

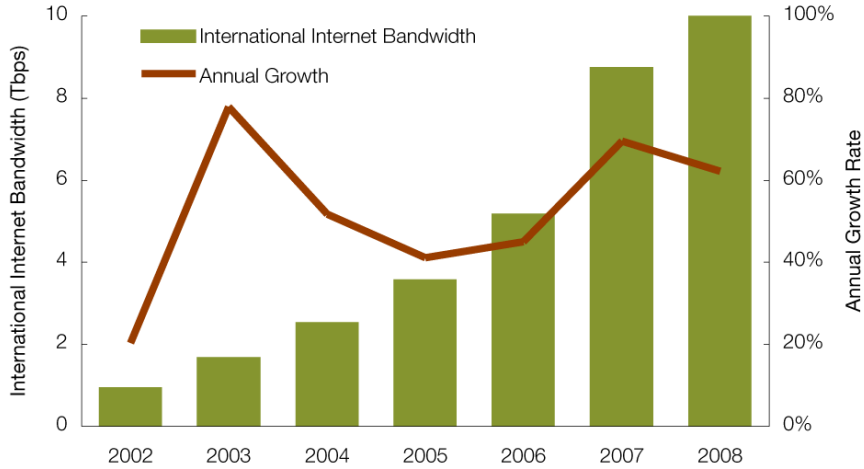
Executive Summary

New applications and services have combined with strong broadband subscriber growth worldwide to fuel demand for Internet capacity. Despite predictions from some quarters that Internet traffic would overwhelm networks, the global Internet is far from reaching its maximum capacity. Internet backbone operators have been able to accommodate the torrid demand with continued network investment and more efficient network management. TeleGeography's *Global Internet Geography Research Service* provides analysis and statistics on Internet capacity and traffic, Internet Protocol (IP) transit pricing, and backbone competition.

Internet Traffic and Capacity

TeleGeography's annual survey of Internet backbone operators tracks both deployment of Internet capacity as well as peak and average network utilization levels. International Internet capacity grew at a compounded annual rate of 57 percent between 2002 and 2008. In 2008, international Internet bandwidth rose 62 percent over 2007 as backbone operators continued to upgrade their networks to meet rising traffic requirements. The rapid pace of new capacity deployment was evident worldwide, with particularly impressive annual growth occurring on links connected to Latin America and South Asia, which increased 119 percent and 112 percent, respectively, between 2007 and 2008.

FIGURE 1
International Internet Bandwidth Growth, 2002-2008



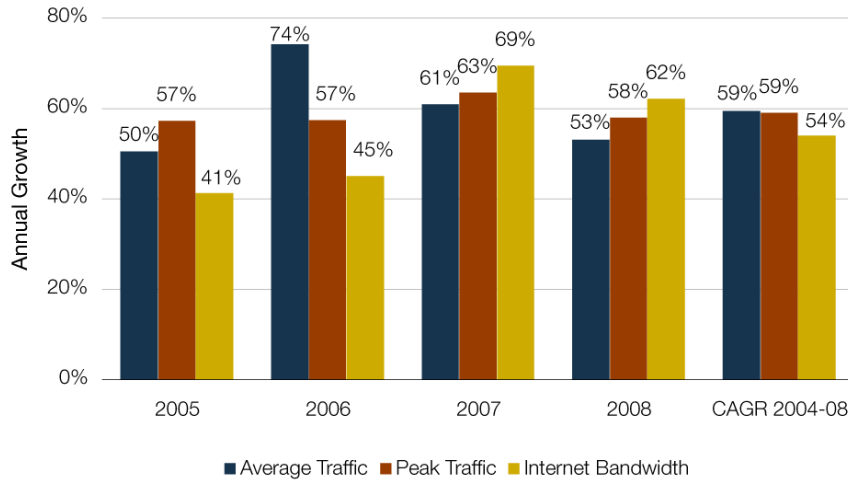
Notes: Data as of mid-year.

Source: TeleGeography Research

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For the second consecutive year, the rate of underlying international Internet capacity deployment outpaced global Internet traffic growth, leading to lower utilization levels on many Internet backbones (see Figure: International Internet Traffic and Bandwidth Growth, 2005-2008). Between 2007 and 2008, average traffic utilization levels decreased from 31 percent to 29 percent while peak utilization fell from 44 percent to 43 percent. The aggregate trend toward lower utilization of capacity belies differences at the regional level. While utilization on international links to Europe and Asia fell in 2008, they rose in the U.S. & Canada and Latin American where traffic growth outpaced the deployment of new Internet bandwidth.

FIGURE 2
International Internet Traffic and Bandwidth Growth, 2005-2008



Notes: Data reflect traffic over Internet bandwidth connected across international borders. Data as of mid-year.

Source: TeleGeography Research

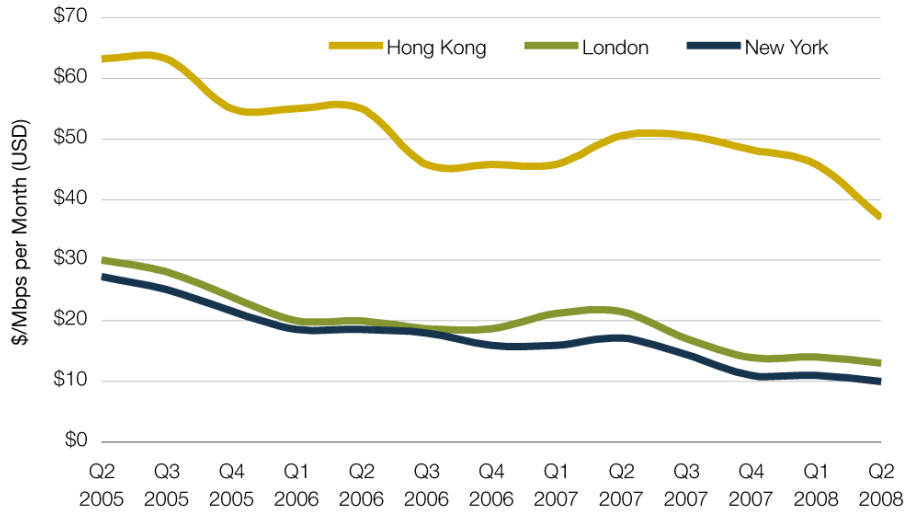
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Prices

Only a small handful of the world’s largest Internet service providers are able to exchange all of their traffic via unpaid peering relationships. All other service providers must rely on wholesale Internet connectivity—called IP transit—from other backbone providers to deliver at least a portion of their traffic. TeleGeography has conducted a quarterly survey of major IP transit providers in key telecom hub cities around the world since 2003 to track trends in this product’s pricing. Although IP transit is just one revenue stream for Internet backbone providers, it provides a metric to discern Internet market pricing trends.

IP transit prices vary widely by region. Prices in the U.S. and Europe are lowest while prices in Asia, Latin America, and other markets tend to be significantly higher. In Q2 2008, the median price for a 1 Gbps IP transit port in New York was \$10 per Mbps, compared to more than \$37 per Mbps in Hong Kong (see Figure: Median GigE IP Transit Prices in Major Global Cities, Q2 2005-Q2 2008). Between Q2 2005 and Q2 2008, the median price per Mbps of GigE ports declined at a faster rate in New York and London than in Hong Kong, reflecting stiffer competition and more abundant capacity in North America and Europe compared with Asia.

FIGURE 3
Median GigE IP Transit Prices in Major Global Cities, Q2 2005-Q2 2008



Notes: Each line is the median monthly price per Mbps in that city. Data exclude installation and local access fees. Gigabit Ethernet (GigE) = 1,000 Mbps. Historical prices received in another currency were converted using the June 2008 average exchange rates.

Source: TeleGeography Research

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Outlook

The Internet backbone market will almost certainly experience a continuation of current trends: strong demand growth accompanied by falling prices. The continued expansion of content delivery networks and increased use of P2P traffic management tools by backbone providers could reduce inefficient uses of Internet capacity. However, even with improved network and routing management, rapid Internet traffic growth from broadband subscribers, both in number and in traffic per user, will require new investments in capacity. IP transit prices have fallen steadily in developed markets and have remained stubbornly high in less developed markets. As carriers expand into emerging areas in search of new customers and favorable market conditions, prices in those markets will fall in line with more mature IP transit markets. Meanwhile, several planned fiber optic networks will expand network connectivity options to less developed markets. Increased supply of underlying transport capacity will accommodate lower IP transit prices by reducing costs to the Internet backbone providers. Although prices in emerging markets have the farthest to fall, demand growth prospects remain particularly robust. Although comparing IP transit prices and international traffic are an imperfect proxy for assessing revenues, demand growth in all regions will likely continue to outpace price declines sufficiently to imply market revenue growth.

The content on the preceding pages is a section from TeleGeography's Global Internet Geography

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