facsimile and data (from 1,000 to 3,000 words per minute); 16 kHz for high fidelity radio program transmission and facsimile; and 48 kHz for high-speed computer-to-computer data exchange (51,000 words per minute) and high speed for facsimile. The four-kilohertz bandwidth is now operational and the other bandwidths will become available upon customer demand. Transmission is carried by the CN-CP microwave system using frequency diversity techniques to provide a high degree of reliability. In other words, the transmission is carried over different circuits at the same time, one being the back-up system for the other.

Each subscriber has in his office a voice-data subset which can be changed from voice to data communication. The subset features push-button "dialling" and the customer, to reach a distant point, simply keys a series of seven digits. The first three digits designate the distant exchange, the fourth digit indicates the desired bandwidth and the last three digits select the line of the desired party. A re-ring button is included so that the customer may signal the distant party to revert to voice communication during or after sending data. A feature of broadband is abbreviated keying, where customers may contact frequently called stations by pushing a two-digit code instead of the normal seven digits. Broadband will establish connections, including keying time, within five seconds, or two seconds on the special "hot-line" service. Actual connection time after keying or "dialling" is less than two seconds. Another feature of broadband is conference calling, where a subscriber, by pushing a two-digit code, will automatically contact a predetermined list of parties needed for the conference. Subscribers are charged on a "pay-as-you-use" basis.

Computer-controlled transmission systems. CN-CP Telecommunications and the Trans-Canada Telephone System operate store-and-forward message-switching computers which control the flow of message traffic. CN has operated in this field since 1964.

CN's system provides a switching medium for Air Canada, CP Air, regional air lines such as PWA, Transair, Quebecair, EPA, and CN administrative message traffic, and also controls and transmits information on CN's reservation system. To make a reservation, a computer card is marked and inserted into a card reader and a reply returns via a teleprinter confirming the reservation. A third-generation computer installed for CN in 1968 is performing major store-and-forward message switching functions for the Atmospheric Environment Service: when the computer finds a weather report from any of the 500 weather stations throughout Canada, it will tell the station equipment to transmit the report into the computer, which then determines where and at what time of the day the information is to be sent.

Commercial telegrams, entered on local CRT sets at most major offices, are forwarded by mini-computers to CN's third-generation message-switching computer complex for switching across the country.

A new time-shared, computer-directed data-and-message system called Telenet was introduced by CN-CP Telecommunications in 1971. The Telenet system controls a number of subscriber networks by central computers. The message-switching computer centres handle many customers but each customer's network is completely private. In its initial phase, Telenet will be confined to message-switching and related features such as speed and code conversions, message storage and retrieval, high-speed data handling, interface with customer-owned computers and message refile. A single message may be transmitted for delivery to as many as 32 stations by one group-routing indicator at one time. The computers recognize two levels of priority; messages marked "quick" are handled first. Message-switching computers are located at CN offices in Toronto and CP offices in Montreal and all Canadian subscribers' requirements are routed by one of these centres. Future plans call for switching-computer centres at Vancouver, Edmonton, Winnipeg and Halifax. Various options and capabilities of Telenet will enable CN-CP to custom-design a system to meet specific needs of individual subscribers.

Message-switching data service. TCTS companies provide a message-switching data service (MSDS) which controls teletypewriter transmissions by computer. Message traffic between TWX terminals and private line terminals supplied by the TCTS companies can be so controlled. Some businesses have both TWX and private line teletypewriter networks. TWX operates on a switched network of 100 words per minute and private line teletypewriters can operate at 60, 75 or 100 words per minute. In addition, the TWX and private line teletypewriters may use different codes. Normally, teletypewriters using different speeds and codes cannot communicate, but the MSDS computer makes this possible. The computer can