



Laurea Magistrale in *Ingegneria delle Telecomunicazioni*

Information Theory@Digital Communications

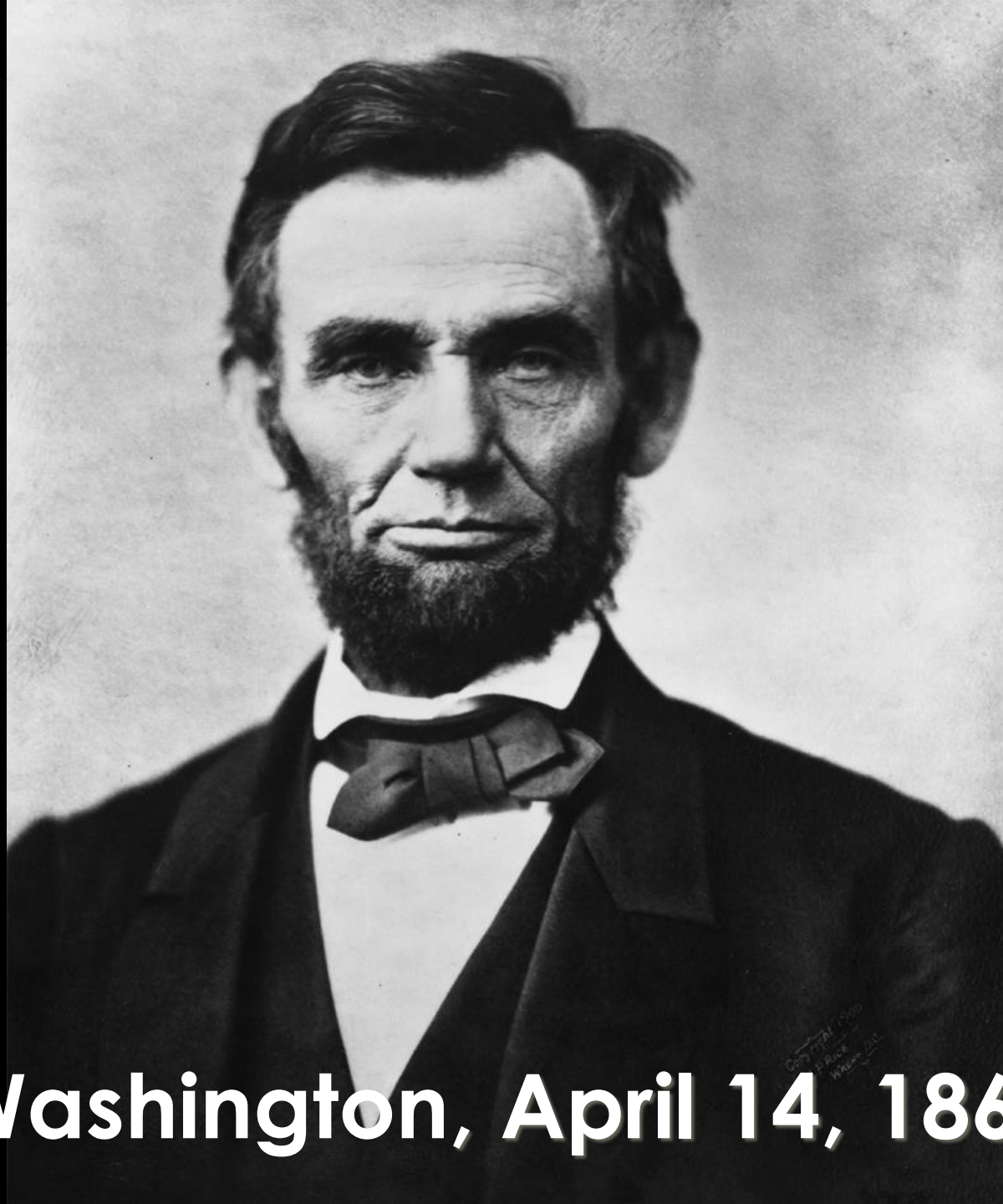
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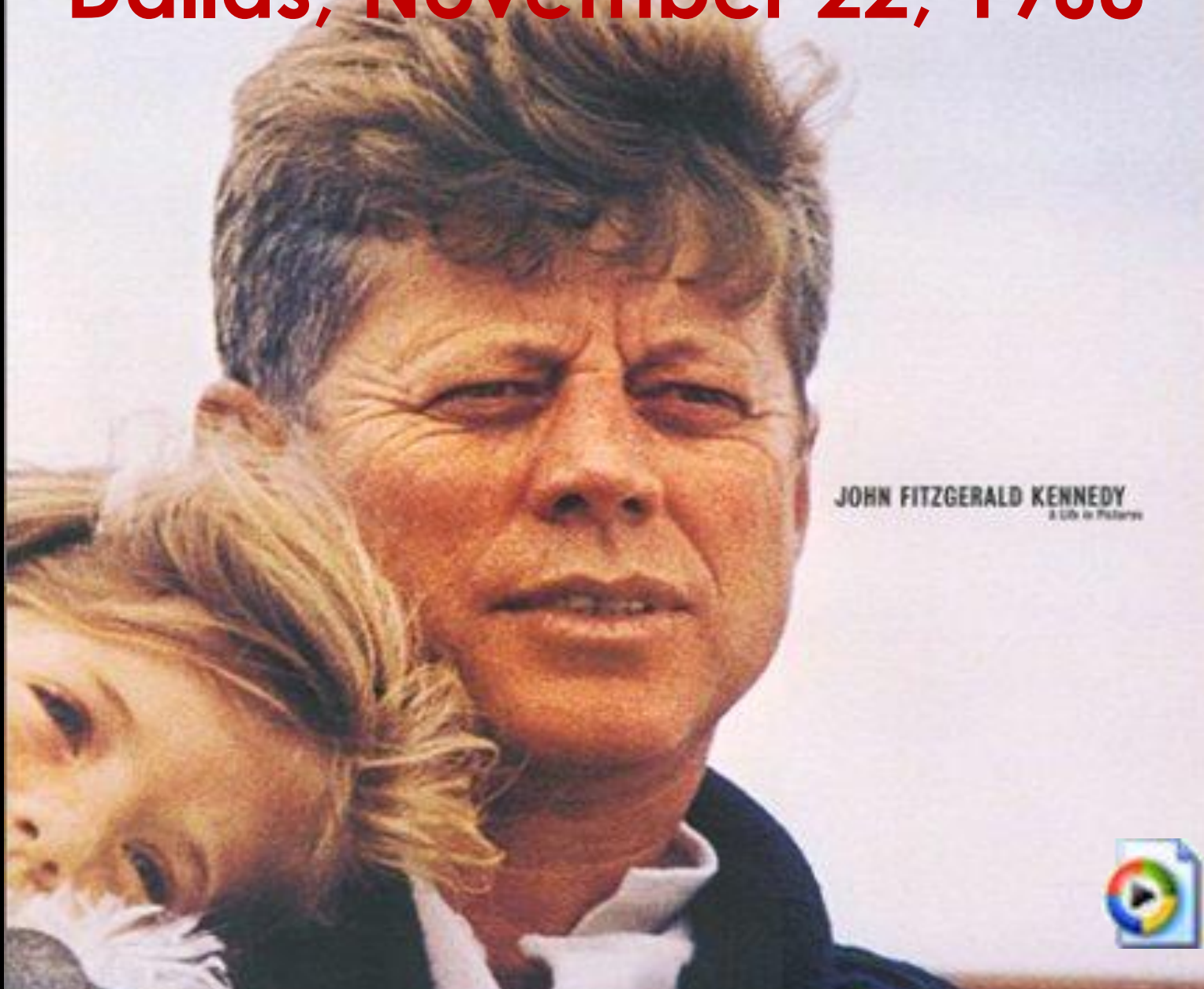
Washington, April 14, 1865

Bologna, End of September 1895





Dallas, November 22, 1963



JOHN FITZGERALD KENNEDY
A LIFE IN PICTURES



e, Anytime



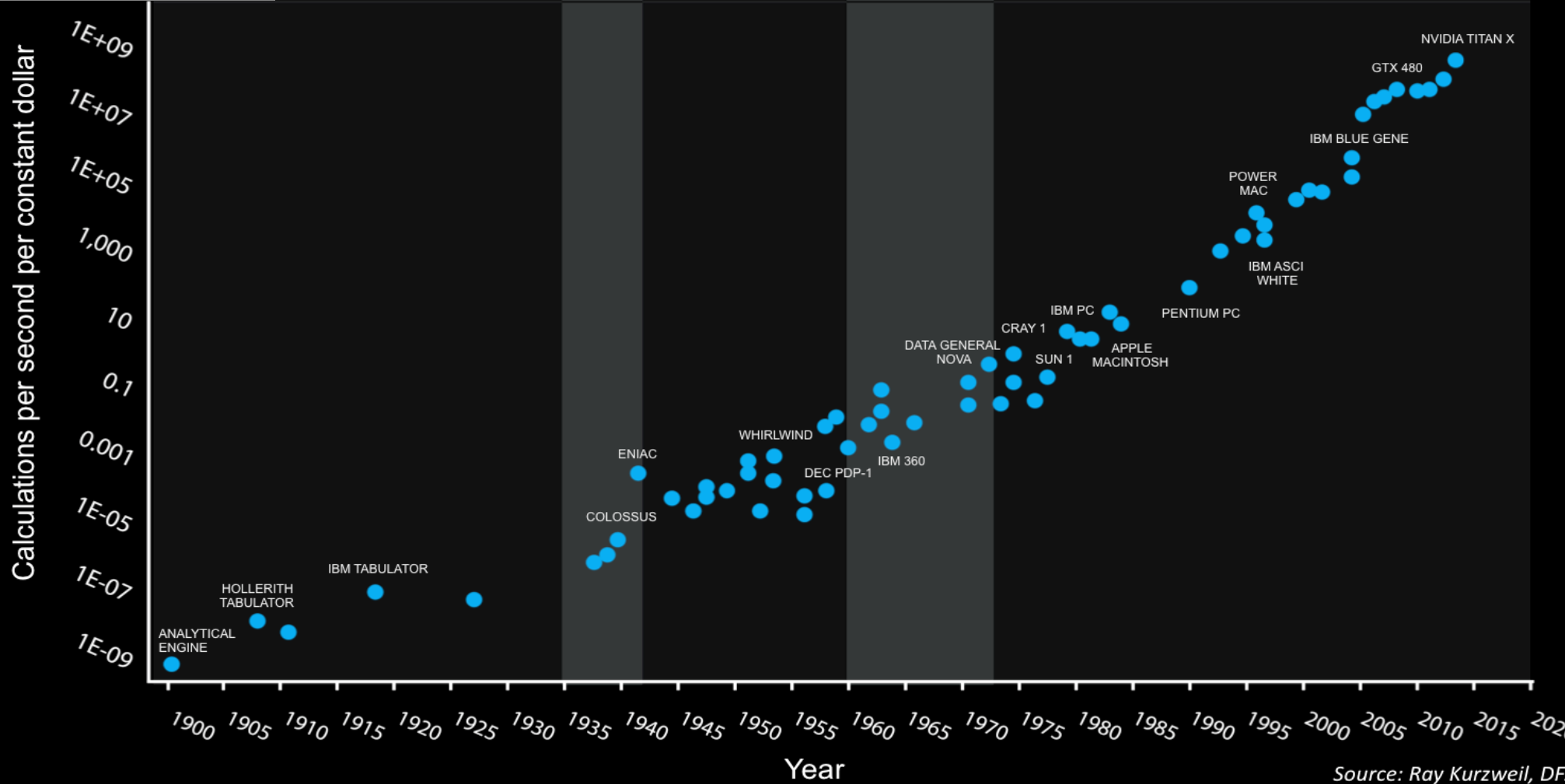
TLC Growth Factors

- **TECHNOLOGY:** *HW (electronics, photonics), SW (signal processing)*
- **GOING WIRELESS:** *Cellular, Wireless LANs*
- **THE INTERNET:** *(Applications), Transport Network, Access Network*
- **DEREGULATION:** *New operators, Lower costs*





120 Years of Moore's Law



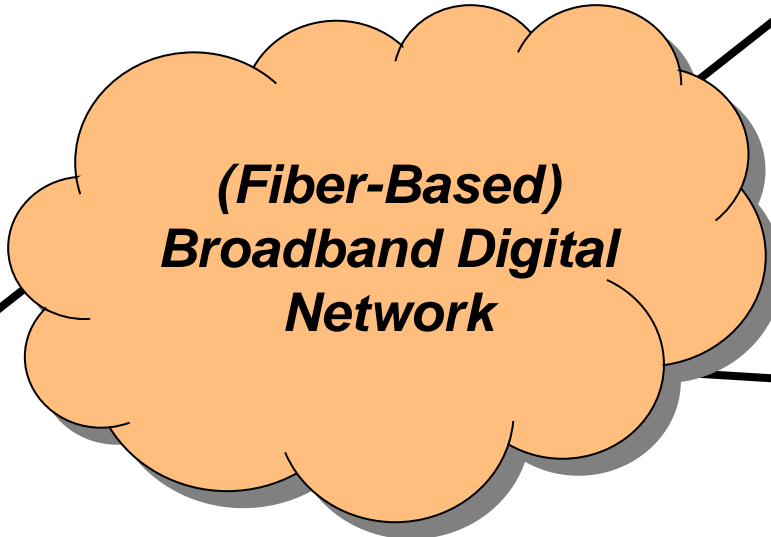
Source: Ray Kurzweil, DF

Transport and Access Networks



MP4 Encoder

User Terminal



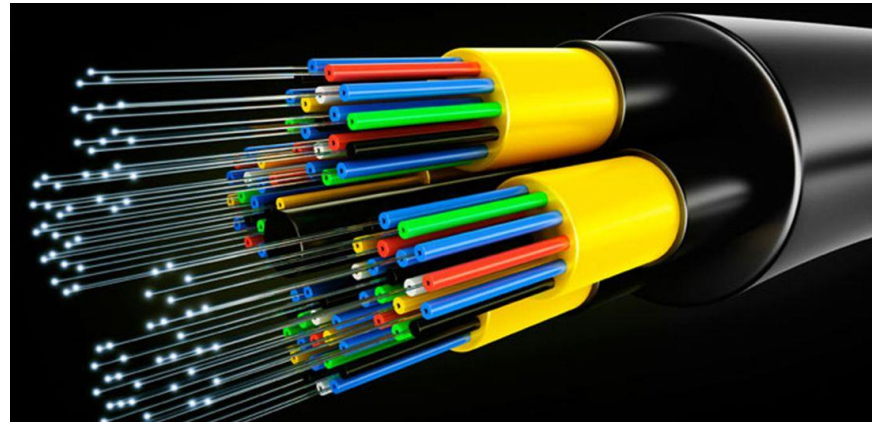
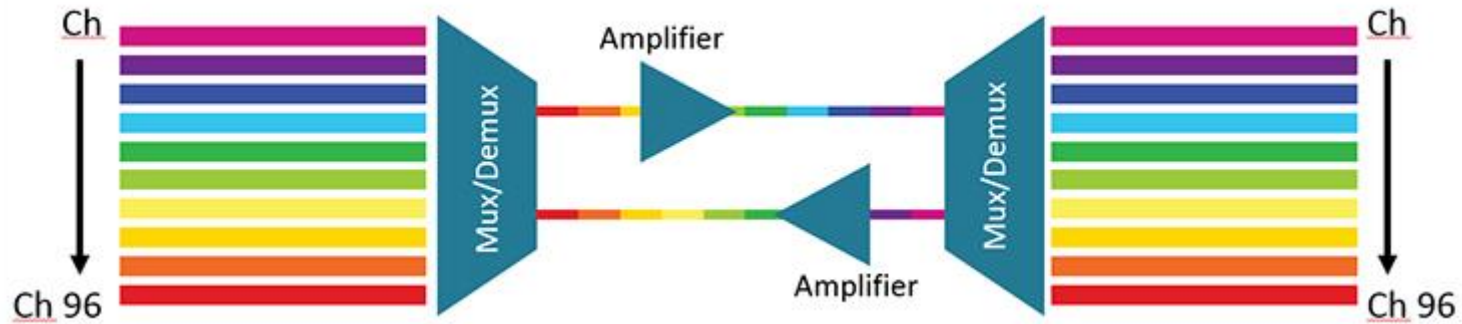
User Terminal

User Terminal

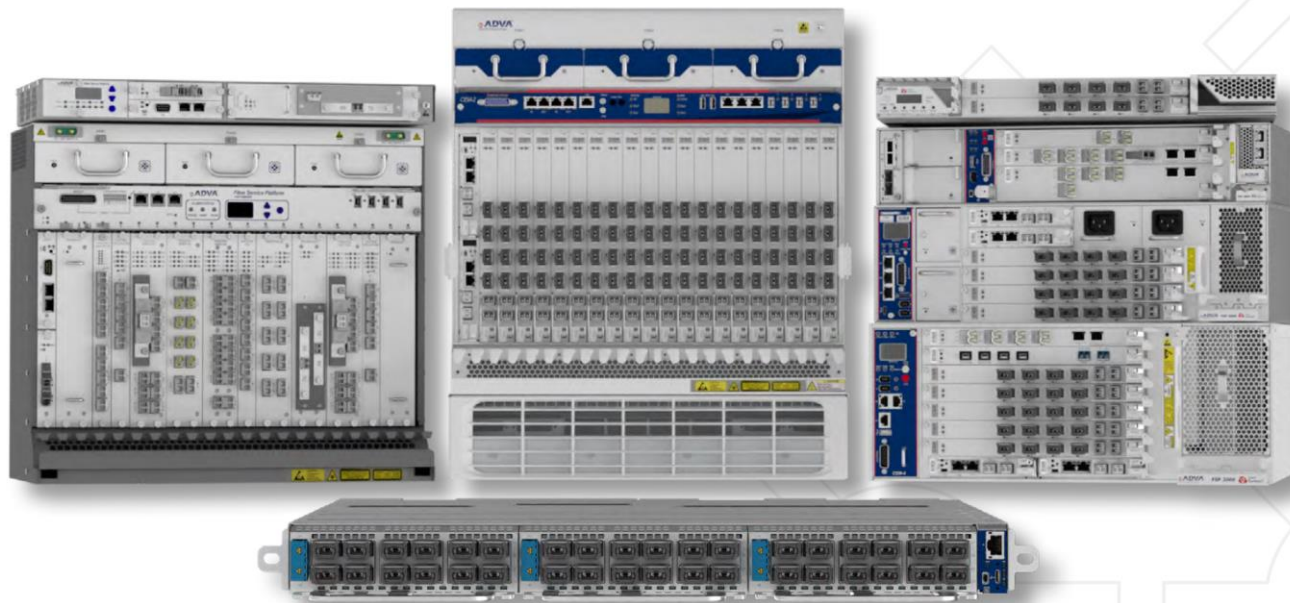
Wired/Wireless Access Links

User Terminal

WIRED Systems for the Transport Network



Optical (D)WDM



Your benefits

✓ Scalability

Up to 600Gbit/s per wavelength and 38.4Tbit/s duplex capacity per fiber pair with best-in-class metrics; up to 3.6Tbit/s per 1RU chassis

✓ Flexibility

From complete turnkey systems including all equipment necessary for end-to-end transport applications to disaggregated solutions

✓ Pay-as-you-grow design

Modular and scalable architecture that ensures both low initial cost and flexibility into the future

✓ Fully open and programmable

Open line system (OLS) architecture and YANG-based APIs (OpenConfig) for network disaggregation and easy integration into SDN-based environments

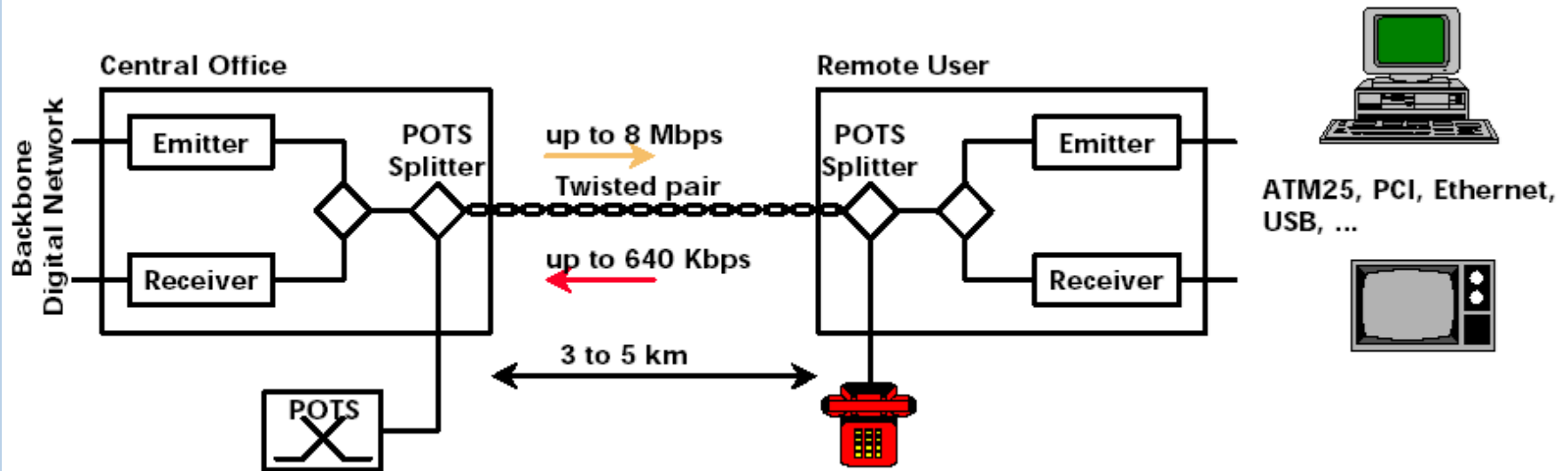
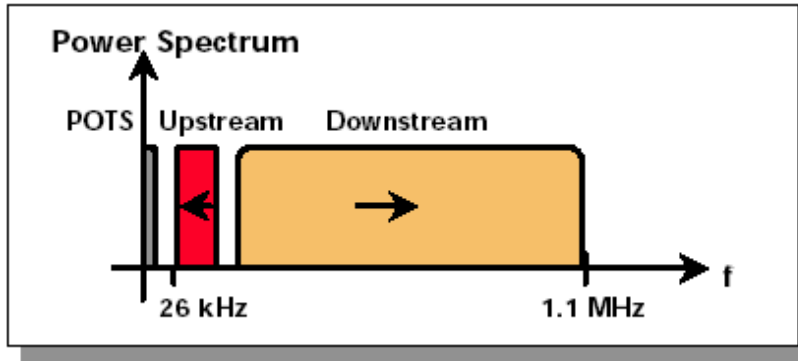
✓ Dynamic and scalable optical layer

Multitude of ROADM options from metro-optimized 2-degree ROADM to multi-degree ROADM for flexgrid optical layer

✓ ConnectGuard™ encryption technology

Certified data encryption with 100% throughput for any service on the transport layer

ADSL: a Sample (Wired) Communication System



NON describe:

Network Protocols/Architecture, Services, Applications

MA describe EVERYTHING ABOUT IT:

- ***1. Lossless Data Compression***
- ***2. Lossy Data Compression***
- ***3. Reliable Communication with Noise I***
- ***4. Data Protection***
- ***4. Reliable Communication with Noise***
- ***6. MIMO Information Theory***



“Ma sopra tutte le invenzioni stupende,
qual eminenza di mente fu quella
di colui che s'immaginò di trovar modo
di comunicare i suoi più reconditi pensieri
a qualsivoglia altra persona, benché distante
per lunghissimo intervallo di luogo e di tempo?”

Galileo Galilei: Dialogo sopra i due massimi sistemi del mondo,
Tolemaico, e Copernicano - Firenze, 1632 (I giornata VII, 126-131)