Network Structures & Costs in Germany

Addition to WP 430:
2-Mbit Experimentation

IRIS™ MEDIA

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- 20/50 Batch operations per month

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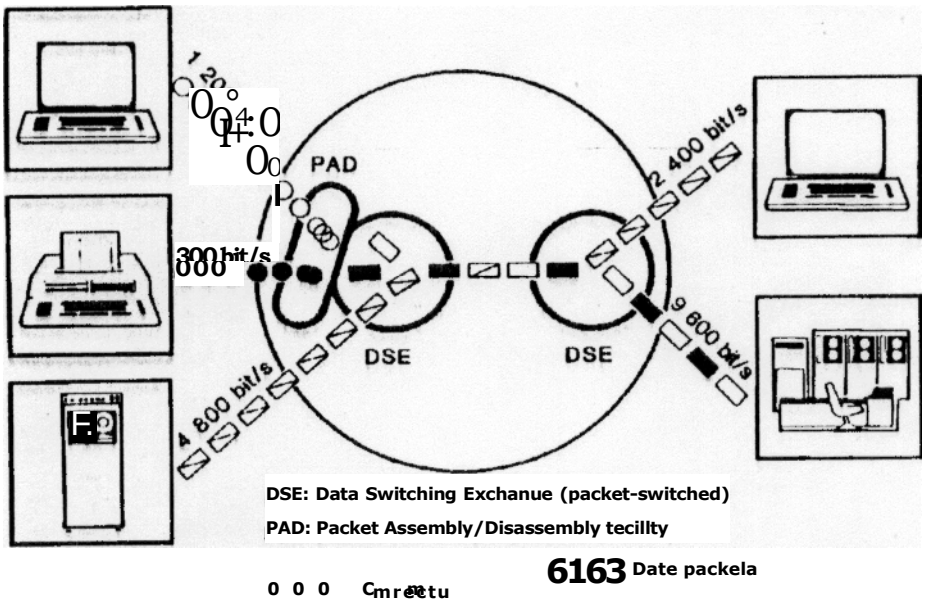


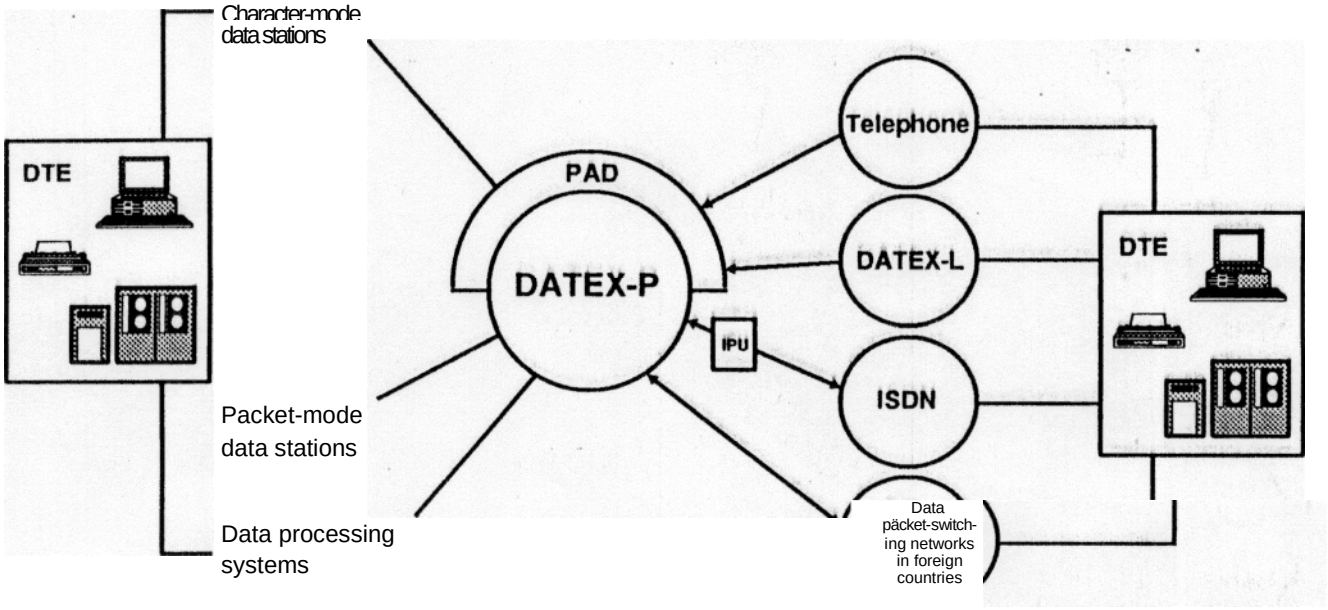
Principle of packet-swi tching (DATEX-P)

For traffic relations which must be constantly available, permanent virtual circuits can be provided upon request.

Agreement an the technical parameters of the link access procedures (protocols) for exchanging data between two terminals has to be reached. Other than manufacturer specified protocols, the CCITT recommendation X.25 has been adopted worldwide.

Customer accesses for packet-switched connections

Other customer accesses for switched connections



DTE = Data Terminal Equipment

IPU = Interworking Port lJnit

DATEX—P access possibilities

1.2 DATEX-P in the Public Telecommunications Network

Data switching exchanges (packet-switched) installed at 21 locations and interconnected by high speed circuits allow DATEX-P to be offered under the same conditions in the whole service area of Telekom. The installation of further DATEX-P exchanges is planned for the near future.

The data switching exchanges (DSE) and trunks are so designed that enough spare capacity is available for peak traffic.

1.3 Charges

A DATEX-P access is provided against payment of a monthly basic charge which includes the data circuit-terminating equipment. It only depends an the data signalling rate used; whereas, the distance to the data switching exchange is of no importance.

The call charges are mainly determined by the data volume transmitted within an accounting period of about 30 days. Owing to the graduation of charges according to the volume of data transmitted, the time of day and the possibility for the subscriber to choose the optimal facilities, DATEX-P can be used economically for a wide range of applications, especially in the dialogue mode.

DATEX-P charges are distance independent. Therefore, the telecommunications charges need not be considered when the location of the outstations and of the data processing system is chosen.

More details below:

1.3.1 Charges for provision (non-recurring charges)

for each customer access for packet-switched connections (DATEX-P access)	DM 200.-
* for a network user identification (NUI), applicable for dial-up port (PAD)	DM 10.-

1.3.2 Monthly basic charges for each DATEX-P access including Data Circuit Terminating Equipment

Note: Because the connections up to 64,000 bit/s are planned, the prices are included here.

	300 bit/s	(DATEX-P20H, X.28)	DM 120.-
*	1,200 bit/s	(DATEX-P20H, X.28)	DM 160.-
*	2,400 bit/s	(DATEX-P20H, X.28)	DM 220.-
*	2,400 bit/s	(DATEX-P10H, X.25)	DM 220.-
*	4,800 bit/s	(DATEX-P10H, X.25)	DM 320.-
*	9,600 bit/s	(DATEX-P10H, X.25)	DM 420.-
*	48,000 bit/s	(DATEX-P10H, X.25)	DM 2500.-
*	64,000 bit/s	(DATEX-P10H, X.25)	DM 1500.-

1.3.3 Monthly surcharge per DATEX-P access added to the basic Charge

* multi-access for each additional logical channel (one logical channel is included in the basic charge)	DM	5.-
* reverse charging acceptance	DM	10.-
ciosed user group	DM	10.-
* direct call	DM	5.-
* subaddress up to 10	DM	10.-
up to 100	DM	30.-
up to 1,000	DM	100.-

1.3.4 Monthly charges for NUI (Network user identification)

* for the first NUI	DM	15.-
* each additional NUI	DM	5.-

1.3.5 Charges for Connections to public dial-up port from other services

* Telephone service	ordinary call charges (distance dependent)
* DATEX-L service	call charge as in the lowest distance (distance independent)

1.3.6 Access charges from other services to the PAD

* up to 2,400 bit/s	DM	0.04/min.

1.3.7 Charges for PAD usage

	dial-up port	DATEX-P access
* switched virtual circuits	0.06 DM/min	0.06 DM/min*
permanent virtual circuits (PVC)		180.-- DM/month

* Per DATEX-P access the maximum PAD usage charge is 180 DM per month for national traffic, as long as no reversed charging is applied.

1.3.8 Call set-up charges

	dial-up port	DATEX-P access
* per call	0.05 DM	0.05 DM

1.3.9 Call charges for international connections

country of destination *(those listed are GEOTEL partners' countries)*	duration charge DM/minute	volume charge DM/segment 1)
Belgium	0.05	0.005
France	0.05	0.005
Greece	0.05	0.005
United Kingdom	0.05	0.005

1.4 Data Packet-switching with ISDN and DATEX-P

In reference to data communication, ISDN is closer to DATEX-L than DATEX-P in its conception. It is - currently - a circuit switched but not a packet switched network. However, ISDN offers feeder port services to DATEX-P; that means that Datex-P services and participants can also be reached from a universal connection.

This offer is interesting for those who have an ISDN universal connection and only wish to use Datex-P occasionally, as they are spared the expense of getting their own Datex-P main connection. In order to do this, an X.25 end terminal (authorized for Datex-P10) and a terminal adapter TA-X.25 are needed. The TA-X.25 is available through the Deutsche Bundespost Telekom (DBPT) and the industry. The call charges are currently about the same as those for Datex-P main connections. The monthly fixed charges are comparable to those of a universal connection: charges for the TA-X.25 and for the connection transition to Datex-P. The ISDN connection charge is included in the monthly charges for the TA-X.25; the participant pays only the regular Datex-P charges.

In this way, one can have a full X.25 connection, which can also be used with synchronous and asynchronous PADs (packet assembly/disassembly facility), terminal emulations, X.25 gateways and LAN accesses. The speeds which can be reached are the same as for conventional end terminals (up to 19,200 bit/s). All X.25 connections together fill up a B-channel and run continually over Datex-P. In pure in-house traffic (without the detour over Datex-P), the TA-X.25 cannot be used, due to the fact that it can only communicate with a network entrance to Datex-P.

If a PC or other machine is being used, an ISDN connection card is needed, on which the TA-X.25 function is integrated. Advantage: this situation offers higher speeds, facilitates the integration of PADs and also allows for direct participant connections under some conditions without the detour over Datex-P.

In the long run, Datex-P will still remain an independent network next to ISDN. At this time, the existence of the two networks still has an effect on the user (>Minimal integration‹). In the near future, the ISDN participant will only see ISDN and no longer Datex-P. A stronger (>maximal<) integration of packet switching and ISDN will be available in 1993 at the earliest. The advantage of such an Integration is that the following would also be usable for packet-switching traffic: use of the ISDN address, single stage selection, full 64 KByte/s on the B-channel, D-channel as a third way of transmission with 9,6 KByte/s, a genuine X.25 ISDN end terminal and performance characteristics of ISDN.

		from	to
Meter pulse counter			
East	DM	5,20	
West	DM	0	
Complementary telephone units			
East	DM	0	10 (2,30 DM)
West	DM	20 (4,60 DM)	10 (2,30 DM)

New time-pulses in the new Eastern states, also for connections in the Western states

Local Zone		
Normal tariff	60 seconds	60 seconds
Discount tariff	60 seconds	120 seconds
Non-local zone		
Normal tariff	21 seconds	21 seconds
Discount tariff	28 seconds	42 seconds

The tariffs for telephone line rentinq were restructured as follows:

~~Analogue permanent circuit connections~~

Permanent circuit connections (Monopoly)	0		
Installation		2 x 65,-	2 x 300,-
Basic Charge			2 x 12,50
Distance dependent local zones		60,- or	4,-
		120,-	1,20
			0,40 per 100 m

	from	to
Permanent circuit connection 1 (Competitive)		
Installation	2 x 65,-	2 x 300,-
Basic charge	2 x 5,-	2 x 12,50
Distance dependent (unchanged)	4,-	4,-
	1,20	1,20
	0,40	0,40

2.2 ISDN

These charges will increase much more than in analogue or in other connections.

Digital permanent circuit connections

Basic rate access:

Installation	2 x 130,-	2 x 600,-
Basic charge	2 x 74,-	max. + 50 %
Distance dependent each month	4,-	until 30.6.1992
	1,20	
	0,40	per 100 m

Primary rate access:

Installation	2 x 200,-	2 x 600,-
Basic charge	2 x 518,-	max. + 50 %
Distance dependent each month	4,-	until 30.6.1992
	1,20	
	0,40	

2.3 Other connections

On-line data connections

50 bit/s and 300 bit/s

Charge increase for all distances up to 100 %

1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, 64 kbit/s, 1,92 Mbit/s

Short transmission paths will become more expensive, longer transmission paths will become cheaper.

International leased line

Installation:

Analogue	200	500
Digital	200	1000

Cancellation of extra charge (30 %) for transmission paths with access to switched network

Further tost savings, e.g. 25 % for analogue lines USA

18 % increase for underwater 2 Mbit/s lines to Japan

Cancellation of extra system charge 2,-/per extension

Note: These charges are an update to the detailed charges presented in July, 1990 in Work Package 210, Section 2.1.: Costs.

3. PTT (Deutsche Bundespost) Charges for X25 connections in ECU (taxes included)

(Those countries listed are GEOTEL partners' countries)

	National	Europe	Scand.	USA	Canada	Japan
Belgium	0.18	0.90	0.90	2.44	2.44	3.22
France	1.08	1.16	1.16	2.45	3.08	3.08
Gernany	0.69	0.80	0.80	1.67	2.23	2.59
Greece	0.38	1.37	1.37	4.21	4.21	4.21
UK	0.19	1.06	1.06	2.66	2.66	3.12

5. Model Calculations: Examples based an 1990 costs

Conclusions about the current tariffs, as seen in the following examples:

* ISDN switched connections are cheaper for long dialogues and batch traffic.

  ISDN permanent circuit connections are cheaper than HfD for all distances.

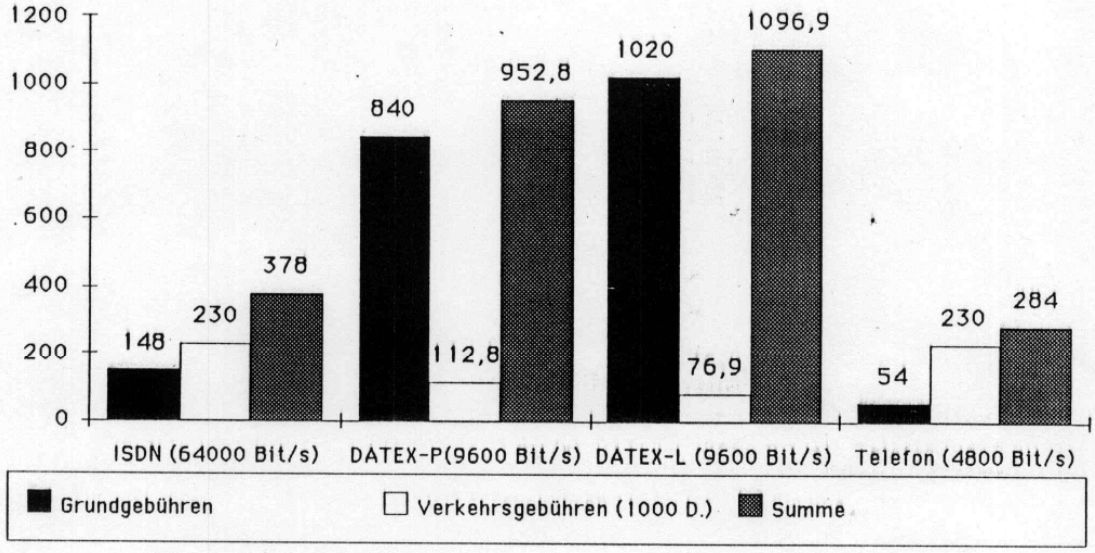
The further developments in tariffs will make ISDN even more attractive.

Switched Connections

Short Dialogue

Assumptions:

1000 Dialogues per month
1 KByte per dialogue
Distance > 100 km

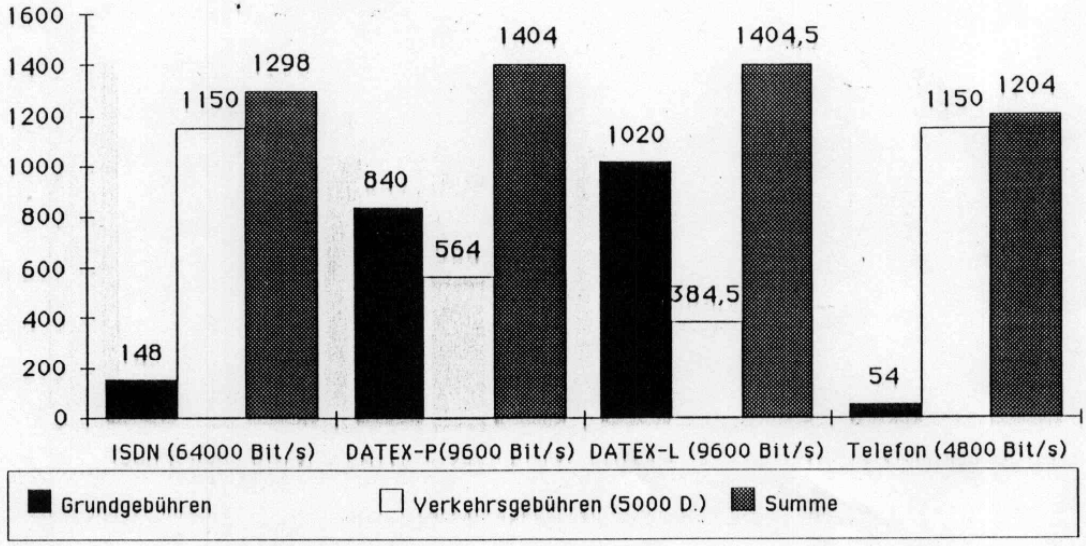


Switched Connections

Short Dialogue

Assumptions:

5000 Dialogues per month
1 KByte per dialogue
Distance > 100 km

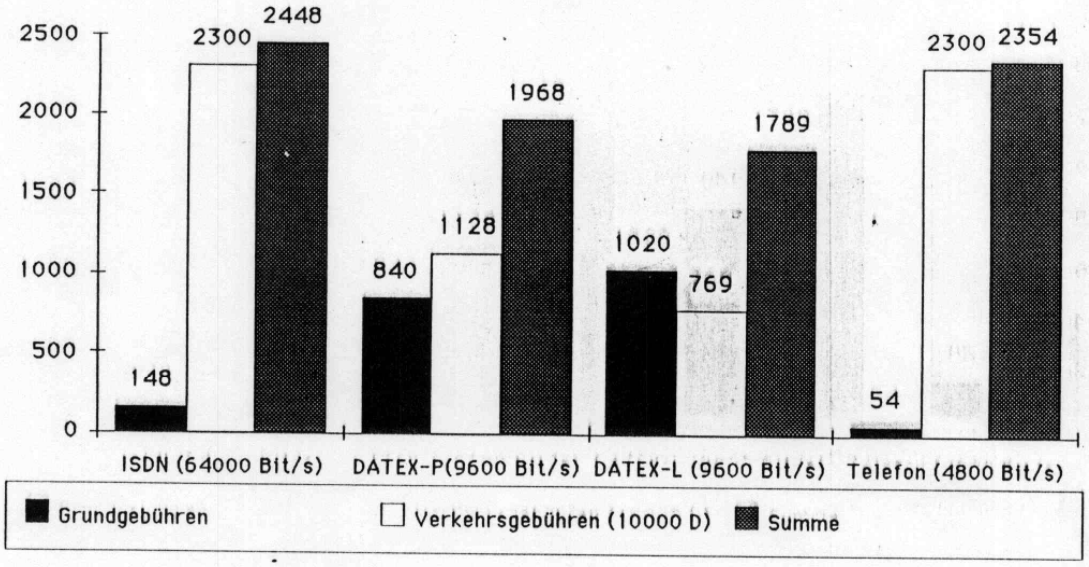


Switched Connections

Short Dialogue

Assumptions:

10,000 Dialogues per month
1 KByte per dialogue
Distance > 100 km

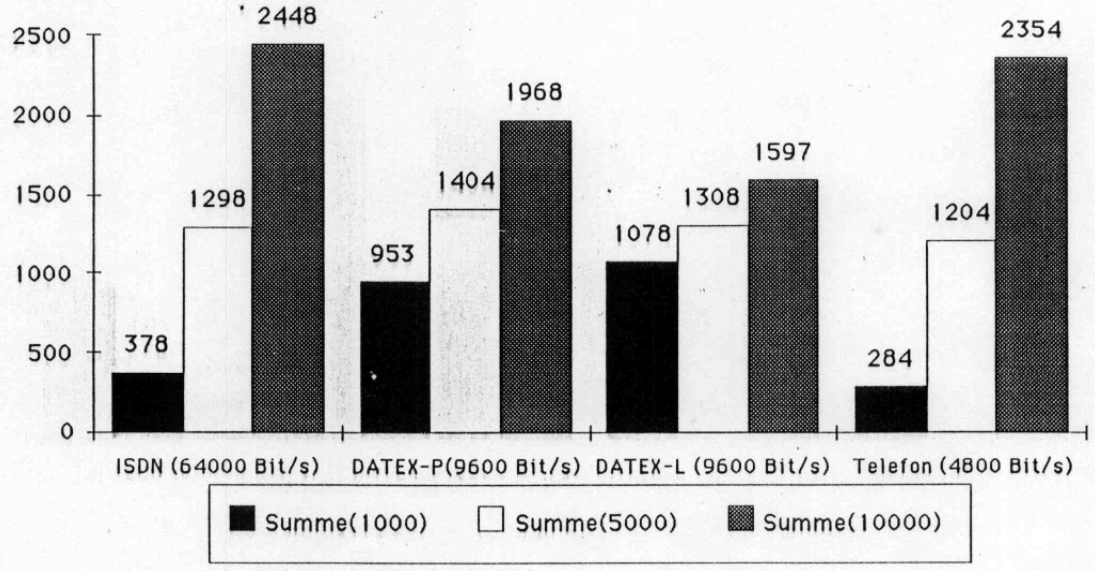


Switched Connections

Short Dialogue

Assumptions:

1000/5000/10,000 Dialogues per month
1 KByte per dialogue
Local

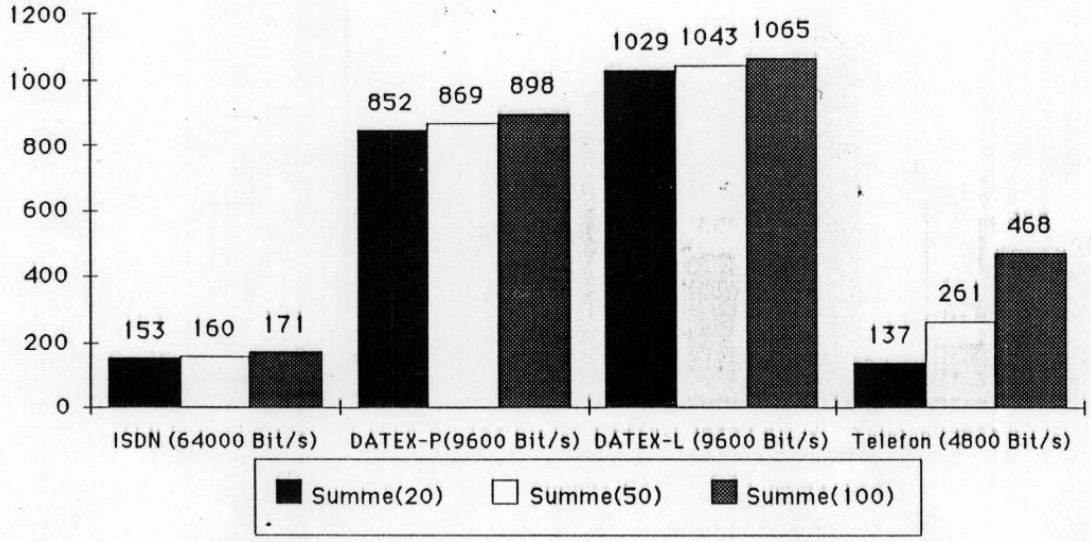


Switched Connections

Long Dialogue

Assumptions:

20/50/100 Dialogues per month
10 KByte per dialogue
Distance > 100 km

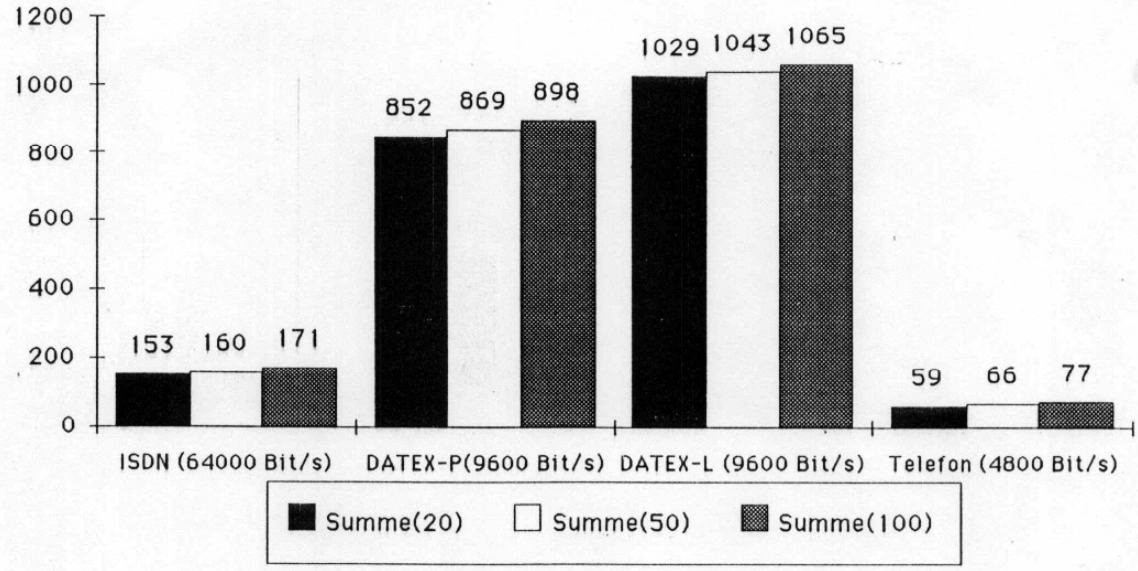


Switched Connections

Long Dialogue

Assumptions:

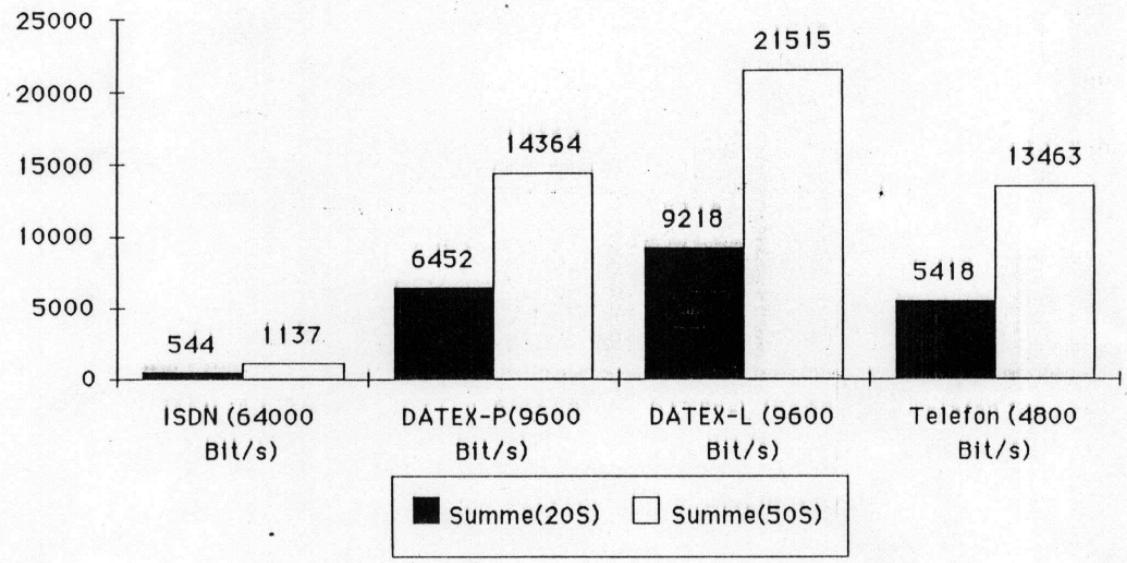
20/50/100 Dialogues per month
10 KByte per dialogue
Local zone



Switched Connections Batch Traffic

Assumptions:

20/50 Batch operations per month
10 MByte per Dialogue
Distance > 100 km



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