

# North American Carrier & Network Services

## Dedicated Channel, Packet-Switched, Value-Added, Switched & Residential Services

This Survey profiles communication common carriers and other communication networks that currently offer services within the domestic United States and Canada. Although regulatory conditions still distinguish between domestic carriers authorized to operate on an interstate basis and international record carriers (IRCs), this distinction is quickly fading. Carriers are expanding into the international arena as well, and IRCs have requested and received permission to extend their services domestically. However, until legislative action now under way is completed, and the legal restrictions completely dissolved (Section 222 of the Communications Act of 1934), IRCs will continue to provide connections primarily for traffic destined abroad.

Common carrier services can be categorized as dedicated channel, where the user has exclusive use of a facility all the time, and switched network, where the facility is accessed on an as-required basis. Leased-line or private-line services are dedicated-channel services which typically use terrestrial (landline) facilities. This is

now primarily only a semantic distinction, however, since many "leased lines" are made up of both hardwired and microwave links. Similarly, some carriers offer dedicated satellite channels which invariably require terrestrial access lines from the user's premises.

The Carrier and Network Outline Table below combines dedicated channel and switched network services. Many of the same services offer both. In some cases the same "backbone" network is used, but often the facilities are completely separate. This edition of the Survey profiles the salient characteristics of about **58 services** available from **24 common carriers and networks**. The parameters of the Outline capsule the transmission ranges, billing basis, type of facilities, access, and special features provided by the various services. It is intended to provide a quick reference to those services which meet the specific requirements of the user. Listings in the main survey are arranged alphabetically by vendor name, and then by the specific service.

### NORTH AMERICAN CARRIER & NETWORK SERVICES OUTLINE

VENDOR	SERVICE	DATA	VOICE	ANALOG	CHICUTS	DEDICATED	SWITCHED	DATA RATES	LOW SPEED	VOICE GRADE	WIDEAREA	WIDEBAND	BILLING	USAGE SENSITIVE	TRAFFIC VOLUME	BACKBONE FACILITIES	USER ACCESS	LEASED LINE	ON-SITE INTERFACE	FEATURES							
	Data/Digital	Facsimile	Message	Video/Telex/TWX	Dedicated	Switched	Low Speed (0 to 300 bps)	Voice Grade (to 1600 bps)	Wideband (to 9600 bps)	Wideband (to 36K bps)	Wideband (to 1.544M bps)	Wideband (to 3.088M bps)	Distance Sensitive	Usage Sensitive	Terrestrial	Terrestrial	Microwave	Satellite	Hybrid (User-Transparent)	Dial-Up	Leased Line	On-Site Interface	Packet Switched	Value Added	Gateway Service	Residential Service	
American Satellite	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
AT&T Communications	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
AT&T Information Systems	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Automatic Data Proc (ADP)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
C&W Network Systems	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Computer Sciences Corp (CSC)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Consortium Comm Int'l (CCI)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Gen'l Electric (GEISCO)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Graphnet Inc	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GTE Sprint	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GTE Telecommunications	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Int'l Business Mach (IBM)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MCI Int'l/WUI	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MCI Telecommunications	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
RCA American Comm (Americom)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

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VENDOR	SERVICE Data—Digital Data/Voice Analog Facsimile Message—Telex/TWX Video/Teleconferencing	CIRCUITS Dedicated Switched	DATA RATES Low Speed (0 to 300 bps) Voice Grade (to 4800 bps) Wideband (to 9600 bps) Wideband (to 56K bps) Wideband (to 1.544M bps) Wideband (to 3.088M bps)	BILLING Distance Sensitive Usage Sensitive Traffic Volume Based	BACKBONE FACILITIES Terrestrial Microwave Satellite Hybrid	USER ACCESS (User-Transparent) Dial-Up Leased Line On-Site Interface	EQUIPMENT Packet-Switched Value-Added Gateway Service Residential Service
RCA Cylx	• — • —	• •	• • • • —	• —	• • —	• • —	• —
Satellite Business Sys (SBS)	— • — —	• —	• • • • —	— • —	— • —	— —	• — •
Starnet Corp	• • — —	• —	• • • • —	— • —	• • —	— —	• —
Telecom Canada	• • — •	• •	• • • • —	• • —	• • —	• —	• • —
TRT Telecommunications	— — — •	• •	• • • • —	— • —	— —	• —	• —
Tymnet, Inc	• — • —	• •	• • • • —	— • —	• • —	• —	• —
Uninet, Inc	• — — —	—	• • • • —	— • —	• —	— —	• • —
Western Electric	— • • •	• •	• • • • —	• • —	— • —	• —	• • —
Worldnet Comm, LA	— — — •	• •	• • • • —	— • —	• • —	• —	— —

### NORTH AMERICAN CARRIER & NETWORK SERVICES FEATURES

#### ■ SWITCHED OR DEDICATED CHANNEL

A Data Decisions survey found that use of communications facilities for data transmission is about evenly split between switched and dedicated-channel services, although larger organizations exhibit a higher use of dedicated channels than do smaller companies. Selection of a dedicated channel over a switched facility is usually predicated on the frequency with which one station needs to call another. A station could operate at a very low speed (300 bps or below), but if it needs to access the same point consistently and recurrently, a dedicated, low-speed channel could offer the most cost-effective solution.

There are other situations which could mandate use of a dedicated channel, including high transmission speeds and multipoint arrangements. The switched telephone network, for example, will support no more than about 4800 bps of data over a dial-up connection. A leased voice-grade line from AT&T, however, can be "conditioned" because the same connection always exists between the same 2 points. Subsequently, data rates of 9600 bps and higher can be supported. For example, modems are now available which transmit up to 14.4K bps over a conventional voice-grade telephone line. Most multipoint (or multidropped) terminal arrangements use a polling protocol which requires a dedicated channel, even if the device traffic loads are relatively light.

#### ■ DATA RATES

It is important to select a carrier that supports the right data rate, or transmission capacity, for the user's devices or applications. Users with Teletype-like devices that typically operate at 300 bps and below do not need all the bandwidth provided with a "voice-grade" line. However, users with multiple low-speed devices which need to operate concurrently could well benefit from multiplexing several low-speed channels onto a single voice-grade line.

**Low-Speed** • data transmission category, typically at rates of 300 bps and below • includes asynchronous Teletype (TTY) and TTY-compatible devices, and message networks such as Telex and TWX.

**Voice-Grade** • transmission capacity category capable of carrying voice conversation in its analog form (typically 3K to 4K Hz) • voice-grade channel may also carry data in analog form via modems, with maximum data rates ranging from about 1200 bps to 14.4K bps, depending on modem and quality of transmission facility, whether switched or dedicated, and whether or not line conditioning applied • analog voice-grade facilities generally used for alternate voice and data applications.

**Wideband** • transmission capacity category supporting data rates over 9600 bps • generally expensive facilities used only when high-volume point-to-point transmission is prerequisite • wideband facilities may be analog or digital • typical data rates include 56K bps, 1.544M bps, and 3.088M bps • except for processor-to-processor links, wideband facilities generally used for multiplexed voice-grade transmission channels.

#### ■ BILLING

Users may spend too much for communications facilities if they select a vendor whose billing structure is incompatible with their traffic patterns. For example, a user whose communications needs are primarily long-distance would be advised to seek a carrier whose services are insensitive to distance.

**Distance Sensitive** • indicates that some or all of service charges based on distance traversed by the channel or connection • all of AT&T's service offerings, for example, based on distance (although DDD network also bases charges on connect time).

**Usage Sensitive** • indicates that some or all of service charges based on connect time to service • users with high percentage of interactive traffic (characterized by long-duration, online connections) not advised to use such services • Western Union Telex and TWX networks, for example, bill on connect-time basis.

**Traffic Volume-Based** • indicates that at least portion of service charges based on number of characters transmitted • users with high-volume transmissions (such as extensive file transfer) not advised to use such services; however, depending on associated charges such as connect time, such services could be ideal for interactive traffic • GTE Telenet and Tymnet, for example, use traffic volume as billing factor.

#### ■ BACKBONE FACILITIES

Several carriers use a backbone network which employs a particular transmission technology. The type of backbone is important to the user for several reasons. First, satellite and microwave links provide generally higher quality transmission capabilities than those of landline facilities. This equates to fewer errors and generally improved transmission efficiency. Satellite channels, on the other hand, are typified by propagation delay and echoes, 2 factors which may affect data transmission throughput. When using satellite channels, customers will need to evaluate their traffic patterns and protocols in order to maximize the use of the channel. It should be noted in passing, that landline facilities are on the verge of a dramatic improvement in signal quality. The common carrier services are beginning to adopt fiber

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optics; a high-capacity technology which is immune to electromagnetic interference.

**Terrestrial** • indicates that some or all of service use primarily landlines for transmission between access nodes • short-distance connections currently favor landline facilities.

**Microwave** • some common carriers provide service based on extensive backbone network of microwave facilities; user access to such facilities typically via leased terrestrial line, although possibly by microwave.

**Satellite** • indicates that most of carrier internal trunks use transponder capacity of satellite • some peculiarities with satellite transmission of which user should be aware include echo (affects voice communications) and delay (affects data communications, primarily with interactive applications).

**Hybrid** • indicates that carrier backbone facilities are mixture of landline and microwave, and possibly even satellite • for switched communications, user will not know what type of facilities are being used; may vary from connection to connection • for dedicated channels, user can usually request type of transmission facilities.

#### ■ USER ACCESS

Users may generally access a switched service either by dialing up a connection through the switched phone network, or via a leased-line from the customer's premises to the nearest access node. Access to a dedicated-channel service is invariably via leased-line.

AT&T's services are locally accessible nearly everywhere (except for the digital DDS), but access to other carriers' services can only be accomplished at certain locations. There is no standardized procedure for accessing the widely divergent services. In some cases, the carrier supplies an access line free. In other cases, the user must arrange and pay for the access line. In still other cases, there is no access line, such as with on-site satellite earth stations.

Dial-up connection to a switched service also limits the data rate supported. GTE Telenet, for example, supports dial-up connections at no more than 1200 bps. Data rates over Bell's switched network (DDD), on the other hand, can be up to 4800 bps with current modem equipment.

**Dial-Up** • indicates that some or all of service may be accessed by dialing up over switched phone network (exception is Western Union, whose Telex and TWX networks use dial-up procedure, but connect to user premises via dedicated leased-line).

**Leased-Line** • indicates that some or all of service accessed by leased line; may also include microwave link • leased access line, typically furnished by local telephone company, links customer with nearest access node of carrier (concentrator, switching center, satellite earth station, etc); leased-line must coincide with the speed of the input channel to carrier service (voice-grade access line may not be used with wideband service) • if carrier service uses line conditioning as requirement to achieve certain data rate, access line also generally needs to be so conditioned; usually arranged by carrier in conjunction with phone company, although customer could be responsible for paying both for line conditioning • if customer located near carrier's access point, access line usually provided for flat monthly fee • if remote, however, typically billed for mileage and installation of access line in addition to other monthly charges; possible that customer may pay more for access lines than for use of carrier service accessed.

**On-Site Interface Equipment** • indicates that carrier either requires special on-site interface equipment, or has such equipment available to facilitate connection to service • could be

special terminal (in case of Telex and TWX), or entire satellite earth station (as with SBS) • many carriers provide equipment such as modems and multiplexers which facilitate connection; this equipment either optional or acquired from independent vendors.

#### ■ OTHER SERVICE FEATURES

Carrier and network services can be distinguished by a number of other characteristics or features which may prompt the potential user to select one over another. The Outline Table shows those characteristics, and indicates who supports them.

**Packet-Switched** • indicates that traffic moves through network in discrete packets (blocks of data which vary in length) • typically provide for error checking and correction between network nodes; provides high-integrity transmission for data, but may not be used to alternately carry voice conversations • packet-switched services technically neither switched nor dedicated-channel, but provide characteristics of both; from user point of view, however, whether service is switched or dedicated-channel will depend on access arrangement.

**Alternate Voice/Data** • indicates that some or all of services can be used either for transmission of voice or data; attractive feature, especially when service not fully utilized for data transmission • in some cases service transparent to type of traffic carried, and user may freely alternate between voice and data (assuming bandwidth supports both); in other cases user must specify channel use for both, and frequently incurs premium charge for added capability.

**Error Detection/Correction** • indicates that service provides for detection and correction (usually through retransmission) of data errors which may occur during transmission • feature usually only provided within network; errors that occur over access lines may escape detection.

**Protocol/Code/Speed Conversion** • indicates service may support interconnection between 2 dissimilar user devices • involves buffering and processing of user data within intelligent network nodes; in some cases (RCA Cylix network), processing done by processor placed at user site; in other cases (GTE Telenet), performed at intelligent access nodes; in still others (Western Union Telex), accomplished by centralized computer.

**Store-and-Forward Operation** • indicates that service temporarily stores user data either in RAM memory for error detection/retransmission, or on peripheral storage media • feature prerequisite to performing code, speed and protocol conversion, but may also indicate availability of value-added services such as electronic mail.

**Gateway Services** • indicates the ability to link service with services outside of the country of origin • interface may be directly with IRC or through third party.

**Residential Service** • indicates the ability to provide voice-oriented services to nonbusiness sites • usually cheaper than those provided by common carriers.

**Line Conditioning (Dedicated-Channel Facilities Only)** • indicates availability of special line conditioning for analog facilities which limits distortion and attenuation inherent to such facilities, and increases transmission capacity (data rate).

**Multipoint Support (Dedicated-Channel Facilities Only)** • indicates that service supports conventional multipoint arrangements • usually cheaper for customers than multiple point-to-point configurations • devices attached to multipoint lines are always connected to each other, although particular device protocol will generally permit only one to transmit at given time.

### NORTH AMERICAN CARRIER & NETWORK SERVICES LISTINGS

#### ■ AMERICAN SATELLITE CORPORATION (ASC)

1801 Research Boulevard, Rockville, MD 20850 • 301-251-8399.

#### □ ASC Private Line Service

**Service** • leased voice-grade and wideband circuits for voice,

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record, data, or alternate voice/data • 24-hour, 7-day-a-week service • point-to-point satellite links between major U.S. city-pairs; ASC provides end-to-end service • supports data rates up to 56K bps, echo canceller option available • optional foreign exchange service provides tie-lines to outlying cities located near city-pairs.

**Access** • via ASC-provided access lines to earth stations located in over 27 city-pairs in the continental U.S. • shared station-to-station voice exchange • extended service through ENFIA.

**Pricing & Other Features** • based on monthly charges for channel between satellite and city-pair, plus monthly charges for local facilities and customer termination packages • voice-grade channel monthly rental \$525 to \$800; plus \$37 per month connection fee from customer site to ASC central office • station-to-station voice satellite service \$325 to \$475 per month plus \$220 installation charge • foreign exchange service \$325 to \$475 per month plus \$220 installation charge • wideband (56K bps) digital service \$4,500 per month plus \$2,000 installation fee.

#### Specialized Network Service

**Service** • custom point-to-point/multipoint digital network • data rates 56K to 1.544M bps.

**Pricing & Other Features** • vendor quote.

#### AT&T COMMUNICATIONS

295 North Maple Avenue, Basking Ridge, NJ 07920 • 201-221-2000.

#### AT&T Direct Distance Dialing (DDD)

**Service** • dial-up voice or data channels using AT&T switched telephone network • after circuit established, channel provides about 3000 Hz of bandwidth (voice grade) in most cases • can reliably carry up to 9600 bps with conventional modem equipment • circuit established with dial pulses or touch tones (supported in most areas) either manually or automatically • line conditioning not available.

**Access** • nationwide, direct from user premises • modem required to interface terminal/computer equipment to local telephone company (telco) circuit (local loop) • if modem or multiplexer equipment not FCC-certified, data access arrangement (DAA) may be required • automatic dialing accomplished by terminal/computer equipment with automatic calling unit (ACU).

**Pricing & Other Features** • based on geographic distance of connected circuit and usage connect time • ranges from \$0.30 per minute (less than 10 miles) to \$0.74 per minute (5,750-mile link) for the first minute; \$0.15 to \$0.50, respectively, for each additional minute • additional cost if operator-assisted or person-to-person • evening and night rates up to 60 percent discount • special bulk rates available under AT&T WATS where many calls are originated from the same facility, and under AT&T 800 Service, where many toll calls are terminated at same facility.

#### AT&T WATS

**Service** • long-distance, switched, bulk-rate outward-bound telephone service • uses AT&T Communications network, consisting of landlines, microwave, and satellite links • suitable for either voice or data • both interstate and intrastate service • line conditioning not available, but data-conditioned lines are available at no extra charge.

**Access** • dial-out from customer premises; requires installation of AT&T WATS access line; available at almost any location within the United States • data transmission at rates to 9600 bps on a permissive basis, requiring customer-supplied, FCC-registered modems.

**Pricing & Other Features** • based on a monthly access fee of \$81.65 for access to all, or a subset of 6 wide service calling areas; determined by amount of hourly usage per access line per month for each rate period to each service calling area • traffic charges based on time of day • traffic pricing ranges from \$5.68 to \$27.27

per hour, depending on time of day and rate step (rate step is first 15 hours; next step 25 hours; next 40 hours; and last over 80 hours per month); minimum operating cost of \$31.65 per month per line plus any usage • \$51.80 service charge; \$123.00 installation connection charge for each access line to nearby local exchange carrier office.

#### AT&T 800 Service

**Service** • long-distance, switched, bulk-rate telephone service • inward-bound (AT&T 800 Service) • uses AT&T Communications network, consisting of landlines, microwave, and satellite links • suitable for either voice or data • both interstate and intrastate service • Advanced AT&T 800 Service provides additional options, including single-number calling for intrastate and interstate callers, and more flexible call routing • line conditioning not available.

**Access** • dial-in to customer premises; requires installation of AT&T 800 Service access lines (2 minimum); AT&T WATS and 800 Service cannot share the same access line • available at almost any location within the United States • data transmission at rates to 4800 bps requiring customer-supplied, FCC-registered modems • caller does not pay charges for AT&T 800 Service; i.e., telephone numbers prefaced by 800 are toll-free numbers.

**Pricing & Other Features** • based on a monthly fee for access to all, or a subset of 6 wide service areas; determined by amount of yearly usage per access line per month for each rate period to each service area • traffic charges based on time of day • traffic pricing ranges from \$7.78 to \$24.55 per hour, depending on time of day and rate step (rate step is first 15 hours; next step 25 hours; next 40 hours; and last over 80 hours per month); minimum operating cost estimated at \$36.80 per month per line plus usage • \$60.95 service charge; \$306 installation charge for access line to nearby local exchange carrier office • AT&T 800 Service-Canada is also available; this new international network service enables a customer to receive inward calls from 3 service areas (D, E, and F) encompassing 25, 60, and 100 percent of Canadian telephones • a 2-access-line minimum is required • AT&T 800 Service-Canada is available with all AT&T-enhanced 800 Service optional features • AT&T 800 Service-Canada has separate tapered usage rate table, including time of day and weekend discounts.

#### AT&T Series 1000 Channels

**Service** • low-speed leased-lines designed for Teletype (TTY) traffic • maximum data rate of 150 bps • primarily half-duplex channels, although full-duplex facilities also available at additional cost.

**Access** • nationwide, direct from user premises • because of limited bandwidth, channels cannot alternatively be used for voice traffic • user connection to local loop via low-speed modem • multiple TTY channels can be multiplexed on AT&T Series 3000 channel.

**Pricing & Other Features** • based on distance between rate centers traversed by the channel • ranges from \$1.80 per mile per month (first 100 miles for 75 bps channel) to \$0.44 per mile per month (over 1,000 miles for 150 bps channel) • in addition, channel termination charge of \$43.50 for each end of the channel, plus service termination charge ranging from \$57.70 to \$95.20 per month for each termination at AT&T switched network • one-time installation charge of \$74.60 per termination also applied.

#### AT&T Series 2000/3000 Channels

**Service** • voice-grade leased-lines • Series 2000 intended primarily for voice transmission; Series 3000 intended for data • use same facilities as AT&T switched network, except that circuits permanently established (dedicated) • line conditioning permits data transmission at up to 9600 bps (higher with latest modem models), as well as multipoint arrangements • typically terrestrial, analog channels (compared to DDS, which is all digital) • with multiplexers, multiple low-speed devices can share single leased-line (data traffic only).

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**Access** • nationwide, direct from user premises • rate centers designated as either Category A or B • Category A centers with more sophisticated equipment offer slightly cheaper rates for terminating leased lines; most major metropolitan areas serviced by Category A centers • phone company terminates leased-lines at user site with terminal block or 4-wire terminating set • modem transmit/receive pairs attach directly • on-site, AT&T-provided concentrators and multiplexers (Datrex) permit up to 8 150-bps channels to be carried over single Series 3000 channel • variety of line conditioning services supporting 9600 bps transmission, short-haul modems, or multipoint arrangements also available.

**Pricing & Other Features** • based on distance between rate centers traversed by channel • ranges from \$76.43 per month (first mile between 2 Category B centers) to \$1,300 per month at 1,000 miles, plus \$0.58 per month per mile for each additional mile, and exchange termination charge of \$36.05 per month • one-time installation charge of \$78.05 per exchange termination also applied • monthly charge for line conditioning ranges from about \$10 to \$70 month per channel.

#### □ AT&T Series 4000 Channels

**Service** • dedicated analog channels with a bandwidth not exceeding 4000 Hz • designed for facsimile transmission • not suitable for transmission of direct current pulses • full- or half-duplex • error rate not greater than 1 in 10,000 bits • telephotographic (facsimile) transmission in 1200 to 2600 Hz range, point-to-point or multipoint; line conditioning available.

**Access** • nationwide, direct from user premises • user interfaces directly to line termination, similar to Series 2000/3000 channels.

**Pricing & Other Features** • based on distance between rate centers traversed by the channel • ranges from \$6.25 per mile per month (first 250 miles) to \$2.57 per mile per month (500 miles) and up to \$2.17 per month per mile for each additional mile; plus fixed rate of about \$23.40 to \$111.00 per channel per month • installation charge of \$78.05 per channel • channel conditioning available for \$26.55 to \$53.05 per month, plus installation charges ranging from \$117 to \$234 per channel.

#### □ AT&T Series 5000 Channels (Telpak)

This listing is for reference only; Series 5000 channel service, also known as Telpak, has been discontinued. It is only available to Telpak customers of record on July 21, 1977. Telpak, when an active service, provided for the leasing of groups of wideband channels between 2 or more points.

#### □ AT&T Series 6000 Channels

**Service** • one-way transmission of audio signals for broadcast, wired music, closed circuit, or recordings • transmission in the opposite direction is furnished as a separate service, or by furnishing additional channels • frequency ranges from 300 to 2500 Hz up to 50 to 15,000 Hz • full-time dual Satellite Audio Service available • these are the only channels furnished by AT&T for audio (program) transmission • can be connected with the audio portion of Series 7000 local channels at the customer premises or via other common carrier • channel conditioning available.

**Access** • available nationwide.

**Pricing & Other Features** • based primarily on airline mileage distances in addition to various access charges; some limited-distance, low-frequency channels are leased by the hour only • typical pricing ranges from \$6.72 per month per mile per channel, full-time service; station connection charges range from \$3.60 to \$19.70 per hour for part-time service and \$57.40 to \$255 per month for full-time service • dual Satellite Audio Channel Service charged at \$42,400 per month plus \$2,000 installation; \$425 per month and \$100 installation per additional dual channel • additional charges for zero loss/stereo equalized channel conditioning; other special services.

#### □ AT&T Series 7000 Channels

**Service** • one-way transmission of television signals for viewing

or recording • routed over FCC-type accepted transmission systems; consists of United States standard monochrome and National Television Systems Committee (NTSC) color television baseband video signals and the associated audio signals • options include additional audio channels and remote control channel switching • satellite television available.

**Access** • available to all continental U.S. points served by AT&T and in Puerto Rico and Hawaii.

**Pricing & Other Features** • based primarily on airline mileage distances plus access charges, part-time or full-time service • \$79.75 per month per mile, full-time service; \$0.75 per hour per mile, part-time • Satellite charges at \$75,000 to \$150,000 per month per channel; earth stations from \$5,400 to \$18,741 per month per terminal • station connection charges at \$99.10 per hour, part-time service; \$1,858 per month, full-time service.

#### □ AT&T Series 8000 Channels

**Service** • wideband, analog, dedicated channels • designed for data or facsimile transmission at rates to 56K bps, or alternate voice/data transmission • when not used for data or fax, can support up to 12 individual voice channels • typically analog facilities, but may be employed as extension channel to DDS facilities of comparable bandwidth • may also be employed with wideband foreign exchange (FX) facilities.

**Access** • nationwide, direct from user premises, although installation times may vary significantly depending on location and distance from telco • same Category A and B distinctions apply to phone company centers as with Series 3000 channels • line conditioning also available as with voice-grade leased lines • user similarly interfaces directly to line termination and responsible for switching equipment in case of alternate voice/data applications.

**Pricing & Other Features** • based on distance between rate centers traversed by the channel • ranges from \$23.40 per mile per month (first 250 miles) to \$11.70 per mile per month (over 500 miles) • monthly exchange termination charges range from \$230 (connection to wideband FX facilities) to \$937 (full 56K-bps capacity) • monthly charges for termination at customer premises range from about \$20 (per voice termination) to \$100 (for facsimile) • one-time installation charges per channel range from \$156 to \$320, and \$78 per exchange termination • conditioning available; prices are same as with Series 3000 lines.

#### □ AT&T Series 9000/10000 Channels

Series 9000 private line service is custom-engineered to provide a half-duplex 1.344-bps digital data channel between specific customer locations via combinations of terrestrial and satellite channels; charges are developed on an individual case basis • Series 10000 is a special channel service for extending customer communication systems to other customer premises or to other common carriers; provided on a full-period, half- or full-duplex, point-to-point basis.

#### □ AT&T Dataphone Digital Service (DDS)

**Service** • all-digital dedicated channels • data rates supported from 2400 to 9600 bps; 56K bps • point-to-point and multipoint configurations supported • available in 103 major metropolitan areas • phone company maintains that 99.5 percent of time transmission will be error-free, regardless of data rate • facilities operate synchronously.

**Access** • direct from user premises located in served areas • 103 offices now offering DDS access include most major metropolitan areas; users in non-served areas can generally access DDS via voice-grade or wideband analog facilities (extension lines) • data service unit (DSU), and channel service unit (CSU) provided by customer as required to convert unipolar signaling of computer/terminal equipment to/from bipolar signaling of DDS network • if user data equipment operates asynchronously, synchronous converter required • other modem equipment not required • variety of multiplexing/switching arrangements, permitting single DDS channel to be accessed from multiple or alternate devices, available from a variety of vendors.

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### Dedicated Channel, Packet-Switched, Value-Added, Switched & Residential Services

**Pricing & Other Features** • basic service for 9600 bps ranges from \$73.56 per mile per month for first mile to \$1,098 per mile per month for 1,000 miles; each additional mile over 1,000 miles is \$0.58 per mile per month • basic service for 56K bps ranges from \$367.80 for first mile to \$5,494.60 for 1,000 miles; each additional mile over 1,000 miles is \$2.90 • 56K-bps channels similarly range from \$12.95 to \$2.90 per mile per month • one-time installation charges for user-end channel termination (and DSU) range from about \$148 (for 9600 bps and below) to \$224 (for 56K bps) • analog/digital adapters from \$213 to \$693 per month, depending on speed • for channels within exchange, cost is sum of all access line and termination charges.

#### □ ACCUNET Packet Service (APS)

**Service** • a basic, common-user packet switching and transport service for data only, based on the CCITT X.25 recommendation • regulated service, FCC tariff approval, effective August 18, 1984 • service composed of switching nodes, interconnected by 56K-bps DDS facilities (included as part of service) • shared switching and transport allows data transmission access at data rates of 4800 and 9600 bps and 56K bps • X.75 gateway and other features available in the future.

**Access** • via customer-provided DDS (4800 bps, 9600 bps, and 56K bps) or dedicated analog access line (4800 and 9600 bps) direct from customer premises to switching node • customer must perform packet assembly/disassembly according to CCITT X.25 specifications • 1984 locations—New York, Atlanta, Chicago, Dallas, Denver, Los Angeles, and Minneapolis.

**Pricing & Other Features** • fixed and usage based; fixed charges per port are \$470 per month for 4800 bps, \$615 per month for 9600 bps, and \$1,065 for 56K bps; tapered usage charges per kilopacket during business hours are \$0.82 up to 4000; \$0.77 up to 8000; \$0.72 up to 12,000, and \$0.67 over 12,000; off-peak usage charges per month (not included in previous volumes) are \$0.34 per kilopacket; \$3.36 per month for each 1000 call setups attempted.

#### ■ AT&T INFORMATION SYSTEMS

100 Southgate Parkway, P.O. Box 1955, Morristown, NJ 07960 • 201-898-2000.

#### □ AT&T-IS Net 1000 Service

**Service** • value-added, interstate common-carrier X.25 packet service • data/message nonvoice transmissions • error detection/correction, protocol/speed/code conversion, alternate routing, customer program execution and data storage facilities, interactive/noninteractive communications processing • asynchronous contention (IBM 2780/3780/3275), synchronous polled (IBM 3271/3274 BSC/3276 BSC), and SDLC interface; synchronous contention (IBM 2780/3780), synchronous polled (IBM 3271 BSC), and SDLC interface • primary communications facilities are Call Service, which provides 2-way, session-oriented transmission, and Message Service, which provides 1-way store-and-forward capability.

**Access** • public and dedicated dial-up to 4800 bps; private lines to 9600 bps • access to service points via local common-carrier facilities • 47 service and access points in major metropolitan centers • by end of 1984, nontoll access to Net 1000 Service will be available from every LATA in the Continental U.S.

**Pricing & Other Features** • based on traffic volume, type of service, customer-specified transmission priorities, delivery option, service point interface, and computer resources used • Call Service assessed per 1,000 packets of 128 characters; \$1.75 per kilopacket • Message Service charges calculated on 100K characters transferred; priority service billed at \$1.50 plus \$0.05 per destination; standard service at \$1.15 plus \$0.01 per destination; delayed service planned • public dial ports: 1200 bps \$0.07; 2400 bps 3275 BSC \$0.25; 4800 bps 3780 BSC \$0.29 per minute • dedicated dial ports: 1200 bps asynchronous \$275; 2400 bps 3275 BSC \$525; 4800 bps 3275 BSC \$600 per month plus \$450 one-time charge • dedicated dial rate 2400 bps 3780 BSC \$675; 4800 bps 3780 BSC \$775 per month plus \$600 one-time charge • private line analog ports 0 to 1200 bps

asynchronous \$275; 2400 bps 3270 BSC \$525; 4800 bps 3270 BSC \$600; 9600 bps 3270 BSC \$800 per month plus \$10 per network standard address per month and \$450 one-time charge • private line digital ports 2400/4800/9600 bps 3270 BSC billed at \$450/\$550/\$700 plus \$10 per network standard address and \$300 one-time fee • Interactive Processing costs \$0.02 per resource unit; Noninteractive Processing costs \$0.005 per resource unit • reserved storage \$10 per 100 kilobytes per month; demand storage \$0.50 per 50 kilobytes per hour • program Network Standard Address (NSA) reservation \$1 per NSA • Month Billing Identifier (BID) \$1 per BID per month • meter \$0.50 per metered execution • remote dial network access \$0.33 per minute additional to port charge • reserve program storage \$20 per 100 kilobytes; timed delivery demand storage \$0.01 per kilobyte characters per hour per service point • customized processing \$0.005 per resource unit • services charge \$125 per hour • deferred message service character volume \$0.75 per 100K characters; deferred and standard message service—message origination \$0.02 per message; confirmed delivery option \$0.02 per destination • information movement: priority message service message origination \$0.20 per message; confirmed delivery option \$0.15 per destination • Net 1000 will support various user-site modems and digital interfaces, terminal interfaces and host interfaces as defined in full product report 910-A428-1000 • LAP, SCCP, MAP, SHGP, SPHP, SSSP, On-Line Documentation, Net 1000 Editor, Net 1000 Command Language and Format Translator are available at no extra charge except for related storage and processing costs • Net 1000 is a self-monitoring network.

#### ■ AUTOMATIC DATA PROCESSING (ADP)

175 Jackson Plaza, Ann Arbor, MI 48106 • 313-769-6800.

#### □ ADP Autonet

**Service** • packet-switched, value-added network • supports data and message traffic • supports digital transmission via satellite • supports data at rates up to 2400 bps dial-up; 14.4K bps dedicated; estimated error rate is 1 in a trillion bits • wideband and T1 dedicated circuits • satellite network supports point-to-point; provides customer earth stations • value-added network features; X.25 packet switching; alternate routing; protocol conversion; error detection/correction; consists of over 250 network nodes; supports X.25, 3270, asynchronous protocols; offers electronic mail service, AutoMail, automatic dial back-up.

**Access** • dial-up (DDD), dedicated, and dedicated dial-up access • data requires user-provided modem, vendor-provided host interface line and/or boxes • optional vendor-provided equipment: dial back-up, virtual dedicated ports; supports both inbound and outbound traffic • dedicated access between 250 to 500 miles • access outside of Autonet cities available through Telenet or Tymnet, Datapac connections • accesses over 300 cities in the U.S. and Canada.

**Pricing & Other Features** • based on network access, traffic, host interface and other services provided during the month • hourly rates range from \$3 (110-300 bps) to \$4 (1200/2400 bps) for public dial-in or \$18 for WATS • monthly subscription charge of \$500 per month for nonprime usage plus an hourly rate of \$1 (110-300 bps), \$1.50 (1200/2400 bps) • private dial-in requires \$500 installation fee plus \$250 per port (110-300 bps) or \$275 per port (1200/2400 bps) monthly rate • dedicated terminal facility (DTF) requires \$1,000 per port installation fee plus \$600 per port monthly rate • asynchronous terminals concentrator (ATC) requires a \$1,000 installation fee plus \$600 plus \$100/4 ports or \$1,300 plus \$200/8 ports (8 to 32 ports) or \$1,700 plus \$200/8 ports (up to 80 ports); each ATC requires a terminal communication facility (TCF), which includes a dedicated line, modems, and unlimited connect time; requires \$1,000 installation fee plus monthly rate of \$750 to \$2,200 depending on data rate; when TCF is installed concurrently with an ATC, TCF installation charge is reduced to \$200 • all terminal connections require a measured traffic charge of \$0.03 per 1,000 characters or a prepaid traffic charge of \$100 per month (110-300 bps) or \$180 (1200 bps) • host communication facility (HCF) requires a \$1,000 installation fee plus \$750 to \$2,200 monthly rate depending on

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data rate • AHIP and XHIP host interface processors require \$1,000 installation fee plus \$1,200 to \$1,600 monthly rate depending on number of ports supported • optional charges include \$425 per port per month for virtual dedicated ports; \$325 per line per month for dial back-up, \$500 installation fee plus \$100 per month for private rotary • other administrative charges, including monthly account charge at \$100 per invoice per month; optional detailed usage report at \$250 per report per month, provided on magnetic tape; validation of new users at \$10 per user ID plus \$3 per month per ID, optional individual billing and usage report at \$25 per month • IRC link rates quoted by vendor • optional additional services including publications, network consulting and design, specialized communication equipment and other tailored services quoted by vendor.

#### ■ C & W NETWORK SYSTEMS & SERVICES

8321 Lemmon Avenue, Dallas, TX 75209 • 214-353-0396.

#### □ C & W IXC (Inter-Exchange Circuits)

**Service** • voice-grade, dedicated channels with certain value-added features • network provides error detection/correction internationally and performs network monitoring/diagnostics • resale network, uses terrestrial analog and digital facilities leased from other common carriers • data rates up to 56K bps supported.

**Access** • either by dial-up or leased-line facilities direct from customer premises • local access available in 28 major metropolitan areas including Anchorage and Honolulu • local loop access may be arranged and billed through IXC • on-site modem equipment available from vendor • although network basically transparent to user terminal code, speed and protocol, special rates offered for certain common terminal protocols (IBM, Honeywell, and CDC).

**Pricing & Other Features** • charges based on channel speed, mileage, and protocols • tail-circuit modems user or vendor supplied • multiplexer services available • channel service billing based on per mile per month basis in increments of 1 to 100, 101 to 350, 351 to 750, 751 to 1,500, over 1,500 miles • 50- to 75-bps channel charge \$79.80 for first mile; \$0.61 for miles 2 to 100; to \$0.20 for miles over 1,500 • 300-bps channel charge \$93.10 for first mile; \$0.98 for miles 2 to 100 to \$0.23 for miles over 1,500 • 1200-bps channel charge \$99.75 for first mile; \$1.18 for miles 2 to 100; \$0.29 for miles over 1,500 • 1800-bps channel charge \$126.75 for first mile; \$1.44 for 2 to 100 miles to \$0.35 for miles over 1,500 • 2400-bps channel charge \$133.00 for first mile; \$1.69 for 2 to 100 miles to \$0.40 for miles over 1,500 miles • 4800-bps channel charge \$139.65 for first mile; \$2.26 for miles 2 to 100 to \$0.67 for miles over 1,500 • small premium for 2400/4800 channels handling 2780/3270/3780/HASP/GRTS/UT200 • Dallas/Oakland to Honolulu flat rate from \$575 (50 to 75 bps) to \$3,560 (4800 bps) • one-time installation charges ranging from \$200 to \$500 for all services.

#### □ C & W MMS (Message Management Services)

**Service** • voice-grade, dedicated channels with certain value-added features; shared store-and-forward message network • provides error detection/correction; protocol conversion; supports 83B3, 8A1, 81D1, Freewheeling Telex, TWX, DDD protocols • uses microwave analog and digital facilities leased from other common carriers • data rates up to 1200 bps.

**Access** • dial-up and dedicated facilities • user-provided modem for data support • supports inbound and outbound traffic • no restrictions for dedicated access.

**Pricing & Other Features** • based on number of channels and number of drops • \$100 for each address on network and \$100 per port per month • \$200 installation fee per channel.

#### ■ COMPUTER COMMUNICATION GROUP (CCG)—see TELECOM CANADA

#### ■ COMPUTER SCIENCES CORPORATION (CSC)

650 North Sepulveda Boulevard, El Segundo, CA 90245 • 213-615-0311.

#### □ Infonet

**Service** • dedicated value-added network • supports message traffic • supports data at rates up to 16K bps; estimated error rate 1 in 1 million • value-added network features: X.25 packet switching; alternate routing; protocol conversion; error detection/correction; 200 network nodes; supports TTY, 2780/3780 BSC, 3270 BSC, X.25; trunk priority for interactive traffic, private ports, public ports for RJE, billing supplements.

**Access** • dial-up (DDD); dedicated or dedicated dial-up access • does not require vendor-provided modem • supports both inbound and outbound traffic • 110 locations in U.S. plus 55 international locations, plus access via IN-WATS, Telex, FRGs, and 5 other public data networks.

**Pricing & Other Features** • \$600 to \$1,600 for dedicated access links, and if required, \$400 to \$3,000 for interface equipment • \$4 per hour to \$10 per hour (U.S.) for asynchronous traffic • \$0.04 per kilobyte for interactive traffic down to \$0.015 per kilobyte for RJE and file transfer traffic • \$400 to \$3,000 per month for terminal or host interface equipment where required.

#### ■ CONSORTIUM COMMUNICATIONS INTERNATIONAL, INC (CCI)

80 Broad Street, New York, NY 10004 • 212-363-3700.

#### □ CCI Multilink

**Service** • switched and dedicated value-added network for data/message traffic • supports analog/digital transmissions • backbone facilities comprised of microwave, satellite, and telephone circuits • supports data at rates up to 9600 bps; estimated error rate 1 in 10 million • voice-grade/wideband dedicated circuits • line conditioning available • supports point-to-point; leases transponder capacity • X.25 packet switching; alternate routing; protocol conversion; error detection/correction; 7 network nodes; supports synchronous, asynchronous, Telex, TWX, IBM 3270, X.25 protocols; electronic mail, abbreviated codes, departmentalized billing, dynamic conformations, dynamic routing, daily journal reports, online message inquiry, multiple address destinations, automatic retry.

**Access** • dial-up and dedicated dial-up lines • user-provided modem required for data • optional vendor-provided terminal • supports inbound and outbound traffic • no mileage restrictions for dedicated access • accessible worldwide.

**Pricing & Other Features** • no charge for installation, no subscription fee or monthly minimum • Telex access charges range from \$1.3172 to \$2.6072 per minute; high-speed access rates range from \$0.99 to \$2.54 per minute; Telex via Telemail ranges from \$.15 per 1,000 characters to \$2.54 per minute; international component rates range from \$0.802 to \$2.352 per minute.

#### ■ GENERAL ELECTRIC INFORMATION SERVICES COMPANY (GEISCO)

401 North Washington Street, Rockville, MD 20850 • 301-340-4387.

#### □ Mark Net

**Service** • value-added network with online remote computing/application development capability, office communications, and distributed data processing • 4 satellite links, 3 microwave links, undersea, and 350,000 terrestrial miles • based on packet-switching network • accommodates host with asynchronous modems or X.25 interfaces • IBM 3270 protocol • point-to-point, multipoint • error detection/correction; full redundancy, security, power backup and central site control of network nodes.

**Access** • dial-up from 600 U.S. cities • international access planned for 1985.

**Pricing & Other Features** • based on terminal connect time, I/O

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and terminal access • prime time usage ranges from \$4.80 per hour up to 1,000 hours to \$2.80 per hour over 5,000 hours; nonprime time ranges from \$2.40 per hour up to 1,000 hours to \$1.40 per hour over 5,000 hours; city category surcharges \$1.25 per hour for medium; \$4.25 per hour low; \$17.25 per hour WATS • dedicated access (terminal/host) \$600 per month plus \$500 installation charge • \$1,450/\$1,550 per month 2400/4800 bps 8-port interface; \$1,750/\$1,850 per month 2400/4800 bps 16-port interface; \$5,500/\$6,000/\$6,700 per month 9600 bps 48/64/80-port interface; \$1,300 per month X.25 interface, plus \$1,000 installation fee for all interfaces • monthly charge for I/O characters range from \$0.05 to 50,000 characters to \$0.01 over 200,000 characters for prime time; \$0.025 0 to 50,000 characters to \$0.005 over 200,000 characters for nonprime time • terminal connect time per hour \$35/\$45/\$20 for 2400 bps/4800 bps/WATS surcharge • monthly minimum charge \$500/\$40 (per catalog/per invoice).

#### ■ GRAPHNET, INC

329 Alfred Avenue, Teaneck, NJ 07666 • 201-837-5100.

#### □ Graphnet Freedom Network Services

**Service** • switched or dedicated value-added network for data, message, and facsimile transmissions • supports digital transmission via microwave, ITT World Communications and RCA Global Communications • supports data at rates of 50 to 9600 bps • voice-grade dedicated circuits; line conditioning available • value-added features: X.25 packet switching; alternate routing; protocol conversion; error detection/correction; 200 network nodes; supports TTY, 8A1, IATA, 83B, TLX, IBM 2780/3780 protocols; other value-added features: electronic mail (Faxgram), hand delivery, telephone delivery, multiple addressing, delivery notification, departmental billing.

**Access** • DDD or dedicated access, including Telex and TWX • data does not require user-provided modem • no restriction for dedicated access • over 200 local access locations in the Continental U.S.

**Pricing & Other Features** • Class 3A same day, 2.5-hour delivery in business zone, if received by 3:00 PM point of destination time: \$2.15 first 2 lines, \$0.50 each additional 2 lines, \$3.75 delivery charge in business zone via TLX, TWX; \$2.65 first line, \$1.00 each additional line, \$3.75 delivery in business zone, via facsimile or phone; \$2.15 first line, \$0.50 each additional line, \$3.75 delivery in business zone via Dataphone • Class 3B delivery by 6:00 PM when accepted 6:00 AM to 12:00 Noon or by 12:00 Noon of next day when accepted 12:00 Noon to 6:00 PM: \$2.15 first 2 lines, \$0.50 each additional 2 lines, \$2.50 delivery charge in business zones via TLX, TWX; \$2.65 first line, \$1.00 each additional line, \$2.50 delivery charge in business zone via facsimile or phone; \$2.15 first line, \$0.50 each additional line, \$3.75 delivery charge in business zone via Dataphone • Class 3E first class mail delivery by 6:00 PM when received by 4:00 PM \$1.00 first 8 lines, \$0.25 each additional 4 lines via TLX, TWX; \$1.00 first 2 lines, \$0.25 each additional line via facsimile or phone; \$1.00 first 4 lines, \$0.25 each additional 2 lines via Dataphone • Class 4A telephone delivery within 2 hours with mailed confirmation to addressee: \$2.45 first 2 lines, \$0.50 each additional 2 lines via TLX, TWX; \$2.95 first line, \$1.00 each additional line via facsimile or phone; \$2.45 first line, \$0.50 each additional line via Dataphone • Class 4B telephone delivery within 6 hours with mailed confirmation \$2.15 first 2 lines, \$0.40 each additional 2 lines via TLX, TWX; \$2.55 first line, \$0.80 each additional line via facsimile or phone; \$2.15 first line, \$0.40 each additional line via Dataphone • Class 9FB originated from Telex, TWX delivered to domestic Telex, TWX including Canada and Mexico 50 word minimum at \$0.02 per word; Z flag customers 50 word minimum at \$0.08 per word • OFI, originated from Telex, TWX to International Telex, applicable international unbundled IRC rate, one minute minimum; Z Flag customers additional \$-.5-per connect minute surcharge • 9FR full-rate cable for immediate hand delivery overseas, applicable international cable rate • 9LT night letter cable for hand delivery overseas next morning half price of applicable international cable rate • 9FC, originated from Telex, TWX to domestic Telex, TWX including

Canada, and Mexico with automatic terminal cancellation notification 50 word minimum at \$0.01 per word • 9FH, originated from Telex, TWX to International Telex with automatic cancellation notification, applicable international unbundled IRC rate, one minute minimum.

#### ■ GTE SPRINT COMMUNICATIONS CORP

One Adrian Court, Burlingame, CA 94010 • 415-692-5600.

#### □ GTE Sprint

**Service** • primarily voice-oriented analog transmission; supports data rates up to 4800 bps • metered use business, residential, nationwide services; intrastate switched/voice-grade services for states of Texas, California, Maryland, Pennsylvania, and Florida • shared authorization codes; travel calling; special billing arrangements; abbreviated dialing.

**Access** • public dial-up lines; dedicated access dial lines; dedicated leased lines • services generally provided in major metropolitan areas; accessible from 354 U.S. cities • nationwide calling throughout the 50 United States, Puerto Rico, and the U.S. Virgin Islands.

**Pricing & Other Features** • based on time of day, distance between cities and call duration • daytime period extends from 8:00 AM to 5:00 PM, Monday through Friday; evening hours range from 5:00 PM to 11:00 PM Sunday through Friday; Night/Weekend hours include 11:00 PM to 8:00 AM each day of the week, 8:00 AM to 11:00 PM Saturday and 8:00 AM to 5:00 PM Sunday • no installation or monthly service charges; minimum usage charge of \$5 per month • in addition to time of day discounts to entire bill according to the following structure; \$25 to \$74.99 accrues 2 percent, 7 percent, and 8 percent discounts for day, evening, and night/weekend calls, respectively; \$75 to \$199.99 accrues 5 percent, 8 percent, and 10 percent discounts; \$200 and up accrues 8 percent, 10 percent, and 12 percent discounts • day traffic charges range from \$0.22 to \$0.41 from 1 to 10 miles to 1,011 to 3,000 miles.

#### □ GTE Direct Sprint

**Service** • primarily voice-oriented analog transmissions; supports data rates up to 4800 bps • metered use business, residential, nationwide services; intrastate switched/voice-grade services for states of Texas, California, Maryland, Pennsylvania, and Florida • Direct Sprint bulk-rate metered service • shared authorization codes; travel calling; special billing arrangements; abbreviated dialing.

**Access** • public dial-up lines; dedicated access dial lines; dedicated leased lines • services generally provided in major metropolitan areas; accessible from 354 cities • nationwide calling throughout the 50 United States, Puerto Rico, and the U.S. Virgin Islands.

**Pricing & Other Features** • based on elapsed call time, time of day, and day of week; daytime period extends from 8:00 AM to 5:00 PM, Monday through Friday; evening hours from 5:00 PM to 11:00 PM Sunday through Friday; night/weekend from 11:00 PM to 8:00 AM, each day of the week, 8:00 AM to 11:00 PM Saturday, and 8:00 AM to 5:00 PM Sunday • rates are based on a 6-second billing increment; distance and rate bands are not involved • minimum traffic charge \$350 per month per access line • daytime traffic rates range from \$15.42 per hour for first 15 minutes to \$11.62 per hour for over 80 minutes.

#### ■ GTE TELENET COMMUNICATIONS CORP

8229 Boone Boulevard, Vienna, VA 22180 • 703-442-1000.

#### □ GTE Telenet/Telemail Packet-Switched Data Service (PSDS)

**Service** • packet-switched, value-added network for data only • composed of X.25 switching nodes interconnected by hybrid terrestrial links • subscriber data messages routed through network individually, although user seems to have hard-wired connection (virtual circuit) • within network, end-to-end error detection/correction assured • traffic rates up to 9600 bps

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supported in most areas; wideband access at up to 56K bps available • service traffic-based and transparent to mileage, making it attractive to long-distance, low-traffic users.

**Access** • by either dial-up or leased-line facilities direct from user premises • access to Telenet central offices supporting 56K-bps channels requires dedicated wideband access channel; at 9600 bps and below, voice-grade access line will usually suffice • Telenet handles ordering and installation of access line to user's premises; customer pays only for leased-line port, Telenet assumes the cost of the access line • currently about 325 access points which support dial-up access at up to 1200 bps • protocol/code conversion offered as standard value-added service • because of store-and-forward operation, originating and destination devices do not need to operate at same speed • for users with large number of terminal devices, on-site Telenet communications processors are available as options • electronic mail service (Telemail) also available.

**Pricing & Other Features** • pricing based on usage • cost for transmitting 1,000 packets (128 characters each) ranges from \$1.70 in continental U.S. to \$7 to/from Alaska; or \$200 to \$300 per month fixed rate • dial-in access costs \$6.04, \$9.37, or \$13.91 per hour depending on location; discounts of 10, 20, and 30 percent for volume users • monthly charges for leased line range from \$600 (low speed) to \$2,000 (for 14400 bps) plus \$1,000 installation charge • on-site Telenet processors required for 110-bps to 56K-bps access priced at \$350 to \$2,530 per month depending on number of ports, device timing protocols and speeds; installation charges run \$400 to \$1,000.

#### ■ IBM—see INTERNATIONAL BUSINESS MACHINES

#### ■ INTERNATIONAL BUSINESS MACHINES (IBM) CORPORATION/Information Systems Group

National Accounts Division; 1133 Westchester Avenue, White Plains, NY 10604; 914-696-1900 • National Marketing Division; 4111 Northside Parkway, Atlanta, GA 30327; 404-238-2000.

#### □ IBM Information Network (IBM/IN)

**Service** • value-added data network with online remote computing/application development capability • composed of nodes established in 16 U.S. cities and interconnected by digital terrestrial links; multiple mainframe computing facility located in Tampa, FL; also available through secondary value-added network in more than 250 U.S. cities • SNA-managed network featuring parallel links, alternate routing, optional dial-backup, and optional password security • supports SNA/SDLC and BSC protocols for both user CPUs, 3270-compatible terminals, interactive and batch; supports 2780/3780, 3101, and IBM Personal Computer; supports other vendor terminals on a contract basis; supports asynchronous terminals in limited applications • online services includes VM interactive products, remote computing, applications development (VMPS), MVS applications development, and remote computing (MVSPS) • facilities provided for text processing, report formatting, financial planning and problem solving, and color graphics • online data bank provides a user reference on current network offerings and technology updates.

**Access** • primarily via IBM- or user-provided leased lines and associated modems between customer site and IBM node • dial-in for some applications • available in New York, Washington, Atlanta, Tampa, Miami, Chicago, Dallas, Houston, San Francisco, Los Angeles, Philadelphia, Seattle, Denver, and Minneapolis • customers can employ IBM/IN solely for networking without remote computing, via Network Service • optional Extended Network Attachment makes IBM an intermediary between user and common carrier/modem vendors.

**Pricing & Other Features** • based on network and computer resources used, plus lease line charges • minimum fee of \$200 per month per line.

#### ■ MCI INTERNATIONAL/WUI

International Drive, Rye Brook, NY 10573 • 914-937-3444.

#### □ MCI Cablegram

**Service** • packet-switched for message traffic • supports analog transmission • backbone facilities consist of undersea cable • abbreviated addressing, departmental billing.

**Access** • via dial-up and dedicated access • supports inbound and outbound traffic.

**Pricing & Other Features** • traffic charges typical rate ranges between \$0.23 to \$0.34 per word.

#### □ MCI Impacs (Packet Switching)

**Service** • switched network • supports data traffic • backbone facilities comprised of satellite and undersea cable • supports data at rates up to 9600 bps.

**Access** • via dial-up and dedicated lines.

**Pricing & Other Features** • rates vary by location served.

#### □ MCI Leased Channel

**Service** • dedicated network • supports voice/data/message traffic • backbone facilities comprised of satellite and undersea cable • supports data at rates up to 1.544M bps • line conditioning available • supports point-to-point, multipoint, point-to-multipoint; leases transponder capacity; provides customer earth stations • alternate routing; protocol conversion; error detection/correction.

**Access** • via dial-up and dedicated lines • supports inbound and outbound traffic.

**Pricing & Other Features** • rates vary depending on speed of channel and locations served.

#### □ MCI Telex

**Service** • switched network • supports message traffic • supports analog transmissions • backbone facilities comprised of satellite and undersea cable • accepts data at higher rates and transmits at 50 bps • leases transponder capacity • abbreviated selection; departmental billing, multiple addressing, outbound and inbound store-and-forward delivery; XON/XOFF handling.

**Access** • dial-up and dedicated lines • support inbound and outbound traffic.

**Pricing & Other Features** • typical international Telex call ranges between \$1.41 to \$2.92 per minute including domestic and international segments.

#### ■ MCI TELECOMMUNICATIONS CORP

1133 19th Street, Washington, DC 20036 • 202-872-6200.

#### □ MCI Dedicated Leased Line Service

**Service** • dedicated, voice-grade service for intercity connection • offered in 4 transmission modes: voice-grade service, data service, alternate voice/data service, and teleprinter service • voice-grade is offered in increments of 1 or more voice-grade channels each with nominal bandwidth of 4KHz; data service at rates of 0 to 300, 1200, 2400, 4800, 7200, 9600 bps; alternate voice/data is offered with the capability of voice-grade and data communications on an alternate use basis (if required MCI will provide a handset at each circuit end as part of service); teleprinter service furnishes the transmission at speeds of 0 to 75 and 0 to 150 baud • primarily terrestrial microwave facilities using analog transmission techniques; some usage of satellite-based facilities • terrestrial extension channels expand access to many areas.

**Access** • dedicated dial-up lines; dedicated leased lines at 9600 bps • service generally provided to major metropolitan areas • extension point service to other communities • nationwide calling throughout the contiguous U.S. • 96 microwave relay sites nationwide.

## North American Carrier & Network Services

### Dedicated Channel, Packet-Switched, Value-Added, Switched & Residential Services

**Pricing & Other Features** • based principally on airline mileage between MCI exchanges and access charges • basic monthly charge for each circuit termination for following services: \$36.75 and \$113.30 for voice-grade; \$36.75 for analog data service; \$220 for 2400 and 4800 digital data service; \$295 for 9600 digital data service; \$435 for 56K digital data service; \$1,000 for Terrestrial digital service, plus \$600 surcharge, if applicable; \$78.75 for alternate voice/data service; \$57.75 for teleprinter service; \$36.75 for customer-provided business lines; \$50 order charge and \$80 installation fee for all services • monthly analog long haul charge for up to 1 mile is \$60.75; 2 to 15 miles \$90.43 plus \$1.76 per mile per month; 26 to 100 miles \$108.03, plus \$1.34 per mile per month; 101 to 1,000 miles \$208.53, plus \$0.75 per mile per month; 1,001 to 1,500 miles \$883.53 plus \$0.06 per mile per month; over 1,500 miles \$1,113.53 plus \$0.34 per mile per month • short-haul surcharge (circuits below 176 miles) \$31.50 per month • reduced monthly mileage rate for teleprinter service 50 percent 0 to 75 baud and 75 percent 0 to 150 baud • \$100 one-time charge for additional extension handset connection • \$100 per month for calls recorded on magnetic tape • \$500 one-time charge to set up monthly call records on magnetic tape.

#### □ MCI Execunet

**Service** • one-way, dial-in/dial-out multipoint service allowing customers to originate and terminate calls via MCI-provided local business telephone lines • similar to AT&T DDD • over 200 major metropolitan cities in the contiguous U.S., Honolulu, HI serviced; international service in Canada, Puerto Rico, and the U.S. Virgin Islands.

**Access** • via MCI-provided local business telephone lines • calls can only originate in the city or cities where an active account is maintained.

**Pricing & Other Features** • metered • traffic charges based on mileage, time of day, and day of week; circuit mileage calculated using standard vertical and horizontal (V and H) coordinate tables; business day rate 8:00 AM to 5:00 PM, Monday through Friday; evening rates 5:00 PM to 11:00 AM, Sunday through Friday, and MCI recognized holidays, except when lower rate would normally apply; night and weekend rates 11:00 PM to 8:00 AM Monday through Friday, and 48-hour Saturday and Sunday, exclusive of 5:00 PM to 11:00 AM Sunday; Super Saver primarily offered to residential customers; Basic is restricted to calls between 4:00 PM and 10:00 AM Monday through Friday, and any time Saturday, Sunday, and MCI-recognized National holidays • at customer's option: monthly subscription fee, one-time installation fee or recurring minimum charge for intercity usage • per minute usage charge for business day/evening/night: Tier 1 (Execunet) ranges from \$0.15/\$0.09/\$0.06 for 1 to 10 miles to \$0.4784/\$0.2787/\$0.1910 4,251 to 5,750 miles • Tier 2 (Super Saver) \$0.15/\$0.09/\$0.06 for 1 to 10 miles to \$0.4970/\$0.2787/\$0.1910 for 4,251 to 5,750 miles • Tier 3 (Basic) \$0.15/\$0.09/\$0.06 1 to 10 miles to \$0.4970/\$0.2970/\$0.1985 4,251 to 5,750 miles • Tier 4 (calls terminating in cities not included in Tier 1) \$0.15/\$0.09/\$0.06 1 to 10 miles to \$0.4988/\$0.2983/\$0.1985 4,251 to 5,750 miles • U.S. to Canada per minute usage charge ranges from \$0.12/\$0.078/\$0.048 for 1 to 8 miles to \$0.648/\$0.4212/\$0.2592 for 2,221 to 4,000 miles • U.S. Mainland to Puerto Rico/U.S. Virgin Islands Band 1 \$0.4085/\$0.2451/\$0.1634; Band 2 \$0.4560/\$0.2736/\$0.1824; Band 3 \$0.4750/\$0.2850/\$0.1900 • access charge based on usage or standard monthly subscription: \$75 minimum monthly usage; \$10 Execunet/Basic monthly subscription fee; \$5 Super Saver monthly subscription fee • \$5.50 speed number dial; \$100 per month magnetic tape call records; \$500 one-time setup charge for magnetic tape • \$1 credit for usage charges on initial Super Saver and Basic subscription fee; \$2 credit for standard subscription fee • minimum charge and subscription fee not applicable to customers accessing via single-digit access level • Corporate (Group) Account Billing monthly minimum usage charge is \$2,500 for up to 50 accounts; \$25 per month per account in excess of 50.

#### □ MCI-WATS

**Service** • one-way, multipoint service requiring customers to originate calls via dedicated facilities between their premises and MCI's terminal location and allowing termination of calls via MCI-provided local business telephone lines • similar to AT&T WATS.

**Access** • via MCI-provided dedicated local access lines, or intercity dedicated leased lines, or customer-provided dedicated facilities of other common carriers.

**Pricing & Other Features** • traffic charges based on per-minute rates established for time of day, day of week, and average monthly use • business day/evening/night hours are same as Execunet • calls subject to 1-minute average connect-time • rate schedule is in 18 rate steps: each rate step has two tiers, Tier 1 applies to calls on MCI network, Tier 2 applies to nonnetwork calls • business day/evening rates range per minute from \$0.20/\$0.14 Tier 1, \$0.25/\$0.16 Tier 2 Rate Schedule 1 to \$0.26/\$0.18 Tier 1, \$0.34/\$0.22 Tier 2 Rate Schedule 18; night/weekend rate all hours \$0.08 to \$0.11 Rate Schedule 1 to 18 • \$75 minimum monthly charge; \$10 monthly subscription fee; \$85 per month circuit termination end for MCI-provided dedicated access line; \$35 per month circuit termination end for customer-provided dedicated access line; \$120 installation fee and \$50 one-time processing charge for each installation order.

#### □ MCI Quickline Service

**Service** • nondiscounted 2-way point-to-point service • calls originate and terminate via dedicated facilities between customer's premises and MCI's terminal location.

**Access** • via MCI-provided dedicated access lines or intercity dedicated leased lines or customer-provided facilities from common carrier.

**Pricing & Other Features** • metered • based principally on traffic and access charges • traffic principally based on mileage and elapsed time; circuit mile calculated using standard V and H coordinate tables • charges range from \$0.792 per minute for 1 to 10 miles to \$0.3520 for 1,911 to 3,000 miles • access charges based on minimum monthly usage or monthly subscription fee; \$75 monthly minimum usage fee; \$10 monthly subscription fee; \$70 per month circuit termination charge; \$120 installation fee, plus \$50 one-time processing charge per installation • \$5 per month per additional code; \$100 per month preprogrammed automatic signaling; \$100 per month per magnetic tape reel for recorded calls, plus \$500 one-time setup fee.

#### □ MCI Credit Card Service

**Service** • one-way, dial-in/dial-out, multipoint service allowing customers to originate calls from any city within contiguous U.S. and terminate calls to every location in contiguous U.S., Hawaii, Puerto Rico, and U.S. Virgin Islands.

**Access** • via MCI dedicated line; or via resold facilities.

**Pricing & Other Features** • metered • principally based on traffic and usage • traffic charges based on mileage, elapsed time, time of day, day of week, circuit mileage calculated using V and H coordinate tables • business day/evening/night hours same as Execunet: charges for business day/evening/night range from \$0.15/\$0.09/\$0.06 for 1 to 10 miles to \$0.50/\$0.30/\$0.20 for 4,251 to 5,750 miles • access charges based on monthly usage fee or monthly subscription; \$75 per month minimum usage fee; \$5 monthly subscription fee • \$0.15 per call • \$1 per month additional codes • \$5.50 per month speed numbers • \$100 per month magnetic tape call records, plus \$500 one-time setup fee • proposed offering to be effective September 13, 1984 will provide universal origination via a 2-tiered first and additional rate structure to which volume discounts will apply and the monthly minimum charges and subscription fees will be deleted • one-time initiation service charge will apply to new customers requesting standalone service.

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#### MCI CCSA (Common Control Switching Arrangement)

**Service** • common control switching service interconnecting network trunks including circuits and services provided by either MCI or other participating carriers • 2 customer options available: Option A—Telemanagement (full service); Option B—Least Cost Routing provides least-cost-first-routing, authorization/accounting codes, abbreviated dialing codes, and priority level routing arrangement.

**Access** • via MCI-provided dedicated lines or other participating carriers.

**Pricing & Other Features** • metered • dedicated access arrangement charge: basic monthly recurring charge for Option A is \$230 per dedicated access arrangement; Option B is \$105 via MCI-provided dedicated access • via MCI intercity facility or customer-provided facility, basic monthly recurring charge per dedicated access arrangement is \$165 for Option A and \$50 for Option B • additionally \$0.01 per minute will apply to all non-MCI traffic utilizing a dedicated access arrangement (does not apply to noncompleted calls).

#### MCI Extension Point Service

**Service** • provides service via other common carriers to locations not served by MCI.

**Access** • via other common carriers connected to the nearest MCI terminal location equipped to provide the specified MCI service.

**Pricing & Other Features** • MCI passes through monthly recurring rates by common carriers providing extension facilities • \$10 per month administrative service fee • \$80 installation fee, plus one-time processing charge for each order.

#### MCI Wideband Service

**Service** • 960-KHz maximum bandwidth between given city-pairs • 240-KHz minimum bandwidth between any given city-pair; additional service in increments of 48 KHz between the same 2 locations.

**Access** • via dedicated MCI line.

**Pricing & Other Features** • special arrangement charges include: engineering, construction, labor, facility costs are additional, and at the expense of the customer • initial 240 KHz \$27 per mile per month; additional 48 KHz \$5.40 per mile per month • initial 240 KHz access charge is \$2,000 per city-pair per month; additional 48-KHz increments access charge \$400 per city-pair per month.

#### PACIFIC NETWORK COMMUNICATIONS—see C & W NETWORK SYSTEMS

#### RCA AMERICAN COMMUNICATIONS (AMERICOM)

400 College Road East, Princeton, NJ 08540 • 609-734-4000.

#### RCA Americom Domestic Satellite Service

**Service** • switched and leased voice-grade and wideband channels; switched and leased network services for teleprinter, data, facsimile, and voice transmission • analog and digital, satellite, microwave, and landline network comprising RCA-owned operating center earth stations as well as earth stations at customer sites • terrestrial channels extend access to major metropolitan areas • specializes in Government communication services • television and radio program transmissions • transponder services • 56 plus service is available between RCA operating centers and can include local channels to customer premises.

**Access** • direct from customer locations via on-site earth stations • access to network via RCA operating center in 10 major cities serving over 350 communities in their location distribution areas • service extensions provide access to more than 130 other locations.

**Pricing & Other Features** • based on service level and basic monthly charge per channel • private line switched channel

service billed at \$265 per month up to 1,320 minutes, plus \$0.09 per minute over 1,320 minutes; \$100 nonrecurring charge applies to each switch connection at RCA operating center; \$60 monthly charge applies to each channel switch termination at RCA operating center • leased voice-grade channel based on site-pair basis: \$600 to \$1,300 depending on distance • channel charges between Honolulu, HI and operating center require \$50 installation fee plus \$250 monthly charge • local channel between customer and operating center requires \$50 installation fee plus \$100 monthly charge • 56K-bps wideband service between operating centers \$5,000 per month; installation and testing charges for each channel derived from 56K-bps channel; \$38.25 per hour per channel • leased common carrier channel monthly per-channel charges: Type A \$600 per month; Type A to Honolulu, HI \$850 per month; Type B \$470 per month; Type B to Honolulu, HI \$720 per month; Type C ranges from \$470 to \$300 depending on number of channels and grouping; Type C to Honolulu ranges from \$720 to \$550 depending on number of channels and grouping • termination charges \$25 per month • alternate use charge \$20 per month • fixed-term discounts range from 35 to 45 percent for Type I through Type III • monthly discounts available on Type B and Type C services • off-shore services \$2,400 per month • specialized services for the government include video services for the armed forces, and NASA; wideband data networks for NASA, Defense Department and for LANDSAT/TIROS programs and voice networks for the General Services Administration and the Voice of America • video/audio services via satellite.

#### RCA CYLIX COMMUNICATIONS NETWORK SERVICES

800 Ridge Lake Boulevard, Memphis, TN 38119 • 901-761-1177.

#### RCA Cylinx Network

**Service** • value-added, medium-speed satellite packet-switching network services • data/message nonvoice transmission • combination leased-line and satellite network consisting of RCA Cylinx-owned remote earth stations connected via high-speed satellite links through central switching facility located in Memphis, TN • direct terrestrial connections between remote sites for medium-to-high volume usage • user terminal-access speeds for 4800 or 9600 bps; host access to 9600 bps • end-to-end network management services • protocol conversion • supports IBM 3270 SDLC/BSC, Burroughs Poll/Select and an internal proprietary protocol for handling mini-based systems CCITT X.25.

**Access** • users connect to remote stations using multipoint or point-to-point dedicated leased lines • direct lines to remote station can be installed where user is located near that remote station • 35 remote stations currently located nationwide.

**Pricing & Other Features** • based on factors associated with number of drops on network, number of characters transmitted each month and flow rate characteristics of lines • host to host connection requires \$1,000 installation fee plus \$1,300 monthly access charge • host to remote terminal locations requires \$425 installation fee plus monthly access charge of \$450 for 1 to 9 locations; \$425 for 10 to 49 locations; \$370 for 50 and over locations • no mileage charges; access lines, modems, and station termination are included in RCA Cylinx fees • optional features/charges: spare VSM modem \$120 monthly; diverse host routing \$1,000 installation fee, monthly access charge, vendor quoted; remote terminal relocation, \$265/\$425 (inside/outside) installation charge.

#### SATELLITE BUSINESS SYSTEMS (SBS)

8283 Greensboro Drive, McLean, VA 22102 • 703-442-5000.

#### SBS Communications Network Service CNS-A & CNS-B

**Service** • switched and dedicated, voice-grade and wideband channels • service entails placement by vendor of multiple Network Access Centers (NACs) on customer premises • service designed to handle intra-corporate data and voice communications needs of large organizations • service uses satellite bandwidth of 2 SBS-owned satellites, supplemented with terrestrial extension channels leased from other common carriers

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when required • point-to-point or multipoint configurations supported • dedicated or switched analog voice channels at 32K bps, and digital data channels at from 2400 bps to 3.088M bps.

**Access** • direct from customer devices to Connection Arrangement Units (CAUs), which interface device to NAC • service points may be established by vendor extending access area of the NAC • NAC has throughput capacity of 25.5M bps • variety of CAUs available depending on whether attached device is for voice or data, switched or dedicated channel • for planning, NAC can nominally handle 738 voice-grade, analog CAUs simultaneously, or equivalent in digital data units • SBS earth stations offer variety of diagnostic and management functions.

**Pricing & Other Features** • based on individual customer configurations • basic traffic unit is 224K-bps simplex satellite transponder capacity or the equivalent in analog voice channels at 32K bps per channel termed Transmission Unit (TU) • TU can be Full Business Day Transmission Unit (FBTDU), Full-Time Transmission Unit (FTU), Nonbusiness Day Transmission Unit (NTU) for CNS-B only, Demand Transmission Unit (DTU), when traffic requirements exceed capacity regularly leased • FBTDU monthly charge is \$2,250; FTU monthly charge is \$2,550 (CNS-A) or \$2,400 (CNS-B); NTU monthly charge is \$600; DTU charge is \$0.016 per second • Network Access Center (NAC) consists of satellite earth station antenna, transceiver, and controller: CNS-A must contract for at least 3 NACs \$11,500 shipment charge plus \$17,850 per month per NAC; CNS-B maximum of 2 NAC \$11,500 shipment charge plus \$13,000 per month per NAC • Connection Arrangement Unit (CAU) is required to access a NAC or SBS Service Point; nonswitched digital CAUs range from 2400 bps to 3.088M bps, each requires \$200 installation fee plus monthly service charge from \$150 to \$3,000; switched digital CAUs range from 2400 bps to 3.088M bps, each requires \$200 installation fee plus monthly charge from \$200 to \$3,300; Analog CAUs available in 3 types: Type A1 used for nonswitched analog connections; Type 3A used for switched (dial-up) analog connections; Type 3A uses automatic connection feature of NAC to establish switched connection between 2 stations specified by customer • CNS-A, all type analog CAUs require \$100 installation fee plus \$100 to \$70 per month charge depending on amount; CNS-B require \$100 installation fee plus \$275 per month charge • Intra-NAC facility link, connection between NAC center and antenna requires \$1,000 installation fee plus \$13 per foot charge • Bulk Encryption uses Data Encryption Standard (DES) algorithm to encrypt all customer traffic between NACs, available to CNS-A customers only, requires installation fee plus \$4,120 per month charge, per NAC.

#### □ SBS Message Service I (MS-I)

**Service** • switched interstate voice communication service allows business users in the contiguous U.S. to place calls to any telephone in the contiguous U.S., Puerto Rico, and U.S. Virgin Islands using SBS-owned and operated switching center • service available in over 150 cities.

**Access** • access is provided through SBS-furnished dedicated access channels from customer's serving vehicle (PBX, CENTREX) to a nearby MS-I Switching Center • transmitted through space via satellite to closest designation with egress to called station through ENFIA or WATS, provided by SBS.

**Pricing & Other Features** • per minute charge based on call destination, volume, and time of day • business day rates are in effect from 8:00 AM to 5:00 PM, Monday through Friday; nonbusiness hours from 5:00 PM to 8:00 AM weekdays and 24 hours on weekends and holidays • called destinations divided into 3 tiers with billing done on per minute basis • Tier I covers 20 major cities, usage hours based on average total hours of use per access channel; charges per minute for business hours range from \$0.2803 for 0 to 49.99 hours to \$0.2040 for 250 or over hours; nonbusiness charge per minute is \$0.11 • Tier II consists of the local calling areas of 130 additional frequently called cities: per minute charges for business hours range from \$0.3059 for 0 to 49.99 hours to \$0.2275 for 250 and over hours; nonbusiness charge per minute is \$0.13 • Tier III covers remainder of the contiguous U.S., Puerto Rico, and the Virgin Islands; charges per

minute for business hours range from \$0.3346 for 0 to 49.99 hours to \$0.2832 for 250 and over hours; nonbusiness charges per minute range from \$0.2075 for 0 to 49.99 hours to \$0.1756 for 250 and over hours • minimum monthly total usage charge of \$400 or 50 hours • minimum service period for access channels is 30 days; minimum service period outside access channels local area is telephone applicable; \$12 per month administrative charge plus charges of other common carriers for extended access channel terminated outside of Tiers • Co-Located Access Channel requires \$105 installation fee plus \$22 per month • Local Access Channel requires \$105 installation plus \$86 per month.

#### □ SBS Skyline Service

**Service** • voice-oriented, interstate long-distance telephone service • for residential/small-business user calls in contiguous U.S., Puerto Rico, and U.S. Virgin Islands • calls satellite transferred to earth station near destination, with routing through telephone company terrestrial lines • competitive with AT&T DDD, MCI SuperSaver, and several GTE Sprint services.

**Access** • tone-generating-type phone to SBS switching center • available in 31 cities; will be implemented in other cities later.

**Pricing & Other Features** • based on time of day, day of week, location and duration of call • \$16 one-time access charge • \$15 per month minimum monthly usage charge • weekday from 8:00 AM to 4:59 PM inclusive Monday through Friday; weekday evening 5:00 PM to 10:59 PM inclusive Monday through Friday; late night/weekend 11:00 PM to 7:59 AM inclusive Monday through Friday, and 24 hours Saturday and Sunday • \$0.25 to \$0.39 weekday rate; \$0.13 to \$0.18 weekday evening rate; \$0.10 to \$0.14 late night/weekend rate.

#### ■ SOUTHERN PACIFIC COMMUNICATIONS CO (SPC)—see GTE SPRINT

#### ■ STARNET CORPORATION

654 Madison Avenue, Suite 1509, New York, NY 10021 • 212-752-9402.

#### □ Starcall

**Service** • metered long-distance telephone service, outbound only, similar to AT&T's Out-WATS • voice-grade analog circuits also accommodate data traffic at rates up to 1200 bps with conventional modem equipment; employs echo-cancellers for enhanced voice traffic and data traffic over satellite links • employs Starnet satellite and landline circuits, plus AT&T and other carrier services in cities not equipped with Starnet (Starswitch) nodes • least-cost traffic routine, with a greater emphasis on satellite circuits • record call data optionally available • line conditioning not available • data rates up to 1200 bps.

**Access** • via dial-out or dedicated access line to a Starswitch node, direct from user premises, in the 48 contiguous states and Hawaii • 40 major cities with Starswitch nodes, 75 cities planned • modem required to interface terminal/computer equipment • dial-out (versus dedicated) service requires Starnet-provided autodialer; service typically accessed by dialing 2 digits and the 7-digit phone number.

**Pricing & Other Features** • based on usage connect time and time of day • ranges from \$0.14 per minute night rate for Starswitch node cities to \$0.34 per minute day rate for other inter-exchange carrier facilities to non-Starswitch node cities; ranges from \$0.262 per minute night for 0 to 15 hours to \$0.34 per minute over 80 hours for Alaska and Hawaii • monthly minimum charge of \$150 per line • installation charge \$120 per line for dedicated access; \$25 per order service initiation for private access; \$60 per dialer (up to 5 dialers) for dial-up access; no installation charge for customer owned and maintained equipment • auto-dialer option for dial-up service \$10/\$20 per dialed per month (push button/rotary dial).

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#### ■ TELECOM CANADA

410 Laurier Avenue West, Ottawa, ON K1P 6H5 • 613-560-3030.

#### □ Telecom Canada Dataroute

**Service** • all-digital dedicated channels analogous to Dataphone Digital Service (DDS) in the U.S. • supports synchronous data rates at 2400/4800/9600/19.2K/56K bps; asynchronous data rates up to 1200 bps • point-to-point or multipoint • available in 82 Canadian cities, with access to DDS in the United States • line conditioning not required.

**Access** • direct from user premises to Dataroute facility; vendor provides tie-line and data service unit (DSU), required to convert unipolar signaling of computer/terminal equipment to/from bipolar signaling of Dataroute network • other modem equipment not required.

**Pricing & Other Features** • based primarily on data rate and distance, plus a monthly access fee • Dataroute International provides digital, leased-line data service between Canada and the U.S.; it connects Telecom Canada's Dataroute to AT&T Communications' Dataphone Digital Service • connection to DDS network incurs additional charges from AT&T at variable rates (see AT&T entry) • Dataroute Multistream serves customers who require multiple, medium-speed synchronous circuits between 2 or more Dataroute serving areas; it allows derivation of up to 4 sub-channels from one channel operating at 4800 to 9600 bps.

#### □ Telecom Canada Datapac

**Service** • packet-switched, value-added data network • switching nodes in over 84 Canadian cities interconnected by digital terrestrial microwave links, with gateways to other worldwide VAN networks and carrier services including Tymnet and Telenet in the United States • supports X.25 full-duplex synchronous communication; supports ASCII and IBM BSC (batch or interactive) communications through vendor-supplied PAD and BPAD devices • value-added features include alternate routing, and end-to-end error control • network internal error rate approximately 1 in 10 billion data packets transmitted • optional electronic mail service; online directory/database service available through iNet 2000.

**Access** • via public dial or leased line direct from customer premises, depending on the service; leased line options include private dial or dedicated access • closed user groups available • access support for X.25 synchronous protocol from 1200 to 9600 bps; ASCII and asynchronous poll/select (ISO) protocols up to 1200 bps; IBM 2740 Mod II, 3270 BSC, and HASP up to 9600 bps; IBM 2780/3780 up to 4800 bps • host support via software module (DAS) for user-supplied IBM 3704/3705 front ends; features optional X.25, ITI, or 3303 interfaces • 38 foreign countries can access Datapac (one-way); Canadian Datapac users can access X.25 networks (2-way) in Austria, Belgium, Denmark, Finland, France, French Antilles, Germany, Greece, Hong Kong, Ireland, Japan, Luxembourg, Netherlands, Norway, Singapore, South Africa, Spain, Sweden, Switzerland, United Kingdom, Hawaii, and continental U.S.

**Pricing & Other Features** • cost for transmitting 1,000 packets (each 256 characters max) ranges from \$0.21 to \$13.41 depending on distance (for Canadian subscribers only, in Canadian dollars; foreign subscribers billed by their respective country/carrier) • dial-in access charge of \$0.0278 per minute • leased-line access charges range from \$45 to \$435 per month; access equipment charges range from \$0.39 to \$0.69 per 1K characters transmitted; service charges and closed user group option fees also apply • host/front-end support Datapac Access Software (DAS) charged at \$500 to \$600 per month, plus \$500 to \$600 service charge • Canadian access charges to Tymnet/Telenet services, in addition to fixed monthly rates for Datapac access lines and options, ranges from \$1.85 to \$6.75 per kilopacket (128 characters per packet) for X.25 terminals and from \$3.60 to \$8.70 per kilopacket for ASCII terminals; holding time charges range from \$4.50 to \$5.70 per hour for public dial ports (110-1200 bps) • U.S. access charges to Datapac are approximately the same for Telenet; Tymnet charges at \$0.07 to

\$0.25 per kilocharacter; holding time charges also apply; U.S. charges billed in addition to fixed monthly rates for U.S. access lines.

#### □ Telecom Canada Datalink

**Service** • switched network for data traffic • supports digital transmissions over microwave circuits • supports data at 2400/4800/9600 bps • transparent to protocols • itemized monthly billing, closed user groups available, equivalency, reversed billing.

**Access** • dedicated access • data does not require user-provided modem; digital communications equipment required • optional vendor-provided equipment: automatic calling unit • supports outbound traffic in unattended mode • can access 62 cities across Canada and other locations via offnet extensions.

**Pricing & Other Features** • requires \$150 installation fee; access charges range from \$130 (2400 bps) to \$370 (9600 bps); traffic charges range from \$0.12 per minute at 2400 bps for least distance to \$1.09 per minute at 9600 bps for greatest distance • volume discounts of approximately 30 percent apply after 500 minutes transmission on per line basis.

#### □ Telecom Canada Envoy 100

**Service** • value-added network supports message traffic • supports data at rates up to 1200 bps • value-added network features X.25 packet switching; protocol conversion; computer-based electronic messaging service; backbone network Datapac • messages sent to nonsubscribers via the national stream Envoy Post electronic mail/delivery service; service to U.S. via EMCA.

**Access** • from asynchronous 110 to 1200 bps ASCII or bisynchronous 3780 EBCDIC devices via TWX, PSTN, or Datapac networks • supports inbound and outbound traffic via Datapac across Canada, the U.S. via Telenet and TYMNET, or international packet networks worldwide via Datapac International.

**Pricing & Other Features** • corporate service based on monthly fixed rate of \$20; plus usage and storage charges and \$3 per user-ID • individual user service based on monthly fixed rate of \$5 and usage and storage • Envoy Post rates consist of Envoy 100 usage charges, plus a flat rate for delivery per message: \$1.10 (Basic delivery-next business day); \$2.16 (special delivery-same business day); \$1.60 (delivery to U.S.) • Envoy Post message storage charge is first 5 days free then \$0.05 per 1K characters per day.

#### □ Telecom Canada Conference 600

**Service** • switched network • supports 2-way interactive color video traffic • digital transmission via satellite circuits (ANIK C) • dedicated circuits are wideband T1 • satellite network supports point-to-point; vendor leases transponder capacity from another vendor • provides error detection/correction; 7 network nodes expanding to 19 by 1987.

**Access** • dedicated access • supports inbound and outbound traffic • digital service, but has analog access, provided on 0.25-mile increment basis • is currently accessible from Vancouver, Calgary, Edmonton, Toronto, Quebec City, Montreal, and Ottawa.

**Pricing & Other Features** • access charges vary depending on method of provisioning and member company • traffic charges are distance and usage sensitive; charges per increments of 0.5 hour are from \$125 per conference call to a maximum of \$500 per call for distance of 1,800 miles • picture processor included in traffic charge, rooms and access separate.

#### □ Telecom Canada Multicom 1

**Service** • switched network • supports voice and data traffic • analog transmission via satellite • supports data at rates up to 2400 bps • voice-grade dedicated circuits provided; line conditioning available • abbreviated dialing.

**Access** • dial-up (DDD) access via auto-dialer • requires modem

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which may be user or Telco provided • access available throughout Canada wherever DDD is available.

**Pricing & Other Features** • requires \$40 installation fee plus \$75 to \$100 for AAA (modem) if Telco provided • \$134 per month traffic charges range from \$0.16 per minute to \$0.89 per minute.

**Telecom Canada Teletex**

**Service** • switched value-added network • supports message and document transfer • supports analog transmissions via satellite circuits • supports data at a rate of 2400 bps • line conditioning available for voice-grade dedicated circuits • value-added network features: X.25 packet switching; supports CCITT Teletex K protocol; allows conversion to/from TWX, International Telex, ASCII; document storage will be available with an impending conversion facility • Teletex is a business communication service that allows vendor-supplied office text machines to intercommunicate • conforms to the CCITT International Teletex standard • switched voice network value-added features: least-cost routing; abbreviated dialing; simultaneous typing and receiving, unattended operation.

**Access** • dial-up (DDD) access from virtually anywhere in Telecom Canada territory data supported requires user-provided Teletex terminal • supports both inbound and outbound traffic.

**Pricing & Other Features** • regular DDD charges for installation; charge for 1FB access line plus a monthly accreditation charge for the conversion facility; free local usage in most locations • optional features include: full range of terminals; choice of character pitches, line spacing, type; forms capability; password message capability to protect document; timed delivery abbreviated address calling; multiaddressing; encryption • will eventually intercommunicate with services such as certain Datapac services, TWX, U.S. Telex/TWX and International Telex.

**TRT TELECOMMUNICATIONS CORPORATION/  
Subsidiary United Brands Co**

1747 Pennsylvania Avenue, NW, Washington, DC 20006 • 202-862-4500.

**TRT Telex Service**

**Service** • low- to medium-speed switched record service • data rates from 50 to 4800 bps • utilizes DDD network, and other Telex networks; compatible with Western Union Telex/TWX service at 50, 75, 100 bps • designed for textual message traffic between subscribers; no low-speed error checking/detection • options include high-speed (up to 4800 bps) store-and-forward message service; 300-/1200-bps "mailbox" service for batched message transmission; answerback service with call-complete verification; abbreviated dialing codes; broadcast service for up to 8 locations • telegram service available • customized data networks/leased data channels from 50 to 3.088M bps, including alternative voice data, available from vendor.

**Access** • via vendor-supplied dedicated tie-line, WU Telex/TWX or public dial-in • ubiquitous access from/to U.S. and most international locations • accommodates standard Telex/TWX terminals, or vendor-supplied Constellation Series terminals ranging in size and performance • specialized interfaces accommodate user terminal and computer equipment including PCs and word processors.

**Pricing & Other Features** • based primarily upon connect time (usage) • minimum usage 1 minute • pricing for dedicated access within the contiguous U.S. is \$0.3475 per minute (TRT), \$0.47 per minute (Telex I), \$0.525 per minute (TWX); DDD access (up to 4800 bps) ranges from \$0.4975 to \$0.8975 per minute, depending upon speed/type of service • store-and-forward pricing same as for dedicated users; DDD delivered over the DDD charged an additional \$0.035 per one-tenth minute • store-and-forward for domestic Telex charged an additional \$0.15/\$0.40 per call (Telex I/TWX) over the DDD • calls outside the contiguous U.S. range from \$0.3475 per minute (Hawaii) to \$2.90 per minute (American Samoa) • international calls range from \$0.78 to \$2.92 per minute; some international countries incur a 3-minute minimum • additional charges for dedicated

access lines and terminal equipment • Direct Satellite Access (DSA) for high-speed data overseas • international and domestic Packet-Switching access • format, speed and protocol conversions • nationwide customer/field service groups • sales offices in most major U.S. cities and international countries.

**TYMNET, INC**

20705 Valley Green Drive, Cupertino, CA 95014 • 408-446-6000.

**Tymnet Packet-Switched Data Service (PSDS)**

**Service** • data/message nonvoice transmissions • public and private dedicated networks • error detection/correction, speed/protocol/code conversion; alternate routing • supports interconnection of various host processors and asynchronous terminal types • protocol support for SDLC, HDLC, X.3, X.25, X.75, X.27, X.28, X.29, 3270 BSC, and 3270 DSP.

**Access** • local dial-up from over 400 domestic and over 50 international metropolitan areas for asynchronous transmission at 300 to 1200 and 2400 bps; asynchronous transmission at 2400 to 9600 bps • asynchronous access via public dial-up network ports or private ports using dial-up leased lines • speeds up to 56K bps under special arrangement • WATS and Foreign Exchange access available.

**Pricing & Other Features** • based on network usage; usually combination of connect time (for dial-up customers) and volume of characters transmitted • minimum monthly operating costs \$658 per month consists of \$300 per month for X.25 Tymnet/host interface; \$250 per month for traffic charges; \$100 per month for customer account charge; and \$8 per month for user names • peak connect time charges range from \$4.25 per hour (high-density access center) to \$5.00 per hour (low-density access center) • if accessed via WATS, connect-time charge is \$18.75 per hour for peak time • off-peak connect time ranges from \$1.50 per hour (high-density access center) to \$1.25 per hour (low-density access center) • if accessed via WATS connect time charge is \$15 per hour for off-peak time • dial-up service includes switched business line and one modem at Tymnet facility requires \$500 installation charge and ranges from \$250 per month (high-density city/110 to 1200 bps) to \$325 per month (high-density city 2400 bps); \$400 per month (medium-density city/110 to 1200 bps); rotary access \$12 per month • leased line service requires \$500 installation fee plus \$200 per month (high-density city 110 to 1200 bps) to \$250 per month (high-density city 2400 bps); \$350 per month (medium-density city 110 to 1200 bps); permanent virtual circuit requires \$200 installation fee plus \$50 per month • Tymnet asynchronous terminal service requires \$200 to \$600 installation fee plus \$225 to \$550 per month depending on density and number of ports • dedicated network connections require \$250 installation fee plus \$800 to \$1,500 per month depending on data rate • Tym-Link express service requires \$300 installation fee plus \$164 per month • traffic charge is \$0.05 to \$0.01 for 50K to 200K characters transmitted per month • asynchronous host interfaces range from \$300 to \$2,000 per month depending on number of ports supported plus installation fee ranging between \$100 to \$600 • asynchronous terminal interfaces require installation fee between \$100 to \$600 plus monthly charge between \$150 and \$2,000 depending on number of ports supported • synchronous host interface requires \$750 installation fee plus \$300 per month charge • synchronous terminal interface requires \$750 installation fee plus \$300 per month charge • asynchronous terminal concentrator requires \$900 installation fee plus \$900 to \$1,300 per month charge depending on number of ports • Micro-Engine requires \$650 installation fee plus \$300 per month charge; Mini-Engine and Engine requires \$1,400 installation fee plus \$700 per month charge.

**UNINET, INC/Subsidiary United Telecom Communications, Inc**

2525 Washington, Kansas City, MO 64108 • 816-221-2444.

**Uninet**

**Service** • value-added packet-switched network for interactive/

## North American Carrier & Network Services

### Dedicated Channel, Packet-Switched, Value-Added, Switched & Residential Services

batch data • terrestrial facilities and satellite links • Uninet-supplied modems and PAD connection devices for dedicated service; leased host interface processor required to connect user host to Uninet • supports several bisynchronous-type (batch) protocols at data rates to 56K bps, requiring dedicated wideband access channel; dial-up synchronous access to 4800 bps • supports single asynchronous or multiplexed asynchronous channels at 110-to 1200-bps data rates • dial-up, dedicated or WATS access • features end-to-end error detection/correction, protocol/speed conversion, and optional dial back-up • full support for CCITT Recommendations X.25, X.3, X.28, X.29, and X.121.

**Access** • public dial-up, private access, private leased access, or terminal-packet network adapter (T-PNA) facility • available in 332 cities throughout U.S. and 40 countries worldwide • Network Control Center in Kansas City, MO • Interregional Switching Node (RSN) connect various regions; Intraregional Switching Node (ISN) provides local switching within a region and act as gateway to RSNs; Interconnect Nodes (ICN) provides interface between internal switching network and X.25 public network interface; Packet Network Adapters (PNA) provide asynchronous interface to network.

**Pricing & Other Features** • based on host to network connection, customer terminals to network connection, and usage • synchronous transmission rates for 2400/4800/9600 bps range from \$350 (1 mile) to \$650 (81 to 100 miles) per month plus \$450 installation fee; \$650 per month plus \$1.25 per mile over 100 miles (101 to 1,000 miles); \$1,775 per month plus \$0.70 per mile over 1,000 miles • synchronous network connection \$600 per month (up to 8 ports); \$800 per month (up to 16 ports plus \$1,000 installation fee; each 16 ports installed concurrently \$800 per month plus \$200 installation fee • dial back-up \$200 per month • prime time access \$3.50/\$6.50/\$9.50 (high/medium/low density) per hour; nonprime time access \$1.75/\$3.25/\$4.75 (high/medium/low density) per hour with no minimum usage; nonprime time access \$1.10 per hour all densities with \$5,000 minimum usage; WATS access \$23 per hour • private dial-up (asynchronous 110-1200 bps) \$300/\$500 (high/medium density) per month plus \$500 installation fee • asynchronous transmission rates for 110/300/1200 bps ranges from \$275 (1 mile) to \$575 (81 to 100 miles) per month plus \$450 installation fee; \$575 per month plus \$1.25 per mile over 100 miles (101 to 1,000 miles); \$1,700 per month plus \$0.70 per mile over 1,000 miles • synchronous transmission rate \$900 per month plus \$500 installation fee • prime time access per kilocharacters range from \$0.05 (first 25,000 kilocharacters) to \$0.01 (over 250,000 kilocharacters); nonprime time access \$0.005 per kilocharacter with \$5,000 minimum usage charge • rate reductions and various discount plans available.

#### ■ THE WESTERN UNION TELEGRAPH COMPANY (WU)

One Lake Street, Upper Saddle River, NJ 07458 • 201-825-5000.

#### □ WU Telex/TWX Network

**Service** • low-speed switched record service • data rates at 50 bps (Telex) and 110 bps (TWX) asynchronous, half-duplex • can be used for "conversational" mode message exchange • store-and-forward message service available (InfoMaster) • EasyLink option provides store-and-forward communication between word processors, personal computers, teleprinters, and Telex/TWX terminals in the U.S., or between Telex terminals internationally • not designed for data; no error checking/detection • designed for textual message traffic between network subscribers • printed and online directory of subscribers available • several free online databases (weather, stocks, etc) • Telex-to-TWX communications supported • network costs distance-insensitive.

**Access** • by leased line from customer premises • line provided by WU although typically supplied by phone company • local access (at flat monthly rate) available in over 1,640 "exchange" cities • terminals may be leased or purchased from WU • variety of other terminal vendors manufacture "Telex/TWX-compatible" terminals • Telex or TWX line may be terminated at customer

computer, but special interface, available only from independent electronics suppliers, required • Telex recommended for international traffic.

**Pricing & Other Features** • based primarily on connect time (usage), with associated charges for access lines and optional terminal equipment • \$0.3775 per minute (Telex); higher charges ranging up to \$1.5098 per minute (Alaska) for connection outside the continental U.S. • \$0.43 per minute (TWX); higher charges ranging up to \$0.85 per minute (Canada) for connection outside the continental U.S. • \$0.80 per minute for Telex-to-TWX • access line charges \$34 to \$44 mo depending on exchange city, plus \$100 installation; customers remote from an exchange city pay additional leased line charges • terminals cost from \$60 to \$89 month depending on type, plus \$100 installation • separate pricing for InfoMaster and EasyLink electronic mail services.

#### □ WU Metro-Fone

**Service** • switched voice service akin to USTS Longer Distance Service, SPC SPRINT, etc • alternative to AT&T DDD and WATS • provides switched voice-grade connections; applicable to analog data transmission, but limited to 300 bps • itemized billing, management control, nationwide coverage • no value-added features; no line conditioning available • options include automatic and abbreviated dialing.

**Access** • typically via dial-up from customer's premises, although dedicated line access supported in New York, Chicago, Los Angeles, San Francisco, Cincinnati, and Dallas • modems required for data transmission are customer responsibility • currently local access to Metro-Fone available in about 130 major metropolitan areas.

**Pricing & Other Features** • distance and connect-time based • charges for dial access range from \$0.20 to \$0.42 per minute (regular daytime rates) and from \$0.17 to \$0.50 per minute (leased-line access) • rates drop by 20 percent for high-usage customers (over 100 hours per month) • in addition, discounts for night and weekend usage up to about 60 percent • 1 minute increments; 30 seconds for leased line access • leased access line is \$85 mo, plus \$60 for installation • authorization codes for dial access cost up to \$3.00 month, depending on geographic restrictions • minimum usage charge per month is \$40 per dial-up port and \$250 for leased line • options such as abbreviated and automatic dialing priced separately.

#### □ WU Private Line Services—Low-Speed Data Channels

**Service** • leased channels for data rates up to 300 bps • point-to-point and multipoint configurations supported • bandwidth will not support alternate voice applications • facilities are terrestrial and analog; no value-added features; no line conditioning available • costs about 15 to 20 percent less than comparable AT&T Series 1000 channels for customers in local areas of WU exchange centers.

**Access** • via leased line direct from customer premises • user pays flat monthly fee for access if in local area of WU exchange center; those outside local exchange center area will typically require facilities of another common carrier, billed by WU at carrier rate • locally accessible in over 300 WU exchange cities • broadcast service offered for transmission at 300 bps and below which permits single station to address multiple addressees in different areas.

**Pricing & Other Features** • based on data rate and distance traversed by channel • 75-bps channel costs \$1.49 per mile per month (first 70 miles) dropping to \$0.60 per mile per month (over 150 miles) • mileage charges slightly higher if 1 station outside exchange city area ("off-net") • access center termination charges range from \$42 to \$45 month, depending on channel speed • station termination charges (at user premises) range from about \$60 to \$70 month, also depending on line speed • additionally one-time installation charges of \$90 per station • broadcast features priced separately and based on geographic region.

#### □ WU Private Line Services—Voice-Grade Channels

**Service** • leased voice-grade channels • alternative to AT&T

## North American Carrier & Network Services

### Dedicated Channel, Packet-Switched, Value-Added, Switched & Residential Services

Series 2000 channels; offers significantly cheaper mileage rates for short-distance channels as long as user stations are within exchange area of WU access center • channels may be used for voice or data, or for alternate voice and data (at premium station-termination charge) • facilities are terrestrial and analog; line conditioning available that supports data rates up to 9600 bps • stations located outside of local area of exchange center require leased line acquired from other common carrier (typically AT&T).

**Access** • via leased line from customer premises • line arranged by WU if near exchange center; if outside exchange area, access facilities provided by other common carrier at that carrier's rate • over 200 WU exchange centers serve most major metropolitan areas • several types of line conditioning are available, depending on configuration (point-to-point or multipoint) • multiplexing and modem equipment available from WU (Datacom service, akin to AT&T's Datrex).

**Pricing & Other Features** • based on distance traversed by channel • voice, data, and alternate voice/data over WU-owned lines per channel: 1 mile \$70; 2 to 51 miles \$70 plus \$1.45 over 1 mile; 51 to 100 miles \$141.05 plus \$1.20 per mile over 50 miles; 101 to 500 miles \$201.05 plus \$.90 per mile over 100 miles; 501 to 1,000 miles \$561.05 plus \$.75 per mile over 500 miles; 1,001 to 1,500 \$936.05 plus \$.60 per mile over 1,500 miles; over 1,501 \$1,235.05 plus \$.55 per mile over 1,500 miles • nonrecurring channel installation charge of \$127.60; relocation or reconfiguration charge of \$63.80 per channel end • \$19.25 per month for unlisted station • channels not provided over WU-owned facilities are assessed by carrier-providing facilities.

#### □ WU Satellite/Wideband Channels

**Service** • voice-grade and wideband, switched and dedicated channels; carrier network services • switched and leased network services for teleprinter, data, facsimile, and voice communication • television program transmission services • satellite transponder leasing services • customer-owned earth station services • data-only service from 75 bps to 4800 bps for point-to-point transmission; to 9600 bps, subject to approval by WU • Wideband in bandwidths of 48 KHz or 240 KHz • 48-KHz alternate voice/data provides alternate voice/data channel with bandwidth equivalent to 12 voice-grade channels for data transmission at 50K bps.

**Access** • voice-grade channel access to network via W & R (wire and repeater) rooms in 26 major metropolitan areas • data-only via satellite and conditioned voice-grade landline channels • extended local access arrangements via other common carriers • wideband services available in 6 major metropolitan areas.

**Pricing & Other Features** • based on distance traversed by channel and monthly station terminal charges • city pairs are in 3 categories: 1, 2, and 3 • monthly rentals range from \$925 for Category 1 to \$580 for Category 3; reduced monthly channel rates offered for Categories 1 and 2 for 12-month rental commitment; discounts range from \$825 for Category 1 to \$615 for Category 2 • \$60 installation fee required for voice-grade analog channels • monthly station terminal charge \$60 for voice-grade only, \$50 for data only, \$85 for alternate voice/data, plus \$60 installation fee • monthly echo canceller for basic unit \$40, plus \$30 installation fee; tone disabler/bypass option requires \$35 installation fee, no monthly charge • monthly channel conditioning charge \$5 for Type C1; \$19 for Type C2; \$30 for Type C4 • monthly rental for 48-KHz Category 1 is \$9,900; Category 2 is \$7,400; Category 3 is \$4,950; for 240-KHz

Category 1 is \$40,300; Category 2 is \$30,500; Category 3 is \$20,150 • \$100 installation fee for Wideband • whole transponder service provides exclusive use of Westar satellite transponder on month-to-month basis or fixed-term basis, at lower cost • video channels offered for transmission, in one direction only, of standard black and white and National Television System Committee (NTSC) color signals with accompanying audio signals • customer-owned earth stations: customers may provide own earth stations and lease only a transponder or portion of transponder.

#### □ WU Spacotel

**Service** • voice-oriented, point-to-point service • uses voice-grade satellite channels with terrestrial access lines • channel cost includes basic volume of usage (900 minutes per month); customer pays for connect time in excess of basic allowance • no switching or line conditioning available; data rates limited to 4800 bps • service provides for cheaper point-to-point, long-distance, high-usage voice connections than Bell switched network (DDD).

**Access** • via leased line from customer premises • access lines typically supplied by WU and included in channel charges for customers in local area of Spacotel access center (currently about 20 locations serving major metropolitan areas) • customers outside of local area pay for extension access line, whether provided by WU or other common carrier • channels available 24 hours per day, 7 days per week • modem required for data transmission.

**Pricing & Other Features** • distance and usage based • connect time in excess of 900 minutes per month (15 hours) billed at \$0.20 per minute, in one-tenth-minute increments regardless of channel distance • channel costs range from \$300 to \$350 month, depending on distance • additional \$25 month charge if channel terminates at user PBX • installation charges for channel termination at user premises are \$80 for initial station, \$25 for extensions.

#### ■ WORLDNET COMMUNICATIONS, LA

9109 Wilshire Boulevard, Suite 700, Beverly Hills, CA 90210 • 213-859-0339.

#### □ Store-&-Forward Message Delivery

**Service** • switched network for message traffic • supports analog/digital transmission • backbone facilities comprised of microwave supports data at rates up to 4800 bps; estimated error rate of 1 bit in 1 million • inter-LATA; intra-LATA • voice-grade dedicated circuits, line conditioning available • provides customer earth stations • X.25 packet switching; alternate routing; protocol conversion; error detection/correction; 2 network nodes; store-and-forward message; switching and delivery for international messages; supports Baudot, ASCII, IBM 2780/3780, X.25 protocols.

**Access** • via dial-up and dedicated lines • data requires user-provided modem • supports inbound and outbound traffic • no mileage restrictions for dedicated access • Beverly Hills, domestic access location; London, England international access location.

**Pricing & Other Features** • based on traffic charges which vary depending on location of receiver.

• END