,000 locations.
- Bank of America's "Home Banking Service" offers customers a wide variety of banking and investment services, at home or at the office, seven days a week, 18 hours a day, nationwide and overseas.
- Hewitt Associates' "FlexSystem" allows employers to manage and administer flexible compensation programs for their employees, enabling employees to choose the benefit plan that best suits their needs.

We at Tymnet are indeed proud that United Airlines, Hewitt Associates and Bank of America have chosen Tymnet to fulfill their business communications requirements. Tymnet will continuously strive to earn their business by providing unique, reliable and cost-effective communications solutions.



Bernie Kemple

Bernie Kemple
Executive Director
Domestic Field Operations

President's Message



Warren Prince
President
McDonnell Douglas
Network Systems Co.

On-line Access Charges – A Costly Plan for Many

In the June issue of **Networking Today** we discussed Computer Inquiry III and Tymnet's commitment to providing quality, cost-effective services and to represent the industry in the regulatory process—Tymnet's commitment to lead the industry to a "triple win." Today we are asking for your assistance in maintaining that commitment.

As most of you know, the Federal Communications Commission issued a Notice of Proposed Rulemaking (NPRM) which tentatively proposes to place additional and substantially higher access charges on enhanced services. These additional access charges would add over \$4.00 per hour to the cost of providing enhanced services. Inevitably, these costs would be borne by the users of enhanced services—our customers and your customers.

We believe you can be effective in educating the FCC about the detrimental impact these charges would have, not only on information services but on the industry in

general. This proposal, if adopted, would cause a reduction in the use and implementation of information services which benefit both business and consumers.

The FCC has not yet adopted the proposal and has asked for comments on it. Tymnet will be responding to this request, and we strongly urge you and your customers to do the same. Together we have the opportunity to convince the FCC that this is not good public policy.

Tymnet is working hard to educate the FCC and others on our position. Tymnet is strongly opposed to the imposition of carrier access charges for the following reasons:

1. The FCC has not clearly defined the category of users to which these charges apply, nor has it indicated that this group of end users is sufficiently distinguishable from other end users to justify the imposition of these charges.
2. The imposition of these charges would significantly increase the cost of providing information services. Certain existing services would be curtailed and the introduction of new and innovative services would be hampered.
3. These access charges would adversely impact the entire information industry in which the U.S. currently enjoys a positive balance of trade. These charges could seriously affect that positive balance.
4. Despite the serious impact of these charges on the information industry, the total contribution by Enhanced Service Providers (ESP) to the access charge pool would be too small to allow any real reduction in access costs on the rates for long distance voice service.

5. Enhanced Service Providers do not require, nor can they currently utilize, many elements of the services provided under the carrier access charge tariff. For example, an ESP normally uses "line-side" connections, while carriers use "trunk-side" connections. Signaling information is only available on 4-wire trunk-side connections and is not available on 2-wire line-side connections. Enhanced Service Providers would be paying for services they neither need nor can use.

6. Enhanced Service Providers currently pay access charges including a subscriber line charge of \$6.00 per month.

After reviewing the FCC notice, you may share our views and wish to express them to the FCC. If you are interested in more information, please contact Jo An Couche, Manager of Regulatory Planning at McDonnell Douglas Center, 2560 N 1st Street, P.O. Box 49019, San Jose, CA 95161-9019, (408) 922-6202.

We believe the FCC made the right decision in the Third Computer Inquiry by maintaining the competitive nature of American business. Together, we can succeed in getting the FCC back on target towards an information age which can benefit everyone.

Cover Story

Tymnet & Apollo Fly the "Friendly Skies"



It was 10 a.m., January 1, 1914, and Mayor A.C. Pheil of St. Petersburg, Florida, carefully lowered himself into the cockpit of the 26-foot long Benoist flying boat. His pilot Tony Jannus gunned the 75-horsepower engine. The plane skimmed across the St. Petersburg Yacht Basin and gracefully took to the air. Twenty-three minutes and 18 miles later it landed, having successfully completed the inaugural flight of the world's first scheduled passenger airline—the St. Petersburg-Tampa Airboat Line.

The ensuing years saw the struggle of a new industry dependent on an undeveloped technology. The public remained skeptical of flying, and perceived those who flew these

strange flying machines as romantic daredevils who often led short lives. And it's no wonder. Emergency landings were frequent. Navigational aids and weather reporting were primitive. Pilots often acquired information on visibility and wind direction by peering down at canvas strips laid out in prearranged patterns on the airfield. A change in the pattern meant a change in wind direction. Some planes were equipped with radio equipment, but the noise interference was often deafening, and every time a plane flew into rain, snow or even a cloud, the static blocked out all reception.

Traveling conditions were unpleasant. Protective coveralls had to be worn for insulation against the cold. And for protection against extreme

low temperatures, hot water bottles were provided. Sitting in cramped quarters, sharing the space with bags of mail, strapped into parachute harnesses, passengers endured noise, vibration, extreme temperatures and bumpy rides.

Fortunately, a reluctant public, flying mishaps, uncomfortable flying conditions and occasional deaths from flying did not deter the men who flew and designed these potential wonders of the air. A mettlesome breed of aviation enthusiasts, mesmerized and enthralled by the freedom of the air and the far-reaching potential consequences of flight, they would not give up flying and were intent on building ever faster, more efficient planes. Thanks to the persistence of these

“dope”; to today’s 360-ton jetliner of 4.5 million parts, fashioned from metal and plastic.

Long Distance Travel Changes Forever

The age-old experience of long-distance travel would never be the same—and the consequences would be far reaching. Makeshift runways in fields and meadows gave way to paved, lighted runways. Primitive navigation equipment was replaced by sophisticated control towers and radar systems. Umbrella ticket stands, precariously balanced at the edge of runways, became sophisticated airline terminals. Once non-existent service was now embodied in the form of flight attendants, hot meals, movies, music, cocktails, lounges and warm, pressurized cabins.

Flying, a once hazardous, exciting form of transport, endured by only the hardy and adventurous, had become a means of transport for nearly everyone. In 1919 there were 27 airlines and by 1929 the number had increased to 100. By 1945 there were 200 airlines. Today there are more than 650 airlines.

Airline passenger traffic in 1929 was 60,000. Today more than 600 million persons fly each year. In a single year alone, American travelers log more than two hundred billion miles.

At 155 major U.S. airports, jets take off 13,000 times a day. U.S. airlines are expected to earn operating profits of as much as 3.5 billion dollars this year.



men, the airplane has evolved from yesterday’s first plane of wood, cloth and wire, with wings of spruce, covered with cotton cloth and coated with stiffening airplane

Phenomenal Passenger Traffic Growth Demands a New Reservation System

Just as the airline industry evolved from primitive to sophisticated technology, so too did the reservation systems necessary to keep track of the phenomenal growth in passenger traffic. By the 1960s, airline traffic had increased to the point that a major change was necessary for survival. The search was on for a reservation system that would be more efficient than the traditional manual modes of operation. The use of charts, pieces of chalk and lights to track reservations was no longer adequate. Key punch systems partially automated the system. However, this method too was unreliable, with the risk of cards being misplaced, misfed or dropped off conveyor belts.

One of the first airlines to finally succeed in computerizing its reservation system was United Airlines. In 1971 a United Airlines computerized reservation system became reality. The system was first used to serve only the inhouse needs of United. But some 2,500 enhancements and six years later, this primitive inhouse United reservation system had evolved to become Apollo Services®—one of the most far-reaching, sophisticated computer reservation systems in the world. Apollo was also one of the first computerized systems made available for use by travel agents.

The Mighty Apollo

Apollo Services processes reservations and tickets for airlines, rental cars, hotels and many other travel services around the world. "It even allows you to make theatre reservations and dinner reservations in Europe," says Sue Powers, Director of Marketing. "Or, you can order a

lei greeting for someone in Hawaii. You can book Amtrack through Apollo, or buy a Eurail pass." Other related features of Apollo Services include information on cruises, limousines, tours, passports and visas and special events.

The heart of Apollo Services is its data base in Denver, Colorado, which contains the schedules of more than 650 airlines with 270,000 origin/destination city pairs, six million air fares, hotel room availability for 17,000 hotels, car rental availability for 20 car rental agencies with more than 5,000 locations and ticket information for 22 theatre companies.

The data base resides on eight IBM mainframe computers which work virtually around the clock, seven days a week. They are linked by 500,000 miles of communication circuits to 60,000 terminals in 10,000 locations, including more than 500 locations in 41 countries. Thirty million transactions are processed through Apollo each day, translating into 300,000 new passenger records created daily and 350,000 airline tickets issued each day. The data base can handle 13,000 inquiries per second or five million requests per hour. The data storage capacity of Apollo is 488,000 miles of characters—enough to reach the moon and back.

Before Apollo, travel agents depended on the well-used Official Airlines Guide which lists all scheduled flights. Scanning the long list, pencil in hand, an agent would jot down the flight number, class of service and date, and then call the airline for confirmation. Phone lines were often busy and confirmation took anywhere from 20 minutes to all day. In addition, the procedure gave the agent's client only a seat on the plane.

"Tymnet's dial-up capability allows an agent to access Apollo from many locations."

Today 9,000 travel agencies use the Apollo Services reservation system. With Apollo, a passenger's requests for airline, hotel and car rental reservations, as well as a multitude of other travel services, are confirmed in seconds. And it's all done by a few key strokes at a computer terminal.

The Birth of Corporate ApolloSM

As the Apollo Services reservation system has expanded over the years, so too has its method of access. In 1985, United Airlines made the Apollo data base directly accessible by corporations through Corporate Apollo. "Corporate clients were saying to their agents that they wanted the ability to make and change reservations without having to be on the phone several times a day," says Jackie Ross, Corporate Apollo Product Manager. "Yet they still wanted the travel agent to provide the quality control necessary in booking reservations." Hence, Corporate Apollo was developed.

"Corporate Apollo is a user-friendly software package that provides a corporation with dial-up access to the Apollo Services data base," says Ross. "The responses that come back to the corporate user are the exact same responses that a travel agent sees." Corporate Apollo brings to corporations the convenience and efficiency of 24-hour access to Apollo's vast resources.

Corporate clients can use Corporate Apollo for all their travel planning needs. In an instant, they can see schedules, flight availability, plus fare and rules information. They can make their own flight reservations, make seat requests and enter frequent flyer information, even request hotels and rental cars. And, if necessary, they can retrieve their reservations for

changes or cancellations. Corporate Apollo is linked to the main Apollo data base by TYMNET[®], McDonnell Douglas' public data communications network.

To use Corporate Apollo, a corporate client needs only an IBM-compatible PC loaded with Corporate Apollo software, a modem and a travel agency host. Once corporate clients complete their reservations, they are automatically queued to the host travel agency for review. The travel agent performs quality control to ensure the client's travel plans conform to corporate policy and guidelines and that all travel arrangements are complete. If everything is in order, the travel agent instructs Apollo to print the passenger's tickets and itinerary. Travel documents can even be delivered electronically to the corporate location with an Apollo Services Satellite Ticket Printer.

Travel Agents Find New Uses for Corporate Apollo

"Corporate Apollo was first developed for the corporate client," says Ross, "but travel agents have begun to use it as well. They are using Corporate Apollo as a portable version of Apollo." Apollo is accessed by the travel agent through dedicated leased lines and, therefore, is not portable. "The average travel agent uses at least four dedicated CRTs to access Apollo," says Powers. "They generally access the system ten hours a day or more."

The high volume of traffic makes a dedicated line the most cost-efficient means of access for the agent, but it limits the agent from accessing Apollo from any location other than the agency office. Tymnet's dial-up capability allows an agent to access Apollo from many locations. "Agents are taking Corporate Apollo with them as they

make calls," says Ross. "They enter their transactions directly into Apollo from wherever they are. Thus, Corporate Apollo has expanded our market. Not only does the corporate client use Corporate Apollo, but the agencies themselves have become corporate clients as well."

Tymnet Provides the Answer for Corporate Apollo

The decision by United Airlines to use Tymnet for Corporate Apollo was based on many factors. Although United first considered using a dedicated network, the company concluded it would be more cost-efficient to use a public data network. The variable amount of traffic typically generated by a corporate travel department makes the use of a public data network more cost-effective than the use of leased lines.

One of the most important features United requires in its network for Corporate Apollo is protocol conversion. Most corporate clients have asynchronous terminals, but United's Apollo host communicates with a 2946 protocol, a synchronous protocol developed by IBM for the airline business.

"Tymnet provides the protocol conversion that we couldn't find in any other network," says Ross.

Tymnet's node distribution is also a major benefit to United as it gives Apollo access to corporate clients nationwide. "TYMNET is expansive," says Ross. "It covers the U.S. extensively."

Corporate Apollo will continue to keep pace with Apollo Services' state-of-the-art technology. Already, a Corporate Apollo Phase II is being readied for introduction. This version will contain many enhancements such as corporate client profiles and expanded menus to provide corporate clients with faster and better service.

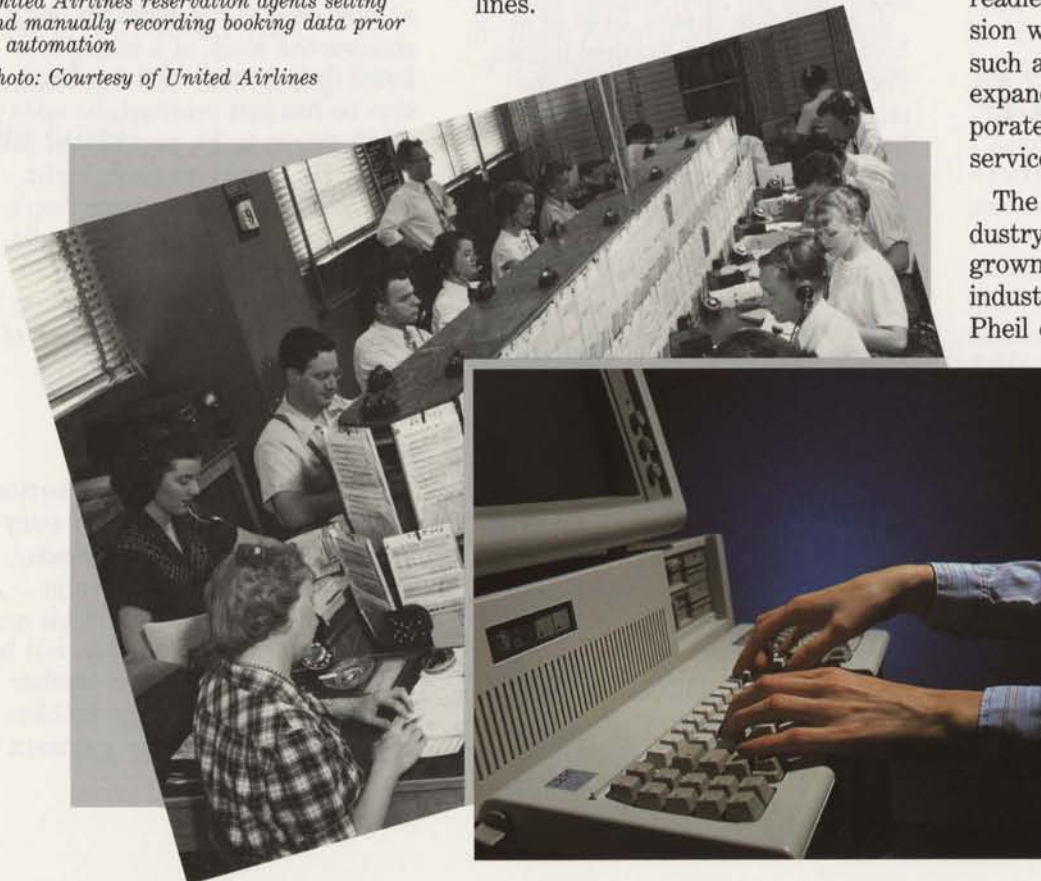
The computerized reservation industry, like the airline industry, has grown beyond the expectations of the industry pioneers. Indeed, if Mayor Pheil of St. Petersburg, Florida were to board a plane today, he would be amazed at the incredible changes that have taken place.

As the airline industry continues to evolve and grow, so too will Corporate Apollo. And as Corporate Apollo grows, so too will the relationship between Tymnet and United Airlines. ●

1949

United Airlines reservation agents selling and manually recording booking data prior to automation

Photo: Courtesy of United Airlines



Feature Articles



Banking of Tomorrow

Scenario One

It's 7:30 p.m. Kathy Baily is at home. She has just finished dinner. She sits down at her desk in the study and in seconds she has paid her electric bill, phone bill, major credit cards, garbage service and mortgage. She accomplished her



task without filling out or signing any checks, without addressing any envelopes, without making any phone calls.

Scenario Two

Tim Stevenson leans back in his favorite chair in the comfort of his den and pensively gazes at the screen that displays an array of stock quotes. He is especially interested in high tech stocks. After



an appraisal of the offerings, he chooses the stock of a major computer firm. Based on the information he has just received, he adds 1,000 shares to his portfolio at \$50 a share. He played his cards right. The next day the computer firm's stock jumps two points. Tim sells and makes \$2,000. He conducted these transactions without calling or visiting his broker. As a matter of fact, Tim never left his favorite leather chair.

Scenario Three

John Robinson's business requires extensive travel. He is often away for weeks at a time. It's Tuesday, Sept. 29 and John wakes up in Hong Kong. He remembers his mortgage payment is due today, but he will be in Hong Kong for another two weeks. He solves the problem by sending his mortgage payment to

the bank from his hotel room. He now wonders about his account balance. Again from his hotel room, John checks his balance. He performed these transactions without leaving his room, and he did it in seconds.



In these three scenarios, how is it that Kathy paid her bills, Tim bought and sold stock, and John paid his bills and checked his account balance from his hotel room in Hong Kong? They all used Bank of America's HomeBanking service.

Although these scenarios are hypothetical, the scenes they portray are real. Today thousands of households use Bank America's HomeBanking service to perform a variety of banking transactions—and they do it in the comfort of their own homes or offices. The bank has customers using HomeBanking nationwide and overseas.

It's almost like having a bank at home. All a HomeBanking customer needs is a PC or terminal (any kind will do) and a modem. And with the help of TYMNET®, McDonnell Douglas' data communications network, HomeBanking customers are linked to Bank of America seven days a week, 18 hours a day (6 a.m. to midnight). TYMNET allows up to 64 HomeBanking sessions to be processed simultaneously.

HomeBanking was introduced on November 30, 1983 and by January 15, 1984 there were 5,000 customers using the service. "That's 5,000 customers in the first 45 days of service," emphasizes Gerritt Kerkstra, Bank of America Vice President.

HomeBanking—Popular and Easy to Use

What makes HomeBanking so popular? First, as previously mentioned, it allows a customer to perform banking transactions from the home or office. Secondly, it's easy to use. Paul Lohse, Systems Manager at Bank of America, demonstrates just how easy. He turns on his terminal and waits for the prompt to log in. "This is our regular Tymnet log-in," he explains, as the screen lights up. He presses a couple of keys. "Now we are talking to TYMNET," he says. A couple more keys—"Now TYMNET has linked us all the way to the bank."

Lohse's dialogue with Bank of America begins. He is asked for his personal identification number and pass code. "The computer is asking questions to make sure it's really me," he says. The prompts flash by and Lohse answers each question. Adds Kerkstra: "The entire system is menu driven. It operates easily; step-by-step instructions walk you through the service."

Log-in finished, the main menu appears on the screen. Lohse's choices: pay bills, transfer funds, balance inquiry, review or cancel, electronic statement, electronic mail, account maintenance, other services.

HomeBanking customers can pay bills to a growing list of more than 7,000 companies, including department stores, utilities, insurance

"Now TYMNET has linked us all the way to the bank"

companies and various other businesses. A customer's money is withdrawn from their designated checking account and transferred to the appropriate company account. "It takes only a few seconds to schedule a bill payment," says Lohse. "I pay my entire month's bills in two or three minutes."

Transfer funds allows HomeBanking customers to shift money from one Bank of America account to another.

The electronic statement that appears on the screen—or which can be printed out—appears in the same format as the statement that customers receive in the mail. HomeBanking customers can obtain up to three months of checking statements at the push of a button.

Upon selection of the electronic mail function, HomeBanking customers are greeted by various bank announcements. These may include information on travel packages, discount information on new banking services and the latest rates for selected Bank of America accounts.

```
1 REVIEW ALL TRANSACTIONS
2 CANCEL PENDING TRANSACTIONS
3 REVIEW OR CANCEL USING
  TRANSACTION NUMBER
4 REVIEW OR CANCEL TRANSACTION
  MOST RECENTLY ENTERED
SELECT ONE: 1

CHOOSE ONE FOR MORE DETAIL
1 12/82/83 SAV TO CHK          $375.00
2 12/16/83 SAV TO CHK          $50.00
3 12/16/83 BA VISA              $75.00
4 12/16/83 BA REAL ESTATE      $601.00
5 12/16/83 BA CONSUMER LOAN    $180.00
6 12/21/83 SAV TO CHK          $150.00
7 01/19/84 CHK TO SAV          $550.00
SELECT ONE: 1
```

The other services section of HomeBanking presently includes StockLine.™ StockLine gives customers the latest market reports and allows them to trade on-line through a discount broker.

HomeBanking Appeals to Many

HomeBanking especially appeals to busy professionals who don't have time to come into a branch. "HomeBanking lets our customers bank at the time and place that's convenient for them," says Kerkstra. "It also can give customers greater control of their finances by reducing the number of checks they need to write and by providing the flexibility of transferring funds and reviewing account balances outside of normal banking hours."

HomeBanking also appeals to customers who live in remote areas where it may be difficult to get to the bank and to customers who travel extensively. "We have people calling into the system from various parts of the world to do their banking," says Lohse. "It's very convenient for travelers because overseas mail is often slow. With HomeBanking you can be electronically linked overseas to your Tymnet node and you can manage your money as well as if you lived right next door to the bank." Adds Kerkstra: "And Tymnet's Information System gives you information on how to log in from a foreign country."

The Business Connection™—The Businessman's Answer to HomeBanking

Since businesses require frequent access to their account information, they often need to be in touch with the bank daily. So, Bank of America developed the Business Connection service. It has all the features of the regular HomeBanking service, in addition to features designed especially for the small business owner. "Some of our most enthusiastic Business Connection service customers are those who own several branches or business units

that are a part of the same company," says Kerkstra. "They find Business Connection very useful for tracking the operation of these multiple locations and also enjoy the ability to see activity in their accounts."

According to Kerkstra, HomeBanking customers tend to build stronger relationships with the bank than do most other customers. "Because HomeBanking customers have such easy access to their accounts," says Kerkstra, "they feel like they have more control. This sense of control helps them build a relationship with the bank." Then too, because HomeBanking customers can manage most of their account activity from one location, they tend to slowly increase the number of accounts they maintain with the service.

"One of the nicest features about HomeBanking," says Lohse "is that you can see your statement in progress during the course of the month. For example, if a check cleared last night, you'll be able to see it the next morning."

HomeBanking in Search of a Network

The decision to launch a home banking service was made in 1982 at which time Bank of America began studying value-added packet-switching networks to implement the service. "We received presentations from all the major network companies," says Kerkstra. "In the end we went with TYMNET because of its node distribution and dial-up capability."

Bank of America was also looking for a network that would not restrict its banking customers to certain types of terminals or PCs. The bank wanted the ability to serve

the entire market, and, therefore, did not want to limit itself to any one interface. "We developed an ASCII interface with a TTY delivery to serve as many types of terminals and PCs as possible," says Kerkstra.

Tymnet Has the Answer

Tymnet's protocol conversion service allows the bank the freedom it desired. With Tymnet's protocol conversion, HomeBanking customers can access the system with virtually any type of PC or terminal on the market. "We even have customers who communicate just with printers," says Kerkstra. "We don't have to know how they are hooking in. They can do it any way they want to."

"Another feature we like very much about Tymnet," adds Lohse, "is that you can use different modem speeds. We have people at work who use an expensive modem at a high speed and who use a more modest, slower speed modem at home."

In addition, the freedom to use different modem speeds has allowed Bank of America to serve the handicapped. Such devices as braille terminals or special telecommunication devices for the deaf function at slow speeds of 110 baud. "It's easy for our system to accommodate these devices," says Lohse, "because Tymnet allows such a wide variety of connectivity."

Tymnet also fulfills Bank of America's requirement for a system that allows customer access for the mere cost of a local phone call. And Tymnet's node distribution brings HomeBanking to customers living in remote areas.

The wide distribution of nodes also gives Bank of America customers the flexibility to change residence, while still maintaining access to the

"We chose Tymnet to build the network... because we needed a network that could support a wide variety of technology."

HomeBanking system. After moving, a customer need only call the nearest Tymnet node to regain access to HomeBanking. "Other networks who made presentations to us," says Kerkstra, "did not have nodes in the areas we needed."

Bank of America and Tymnet Working Together

Since customers' needs change, a banking system must be flexible, allowing it to evolve to meet changing customer needs. This is why Tymnet and Bank of America have an ongoing relationship. "Our relationship with Tymnet has developed and modified with time just as the HomeBanking system has," says Kerkstra.

Tymnet and Bank of America meet on a regular basis to discuss ways in which the bank can utilize Tymnet in the most economical and efficient way possible. "Tymnet has been very open to us on how we can economize on using its services," says Kerkstra.

In 1986 Bank of America conducted a successful marketing campaign for its HomeBanking system. The result was a significant increase in the amount of HomeBanking traffic. "We noticed the line was approaching peak usage," says Kerkstra. "During one of our meetings with Tymnet we informed them of the problem." Bank of America was using one line for traffic with another in reserve as a back up. This system, however, was unable to efficiently handle the increased traffic. "With the help of Tymnet we balanced the traffic over two separate lines," says Kerkstra. "We were now able to use both lines, and Tymnet software was able to direct traffic from one line to another as necessary."

In 1986 Bank of America also encountered problems with customers accessing a node in Fairfield. The node was a low density node and was having difficulty accomodating the amount of traffic. To solve the problem, Tymnet upgraded the node so it would handle more calls. "This upgrade was based on the problems our customers were experiencing," says Kerkstra. "We have a good distribution of customers in Fairfield and the upgrade solved our problem."

Tymnet and Bank of America are now exploring the possibility of placing additional nodes in locations based on the bank's HomeBanking customer distribution.

A Tymnet Private Network for Bank of America

In addition to using Tymnet's public network, Bank of America also has a private network built by Tymnet. The private network, called BOFANET, runs between Hong Kong and London and links Bank of America with its locations in Hong Kong, London, Frankfurt, Milan, Manila, Los Angeles, New York and with Bank of America's technology center in Concord. It is primarily used for such applications as cash management, electronic mail and internal timesharing.

"We chose Tymnet to build the network," says Irv Hatch, Advisory Systems Engineer—Operations, "because we needed a network that could support a wide variety of technology. We had to link everything ranging from antiquated telex terminals to terminals that use async-to-3270 protocol."

The fact that Tymnet could accomodate telex was of significant importance to Bank of America because telex is predominantly used in the banking industry. "With

Tymnet we were able to conform to the standards of our customers using telex, rather than asking them to use a different terminal to hook into our bank," says Hatch. To accommodate five-bit telex transmission, Tymnet installed a special board which pads each character with three extra bits during transmission through the network. At the end of transmission the three bits are stripped from each character.

The Future of HomeBanking

One of Bank of America's goals is to provide its customers with several means of accessing their banking services to make banking as convenient and easy a task as possible. Consequently, the bank has one of the largest ATM networks in the world consisting of more than 1,300 automated tellers machines. It is also a part of the PLUS System network which allows Bank of America customers throughout the United States and Canada to conduct transactions with their ATM

cards. And now, Bank of America's latest innovation of convenience: HomeBanking. "If you want to get in touch with Bank of America," says Kerkstra, "you can do so pretty much from wherever you are and by the method you most prefer."

Bank of America expects HomeBanking to become increasingly popular even though it is still a relatively new concept in the public's mind. Lohse explains: "It's something very different for the customer who has never done electronic banking before from his home or PC. So you don't know what it really is until you do it. It was the same situation when automatic teller machines first came out. People had funny looks on their faces as they walked up to the ATM for the first time. They weren't sure what the ATM could do or why they should try it in the first place. I think we have a similar situation with HomeBanking customers. But once they have tried HomeBanking and realize how easy and convenient it truly is, they become very enthusiastic about it."

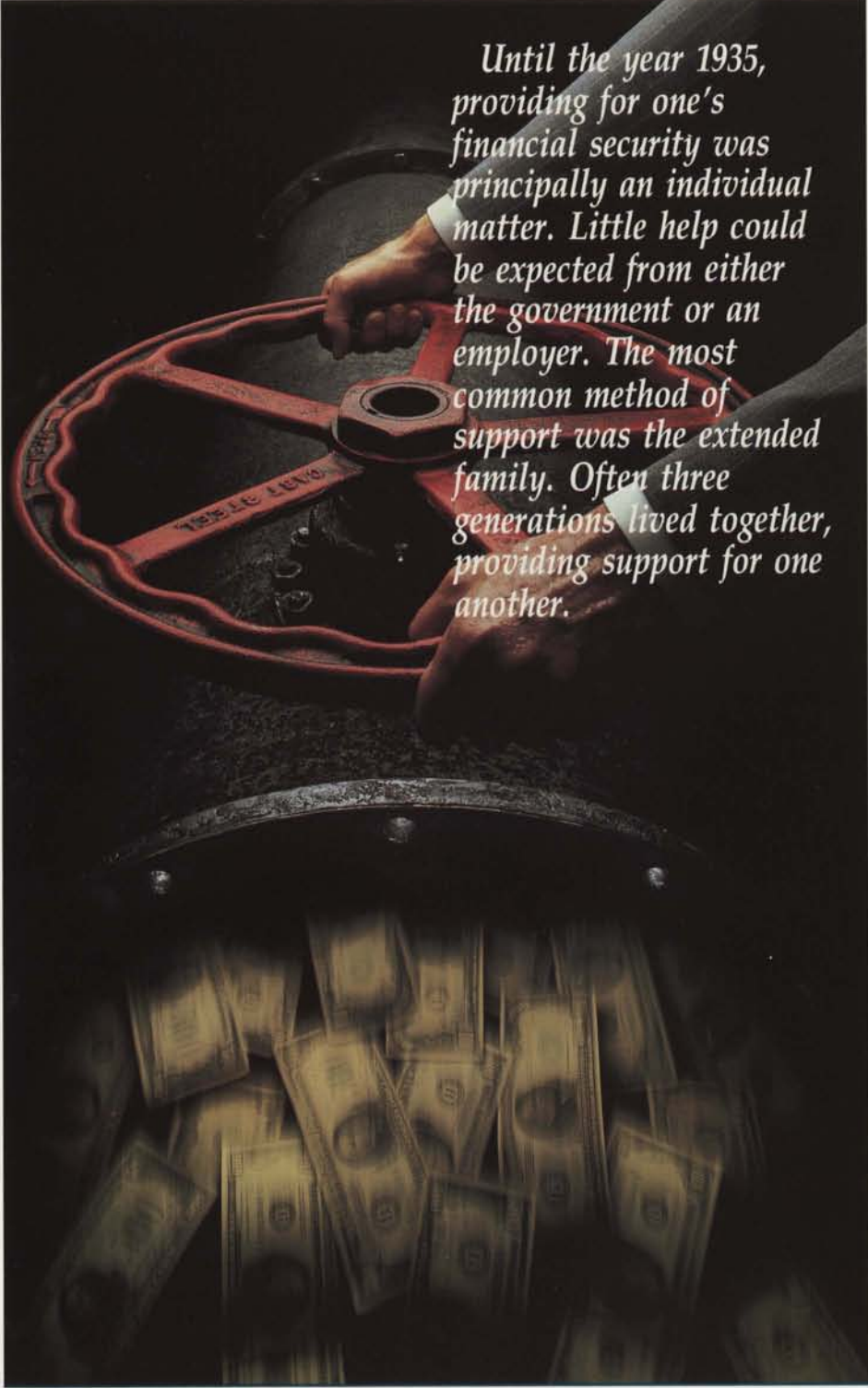
As HomeBanking becomes increasingly popular, it appears that Tymnet and Bank of America will continue to be a winning team.

To receive more information about HomeBanking, call 1-800-792-0808, in California; outside California, call collect 415-622-1810. ●



"If you want to get in touch with Bank of America... you can do so pretty much from wherever you are and by the method you most prefer."

Changing Times Challenge Employers



Until the year 1935, providing for one's financial security was principally an individual matter. Little help could be expected from either the government or an employer. The most common method of support was the extended family. Often three generations lived together, providing support for one another.

Unfortunately, life is no longer as simple, and the depression of the 1930s clearly showed the inadequacy of the system. It was during this time that the Federal Government recognized the need for a more comprehensive system to help individuals cope with economic risk, unemployment, old age, death and disability. Consequently, Congress introduced social security, first to provide retirement benefits, and later to help disabled workers or dependents of deceased workers. Still later, Medicare was introduced to help the elderly with the cost of medical care.

Encouraged by the government, employers also began taking on a more active role in providing security for their employees. Nearly every employer today offers some kind of health and dental plan, life and disability benefits. Most employers also offer some kind of retirement plan.

But the provision of employee benefits is not an easy task for employers. Employee benefits are directly affected by economic, demographic and legislative conditions of the time. Therefore, updating and redesigning such programs is an ongoing process, and employers are often faced with complicated issues. These issues may include the problem of providing adequate medical coverage in times of rising medical costs; providing pension plans for an aging work force that requires benefits long after retiring; dealing with legislative requirements for both welfare and retirement benefit plans.

The Answer to Planning Benefits and Compensation Programs

A company that helps employers deal with such issues and many more is Hewitt Associates. Hewitt Associates, founded in 1940 by Edwin Shields Hewitt, is one of the world's leading human resource consulting firms. Hewitt's services focus on helping management address critical issues involving the design, administration, financial management and communication of both employee benefits and compensation. The company has more than 2,000 associates located in 23 U.S. offices and 10 offices worldwide. It has served more than 4,000 clients including 70 percent of the Fortune 500 companies. Hewitt's clients come from a wide array of industries including manufacturing, transportation, banking, health care and education. Hewitt Associates' annual rate of growth: 25 percent.

An Educator, Catalyst and Designer

Hewitt Associates views its role as that of an educator, catalyst, designer and facilitator. "We don't come in and tell a client how to run its business or compensation structure," says Peter Friedes, Chief Executive at Hewitt. "We help the client define their objectives. Through the process of evaluating alternatives—rejecting some, rethinking others—we try to help the client arrive at the best answer."

To find the best answer for its clients, Hewitt Associates employs consulting professionals with varied backgrounds in actuarial science, law, economics, finance, personnel, accounting, communication and data processing. These consultants work with employers on an ongoing basis, and guide them through the process



The Hewitt Associates' headquarters located in Lincolnshire, Illinois.

of designing and implementing the benefit and compensation plan that best meets the needs of the company and its employees.

Hewitt helps clients design and implement all types of benefit plans including pension, savings, profit sharing; group life and disability; medical, dental, vision and hearing care; vacation and other time off. Each plan is carefully designed, taking into account differing employee groups and locations.

In the area of compensation, Hewitt helps its clients identify appropriate compensation approaches that are consistent with an employer's strategic planning, financial goals and management style. Compensation plans include executive compensation, salary administration and sales compensation.

Benefit Plans Reflect Changing Times

Because trends and government legislation play such an important role in determining benefit plans, Hewitt also has its own research and legal departments. The research department tracks trends and the legal department monitors legislation that is proposed or passed in Washington. "Every time a significant piece of legislation comes out or a new law is passed," explains Jean Boyle, a consultant at Hewitt,

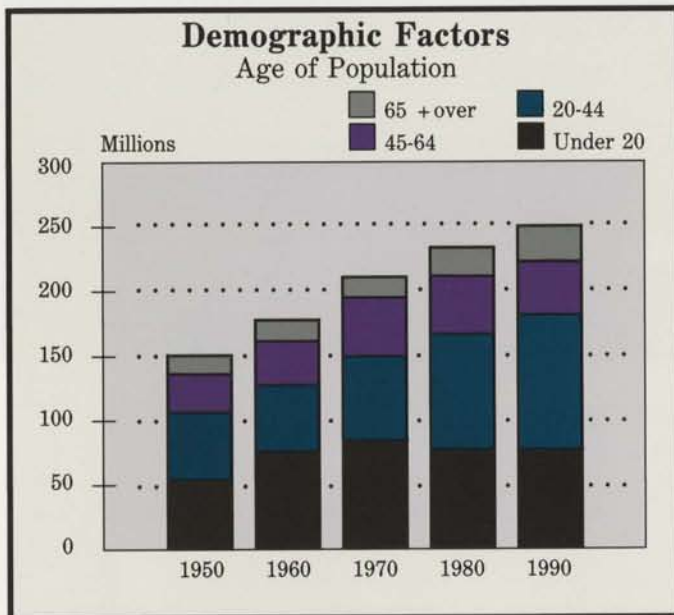
"we issue a special report to our clients. The report describes what the legislation is and what impact it will have on an employer's benefit or compensation plan." Hewitt also maintains a mailing list of 30,000 names. The company sends out two to three direct mail pieces each month to keep its clients informed.

One trend that has led to dramatic changes in benefit plans is an employee

population that has become increasingly diverse. "In the 50s we had a relatively homogeneous population," says Boyle. "Most employees were males, heads of the household, in their 30s with a wife and children who remained at home. Today there are many single parent households, one income households, and two income households. The nature of the work force is now one in which everyone has different needs. So the 'one-size-fits-all' benefit plan no longer works as well as it used to."

Hewitt Associates Pioneers Flexible Compensation

To deal with the problem, Hewitt pioneered the concept of "flexible compensation." Flexible compensation is a way of providing benefits to employees, while also allowing employees to have some decision-making power in choosing benefits to meet their needs. "In a flexible compensation plan, you don't have complete freedom over what benefits you want," explains Boyle, "but you do have choices. For example, you might have three levels of medical coverage to choose from and you decide which one is most appropriate for you. You may have a couple of dental and various life insurance choices and you must decide what level of coverage you want. The higher the coverage, the more it will cost. With flexible compensation, employees are not automatically covered by a program which may provide them too much coverage."



An aging population and consequently an aging work force means increased health care costs for employers.





Hewitt Associates

FlexSystem—the Answer to the Administration of Flexible Compensation

Although flexible compensation has advantages for employees and employers, it increases the requirements for plan administration. Employers now must keep track of multiple plans and options for each employee instead of one plan designed for all. So Hewitt designed FlexSystem[®], a computer software system designed for the administration of flexible compensation.

FlexSystem provides generic software for almost any type of flexible program. It automates the major administrative functions of a flexible compensation program. These include enrollment, ongoing coverage administration and spending account recordkeeping. The parameters of the FlexSystem data base are coded to allow the system to conform quickly to the individual plan specifications of each user. For example, a company that starts with a program that contains only medical options can easily expand the program in future years by simply adding parameters for other design options such as death, disability or time-off.

Tymnet Provides the FlexSystem Link

Companies may purchase the software for installation on a mainframe computer or use on a PC, but the oldest and by far the most widely-used software is FlexSystem Timesharing. TYMNET[®], McDonnell Douglas' data communications network, provides the link between FlexSystem Timesharing and the client's terminal or personal computer.

All timesharing client data bases reside on Hewlett-Packard mainframe computers located in Lincolnshire, Illinois. Access to the mainframes is provided by X.25 host interfaces and 9.6 kbps leased lines. Using 1200 or 2400 baud modems, Hewitt clients initiate a local call to the nearest Tymnet node. Tymnet's log-in sequence requires a user name and password before a network connection to FlexSystem is established. Hewitt controls user names and passwords for maximum security.

Debbie Gussarson, who manages the Hewlett-Packard Data Center for Hewitt, has found Tymnet's Tymvalidate system to be very useful in supporting FlexSystem. Tymvalidate is an online program that allows a central administrator to assign, change and delete user names and passwords. Only the designated person can validate an account to which the user name and host is assigned. Gussarson accesses Tymvalidate to perform the procedure. "Most Tymvalidate commands are processed automatically so the changes become effective immediately," says Gussarson, "and it's simple to use."

FlexSystem Easy to Use

How does a client access FlexSystem? Thomas Schmitz, a partner with Hewitt Associates explains: "Imagine a computer terminal in your office that uses FlexSystem Timesharing to hook up with our central computer. You want to enter the election decision for one employee, change the status of another employee from single to family health coverage, and process a reimbursement claim for still another employee. The FlexSystem software automatically logs you into TYMNET, giving you access to the FlexSystem data base.



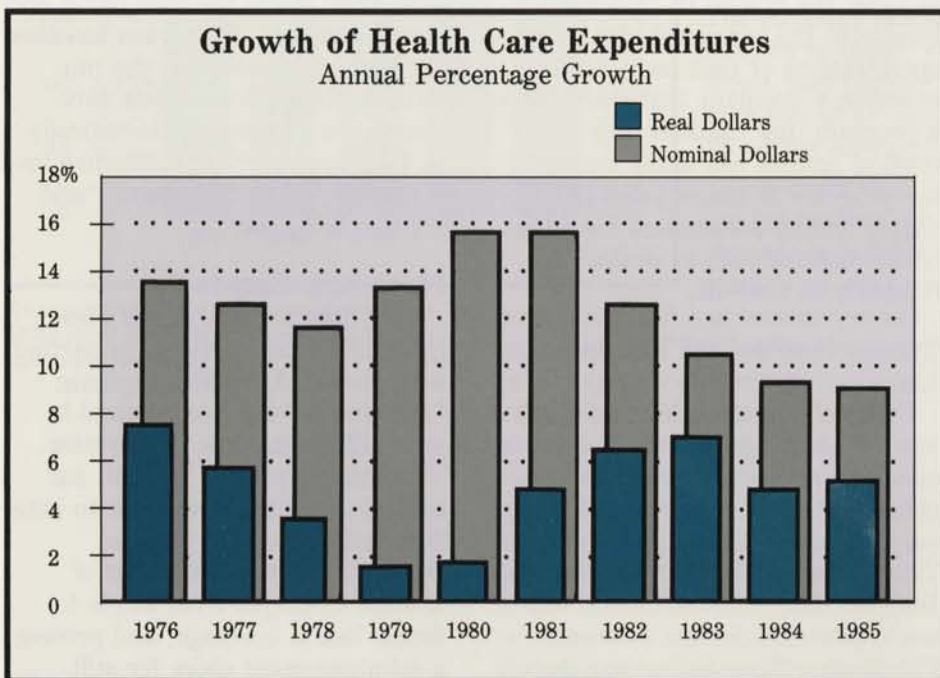
“The terminal displays a menu of functions you can perform for those employees. You type in the information. Thereafter, elections are recorded; family coverage is in force; an account balance is updated; and a request is set in motion for payment of the reimbursement account. That’s the process—an easy-to-use, online system for flexible program administration.”

For FlexSystem users who require an exceptional amount of connect time, Hewitt utilizes Tymnet’s Asynchronous Terminal Concentrators, installed on the client’s site. “This literally gives a Hewitt client an extension of the network in their office,” says Leonard Wadewitz, Tymnet Sales Representative. “It guarantees data integrity from the terminal to the host and allows a higher access speed of 4800 baud at a fixed monthly connect cost.”

Tymnet’s Number of Nodes a Big Plus

Approximately 500 users from 63 companies access FlexSystem through TYMNET. “We chose TYMNET as our data communications network,” explains Schmitz, “because of its easy accessibility and many nodes. Many of our timesharing users are decentralized with administrators using our system from around the country and they often come in through low density areas.” TYMNET has nodes in these areas, allowing these users the opportunity to access FlexSystem for the cost of a local phone call. “The number of nodes has always been a big plus to us,” adds Schmitz.

“We view FlexSystem as a major development that should significantly ease, if not eliminate, employer concerns about the expense and effort required to administer flexible compensation programs,” says Schmitz. FlexSystem makes flexible compensation easy to administer, and Tymnet makes FlexSystem easy and cost-efficient to access. ●



The increase in health care costs has prompted employers to search for employee health plans that contain company costs, while also providing adequate medical care coverage for employees.

TYMNET Maps out Async Strategy



Innovative Services Meet Customer Requirements

In its continuing effort to provide customer solutions, Tymnet has developed an aggressive async access strategy for the late 1980s: the implementation of a series of network enhancements, including new services and expansion of existing services.

The enhancements include the introduction of 9600 bps asynchronous dial-up access, known as the TymDial 9.6™ service—making TYMNET® **the first value-added network** to offer such a high-speed access. Also included is expansion of the Asynchronous Outdial™ service; increased local access coverage; introduction of the MNP error-protection protocol; expansion of the 2400 bps asynchronous access; and the announcement of Tymnet's intent to support the AFT error-protection protocol.

TymDial 9.6 Service

TYMNET users will soon be able to access the network asynchronously at 9600 bps. The addition of this service makes TYMNET the only value-added network to offer public dial-up async access at 9600 bps. The service will be provided via CCITT-recommended V.32 modems.

Access will be provided in San Francisco, Los Angeles, Denver, Chicago, Dallas, Houston, New York, Boston, Atlanta and Miami. "We plan to have all ten cities up by the end of the year," says Jeff Steinberg, Tymnet Access Product Manager.

Over the next two to three years Tymnet will add dial-up 9.6 service to many other metropolitan areas. Customer demand will continue to fuel this expansion.

"This service will be much faster than what is now available," says

Steinberg. "It is a big step in our continuing effort to provide faster response time for customers using our async-to-3270 protocol conversion service." The faster response time will also reduce connect time for users, thereby reducing their communication costs.

Asynchronous Outdial Expansion

Tymnet's Asynchronous Outdial service, which allows the network to dial out to terminal or host equipment not connected to the network, is presently available in 15 cities. By the end of this year Tymnet will expand Outdial to include 25 additional cities, with 36 more to follow in early 1988. By early next year all of Tymnet's 2400 bps access sites will also have Outdial. This will make a total of 110 cities that support the Outdial service. "Customers using Outdial now really like it," says Steinberg. "In order for Outdial to make an impact, we need to support a critical mass of cities. That's been the major customer requirement." Over the next two to three years, Tymnet will add Outdial to nearly all access locations.

Local Access Expansion

Twenty-two new dial-up access cities will be added to the network. The cities will include Gaithersburg, Maryland; Twin Falls, Idaho; Ames, Iowa; Pullman, Washington; Grand Junction, Colorado; and Naples, Florida. The new access locations will support 2400 bps, MNP, and Outdial.

The additional 22 locations further increase Tymnet's already superior local access coverage with 80 cities more than the nearest competitor. This expansion will allow additional Tymnet customers in many more areas to dial into the network for the price of a local phone call.



9600 bps Async Access	Async Outdial Expansion		Local Access Expansion* in order of deployment priority	2400 bps Expansion*
	Phase 1	Phase 2		
San Francisco New York City Dallas Miami Atlanta Boston Denver Chicago Los Angeles Washington D.C.	Birmingham, AL Mesa/Phoenix, AZ Anaheim/Newport Beach, CA Pleasant Hill/Walnut Creek, CA San Francisco, CA Hartford/ Bloomfield, CT Stamford, CT Longwood/ Orlando, FL Tampa, FL Indianapolis, IN Baltimore, MD Englewood Cliffs, NJ Buffalo, NY Charlotte, NC Cincinnati, OH Cleveland, OH Columbus, OH Dayton, OH Oklahoma City, OK Philadelphia, PA Pittsburgh, PA Nashville, TN San Antonio, TX Portsmouth/ Norfolk, VA Bellevue/ Seattle, WA	<i>(Phase 2, an additional 36 cities to be implemented by early 1988)</i>	Gaithersburg, MD Salisbury, MD Manassas, VA Harrisonburg, VA Winnetka, IL Chicago Heights, IL Grand Junction, CO Yuma, AZ Flagstaff, AZ Ames, IA Twin Falls, ID Pullman, WA Sequim/Pt. Angeles, WA Bremerton, WA Laramie, WY Tupelo, MS Myrtle Beach, SC Kissimmee, FL Stuart, FL Naples, FL Los Alamos, CA Georgetown, DE	Syracuse, NY Des Moines, IA Baton Rouge, LA Knoxville, TN Clearwater, FL Southfield, MI Springfield, MA Harrisburg, PA Wilmington, DE El Paso, TX Corpus Christi, TX Riverside, CA Lyndhurst, NJ Columbia, SC Boulder City, NV Lansing, MI Grand Rapids, MI Ann Arbor, MI Winston-Salem, NC Boise, ID South Bend, IN Spokane, WA Toledo, OH Lexington, KY Mobile, AL Greenville, SC Little Rock, AR Durham, NC Bridgeport, CT Rockford, IL Springfield, IL Huntsville, AL Santa Barbara, CA

* Local Access Expansion will have MNP, 2400 bps and Outdial deployed simultaneously.
All 2400 bps Expansion will have MNP and Outdial deployed simultaneously.

New access sites will continue to be added according to market demand. Adds Steinberg: "Customers are strongly encouraged to continue making requests for local access. Tymnet analyzes and responds to every request and we try to accommodate as many sites as we can. Tymnet remains committed to providing the broadest local access coverage possible."

Support for the MNP® Protocol and Intent to Support AFT

It is Tymnet's intent to support all major error-protection protocols. "We're taking the smorgasbord approach to the so-called protocol wars," says Bob Fultz, Sr. Product Manager, "by supporting all public domain async link/network level error-protection—X.PC, MNP and AFT. We want our customers to have a choice and Tymnet will support all of the available choices."

X.PC is ideally suited to a network customer who is writing his own customer PC communications software package. X.PC is currently accounting for about two percent of all customer traffic, a phenomenal amount. MNP and AFT are primarily modem-resident protocols.

Support for the MNP protocol will be added to all 2400 bps access cities starting in the fourth quarter of 1987. Support for the AFT protocol will be added to all 2400 bps locations when it becomes more widely available in PC product offerings.

2400 bps Expansion

Having received a significant number of customer requests for the expansion of its 2400 bps service, Tymnet will expand the service to include 33 additional medium-density cities starting in the fourth quarter of 1987. This increases the 2400 bps service from 77 to 110 cities.

Tymnet remains committed to a leadership position in 2400 bps access, and will over the next two to three years expand 2400 bps service to virtually every access location.

The service improves response time for Tymnet's Async-to-3270 service and facilitates the rapid expansion of the 2400 bps modem market. Tymnet's 2400 bps coverage is more wide-spread than the dial 9.6 service and it will continue to be so in the foreseeable future. In addition, whenever a 2400 bps access city is added Tymnet will offer Out-dial, MNP; and in the future, AFT capability. ●

If Man Were Meant to Pay So Much For WATS And DDD, We Wouldn't Have Invented OUTDIAL.™

OUTDIAL Service is Tymnet's lower-cost replacement for centrally-initiated DDD and WATS. Now your computer can call out to remote async devices directly through the TYMNET® network.

If your central computer places calls to remote async devices for information collection and distribution, we can save you 40% or more by

- Eliminating DDD and WATS charges
- Allowing unattended nighttime operations that use lower rates
- Offering discounted rates for large-volume users.

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Call (800) 872-7654 and let Tymnet show you how much we might save you.

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