



NETWORK

REPORT

2021

OVERVIEW

In a year marked by shifts in Internet usage patterns as the COVID-19 pandemic ebbed and surged, Comcast's network continued to thrive as overall demand rose over historic 2020 levels. Data suggested a shift to pre-pandemic usage patterns, as peak download (downstream) traffic grew faster than peak upload (upstream) traffic.

In this second annual **Comcast Network Report**, we're sharing the major trends we observed on our network over the past year, and detailing how billions in strategic investment, combined with continuous innovation, allowed our network to thrive during a record-setting period of Internet demand.



INVESTMENT

In 2021 alone, Comcast invested more than **\$4.2 billion** to strengthen, expand and evolve the network – more than any previous year.



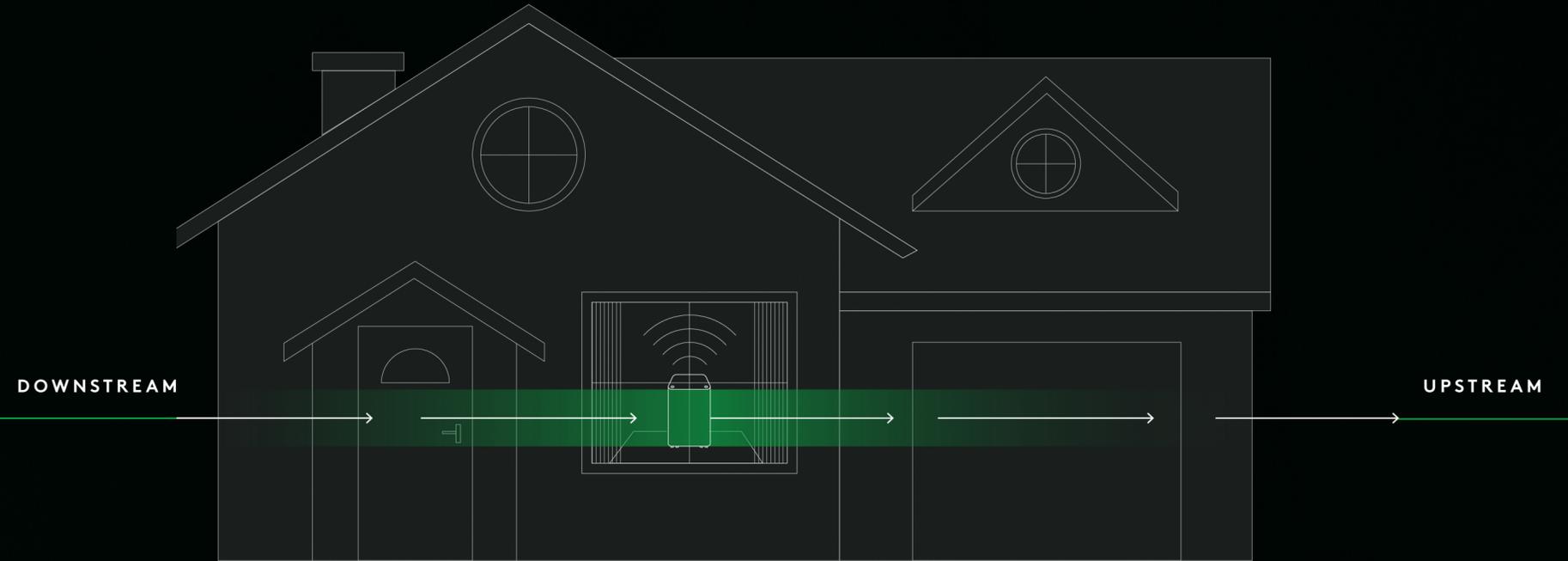
+50k

From 2017 to 2021, we built 50k new route miles of fiber into our network.

\$20B

In the past five years (2017-2021), we've invested nearly \$20 billion to evolve and grow our network.

TRAFFIC



Peak traffic growth continued to climb, even from record highs set in 2020. Peak downstream traffic grew **2x faster** than upstream traffic, more closely mirroring pre-pandemic trends.

+11%

Peak **downstream** traffic increased approximately 11 percent over 2020 levels.

+5%

Peak **upstream** traffic increased approximately 5 percent over 2020 levels.

Asymmetrical speeds: Network asymmetry increased throughout the year, with **total downstream traffic volumes 12.4x higher** than upstream for the first 6 months of the year, and **14.5x higher** for the last six months

Daily peak times shifted toward pre-pandemic norms throughout the year – peak upstream traffic times were 10am in January, 3pm in June, and 10pm in December.

10:00 AM

JAN

3:00 PM

JUN

10:00 PM

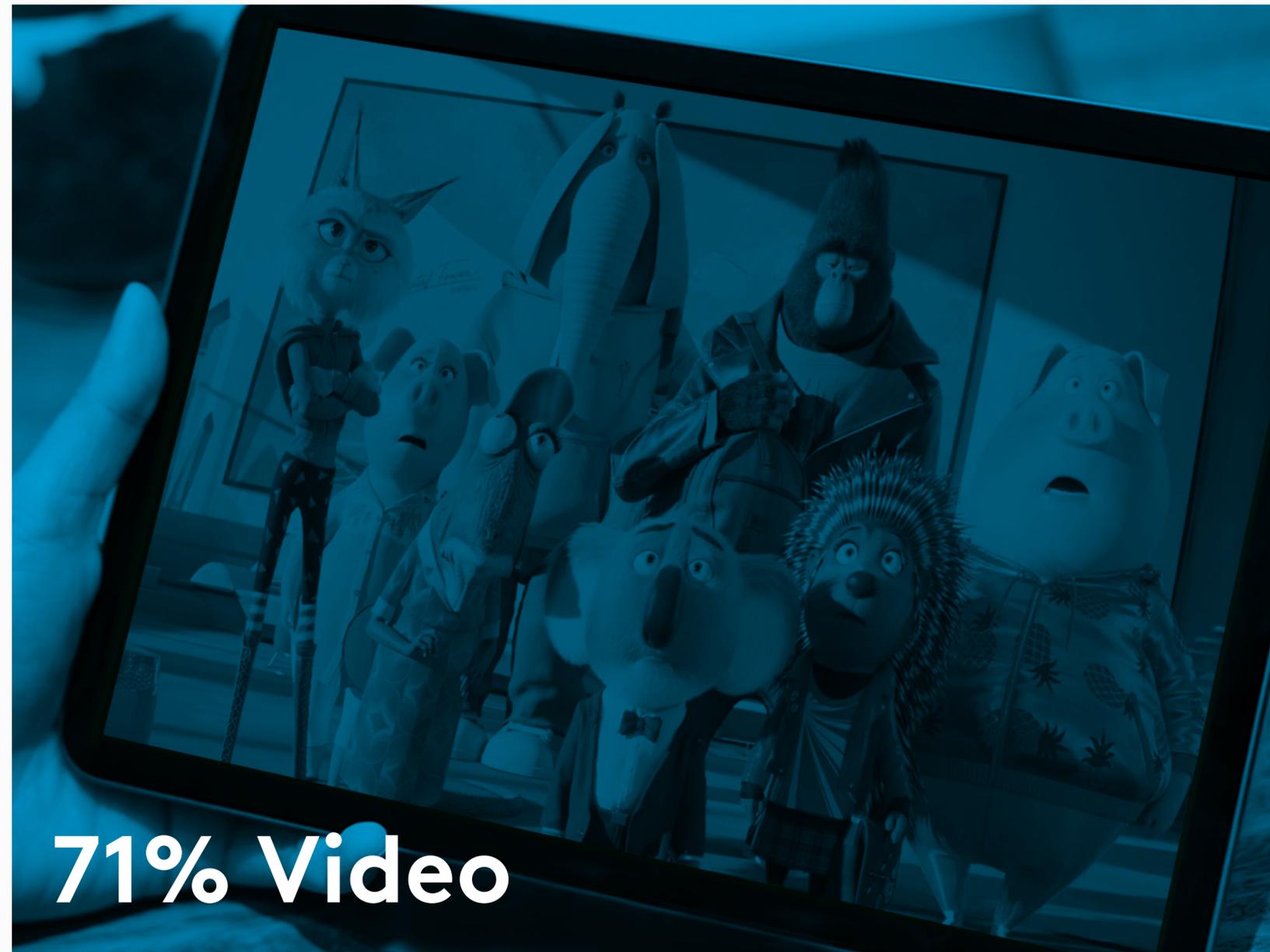
DEC

CONTENT

Similar to last year, entertainment activities dominated peak network traffic, with **video streaming** accounting for 71 percent of downstream traffic (same as 2020).

↑ 10-20% increase in video streaming, gaming, and web browsing

Videoconferencing fell slightly as a percentage of peak network traffic, remaining less than 5 percent in 2021.



2021 NETWORK TRAFFIC

■ Video Streaming ■ Online Games ■ Web Browsing ■ Other ■ Software Updates

NETWORK INNOVATION & THE ROAD TO 10G

Investing billions to strengthen and grow our network is important...but it's only the beginning of building a smart network that's ready for anything.

Our network architects and software engineers continuously innovate and evolve our network technology to increase speeds, strengthen reliability and improve overall performance.

Innovating for Reliability

XMF, a new network technology, reduces the amount of time it takes for a technician to find and isolate a fiber cut from 2 hours down to one-and-a-half minutes. The XMF platform monitors hundreds of thousands of local broadband optical links every minute across the Comcast network, measuring both the optical spectrum and testing the length and quality of the fiber links. In practical terms, that means that with XMF installed, network engineers can pinpoint the exact point at which a local fiber network is experiencing an issue and share the precise geolocation with local technicians.

Leading the Way on 10G

We are evolving our network to 10G, a technology which will allow Comcast to deliver multigigabit upload and download speeds to tens of millions of Americans over the cable connections already installed in their homes and businesses. In 2021, our work on 10G technologies kicked into high gear.

- In April, we conducted a lab test of DOCSIS 4.0 technology and showed ability to deliver 4-gig upload and download speeds.
- In October, we conducted the world's first test of a 10G connection all the way from our network to a modem. The team activated a virtualized cable modem termination system (vCMTS) powered by Full Duplex DOCSIS 4.0 Technology, another world's first.



DOCSIS 4.0

1. Dramatically increases the amount of data we can deliver both upstream and downstream, enabling multigigabit symmetrical speeds over traditional "cable" connections in homes and businesses.
2. Transforms **how** data is delivered over cable connections to be more efficient and support anything our customers choose to do online.

WiFi

The fastest network is only as good as its WiFi.

That's why we've paired our network advancements with smart, supersonic WiFi that ensures customers have the best connected experiences however and wherever they connect.

Billions

Unique devices: Nearly **a billion** unique devices connected to WiFi in Xfinity households, a 12x increase from 2018.

xFi Advanced Security: Proactively blocks **billions** of cybersecurity threats before they reach our customers' devices, and is included with our xFi gateway.

Millions

Smartphones: Continuing to be the main device connected in our customers' homes, smartphones make up **1/3** of all devices connected to Xfinity WiFi.

xFi Pods: Help to cover the home with strong and reliable WiFi. **90-100 million** devices are connecting through our xFi Pods in the U.S. and Europe each day.

Pause/unpause: Xfinity customers used the pause/unpause WiFi feature nearly **100 million times**.

Parental Controls: More than **1 million** Xfinity customers are using xFi parental controls to help manage WiFi in their home.

Gigabits

Gig speeds: Even as demand on the network continued to grow, Comcast increased speeds for the most popular Xfinity speed tiers, including increasing gig speeds to **1.2 Gbps**.

xFi Advanced Gateway
Comcast's most powerful device to date, the next generation xFi Advanced Gateway incorporates WiFi 6E, offering customers an unbeatable broadband experience with a faster, more reliable wireless connection. The gateway will boost capacity in the home with three WiFi bands – 2.4 GHz, 5 GHz, and a new, 6 GHz band.



PROJECT UP

As the world becomes more digital, it's our responsibility to use media and technology to ensure that everyone has the resources and opportunities they need to participate and excel in today's society. Project UP is our comprehensive initiative to advance digital equity and help **build a future of unlimited possibilities.**

**PROJECT
UP**

Backed by a \$1 billion commitment, Project UP encompasses the programs and community partnerships across Comcast, NBCUniversal, and Sky that connect people to the Internet, advance economic mobility, and open doors for the next generation of innovators, entrepreneurs, storytellers, and creators. Three of these programs are featured below:

**internet»
essentials**
FROM COMCAST

We have been committed to creating and supporting digital equity within the communities we serve for more than a decade. We launched Internet Essentials in 2011 to bring affordable, high-speed Internet to low-income families connecting a cumulative total of more than 10 million people from low-income families to the Internet at home in 10 years.



Comcast launched 1,000 Lift Zones nationwide to provide spaces for students to access free, high-capacity WiFi in 2021. Together with nonprofit partners and city leaders, we are building spaces for students and families to connect to free WiFi for distance learning at more than 1,000 Lift Zones in community centers across the country.



The Comcast RISE Investment Fund has granted \$11 million to 1,100 small businesses owned by people of color and the program will support 13,000 small businesses by the end of 2022. A program offering grants, marketing services, and technology upgrades – Comcast RISE stands for “Representation, Investment, Strength, and Empowerment,” and was created to strengthen and empower small businesses hard hit by COVID-19.

2022 AND BEYOND

In 2022, we're looking forward to accelerating our 10G roadmap, even as we expand our network to serve more people in more places, and deploy new technology innovations that deliver more speed, security and reliability to our customers. Whatever the future holds, our network will be ready to support whatever our customers can imagine.


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