



The Evolution of Optical Transport Networks

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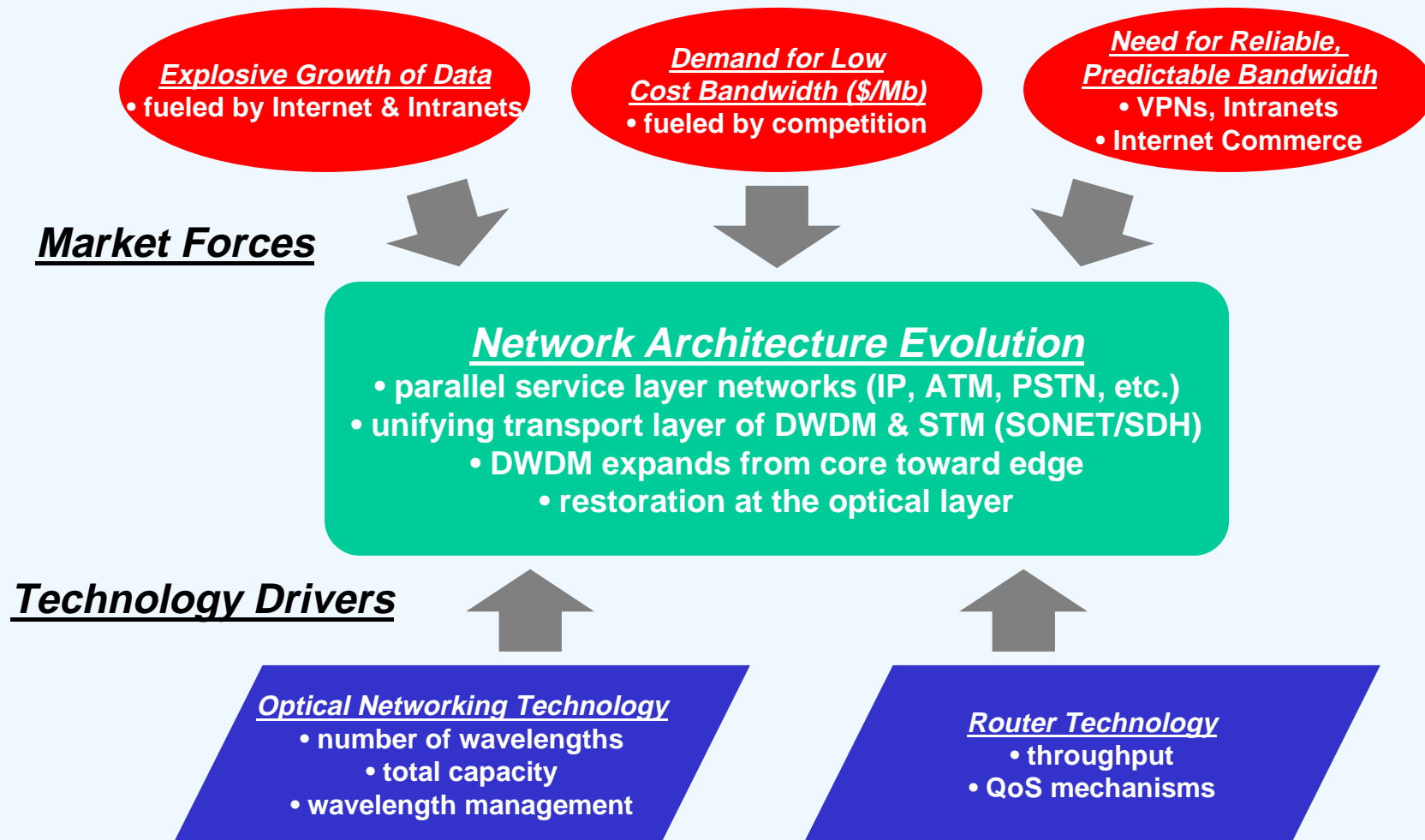
Chief Technology Officer - Optical Networking Group

Lucent Technologies

SPARTAN Symposium - 5/20/98

Network Architecture Dynamics

... in a dramatically changing landscape



Increasing Transmission Capacity in Wavelength and Time Domains



- **Expanding the Wavelength Domain**

- Ultra-Broadband Amplifier(80 nm)
- Large Channel Count Mux/Demux
- 100 Wavelength Channels @ 10 Gb/s



1 Terabit/sec Transmission over 400 km

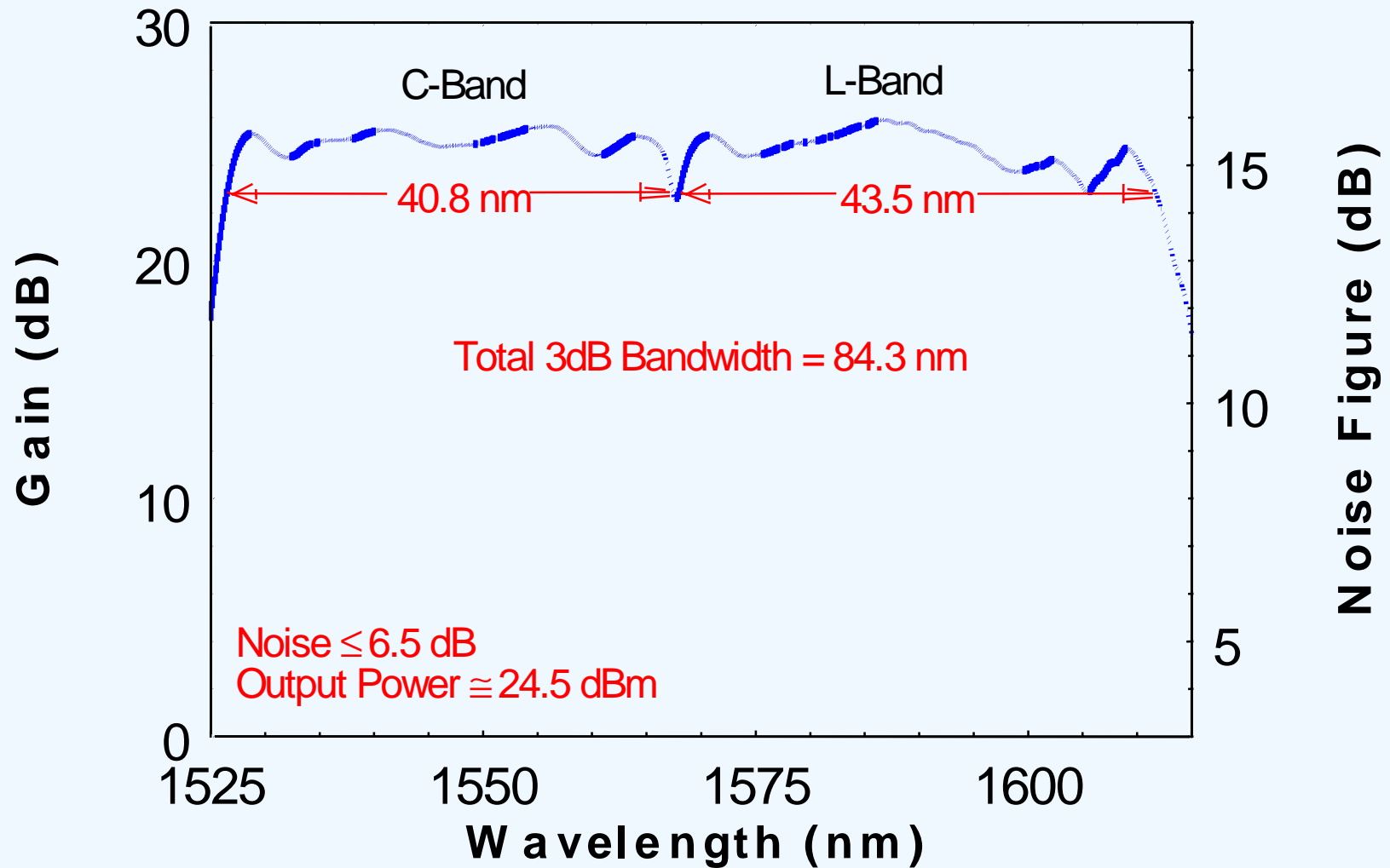
- **Pushing the Time Domain- 40 Gb/s**

- 40 Gb/s x 30 Wavelengths



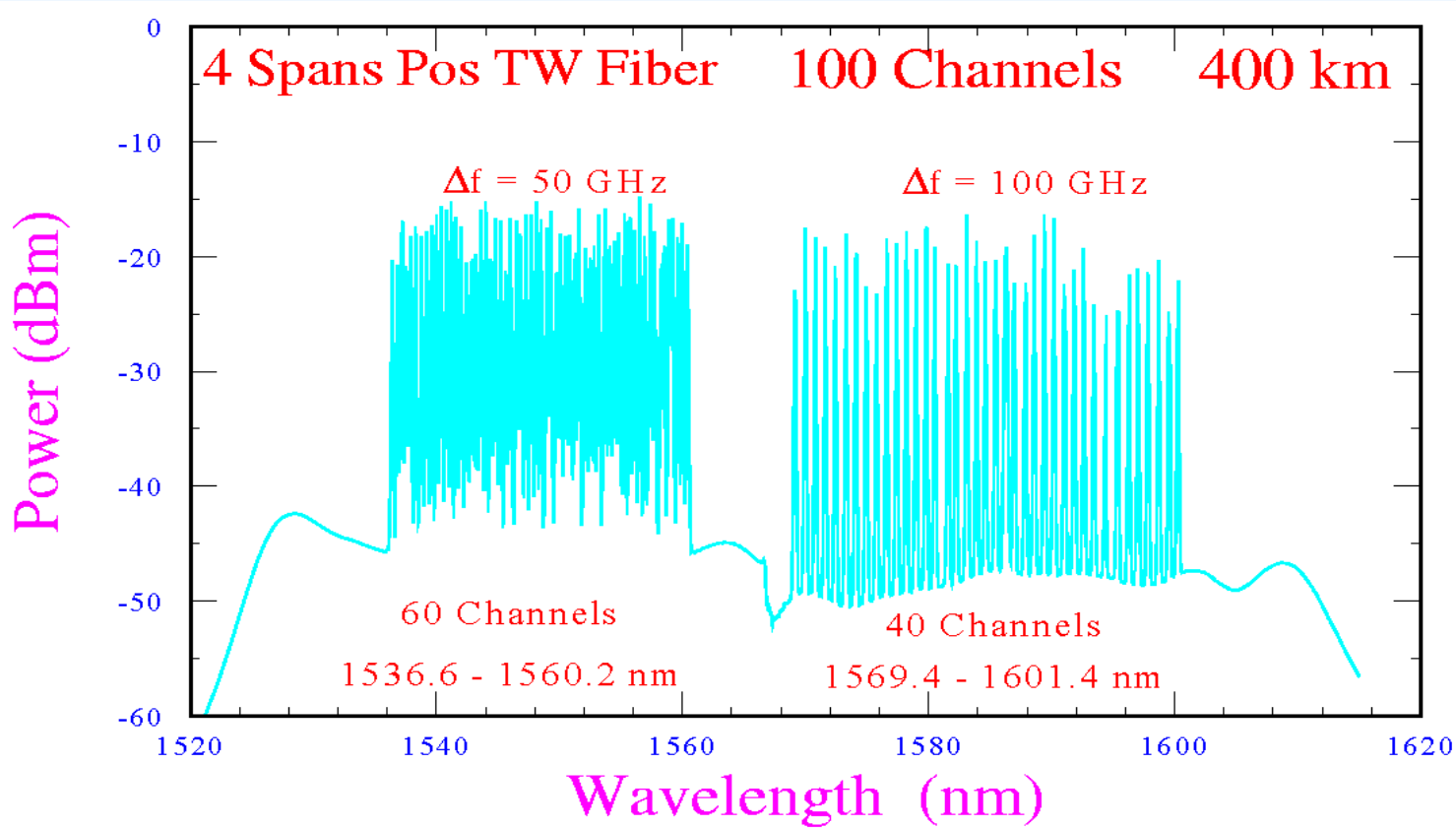
1.2 Terabit/sec over 85 km

Ultra-Wideband EDFA





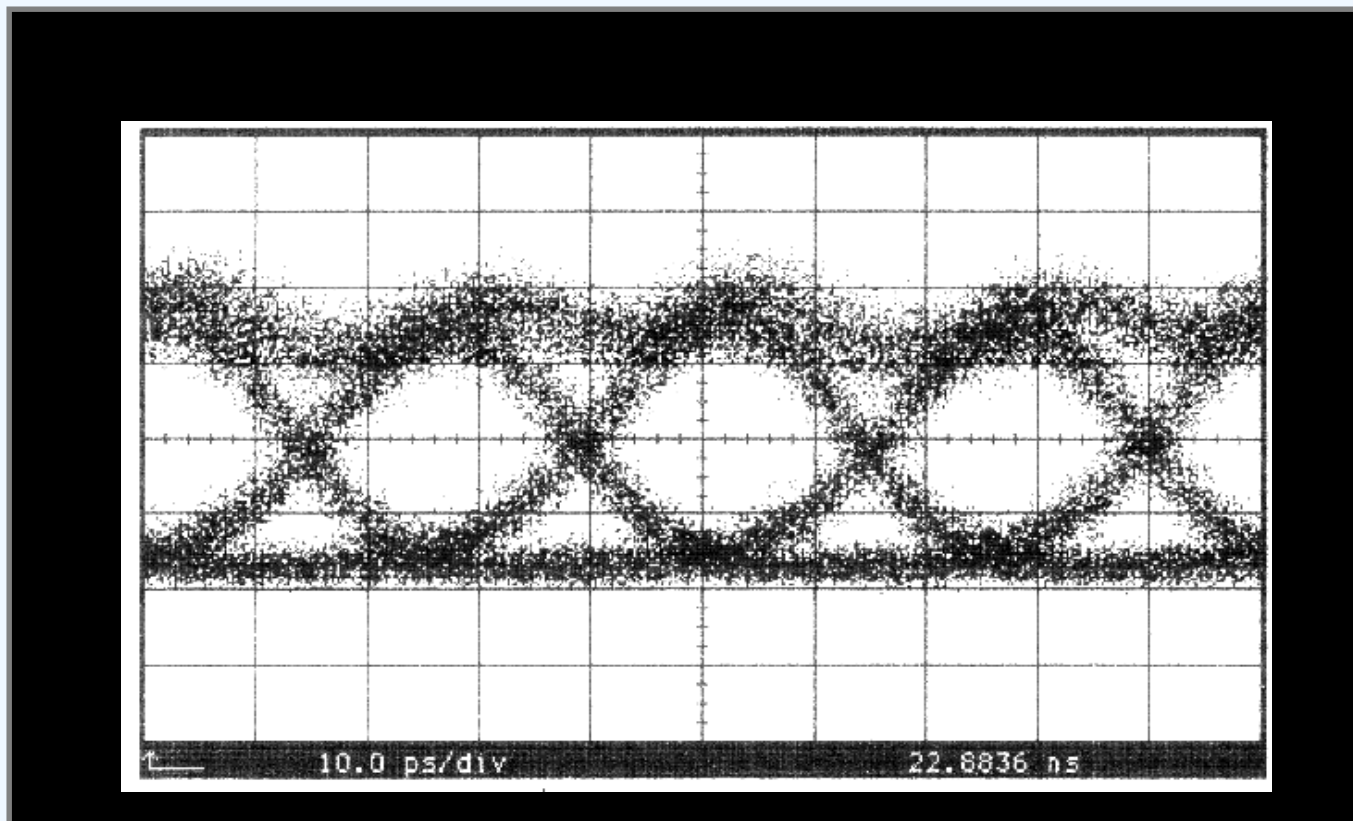
1 Tb/s Experiment: Channel Spectrum



Srivastava and Sun 02.14.98

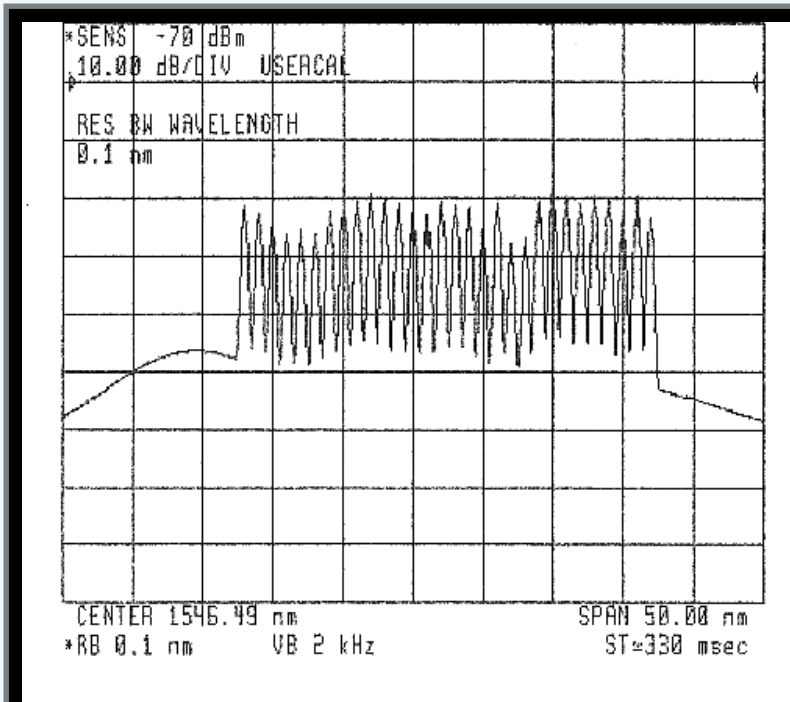
40Gb/s Waveform After 85km TrueWave Fiber @1554.5nm

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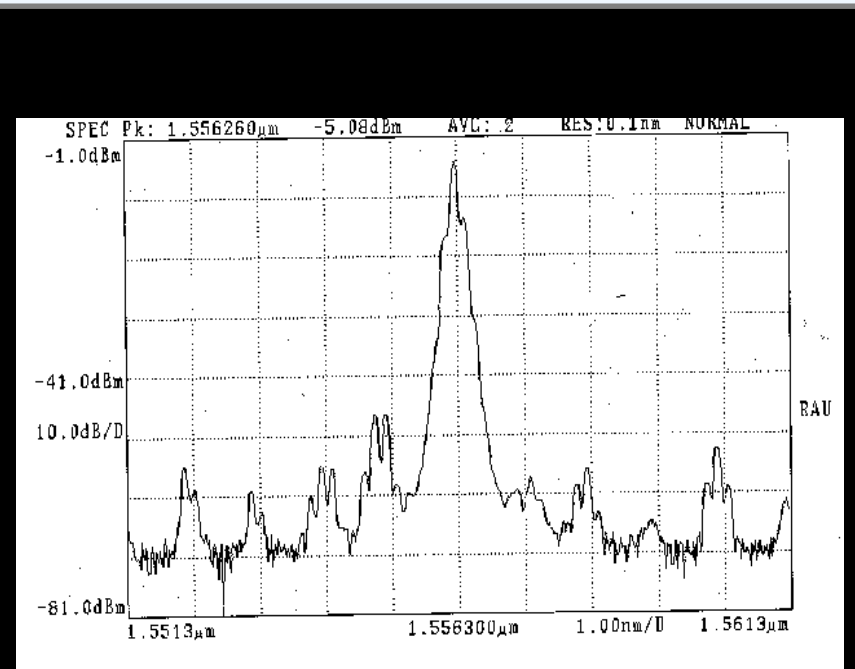


10ps/Div.

30 Wavelength Spectra



Transmitter Output



Receiver Input

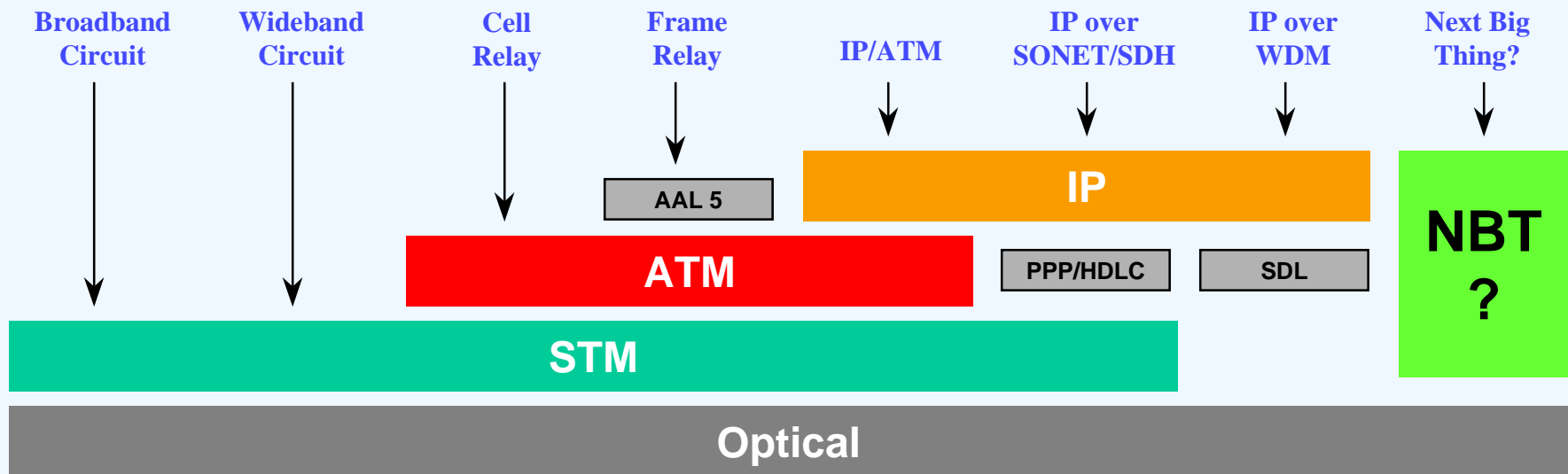
Flexibility, Efficiency, & Reliability

Selective Layered Bandwidth Management

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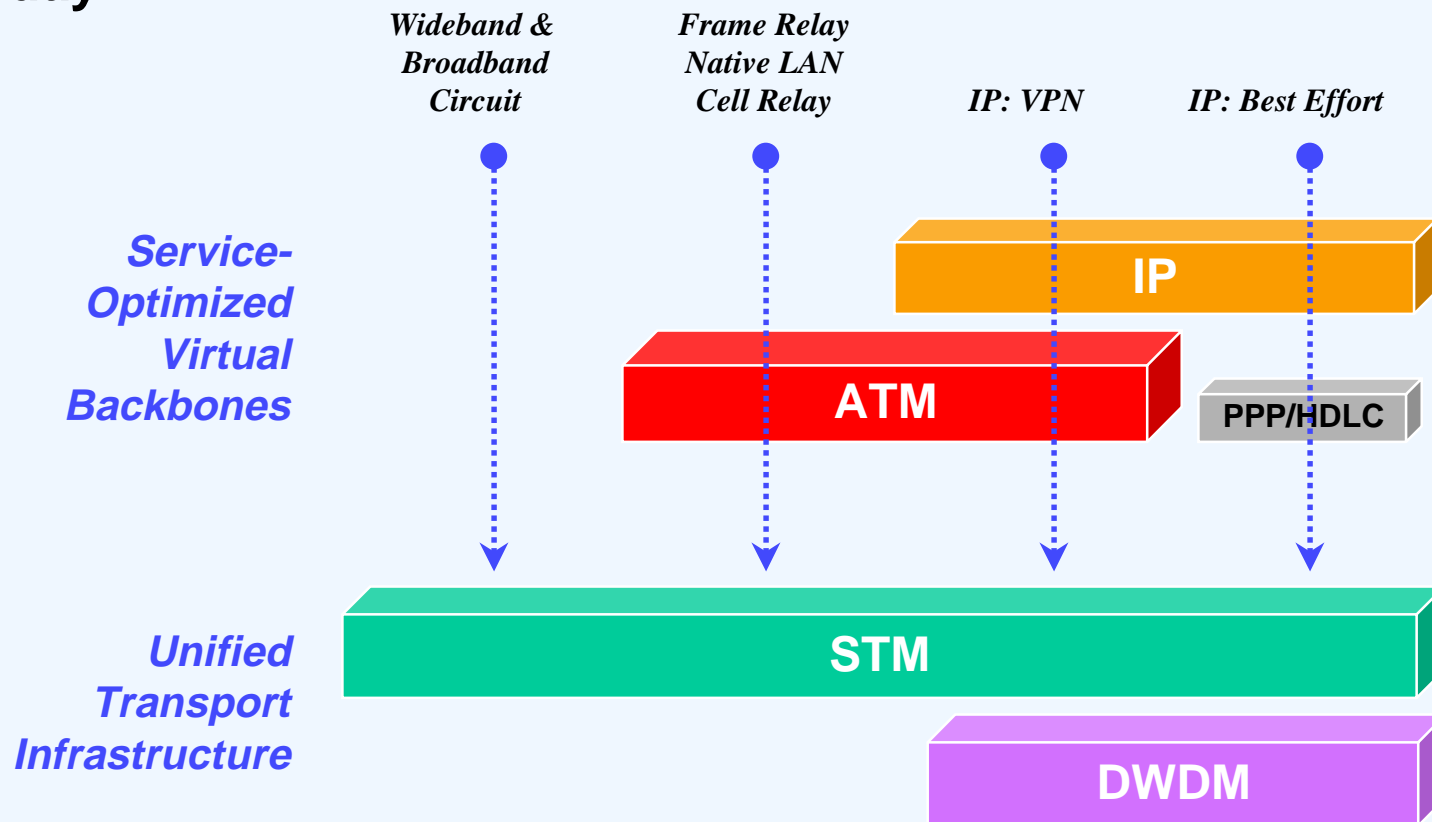


Creating **service-optimized virtual backbones** on a unified infrastructure...



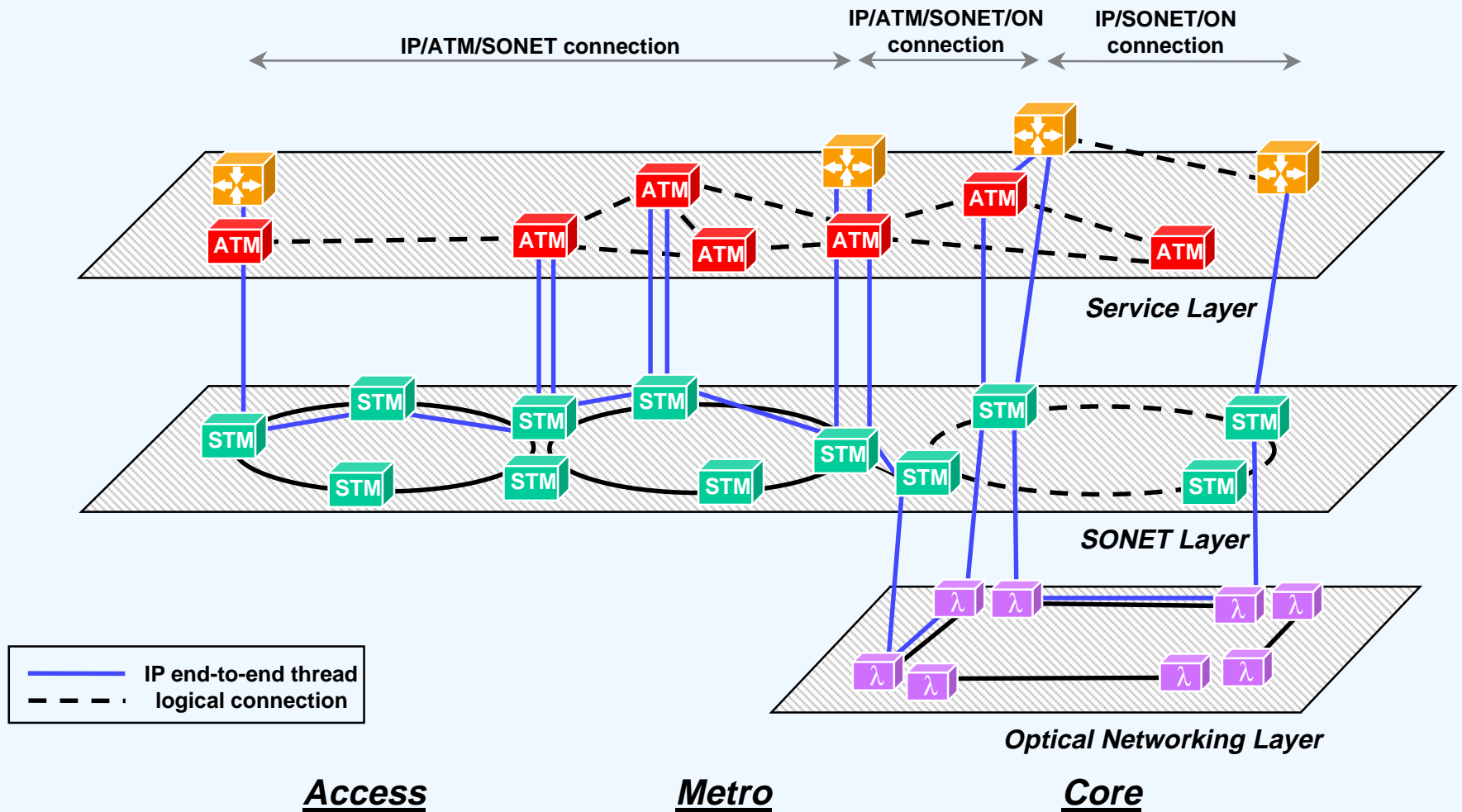
...applying just the right functions at the right place and time,
to match service mix and network needs

Selective Layered Bandwidth Management Today



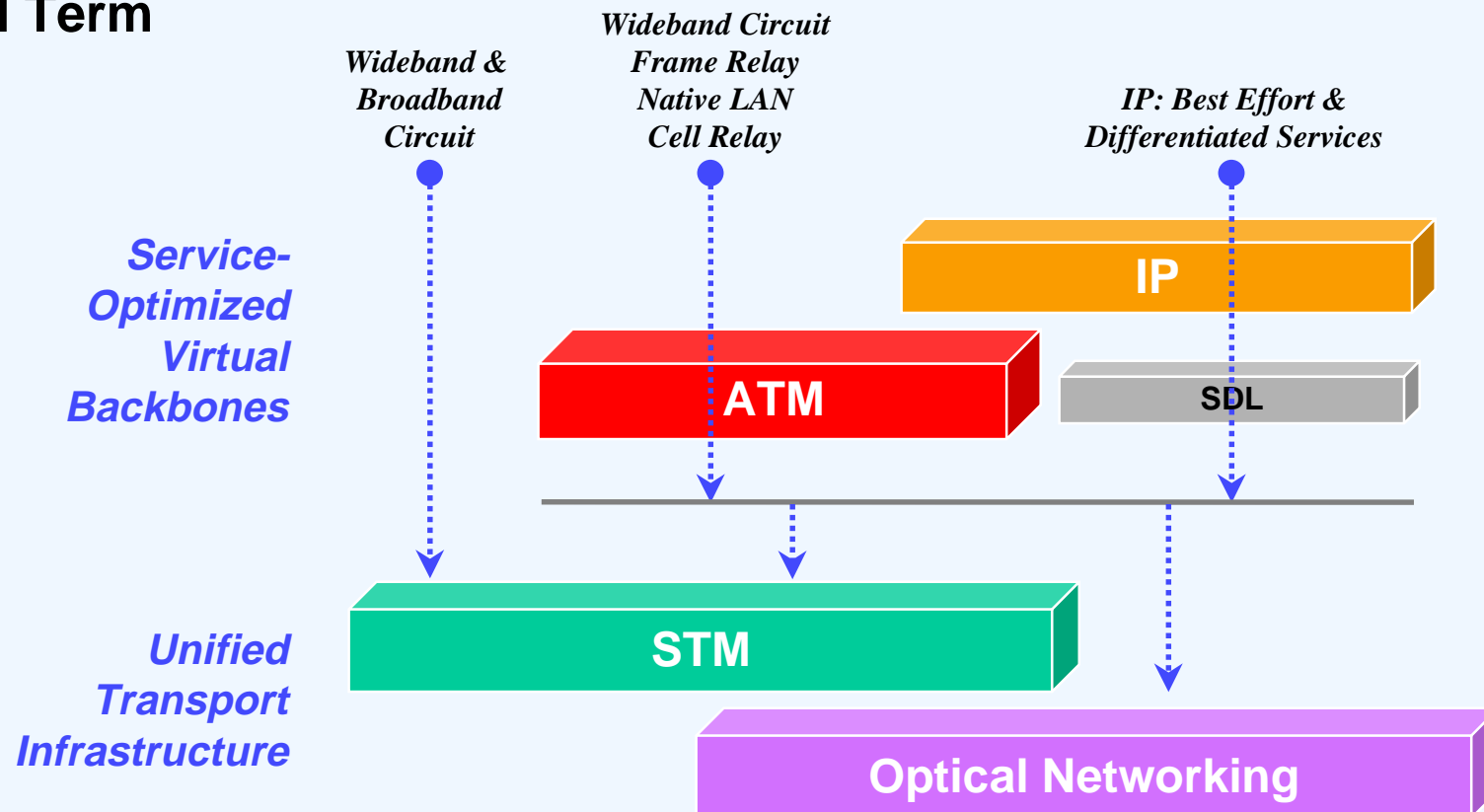
- Rapid expansion of core capacity via DWDM
- Overlaid with circuit, ATM, & IP virtual backbones

Network Example - IP Transport Today



Selective Layered Bandwidth Management

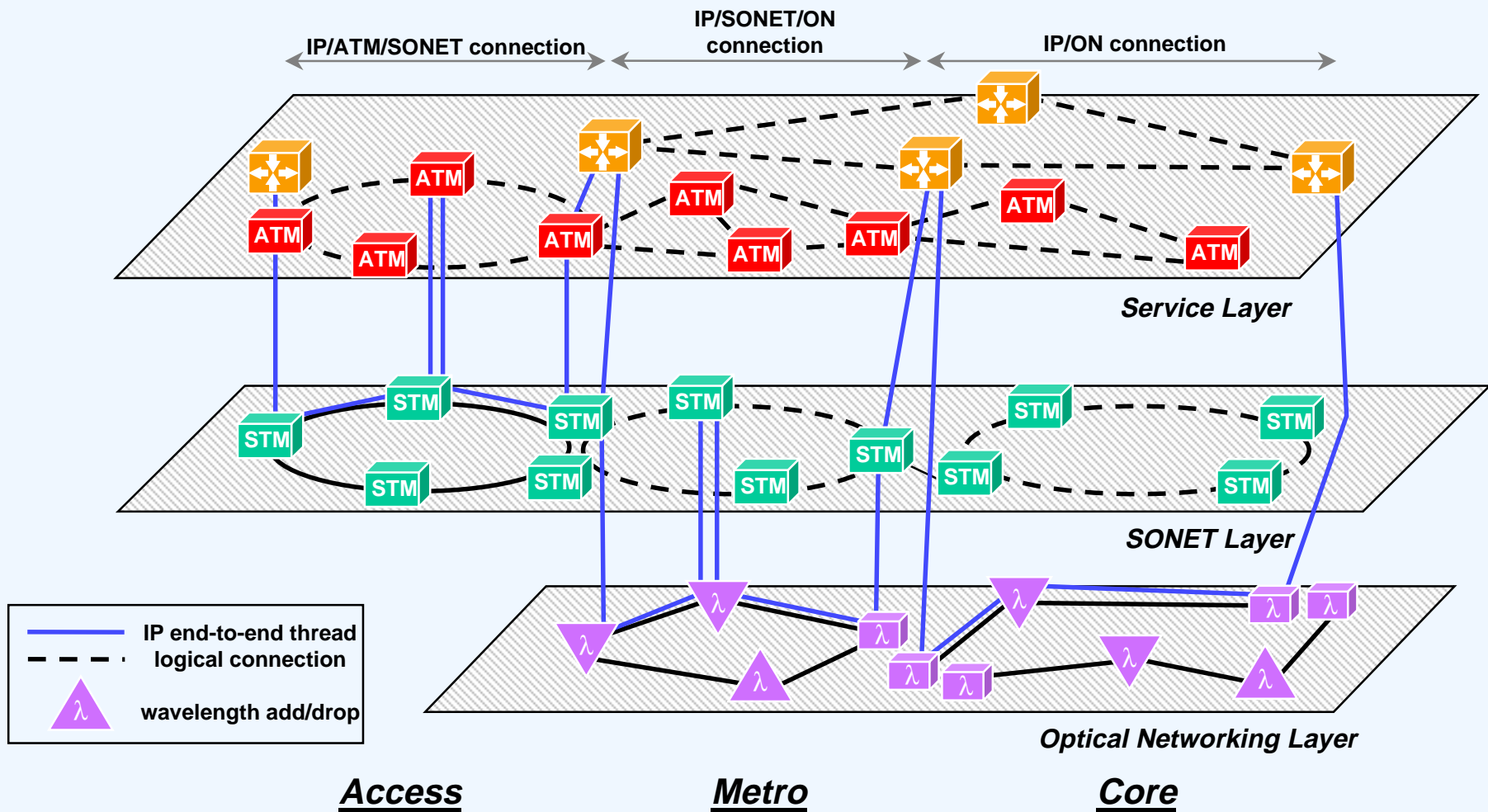
Mid Term



- DWDM with restoration, OAM&P, and flexible bandwidth management becomes **Optical Networking layer**, expands into **Metro IOF**

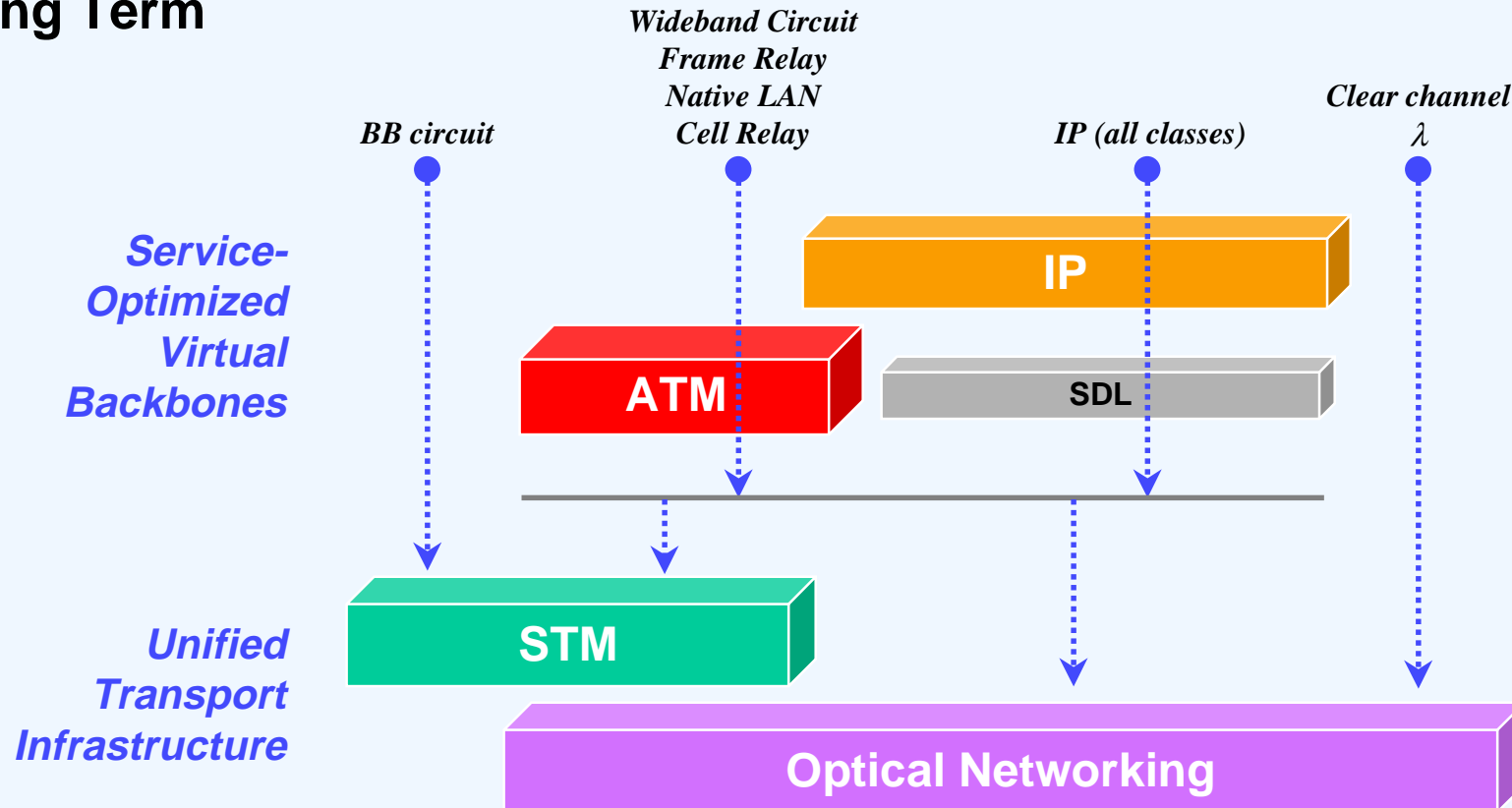
Network Example - IP Transport

Mid Term



Selective Layered Bandwidth Management Long Term

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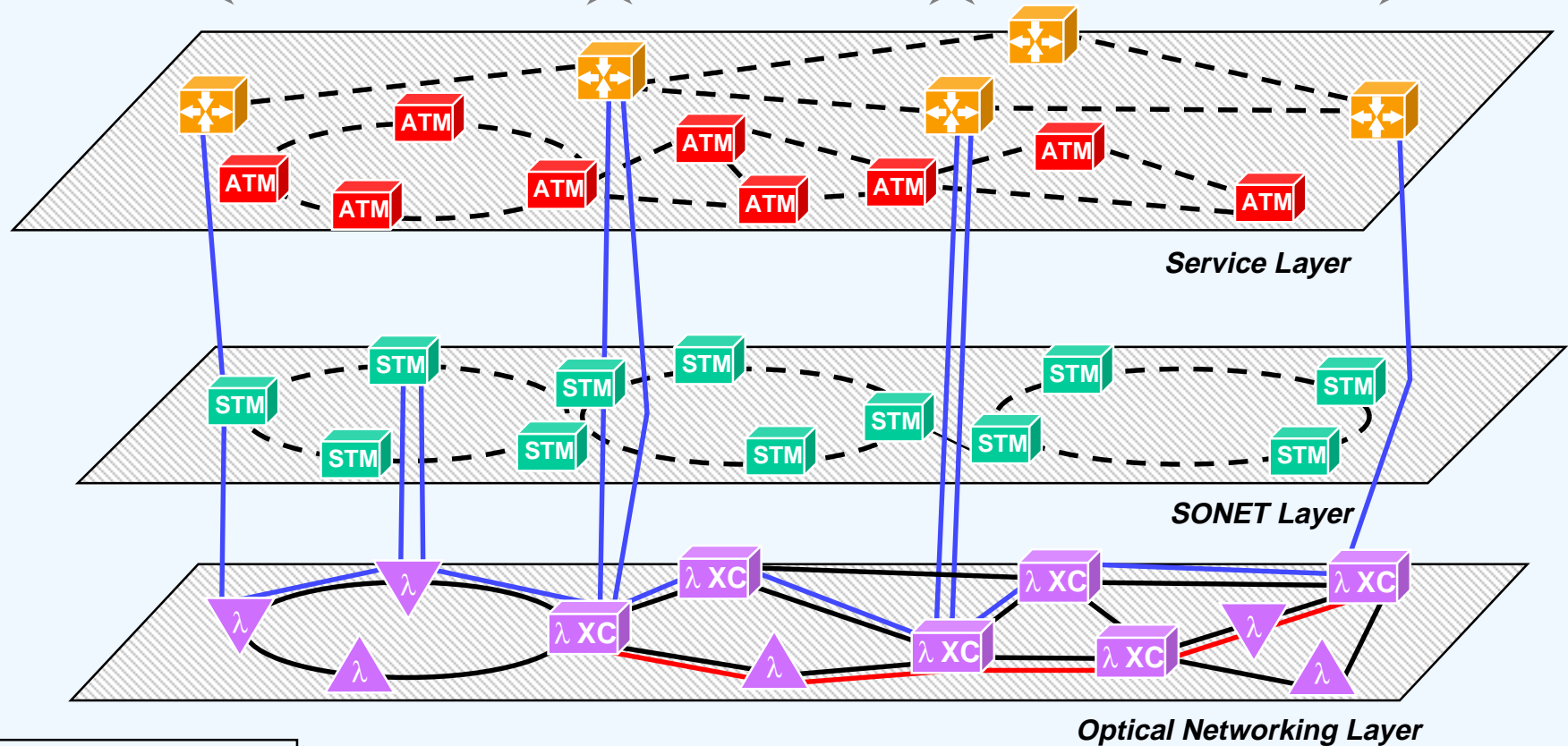
- Optical Networking layer expands into **access**
- Optical Cross-connects support **clear channel λ** services, mesh restoration, & efficient λ expressing

Network Example - IP Transport

Long Term



← IP/SONET/ON connection IP/ON connection IP/ON connection →



	IP end-to-end thread
	backup optical paths
	logical connection
	wavelength add/drop

Access

Metro

Core