



Broadband Insights Report (OVBI)

4Q21

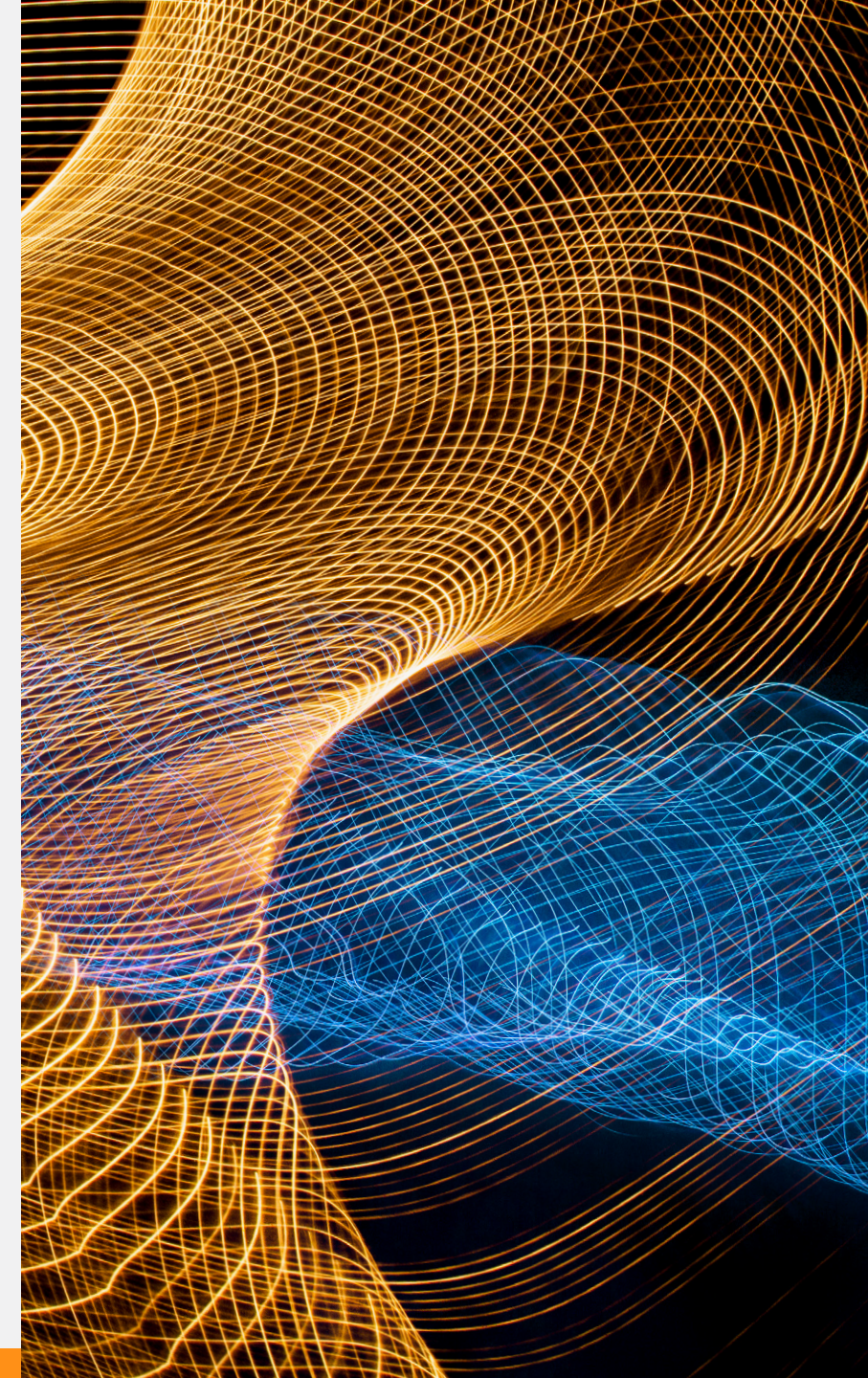
Introduction

The year 2021 ended with a notable broadband industry usage milestone. Average North American bandwidth consumption surpassed 512 GB, or over half a terabyte (TB), for the first time, in alignment with subscribers' migration to faster speed tiers. This milestone confirms the linkage between significant growth trajectories in both bandwidth consumption and faster speed adoption and significantly impacts network planning for network operators, with important revenue and customer experience implications.

This 4Q21 edition of the OpenVault Broadband Insights Report (OVBI) highlights the long-term correlation OpenVault has identified between rising bandwidth usage and faster speed adoption. Over the past five years, average bandwidth consumption has grown nearly 165%. In addition, gigabit speed tier adoption has recently grown by a factor of 4.25x.

As with all editions of the OpenVault Broadband Insights Report (OVBI), this 4Q21 version uses data points from millions of individual broadband subscribers, aggregated from OpenVault's software-as-a-service (SaaS) technology solutions to pinpoint usage patterns as well as the differences between two key categories: subscribers on flat-rate billing (FRB) plans that offer unlimited data usage and those on usage-based billing (UBB) plans, on which subscribers are billed based on their broadband consumption.

Broadband subscribers' desire for faster speeds is driving continued growth in bandwidth consumption, confirmed by over half a terabyte in bandwidth usage on average in the fourth quarter 2021. Properly managing this growth is a fundamental challenge for today's network operator.



Key findings from the 4Q21 OVBI include:



Usage

The monthly weighted average data consumed by subscribers in 4Q21 was 536.3 GB, up 11.1% from 4Q20.



Key ARPU Insight

OpenVault estimates that 23.5% of subscribers in the 400 Mbps or below speed tier are eligible candidates for higher ARPU speed tier upgrades.



Power Users

The number of power users in the 2 TB usage category saw accelerated growth in 4Q21, with nearly 2x more users than the previous year.



Key Bandwidth Usage Insight

Gigabit speed tier subscribers on average are consuming over 1 TB of bandwidth each month.



Speed Tiers

Nearly 1 in 5 subscribers (18%) now receives broadband speeds of 500 Mbps or faster.



Key UBB vs FRB Insight

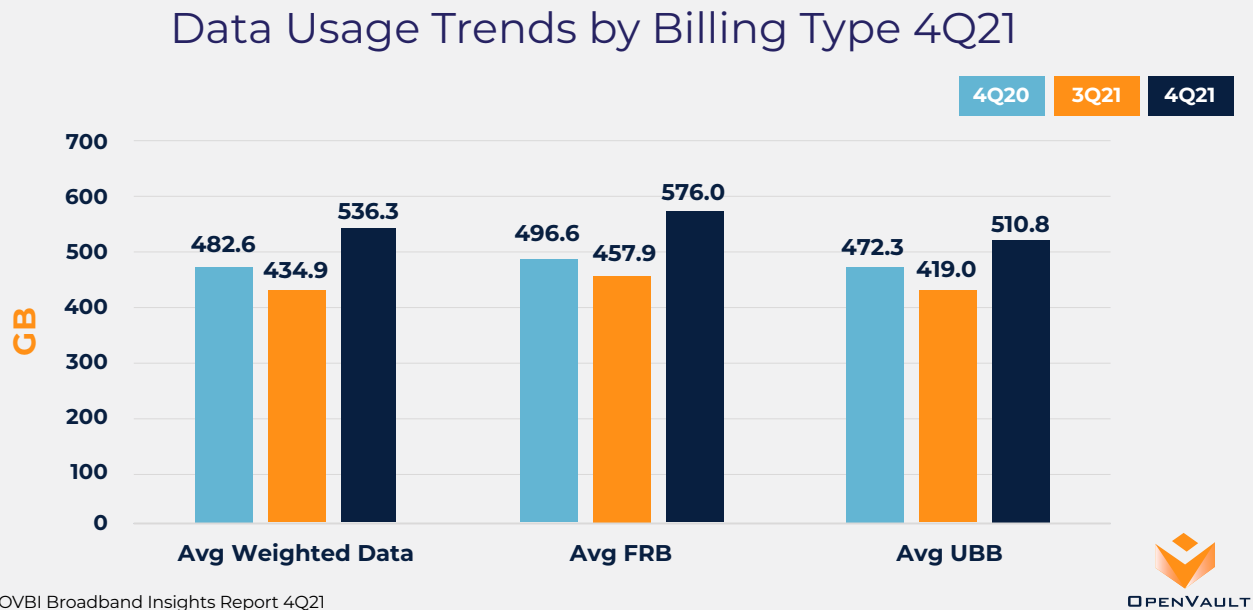
At 398 GB in 4Q21, annual median usage growth of FRB subscribers (32%) is nearly 3x that of UBB subscribers (11%).



4Q21 Broadband Usage Key Findings

The following broadband usage trends were observed in 4Q21.

FIGURE 1

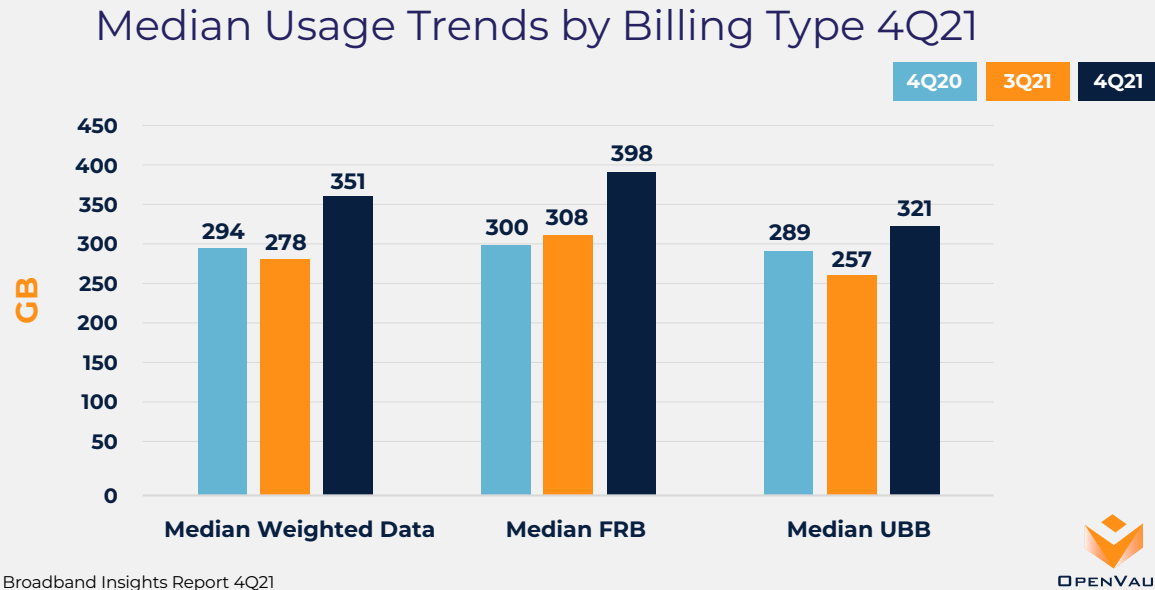


The new milestone of half a terabyte in average usage knew no bounds, as the milestone was reached for both UBB- and FRB-based network operators.

- The monthly weighted average data consumed by subscribers in 4Q21 was 536.3 GB, up 11.1% from 4Q20's weighted average of 482.6 GB, and up 23.3% sequentially (quarter-over-quarter) from 3Q21. Average usage has now surpassed half a terabyte for the first time. Weighted averages combine data from FRB and UBB subscribers.
- Annual growth on FRB networks (16%) in 4Q21 was nearly double that of UBB networks (8.4%), highlighting UBB's superior ability to manage the rate of subscriber usage growth.



FIGURE 2



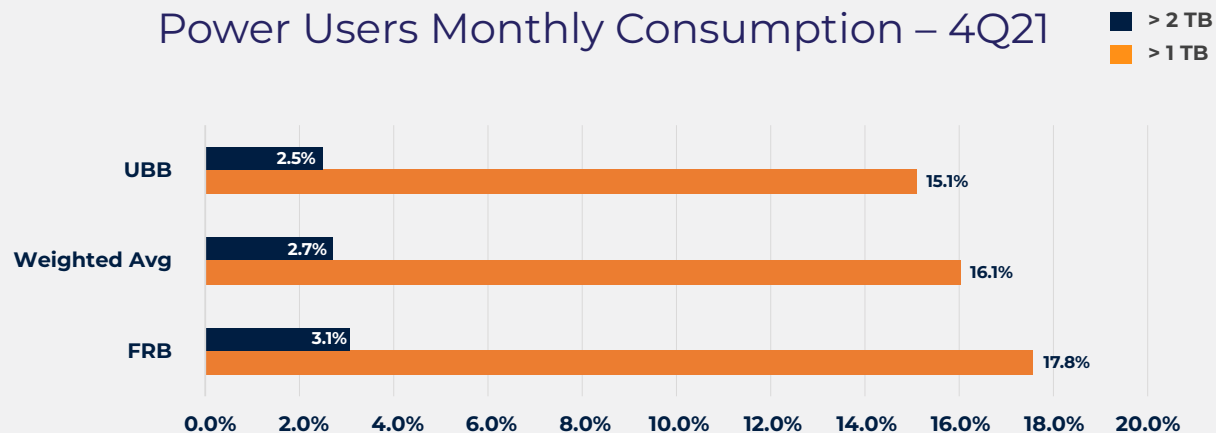
- The monthly weighted median usage in 4Q21 was 351 GB, up 19.4% from 294 GB a year ago, and up 26.2% sequentially from 3Q21's median of 278 GB.
- Annual median usage growth for FRB providers (32.6%) was roughly 3x that of UBB providers (11%).

Median usage growth (19.5%) continued to outpace overall average usage growth (11.1%) in 4Q21, a familiar pattern that indicates the growth in consumption is widespread across the entire subscriber population, and not driven by a smaller group of power users.



FIGURE 3

Power Users Monthly Consumption – 4Q21



Source: OVBI Broadband Insights Report 4Q21

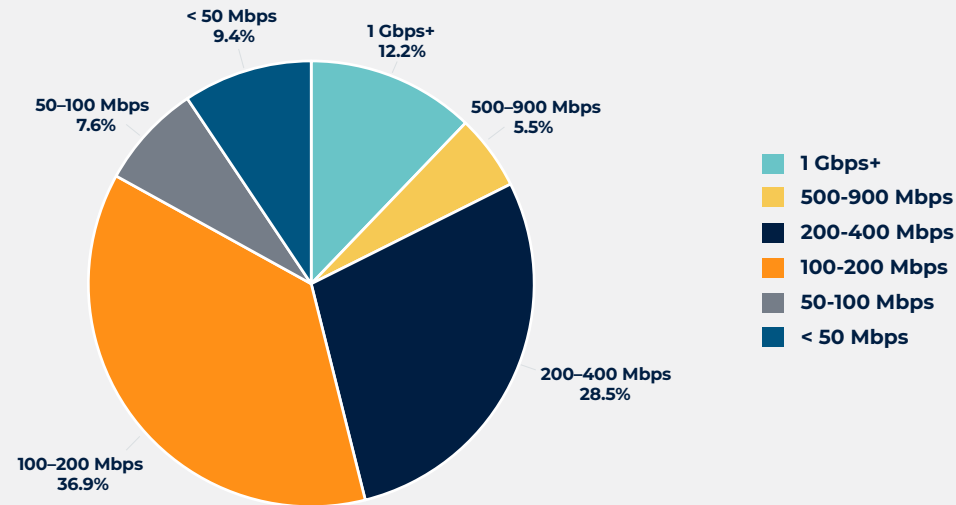


- Power usage growth impacted all categories similarly in 4Q21, with both UBB and FRB networks seeing considerable growth. FRB-based networks saw growth of 53% for 1 TB users compared with 49% growth in UBB-based networks vs 3Q21.



FIGURE 4

Provisioned Speed Tiers – 4Q21



Source: OVBI Broadband Insights Report 4Q21



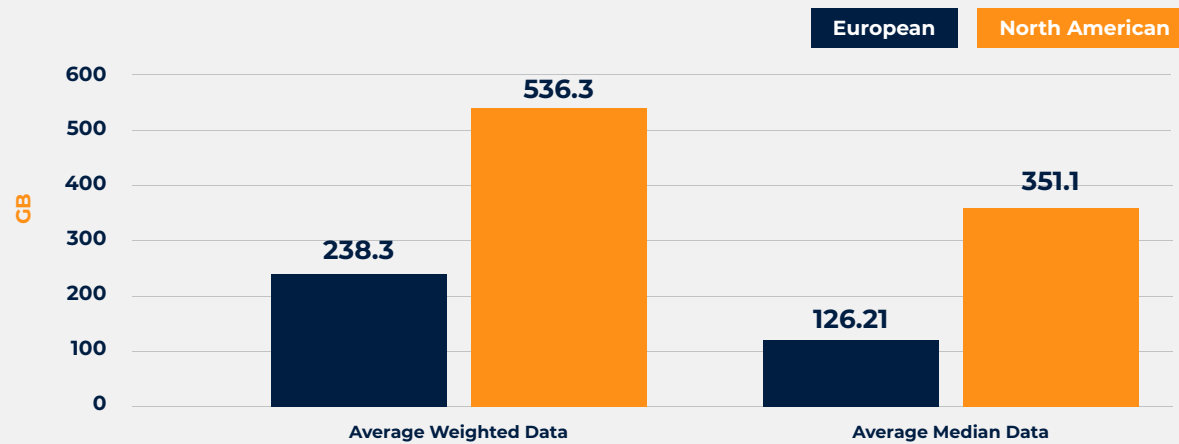
65.4% of all subscribers are provisioned for speeds of between 100 Mbps and 400 Mbps.

- While still increasing, gigabit subscriber tier growth momentum slowed in 4Q21. At 12.2% of subscribers, the fastest speed tier still grew annually by close to 44%.
- The fastest growing speed tier on an annual basis in 4Q21 was the 200 – 400 Mbps tier, at 80% annual growth.
- Less than 10% of all subscribers are in the 50 Mbps and below speed tier.



FIGURE 5

European vs. North American Data Usage - 4Q21



Source: OVBI Broadband Insights Report 4Q21



- European average data usage (238.3 GB) grew by over 20% sequentially from 3Q21 (197 GB).
- As in North America, European median usage is growing faster (23.8%) than average usage (20%).
- North American median data usage (351.1 GB) is roughly 2.8x that of European median data usage (126.2 GB).

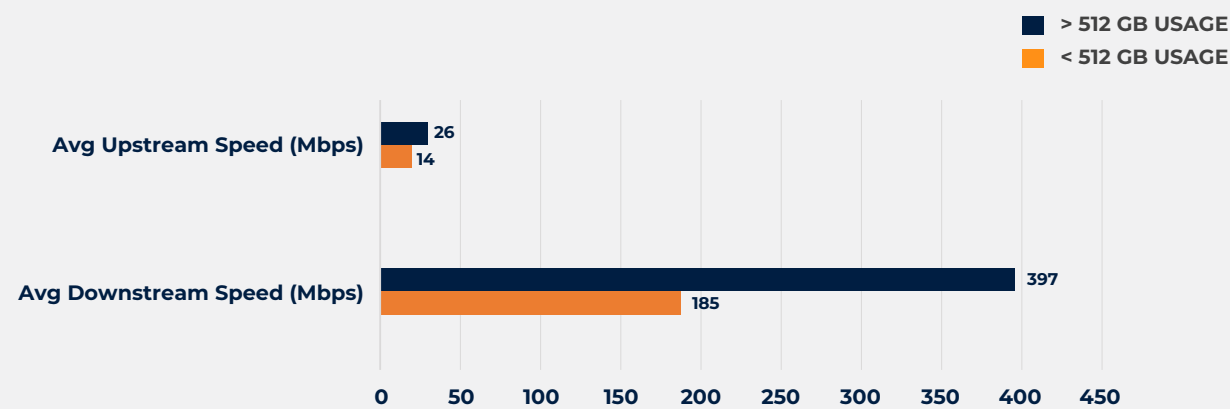


Implications of Faster Speed Adoption

The gigabit speed tier grew by a factor of 4.25x between 4Q19 and 4Q21. That desire for more speed has implications for network operators, as the faster the speed, the more bandwidth subscribers consume. Figure 6 compares the average downstream and upstream speeds for subscribers who consume half a terabyte or more of data per month against subscribers who consume less than half a terabyte per month.

FIGURE 6

Average Broadband Speed by Data Usage



Source: OVBI Broadband Insights Report 4Q21



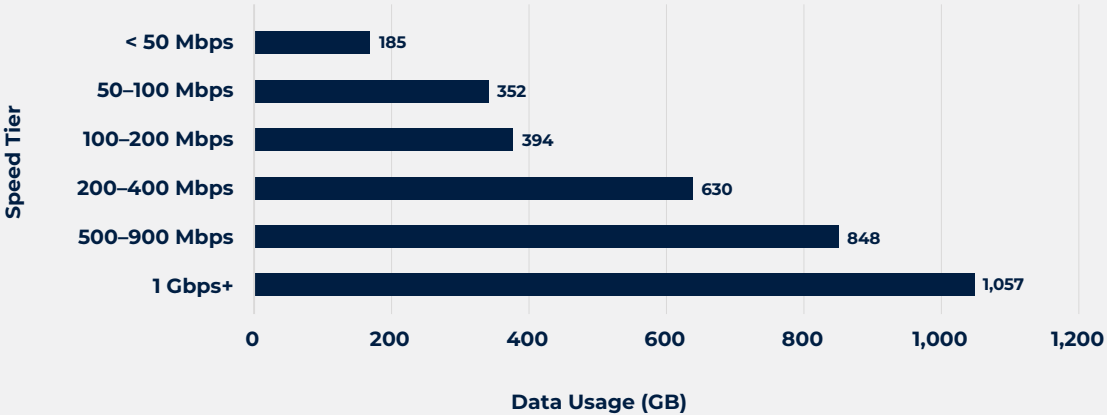
The average download speed (397 Mbps) of subscribers who consume a half a terabyte or more per month is more than 2x faster than the average speed (185 Mbps) of subscribers consuming less than half a terabyte.

While still increasing, the annual growth rate for upstream usage slowed a bit in 4Q21 at 4%, down from 12% growth in 3Q21.

Figure 7 underscores the correlation by plotting the average data usage by speed tier ranging from 185 GB for subscribers in the less than 50 Mbps speed tier to over 1 TB for gigabit speed tier subscribers.

FIGURE 7

Average Data Usage per Month (GB) by Speed Tier – 4Q21



Source: OVBI Broadband Insights Report 4Q21



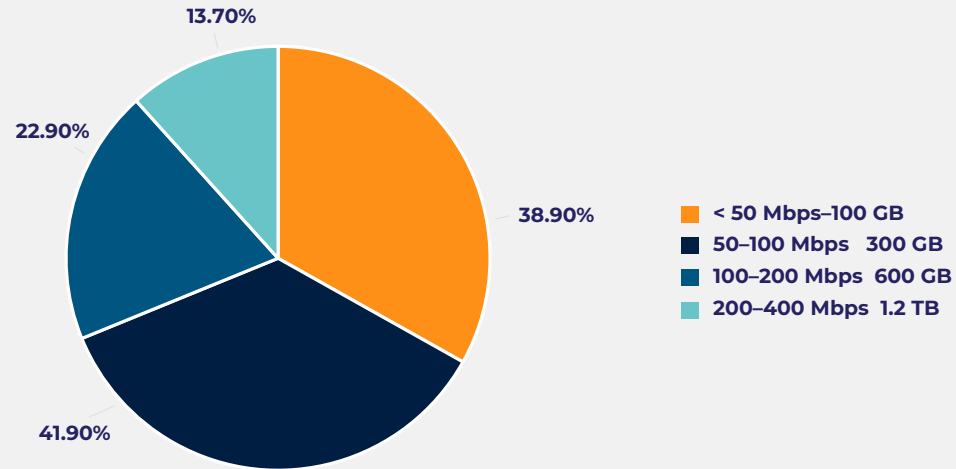
Growing consumption creates opportunities for network operators. A subset of subscribers has consumption habits that do not align with their provisioned speeds creating poor customer experiences.



Measured by speed and bandwidth, OpenVault defines these usage thresholds, as monthly usage of 100 GB or more for the <50 Mbps speed tier, 300 GB or more for the 50 - 100 Mbps speed tier, 600 GB or more for the 100 - 200 Mbps speed tier, and 1.2 TB or more for the 200 - 400 Mbps speed tier. Subscribers who reach these defined thresholds are prime upgrade candidates. Figure 8 outlines the percentage of these subscribers in each speed tier.

FIGURE 8

% of Subscriber Candidates for Upgrades by Speed Tier



Source: OVBI Broadband Insights Report 4Q21



OpenVault data identifies 23.5% of all subscribers in the 400 Mbps or below speed tier as being eligible candidates for speed tier upgrades. Network operators who have the tools to identify and target these subscribers with speed upgrade campaigns have a significant opportunity to raise overall ARPU and improve the customer experience in the process.

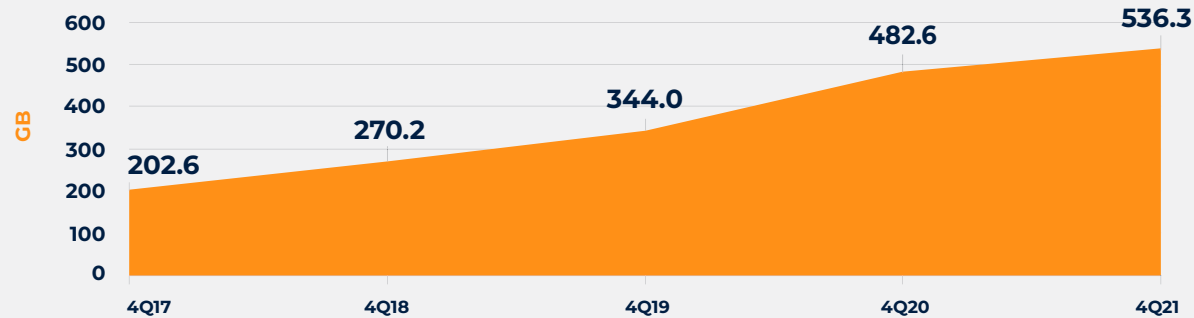


Bandwidth Usage Growth

As subscribers continue to adopt high bandwidth applications such as streaming, gaming, and work-from-home, their need for higher speed tiers only multiplies and the impact on bandwidth consumption is very apparent. Figure 9 illustrates the growth in bandwidth consumption over the past 5 years.

FIGURE 9

Weighted Average Total Data Usage (GB) 2017-2021



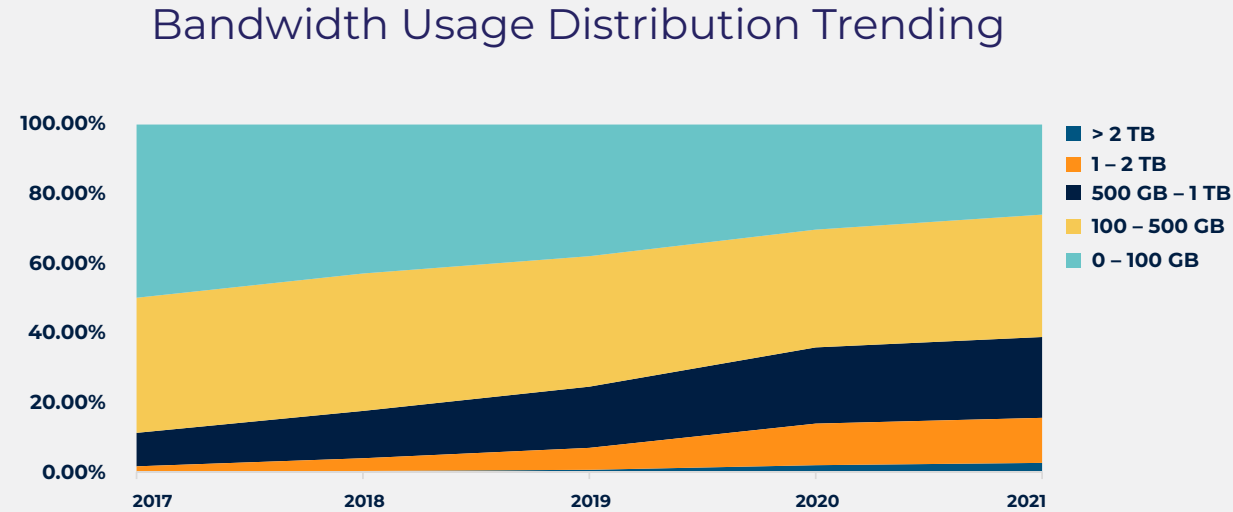
Source: OVBI Broadband Insights Report 4Q21



The average monthly data consumption of 536 GB in 4Q21 is over 2.6x the average of 203 GB in 2017. Proper network planning for these trends is essential, as there is no end in sight for subscribers' hunger for faster speeds. Multi-gigabit speed tiers are now entering the market.

Power user category growth, representing subscribers who consume more than 1 TB per month, is accelerating while lower usage tiers are shrinking. In 2017, 2TB power users only represented .12% of subscribers; the 2021 figure percentage of that number has risen to 2.74% which is 20 times greater than 5 years ago. Over the same period, subscribers who consume 100 GB or less fell from nearly half of all subscribers (49.7%) to just 26%, a decline of 48%. Figure 10 illustrates the changing nature of bandwidth usage over the past five years.

FIGURE 10



Source: OVBI Broadband Insights Report 4Q21



Usage Observations



Power users who consume 1 TB or more per month represented less than 2% of subscribers in 2017. Today, they represent close to 16%, a growth factor of over 750%.



In 4Q21, there were 25% more 2TB power users on FRB-based networks than on UBB-based networks.



European power users who consume 2 TB or more per month grew 54% from 3Q21 to 4Q21.



Median data usage in 4Q21 on FRB-based networks exceeded UBB-based networks by 24%.

Speed Observations



The most popular speed tier in 4Q21 was 100 – 200 Mbps. Subscribers in that tier, on average, consumed 394 GB of data.



OpenVault data suggests that 23.5% of subscribers in the 400 Mbps or below speed tier are eligible candidates for speed tier upgrades.



Average Broadband Household

A snapshot of the average U.S. broadband household.

OVBI Average Broadband Household Index – 4Q21



536 GB

Average Bandwidth Usage



504 GB

Average Downstream Usage



269 Mbps

Average Downstream Speed



9 per household

Average Number of Streaming Services*

*Deloitte Insights- Digital media trends survey, 14th edition



32 GB

Average Upstream Usage



19 Mbps

Average Upstream Speed



25 per household

Average Number of Connected Devices*

*Statista



Conclusion

Consumers have spoken through their use of the Internet. They are using applications and devices that demand higher bandwidth and that rely on faster speeds and lower latency for an acceptable customer experience.

This in turn is driving a dramatic uptick in bandwidth usage, as evidenced by the 4Q21 milestone of average data consumption surpassing half a terabyte for the first time.

As multi-gigabit services are now in the market, and as the push to 10G service is already well underway, this

trend will only continue, and more likely accelerate. It took about three years for bandwidth usage to double from 270 GB in 4Q18 to nearly 540 GB in 4Q21.

These accelerated trends will challenge network operators to plan accordingly and ensure they are delivering an acceptable customer experience to all their subscribers. Network operators should explore all options, including examining the role of usage-based billing to better manage this onslaught of accelerating data consumption.

OpenVault expects that in the post-pandemic world these usage consumption trends will continue. As subscribers demand faster speeds and consume more data, understanding the implications for network planning and the customer experience is a priority. With the tools to identify and understand these network metrics, network operators can not only better manage their network and improve consumer experiences but also can grow revenues as a result.



OpenVault Solutions to Address This Report's Insights

From network congestion to increasing revenue, OpenVault offers solutions to improving the value of broadband networks. Two of the solutions associated with this report's insights are:



Subscriber Upgrade Candidates

Now broadband providers can identify, in near real-time, subscribers with usage behavior that approaches the maximum speed of their service packages. Perfect for upgrading to higher speed and more provider-lucrative plans, targeted subscribers will experience higher QoE and reduce their need for customer care.



Boost Network Capacity

For providers who have invested in a DOCSIS 3.1 network, OpenVault offers a means to supercharge it. Broadband providers can deploy a closed-loop and automated data-driven solution that dynamically creates bandwidth without human intervention. Through persistent analysis of data from each CM and CMTS, the OpenVault Profile Management Application (PMA) learns the state of the system and creates profile sets tailored to the unique real-world environment of each OFDM/OFDMA channel – essentially creating “virtual node splits” and opening up more usable bandwidth.

Learn more about these and other revenue increasing and network management solutions at OpenVault.com.



About OpenVault

OpenVault is a market-leading source of broadband technology solutions and data-driven insights into worldwide broadband consumption patterns. OpenVault's cloud-based, SaaS solutions and tools help service providers optimize network performance, increase revenue, and improve subscriber satisfaction. OpenVault aggregates and analyzes the resulting market data to provide unparalleled granular views of consumer usage that can be used to anticipate residential and business broadband trends.

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