

Chapter-5
Metro and Long-Haul Network
Growth
Demands Exponential Progress

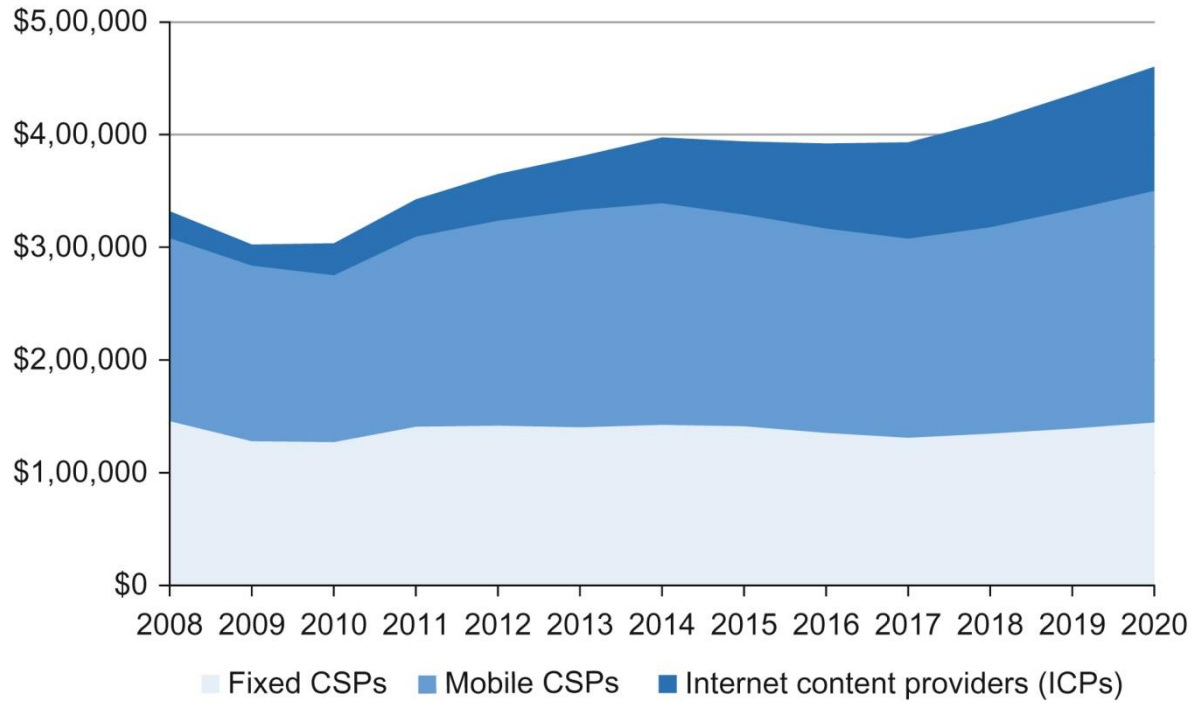


Figure 5.1: Global service provider revenue forecast (millions), 2008-20. Courtesy of Ovum.

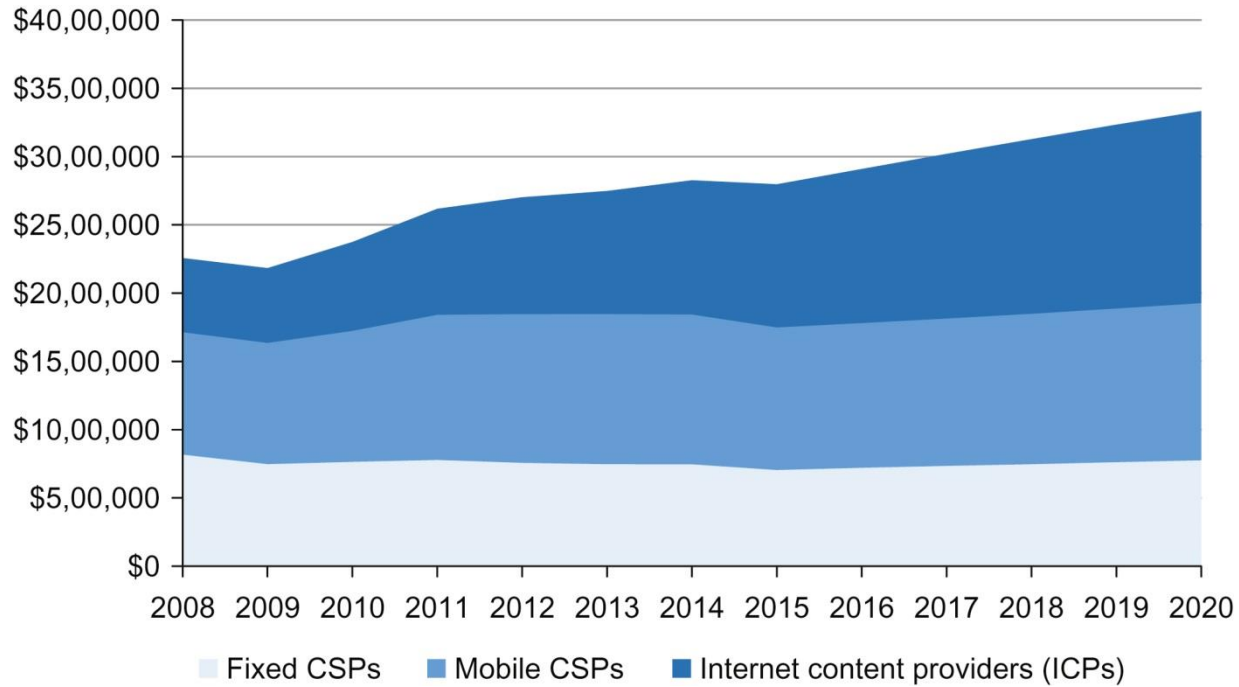


Figure 5.2: Global service provider capital expenditure forecast (millions), 2008-2020. Ovum.

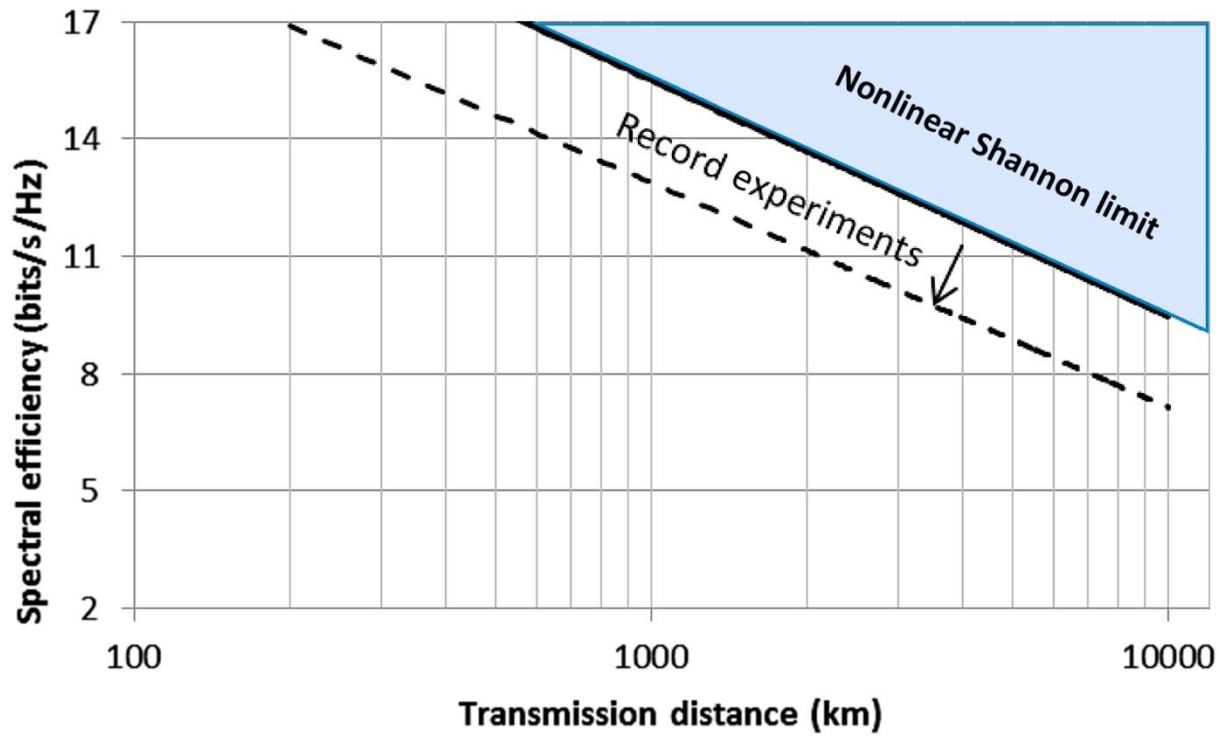


Figure 5.3: How the nonlinear Shannon limit of fiber varies with distance. Based on information from Bell Labs.

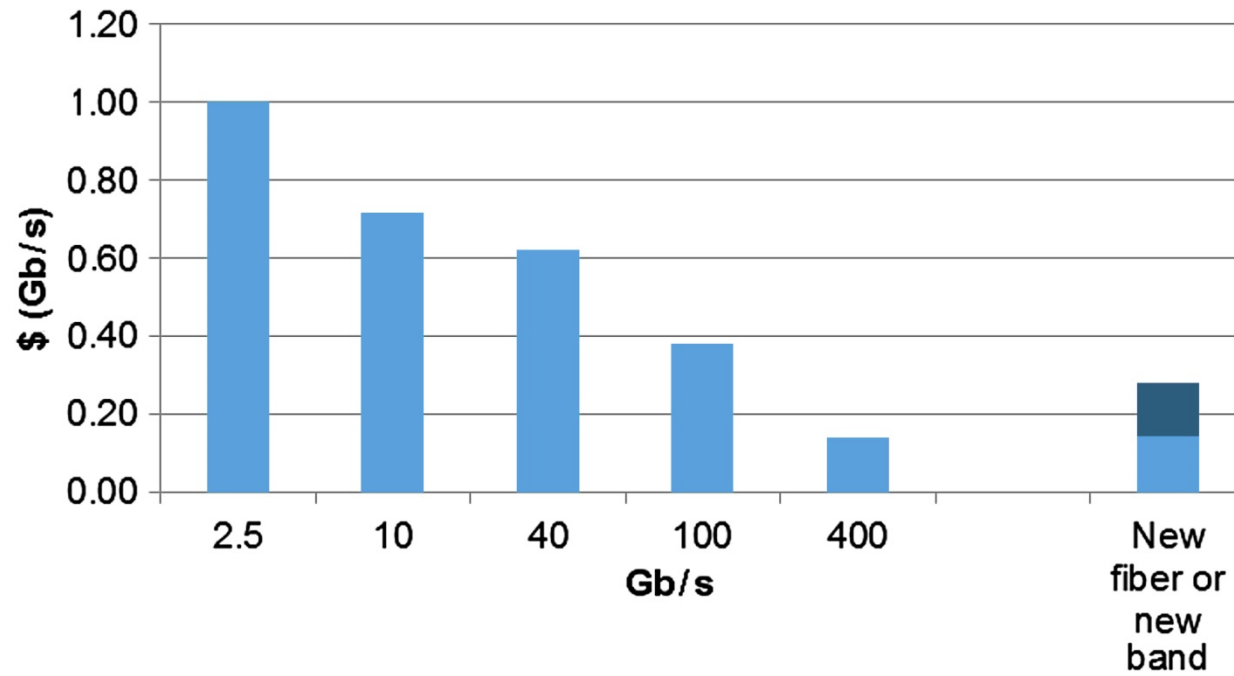


Figure 5.4: Relative transmission cost by data rate. Ovum.

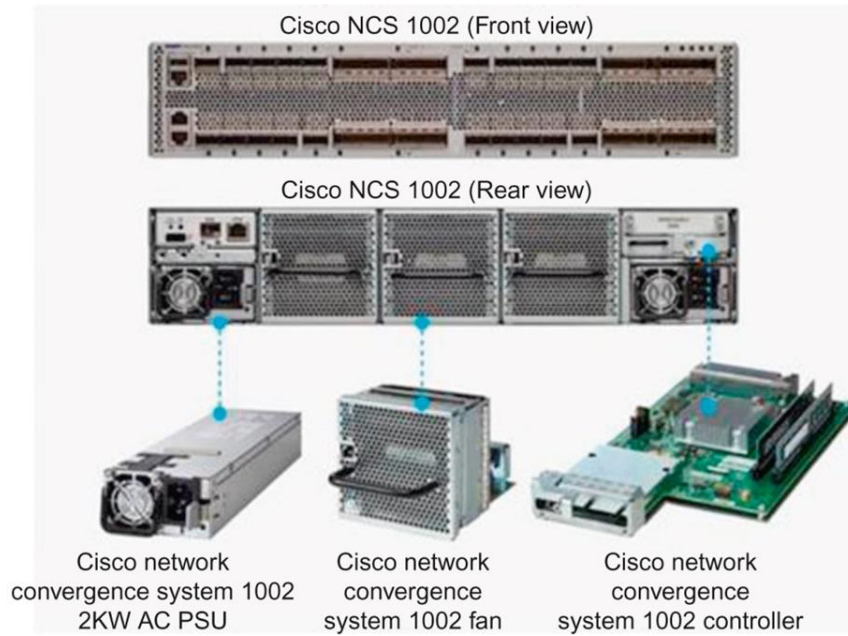


Figure 5.5: Cisco Systems' NCS 2015 and NCS 1002 platforms. From Cisco

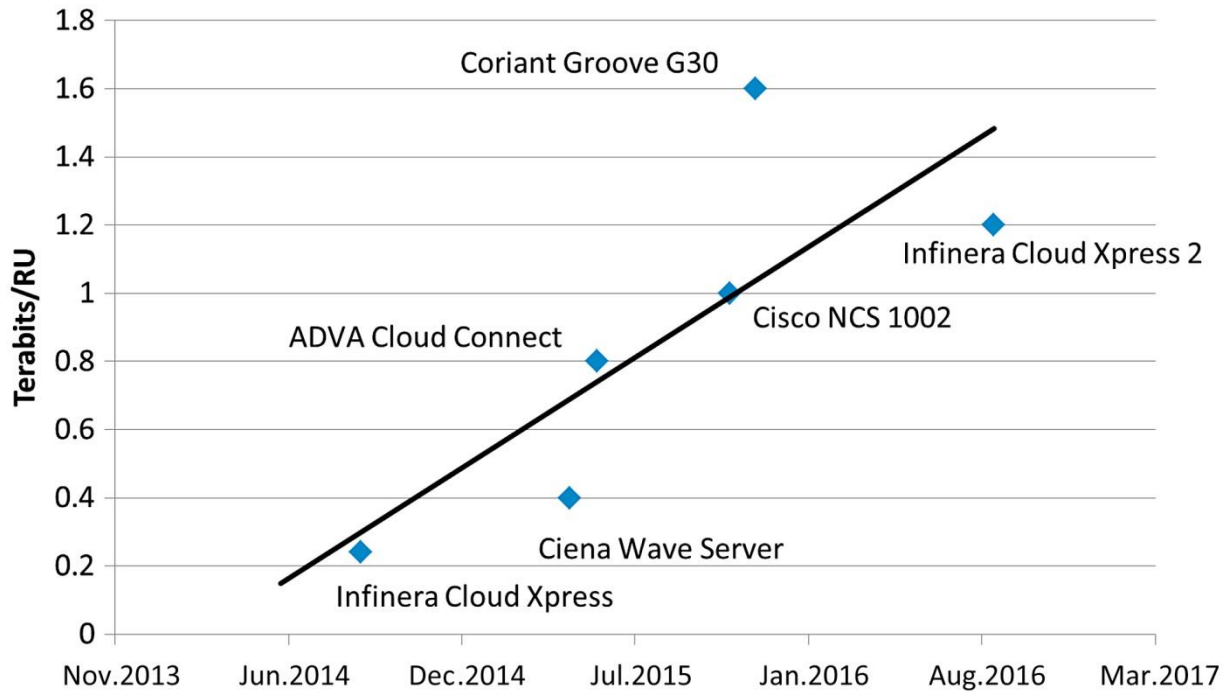
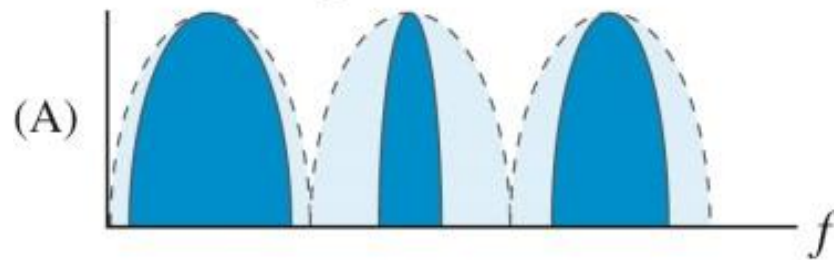


Figure 5.6: Data center interconnect introduction dates and per-rack-unit capacity.

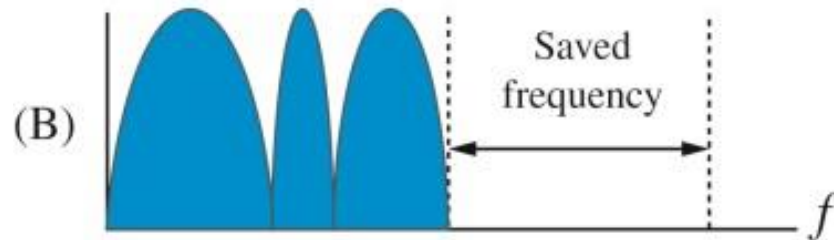
Conventional grid



The assigned band

Detailed description: A light blue semi-circular shape with a dashed outline, representing the total frequency range allocated to a single channel in a conventional grid.

Flexible grid



The actually occupied band

Detailed description: A solid blue semi-circular shape, representing the total frequency range actually used by the channels in a flexible grid, which is significantly narrower than the assigned band in a conventional grid.

Figure 5.7: (A) Conventional and (B) flexible grid illustrated. Japanese Journal of Applied Physics.










	Single core fiber	Multi core fiber	
		Uncoupled	Coupled
Single mode			
Few mode			
Multi mode			

Figure 5.8: Conventional single-mode fiber and multicore fiber.a