Executive Summary

The global wholesale bandwidth market is shaped by many factors—some that change the face of the industry and others that contribute a measure of predictability. The industry is perpetually marked by the impetus to keep innovation and cost competitiveness ahead of inevitable price erosion. TeleGeography’s Global Bandwidth Research Service assesses the state of the global telecom transport network industry and evaluates the factors that shape long-term demand growth and price erosion.

Supply and Demand

Global bandwidth demand continues to grow, spurring terrestrial and submarine cable network operators to undertake extensive network upgrades and deployments. Globally, demand for international bandwidth increased at a rate of 45 percent in 2016. The amount of capacity deployed on international internet, private, and switched voice networks doubled between 2014 and 2016, rising to 443 Tbps (see Figure: Worldwide International Bandwidth Growth, 2012-2016).
The growth of used international bandwidth is rather similar between regions. The pace of growth has been strongest on links connected to Asia, which experienced a compound annual growth rate of 51 percent between 2012 and 2016 (see Figure: Used International Bandwidth Growth by Region, 2012-2016). Growth rates in other regions were only slightly slower, ranging in a narrow band between 42 percent and 47 percent compound annual growth.
The U.S. & Canada retains a sizable advantage for providing inter-regional capacity. In 2016, 82 percent of used inter-regional bandwidth was connected to the U.S. & Canada (see Figure: Used Inter-Regional Bandwidth, 2016). This share is down from 96 percent in 2005. The reduction in dependence on connectivity to North America is largely attributed to an influx of new submarine cables linking Europe to Africa, the Middle East, and Asia, thus shifting connectivity towards Europe.
International internet capacity has accounted for the majority of international bandwidth usage since 2002. Nonetheless, the internet’s share of usage is waning; having accounted for 80 percent of total usage in 2010, the internet’s share has declined to 54 percent in 2016 (see Figure: Used International Bandwidth by Source, 2002-2016). The amount of capacity deployed by content providers has outpaced that of all other customers of international bandwidth in recent years. Between 2012 and 2016 the amount of international capacity deployed by companies such as Google, Facebook, Microsoft and Amazon has risen 14-fold to 170 Tbps. In contrast, international capacity deployed by all other operators rose only 3-fold, to 273 Tbps.
Content providers tend to experience high volumes of demand between their proprietary data centers. The requirements for inter-data center demand vary by company but are generally related to database mirroring, search index synchronization, and cloud computing services and applications. The role of inter-data center demand becomes clear when examining content provider capacity on major submarine cables routes. To date, the large content providers have built U.S.-centric network architectures. Their investments on systems directly connecting Europe to Asia are almost non-existent in comparison. In the Atlantic and Pacific, content providers accounted for over half of total demand in 2016 (see Figure: Share of Used Bandwidth by Category for Major Routes, 2016). In contrast, content providers represented only a small share of capacity usage on routes connected to the Middle East and Africa.
Pricing

Bandwidth prices continue to decline, driven by competition and an ever-expanding supply that lowers unit cost. Median monthly lease prices across a selection of critical routes declined an average of 29 percent year-on-year between 2015 to 2016, and 27 percent compounded annually from 2013 to 2016 (see Figure: Median 10 Gbps Wavelength Price Trends on Major International Routes, 2013–2016). Among these core 10 Gbps routes, Miami-São Paulo exhibited the steepest rate of price erosion at 40 percent compounded annually, dropping from 12 times the trans-Atlantic price in 2013 to 5 times the price in 2016. Prices on the London-New York and Los Angeles-Tokyo routes fell 21 and 24 percent compounded annually during the period.
FIGURE 6

Notes: Each line represents the median monthly lease price for an unprotected 10 Gbps Wavelength on the listed route. Prices are in USD and exclude local access and installation fees.

While bandwidth price declines are widespread, significant differences between regions persist, stemming from available supply and competition—on both international and domestic segments. In Q4 2016, median 10 Gbps prices ranged from just $4,005 on the London-New York route to $40,000 per month on connections between Johannesburg and London (see Figure: Median 10 Gbps Monthly Lease Prices on Select International Routes, Q4 2016).
FIGURE 7
Median 10 Gbps Wavelength Prices on Major International Routes, Q4 2016

Notes: Each line represents the median monthly lease price for an unprotected 10 Gbps wavelength on an individual route. Routes are shaded corresponding to their median MRC, from least expensive in blue to most expensive in red. Prices are in USD and exclude local access and installation fees.

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Outlook

Persistent demand growth and price erosion couple with shifts in sources of demand and changes in network deployment strategies to create challenges for the wholesale telecom market. The following are a few of the key trends that will affect the long-haul capacity market in the coming years.

Subsea Cable Investment Ramps Up

Following several years of relatively sparse submarine cable development, 2016 ushered in a period of significant global investment in the sector. Thirteen new systems worth a cumulative $2.4 billion were deployed in 2016. A notable feature of the recent upswing in cable construction is the breadth and depth of its geographic scope (see Figure: Construction Cost of New Submarine Cables Entering Service by Region, 2015-2018). Nearly every global route grouping saw new subsea cables between 2015 and 2016. In the next two years investment is poised to continue on most routes with the launch of systems such as Seabras-1 (Latin America), New Cross Pacific (trans-Pacific), and others. Latin America leads the way with $1.5 billion of new cable investment in 2017 and 2018.
The Impact of Content Providers

The rapid expansion of major content providers’ networks has caused a major shift in the global wholesale market. As Google, Microsoft, and Facebook invest in new inter-continental submarine cable systems and purchase increments of fiber pairs, they are shifting demand from buying lit wavelengths in the wholesale market. With their demand strongly outpacing that of other customer segments, the share of international bandwidth market that is addressable by wholesale providers is declining.

More companies may join the ranks of the largest content network owners, further decreasing the addressable wholesale proportion of the bandwidth market. But even the largest operators buy additional wholesale capacity to complement their primary investments in their own cable systems, and other operators move up through the ranks of network scale. At the same time, the largess of content networks fuel new generations of submarine cables that lower the overall cost per bit across many routes, ultimately helping wholesale operators accommodate plunging bandwidth prices.

Pricing Trends

Advances in switching and management technologies make provisioning more agile, lowering operating cost and accommodating lower wholesale prices. Innovations such as software defined networking hold the promise of novel commercial models for on-demand bandwidth. However, few wholesale customers have warmed to bandwidth-on-demand offerings. Instead, the technological innovations driving most industry change will remain of the familiar type: cheaper transmission equipment that reduces the cost per bit (and—ultimately—prices) of long-haul capacity.
The wholesale market will continue to consist largely of specialist sellers with the appetite for high rates of both volume growth and price decline, or with unique attributes that pose fundamental differentiation, such as access to emerging markets. Price declines are ultimately enabled by unit cost declines in both capex and opex, in turn driven by technology advances. Adept investment is vital to stay abreast of cost decline and ahead of price erosion. In the global bandwidth market, demand growth has proven just as reliable as price erosion and a substantial market for wholesale bandwidth will endure.
The content on the preceding pages is a section from TeleGeography's Global Bandwidth Research Service.

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Washington, D.C. / San Diego / Exeter


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