



## Germany - 2021 Forecast Highlights

### IP Traffic

- In Germany, IP traffic will grow 3-fold from 2016 to 2021, a compound annual growth rate of 23%.
- In Germany, IP traffic will reach 5.9 Exabytes per month in 2021, up from 2.1 Exabytes per month in 2016.
- Germany's IP networks will carry 196 Petabytes per day in 2021, up from 69 Petabytes per day in 2016.
- In Germany, IP traffic will reach an annual run rate of 71.4 Exabytes in 2021, up from an annual run rate of 25.4 Exabytes in 2016.
- In Germany, IP traffic will reach 74 Gigabytes per capita in 2021, up from 26 Gigabytes per capita in 2016.
- In Germany, average IP traffic will reach 18 Tbps in 2021, and busy hour traffic will reach 127 Tbps.
- In 2021, the gigabyte equivalent of all movies ever made will cross Germany's IP networks every 59 minutes.

### Internet Traffic

- In Germany, Internet traffic will grow 3.2-fold from 2016 to 2021, a compound annual growth rate of 26%.
- In Germany, busy hour Internet traffic will grow 4.6-fold from 2016 to 2021, a compound annual growth rate of 36%.
- In Germany, Internet traffic will reach 5.2 Exabytes per month in 2021, up from 1.6 Exabytes per month in 2016.
- Germany's Internet traffic will be 172 Petabytes per day in 2021, up from 50 Petabytes per day in 2016.
- Germany's Internet traffic in 2021 will be equivalent to 16 billion DVDs per year, 1 billion DVDs per month, or 2 million DVDs per hour.
- In 2021, the gigabyte equivalent of all movies ever made will cross the Internet every 1 hours.
- German Internet traffic in 2021 will be equivalent to 51x the volume of the entire German Internet in 2005.

- In Germany, Internet traffic will reach 65 Gigabytes per capita in 2021, up from 20 Gigabytes per capita in 2016.
- In Germany, average Internet traffic will increase 3.2-fold by 2021 and will reach 16 Tbps.
- In Germany, busy hour Internet traffic will increase 4.6-fold by 2021 and will reach 111 Tbps.

### Wired Wi-Fi and Mobile Growth

- Germany's Fixed/Wi-Fi was 40% of total IP traffic in 2016, and will be 46% of total IP traffic in 2021.
- Germany's Fixed/Wired was 56% of total IP traffic in 2016, and will be 46% of total IP traffic in 2021.
- Germany's Mobile was 4% of total IP traffic in 2016, and will be 8% of total IP traffic in 2021.
- Germany's Fixed/Wi-Fi was 48.8% of total Internet traffic in 2016, and will be 51.2% of total Internet traffic in 2021.
- Germany's Fixed/Wired was 46% of total Internet traffic in 2016, and will be 40% of total Internet traffic in 2021.
- Germany's Mobile was 5.3% of total Internet traffic in 2016, and will be 8.8% of total Internet traffic in 2021.
- In Germany, mobile data traffic will grow 5-fold from 2016 to 2021, a compound annual growth rate of 40%.
- In Germany, mobile data traffic will reach 457 Petabytes per month in 2021, up from 86 Petabytes per month in 2016.
- German mobile data traffic will grow 2 times faster than German fixed IP traffic from 2016 to 2021.
- Germany's Mobile was 4% of total IP traffic in 2016, and will be 8% of total IP traffic in 2021.
- In Germany, mobile data traffic in 2021 will be equivalent to 4x the volume of the entire German Internet in 2005.

### IP Video

- In Germany, IP video traffic will grow 3-fold from 2016 to 2021, a compound annual growth rate of 25%.
- In Germany, IP video traffic will reach 4.9 Exabytes per month in 2021, up from 1.6 Exabytes per month in 2016.
- In Germany, IP video will be 82% of all IP traffic in 2021, up from 75% in 2016.
- In Germany, Ultra HD will be 20.5% of IP Video traffic in 2021, up from 1.3% in 2016 (117.0% CAGR).
- In Germany, HD will be 62.3% of IP Video traffic in 2021, up from 51.0% in 2016 (30.6% CAGR).
- In Germany, SD will be 17.1% of IP Video traffic in 2021, compared to 47.7% in 2016 (2.2% CAGR).
- In Germany, consumer IP video traffic will be 84% of consumer IP traffic in 2021, up from 81% in 2016.
- In Germany, business IP video traffic will be 72% of business IP traffic in 2021, up from 47% in 2016.

### Internet Video

- In Germany, Internet video traffic will grow 4-fold from 2016 to 2021, a compound annual growth rate of 29%.
- In Germany, Internet video traffic will reach 4.2 Exabytes per month in 2021, up from 1.2 Exabytes per month in 2016.
- In Germany, total Internet video traffic (business and consumer, combined) will be 81% of all Internet traffic in 2021, up from 71% in 2016.

- In Germany, Ultra HD will be 20.0% of Internet video traffic in 2021, up from 1.7% in 2016 (112.1% CAGR).
- In Germany, HD will be 62.0% of Internet video traffic in 2021, up from 43.1% in 2016 (39.2% CAGR).
- In Germany, SD will be 18.0% of Internet video traffic in 2021, compared to 55.2% in 2016 (3.4% CAGR).
- In Germany, consumer Internet video traffic will be 82% of consumer Internet traffic in 2021, up from 76% in 2016.
- In Germany, business Internet video traffic will be 74% of business Internet traffic in 2021, up from 50% in 2016.
- In Germany, Internet-Video-to-TV traffic will be 51% of fixed consumer Internet video traffic in 2021, up from 48% in 2016.
- In Germany, Internet-Video-to-TV traffic will increase 4-fold between 2016 and 2021 (29.7% CAGR).
- In Germany, 110 billion minutes (208,629 years) of video content will cross the Internet each month in 2021. That's 41,726 minutes of video streamed or downloaded every second.
- In Germany, 99% of all Internet video traffic will cross content delivery networks in 2021, up from 91% in 2016.
- In Germany, 78.3% of all Internet video traffic will be long-form video (including live) in 2021, up from 59.9% in 2016.

### IP VOD

- In Germany, Ultra HD will be 26.3% of IP VOD traffic in 2021, up from 0.3% in 2016 (163.6% CAGR).
- In Germany, HD will be 70.4% of IP VOD traffic in 2021, up from 79.1% in 2016 (7.5% CAGR).
- In Germany, SD will be 3.3% of IP VOD traffic in 2021, compared to 20.6% in 2016 (-23.9% CAGR).

### Gaming

- In Germany, gaming traffic will grow 15-fold from 2016 to 2021, a compound annual growth rate of 73%.
- In Germany, gaming traffic will reach 425 Petabytes per month in 2021, up from 28 Petabytes per month in 2016.
- In Germany, gaming traffic will be 10% of consumer Internet traffic in 2021, up from 2% in 2016.

### Devices

- In Germany, there will be 760.1 million networked devices in 2021, up from 449.3 million in 2016.
- In Germany, there will be 9.5 networked devices per capita in 2021, up from 5.6 per capita in 2016.
- In Germany, 30% of all networked devices will be mobile-connected in 2021.
- In Germany, M2M modules will account for 61% (466.9 million) of all networked devices in 2021, compared to 43% (193.2 million) in 2016, (19.3% CAGR).
- In Germany, PCs will account for 6% (47.5 million) of all networked devices in 2021, compared to 11% (48.6 million) in 2016, (-0.5% CAGR).
- In Germany, Tablets will account for 3% (23.9 million) of all networked devices in 2021, compared to 5% (21.2 million) in 2016, (2.5% CAGR).

- In Germany, Smartphones will account for 12% (93.2 million) of all networked devices in 2021, compared to 17% (74.7 million) in 2016, (4.5% CAGR).
- In Germany, Connected TVs will account for 13% (101.5 million) of all networked devices in 2021, compared to 17% (74.7 million) in 2016, (6.3% CAGR).
- In Germany, Non-Smartphones will account for 0.4% (3.3 million) of all networked devices in 2021, compared to 5% (23.1 million) in 2016, (-32.1% CAGR).
- In Germany, Other Portables will account for 3% (23.7 million) of all networked devices in 2021, compared to 3% (13.7 million) in 2016, (11.5% CAGR).
- In Germany, 4K TVs will account for 55% (25.3 million) of all flat panel TVs in 2021, compared to 10.7% (3.2 million) in 2016, (51.5% CAGR).
- Germany's IP traffic from non-PC devices was 58% of total IP traffic in 2016, and will be 79% of total IP traffic in 2021.
- In Germany, PCs accounted for 42% of IP traffic in 2016, and will be 21% of IP traffic in 2021.
- In Germany, TVs accounted for 39% of IP traffic in 2016, and will be 43% of IP traffic in 2021.
- In Germany, Smartphones accounted for 8% of IP traffic in 2016, and will be 17% of IP traffic in 2021.
- In Germany, Tablets accounted for 6% of IP traffic in 2016, and will be 9% of IP traffic in 2021.
- In Germany, M2M modules accounted for 4.2% of IP traffic in 2016, and will be 10.4% of IP traffic in 2021.
- In Germany, PCs accounted for 43% of consumer Internet traffic in 2016, and will be 19% of consumer Internet traffic in 2021.
- In Germany, TVs accounted for 33% of consumer Internet traffic in 2016, and will be 43% of consumer Internet traffic in 2021.
- In Germany, TVs accounted for 27% of total Internet traffic in 2016, and will be 37% of total Internet traffic in 2021.

## Speed Evolution

- In Germany, the average fixed broadband speed will grow 2.0-fold from 2016 to 2021, from 31.4 Mbps to 62.3 Mbps.
- In Germany, 99% of fixed broadband connections will be faster than 5 Mbps in 2021, up from 87% today.
- In Germany, 89% of fixed broadband connections will be faster than 10 Mbps in 2021, up from 72% today.
- In Germany, 57.0% of fixed broadband connections will be faster than 25 Mbps in 2021, up from 40.7% today.
- In Germany, 45.6% of fixed broadband connections will be faster than 50 Mbps in 2021, up from 20.1% today.
- In Germany, the average Wi-Fi speeds from mobile devices will grow 1.7-fold from 2016 to 2021, from 21.6 Mbps to 36 Mbps.
- In Germany, the average mobile connection speed will grow 2-fold from 2016 to 2021, reaching 24 Mbps in 2021.

## Traffic per User and Household

- In Germany, the average Internet user will generate 60.6 Gigabytes of Internet traffic per month in 2021, up 180% from 21.7 Gigabytes per month in 2016, a CAGR of 23%.
- In Germany, the average Internet household will generate 109.7 Gigabytes of Internet traffic per month in 2021, up 177% from 39.7 Gigabytes per month in 2016, a CAGR of 23%.

- In Germany, the average FTTx Internet household will generate 364.5 Gigabytes of Internet traffic per month in 2021, 176.7% more than other broadband households.
- In Germany, the average FTTx Internet household generated 120.0 Gigabytes of Internet traffic per month in 2016, 186.8% more than other broadband households.
- In Germany, there will be 7 million Internet households (18.0% of all Internet households) generating more than 250 Gigabytes per month in 2021.
- In Germany, there will be 2 million households (4.9% of all Internet households) generating more than 500 Gigabytes per month in 2021.
- In Germany, there will be 295,870 households (0.8% of all Internet households) generating more than a terabyte per month in 2021.
- In Germany, the average mobile connection will generate 3,139 Megabytes of mobile data traffic per month in 2021, up from 738 Megabytes in 2016.

### Traffic Topology and Traffic Patterns

- In Germany, 89% of all Internet traffic will cross content delivery networks in 2021, up from 72% in 2016.
- In Germany, peak Internet traffic will grow at a compound annual growth rate of 36% from 2016 to 2021, compared to 26% for average Internet traffic.