Evolution of telecom network infrastructure for broadcast and interactive applications

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Networks 2007
To IP and beyond!

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Digitalization of Video contents is changing the Television Models

Video from **Analog** to **Digital**

New content formats, high definition, compression algorithms are driving the digitalization of the network making TV delivery interactive and high quality

From **Video** to **File**

Each Production Center creates new Digital Contents with the possibility to customize according to different diffusion ways and to include interactivity and advertisement

From **Video** Network to **Multi-service** Network

Looking for new business opportunities TV Operators invest in new services (Virtual Network Operator) or new business model (leased capacity, network sharing) along with its traditional core business

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Digitalization of Video contents is changing the Competitive Marketplace

COMPETITIVE TRANSFORMATION

TV Broadcaster & Cable Operators

..enter VOICE and DATA

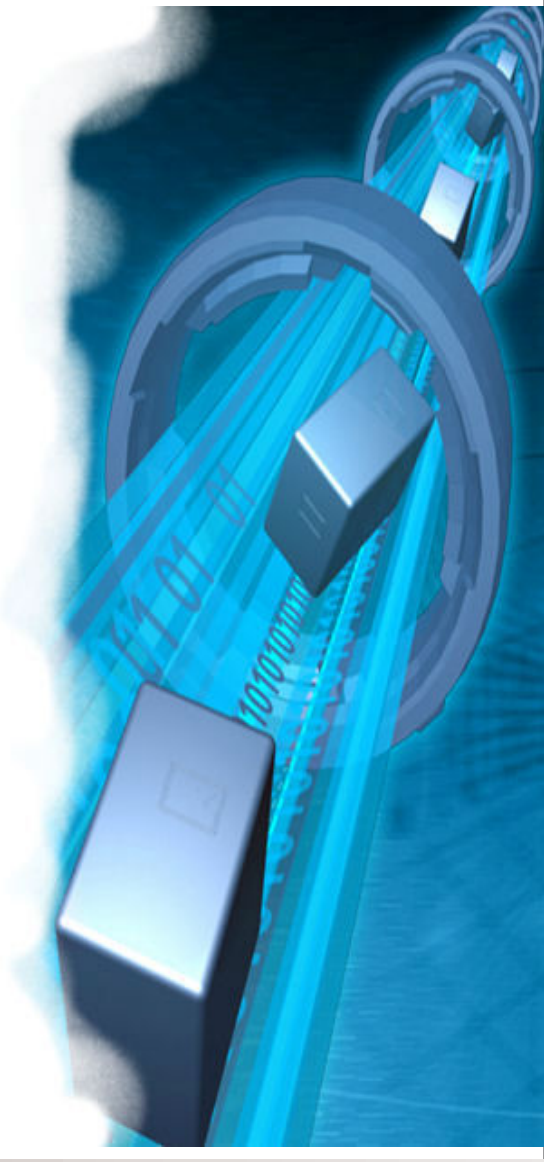
...enter TELEVISION

Fixed & Mobile Telco

1990's 2000's Today & Future

None Weak Fierce

COMPETITION Timescale



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Sailing into the right direction..

COMPETITIVE TRANSFORMATION

Necessary Response

Service Transformation

Traditional Approach

From...

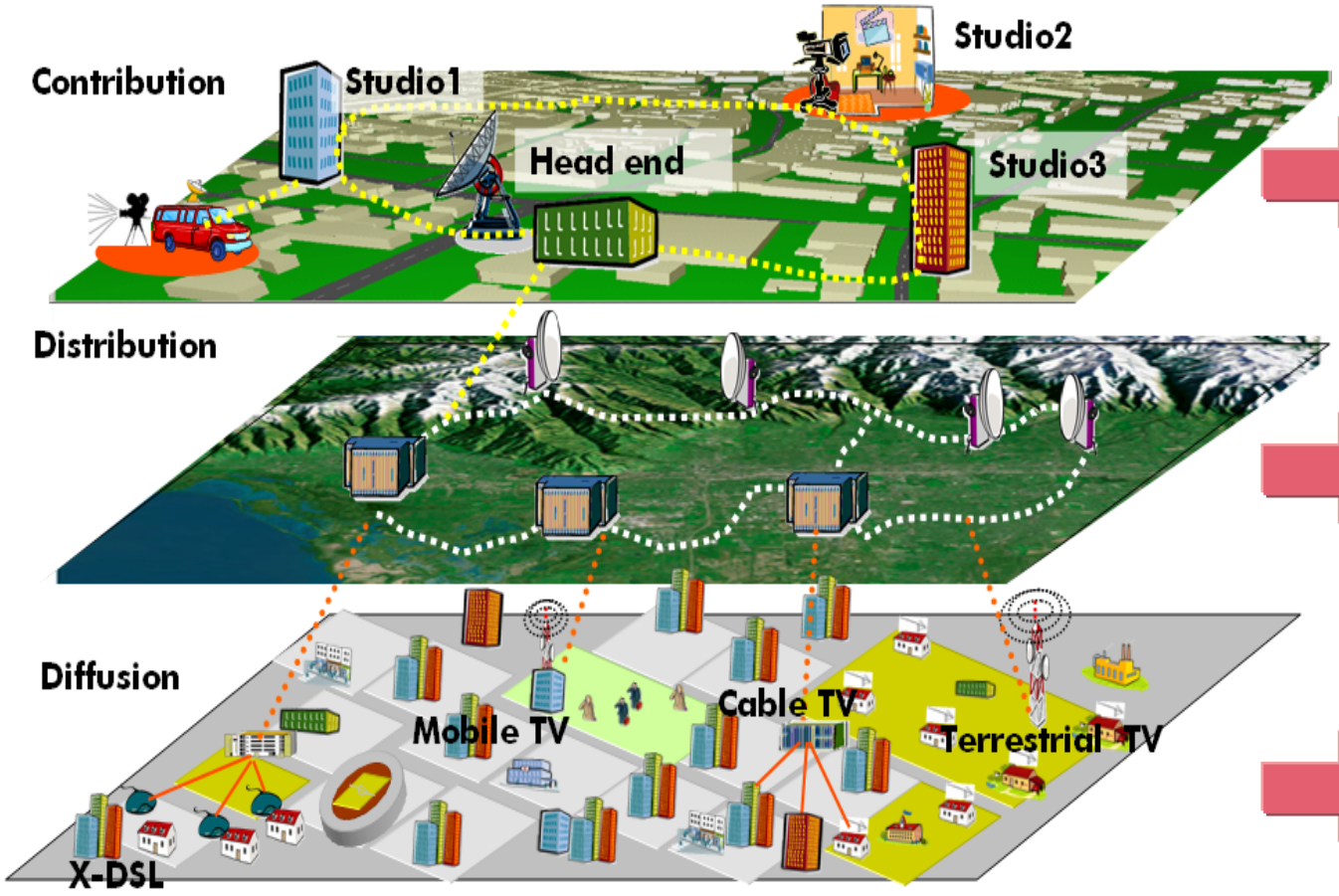
Single Service
"Video" (TV) - "Voice" (Telco)

Thought Leadership

To...

Multi Service
"Video,Data,Voice"

The Building Blocks of Digital Video Networks



Efficient and real-time contents processing and exchange to head-ends

Reliable digital transport network to pave the way to new services provision

Diffusion way to reach as many end users as possible

Challenging TV business as a result of increasing competition

COMPETITIVE TRANSFORMATION

Challenges Television

From the traditional TV to **new media**

- Digital TV (interactivity, HD)
- CATV (pay per view)
- IPTV (TV on demand)
- Mobile TV (new contents)

New Television Networks requires best in class and state of the art telecom technology

Challenges TV Operators

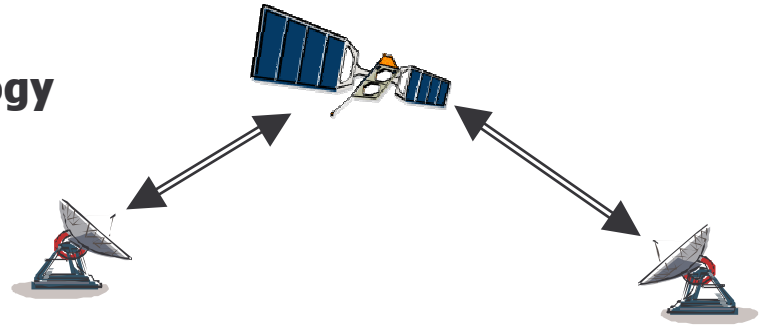
TV Broadcasters have different **telecommunication business model** and can rely on:

- Wireless Microwave
- With leased telecommunication (LL, VPN or lambdas)
- Managed Networks from a Telco
- With owned Optical fiber

Selection for Right Transport Technology for Digital Video Networks is not easy

Choosing the Right Transport Technology

Telecom Transport Technology Comparison



Video	Data	Transport Technology	Bandwidth Capacity
		Satellite	Up to 512 kb/s
ASI - SDI	ASI - SDI	copper	Up to 100 Mb/s
	ATM IP Ethernet	Microwave SDH	Up to 600 Mb/s
ASI - SDI		MSTP	Up to 40 Gb/s
		WDM	Up to 1 Tb/s

Alcatel-Lucent is the ONLY telecom vendor that owns ALL technologies

With Digital Microwave licence

Available **bandwidth** is “only” 155Mb/s and **video circuits** must be optimized

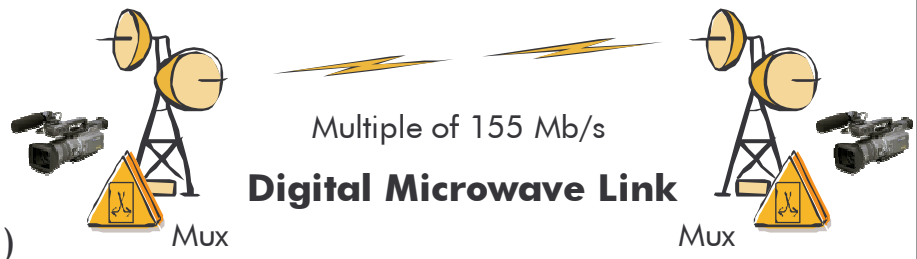
ASI-SDI **270Mb/s** must fit in 155Mb/s telecom frames

Mapping Options:

- 34 or 45Mb/s **TDM** fixed bit rate
  - Low efficiency
- **GFP-F** mapping on VCx-v (NG-SDH)
  - Highest efficiency
  - Circuit oriented
  - Highest reliability (traffic segregation)
  - Highest security
- Gigabit **Ethernet**
  - High flexibility
  - High reliability only with MPLS (high bit rate)

Contribution Network
Typical Rates from 1,5 to 100 Mbit/s
(dual) unidirectional point to point path

Distribution Network
Typical Rates from 18 to 24 Mbit/s
unidirectional point to multipoint path



NG-SDH with GFP-F mapping on VCx-v offers best in class and more efficient digital video transport technology for Contribution and Distribution Networks

With leased lines

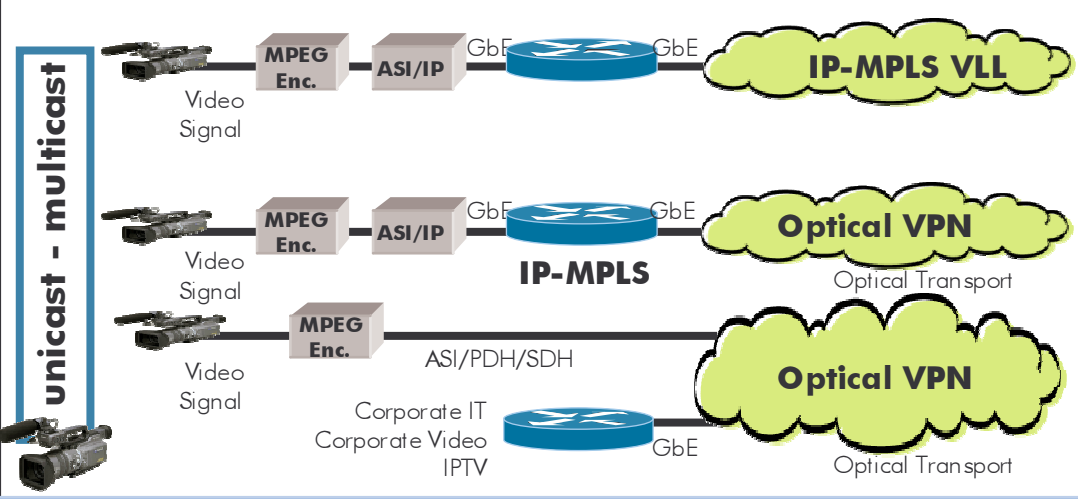
Video are circuits and Leased **Lines can be virtual**

Telecom Service Providers offer for LL is different in the countries.

- GbE LL in average are cheaper but need QoS

Business Model:

- Telecom SPs invest in QoS and TV broadcasters invest on flexibility



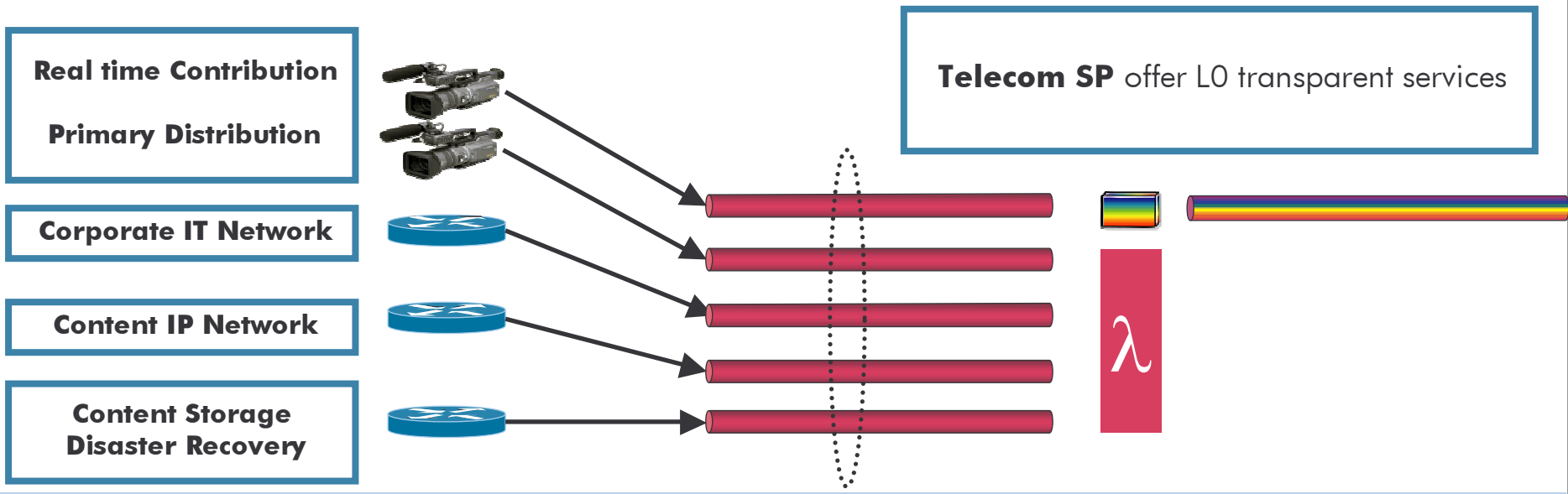
Telecom SP implements the L3 VPN and provides high reliable MPLS links

Telecom SP implements the L2 VPN with Multi Service Optical Transport
TV broadcaster implements Video circuits and FTP and Data virtual services

Optical VPN for best in class unicast and multicast Digital Video Circuits
IP-MPLS for highest Quality of Service differentiation

With lambda services inter studios

Lambda services offer **highest bandwidth** and transparent services
Lambda services enable Centralized Real-Time graph facilities connected over distance
WDM technology supports ASI, SDI, HD-SDI as well as Ethernet, ATM and SDH
Each WDM lambda can transport up to 40Gb/s (100Gb/s in the future)



Lambda Services boost inter-studio connectivity with significant low delay and high quality available in native definition

With optical fiber inter studios

The owner of a dark fiber or the right of use can implement any telecommunication technology to **optimize the operational costs for Video and IT**

- From different Head-ends to a Centralized Real-Time graph facility
- Share contents and files
- Create hot stand-by head-ends and distribution sites
- Implement business continuity or disaster recovery sites
- Extension of the local area network over distance

The business case turn positive when the transmission **overpass 10Gb/s**

32λs

Metro DWDM supports 32 protected lambdas @10Gb/s (or40Gb/s)
Metro CWDM supports 8 protected lambdas @2,5Gb/s (or 10Gb/s)

Optical fibers let TV broadcasters independent from telecom
Business case turn positive after 10-20Gbit

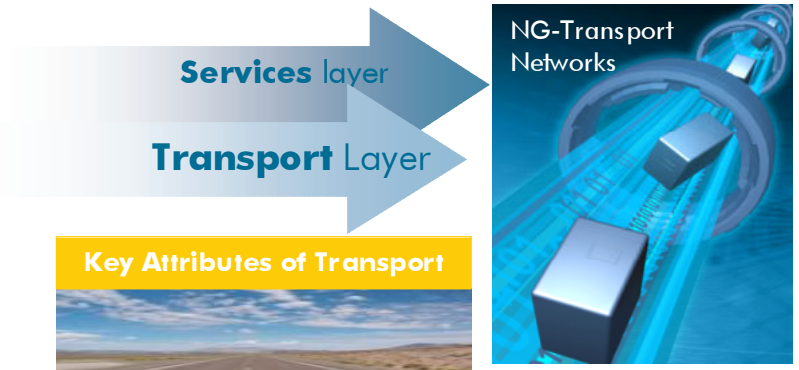
With national optical network

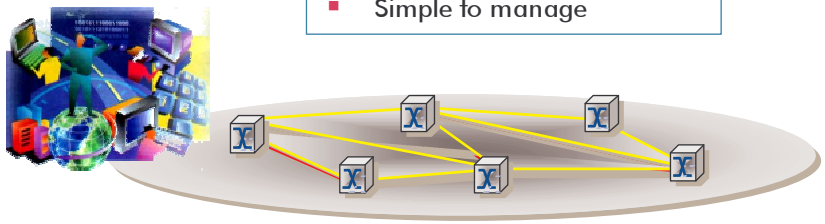
Owner of the telecom network **must** guarantee:

- **Continuance Operation** of Telecom Services
- Appropriate **SLA** to each user
- **Integrity** and **security** of data flow

Owner of telecom network implements services for:

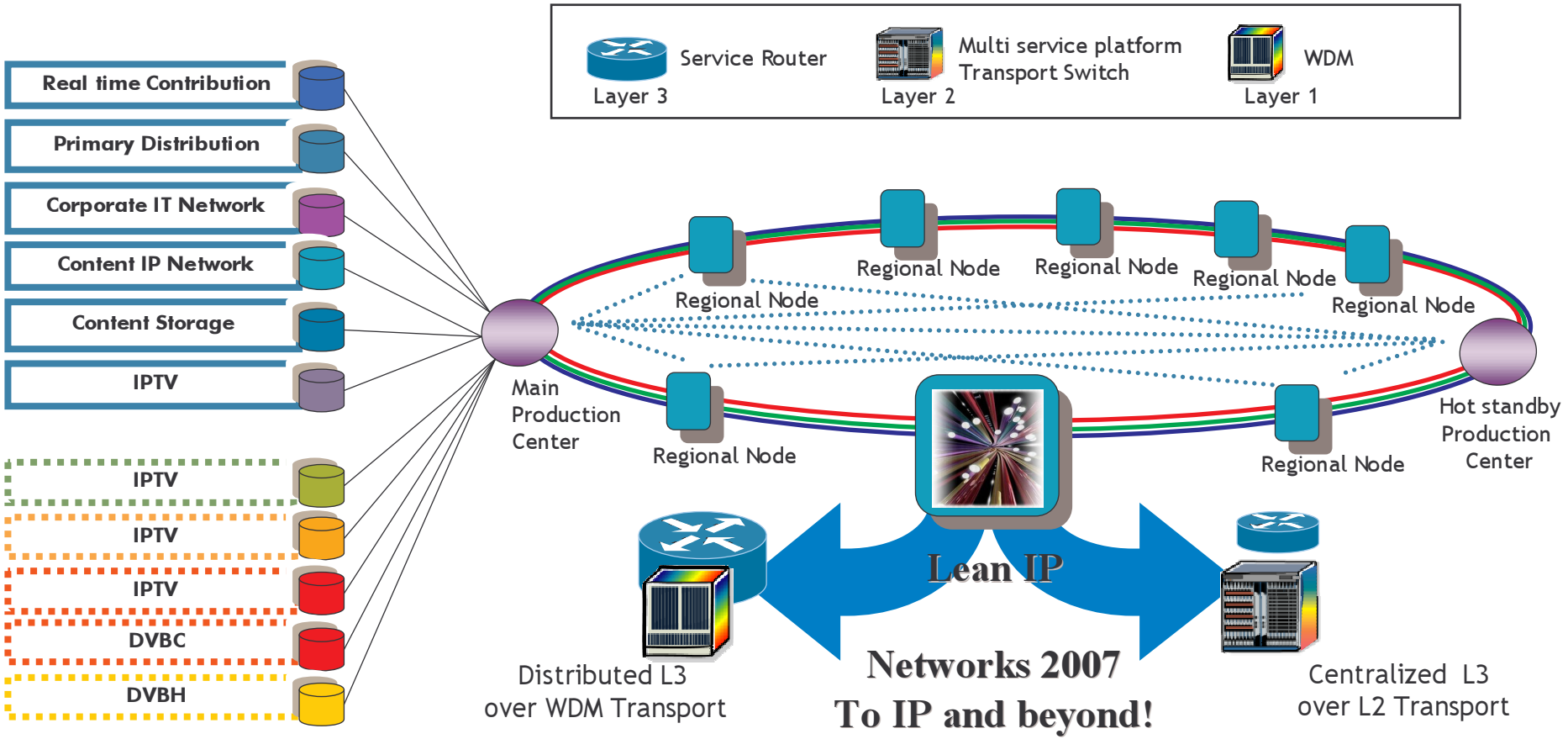
- Content Studios
- Video Production
- Regional Video Distribution
- IT Corporate
- IPTV
- Corporate Video
- Etc.





Private Networks are the first TV broadcasters' step in the telecom world for Internal Video Services, Corporate IT… and external ?

Designing a national optical network for Video Services



Alcatel-Lucent has both Solutions
and supports Customers in this critical phase

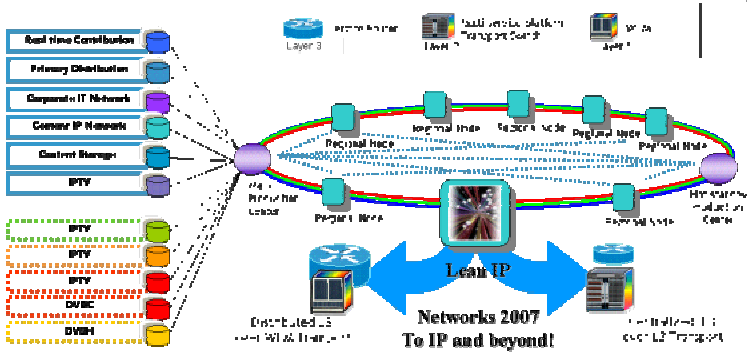
Designing an national optical network for Video

Video needs (unicast or multicast) circuits

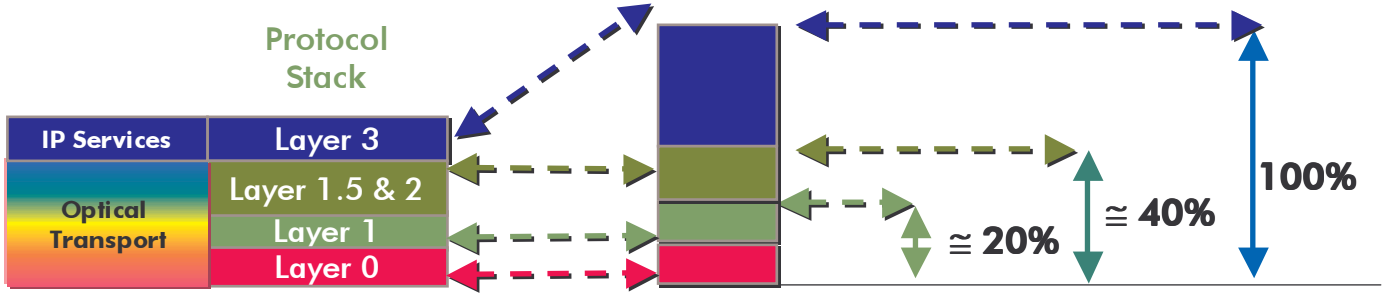
Telecom **Services** (voice and data) **moves to IP**

Telecom technology is moving to **lean IP**

- **Service L3 Layer**
  - Responsible for the SLA of each user of the network
- **Transport L2 Layer**
  - Responsible for the integrity of data transmitted over a telecom network



Network optimization achieved by managing bytes at the **lowest layer possible** that satisfies Quality of Service and end-to-end connectivity requirements



Cost (CAPEX) per managed byte normalized to total protocol stack cost up to Layer 3

cross-connect where you can, switch where you need, route where you must

Conclusions

Voice and Data are entering in the TV or
TV is entering in the voice and data world ?

Video Digitalization compels a strong innovation in the telecom world and creates new content formats, high definition, and interactive TV

Telecom Operators enter the Broadcasting Market offering Mobile and IP TV

TV Broadcasters invest in telecom to secure their main content asset optimizing Digital Microwave networks or even investing in optical fiber

New TV networks can support content contribution and distribution, as well as DVB-x, IPTV and other services

Alcatel-Lucent experience in the Telecom and TV World supports TV operators implementing profitable telecom networks in competitive world of digital video

www.alcatel-lucent.com

Thank You