



CORNING

# The Rise of Upstream Bandwidth

Today's New Reality



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# Changing Internet Behavior





## Changing Internet Behavior

Society has fully embraced the utility of the internet. Its importance has become indistinguishable from other utilities, including electricity and water. Consumers and businesses alike now rely on internet connectivity to: conduct business; learn new skills; stay healthy; play and get entertained; shop; communicate with friends, family, and colleagues; and participate in society.

## Understanding the Difference Between Upstream and Downstream

Asymmetrical broadband connections, with much higher download speeds than upload speeds have historically been the norm. Internet subscribers consumed much more data delivered over the downstream than they uploaded over the upstream. That's been the pattern for average internet usage over the past 20 years. But more recently, the need for symmetrical bandwidth, or equal speed on the upstream and downstream is becoming more evident. Consumer and business applications now demand much more upstream bandwidth, and lack of it creates a poor customer experience.





## Pandemic Impact

The COVID-19 pandemic has exposed the need for symmetrical speeds, as internet usage behavior shifted significantly. It accelerated the work from anywhere trend, where end users are no longer tethered to an office, and can instead, work from home or anywhere that offers adequate broadband connectivity. That shift brought business applications out of the office and into the home, adding extreme pressure to upstream bandwidth.

Consider the following:



According to Gallup, at its height, the pandemic shifted 50% of the overall workforce to working from outside their office and two-thirds of those workers have indicated they wish to continue a work from anywhere lifestyle<sup>1</sup>.



OpenVault also found that the greatest increase in upstream consumption occurred during business hours, jumping 98.5% between 9am and 5pm.



According to OpenVault, at its peak during the pandemic, average upstream traffic was 80% higher than the previous year<sup>2</sup>.



Many operators around the world with cable, DSL, and fiber broadband networks report that upstream peak traffic growth throughout 2020 increased over 50%, while downstream peak traffic growth increased 30%<sup>3</sup>.





## The New Normal

These new patterns have established what has come to be described as the new normal. While the world is emerging from the pandemic, elevated traffic patterns are remaining. Hybrid work environments are the new normal, where workers will regularly be working both inside and outside of the office. Pandemic traffic patterns that drove dramatic shifts in upstream data usage will continue, perhaps permanently.

- According to a report from Accenture, 63% of high-growth companies have already adopted a “productivity anywhere” workforce model<sup>4</sup>.
- 83% of workers say a hybrid model would be optimal.
- 29% of working professionals go as far as to say they will quit their job if they aren't allowed to continue working remotely with their current employer.
- 65% of working professionals say remote work positively affects their work-life balance<sup>5</sup>.





A photograph of a server rack with network cables. The top half of the image is a blue-tinted close-up of blue cables plugged into a switch. The bottom half shows a rack of server units with numerous yellow and blue cables plugged into their ports. The server units have various indicator lights, some of which are glowing yellow and orange. The background is a bright, out-of-focus white wall.

# Implications on the Network



# Implications on the Network

For network operators, the rise in upstream traffic has major implications for network management, customer experience, and both CAPEX and OPEX.

## Impact of growing upstream demand on the network

Network operators must contend with these changing traffic patterns to ensure an acceptable user experience. Consider the following network implications:

- AT&T reports that between 2015 and 2021, average upstream bandwidth use per subscriber has grown by 487%, compared to 358% for downstream<sup>6</sup>.
- The impact is particularly acute for cable MSOs. Dell'Oro reported that cable operator spending on upstream channel purchases climbed 96% in Q4 2020 versus 2019<sup>7</sup>.
- According to OpenVault, for cable MSOs, reconfiguring networks for increased upstream demand use via mid-splits to 85MHz or high-splits to 204MHz can cost as much as \$35,000 per node<sup>8</sup>.

## Applications that are driving upstream demand

The digital lifestyle, where just about everyone walks around with an HD capable video camera in their pocket, helps drive this historic demand for upstream bandwidth. Combine that with the hybrid work environment, with business applications like videoconferencing becoming commonplace everywhere, and the new normal for upstream bandwidth becomes quite clear.

- An optimal Facebook livestream session recommends an upstream bandwidth connection of 6 Mbps just for that one application<sup>9</sup>.
- Group Zoom video calls in HD can use up to to 2.5 GB per hour<sup>10</sup>.
- 500 hours of video are uploaded to YouTube every minute of every day<sup>11</sup>.
- 1,074 photos are uploaded to Instagram every second<sup>12</sup>.
- Every time an episode of the popular TV series Game of Thrones aired, within one hour, file sharing sites would register over 100K shares of the episode<sup>13</sup>.



# FTTH and Upstream

The background features a series of curved, glowing lines in shades of blue and orange, creating a sense of depth and movement. Small, bright white and blue dots are scattered along these lines, resembling nodes or data points in a network. The overall aesthetic is futuristic and technological.



## FTTH and Upstream

Fiber operators have a distinct edge, given the symmetrical advantages of FTTH. Offering higher upstream speeds can ensure the best customer experience, providing a potential competitive advantage, and fiber network architecture best positions network operators to deliver it. Existing GPON technology gives operators the flexibility to offer symmetrical services but does have some bandwidth limitations. Next generation 10G PON deployments are now underway with XGS-PON and NG-PON2, both of which support 10 Gbps symmetrical bandwidth, providing a long-term strategic path for network operators.

## The Name of the Game is Future Proofing Your Network

The pandemic has taught the broadband industry a valuable lesson. While you can't predict the future, you can certainly prepare for it. No one saw the pandemic and its implications on the network coming. No one can see what the future holds.

Network operators who rely on fiber infrastructure can rest a little -easier though. Because whatever the future brings, they're more than prepared. No other broadband access technology can offer that level of comfort.







# Conclusion



# Conclusion

Network operators must now consider symmetrical broadband service as a requirement. Required to deliver the most compelling customer experience. Required to provide a true competitive advantage. Required to provide peace of mind regarding the future and whatever it might bring.

## Sources

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