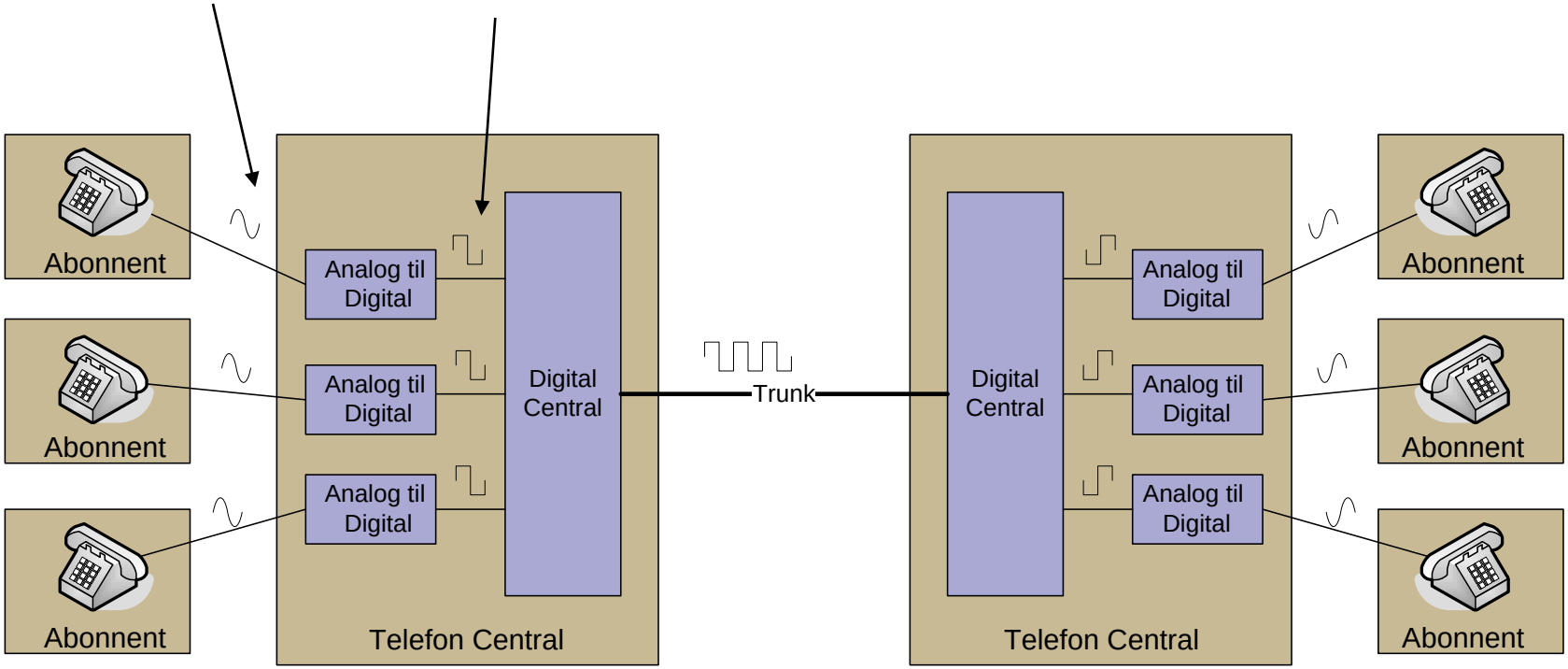
Repetition H1 Tele 2010

Principdiagram



ISDN BRA

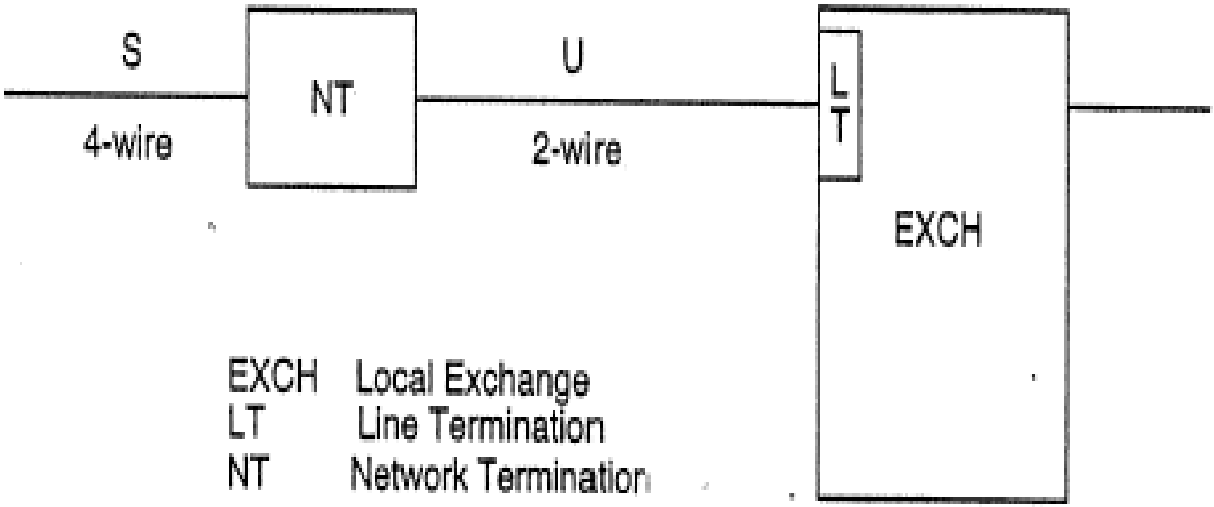
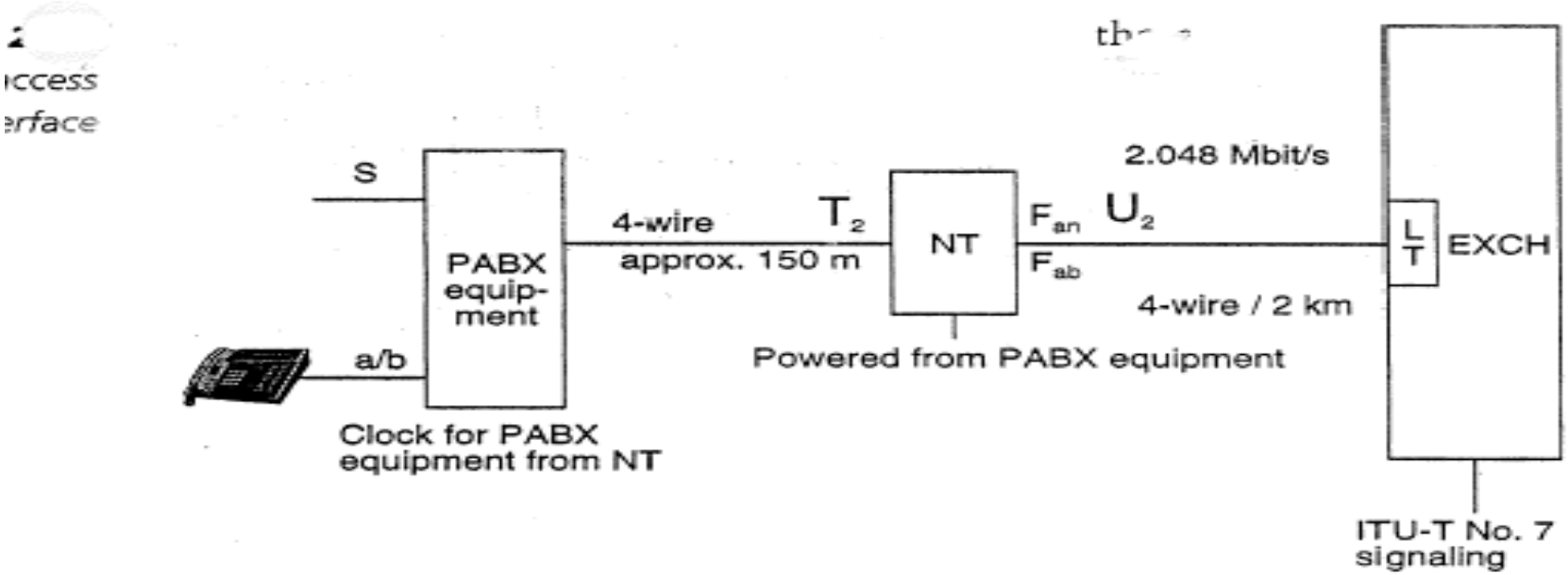


Fig. 2.9:
Basic access netw
termination

ISDN BRA

- 2 stk. B-kanaler af: 64 Kb/s
  1 Stk. D-kanal af 16 Kb/s

ISDN PRA
2 Mb/s = 30 tale-kanaler + 2 signalering af 64 Kb/s



Effekt

$$10 \cdot \log\left(\frac{p2}{p1}\right)$$

Spænding

$$20 \cdot \log\left(\frac{U2}{U1}\right)$$

Eksempler

- Effekt
  - Fordobling af effekten 10*log(2)= 3 dB
  - Firedobling af effekten 10*log(4)= 6 dB
  - 100dobling af effekten 10*log(100)= 20dB
- Spænding
  - Fordobling af spændingen 20*log(2)= 6 dB
  - Firedobling af spændingen 20*log(4)= 12 dB
  - 100dobling af spændingen 20*log(100)= 40 dB

Relative dBm

- dBm Relativ til 1mW ved 50 Ohm
- dBm ved 600 Ω medføre at dBm(600Ω):

$$\sqrt{P \cdot R}$$

$$\sqrt{0.001 \cdot 600} = 0.775$$ V1 ved 600 Ohm

$$\sqrt{0.001 \cdot 50} = 0.224$$ V1 ved 50 Ohm

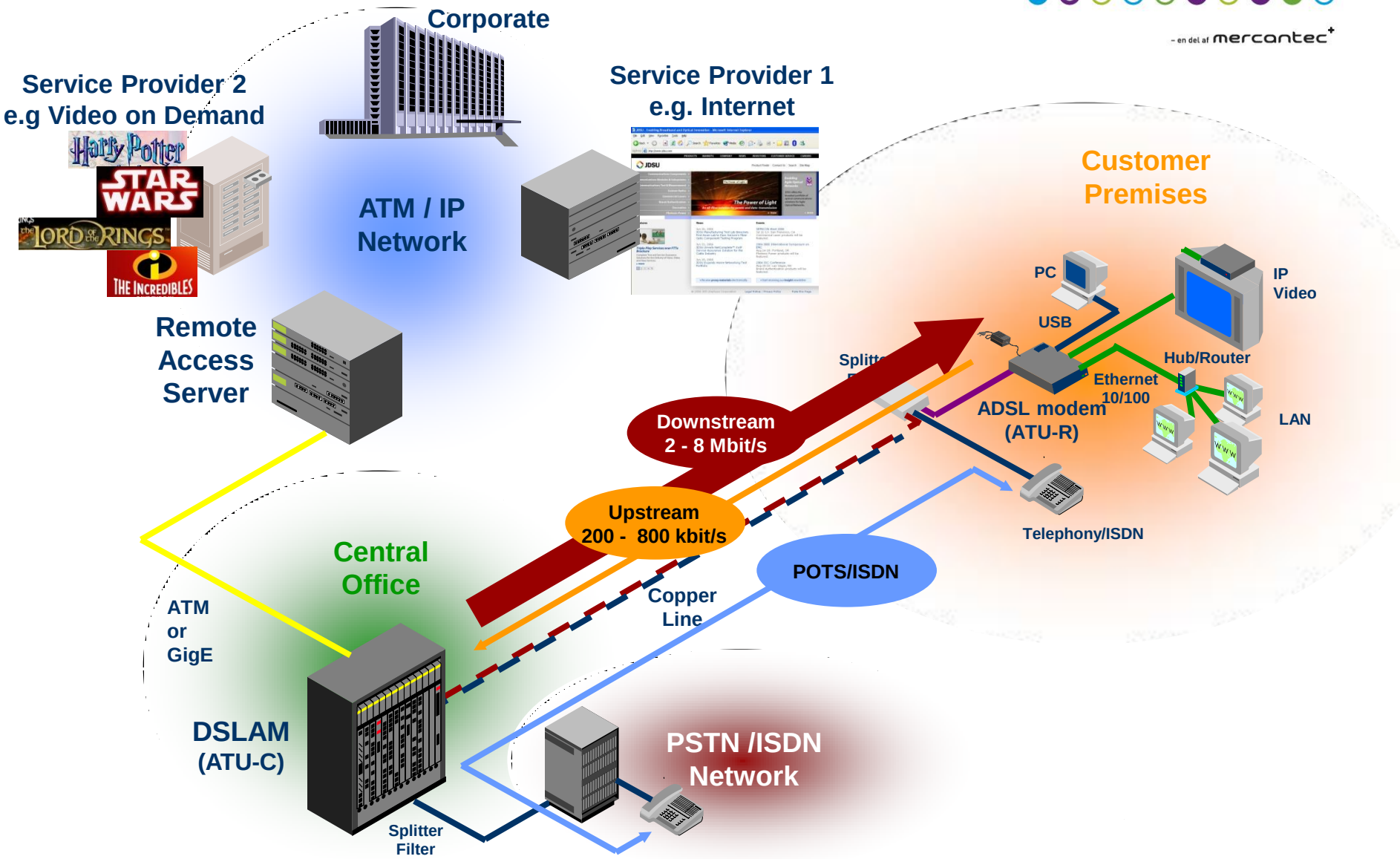
$$20 \cdot \log\left(\frac{U2}{0.775}\right)$$

Relative dBµV

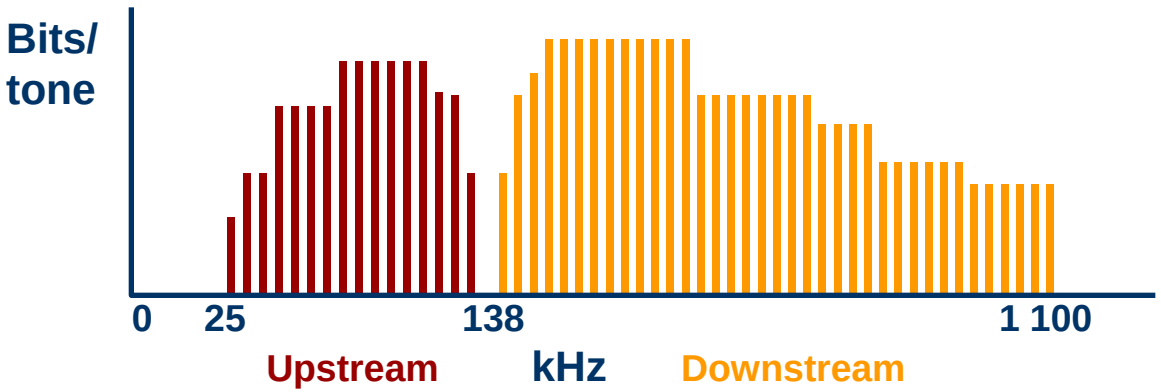
- dBµV Relativ til 1µV

$$dB\mu V = 20 \cdot \log\left(\frac{U2}{10^{-6}}\right)$$

ADSL in the Network



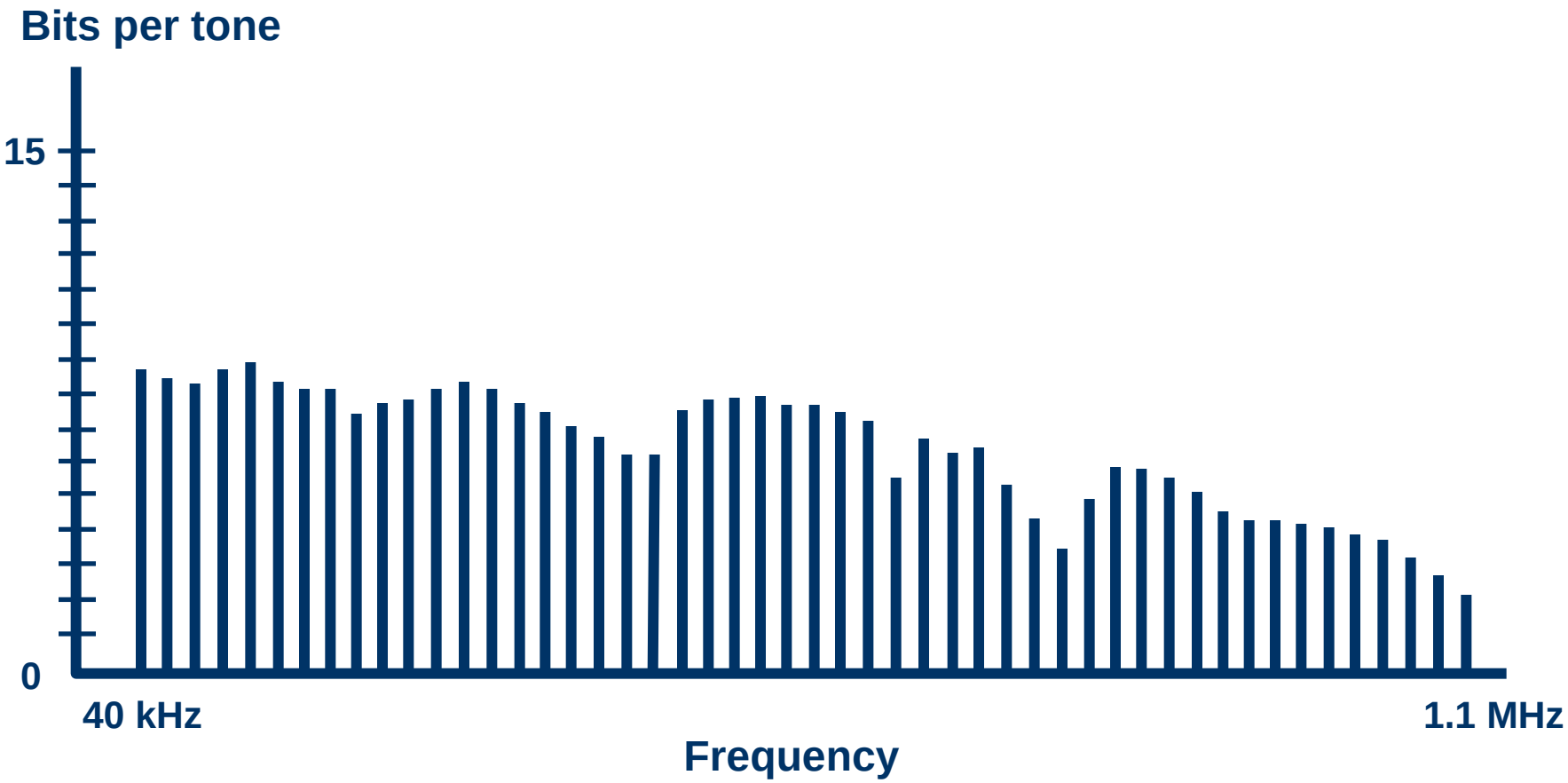
ADSL and DMT (Discrete Multi Tone)



- Worldwide standard line code for ADSL
- Wideband variable spectrum signal
- Bit swapping helps to adapt to loop problems
- Maintains BER $<10^{-7}$
- Many ways of carrying IP over ATM

- 256 Carrier tones (512 for ADSL2+)
- Each tone carries a QAM signal
- 4.3125 kHz/tone
- 4096 baud/tone
- Up to 15 bits/Baud (bits/tone)
- 0 to 61.440 bits/second/tone

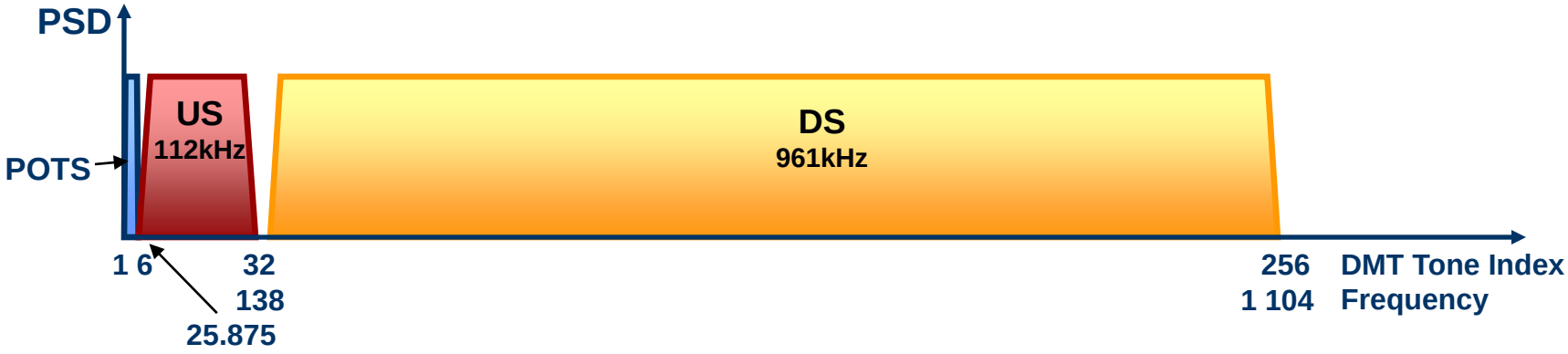
Signal to Noise Ratio (SNR) and DMT



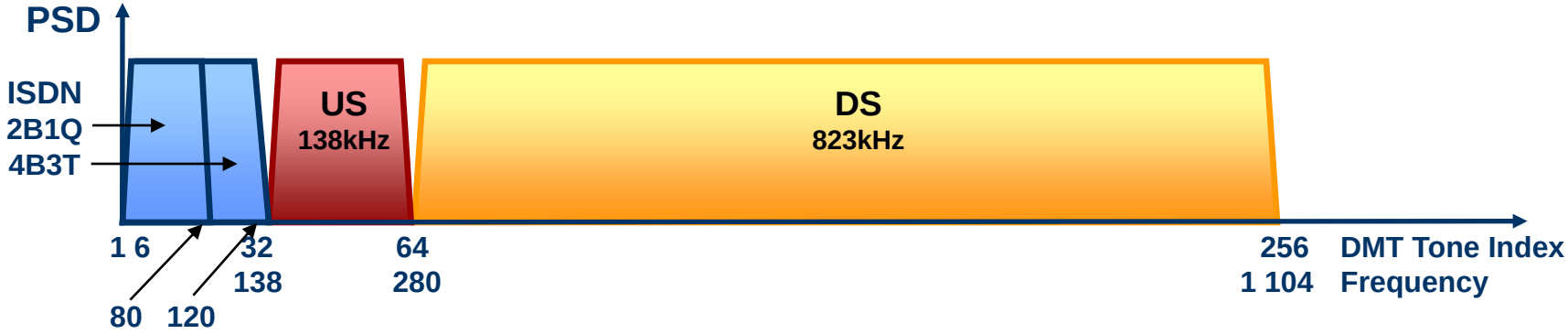
ADSL over POTS vs. ADSL over ISDN

ITU-T G.992.1 Annex A vs. Annex B

ITU-T G.992.1 Annex A, AoPOTS, Non-overlapped spectrum (FDM)



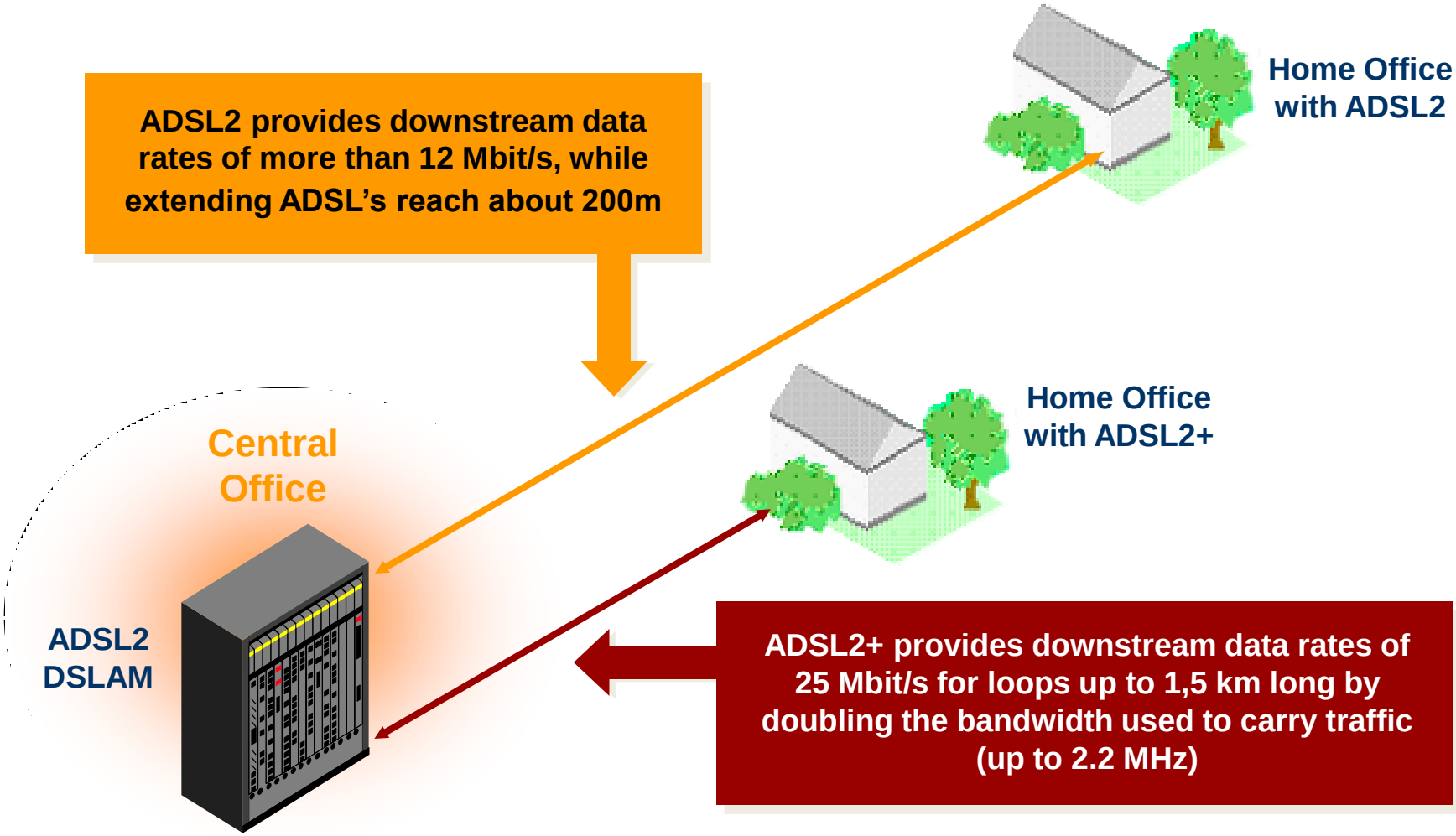
ITU-T G.992.1 Annex B, AoISDN, Non-overlapped spectrum (FDM)



ADSL2 and ADSL2+

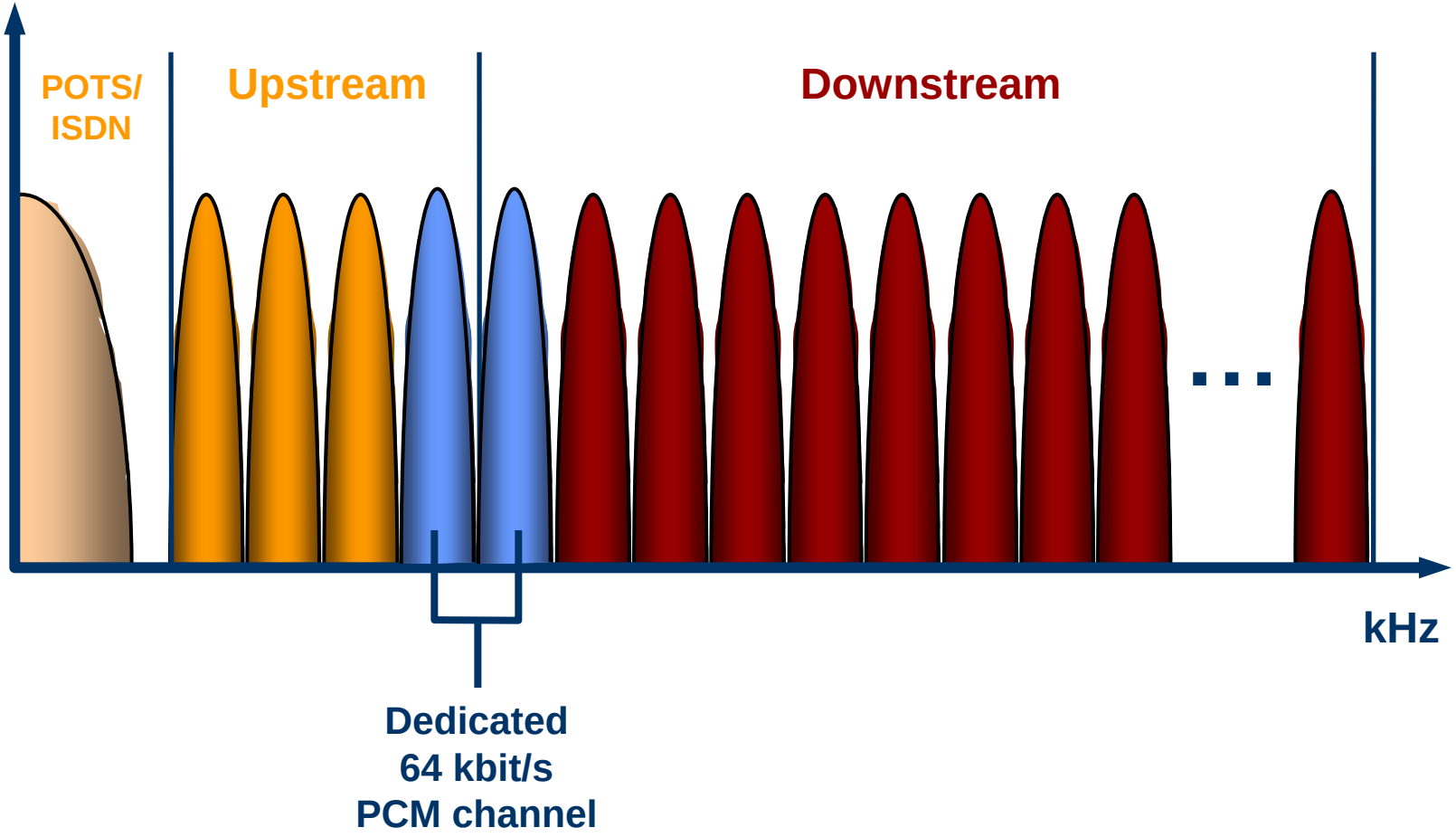
The ADSL2 and ADSL2+ standards improve on the original ADSL by offering higher downstream data rates and longer reach

ADSL2 provides downstream data rates of more than 12 Mbit/s, while extending ADSL's reach about 200m

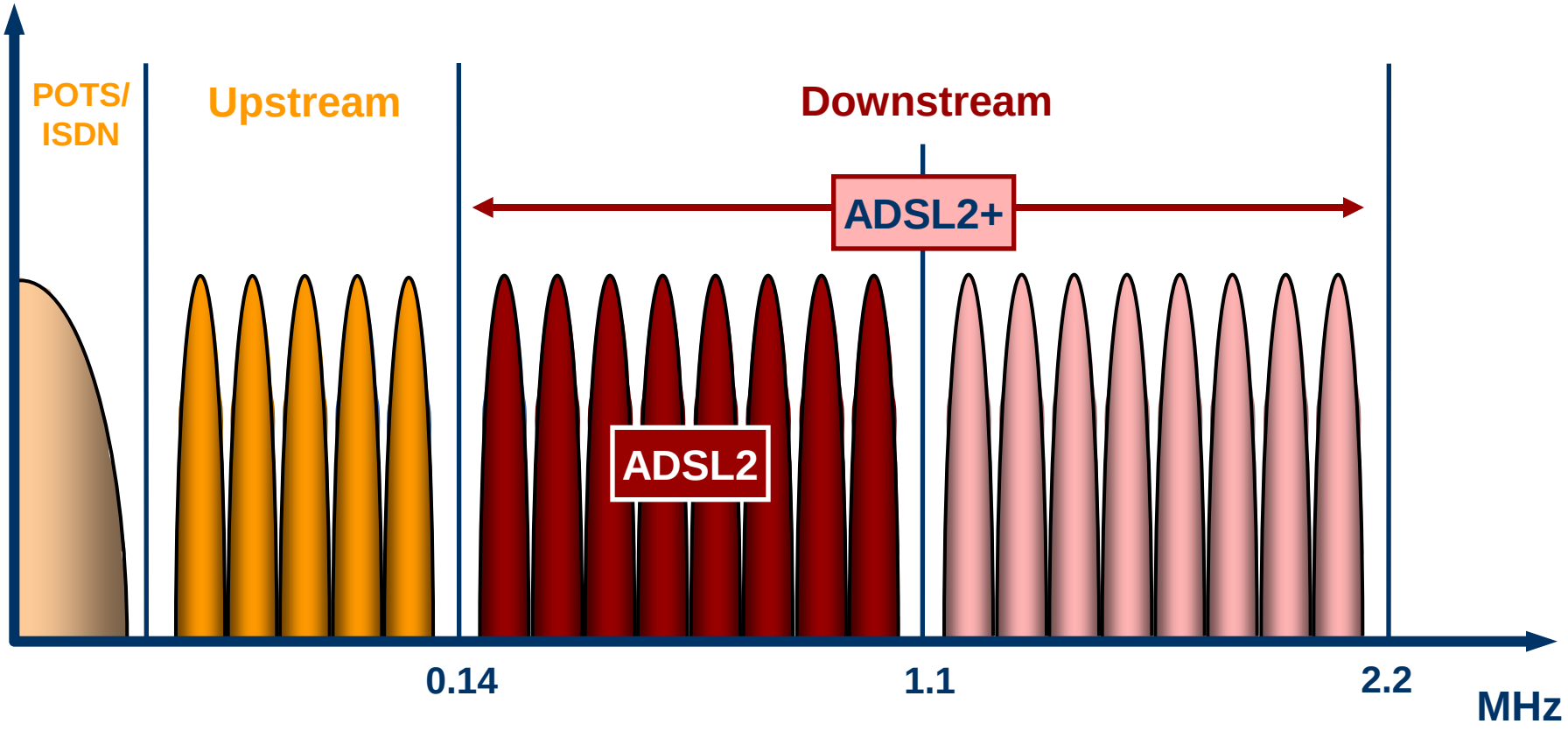


ADSL2+ provides downstream data rates of 25 Mbit/s for loops up to 1,5 km long by doubling the bandwidth used to carry traffic (up to 2.2 MHz)

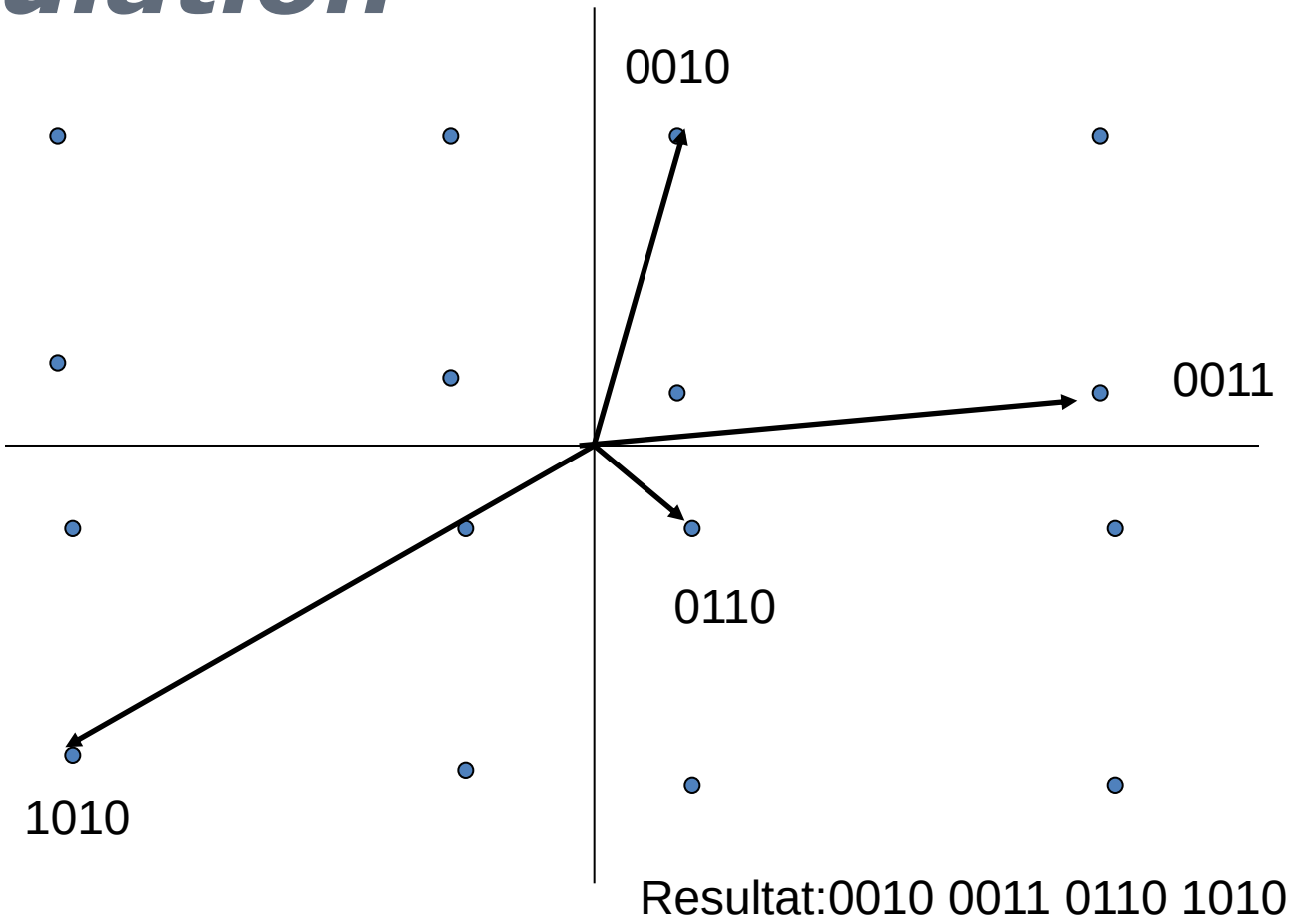
CVoDSL


POTS/
ISDN
Upstream
Downstream
kHz
Dedicated
64 kbit/s
PCM channel

ADSL2+ Doubles the Downstream Bandwidth

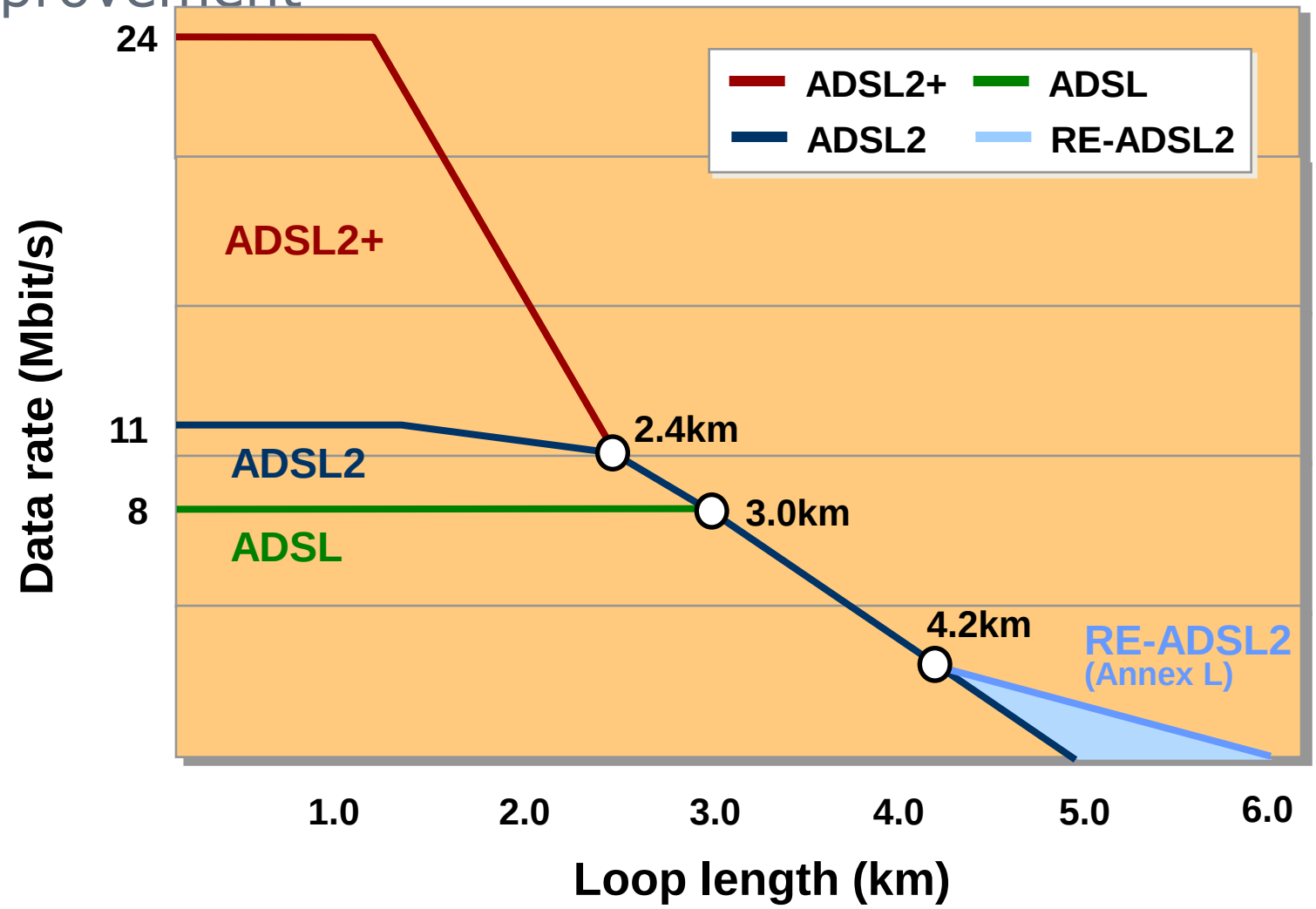


QAM
Quadrature amplitude modulation



Resultat:0010 0011 0110 1010

ADSL2, ADSL2+ and RE-ADSL2 vs. ADSL rate and reach improvement

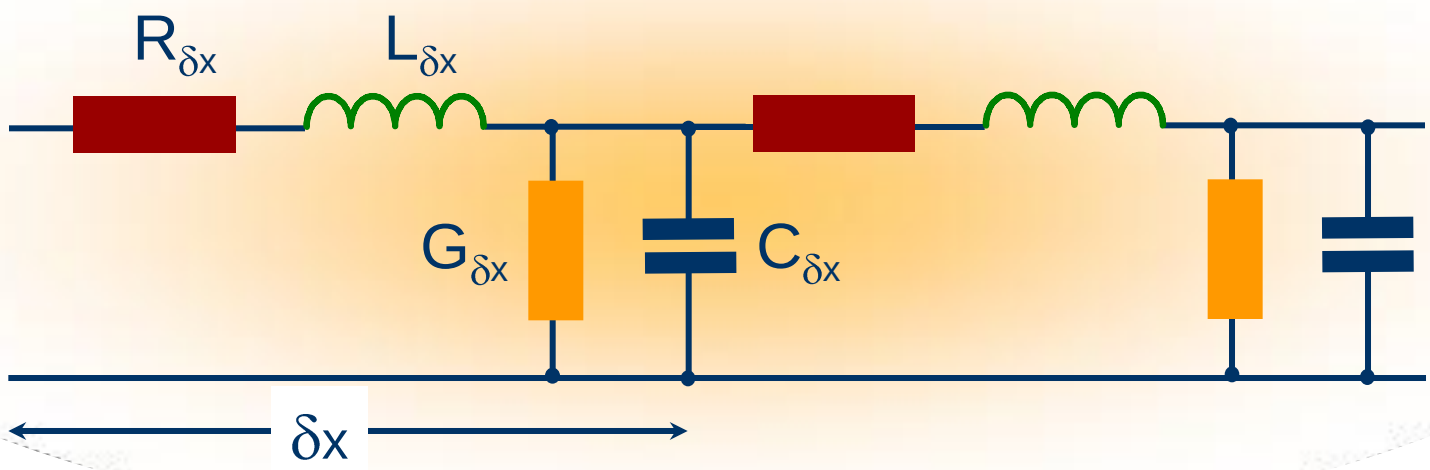


Copper wire characteristics

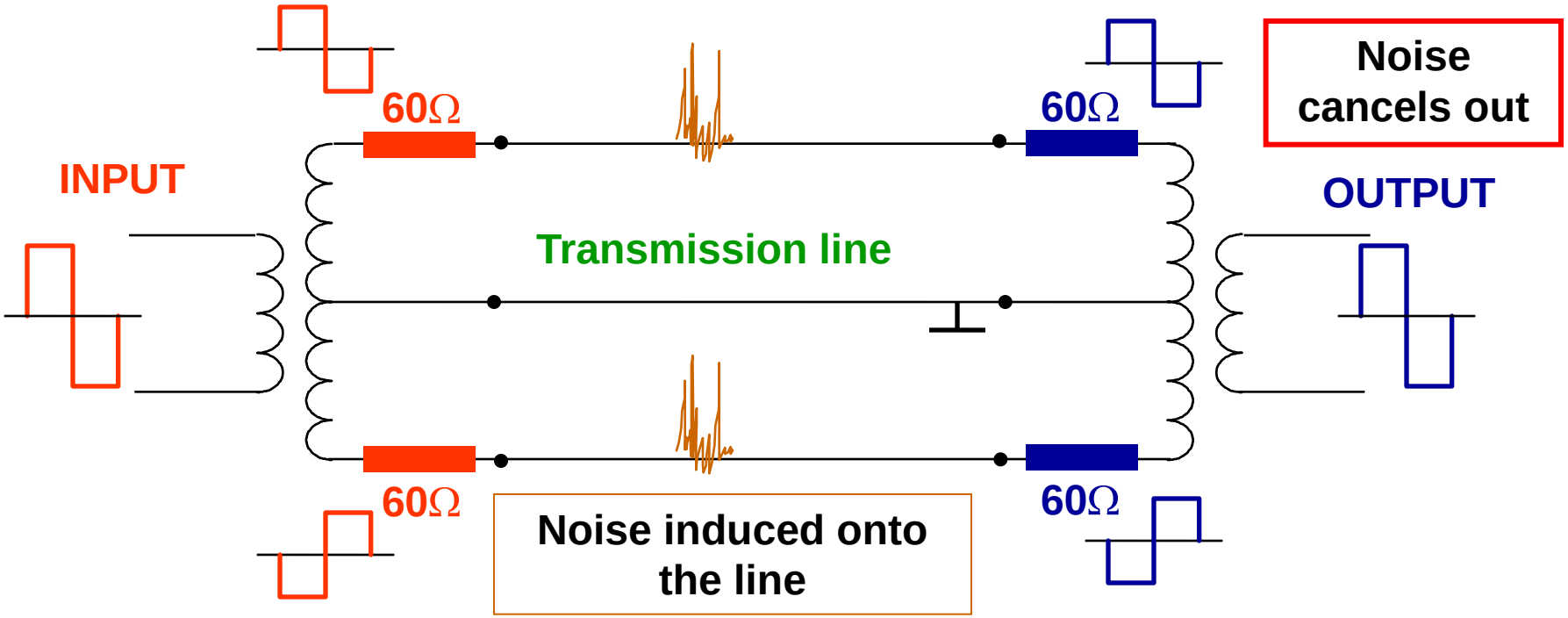
Twisted Pair Lines

Typical values per km

Capacitance: 30 to 60 nF
Resistance: 100 ohms
Inductance: 0.5 to 1 mH
Conductance: > 5M ohms



Balanced line



PDH

- 2 Mb/s = ISDN 30
  - 32 stk 64 Kb/s
  - 30 Tale kanaler
- 8Mb/s = 4*2 Mb/s
- 34/45 Mb/s = 4 * 8 Mb/s
- 140 Mb/s = 4 * 34/45 Mb/s
- 565 Mb/s = 4 *140 Mb/s

SDH

- Multiplex levels:
- Tributær interfaces
- ☐ 2.048 Mbit/s
- ☐ 8.448 Mbit/s
- ☐ 34.368 Mbit/s
- ☐ 139.264 Mbit/s

SDH

HOUSE OF TECHNOLOGY
– en del af mercantec

- The basis of Synchronous Digital Hierarchy (SDH) is
- synchronous multiplexing - data from multiple tributary
- sources is byte interleaved.
- In SDH the multiplexed channels are in fixed locations
- relative to the framing byte.
- Demultiplexing is achieved by gating out the required
- bytes from the digital stream.
- This allows a single channel to be ‘dropped’ from the data
- stream without demultiplexing intermediate rates as is
- required in PDH.

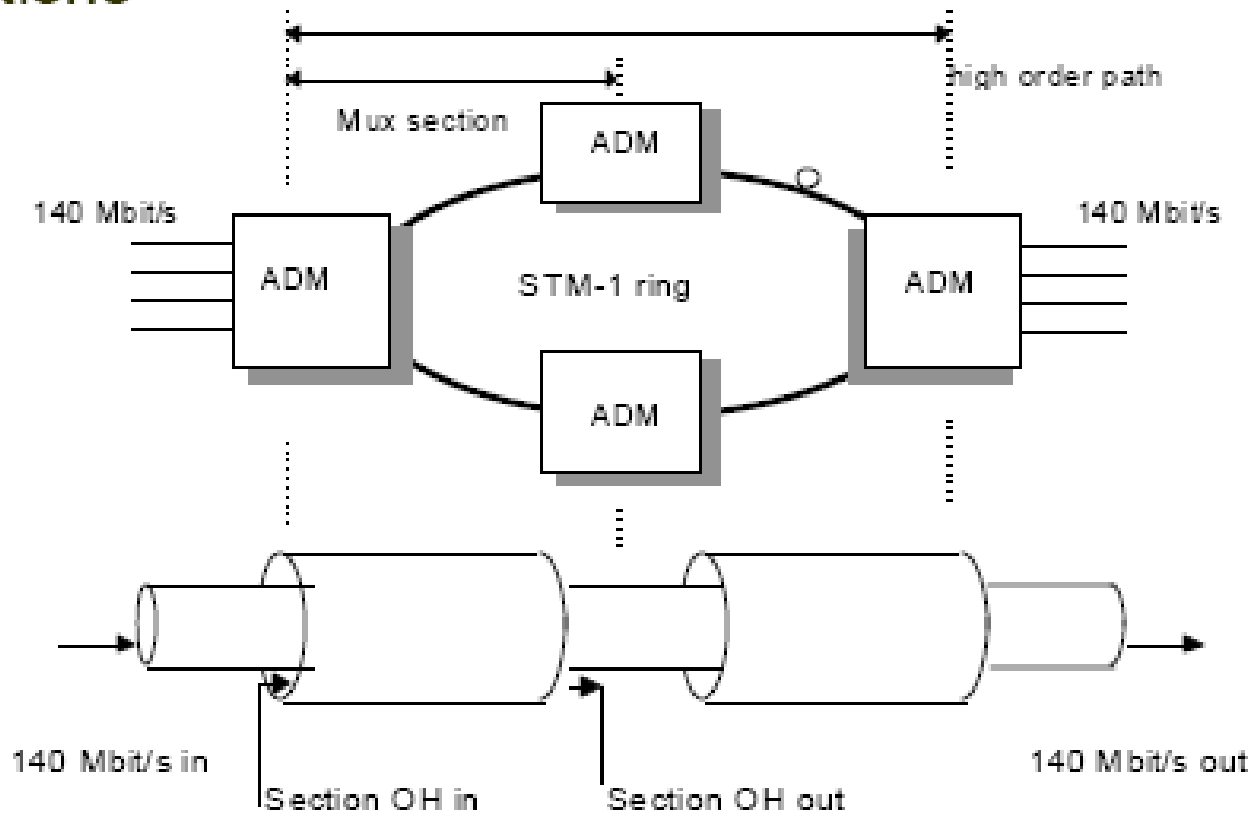
SDH

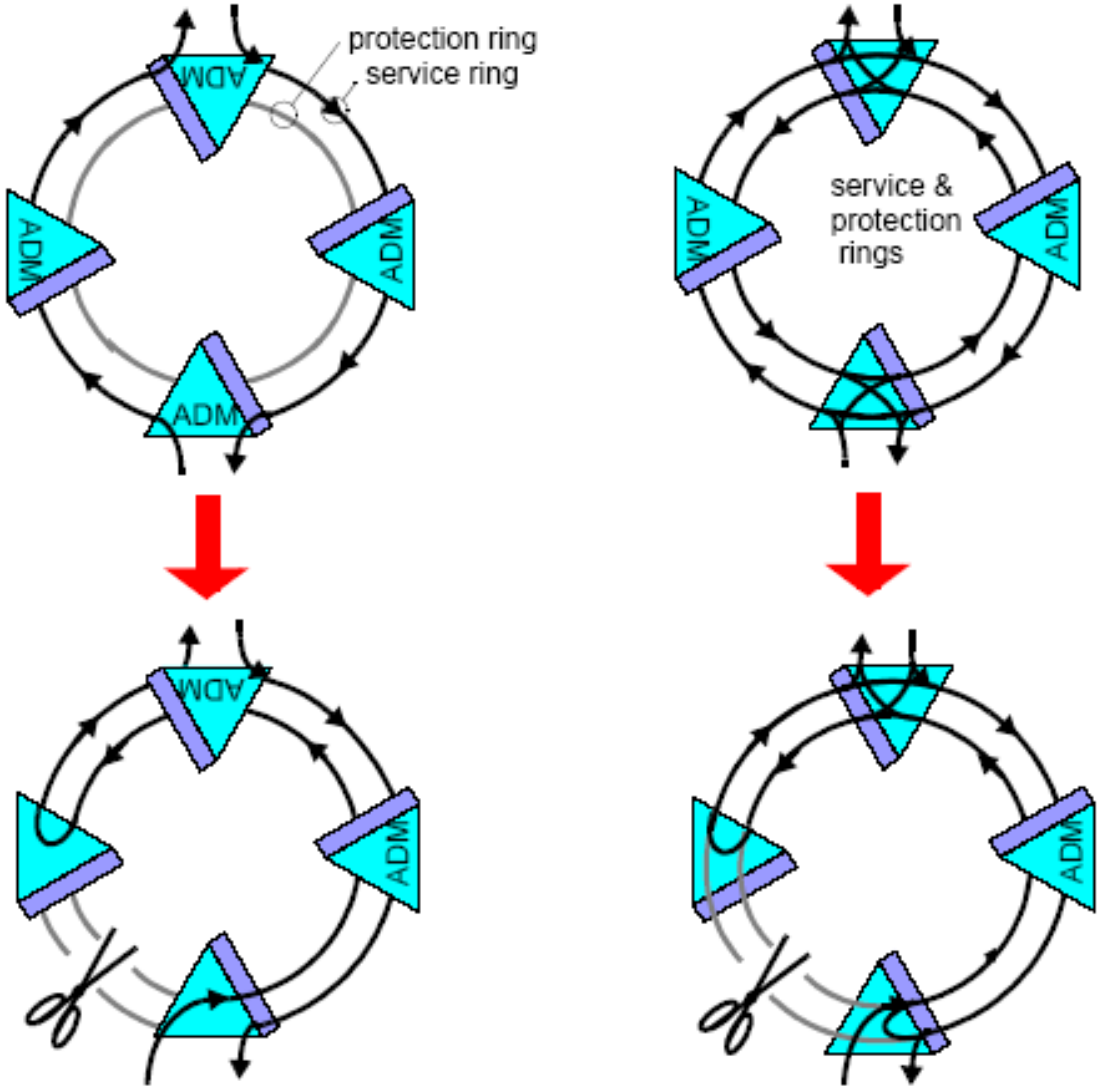
- SDH is a transport hierarchy based on multiples of 155.52
- Mbit/s
- The basic unit of SDH is STM-1:
- STM-1 = 155.52 Mbit/s
- STM-4 = 622.08 Mbit/s
- STM-16 = 2588.32 Mbit/s
- STM-64 = 9953.28 Mbit/s
- Each rate is an exact multiple of the lower rate therefore
- the hierarchy is synchronous.

SDH

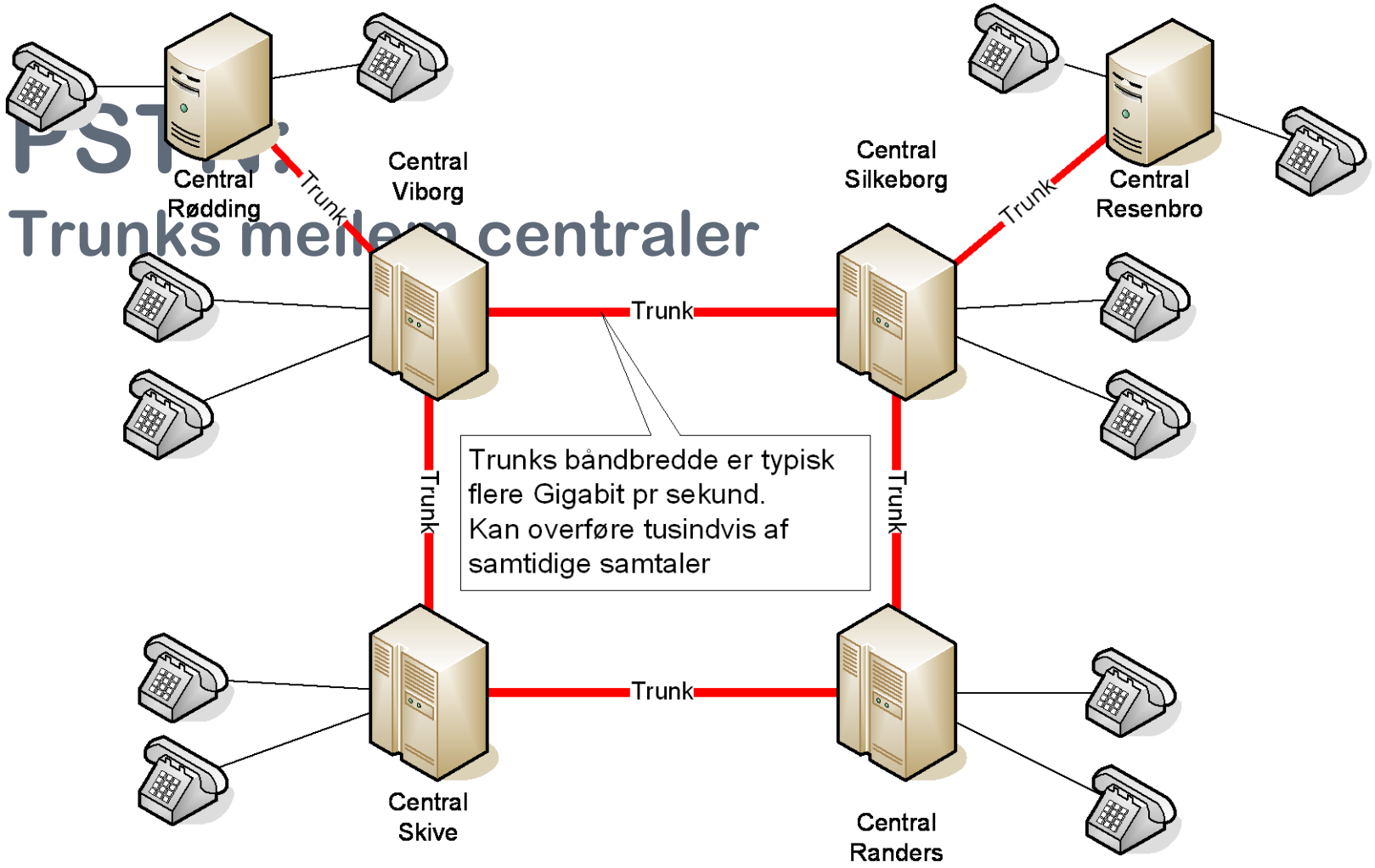
Within a layer each path ends at a 'termination point'

A path in SDH can be visualised as a pipe, In the diagram the 140Mbit/s path passes unaltered through the multiplex section0

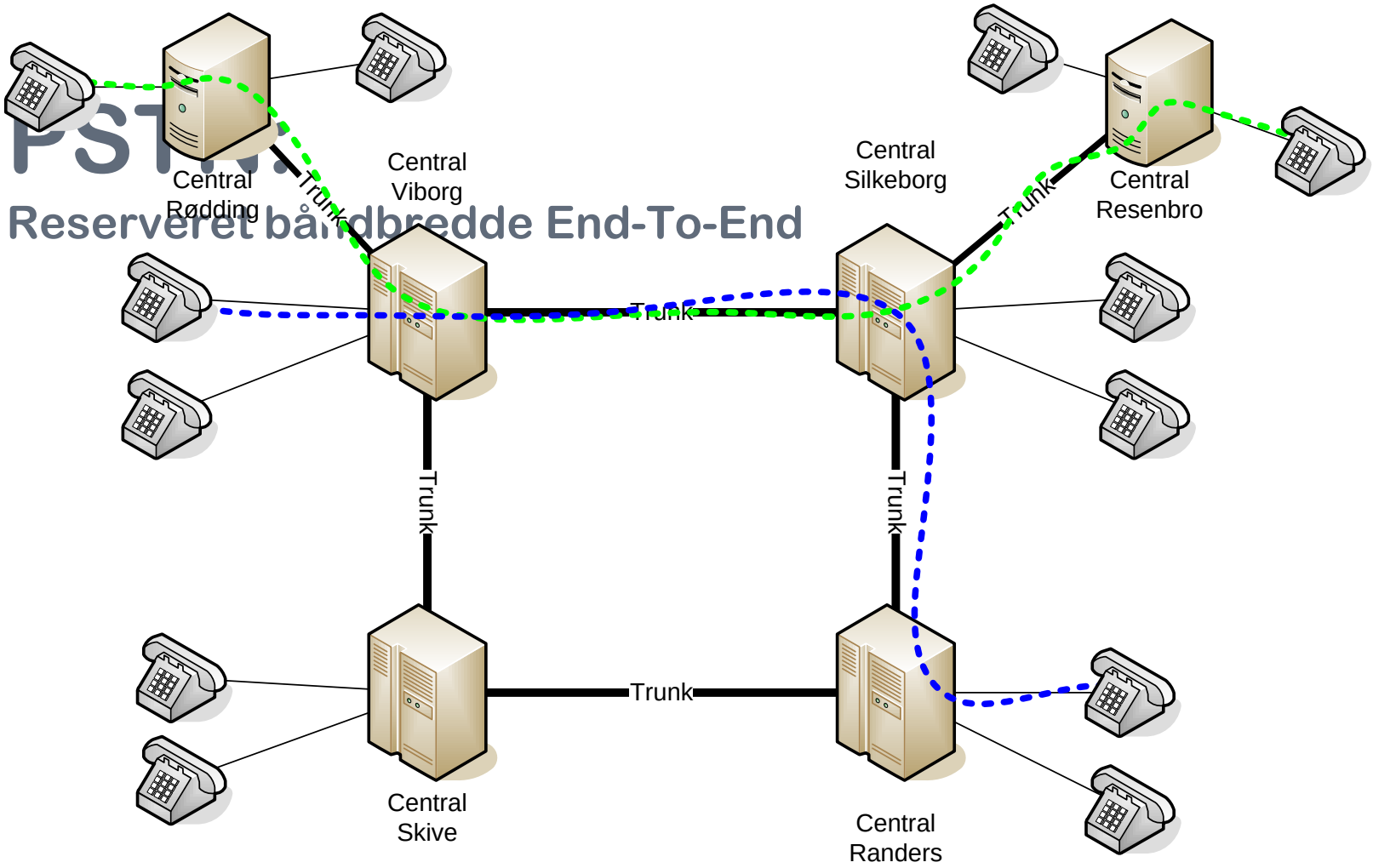


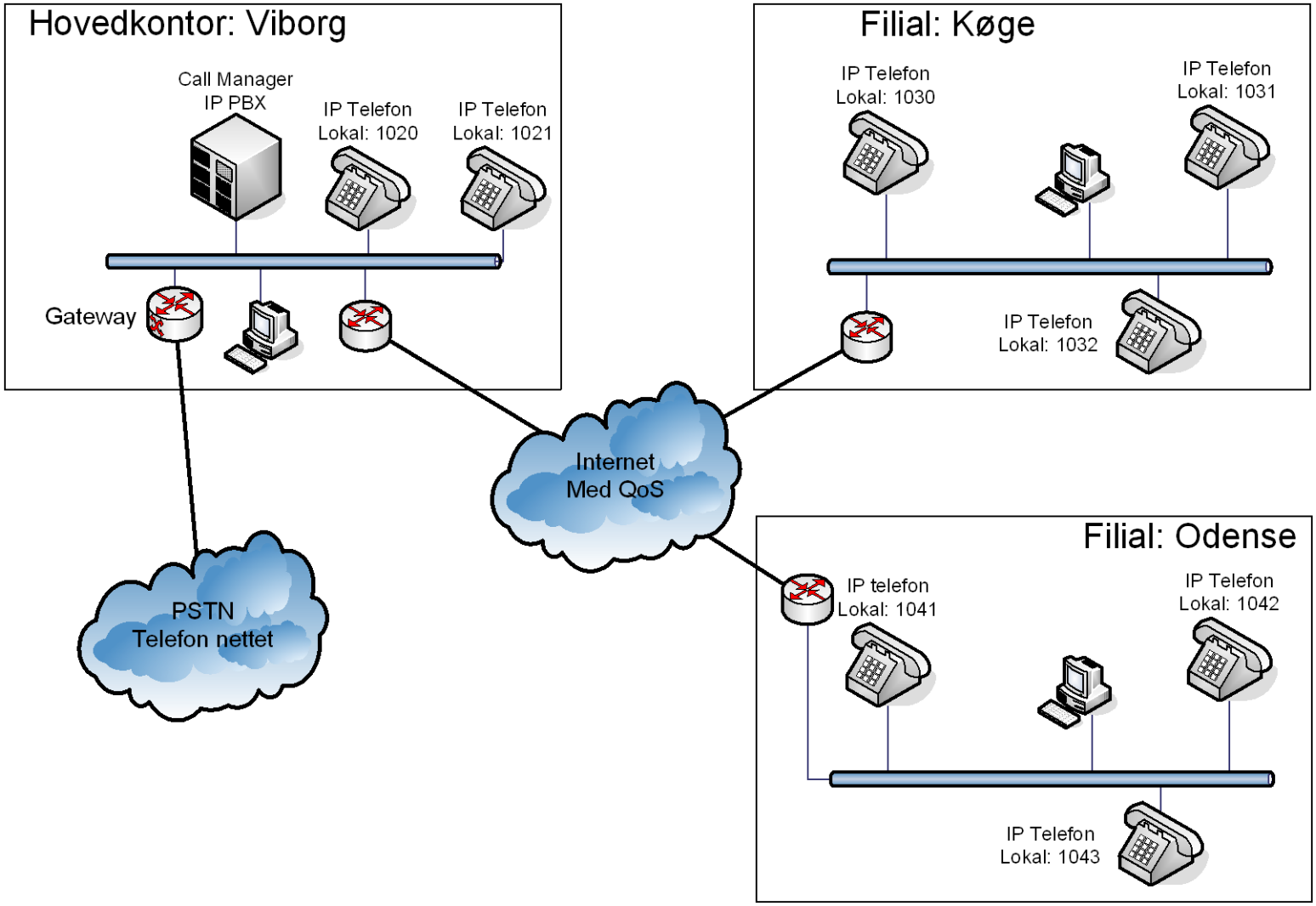

protection ring
service ring
ADM
ADM
ADM
ADM
service &
protection
rings
ADM
ADM
ADM
ADM

PSTN:
Trunks mellem centraler

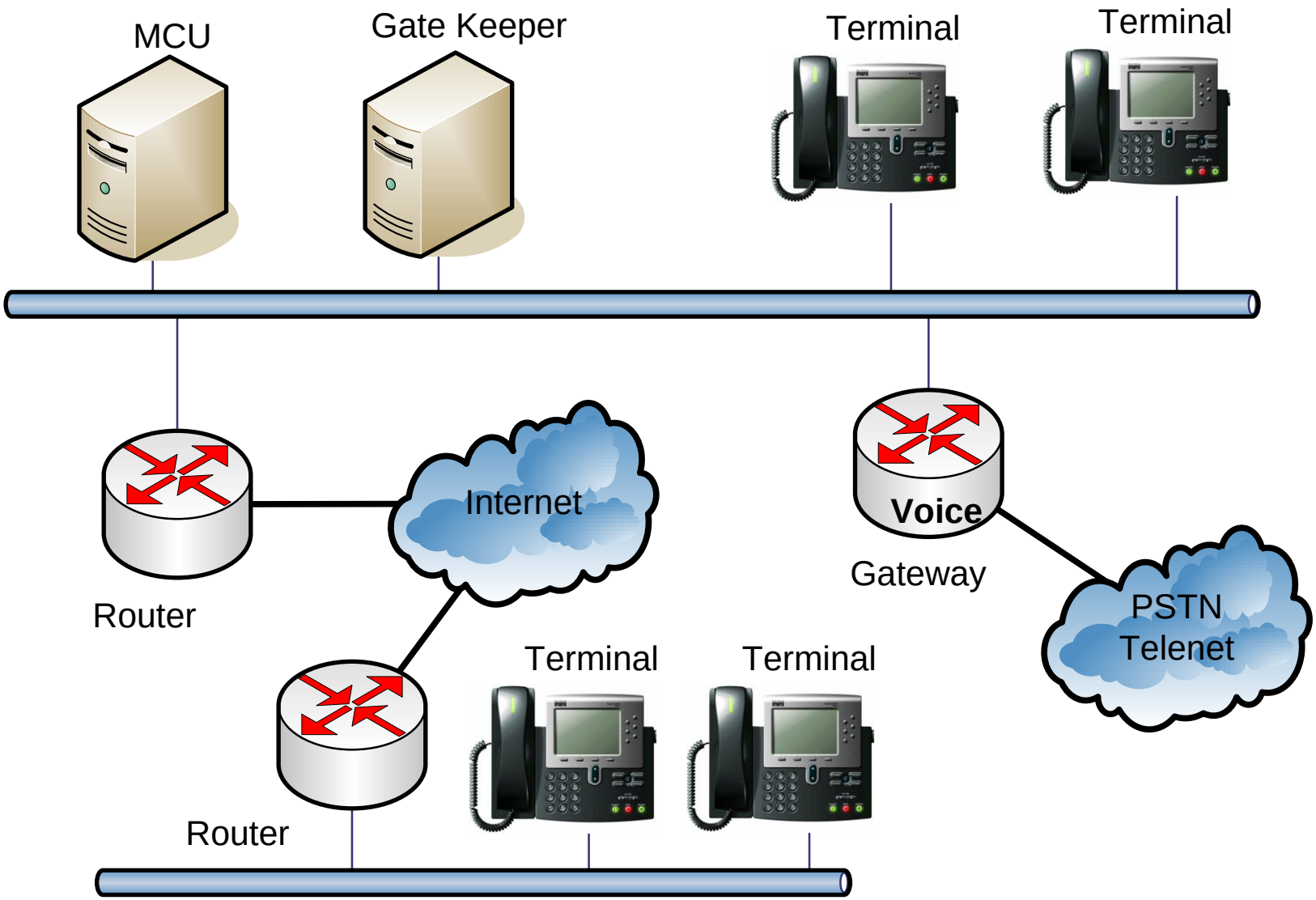


PSTN:
Reserveret båndbredde End-To-End

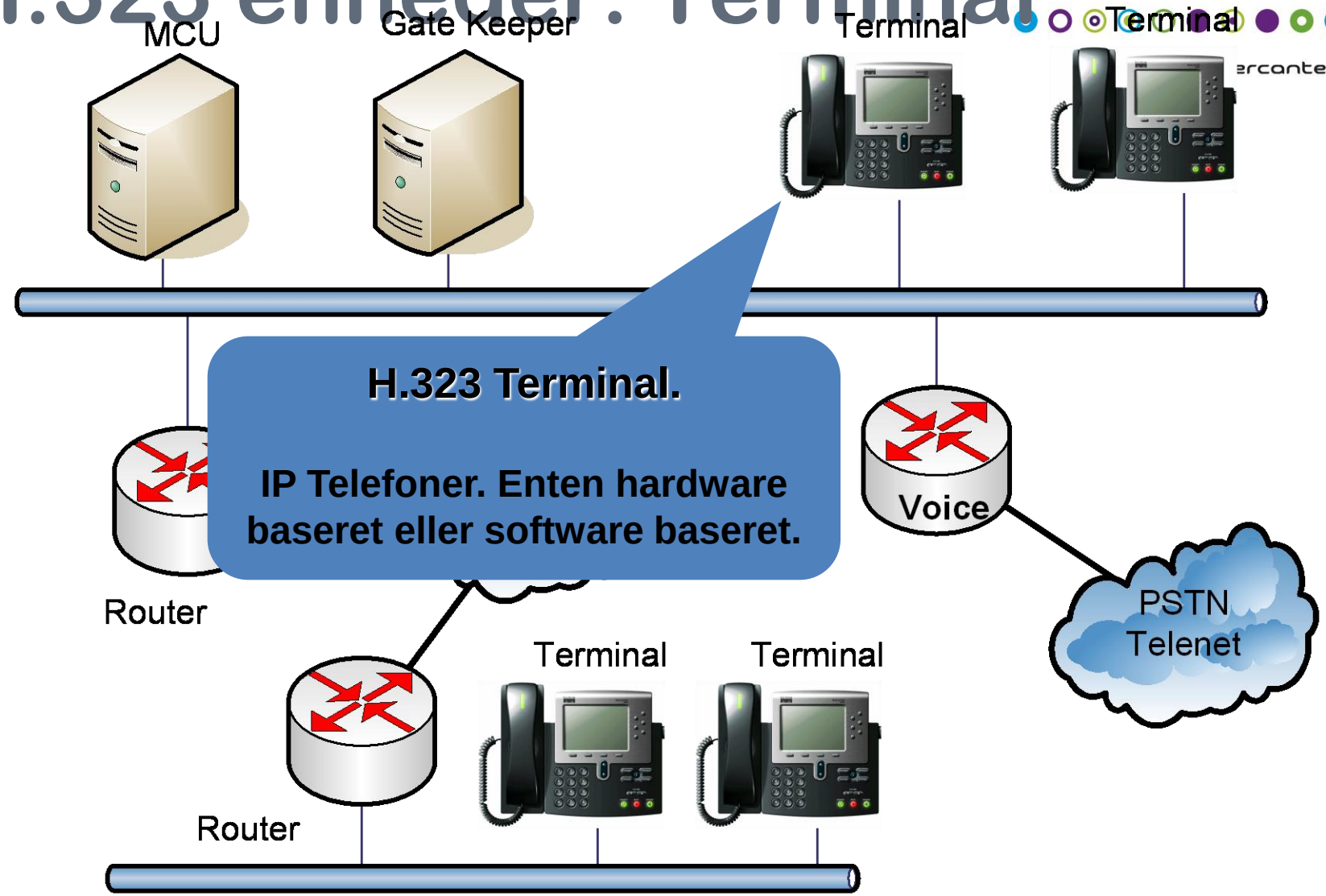



Hovedkontor: Viborg
Call Manager
IP PBX
IP Telefon
Lokal: 1020
IP Telefon
Lokal: 1021
Gateway
Filial: Køge
IP Telefon
Lokal: 1030
IP Telefon
Lokal: 1031
IP Telefon
Lokal: 1032
Internet
Med QoS
PSTN
Telefon nettet
Filial: Odense
IP telefon
Lokal: 1041
IP Telefon
Lokal: 1042
IP Telefon
Lokal: 1043

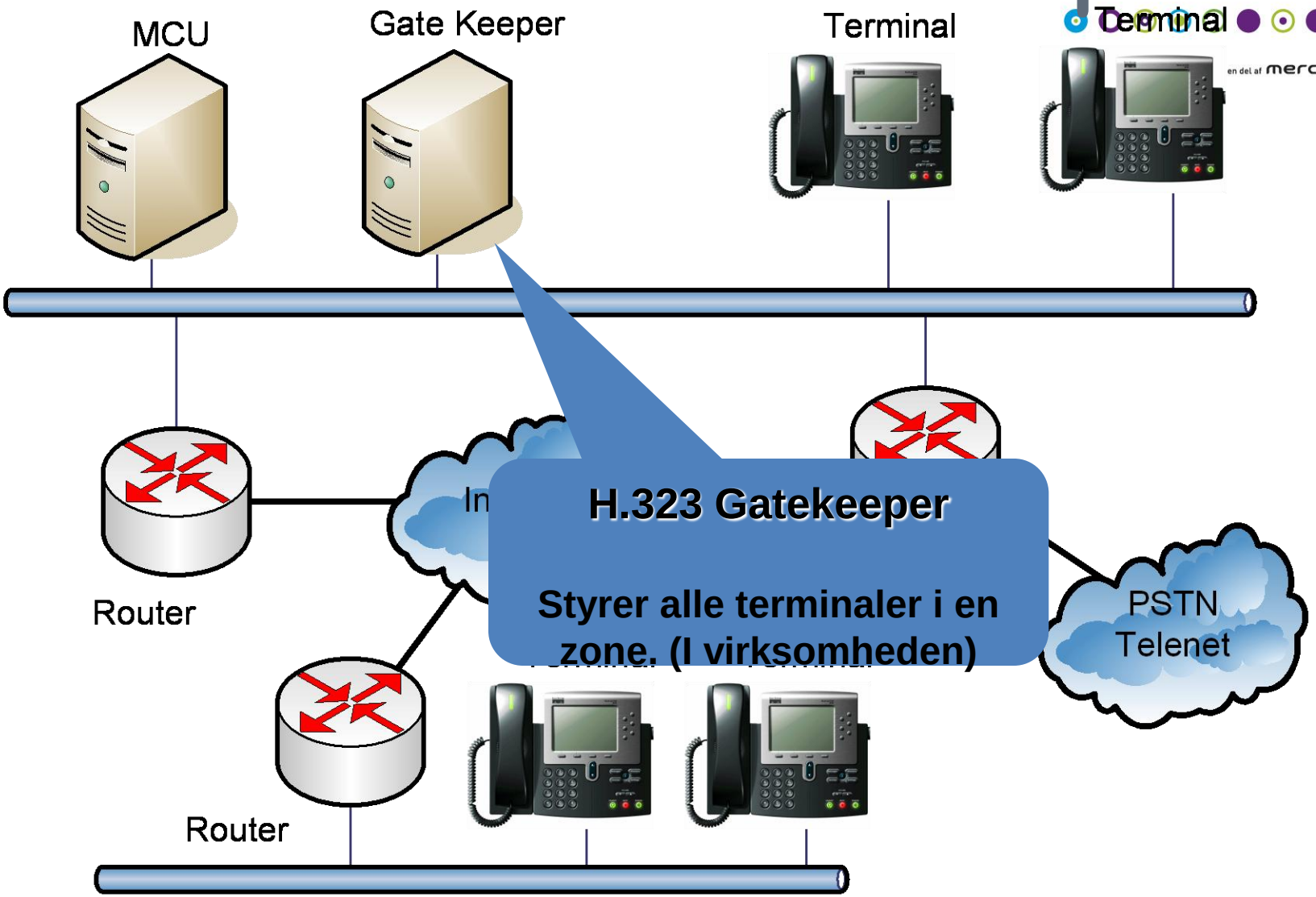
H.323 enheder



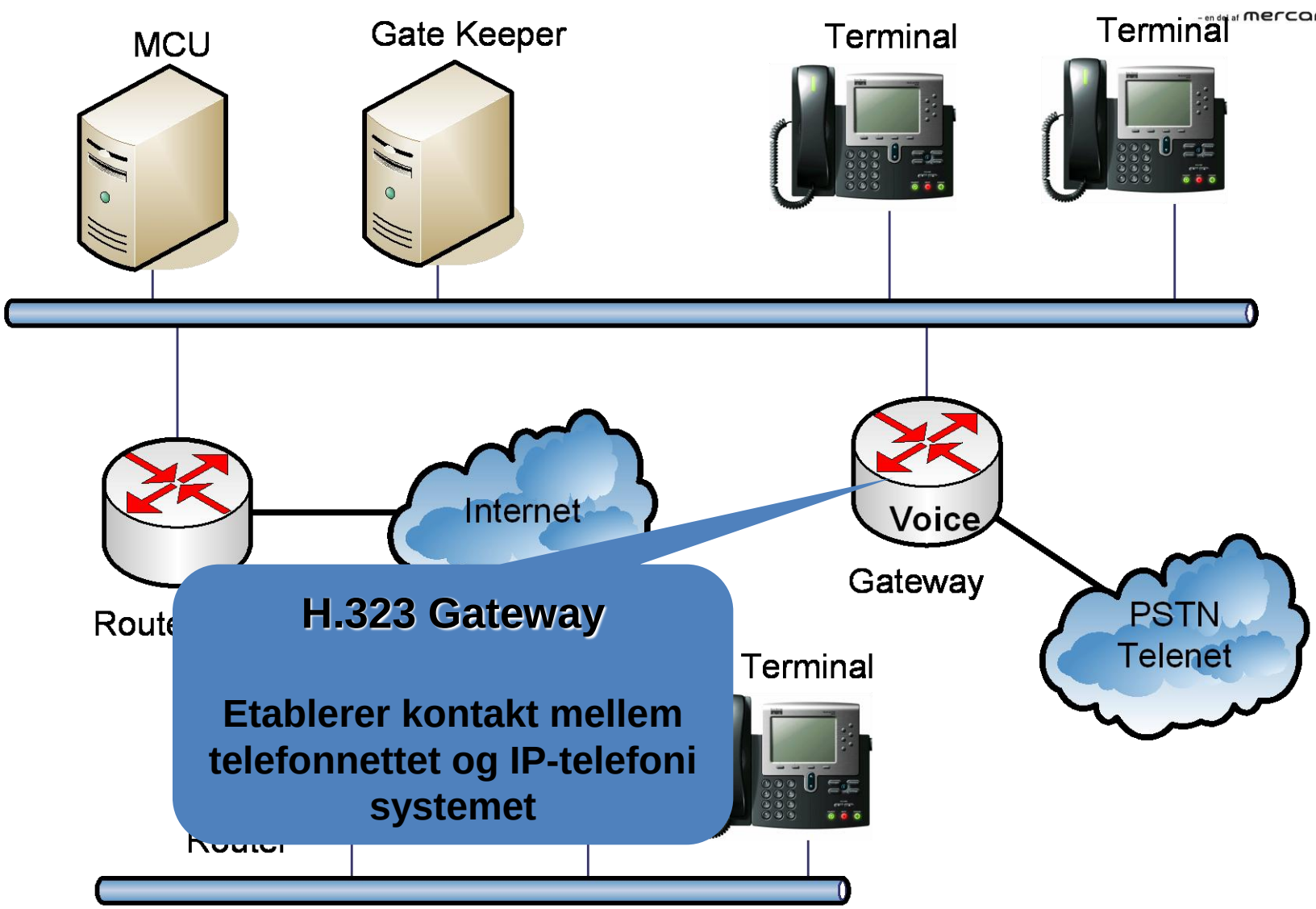
H.323 enheder: Terminal



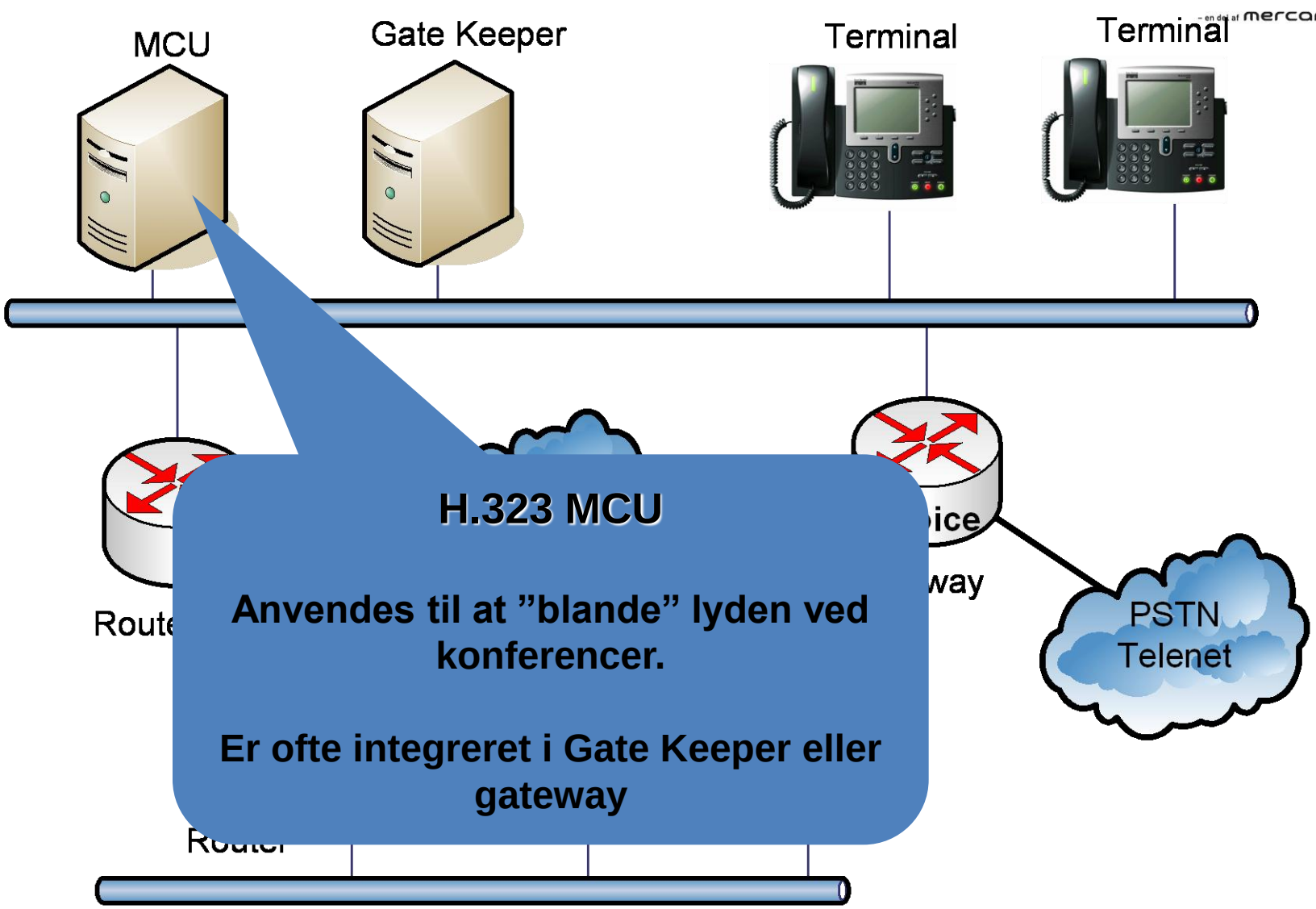
H.323 enheder: Gatekeeper



H.323 enheder: Gateway



H.323 enheder: Multi-point Control Unit

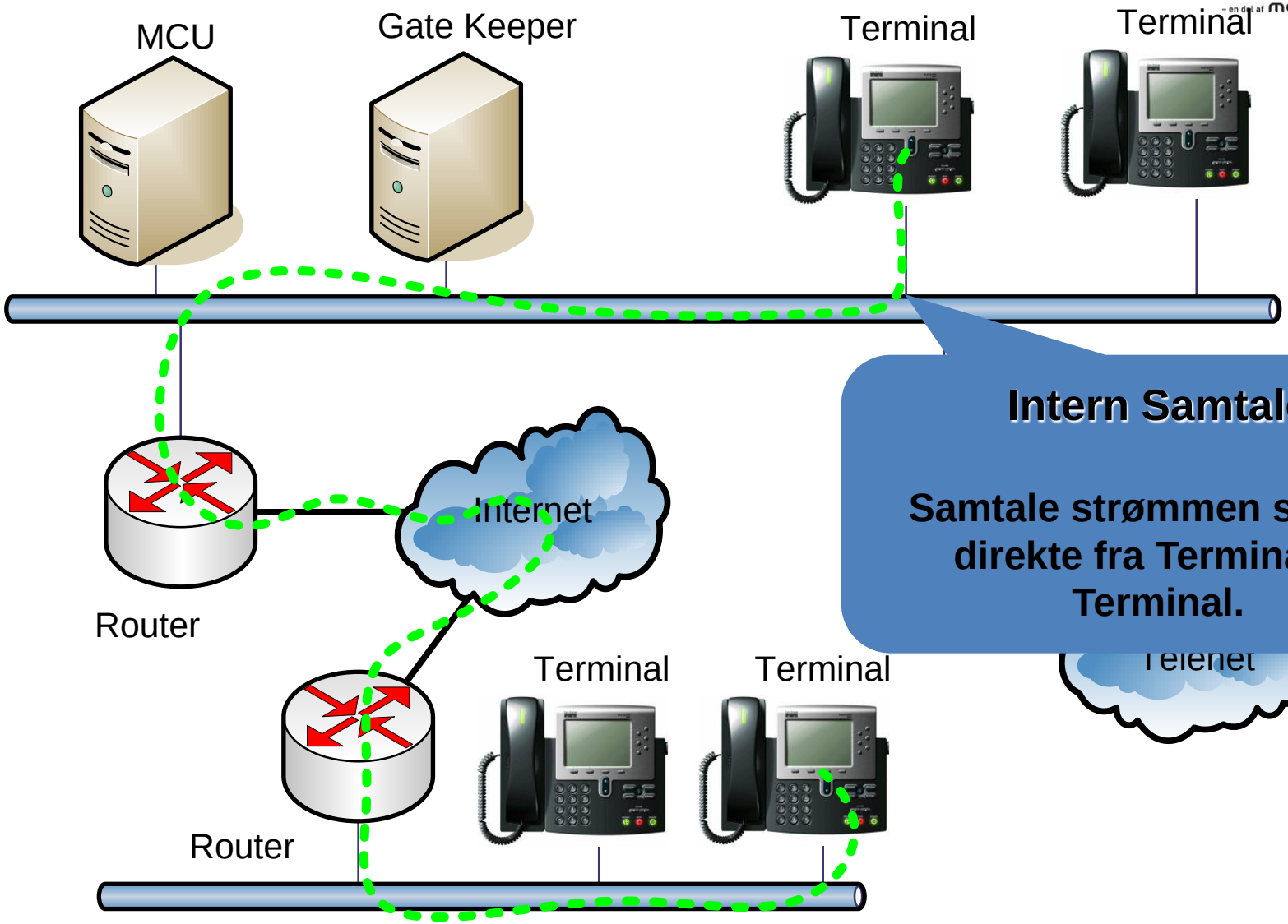


H.323 MCU

Anvendes til at ”blande” lyden ved konferencer.

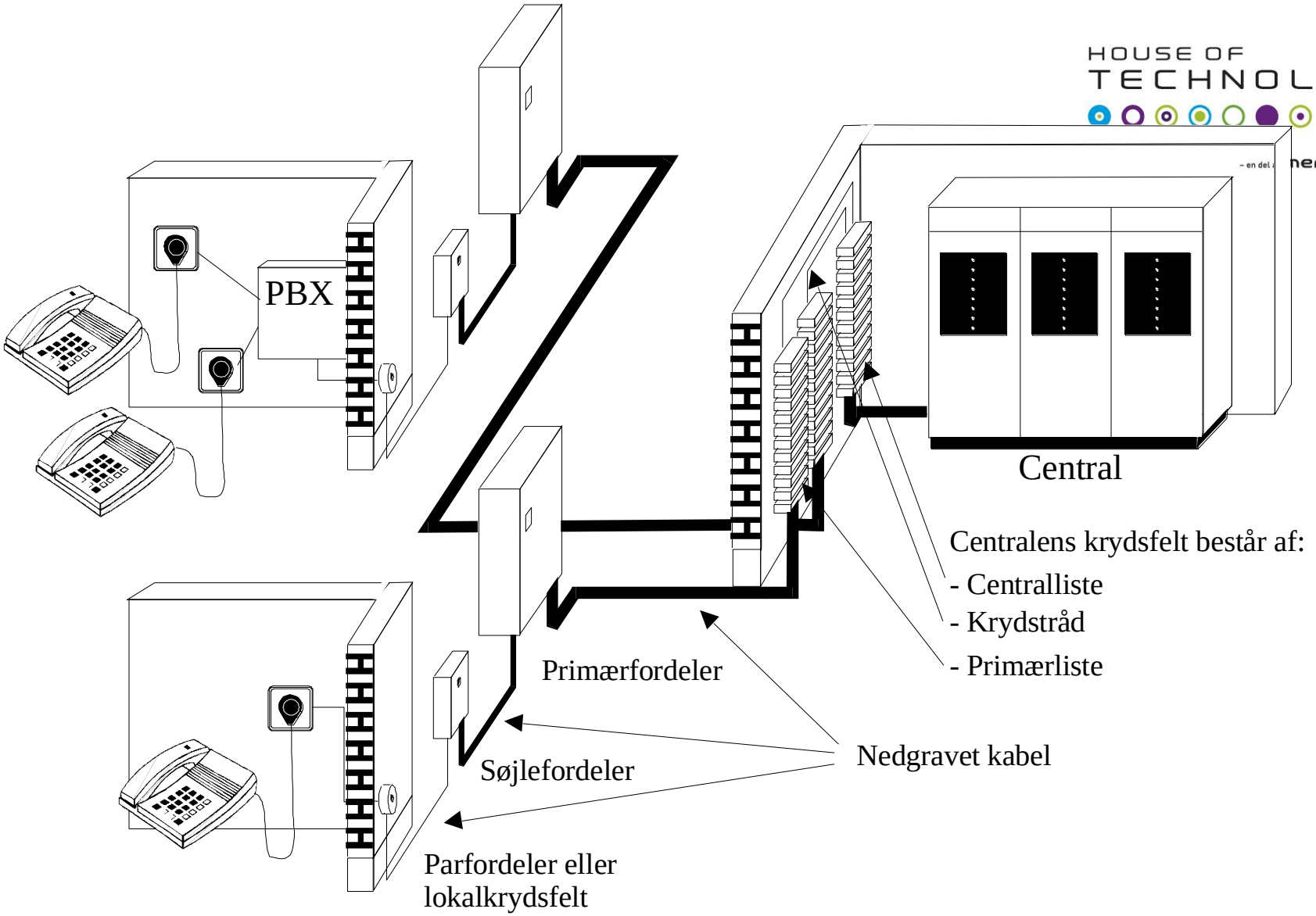
Er ofte integreret i Gate Keeper eller gateway

Gatekeeper etablerer kontakt mellem terminaler



Intern Samtale

Samtale strømmen sendes direkte fra Terminal til Terminal.


PBX
Central
Centralens krydsfelt består af:
- Centralliste
- Krydstråd
- Primærliste
Primærfordeler
Nedgravet kabel
Søjlefordeler
Parfordeler eller
lokalkrydsfelt

. Kvalitetsparametre

Parametre	Min. krav	Bemærkninger
Spænding, AC: A – J B – J A – B	 < 0,8 V < 0,8 V < 0,8 v	Trådparret måles åben/isoleret i fjernende.
Spænding, DC: A – J B – J A – B	 □ 2 V □ 2 V □ 2 V	Trådparret måles åben/isoleret i fjernende.
Isolation: A – J B – J A – B	 > 1 Mohm > 1 Mohm > 1 Mohm	Trådparret måles åben/isoleret i fjernende. BEMÆRK! Det er et TDC mål, 'løbende' at opgradere accesnettet til en måleværdien på □**10 M ohm**. Et mål, som pt. ikke alle driftsværende trådpar kan forventes at leve op til.

Sløjfemodstand: A – B	1400 ohm	Trådparret sløjfes i fjernende.
DC Balance: A – J B – J	2 %	Måledata gælder ved manuel måling. Tilladt afvigelse mellem måleværdien: A – J og B – J.
Kapacitiv balance: A – J B – J	5 %	Måledata gælder ved manuel måling. Tilladt afvigelse mellem måleværdierne: A – J og B – J. Se også afsnit 3, LTS målinger.
Dæmpning: A – B	9 dB	Måles med en frekvens på: 1020 Hz. Impedans: 600 ohm.
Gruppeløbetidsforvrængning	< 0,6 ms	Variation ved 100 Hz i forhold til 15 kHz.
Støj: A - B	-60 dBmp	Måles med et Psofometrisk filter. Afsluttes i fjernenden med 600 ohm. (-60 dBmp = 0,775 mV)
Nærkrydstale dæmpning	60 dB.	Måles med en frekvens på: 1020 Hz. Sendeniveau: 0 dBm. Måles i forhold til ét eller flere trådpar i samme kabel. Trådparrene skal måles med åbne/ isoleret fjernende.
Jord- / signalbalance.	> 60 dB	Læs om teorien - bag målingen - i dok.102-05-01, punkt 3.10. BEMÆRK! DC- og kapacitiv balance målinger kan – til en vis grad - erstattes af en Jord-/signalbalance måling og omvendt.