

Broadband Industry Report (OVBI)

2Q 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 publishes its OpenVault Broadband Industry Report (OVBI), providing a quarterly advisory outlining important data usage trends for the broadband industry.

In addition to these important industry metrics, the OVBI also explores the impact of changing subscriber bandwidth usage on broadband service provider networks. OVBI findings are based on 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.

This OVBI analyzes data from the second quarter of 2019 (2Q19) and reveals important industry trends, including the ongoing impact on the network from video cord cutting behavior. Consumers continue to cut the cord at record numbers, turning to broadband-delivered video options as an alternative. AT&T alone lost close to one million pay-TV subscribers in 2Q19.

OVBI data offers revealing insight into how cord cutting is impacting networks, including a nearly 3x difference in median bandwidth usage between cord cutter homes and video-bundled homes. OpenVault's further examination of broadband usage reveals behavior that may predict cord cutting decisions. This could prove to be significantly valuable market intelligence for broadband service providers.

2Q19 BROADBAND USAGE KEY FINDINGS

Data Usage Growth Continues Annual Growth Rate in 2Q19

The monthly weighted average data consumed by subscribers in 2Q19 was 271 gigabytes (GB), up 25% from 2Q18's weighted average of 216.4 GB. Compared to 1Q19, weighted average data usage growth remained relatively flat.

Usage delta between FRB and UBB providers remains significant

Weighted average data usage combines both flat rate billing (FRB) and usage-based billing (UBB) subscribers. As was shared in the inaugural OVBI (1Q19), there is a strong correlation between billing approach and bandwidth consumption, as the average UBB subscriber consumes less data overall.

In 2Q19, average FRB subscriber usage was 282.5 GB, up nearly 23% from 230.2 GB in 2Q18. In 2Q19, average total usage for UBB subscribers was 262.9 GB, up over 27% from 206.4 GB in 2Q18. Comparing the two

billing approaches, the average FRB subscriber usage was over 7% higher than UBB subscriber usage in 2Q19.

The median monthly weighted average usage in 2Q19 was 144.5 GB, up nearly 32% from 2Q18's 109.6 GB (weighted average usage combines both FRB and UBB billing approaches). Notably, median usage growth continues to exceed average usage growth, which indicates that subscribers at all levels of broadband consumption are using

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more data. Median usage of FRB subscribers was 150.0 GB in 2Q19, which is nearly 7% higher than the median usage of UBB subscribers (140.7 GB).

GB Usage by Billing Type 2Q19



Power Users

OpenVault defines someone who consumes more than 1 terabyte (TB) of data per month as a power user. While power users represent only a subset of all subscribers, service providers must deal with massive demand on their networks and the capacity challenges caused by these power users. This can negatively impact the quality of service for the average subscriber. As of 2Q19, 4.1% of all subscribers could be considered power users. This figure has increased nearly 55% from 2.65% in 2Q18.

The percentage of subscribers using more than 250 GB was 36.5% in 2Q19, largely unchanged from 36.8% in 1Q19. However, compared to 2Q18, the percentage of subscribers using more than 250 GB has increased nearly 18%.

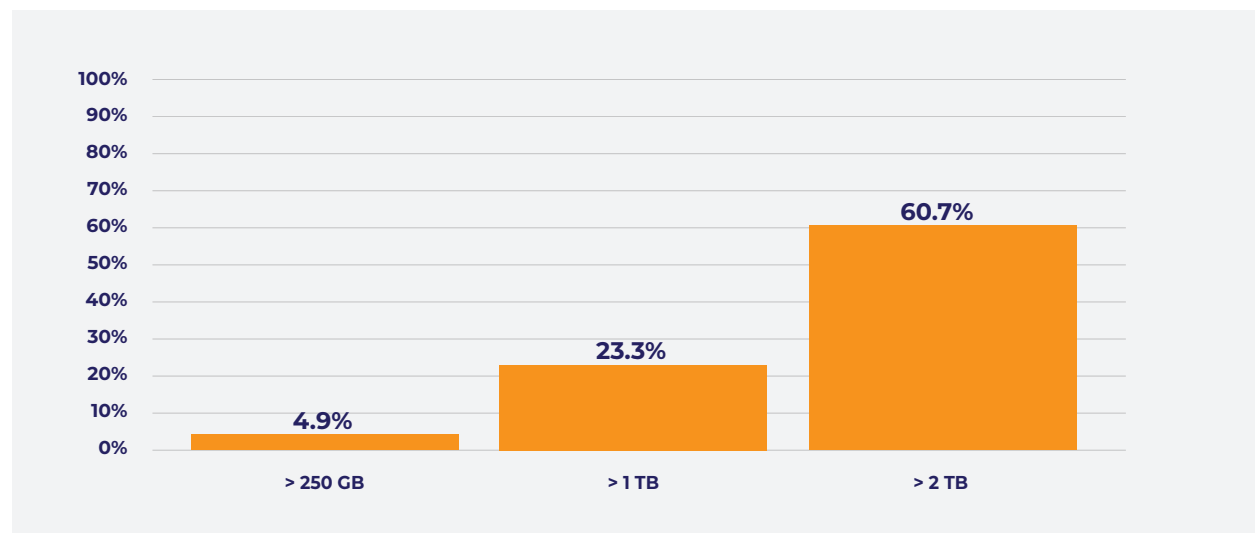
As the percentage of power users continues to rise, curtailing their impact on provider networks should be a priority. According to OpenVault data, the average usage limit employed by US providers generally starts at 1 TB and moves up to between 2 and 2.5

TB of data per month. At the lower end of power usage, the average subscriber generally is not impacted by UBB. As such, the percentage of subscribers using more than 250 GB per month is nearly the same among FRB subscribers and UBB subscribers (37.6% vs. 35.8% respectively).

As of 2Q19, 3.7% of UBB subscribers were using more than 1 TB of data, fully 23% less than the 4.6% of FRB

subscribers who are using more than 1 TB of data per month. When looking at the most extreme power users, those using more than 2 TB of data per month, UBB's impact is even more pronounced. The percentage of subscribers using 2 TB of data per month or more is nearly 61% lower among UBB subscribers compared to FRB subscribers. This is a strong indication that a UBB approach impacts power users and their usage overall.

Percentage Difference Between FRB and UBB Subscribers Across 3 Power User Categories



Provisioned Speed Tiers

The overall percentage of subscribers provisioned for gigabit-speed service increased slightly, to 2.08% in 2Q19 from 1.85% in 1Q19. The majority (62%) of subscribers overall are provisioned for between 50 and 150 Mbps. Forty-eight percent (48%) of subscribers are provisioned for speeds of 100 Mbps or higher.

A higher percentage of FRB subscribers are provisioned for lower-speed

packages compared to UBB subscribers. Among FRB subscribers, 41% are

Subscribers faced with UBB usage limits tend to upgrade to higher speed tiers

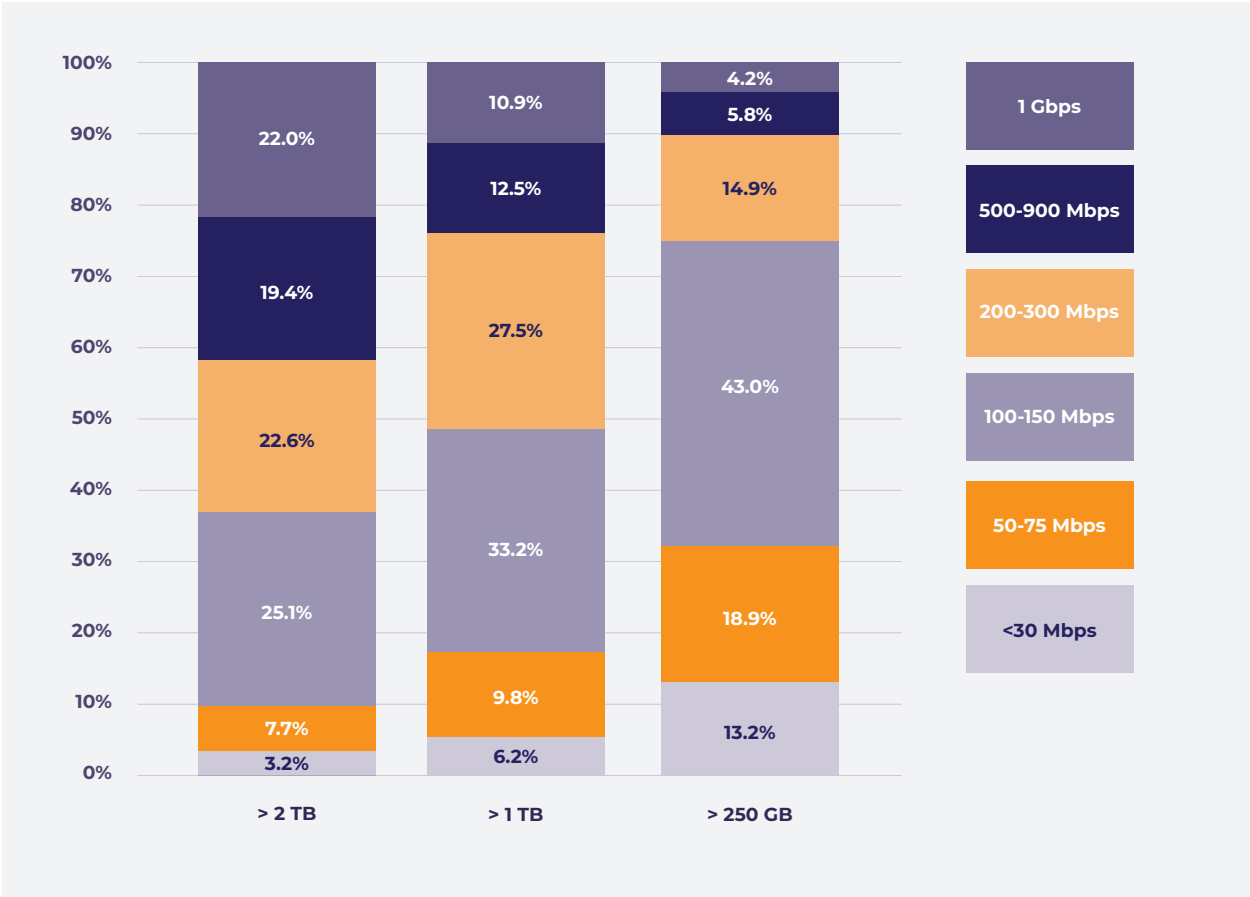
provisioned for speeds of 30 Mbps or less, compared to 13% among UBB subscribers. This indicates that many

subscribers faced with UBB usage limits opt to upgrade to higher speed tiers which routinely come with even higher usage limits in order to avoid extra fees.

As one would expect, power users are generally provisioned for higher-speed packages. However, a surprisingly large percentage of power users are

subscribed to lower-speed packages. For example, 6.2% of subscribers using more than 1 TB per month are provisioned for packages of 30 Mbps or lower. Remarkably, 3.2% of subscribers using more than 2 TB per month are provisioned for packages of 30 Mbps or lower.

Provisioned Speed Tiers by Power User Category



Cord Cutting Impact – Predicting Cord Cutting Behavior

As was discussed in the 1Q19 OVBI, there is a noticeable impact on bandwidth consumption stemming from the increasing trend of subscribers opting out of traditional pay-TV packages, presumably in favor of OTT streaming. In 2Q19, internet-only households (those without a pay-TV

package) consumed 85% more bandwidth than video-bundled households. Among internet-only households, average bandwidth consumption in 2Q19 was 390.42 GB, while bundled subscribers consumed, on average, 210.89 GB of

data in 2Q19. Looking at median usage, the gap between internet-only and bundled households is substantial. Among internet-only households, median usage in 2Q19 was 294.22 GB. This figure is nearly 3x the median usage observed among bundled households (98.8 GB). This large gap in median usage reflects the larger percentage of terabyte power users found among internet-only households. In 2Q19, 6.09%

Subscribers' average usage in the months leading up to a cord cutting event begins to increase steadily

of internet-only households fell into the terabyte power user category, compared to 2.09% of bundled households.

Given the potential disruption that cord cutting can have on operators, understanding when and if a subscriber will cut the cord is valuable market and network operations intelligence. To this

point, OpenVault has begun working to develop predictive modeling to help providers identify likely cord cutters based on their usage behavior.

Using a database that covers thousands of subscribers who cut the cord in the month of March 2019, OpenVault found that subscribers' average usage in the months leading up to a cord cutting event begins to increase steadily, followed by a significant spike in usage in the months after. In this dataset, the average usage among cord cutters increased from 289.3 GB in September 2018 to 328.2 in February 2019, with monthly usage peaking at 365.2 GB during the holiday impacted month of January. After the March cord cutting event, usage spiked, eventually reaching 487.8 GB in June 2019. By contrast, the average subscriber saw only a modest increase in monthly usage, from 254.2 GB in September 2018 to 289.1 GB in June 2019 for this dataset.

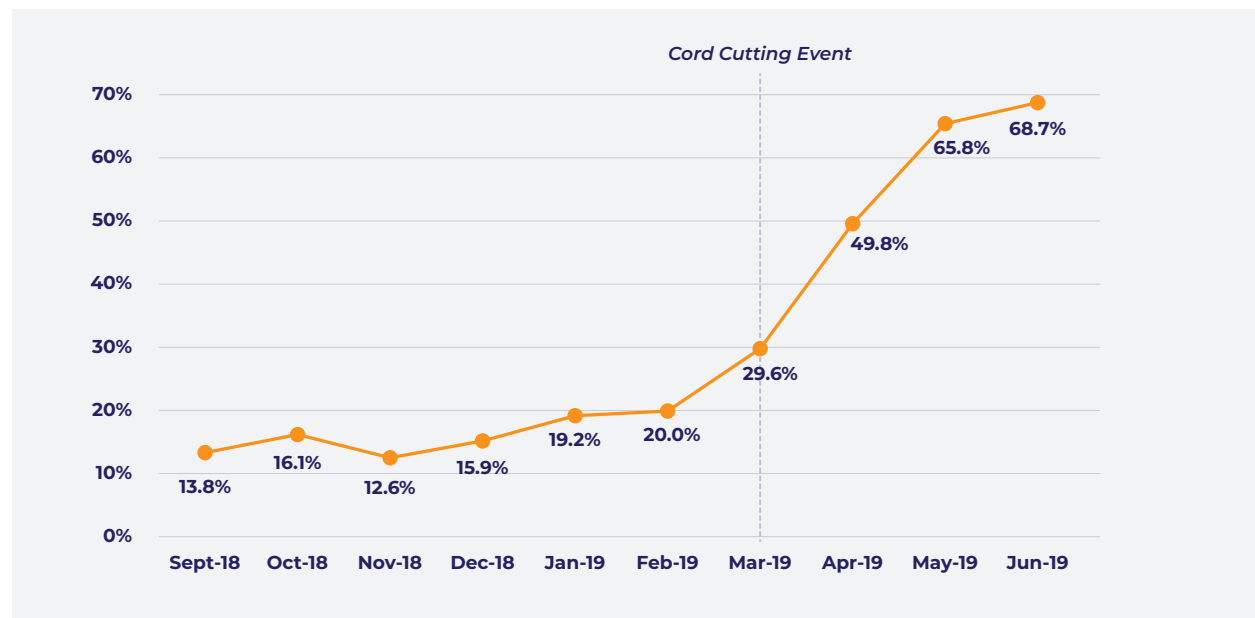
Monthly Data Usage (GB) Before and After Cord Cutting Event



Looking at the percentage difference between the cord cutter and the average subscriber in the months before and after the March cord cutting event is even more revealing. In September 2018, six-months prior to the cord cutting event, cord cutters were already using nearly 14% more

data than the average subscriber. By February, this difference was up to 20%. After the cord cutting event, the percentage difference between cord cutters and average subscribers began to rise rapidly, reflecting the increased bandwidth needs of cord cutters.

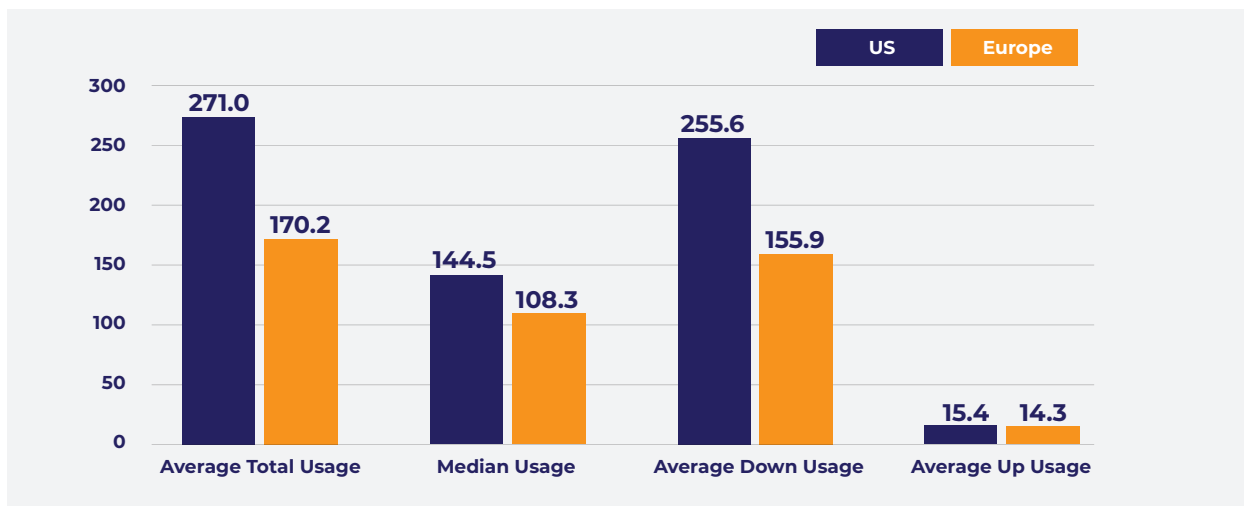
Percentage Difference in Total Usage Between Cord Cutters and Average Subscribers Before and After Cord Cutting Event



European Markets

Average subscriber usage in European markets increased just over 28% from 132.8 GB in 2Q18 to 170.2 GB in 2Q19. By comparison, US markets saw 25% growth over the same period. Average downstream data usage in Europe continued its annual growth trend of 30% in 2Q19 while upstream data usage saw a 14% uptick.

European power users (those using more than 1 TB of data per month) accounted for less than 0.7% of all subscribers in 2Q19, still far behind North America but increasing annually at a similar rate. The share of European subscribers consuming more than 250 GB was 22.13% as of June 2019, up nearly 47% from June 2018.



CONCLUSION

The overall US average broadband usage in 2Q19 was 271.0 GB, up just over 25% from 2Q18. During the same period, median monthly usage was 144.5 GB, representing a 32% increase compared to 2Q18. While average and median usage is relatively unchanged compared to 1Q19, the trend of year-over-year usage increases is expected to continue,

UBB effectively yields 23% fewer power users compared to an FRB approach

especially as more subscribers drop traditional pay-TV packages in favor of OTT options. Meanwhile, although European power users are still far behind North America's by accounting for less than 0.7% of all subscribers in 2Q19, usage is still increasing annually at a similar rate.

As alternative TV-viewing options such as OTT and subscription video-on-demand services become even more viable to the average consumer, service provider networks will continue to see dramatic increases in data usage. Compared to 2018, internet-only households saw a 20% higher growth rate when compared to an

annual usage increase of bundled households. This is especially notable considering that internet-only households consumed 85% more bandwidth than video-bundled households in 2Q19. Given the impact that cord cutting has on operators' networks, anticipating when and if a subscriber will cut the cord becomes valuable market intelligence. Through its usage behavior analytics, OpenVault has found evidence that predictive modeling can be possible in this space.

Along with preparing for the effects of cord cutting, curtailing the impact of power users on networks should compel providers to consider usage-based billing models. In 2Q19, the percentage of UBB subscribers using more than 1 TB of data was 3.7%, compared to 4.6% of FRB subscribers. In other words, UBB effectively yields 23% fewer power users (those consuming more than 1 TB of data per month) compared to an FRB approach. The positive effects of UBB on the most active power users (those using more than 2 TB monthly) is even more noticeable. A UBB approach yields 61% fewer 2 TB power users compared to FRB.

About OpenVault

As a global leader of broadband analytics, OpenVault provides meaningful insight to one of the world's fastest-growing, ever-evolving marketplaces. In this way, OpenVault's solution suite tracks broadband data usage consumption levels for millions of subscribers and helps operators across the globe better manage their networks, saving time and costs while increasing revenue and subscriber satisfaction. Network operators use OpenVault's easy-to-use tools to dramatically improve visibility into their networks and automate management functions to proactively handle congestion, forecast network requirements, monetize broadband growth and communicate with subscribers.

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