

**OpenVault
Broadband
Industry
Report (OVBI)**

1Q 2019

Introduction

OpenVault is a leading provider of broadband industry analytics and software-as-a-service (SaaS) technology solutions for broadband operators worldwide. OpenVault's SaaS platform captures broadband usage data from millions of residential and commercial subscribers across both the U.S. and Europe. With this unique visibility into real-time broadband usage data, OpenVault has launched its OpenVault Broadband Industry Report (OVBI), providing a quarterly advisory outlining important data usage trends for the broadband industry.

The insatiable demand for bandwidth continues to rise unabated and confound broadband service providers and the entire broadband ecosystem. The OVBI will help the industry put these trends into marketplace context by revealing true aggregated market data from millions of subscriber usage data points, providing analysis and comparative period results for identification of key market trends.

OpenVault's SaaS platform enables broadband service providers to track usage trends based on both flat-rate billing, or unlimited data usage, and a usage-based billing approach, where subscribers are billed based on their bandwidth usage. For the purpose of this report, flat-rate billing data will be identified as FRB and usage-based billing data will be identified as UBB.

The inaugural OVBI, which analyzed data from the first quarter of 2019 (1Q19), reveals important industry trends, including the changing nature and definition of a "power user." These broadband subscribers consume much higher amounts of bandwidth per month than the average subscriber. Data from this report suggests that power users of today consume close to 400% more bandwidth than did power users from just several years ago. This trend has far reaching implications for broadband providers and may cause them to revisit their acceptable use policy.

1Q19 BROADBAND USAGE KEY FINDINGS

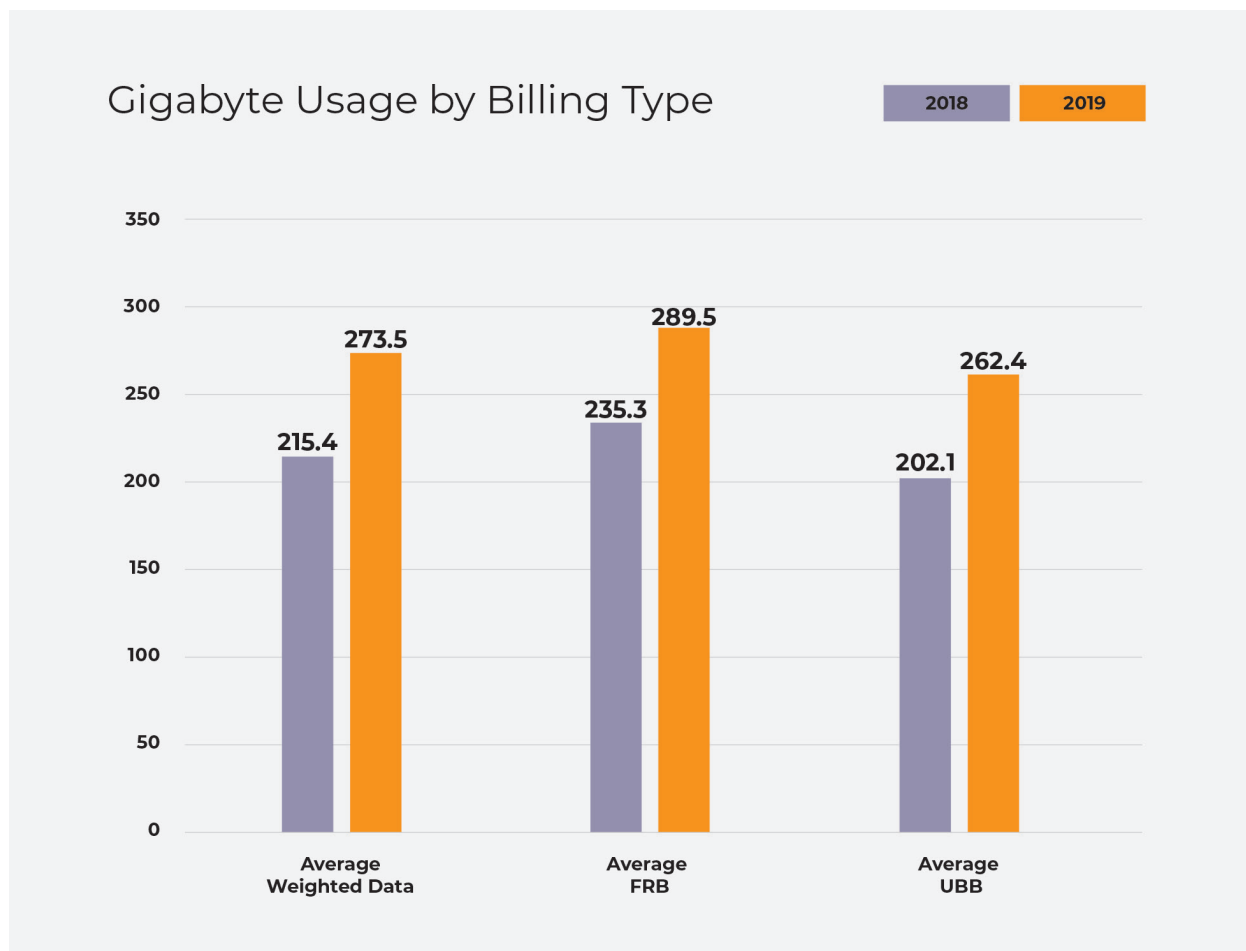
Total Data Usage Still on the Rise

The weighted average data consumed monthly by subscribers in 1Q19 reached 273.5 GB. The weighted average data usage for subscribers includes both flat rate billing (FRB) and usage-based billing (UBB). This represents a 27% increase over 2018's weighted average of 215.4 GB.

There is a clear correlation between billing approach and bandwidth consumption. On average, subscribers on UBB plans consume less data overall.

The average FRB subscriber consumed 289.5 GB per month, compared with 262.4 GB per month for UBB subscribers, a difference of 10.1%. Interestingly, UBB subscriber usage increased more (30%) between 2018 and 2019 than did FRB subscriber usage (23%).

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Breaking down data usage between downloads and uploads, there was a slightly greater year-over-year increase in average data downstream usage (27%) than in upstream usage (23%) during the period.

In 2019, weighted average downstream consumption was 258.6 GB, up from 203 GB in 2018. For UBB subscribers, download consumption was 24.1 GB less (248.7 GB) than for FRB subscribers (272.8 GB). Average upstream usage increased from an average of 12.5 GB (2018) to 15.4 GB (2019).

The weighted average for median usage was 146 GB per month, up 27% from 2018's 114.9 GB. FRB users' median usage was 154.5 GB, which was 14.4 GB (10.3%) higher than UBB median usage of 140.1 GB. It's important to recognize that median usage for UBB subscribers is growing at least as fast as average usage, indicating that usage is growing across the board and is not skewed higher by a small number of power users.

Power Users



Power users represent a subset of subscribers who consume significantly more than average amounts of bandwidth. As bandwidth demand grows across all usage categories, the definition of a power user has changed. When OpenVault began tracking usage data nine years ago, power users were defined as using 250 GB per month. At that time, only about 0.5% of subscribers fell into this category. Today, over one-third of subscribers are using at least 250 GB per month. This substantial increase in usage has forced the industry to adjust its definition of a power user. Today, OpenVault defines a power user as someone who consumes 1 TB or more of data per month.

The percentage of “new” power users is accelerating, having doubled since 2018.

As of 1Q19, 4.2% of all subscribers are consuming 1 TB or more, up from 2.1% in 1Q2018. Over the same period, the percentage of subscribers exceeding 250GB rose to 36.8% from 30.1%.

Providers employing UBB have a lower percentage of power users taxing their networks. FRB providers have 32% more power users than UBB providers. This trend is even more pronounced when looking at subscribers using more than 2 TB. FRB providers have 76% more subscribers in this category than UBB providers.

The changing definition of power users has implications for service providers, their networks, and their acceptable use policies.

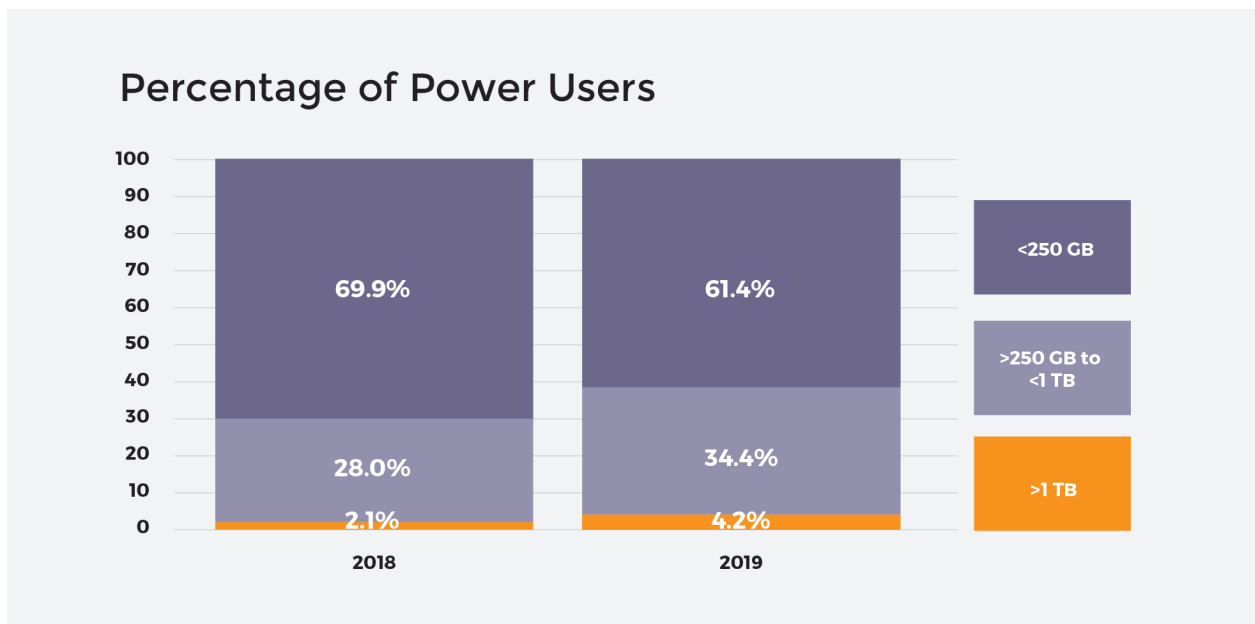
Residential subscribers who routinely exceed 1 TB of bandwidth consumption may be violating the terms of most service provider acceptable use policies. Even with daily usage of streaming OTT video, the consumption of 1 TB of data in a single month is difficult to achieve. The HD video consumption equates to about 3 GB per hour of video viewed, or 333 hours per TB.¹ According to Nielsen data, the average U.S. adult watches 6 hours of video per day across all platforms, or 180 hours per month, with live TV through non-broadband delivery accounting for the majority of that time.²

This suggests that many power users may be using their broadband connections for other high-bandwidth purposes, including sharing bandwidth or server-based computing functions, in violation of most acceptable use policies. Service providers tend not to aggressively enforce these policies, but with growing numbers of power users and the implications those users present

The percentage of subscribers that are using more than 2 TB of data per month has more than doubled, from 0.16 % in Q1 2018 to 0.38 % in Q1 2019.

for bandwidth costs, perhaps some service providers will change course. Their options include moving to usage-based billing, which typically reduces the number of power users on the network.

As median usage continues to increase, and the percentage of power users approaches 5% of all subscribers, the definition of a power user will inevitably change again. As a result, OpenVault is tracking subscribers who are consuming more than 2 TB of data per month. The percentage of subscribers that are using more than 2 TB of data per month has more than doubled, from 0.16% in Q1 2018 to 0.38 % in Q1 2019.

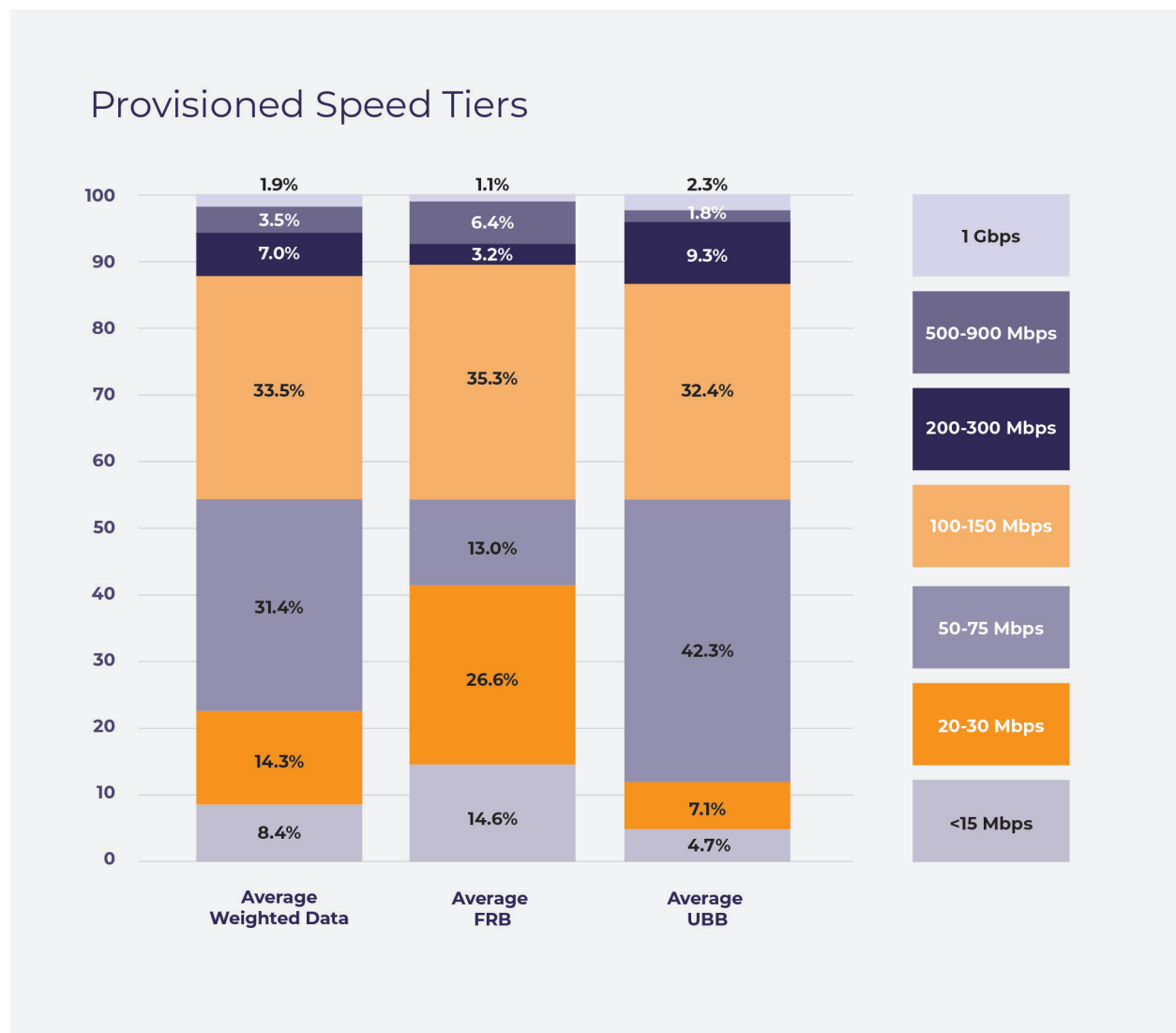


¹How can I control how much data Netflix uses?, <https://help.netflix.com/en/node/87>
²U.S. adults now spend nearly 6 hours per day watching video, <https://techcrunch.com/2018/07/31/u-s-adults-now-spend-nearly-6-hours-per-day-watching-video/>

Provisioned Speed Tiers

Overall, just 1.85% of subscribers tracked are provisioned for gigabit-speed service. Nearly two-thirds of subscribers overall are provisioned for between 50 and 150 Mbps, making that the most commonly represented provisioned speed. Close to half of all subscribers (46%) are provisioned at speeds of 100 Mbps or higher.

Among FRB subscribers, 41.2% are provisioned for less than 30 Mbps, compared to 11.8% of UBB. This data point highlights common subscriber behavior observed by OpenVault, where subscribers often upgrade speed tiers when placed on UBB plans.

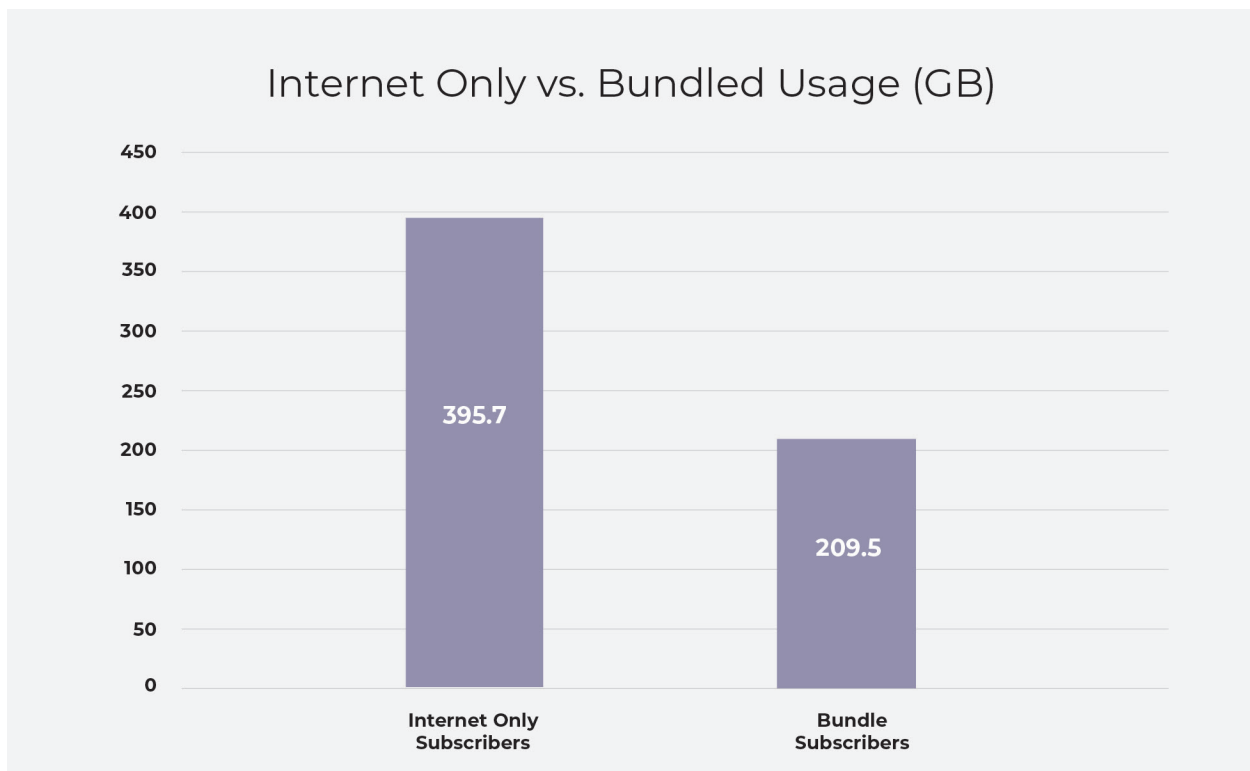


Close to half of all subscribers (46%) can receive speeds of 100 Mbps or higher.

Cord Cutting Impact

As more subscribers opt out of traditional pay-TV packages, presumably in favor of OTT streaming, the impact on bandwidth consumption is notable. For Internet-only households, average bandwidth consumption is 395.7 GB, compared to 273.5 GB for an average household. Households that purchase a bundle of video and internet service consume 209.5 GB per month, which is slightly more than half the data consumption of an internet-only household.

Terabyte power users are more pronounced in Internet-only households, accounting for 6.5% of those households, compared with only 2.2% of bundled households. Median usage also shows a broad gap, with Internet-only households consuming 294.5 GB monthly, compared with 93.8 GB for video-bundled households.



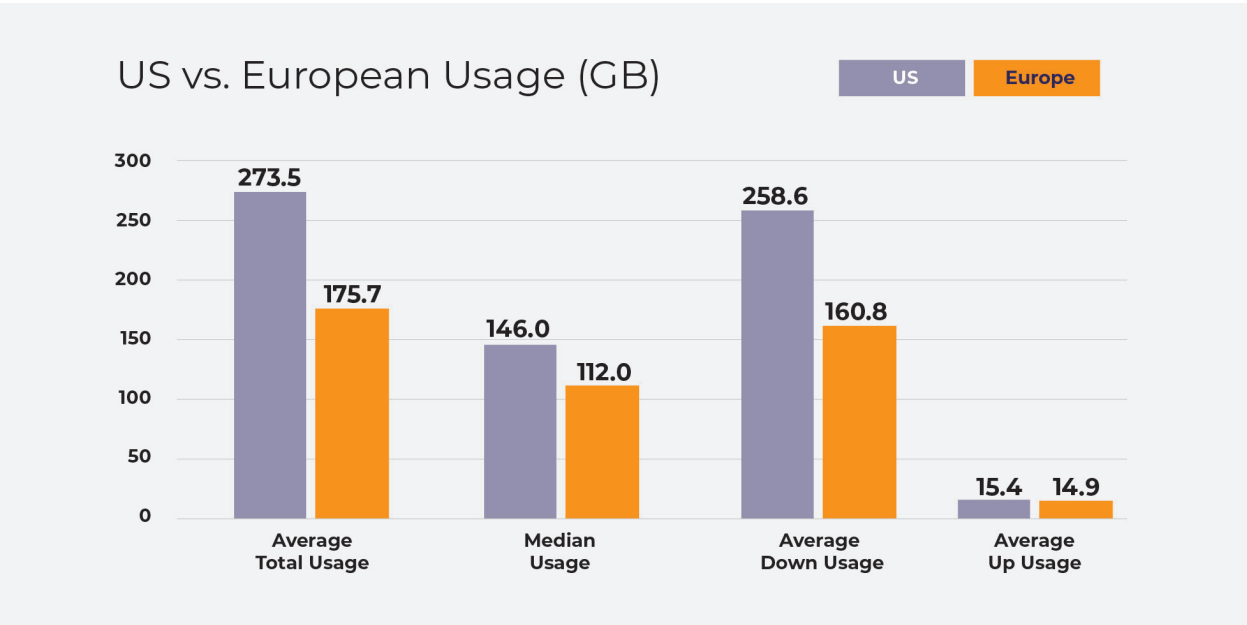
European Markets

Similar data collected by OpenVault from European markets shows that while subscriber broadband data usage in Europe lags about two to three years behind what we're seeing in the U.S., the growth rates are similar. Average subscriber usage grew 27% from 138.1 GB in March 2018 to 175.7 GB in March 2019.

As adoption of over-the-top streaming services is ramping up in Europe, overall usage is also climbing, particularly in downstream data usage. Average downstream data usage increased 30% in the last year in Europe, compared to a 2% increase in upstream data usage.

European power users haven't quite reached TB status, although 0.78% consume a TB or more per month, up 60% from 2018. By comparison, North America saw 4.2% of subscribers qualify as TB users, more than five times the rate seen in Europe. The sweet spot for broadband speeds in Europe was 50 to 75 Mbps, with 67.7% of subscribers provisioned at that speed.

OpenVault's trending analysis shows that European Usage will reach current levels observed in North America within 3 years.



Conclusion



At an overall U.S. average of 273.5 GB per month, broadband usage continues to grow, with year-over-year growth of 27% in 1Q19. Usage-based billing reduces average consumption roughly 10% in comparison with flat-rate billing. Median usage shows a similar trend: The overall median is 146 GB and UBB reduces median consumption by roughly 10% in comparison with FRB. OpenVault expects these trends to continue as subscribers embrace different billing approaches.

Cord cutting behavior is impacting bundling and bandwidth consumption. Service providers rode a significant wave over the past ten years with triple- and double-play bundling of services. There is evidence to suggest that wave has crested, as more consumers opt for Internet-only packages.³ Internet-only homes consume dramatically more bandwidth than the national average, and the gap is particularly broad in comparison with video-bundled households.

The definition of a power user will continue to evolve and may approach 2 TB in the near future. This trend may compel service providers to evaluate a usage-based billing approach, as well as to rethink their acceptable use policy terms and enforcement practices.

Growing bandwidth demand presents opportunities for service providers to grow average revenue per user (ARPU). As service providers gain more market intelligence into how subscribers consume bandwidth, there is an opportunity to support a better subscriber experience by upselling faster broadband packages.

³With Speed Battle Won, Cable Ops Focus on Reliability, <https://www.multichannel.com/news/with-speed-battle-won-cable-ops-focus-on-reliability>