



Vlaamse Radio- en Televisieomroep

Keeping the EU online VRT's CWDM NETWORK

Keeping the EU online - VRT's CWDM NETWORK

1. **What to connect?**
2. **How to connect?**
3. **Technology WDM / CWDM / DWDM**
4. **The Fibre Network in Brussels**
5. **Q&A**



1. What to connect?



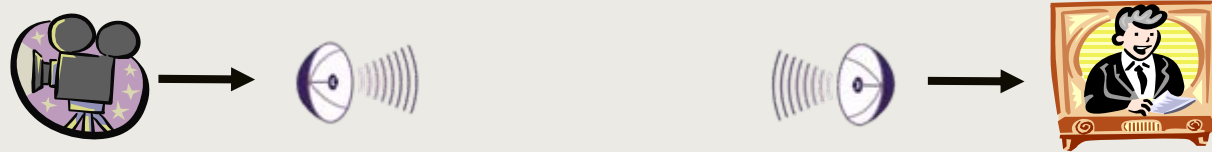
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2. How to connect - History

- Before March 2000 only Micro Wave Radio (analogue & digital) for video links



- March 2000: the first time Video over fibre (PDH 34Mbps ETSI) with ETSI video compression (between ARD / WDR and ZDF Brussels Studio and VRT CNCT)

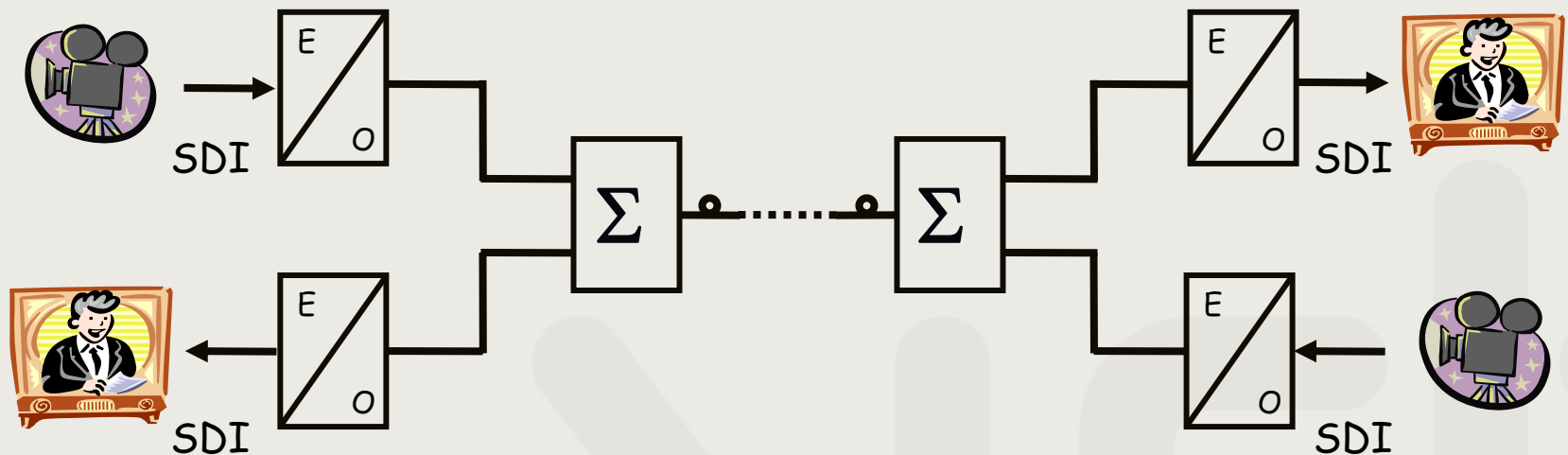
- Compression:

- Lower bandwidth (270Mbps SDI → 34Mbps PDH)
- Higher compression → Higher delay (100ms and up)



2. How to connect - History

- » May 2001: First non compressed SDI over dark fiber with WDM technology (Installation of new International Press Center Brussels)



IPC

International Press Centre



VRT - CNCT



2. How to connect - History

- » June 2003 First SDI and Ethernet over fiber with CWDM Technology (2 x 16 channels with Flemish Parliament Brussels – Elections show)
- » As of April 2004 new fibre connection with:
 - European Parliament (European Elections)
 - European Council
 - European Commission
 - ...

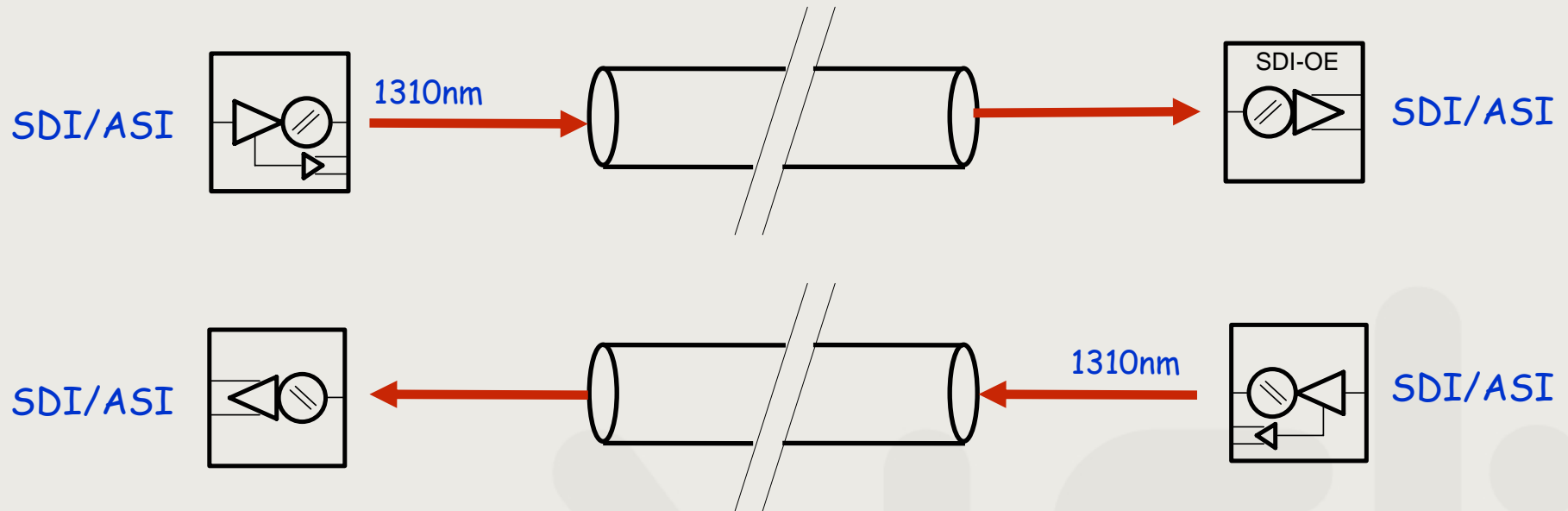
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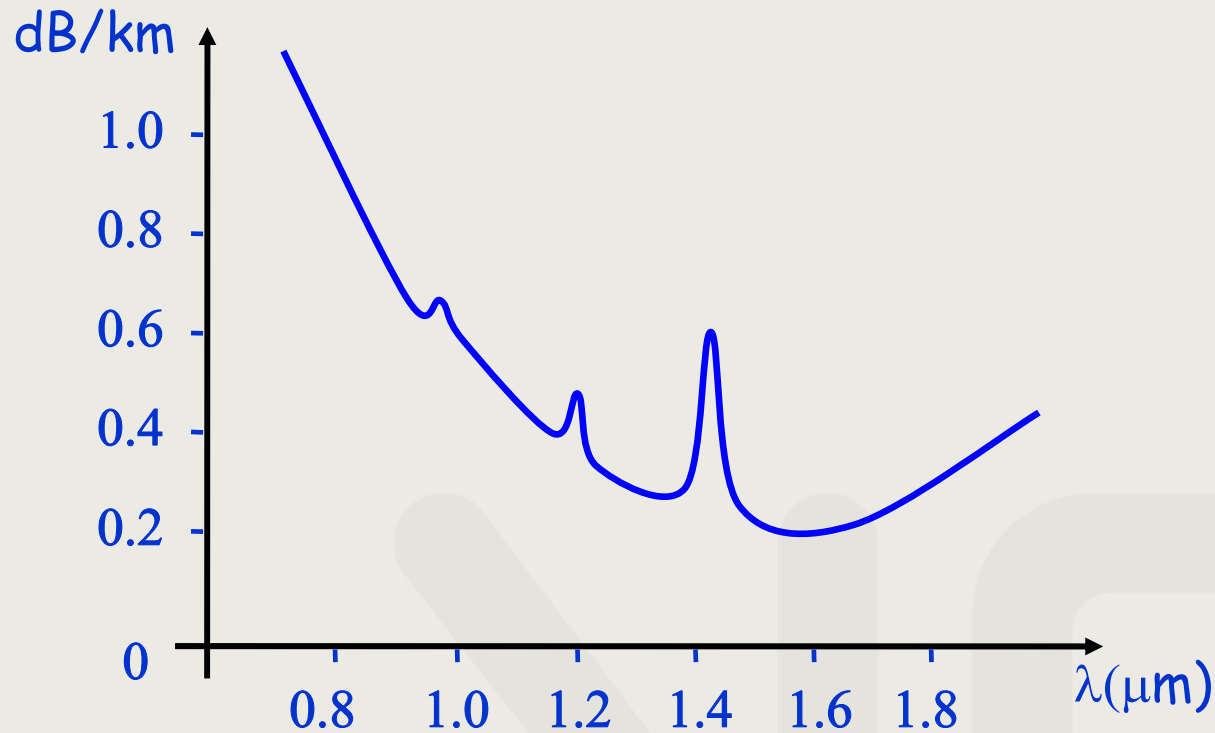
3. Technology WDM / DWDM / CWDM

Optical transmission, single channel per fibre



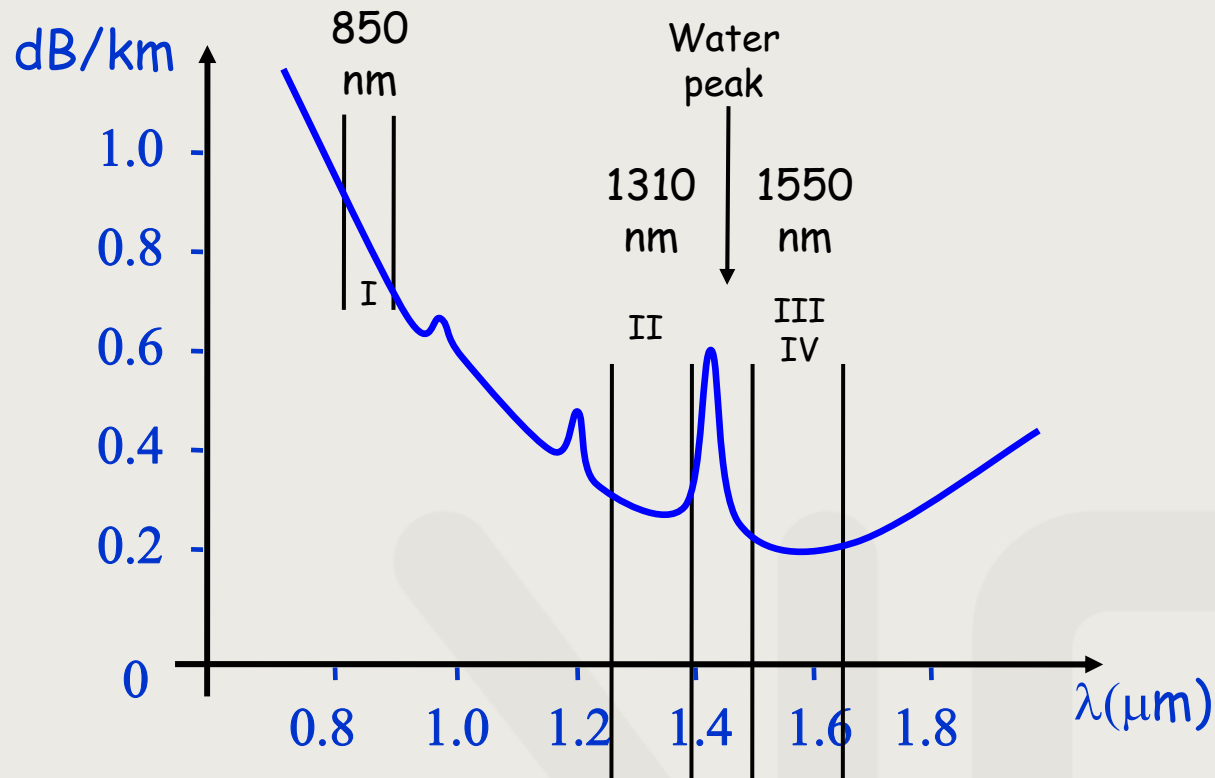
3. Technology WDM / DWDM / CWDM

Typical single mode fibre – spectral attenuation



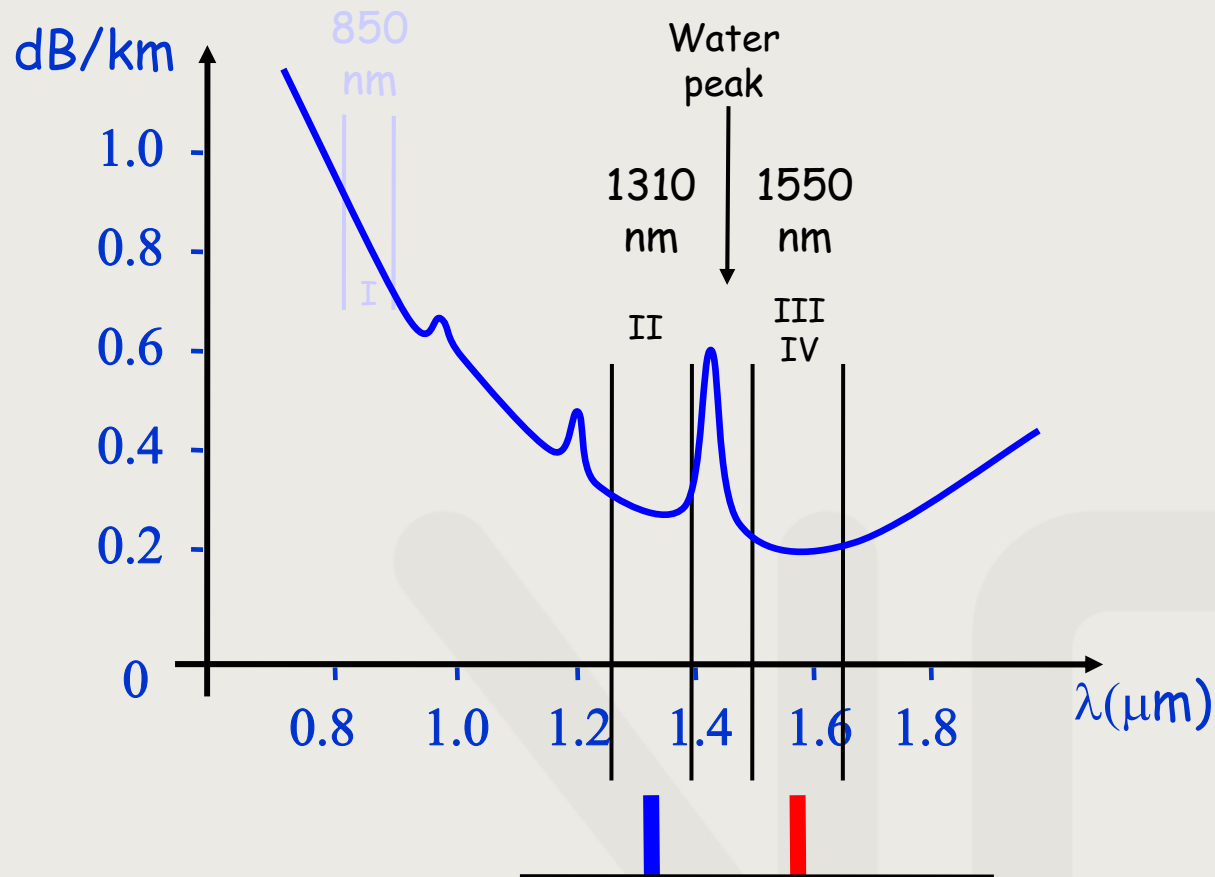
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Typical single mode fibre – spectral attenuation



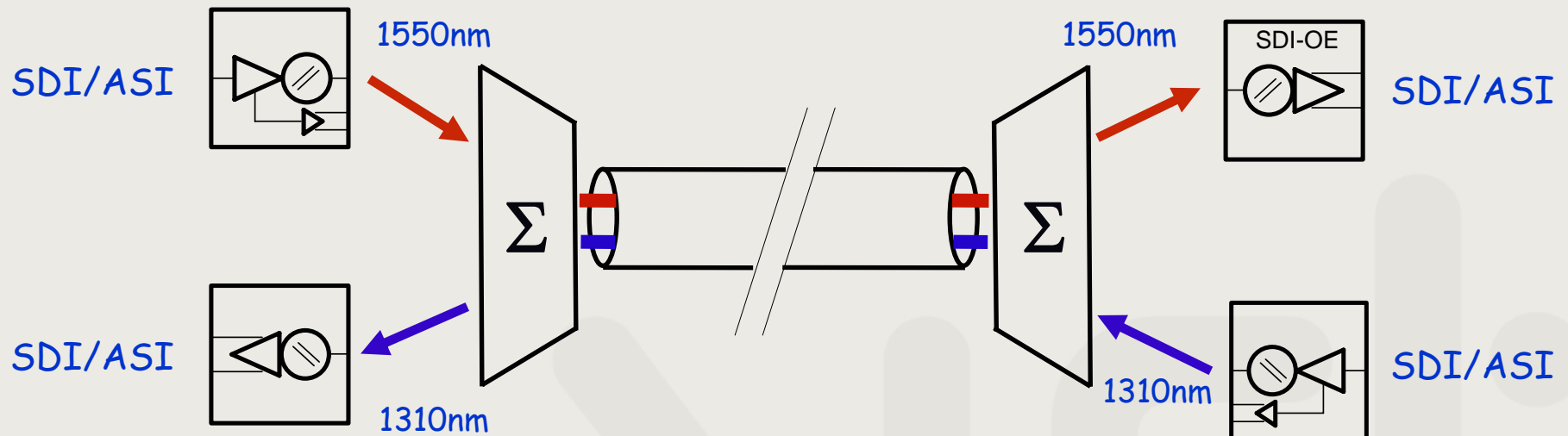
3. Technology WDM / DWDM / CWDM

Typical single mode fibre – spectral attenuation - WDM



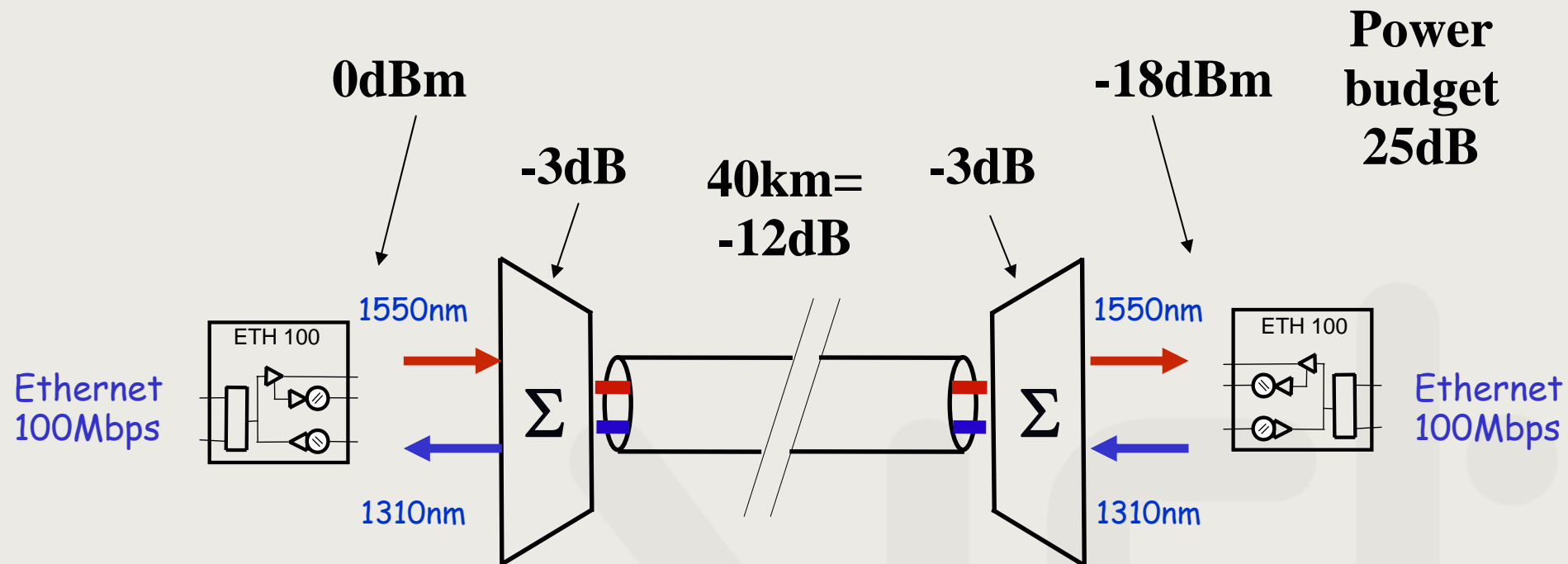
3. Technology WDM / DWDM / CWDM

WDM – Wavelength Division Multiplex - 2 Channels



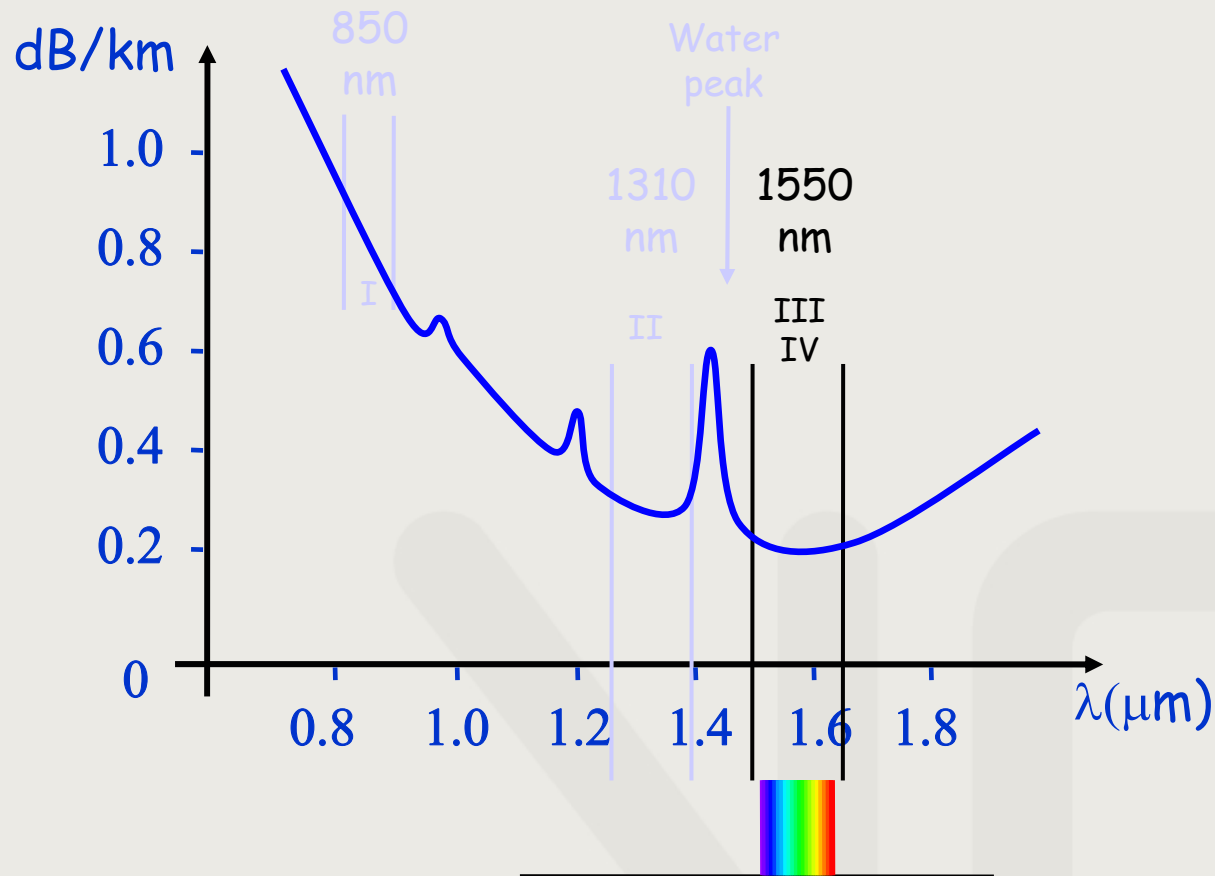
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WDM – Wavelength Division Multiplex - 2 Channels



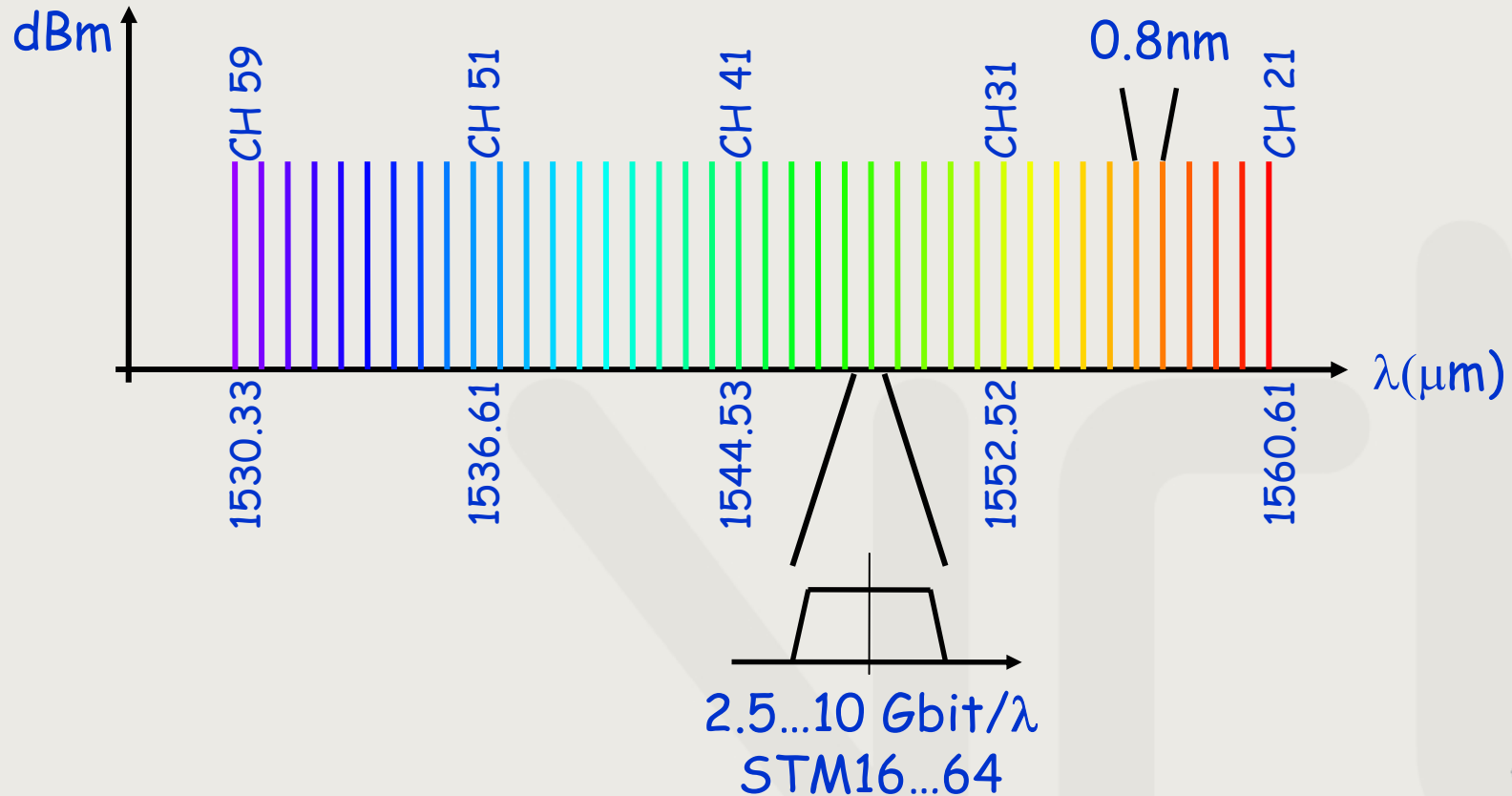
3. Technology WDM / DWDM / CWDM

Typical single mode fibre – spectral attenuation - DWDM



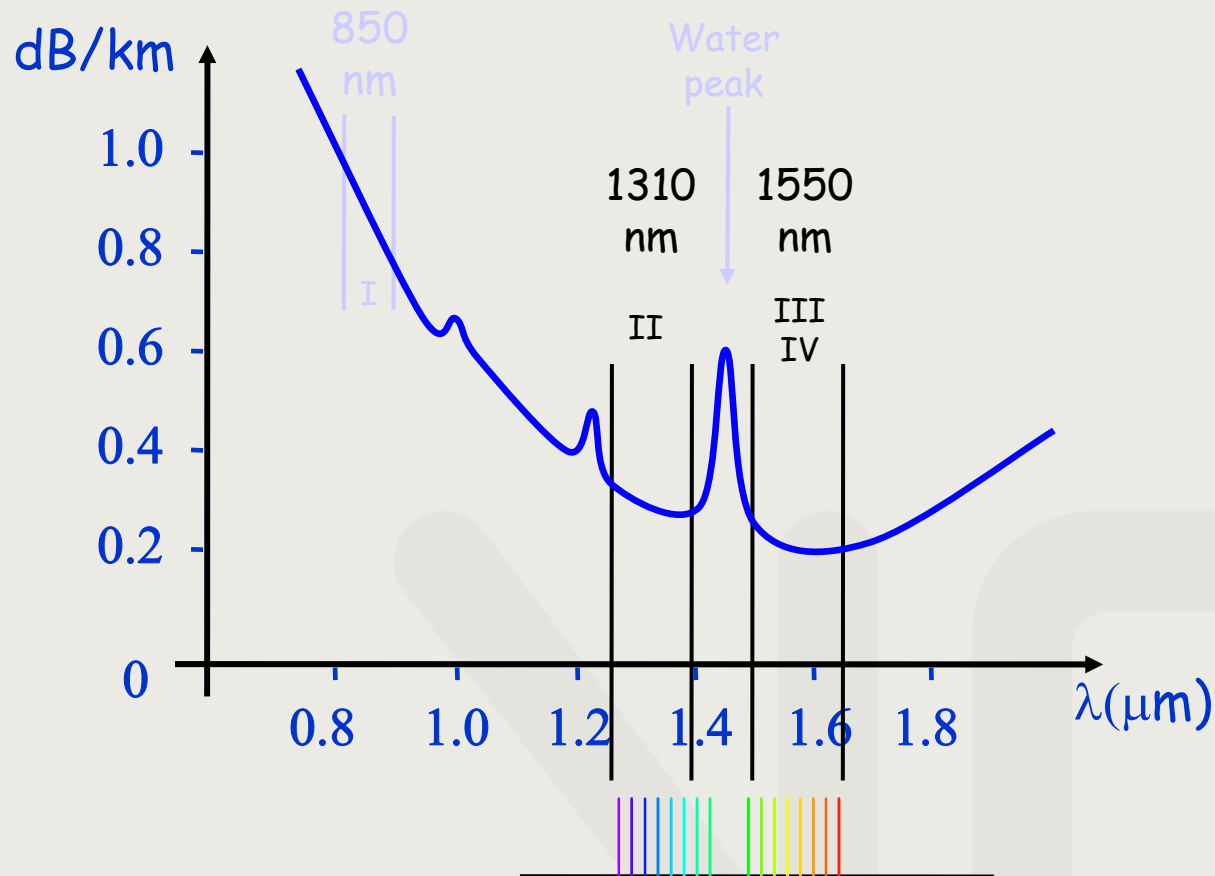
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DWDM – ITU channelling



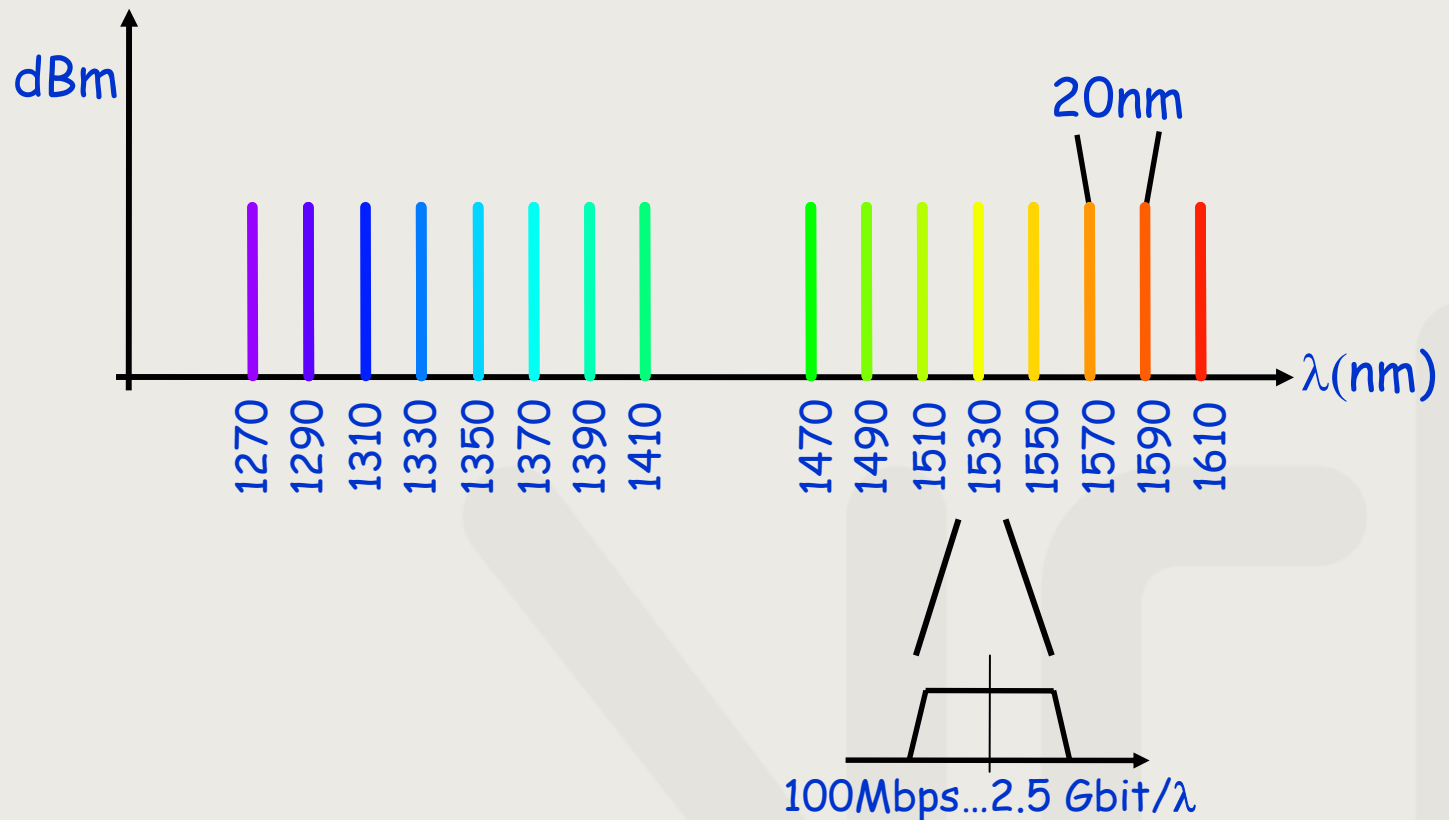
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Typical single mode fibre – spectral attenuation - CWDM

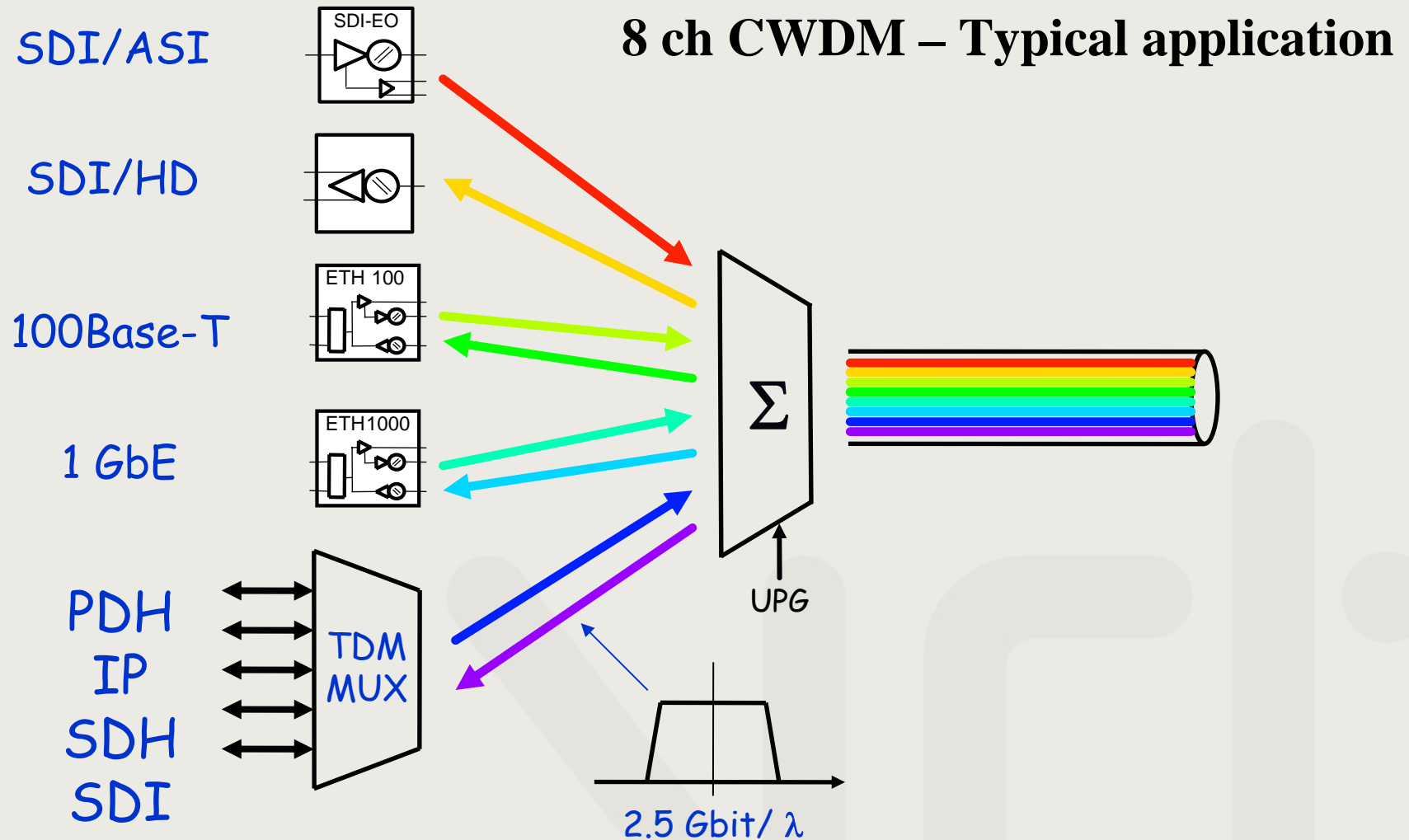


3. Technology WDM / DWDM / CWDM

CWDM – ITU channelling



3. Technology WDM / DWDM / CWDM



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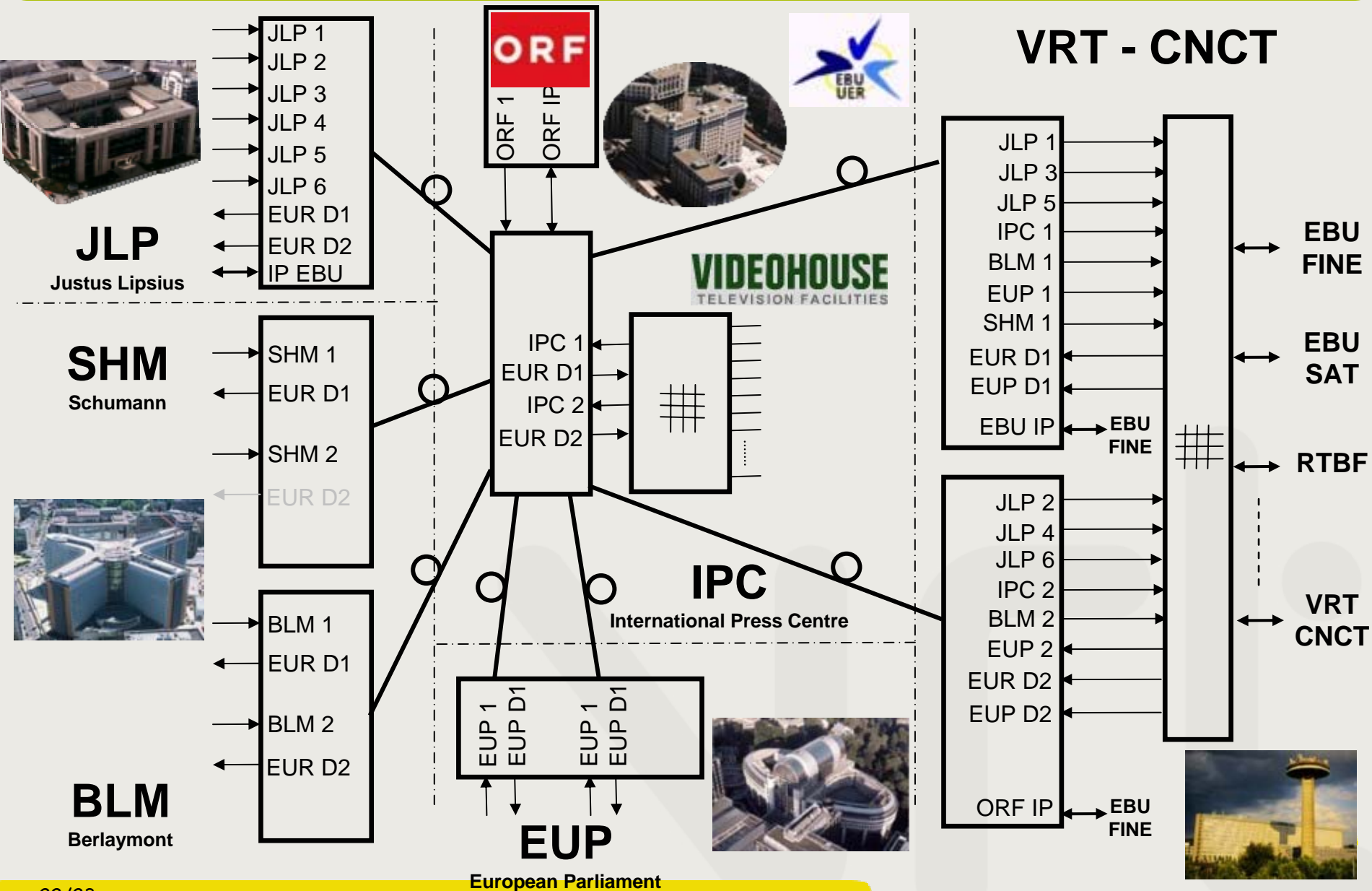
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4. The Fibre Network in Brussels



4. The Fibre Network in Brussels EUROPEAN District



VRT's Fibre Network in Brussels

- 1 Introduction – What to connect
- 2 How to connect
- 3 Technology WDM / CWDM / DWDM
- 4 The Fibre Network
- 5 Q&A**



VRT's Fibre Network in Brussels, Acronyms

- » WDM: Wavelength Division Multiplexing
- » CWDM: Coarse Wave Division Multiplexing
- » DWDM: Dense Wavelength Division Multiplexed
- » PDH: Plesiochronous Digital Hierarchy
- » SDH: Synchronous Digital Hierarchy
- » ETSI: European Telecommunications Standards Institute.
- » MPEG : Moving Picture Experts Group
- » SDI: Serial Digital Interface
- » ITU: International Telecommunication Union