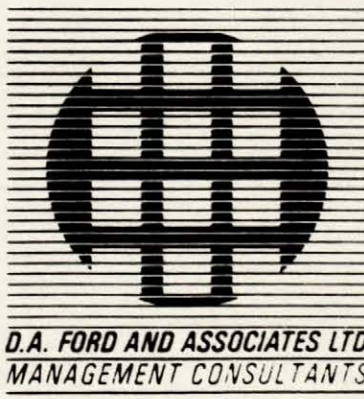

**STUDY OF CANADA-U.S. TELECOMMUNICATIONS RATE
DIFFERENTIALS**

**A STUDY CONDUCTED FOR
THE DEPARTMENT OF COMMUNICATIONS**

FINAL REPORT



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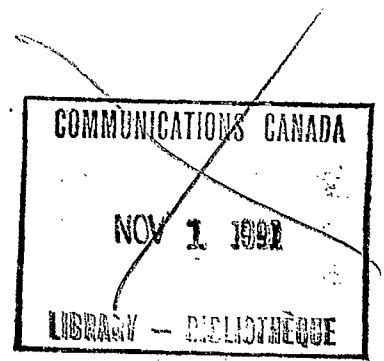


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EXECUTIVE SUMMARY

This report contains the results of a study conducted for the Federal Department of Communications in response to representations from the Canadian Association of Data and Professional Service Organizations (CADAPSO) regarding the relatively high cost of data communications services in Canada compared to the cost of similar services in the United States.

PURPOSE OF THE STUDY

The purpose of the study, as defined in the Statement of Work, a copy of which is attached as Appendix A, is to determine whether data communications costs are significantly higher in Canada than in the U.S. and if so, what impact these cost differentials might be having on research, design and development activities in the information sector. The specific sub-objectives are as follows:

- i) Compare representative sets of data communications services in Canada and the U.S., with respect to prices and availability of service offerings;
- ii) Assess the economic impacts of differentials in costs and service offerings upon different groups of firms engaged in research, design and development activities in the information sector.

APPROACH AND METHODOLOGY

The first phase of the study involved personal interviews with representatives of firms in the Canadian data processing, information service and software industries. We met with executives of CADAPSO. We also held personal interviews with representatives of small, medium and large member firms of CADAPSO. The issues explored in the interviews included actual data communications services used (traffic volumes, number of circuits, annual expenditures), the services required which are not available in Canada, and the significance of telecommunications expenditures in terms of total operating expenditures.

The second phase of the study involved the actual Canada-U.S. rate comparisons. For the data communications services used by respondents, both the current Telecom Canada and Unitel rates as well as the new rates proposed by Bell



Canada in January 1990¹ were compared with the rates for such services charged by AT&T and MCI. In the case of packet switched rates, since AT&T is not the dominant carrier, BT Tymnet rates were used in the comparison. U.S. access and other local rates were based on New York Tel rates.

Rates for the range of services used were compared in two ways. Each element of each service was compared using Canadian (existing and proposed) and U.S. rates. Then the total usage for each company interviewed was priced using the same three rating approaches.

The approach used here provides results which are valid within the context of what is being compared. The element by element comparison for data services yields a number of ratios for each service, but does not lend itself to the assessment of overall impacts. At the same time, the repricing of total company usage indicates the impact of U.S. rates and Bell proposed rates on one company, but does not provide a basis for drawing conclusions with respect to the whole population of data communication users.

OVERALL CONCLUSIONS

In spite of the concerns voiced by members of the data processing, information service and software industries with respect to the availability of telecommunications services in Canada, it is noted that companies in the sample group did not use even the full range of high speed digital services available today. Therefore the availability of services does not appear to be a significant issue.

It is further noted that the modifications proposed in Tariff Notice 3420 include a DS3 (45 Megabits per second) offering. Unitel has also filed DS2 (6.3

¹ Subsequent to the submission of the draft final report, the "proposed" rates were approved, with some minor modifications, in Telecom Decision CRTC 90-22 dated October 3, 1990, and Unitel also filed new rates which were approved by the Commission. However, for purposes of this final report, the terms "current" and "proposed" rates have been retained, with "current rates" meaning those rates in effect prior to October 3, 1990 and "proposed rates" meaning those rates proposed by Bell Canada in January 1990. A review of the calculations and analysis conducted during the course of this study has indicated that the modifications to the "proposed rates" ordered by the Commission would not have any effect on the results.



Megabits per second) and DS3 tariffs. These offerings should meet most requirements in the short to medium term.

Looking at the service-by-service rate comparisons, it is apparent that the major differences between the current and proposed rates are in high speed digital services. With respect to the Canada-U.S. comparisons, the seven times factor for T1 rates is borne out, although the proposed reductions will bring this factor to about four. Comparing packet switching rates in Canada and the U.S., enhanced packet switching services are more expensive in the U.S., but basic X.25 service is cheaper with the introduction of X-Link.

It is not appropriate to draw any overall conclusions from these comparisons. The bottom-line comparison in terms of any one user depends on the mix and volume of services offered. For this reason, a number of case studies of large and small companies has been included as part of this study. The results of repricing the mix of services used by companies included in the sample is the only appropriate way to make overall comparisons and to draw overall conclusions.

With respect to the mix of services used by the companies in the case study group, it was noted that all use data communications or facsimile services from more than one Canadian carrier. However, only one company used advanced digital services (Megastream), and none used T1 service.

The results of the repricing exercise are summarized in Table I.

Table I: Summary of Case Study Results

<u>Rating Basis</u>	<u>Case 1</u>	<u>Case 2</u>	<u>Case 3</u>	<u>Case 4</u>
Current Tariffs	100%	100%	100%	100%
Proposed Tariffs	98%	99%	103%	106%
U.S. Tariffs (\$ Cdn)	72%	123%	144%	68%

The bottom line impact of the proposed Bell/Telecom Canada tariff revisions on data communications costs for the companies in the sample is not large, ranging from a reduction of 2% to an increase of 6%.



The bottom line impact of repricing current usage based on U.S. tariffed rates on data communications costs for the companies in the sample is highly dependent on the mix of services used. Where the volume of conventional packet switched data is low, costs would decrease by almost 30%, but where the volume of conventional packet switched data is high, increases of 23% to 44% would result. In the case where X-Link is applicable, a reduction of 32% would be the result.



INTRODUCTION

This report contains the results of a study conducted for the Federal Department of Communications in response to representations from the Canadian Association of Data and Professional Service Organizations (CADAPSO) regarding the relatively high cost of data communications services in Canada compared to the cost of similar services in the United States.

PURPOSE OF THE STUDY

The purpose of the study, as defined in the Statement of Work, is to determine whether data communications costs are significantly higher in Canada than in the U.S. and if so, what impact these cost differentials might be having on research, design and development activities in the information sector. The specific sub-objectives are as follows:

- i) Compare representative sets of data communications services in Canada and the U.S., with respect to prices and availability of service offerings;
- ii) Assess the economic impacts of differentials in costs and service offerings upon different groups of firms engaged in research, design and development activities in the information sector.

DEFINITION OF THE PROBLEM

There is widespread concern among members of the data processing, information service and software industries with respect to the availability and cost of telecommunications services in Canada. Many senior representatives of the industry have criticized the carriers, policy makers and regulators publicly. For example, it has been stated that 1.5 Megabits per second (Mbps) service (T1) rates in Canada are seven times higher than the U.S. rates for this service. The lack of availability of T2 and T3 (6.3 Mbps and 45 Mbps) services has also been criticized.

In order to examine the validity of these claims and the impact of rate differentials on the competitive position of Canadian data processing, information service and software companies, this study was undertaken.



TERMS OF REFERENCE

The Statement of Work for this study is provided in Appendix A. In essence, it states that the consultant will undertake a comparison of data communications service rates in the United States with the rates for comparable services in Canada. Voice services like message toll service (MTS) and wide area telephone service (WATS) which are offered over the public switched network are not included in the study because they were studied extensively in the Sherman Task Force report on long distance competition².

The rates to be used in the comparisons are

- existing Canadian rates of Bell Canada/Telecom Canada and Unitel
- the proposed new rates filed by Bell Canada in January 1990 which are pending before the CRTC
- the existing rates of AT&T/New York Tel and MCI

APPROACH AND METHODOLOGY

The first phase of the study involved personal interviews with representatives of firms in the Canadian data processing, information service and software industries. The firms included in the survey were selected in discussions with CADAPSO and the participation of each candidate firm was requested in cooperation with CADAPSO. We met with executives of CADAPSO. We also held personal interviews with representatives of small, medium and large member firms of CADAPSO. The issues explored in the interviews included actual data communications services used (traffic volumes, number of circuits, annual expenditures), the services required which are not available in Canada, and the significance of telecommunications expenditures in terms of total operating expenditures. The interviews were conducted using a series of specific questions which were reviewed in advance with the Department of Communications.

² The report of the Federal-Provincial-Territorial Task Force on Telecommunications entitled "Competition in Public Long-Distance Telephone Service in Canada", December 1988.



The information gathered in the interviews determined the range of services for which rates would be compared. It also provided the data for use in the "case studies" for comparing the overall costs of services used by individual companies based on Canadian and U.S. rates.

The second phase of the study involved the actual Canada-U.S. rate comparisons. For the data communications services used by respondents, both the current Bell/Telecom Canada and Unitel rates as well as the new rates proposed by Bell Canada in January 1990³ were compared with the rates for such services charged by AT&T and MCI. In the case of packet switched rates, since AT&T is not the dominant carrier, BT Tymnet rates were used in the comparison. U.S. access and other local rates were based on New York Tel rates.

Rates for the range of services used were compared in two ways. Each element of each service was compared using Canadian (existing and proposed) and U.S. rates. Then the total usage for each company interviewed was priced using the same three rating approaches.

In repricing usage using U.S. rates, a number of factors had to be taken into account including:

- Taxes: In the U.S., the ad valorem taxes on telecommunications services are much lower than in Canada. However, since we are comparing rates which are or would be applied in Canada, the ad valorem telecommunications and sales taxes have been applied using Canadian rates.

³ Subsequent to the submission of the draft final report, the "proposed" rates were approved, with some minor modifications, in Telecom Decision CRTC 90-22 dated October 3, 1990, and Unitel also filed new rates which were approved by the Commission. However, for purposes of this final report, the terms "current" and "proposed" rates have been retained, with "current rates" meaning those rates in effect prior to October 3, 1990 and "proposed rates" meaning those rates proposed by Bell Canada in January 1990. A review of the calculations and analysis conducted during the course of this study has indicated that the modifications to the "proposed rates" ordered by the Commission would not have any effect on the results.



- Exchange rates: The current exchange rate at the time of the analysis (one U.S. dollar = \$1.16 Canadian) has been used to convert the U.S. rates to rates in Canadian dollars.
- The difference in rate relationships: While a company might currently be using a large number of parallel circuits between two points, it might be cheaper to use a T1 circuit in the U.S. If this turned out to be the case, then the costs for the Canadian firm's usage based on U.S. rates would include the T1 service as a substitute for the parallel circuits. In other words, it was assumed that users would make the economically rational choice.

It should be noted that the approach used here provides results which are valid within the context of what is being compared. The element by element comparison for data services yields a number of ratios for each service, but does not lend itself to the assessment of overall impacts. At the same time, the repricing of total company usage indicates the impact of U.S. rates and Bell proposed rates on one company, but does not provide a basis for drawing conclusions with respect to the whole population of data communication users.



SCOPE OF THE STUDY

This section explains what services were considered to be within the scope of the study, what services were excluded, and the reasons for these inclusions and exclusions. It also explains issues related to Canada-U.S. cross-border service rates and rating approaches which, while of concern to CADAPSO member firms, are not a result of rate differentials between Canada and the U.S.

WHAT WAS INCLUDED IN THE STUDY

The survey of four medium to large data communications users and three small data communications users indicated that the following services were used for data communications in Canada:

- Local analogue private line services
- Interexchange analogue private line services
- Local digital private line services at 1.2, 2.4, 4.8, 9.6, 19.2 and 56 Kilobits per second (Kbps)
- Interexchange digital private line services at 1.2, 2.4, 4.8, 9.6, 19.2 and 56 Kbps
- Multiple DSO services
- Packet switched data services
- Facsimile (non-MTS)

One of the four medium to large users used all the above services except facsimile. One used only packet switched services, with no dedicated or private line data. Two used a mixture of dedicated digital and packet switched services.

Of the three small firms interviewed, one used a dedicated facsimile service. No other non-MTS data services were used by any of the small companies.

It will be noted that none of the companies interviewed used T1 services. This was somewhat surprising in view of the size of the firms. One firm used a



large number of parallel voice grade analogue channels between major network nodes for voice and data transmission. However, since the methodology developed for this study provided for the use of the most cost-effective solution, the U.S. rates for T1 service were included in the comparison.

WHAT WAS EXCLUDED FROM THE STUDY, AND WHY

The study was initiated in response to submissions from CADAPSO with respect to rates for data communications services. Accordingly, voice communications services such as MTS and WATS, and basic local services, offered over the public switched network, were excluded from the study. The basis for the decision to exclude voice services from the scope of this study was that they were studied extensively in the Sherman Task Force report on long distance competition.

With those exceptions, all telecommunications services used by the companies interviewed were considered in the study.

It should also be emphasized that the purpose of the study was not to compare the rates charged by Unitel and Bell/Telecom Canada. In fact, the use of this report for that purpose would be completely inappropriate. While Unitel competes with Bell/Telecom Canada in all the services areas under consideration in this study, Unitel and Bell/Telecom Canada rates are included in the Canada-U.S. comparison for a service only in those cases where the companies in the case study group, collectively, used the service from both carriers. For that reason, not all the data services of either Bell/Telecom Canada or Unitel are included in the study. The use of the results of this study to compare the rates charged by Bell/Telecom Canada and Unitel is also inappropriate because, as noted in the footnote on page 3 of the introduction, Unitel's filing of new rates took place after the analysis had been completed. New rates for both Unitel and Bell/Telecom Canada came into effect on December 1, 1990.

CANADA-U.S. RATES AND BORDER CROSSING ISSUES

During the initial meetings with CADAPSO, the matter of cross-border rates was raised as a matter of concern to members. Cross-border rates involve two separate considerations: Canada-U.S. rates; and the border crossing point for rating purposes. As explained below, these issues were not explored during the study.



Both Canadian and U.S. carriers have a "bill to border" policy for private line services. That is, each carrier bills the customer for the portion of the service which it provides. The Canadian carrier (Bell or Unitel or other Canadian carrier) provides the service to the international border and bills the user according to the appropriate tariff item up to the point of interconnection with the U.S. carrier (the international border), and the U.S. carrier bills the user for the service provided in the U.S. Since private line rates are of a declining block structure, i.e., the unit costs decrease with increasing length of the circuit, this means that the total rate charged for any given cross-border circuit will be greater than if a through rate on a declining block structure were used. Users in the U.S. pay the same rates when they cross the border. It is not a problem which is unique to Canadian data communications users and is therefore beyond the scope of the study.

With respect to border crossing points, the agreement between Telecom Canada and AT&T designates 11 border crossing points or gateways through which Canada-U.S traffic is deemed to flow, regardless of the physical routing of a circuit. Unitel also adheres to this border crossing policy. The border crossing used for rating purposes is the closest one to a straight line joining the ends of the circuit. Again, this applies equally to Canadian-based and U.S.-based customers. It was not considered further because it is beyond the scope of the study.



RATE COMPARISONS - SERVICE BY SERVICE

In this chapter, we compare the Canadian and U.S. rates for a variety of data communications services. The range of services compared is based on the services actually used by the companies interviewed. In addition, although no company interviewed used T1 services, they are compared in this chapter because there has been much discussion and debate with respect to this comparison, and because the U.S. T1 service would be a more economical alternative than a large number of parallel analogue circuits in one of the case studies.

The range of services compared in this chapter is as follows:

- Dedicated analogue (private line) services
- Dedicated digital (private line) services, both local and interexchange
- Packet switched services
- Facsimile services

The basis of comparison of the Canadian and U.S. rates for these services is the recurring monthly rate for the end-to-end service, including all access costs, but excluding taxes. Non-recurring service or installation charges are not included. Where it is instructive, the total cost of the service is broken down into elements and the various elements are compared. In some other cases, the total cost of the service is broken down into interexchange (IX) channel charges and non-channel charges.

Where the rates are distance-sensitive, the total cost of the service over a range of local or interexchange distances is compared using Canadian and U.S. rates. For local services (of which Digital Channel Service, or local digital private line service, is the only example), the rates are compared at distances of 10, 20 and 30 miles. For interexchange services, which form the majority of the services compared in this study, interexchange distances of 100, 300, 800 and 2,000 miles, corresponding approximately to Ottawa-Montreal (103 miles), Toronto-Montreal (313 miles), Toronto-Halifax (784 miles) and Toronto-Vancouver (2,094 miles) were used.

Included in the comparisons are some or all of Bell/Telecom Canada current rates, Bell/Telecom Canada proposed rates from Tariff Notice 3420, Unitel rates,



AT&T rates, New York Telephone rates, MCI rates and BT Tymnet rates, depending on the carriers from which the case study companies obtained service.

DEDICATED ANALOGUE SERVICES

The rates for analogue voice-grade lines are compared using Bell/Telecom Canada's current and proposed rates, and AT&T rates. Included in the Bell/Telecom Canada rates are the flat rate charges for a 2 Km local loop. For the current Bell/Telecom Canada rates, the local channel rate in effect prior to June 10, 1990 is used. For the proposed Bell/Telecom Canada rates, the actual changes to Bell Tariff CRTC 6716, Item 950, put into effect on June 10, 1990 are used. The end-to-end service includes the two flat-rated loops, two links, and the distance-sensitive interexchange portion from Bell Tariff CRTC 6716, Item 3750. Since the comparison is for single lines only, the volume discounts under Bell Tariff CRTC 6716, Item 3770 Channel Discounts (Telpak) have not been included. Volume discounts are discussed under a separate heading later in this chapter.

The new rates for Ontario-Quebec and TransCanada IXVG services proposed in Tariff Notice 3420 include slightly lower rates at intermediate mileages, but higher rates for longer mileages.

In the case of AT&T, the end-to-end service includes a number of tariff items. The local access loop is distance and location sensitive. For this analysis, a 2 Km loop in the New York Tel serving area from AT&T's F.C.C. Tariff No. 11 has been used at each end of the analogue circuit. Also included at each end is the access coordination function (ACF) from AT&T's F.C.C. Tariff No. 11 and the access connection (AC) from AT&T's F.C.C. Tariff No. 9. The inter-office channel (IOC) is based on AT&T's F.C.C. Tariff No. 9.

Figure 1 on page 10 illustrates the comparison of the end-to-end costs converted to Canadian dollars for analogue interexchange voice grade (IXVG) circuits for a range of inter-exchange distances from 100 to 2000 miles. It will be noted that the AT&T rates are significantly lower than either the Bell Canada/Telecom Canada current or proposed rates at every distance. For the proposed rates, it will be noted that the end-to-end rates for 100 and 300 miles are slightly higher due to the higher local channel charges put into effect on June 10, 1990. At 800 miles, the proposed end-to-end rate is lower, while at 2000 miles the proposed end-to-end rate is higher.



FIGURE 1
COMPARISON OF ANALOGUE IXVG RATES

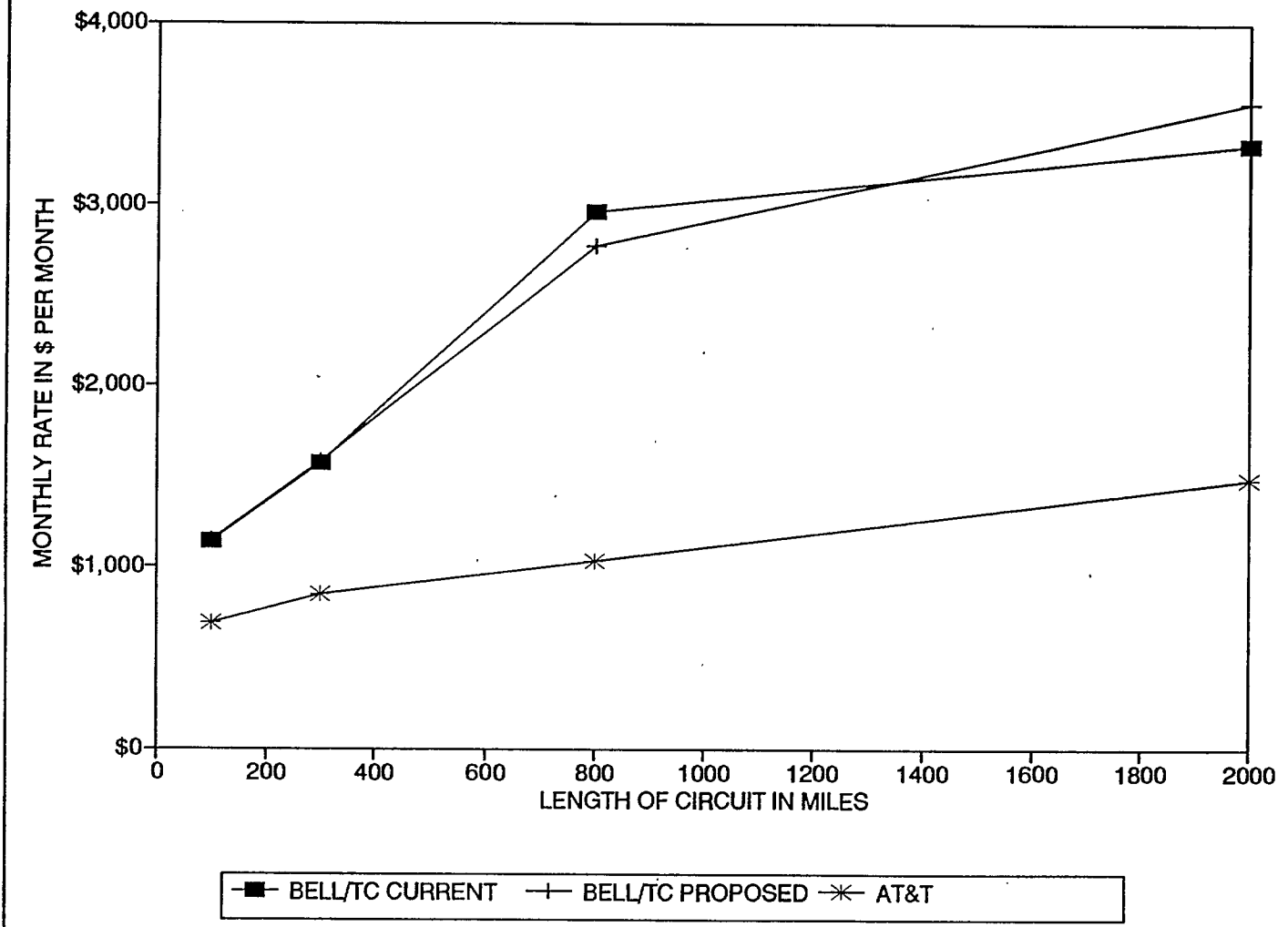


Figure 2 on page 12 shows the components of the end-to-end charges for each rating basis. Even though the non-channel charges from AT&T (including the access channel, ACF and AC) are higher than the flat-rated local loop and link charges from Bell/Telecom Canada, the cost of the IOC is still sufficiently low to make the end-to-end cost in total lower than that of Bell/Telecom Canada.

DEDICATED DIGITAL SERVICES

Both local and interexchange digital channel rates were compared in this analysis.

LOCAL DIGITAL CHANNEL RATES

Local digital channel rates were compared using Bell Canada's current rates filed under CRTC Tariff 6716, Item 5010 Digital Channel Service for a range of data speeds from 2.4 to 56 Kbps with the rates filed by New York Tel in P.S.C. Tariff No. 900, Section 21 Digipath Digital Service II. The Bell Canada service is composed of an access charge at each service point and a distance sensitive channel charge. Bell uses one rate for access at speeds from 2.4 to 9.6 Kbps, and another higher charge for 19.2 and 56 Kbps. The Bell channel charge is distance-sensitive but is not speed-sensitive. The New York Tel tariff includes channel terminations and interoffice channel charges. One rate applies for all speeds from 2.4 to 56 Kbps.

Figure 3 on page 13 compares the end-to-end rates for circuits of 10, 20 and 30 miles in length. The New York Tel rate converted to Canadian dollars is in the range of one-half to two-thirds of the Bell Canada rate for data speeds from 2.4 to 9.6 Kbps, depending on the inter-office distance. For higher speed services at 19.2 and 56 Kbps, the U.S. rate in Canadian dollars is only 40 to 50% of the Canadian rate.

INTEREXCHANGE DIGITAL CHANNEL RATES

For interexchange digital channel rates, two major categories of service in Canadian terms were used by the companies which made up the case studies. The first category was the low to intermediate speed digital data services like Infodat and Dataroute. The second category was the Megastream type of service providing 64 Kbps channels on a point-to-point basis. In addition, since a T1 (1.544 Mbps on



FIGURE 2
 COMPONENTS OF ANALOGUE IX CHARGES

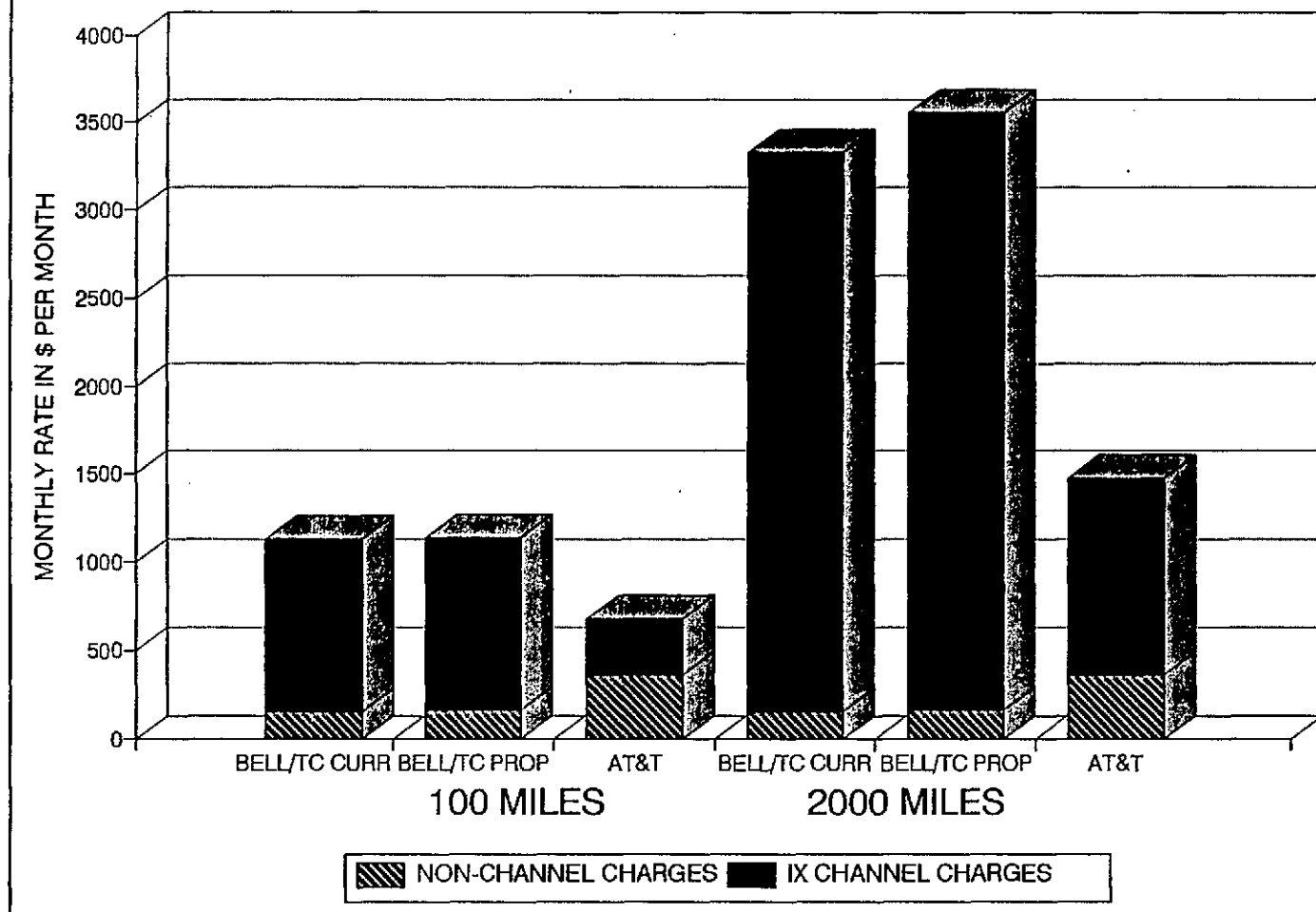
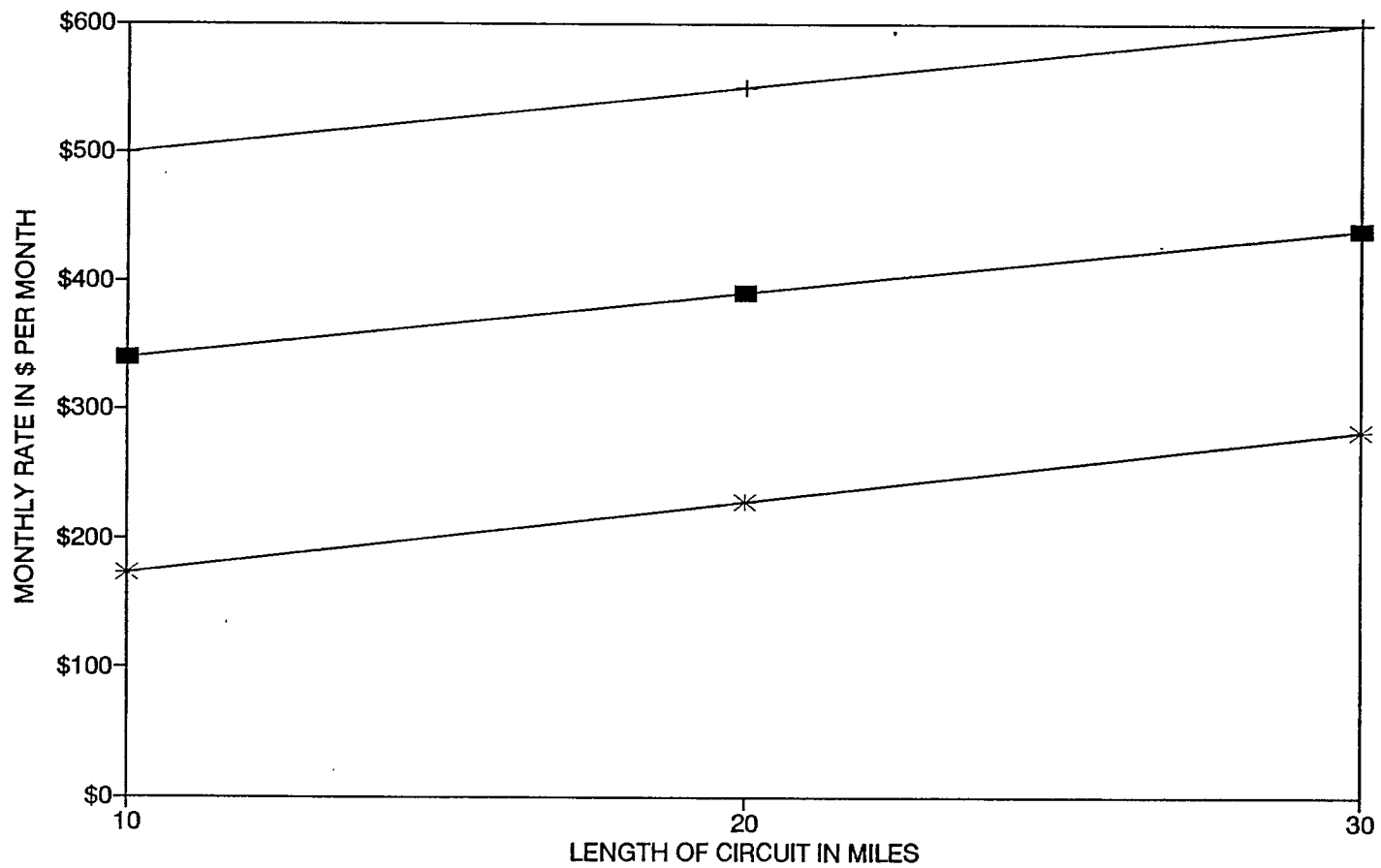


FIGURE 3
COMPARISON OF LOCAL DIG. CHANNEL RATES



■ BELL CANADA 2.4-9.6 + BELL CANADA 19.2&56 * NY TEL 2.4-56

a point-to-point basis) at U.S. rates would prove more economical than multiple parallel analogue voice circuits in some cases, a comparison of T1 rates was included as a third category in the analysis.

Rates for each of these three categories are compared in the following sections.

LOW TO MEDIUM SPEED DIGITAL SERVICES

Five different set of rates are compared in this analysis. They include:

- Bell/Telecom Canada Dataroute Rates
- Bell/Telecom Canada Proposed Dataroute Rates
- Unitel Infodat Rates
- AT&T Digital Dataphone Rates
- MCI Fractional T-1 (DS0) Rates

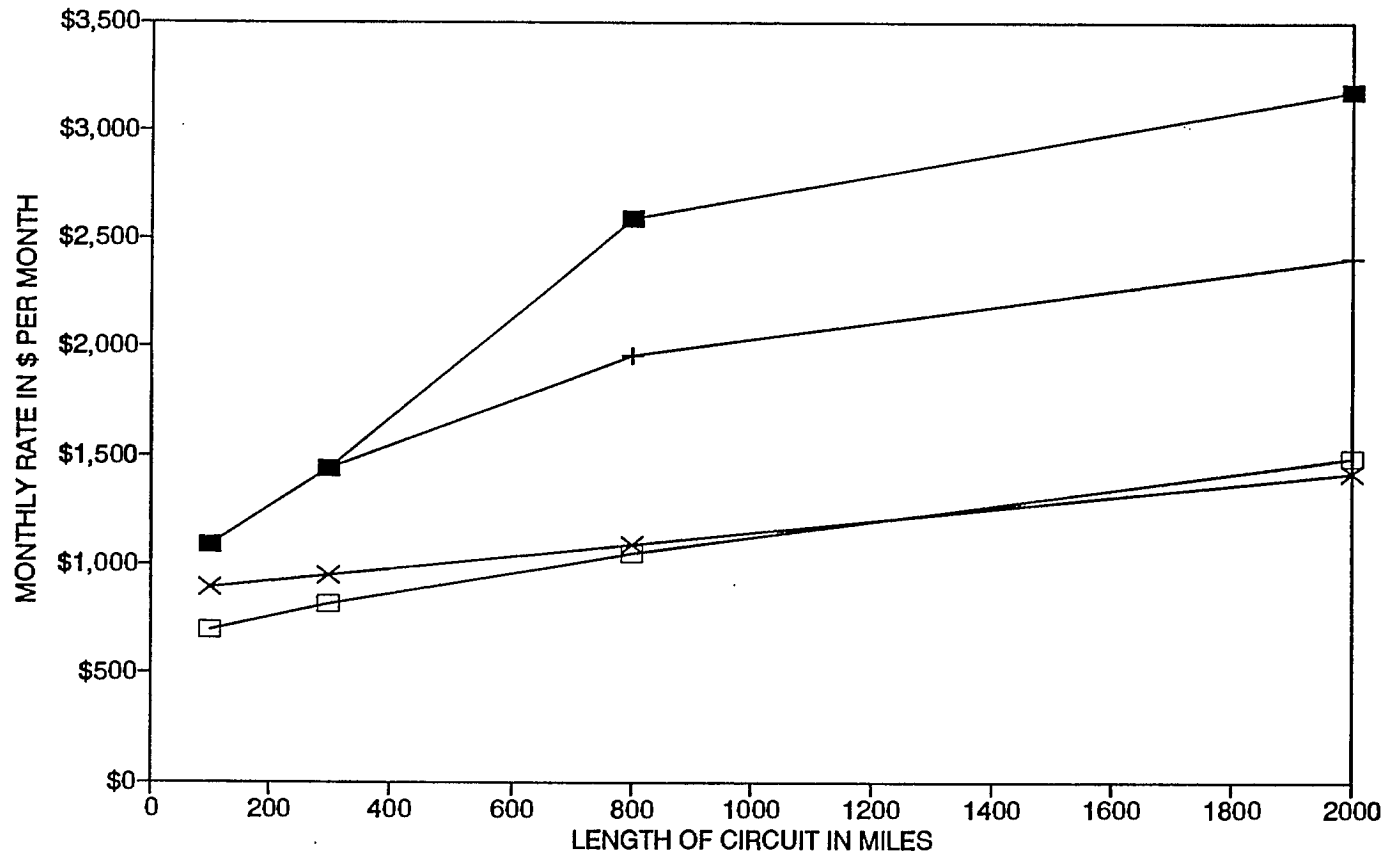
Rates were compared for the most common data speeds (4.8 Kbps, 9.6 Kbps and 56 Kbps) at rate distances of 100, 300, 800 and 2,000 miles.

Figures 4, 5, 6 and 7 on pages 15-18 illustrate the comparisons for 4.8 Kbps, 9.6 Kbps and 56 Kbps respectively. The current rates for Dataroute and Infodat at all three data speeds are for 24 hour service. Business day service is also offered at reduced rates. The current Dataroute and Infodat charges are based on the Ontario-Quebec tariff at 100 and 300 mile rate distances, and on the TransCanada or inter-area tariff for Dataroute and Infodat, respectively, at the 800 and 2,000 mile rate distances. While two of the case study companies used business day services as well as 24 hour services, we believe a more valid comparison is made among the 24 hour services. It should also be noted that the Bell/Telecom Canada tariff proposed in Tariff Notice 3420 combines the Ontario-Quebec and TransCanada rate tables into a single, common table, and eliminates the business day option.

For Infodat and Dataroute rates, we included two accesses of the appropriate data speed and the interexchange channel. In the case of Dataroute, we also added the Digital Data Unit charges which are included in the Infodat access charge. For

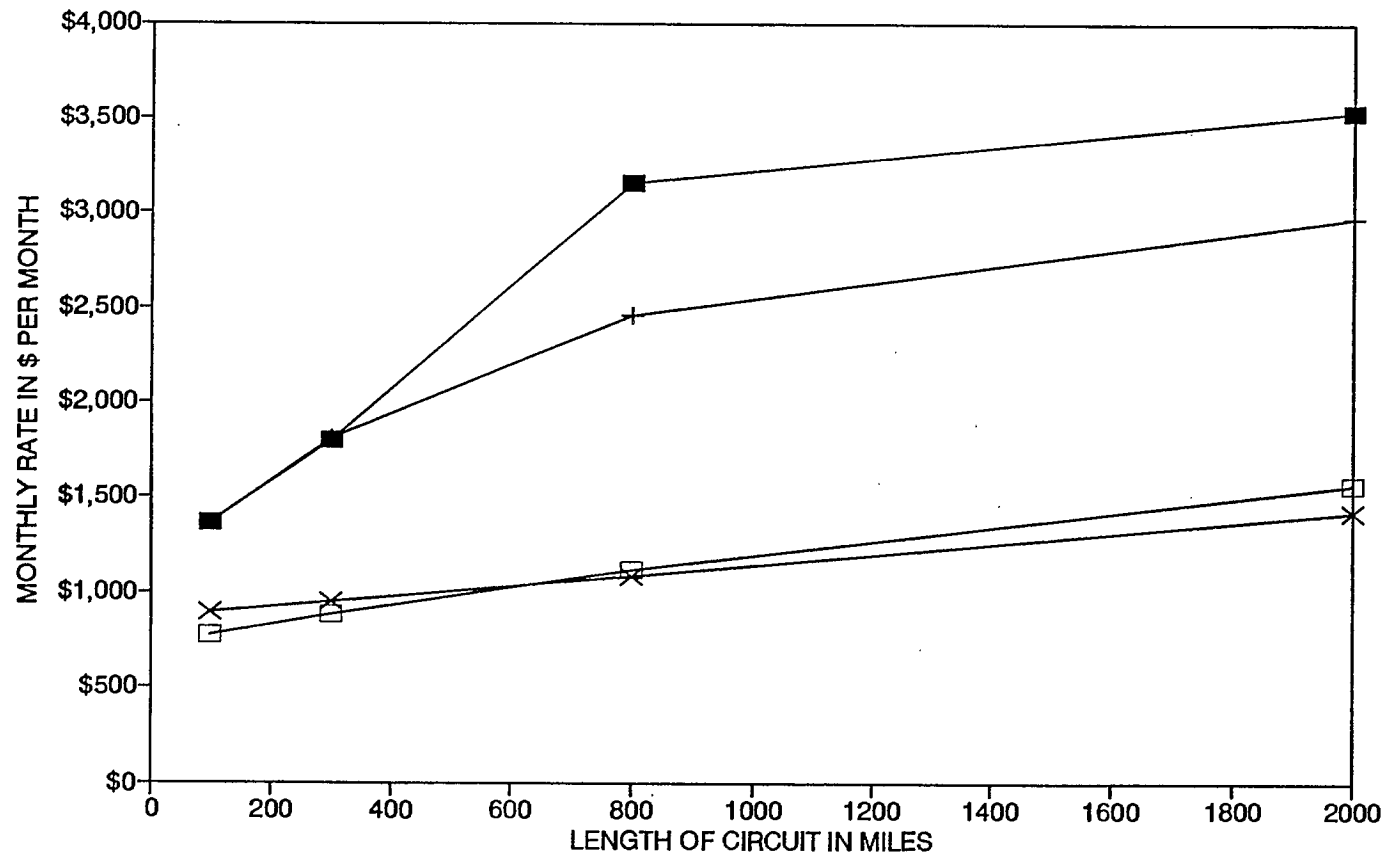


FIGURE 4
COMPARISON OF 4.8 KBPS DIGITAL IX RATES



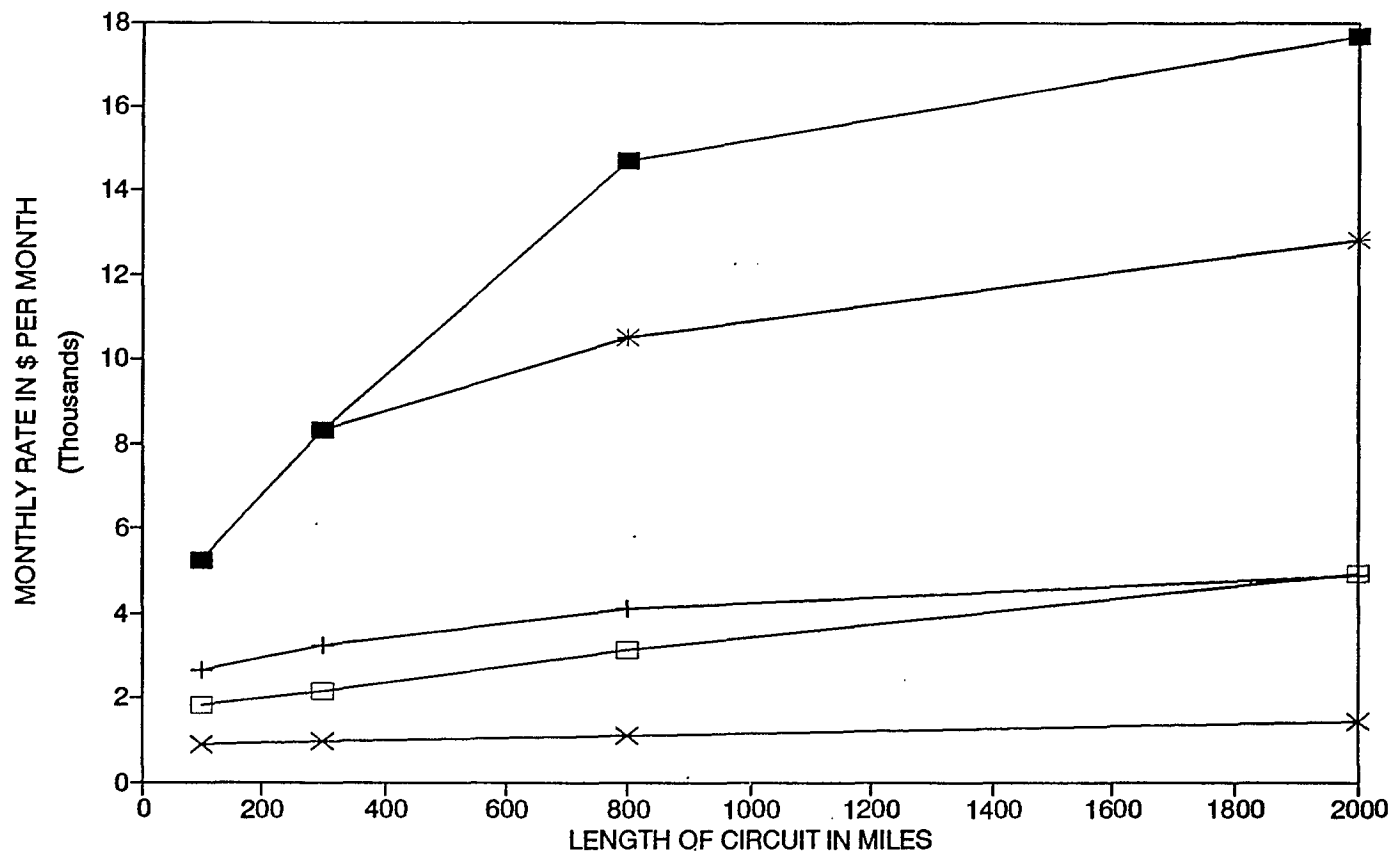
■ BELL/TC CURRENT + BELL/TC PROPOSED ■ UNITEL
 □ AT&T × MCI

FIGURE 5
COMPARISON OF 9.6 KBPS DIGITAL IX RATES



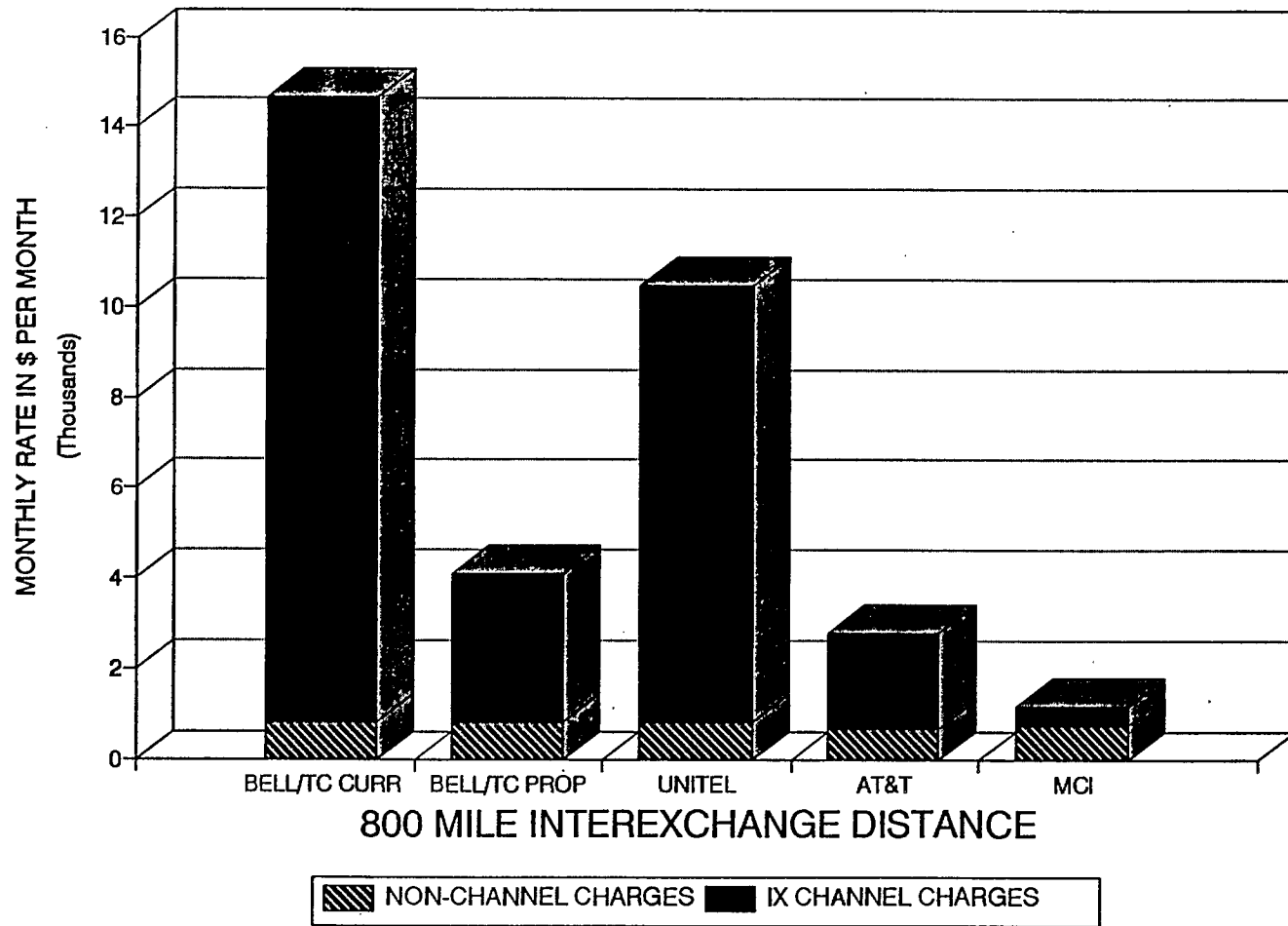
■ BELL/TC CURRENT + BELL/TC PROPOSED ■ UNITEL
□ AT&T × MCI

FIGURE 6
COMPARISON OF 56 KBPS DIGITAL IX RATES



■ BELL/TC CURRENT + BELL/TC PROPOSED * UNITEL
□ AT&T x MCI

FIGURE 7
COMPONENTS OF 56 Kbps DIGITAL RATES



AT&T, we included two 2 Km access channels based on New York Tel rates, two Access Coordination Functions, two Access Connections, and Inter-Office Channel (IOC), all at the appropriate data speed. For MCI, we included two 2 Km access channels based on New York Tel rates, two access coordination functions, two central office connections, and the inter-office channel. In the case of MCI, the same channel can accommodate data speeds from 1.2 Kbps to 56 Kbps.

Figure 4 shows that the Infodat and current Dataroute rates for 4.8 Kbps digital services are identical. The proposed Dataroute rates would provide savings of approximately 20-25% at rate distances of 800 miles and above. MCI and AT&T rates are considerably lower than either the existing or proposed Canadian rates. MCI is slightly more expensive than AT&T at shorter rate distances, and slightly less expensive at longer rate distances.

Figure 5 illustrates the comparison among the five services at 9.6 Kbps. The pattern among the Canadian services is the same as at 4.8 Kbps, while the two U.S. services are proportionately less expensive. Because the MCI rate is the same as for 4.8 Kbps, the cross-over point between MCI and AT&T drops to less than 800 miles.

The comparison among 56 Kbps services is shown in Figure 6. Here, the pattern changes. The Infodat service is priced well below the current Dataroute rates at rate distances above 300 miles, but the proposed changes to the Dataroute rate at 56 Kbps are very significant at all rate distances, so much so that the rate drops below the AT&T rate at 2,000 miles. MCI is by far the lowest priced service at 56 Kbps for all rate distances.

Figure 7 illustrates the breakdown of the total end-to-end charge for an 800 mile 56 Kbps circuit into its IX channel charges and its non-IX channel charges. It should be noted that non-channel charges vary only slightly from one carrier to another. The significant differences are in the IX channel charges.

MEGASTREAM AND EQUIVALENTS

One of the case study companies used Megastream at the current minimum of four point-to-point DS0 channels. For this reason, the comparison of current Megastream rates with the proposed Megastream rates and with the rates for its AT&T equivalent is based on a 256 Kbps channel. It should be noted that the revised Megastream rates proposed in Tariff Notice 3420 do not have the requirement for a minimum of four DS0 channels.



The current Megastream end-to-end service uses elements from the Megastream Tariff (Bell Tariff CRTC 6716, Item 5030) and from the Megaroute Tariff (Bell Tariff CRTC 6716, Item 5020). In all, an end-to-end Megastream circuit currently consists of Common Equipment, Access and Construction from the Megaroute tariff at each end of the circuit, and an MTE (Megastream Terminating Equipment), terminations, and IX links from the Megastream tariff at each end, along with the interexchange channel charge. Three-year initial service periods have been assumed because that is consistent with the usage patterns of companies in the group studied.

The new rates proposed for Megastream and Megaroute in Tariff Notice 3420 both affect the Megastream charge on an end-to-end basis. The access charge in the proposed tariff combines elements of the common equipment and access system charges into a single tariff item, with discounts for five or more DS1 accesses on a contracted basis of one year or more. All interexchange rates for DS0, DS1 and DS3 channels are contained in a proposed new tariff item 5060. The Ontario-Quebec and TransCanada rate schedules from the current tariff have been combined in a single rate schedule. Volume discounts are also proposed and are discussed at the end of this chapter.

The equivalent to Megastream in terms of AT&T services is the fractional T1 service known as ASDS. This service uses an Accunet T1 Access Channel and Access Coordination Function from Tariff F.C.C. No. 9, and the ASDS Access Connection and IOC from Tariff F.C.C. No. 11.

Figure 8 on page 21 illustrates the comparison among the Bell/Telecom Canada current and proposed end-to-end charges for four Megastream channels and the AT&T end-to-end charge for a 256 Kbps ASDS circuit. It will be noted that the proposed Megastream end-to-end charge is of the order of 10% to 15% lower than the current charge at the longer mileages. At the shorter mileages which are based on the Ontario-Quebec rate schedule, the proposed rates lead to end-to-end costs which are actually slightly higher than the current costs. The comparison with the AT&T service indicates the rates for the ASDS service are considerably lower than both the existing and proposed Bell/Telecom Canada rates.

Figure 9 on page 22 illustrates the breakdown of the total end-to-end charge into the IX-channel charges and the non-channel charges. It will be noted that the total non-channel charges change very little from the current to the proposed tariff, with most of the reduction in end-to-end costs coming from proposed reductions in



FIGURE 8
COMPARISON OF MEGASTREAM & EQUIVALENT

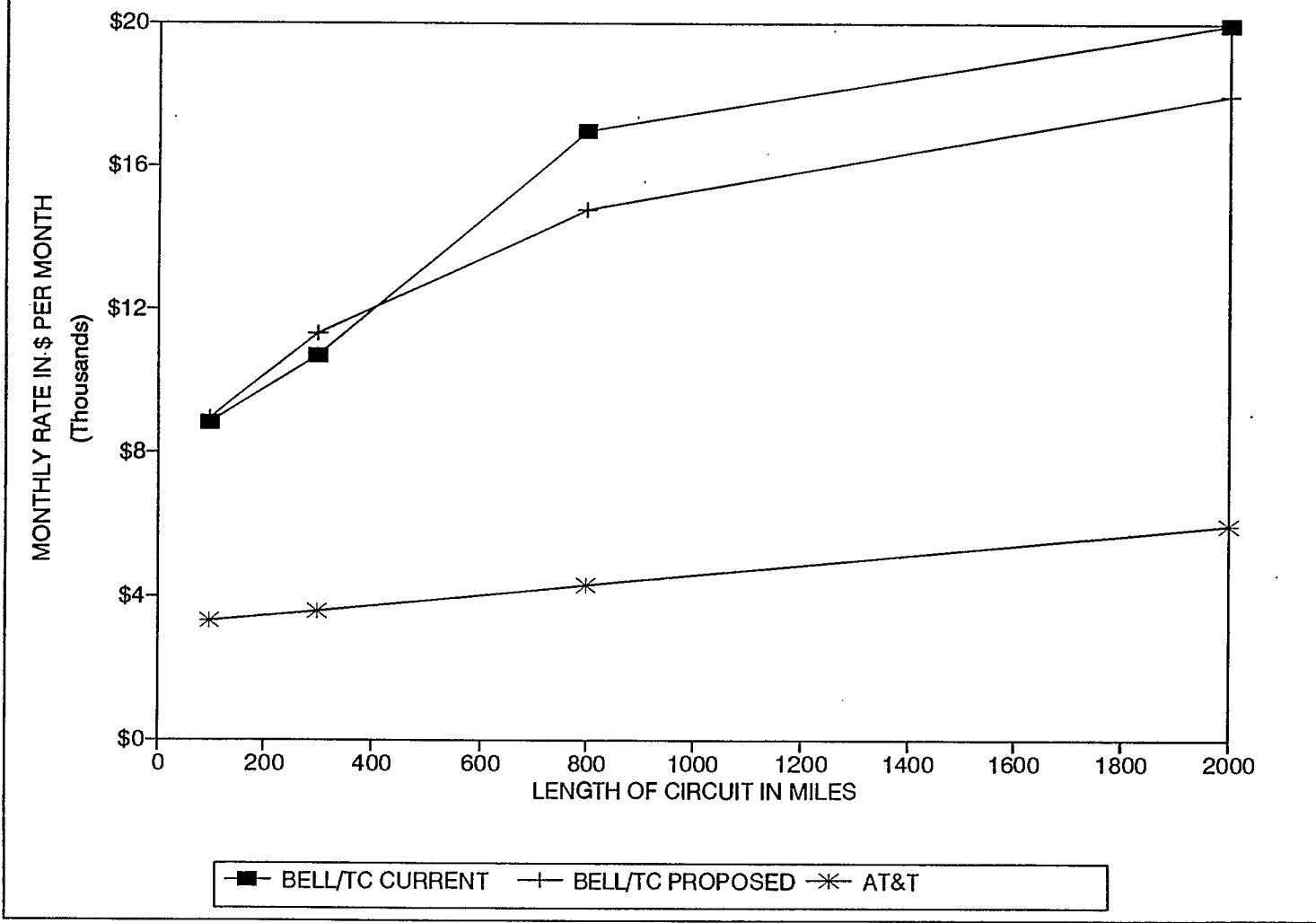
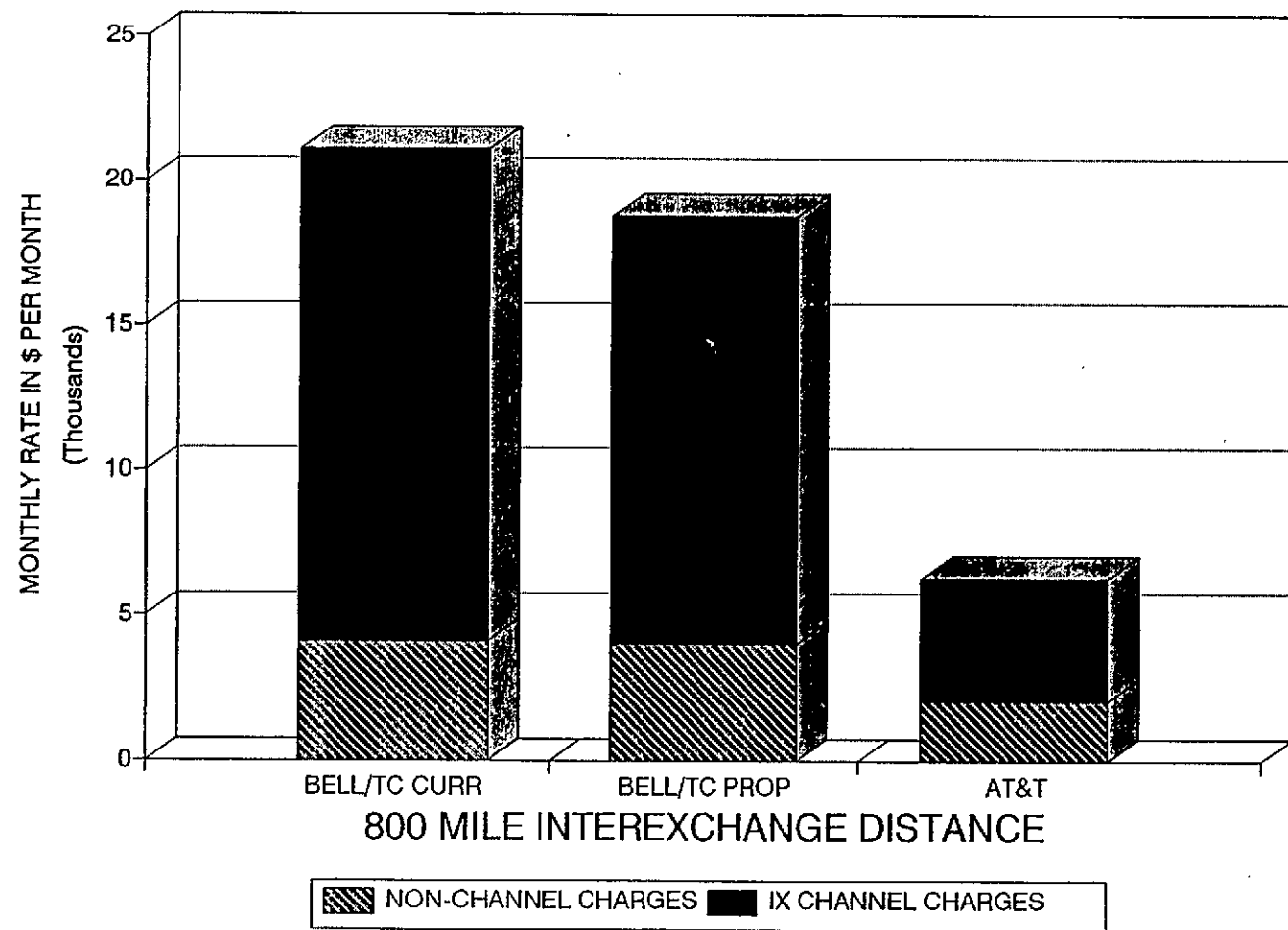


FIGURE 9
COMPONENTS OF MEGASTREAM AND EQUIVALENT



the interexchange portion. The Bell/Telecom Canada non-channel charges are higher than those of AT&T.

T1 SERVICE RATES

The Bell/Telecom Canada Megaroute Service is compared to the Accunet T1.5 Service. The current Bell/Telecom Canada Megaroute service requires Construction, Common Equipment, Access, Access Link and IX link from Bell Canada's Tariff CRTC 6716, Item 5020, at each end of the circuit. The IX channel rates are divided into Ontario-Quebec and TransCanada rate schedules under this same tariff item. Three year initial service period rates are used.

The revised Megaroute tariff under Tariff Notice 3420 makes some changes to both the access and interexchange elements. As with the Megastream access which uses elements of the Megaroute tariff, the access charge combines elements of the common equipment and access system charges into a single tariff item, with discounts for five or more DS1 accesses on a contracted basis of one year or more, and all the interexchange rates for DS0, DS1 and DS3 channels are contained in a proposed new tariff item 5060. The Ontario-Quebec and TransCanada rate schedules from the current tariff have been combined in a single rate schedule. Again, volume discounts are also proposed and are discussed at the end of this chapter. Single Megaroute services at the 100 and 300 mile rate distances would earn a 16% discount for a three year commitment, while an 18% discount would be applied at the 800 and 2,000 mile rate distances for a single Megaroute service with a three year commitment.

AT&T's Accunet T1.5 Service includes a 2 Km access channel at each end based on the New York Tel territory rate filed in AT&T's F.C.C. Tariff No. 11, an ACF at each end based on Tariff No. 11, an Access Connection from Tariff No. 9 and an IOC from Tariff No. 9. The IOC rate is based on a discounted fixed rate plan in which a 22% discount is provided for a three year commitment.

Figures 10 and 11 on pages 24 and 25 illustrate the comparison of the end-to-end rates for the current and proposed Megaroute rates and the AT&T Accunet T1.5 service at rate distances of 100, 300, 800 and 2,000 miles. As shown in Figure 10, the difference between the current and proposed Bell/Telecom Canada rates is substantial. However, the difference between the current rates and the AT&T rates is even more substantial. This graph tends to support the claims mentioned in the



FIGURE 10
COMPARISON OF MEGAROUTE & ACCUNET T1.5

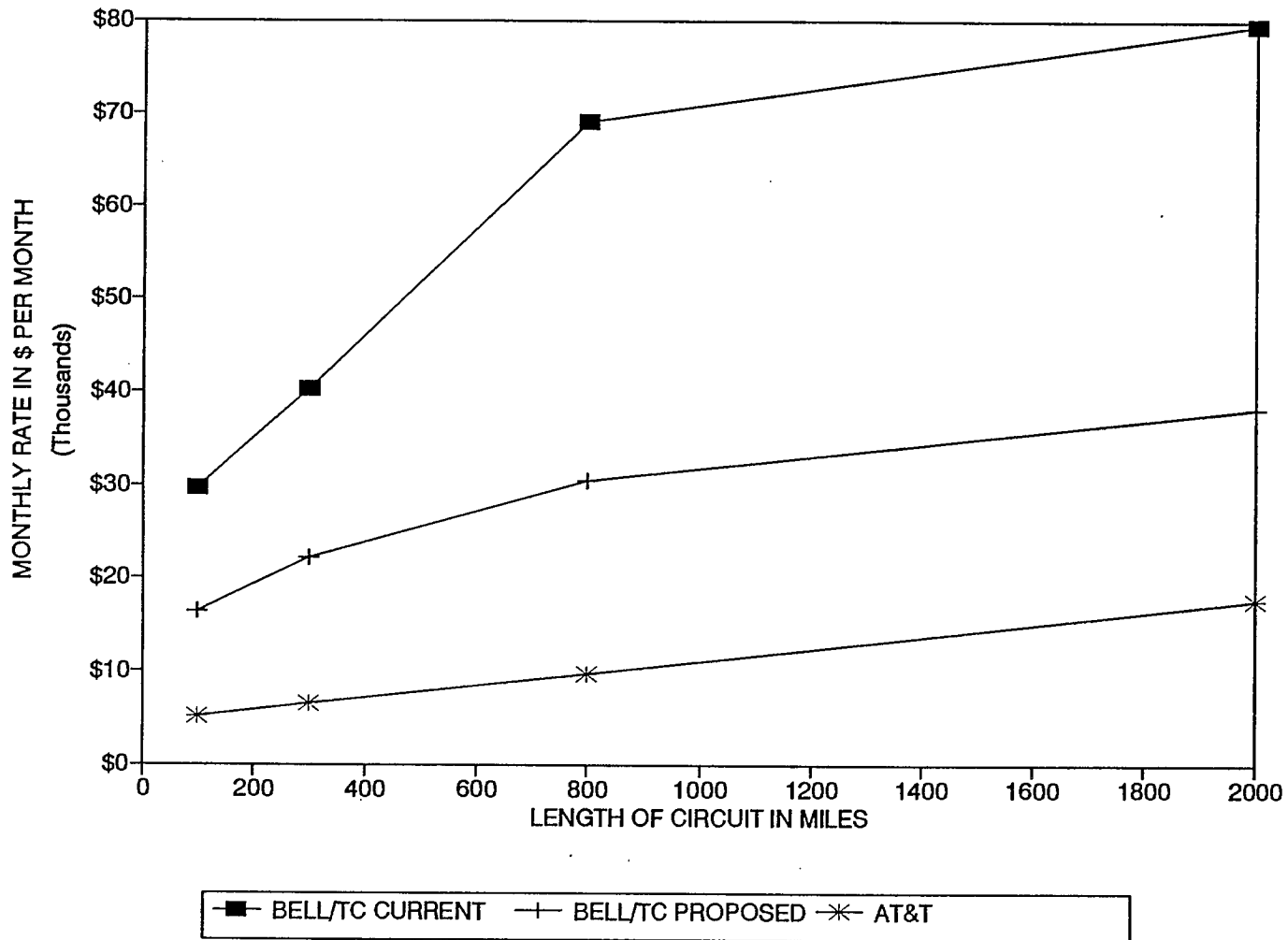
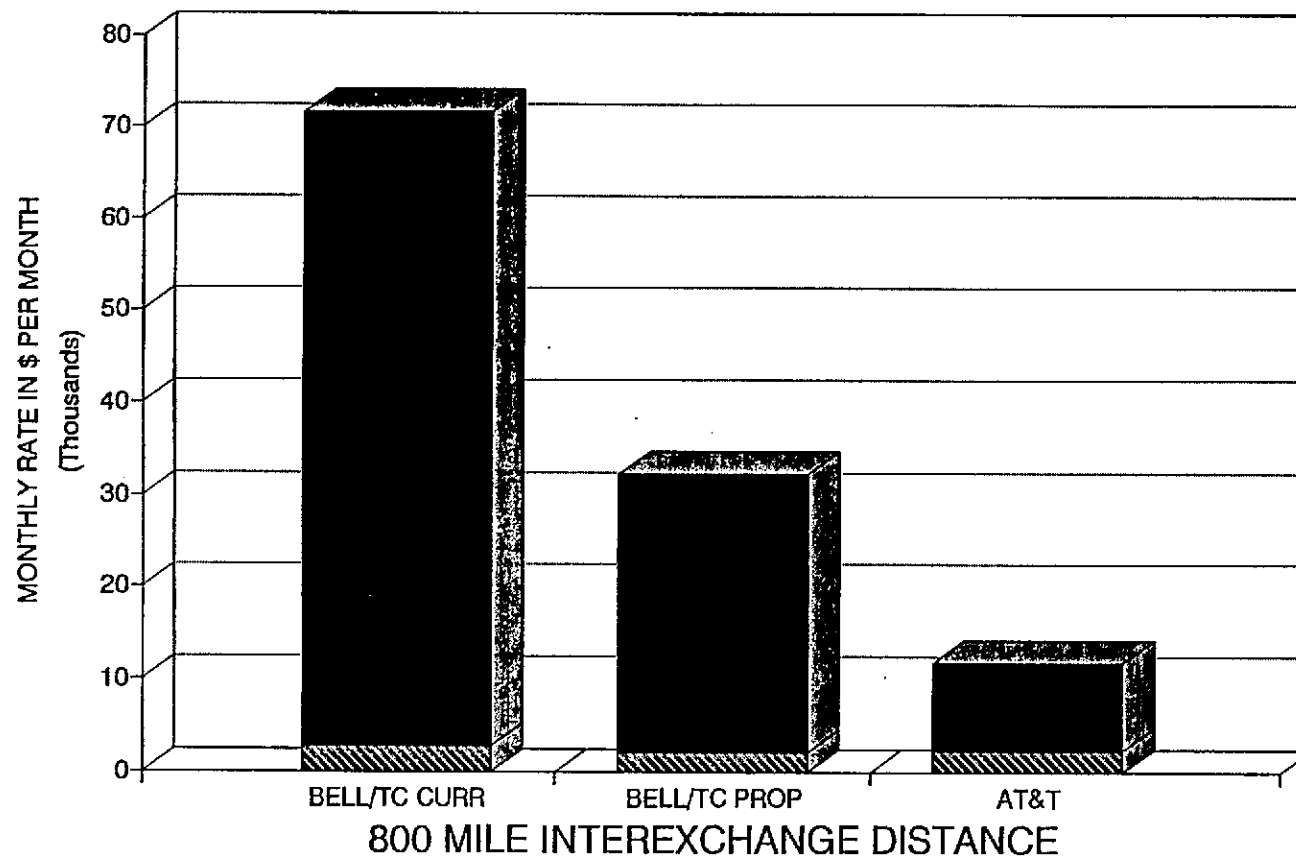


FIGURE 11
COMPONENTS OF MEGAROUTE & ACCUNET T1.5



introduction to this report that current T1 rates in Canada are up to seven times higher than those in the U.S.

Figure 11 shows that there is not a significant difference among the non-channel charges in the three cases. The major differences are among the interexchange channel charges.

PACKET SWITCHED DATA SERVICES

The rates for packet switched services are difficult to compare. As noted earlier, it was decided to make the basis of the U.S. comparison BT Tymnet, since it is one of the main packet switched services in the U.S. There are three main difficulties in making the comparisons using BT Tymnet:

- Unlike Datapac and FasPac, BT Tymnet's rates are not distance-sensitive.
- BT Tymnet charges on the basis of kilocharacters, while Datapac and FasPac charges are on the basis of kilosegments or kilopackets.
- Unitel offers volume discounts once an annual threshold volume is reached, while BT Tymnet offers volume discounts on both total monthly traffic volume and total monthly connect time.

BT Tymnet also recently introduced a service known as "X-Link". It is essentially a virtual private line service. There is no charge at all for data sent between X-Link nodes. The only charge is a fixed monthly access charge which varies with the speed of the access and the number of virtual circuits. This makes the comparison even more difficult.

Given these difficulties, no easy overall comparisons of the end-to-end costs of the various packet switching services is possible. The comparison provided here is a description and comparison of the various elements of each service. The only end-to-end comparisons are based on the repricing of the packet switched data usage by the companies included in the case studies as reported in the next chapter.

Bell/Telecom Canada's Datapac Service and Unitel's FasPac Service are structured similarly. Dedicated asynchronous and synchronous access is available at a fixed monthly rate depending on the data speed, and asynchronous dial-up



access is available at a rate per minute of connect time and a charge per kilosegment or kilopacket. In terms of network charges, they include a call set-up or reset charge and a rate per kilopacket or kilosegment which varies with the rate distance and the "grade" of the serving area.

In the case of BT Tymnet's conventional packet switched service, there is a monthly rate for a network connection depending on the data speed, and a range of synchronous terminal interfaces at fixed monthly rates. Dial-up rates include the PAD charge, but vary with the traffic density of the serving area. The dial-up access rates are subject to discounts based on total monthly connect time. There is no call set-up or reset charge. Network charges are distance insensitive, but are sensitive to total monthly volume, and are based on characters, not packets. In the case of the BT X-Link Service, which connects dedicated X.25 accesses, the only charge is a fixed monthly charge which varies with speed and the number of virtual circuits.

It is informative to compare the costs of a dedicated X.25 access at 2.4 and 9.6 Kbps using the Datapac 3000, FasPac and X-Link dedicated access rates. In the case of Datapac and FasPac, the access costs at 2.4 and 9.6 Kbps are \$220 and \$465 per month, respectively. For X-link, the monthly rates converted to Canadian dollars are \$982 and \$1,284, respectively. However, no call set-up or network charges apply between X-Link ports. In Tariff Notice 3420, it is proposed to increase the Datapac 3000 access charge to \$240 per month for 2.4 Kbps, but no change is proposed for the 9.6 Kbps access.

For a conventional BT Tymnet access, the monthly charge is \$930 Canadian for 2.4 Kbps and \$1,395 Canadian for 9.6 Kbps. The X.25 synchronous terminal interface costs an additional \$349 Canadian per access.

The access and call set-up charges are summarized in Table 1 on page 28.

Dial-up connect time rates for Datapac and FasPac are \$0.04 per minute in peak time (\$0.03 per minute off-peak for Datapac), and the PAD charge is \$0.50 per kilosegment for Datapac, while the additional network usage charge for FasPac terminal to host concentration is \$0.40 per kilopacket. The peak time rates for BT Tymnet are \$.086 per minute for the first 1,000 hours per month, dropping to \$.043 per minute for connect time in excess of 5,000 hours per month. The BT Tymnet off-peak rate is \$0.039 per minute. Surcharges are applied to the rate per minute for medium and low-density serving areas, WATS access and other value added services. There is no additional PAD charge with BT Tymnet.



Table 1: Summary of Access and Call Set-up Charges

<u>Service</u>	<u>Datapac</u>	<u>Rate in \$ Canadian</u>		
		<u>Datapac Proposed</u>	<u>FasPac</u>	<u>BT Tymnet</u>
2.4 Access	\$220	\$240	\$220	\$1,279
9.6 Access	\$465	\$465	\$465	\$1,744
Call Set-up	\$.01	\$.01	\$.0058	0
X-Link				
2.4 Kbps				\$982
9.6 Kbps				\$1,284

The dial-up rates and PAD or terminal to host concentration charges are summarized in Table 2 below.

Table 2: Summary of Dial-up Rates and PAD Charges

<u>Service</u>	<u>Datapac</u>	<u>Rate in \$ Canadian</u>		
		<u>Datapac Proposed</u>	<u>FasPac</u>	<u>BT Tymnet</u>
Dial-up				
Peak Time	\$.04	\$.04	\$.04	\$.086-.043
Off-Peak Time	\$.03	\$.03		\$.039
PAD Charge				
per kilopacket				
Peak Time	\$.50	\$.50	\$.40*	0
Off-Peak Time	\$.375	\$.375		0

* Additional network usage charge for terminal to host concentration



As noted earlier, Datapac and FasPac charges for transmission and switching are on a per kilosegment or per kilopacket basis. BT Tymnet charges per kilocharacter. Datapac and FasPac are distance-dependent and have different rates for different grades of serving areas. Of the two Canadian services, only FasPac offers a volume discount. BT Tymnet rates are independent of distance and grade of serving area, and include a volume discount.

It is extremely difficult to compare the network charges for BT Tymnet with those of Datapac and FasPac because it depends on the packet fill and the grade of the serving area. Even repricing actual usage using BT Tymnet rates requires an assumption regarding packet fill because this information is not reported by Bell/Telecom Canada or Unitel.

In repricing the actual Datapac and FasPac usage for the Case Study companies which would require the conventional BT Tymnet service as opposed to BT Tymnet's X-Link Service, an assumption of 64 characters per segment or packet with asynchronous access was made, and 96 characters per segment or packet with synchronous access was assumed. On this basis, the comparisons shown in Table 3 on page 30 result.

It should be noted again that Datapac and FasPac charge a premium for transporting segments or packets between lower grade serving areas, as the ranges of rates for each rate distance in Table 3 on page 30 show. BT Tymnet charges a premium on the hourly connect time rate for lower density serving areas or 800 service access.

Table 3 also illustrates the lack of distance sensitivity of the BT Tymnet rates and the volume discounts offered by BT Tymnet.



Table 3: Summary of Network Charges

<u>Service</u>	<u>Datapac</u>	<u>Rate in \$ Canadian</u>		
		<u>Datapac Proposed</u>	<u>FasPac</u>	<u>BT Tymnet</u>
<u>1-156 Kiloseg/month</u>				
Rate Distance				
1-100 miles	\$.35-2.95	\$.40-3.13	\$.32-2.65	\$4.46
101-400 miles	\$.60-5.00	\$.65-5.30	\$.54-4.50	\$4.46
401-1000 miles	\$1.00-6.00	\$1.06-6.36	\$.90-5.40	\$4.46
>1000 miles	\$1.70-6.60	\$1.80-7.00	\$1.50-5.94	\$4.46
<u>>6,250 Kiloseg/month</u>				
Rate Distance				
1-100 miles	\$.35-2.95	\$.40-3.13	\$.32-2.65	\$1.12
101-400 miles	\$.60-5.00	\$.65-5.30	\$.54-4.50	\$1.12
401-1000 miles	\$1.00-6.00	\$1.06-6.36	\$.90-5.40	\$1.12
>1000 miles	\$1.70-6.60	\$1.80-7.00	\$1.50-5.94	\$1.12

FACSIMILE SERVICES

At the time of collecting the data for the case studies, the only facsimile services available in Canada were offered by Unitel. Conventional MTS was, at that time, the Bell/Telecom Canada alternative. Since there are, to our knowledge, no similar services offered for domestic carriage of facsimile traffic in the United States, the basis of the U.S. comparison is MCI's Dial-1 long distance service.



Unitel's FacsRoute Service is a subscription service with a fixed monthly charge of either \$9.95 (FacsRoute A) or \$19.95 (FacsRoute B). A rate per minute with a minimum of one-half minute is charged, with additional time charged in increments of tenths of minutes. Message toll service from Bell Canada/Telecom Canada was the alternative at the time of the analysis, although Faxcom has since been implemented. MCI's Dial-1 service is a conventional long distance service, with no monthly subscription charge.

Figure 12 on page 32 illustrates the comparison among FacsRoute A, FacsRoute B, Bell MTS daytime rates and Dial-1 daytime rates per minute at rate distances from 100 miles to 2000 miles. The monthly subscription charge is not included in the comparison, since its impact on the average rate per minute would depend on total monthly usage.

The FacsRoute rates are consistently less than the Bell MTS rates. It will be noted that the FacsRoute and MCI rates are quite comparable at short distances, but MCI's rates are much less distance-sensitive than those of Unitel. The sharp increase in FacsRoute rates from the 300 to the 800 mile rate distances results from changing from the Ontario-Quebec rate schedule to the inter-area rate schedule.

VOLUME DISCOUNTS

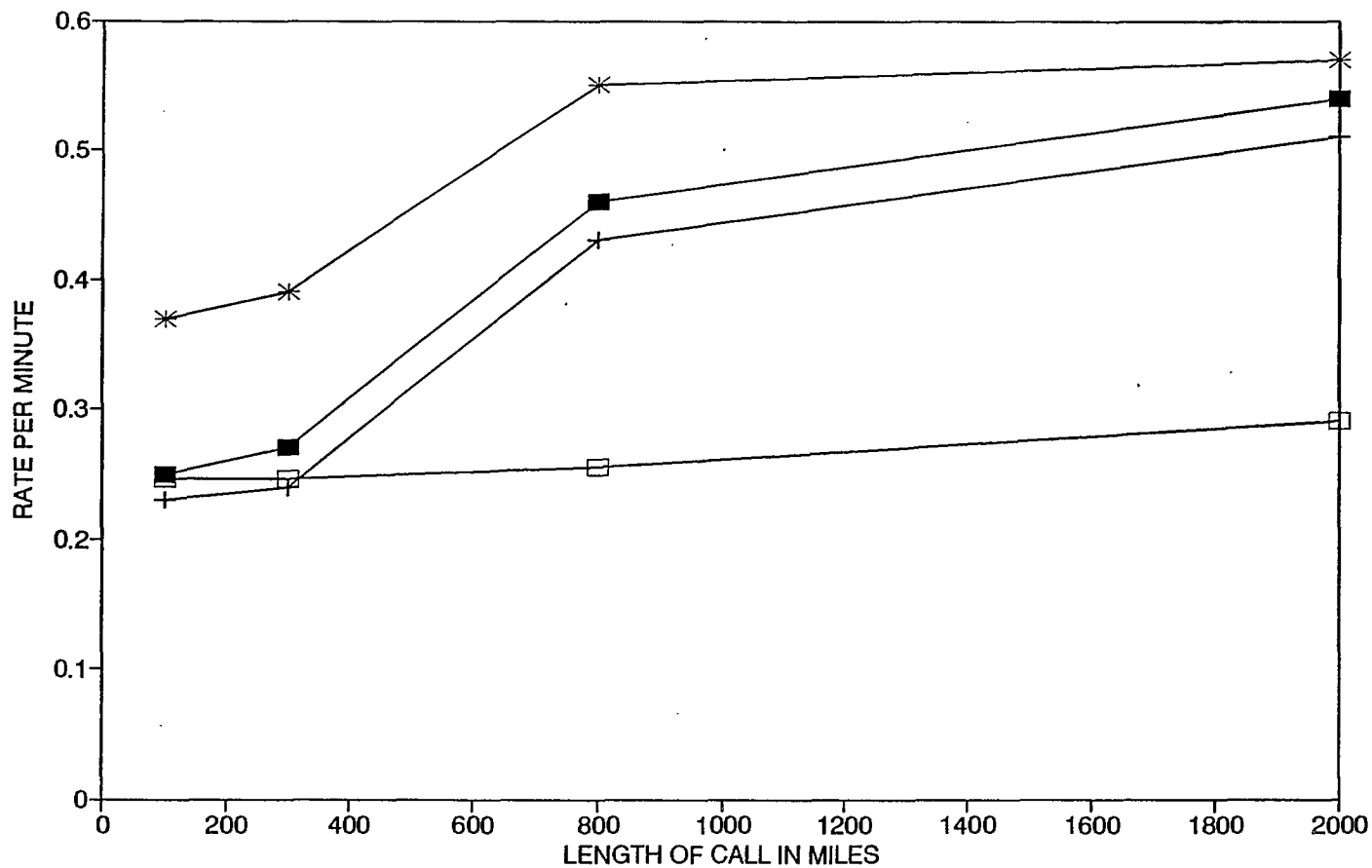
As noted earlier in this chapter, volume discounts have not been taken into account in the service-by-service rate comparisons except for the T1 and BT Tymnet services. The rest of the applicable current and proposed volume discounts are discussed here. They have, in addition, been taken into account in the repricing of the case study usage described in the next chapter. Based on case study usage, only Bell/Telecom Canada and AT&T volume discounts are applicable to this analysis.

Volume discounts are currently available for Bell/Telecom Canada's IXVG and Megastream services. Under Bell General Tariff CRTC 6716, Item 3770 Channel Discounts (Telpak), 7 to 12 IXVG channels between the same two points in Ontario-Quebec are discounted 10%, and 7 to 12 IXVG channels between the same two points on a TransCanada basis are discounted 30%. These discounts increase to 40% for more than 120 IXVG channels on an Ontario-Quebec basis, and for more than 60 IXVG channels on a TransCanada basis.

For Megastream, the volume discounts are prescribed in Bell General Tariff CRTC 6716, Item 5030.2.(d)(3)a. for Ontario-Quebec service and in Bell General



FIGURE 12
COMPARISON OF FACSIMILE RATES



■ UNITEL FACSRUTE A + UNITEL FACSRUTE B * BELL MTS □ MCI DIAL-1

Quebec Megastream Service, 13 to 24 channels between the same two points are discounted 10%, and channels in excess of 24 are discounted 15%. On a TransCanada basis, the corresponding numbers are 15% and 25%, respectively.

In Tariff Notice 3420, Bell proposes to introduce a Customer Volume Pricing Plan under Tariff Item 5050. Under this plan, customers may contract for a minimum monthly billing commitment and receive a discount based on the magnitude and term of the commitment. Services eligible for the proposed discount include the monthly recurring charge for Megaroute and Megastream IX links, IX channels and channel diversity. Discounts range from a minimum of 8% for a one year monthly minimum billing commitment of \$2,500 to a maximum of 60% for a ten year monthly minimum billing commitment of \$1 million. No changes to the current Telpak discount plan for IXVG services are proposed in Bell Tariff Notice 3420.

AT&T offers a range of conventional monthly rates, fixed rate plans, discounted fixed rate plans, volume pricing plans, and a multiservice volume pricing plan. The discounted fixed rate plan for a three year term was used in the rate comparison of T1 service earlier in this chapter in order to be consistent with the Megastream usage. The discount for a three year contract is 22%. It ranges from 17% for a one year contract to 31% for a five year contract.

The Multiservice Volume Pricing Plan offered by AT&T varies with the term and minimum monthly commitment similar to the proposed Bell/Telecom Canada Customer Volume Pricing Plan. As an example, a three year commitment to inter-office channels (IOCs) in the amount of US\$50,000 earns a discount of 19%.

CONCLUDING REMARKS REGARDING RATE COMPARISONS

The objective of this chapter was to provide comparisons among the rates charged by a number of carriers for a range of services. It is not appropriate to draw any overall conclusions from these comparisons. The bottom-line comparison in terms of any one user depends on the mix and volume of services used. For this reason, a number of case studies of large and small companies has been included as part of this study. In the next chapter, the results of repricing the mix of services used by companies included in the sample are provided and discussed.



CASE STUDIES

INTRODUCTION

This section examines the mix of telecommunications services used by four medium to large and three small companies. The companies were selected in discussions with the Canadian Association of Data and Professional Service Organizations (CADAPSO).

While this study was initiated in response to concerns expressed by CADAPSO, it should be noted that there appeared to be a general lack of interest in the study, in particular among the small CADAPSO members. Therefore, since we had some difficulty in getting the agreement of small companies in Eastern Canada to participate, all the small companies in the case study sample are from British Columbia.

METHODOLOGY

The following explains the methodology used to analyze and reprice the cases reviewed.

Sample Bell and CNCP (Unitel) data communications invoices were borrowed from the companies in the study. Typically one month was analyzed. Where more than one month was available, the costs were averaged.

The communications costs were characterized, based on the actual invoices, in terms of services used, channel lengths, numbers of lines, speeds, and usage charges, where identifiable and appropriate. Rentals for hardware such as modems, and local business lines that could be used for voice as well as data, were excluded from the analysis with one exception as noted in Case 1.

Once characterized, each case was repriced based on the proposed rates in Bell Tariff Notice 3420, and using U.S. rates converted to Canadian dollars at an exchange rate of one \$U.S. equals Cdn \$1.16.

U.S. tariffs were based on the closest overall equivalent. For example, New York Tel's Digipath service was used as a proxy for the local Digital Channel Service; various AT&T rates were used for inter-city comparisons with Bell/AT&T



rates; MCI rates were used as a Unitel proxy, and the BT Tymnet rate schedule was used to reprice the Datapac and FasPac usage.

Finally, to provide the best possible comparison, attempts were made to try and select the most cost-effective U.S. comparator. For example, where it was cheaper to use a T1 service based on AT&T's rates for Accunet T1.5 Service instead of a number of parallel IXVG lines, the cost of the Accunet T1.5 Service was substituted for the analogue IXVG costs when determining the cost using U.S. rates.

MEDIUM TO LARGE COMPANIES

Four medium to large companies were included in the sample. As noted earlier, they used the following services:

- Local analogue private line services
- Interexchange analogue private line services
- Local digital private line services at 1.2, 2.4, 4.8, 9.6, 19.2 and 56 Kilobits per second (Kbps)
- Interexchange digital private line services at 1.2, 2.4, 4.8, 9.6, 19.2 and 56 Kbps
- Multiple DSO services
- Packet switched data services
- Facsimile (non-MTS)

The companies are not identified in this report, and the actual costs of their telecommunications usage is kept confidential for competitive reasons. However, we provide a fair degree of detail in the following sections to characterize their usage.



CASE STUDY 1

This company provides data processing and voice and data network management services to government and the private sector. For this purpose, it leases data communications lines and services from Bell/Telecom Canada and Unitel at a cost of a few million dollars per year. The vast majority of its activities are within Ontario and Quebec, with some 9.6 Kbps leased lines and packet switched service to Western Canada, and a few leased lines linking to U.S. services. Only the Canadian component of the Canadian-U.S. links was included in the study.

Almost 60% of the company's service cost is analogue. In this situation, both voice and data analogue lines were included in order to capture accurately the true cost structure that incorporates the Telpak discount. There were too few data-only lines to invoke the Telpak discount if the voice lines were excluded. (Although it is not clear how all of the analogue lines were used, it is believed that roughly 75% of the analogue leased line cost was for lines that could be used for voice or data.)

Dataroute and Infodat are also used (roughly 30% of the total) with Infodat providing the majority of the communications from Central Canada to the East coast, the Prairies and the West Coast. Packet service is also used, in particular, for communications outside of Ontario and Quebec.

COST STRUCTURE

Relative costs for each of the rate structures evaluated are shown in Figure 13 on page 37 and are summarized as follows:

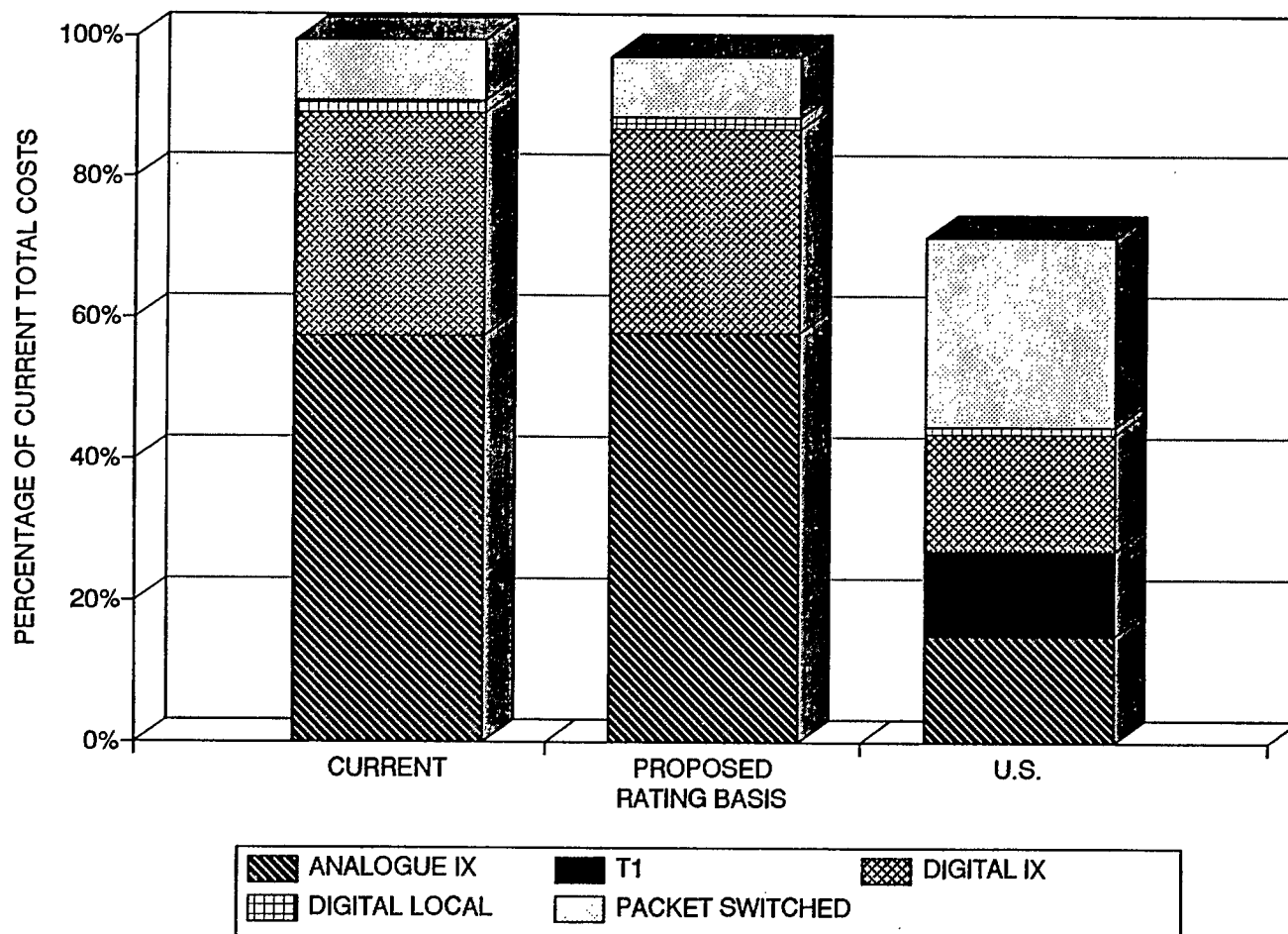
Current Tariffs	100%
Proposed Tariffs	98%
U.S. Tariffs (\$ Cdn)	72%

The reduction based on proposed tariffs is primarily a result of a roughly 10% reduction in digital IX (Dataroute) costs, partially offset by small increases in Datapac costs and the June 10, 1990 increase in analogue access costs. As of the date of the analysis, Unitel had not submitted a proposal for revised FasPac or Infodat rates.

The overall cost based on U.S. rates is 28% lower than the cost based on current Canadian rates. End to end, both the analogue and digital leased line costs



FIGURE 13
CASE STUDY 1



in the U.S. are significantly lower. U.S. analogue IXVG lines are less expensive than in Canada, but because U.S. T1 digital lines are frequently even less expensive, they were substituted for the analogue IXVG lines where the cross sections warranted the change. The total of the U.S. analogue IX and T1 components in Figure 13 provides the same service in terms of voice channels as the Canadian analogue IX component in the same figure and is roughly 50% of the Canadian cost. Only the packet switched service had higher costs in the U.S.

CASE STUDY 2

This company provides data processing services to government and private enterprises primarily within Ontario and Quebec. It spends several million dollars per year for the lease of data communications services from the telephone companies. This represents approximately 10% of its total operating budget. Roughly 25% of the services purchased are analogue, with about 10% falling to Dataroute and 25% to Datapac. Almost one third of the cost is for Megastream (DS0) digital channels and digital channel access, all of which is within Ontario and Quebec.

COST STRUCTURE

The relative costs for the three rate structures are depicted in Figure 14 on page 39, and are summarized as follows:

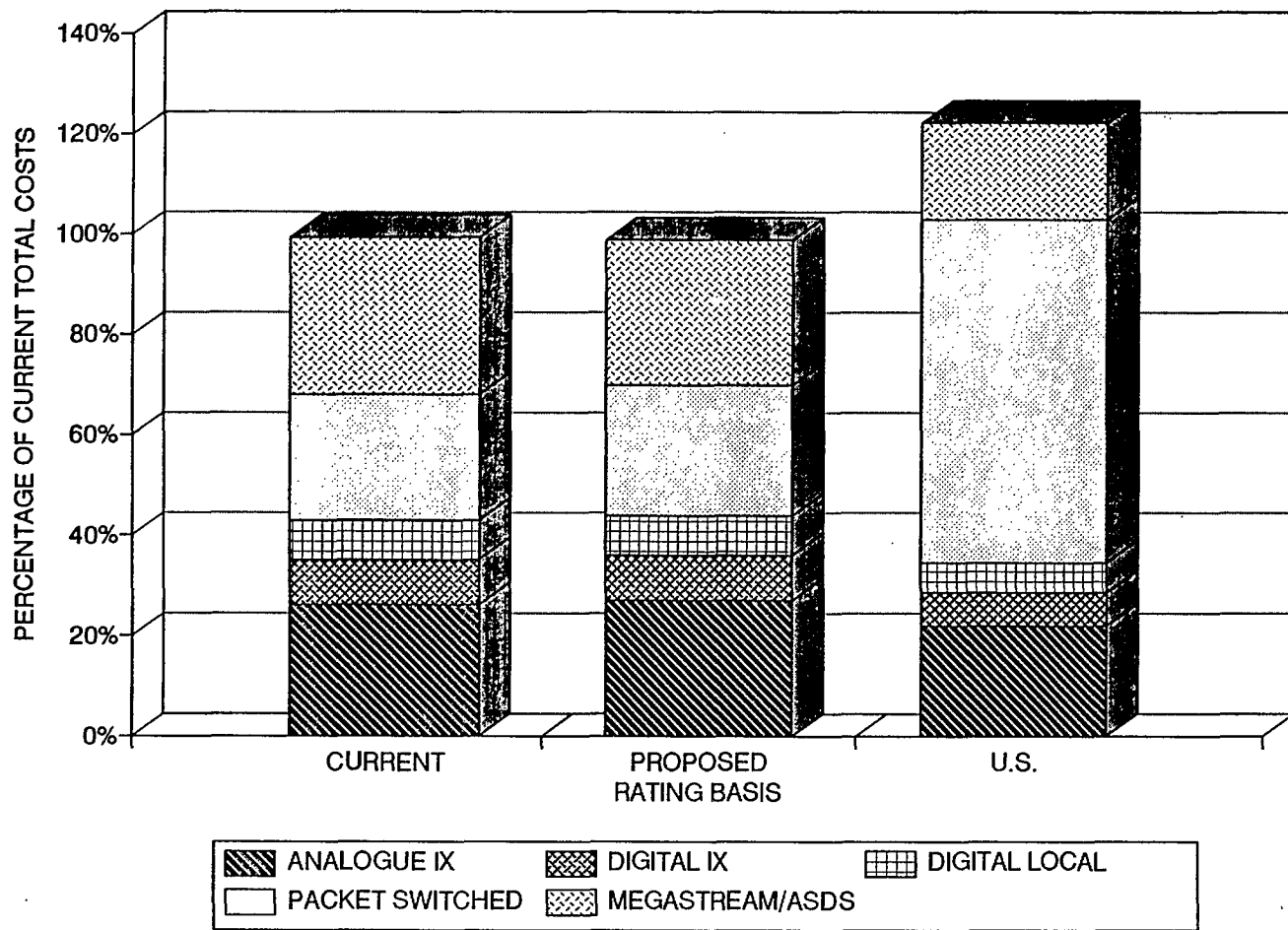
Current Tariffs	100%
Proposed Tariffs	99%
U.S. Tariffs (\$ Cdn)	123%

The total of the differences between the current Canadian and proposed tariffs is negligible, with the Megastream costs decreasing by about 8%, offset by 3% increases in each of Datapac charges and analogue costs. It is interesting to note, as in Case 1 that the Dataroute costs will drop due to the tariff changes, although in this case the drop is marginal. As this company has been using the Dataroute day rate discount which will be eliminated if the proposed tariff is approved, the 10% savings in Case 1 is virtually eliminated in this situation.

Using U.S. rates, the analogue cost reduction is less significant than in Case 1, as the higher cost access component is more of a factor than in the prior case,



FIGURE 14
CASE STUDY 2



offsetting the IXVG savings. As before, the Packet charges are substantially higher in the U.S. As packet switched services are a more significant component of this company's data communications costs, the high U.S. packet cost causes the total cost based on U.S. rates to exceed the cost based on Canadian rates.

In summary, then, for Case 2, the changes proposed by Telecom Canada would have a minor effect on the total data communications cost. Using U.S. rates, although analogue and digital communications costs are lower, the total cost would be roughly 20% more than current costs, primarily because of the higher cost of packet switching in the U.S.

CASE STUDY 3

The third sample company is in the on-line database and publishing business. The database access service is provided through Datapac which accounts for just over 50% of its roughly half a million dollars in total data communications expenditures and represents over 10% of the operating expenses for the database division. Digital interexchange circuits from Bell/Telecom Canada and Unitel account for another 47% of these expenditures, with analogue circuits making up the balance.

COST STRUCTURE

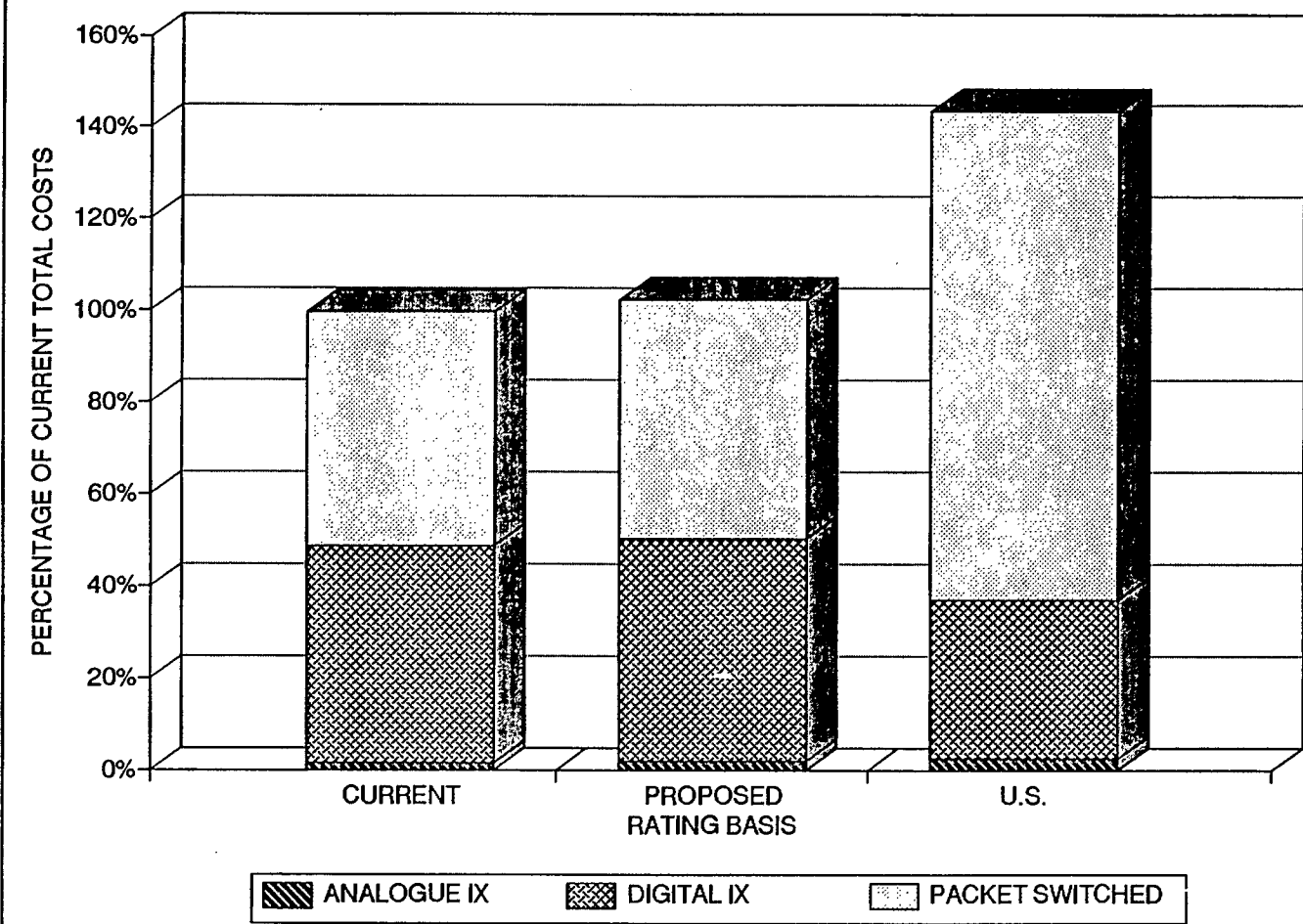
Figure 15 on page 41 illustrates the impact of the various tariff structures on the data communications costs for Case 3. The overall result can be summarized as follows:

Current Tariffs	100%
Proposed Tariffs	103%
U.S. Tariffs (\$ Cdn)	144%

As can be seen in Figure 15, there is little change from the current rates to the proposed rates, with the 3% increase in overall costs due to proposed increases in Datapac network charges. However, the very significant increase in rates which would be experienced by this company if U.S. rates were adopted is due to its extensive use of dial-up Datapac for which the U.S. equivalent, conventional BT Tymnet, is significantly more expensive than Datapac. Since it is dial-up business for its database service, BT Tymnet's X-Link service is not an appropriate substitute.



FIGURE 15
CASE STUDY 3



The increase which would result from the adoption of BT Tymnet rates for packet switching is so significant that it completely masks the cost reductions which would result from substituting AT&T and MCI digital circuit rates for those of Bell/Telecom Canada and Unitel, respectively.

CASE STUDY 4

This company is a systems integrator with offices across Canada, in the U.S., and internationally. Only its data communications services within Canada have been included in the analysis.

During discussions, representatives of the company pointed out that their Canadian operation was somewhat unique in that it made extensive use of packet switching services (Datapac) in Canada, while its U.S. operation used almost exclusively leased lines. The company would prefer to use leased lines in Canada because its technical architecture is more conducive to this infrastructure. However, it uses Datapac because the cost of leased lines in Canada is too high.

The Canadian operation spends two to three hundred thousand dollars per year on data communications services, of which 97% is Datapac and the remainder is FacsRoute.

COST STRUCTURE

Figure 16 on page 43 shows the result of repricing Case 4's data communications and FAX usage using various tariff structures. The overall result can be summarized as follows:

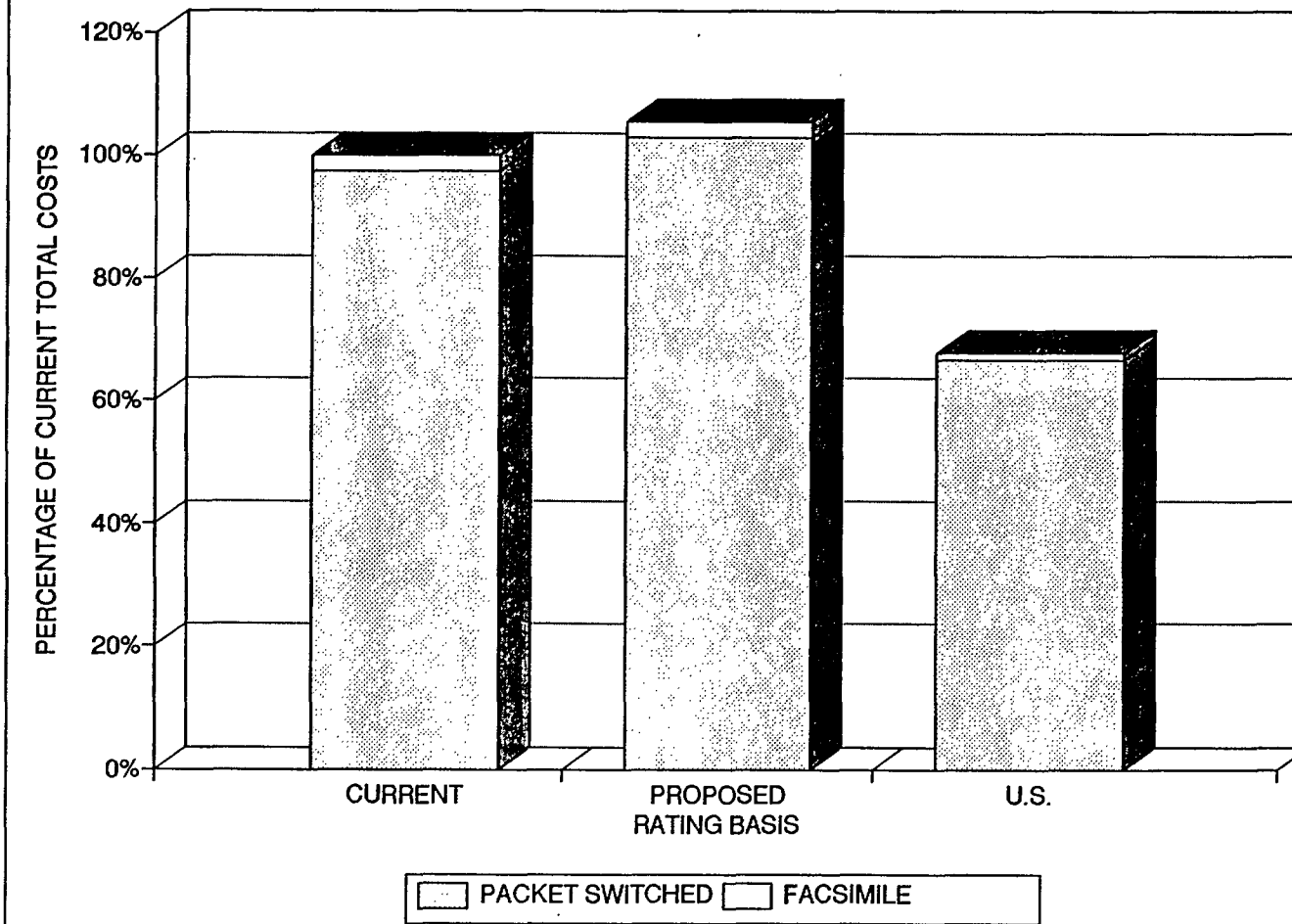
Current Tariffs	100%
Proposed Tariffs	106%
U.S. Tariffs (\$ Cdn)	68%

The 6% increase from the current to the proposed Bell/Telecom Canada tariff is entirely due to the proposed increase in Datapac access and network rates.

With respect to the U.S. rates, this case is different from the first three cases. Since all the packet switched data is intra-corporate involving dedicated Datapac 3000 access, the closest BT Tymnet comparator is its X-Link service. As noted



FIGURE 16
CASE STUDY 4



earlier, this is a virtual private line service with no charge for characters sent between X-Link ports. A reduction in packet switched costs of 32% would result from the use of U.S. X-link rates converted to Canadian dollars in place of Datapac.

It should be noted that while this volume-independent rate is the appropriate rating basis for use in this analysis, the X-Link service provided by BT Tymnet in Canada does include a charge of 2.6¢ per kilocharacter.

The substitution of MCI Dial-1 rates for FacsRoute rates would result in savings of 49% on facsimile costs.

SUMMARY OF LARGE COMPANY RESULTS

The results for the four large company case studies are summarized in Table 4 following.

Table 4: Summary of Case Study Results

<u>Rating Basis</u>	<u>Case 1</u>	<u>Case 2</u>	<u>Case 3</u>	<u>Case 4</u>
Current Tariffs	100%	100%	100%	100%
Proposed Tariffs	98%	99%	103%	106%
U.S. Tariffs (\$ Cdn)	72%	123%	144%	68%

SMALL COMPANIES

Three small companies participated in the study. Of the three, only two had a mix of data traffic amenable to inclusion in this analysis, and that was composed only of FacsRoute.

All three companies are in the software development business in British Columbia. The first company spent approximately \$900 per year on FacsRoute. Savings to this company of approximately 42% of its variable FacsRoute costs or



\$328 per year plus the subscription charge would result from the adoption of MCI rates.

Similarly, the second small company used FacsRoute in the amount of about \$750 per year. Savings on the variable portion of its FacsRoute charge of \$264 plus the subscription charge would result if U.S. rates were implemented.

The third company used conventional message toll service (MTS) both for FAX, in the amount of approximately \$2,500 per year, and for dial-up data transmission in the amount of \$16,000 per year. However, since MTS is excluded from this analysis, no change would result.

OBSERVATIONS AND CONCLUSIONS

The most significant observations to note are as follows.

With respect to the mix of services used by the companies in the case study group:

- All use data communications or facsimile services from more than one Canadian carrier.
- Only one company used advanced digital services (Megastream).
- None of the companies in the sample used T1 service.
- All companies used packet switched data services, in one case from more than one Canadian carrier.
- Analogue services are commonly used for data by two of the four companies, in one case in substantial amounts.
- Only one of the four companies used a dedicated facsimile service (FacsRoute).



With respect to the impact of the proposed Bell/Telecom Canada Tariffs contained in Tariff Notice 3420:

- The most significant rate decreases proposed are for the interexchange portion of high speed digital services (DS0, DS1), which has little impact on these companies given current usage.
- Although it is proposed to reduce Dataroute IX charges, the elimination of the business day rate means those customers who have been benefiting from the business day rate discount will lose that advantage.
- The proposed increase in packet switching rates affects all companies in the sample.
- The proposed reductions in T1 rates might make the replacement of multiple analogue circuits by a T1 cost-effective if the volume discounts are considered. However, the decision to change services would depend on the potential to multiplex lower speed data lines onto the T1 link, and the cost of the multiplexing equipment needed for the task.
- Overall, the bottom line impact of the proposed Bell/Telecom Canada tariff revisions on data communications costs for the companies in the sample is not large, ranging from a reduction of 2% to an increase of 6%.

With respect to the impact of repricing current usage at U.S. tariffed rates:

- The costs of analog and digital facilities would decrease, and the costs of packet switched services would increase, for most companies in the sample. The exception is the one company which uses a "plain vanilla" X.25 service with no protocol conversions, for which BT Tymnet's X-Link service would be suitable.
- T1 service proves in more readily at U.S. rates and would likely replace much of the current IXVG usage.



- The bottom line impact of repricing current usage based on U.S. tariffed rates on data communications costs for the companies in the sample is highly dependent on the mix of services used. Where the volume of conventional packet switched data is low, costs would decrease by almost 30%, but where the volume of conventional packet switched data is high, increases of 32% to 45% would result. In the case where X-Link is applicable, a reduction of 32% would be the result.



OVERALL CONCLUSIONS

The overall conclusions of the study are provided under the following headings:

- Service availability
- Rate comparisons
- Case studies

A short concluding comment is also provided.

SERVICE AVAILABILITY

In spite of the concerns voiced by members of the data processing, information service and software industries with respect to the availability of telecommunications services in Canada, it is noted that companies in the sample group did not use even the full range of high speed digital services available today. Therefore, the availability of services does not appear to be a significant issue.

It is further noted that the modifications proposed in Tariff Notice 3420 include a DS3 offering. Unitel has also filed DS2 and DS3 tariffs. These offerings should meet most requirements in the short to medium term.

RATE COMPARISONS

As noted earlier, the objective of the rate comparisons was to provide comparisons among the rates charged by a number of carriers for a range of services. At the time of the analysis, Unitel had not made a filing in response to Bell Canada's Tariff Notice 3420, so only Unitel's current rates could be taken into account in the analysis.

Looking at the service-by-service rate comparisons, it is apparent that the major differences between the current and proposed rates are in high speed digital services. With respect to the Canada-U.S. comparisons, the seven times factor for T1 rates is borne out, although the proposed reductions will bring this factor to about four. Comparing packet switching rates in Canada and the U.S., enhanced



packet switching services are more expensive in the U.S., but basic X.25 service is cheaper with the introduction of X-Link.

It is not appropriate to draw any overall conclusions from these comparisons. The bottom-line comparison in terms of any one user depends on the mix and volume of services offered. For this reason, a number of case studies of large and small companies has been included as part of this study. The results of repricing the mix of services used by companies included in the sample is the only appropriate way to make overall comparisons and to draw overall conclusions.

CASE STUDIES

With respect to the mix of services used by the companies in the case study group, it was noted that all use data communications or facsimile services from more than one Canadian carrier. However, only one company used advanced digital services (Megastream), and none used T1 service.

The bottom line impact of the proposed Bell/Telecom Canada tariff revisions on data communications costs for the companies in the sample is not large, ranging from a reduction of 2% to an increase of 6%.

The bottom line impact of repricing current usage based on U.S. tariffed rates on data communications costs for the companies in the sample is highly dependent on the mix of services used. Where the volume of conventional packet switched data is low, costs would decrease by almost 30%, but where the volume of conventional packet switched data is high, increases of 23% to 44% would result. In the case where X-Link is applicable, a reduction of 32% would be the result.

CONCLUDING COMMENT

It should be emphasized that the approach used here provides results which are valid within the context of what is being compared. The element by element comparison for data services yields a number of ratios for each service, but does not lend itself to the assessment of overall impacts. At the same time, the repricing of total company usage indicates the impact of U.S. rates and Bell proposed rates on one company, but does not provide a basis for drawing conclusions with respect to the whole population of data communication users.



APPENDIX A
TERMS OF REFERENCE



Statement of Work

Business Telecommunications Costs in Canada and the U.S.:
Differentials and their Economic Impacts

BACKGROUND

Telecommunications services are becoming an increasingly important input in the production and distribution of a wide range of goods and services. Canadian businesses in every sector of the economy use these services to improve their operational efficiency and strategic competitiveness in globalized markets. In some information-intensive service sectors like financial services, telecommunications costs have already become a major element in the overall cost structure.

Issues surrounding the comparative cost and availability of telecommunications services are receiving increasing attention from the Canadian business community. There is a widespread perception that business telecommunications costs in general, and data communications costs in particular, are unduly high in Canada compared to the U.S. These cost differentials are perceived as significant handicaps for Canadian businesses operating in a North American market created by the Free Trade Agreement. Firms operating in the information sector have implied that the perceived handicap of these cost differentials could have significant negative impacts upon decisions to locate research, design and development activities in Canada.

OBJECTIVE

The purpose of this study is to determine whether data communications costs are significantly higher in Canada than in the U.S. and if so, what impact these cost differentials might be having on research, design and development activities in the information sector. The specific sub-objectives are as follows:

- i) Compare representative sets of data communications services in Canada and the U.S., with respect to prices and availability of service offerings;
- ii) Assess the economic impacts of differentials in costs and service offerings upon different groups of firms engaged in research, design and development activities in the information sector.

SCOF

It is obviously impossible to compare every tariffed business telecommunications service offered in Canada and the U.S. The work will therefore focus on creating representative baskets of data communications services, which can be meaningfully compared with respect to prices and service offerings. Voice communications services such as MTS and WATS, offered over the public switched telephone network, will be excluded because they were extensively studied in the Sherman Task Force Report on Long Distance Competition. Special attention will be paid to T1 and higher bandwidth carrier facilities, which form the backbone of high-speed private networks. Attention will also be paid to regional variations in service offerings and prices across Canada and the U.S.

The impact assessment will be based upon a small number of in-depth interviews, with a group of firms selected from the CADAPSO membership. Large, medium sized and small firms will be represented, to the extent possible.

SCHEDULE OF TASKS

1. Select from the CADAPSO membership a sample of small, medium sized and large companies for conducting in-depth interviews. Use these interviews to explore and collect information regarding the actual data communications services used, the services required that are not available in Canada and the significance of telecommunications expenditures in terms of total operating expenditures.
2. Construct groupings of data communications services which are delivered via:
 - i) The public, switched telephone network (PSTN), eg. facsimile, gateway services, videotex and audiotex;
 - ii) Telco and third-party data networks, eg. electronic mail and messaging, EDI, electronic information services; and
 - iii) Private and shared-private networks.
3. For the selected groups of data communications services, perform Canada-MCI and U.S. rate comparisons using:
 - i) Current and proposed Telecom Canada and CNCP rates; and
 - ii) AT&T rates for the bulk of U.S. interexchange services, Tymnet rates for packet switched data services and New York Telephone tariffs for access and other local rates. MCI and U.S. Sprint rates should also be examined for T1-T3 services.
4. Construct typical "baskets" of data communications services and compare the end-to-end costs of these baskets of services and facilities, for representative usage volumes and distances, using Canadian and U.S. rates.

5. Identify those service offerings which:
 - i) are currently provided in the U.S. but not in Canada (eg. T3 services), or
 - ii) have significantly higher prices in Canada.
6. Determine the impacts of differentials in costs and service offerings upon the operations of the companies interviewed, and attempt to draw conclusions from these findings which will be applicable to the industry as a whole.

DELIVERABLES

1. Data on individual companies, collected through the in-depth interviews, will be treated as company confidential and excluded from the final report.
2. All other data including details of the rate comparisons, baskets of services, availability of services, costing of baskets of services, and assessment of the economic impact of service differences and rate differentials, will be provided in the interim and/or final report.
3. The final report will be provided:
 - i) in hardcopy form (5 copies); and
 - ii) in machine-readable form, on a diskette, using a wordprocessing program like WORDPERFECT.
4. Rate and cost comparison information will also be supplied in machine-readable form, for further possible use by DOC.

