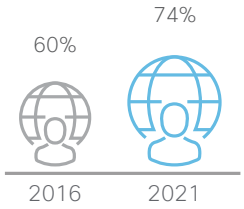
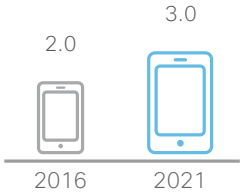
Rest of Central and Eastern Europe

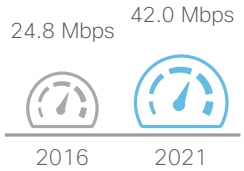
Internet Users: % of Population



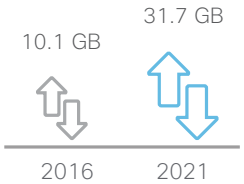
Devices and Connections per Capita



Average Speeds



Average Traffic per Capita per Month



Rest of Central and Eastern Europe – 2021 Forecast Highlights

IP Traffic

- In the rest of Central and Eastern Europe, IP traffic will grow 3-fold from 2016 to 2021, a compound annual growth rate of 26%.
- In the rest of Central and Eastern Europe, IP traffic will reach 11.1 Exabytes per month in 2021, up from 3.5 Exabytes per month in 2016.
- The rest of Central and Eastern Europe's IP networks will carry 364 Petabytes per day in 2021, up from 114 Petabytes per day in 2016.
- In the rest of Central and Eastern Europe, IP traffic will reach an annual run rate of 132.8 Exabytes in 2021, up from an annual run rate of 41.8 Exabytes in 2016.
- In the rest of Central and Eastern Europe, IP traffic will reach 32 Gigabytes per capita in 2021, up from 10 Gigabytes per capita in 2016.
- In the rest of Central and Eastern Europe, average IP traffic will reach 34 Tbps in 2021, and busy hour traffic will reach 164 Tbps.
- In 2021, the gigabyte equivalent of all movies ever made will cross The rest of Central and Eastern Europe's IP networks every 32 minutes.

Internet Traffic

- In the rest of Central and Eastern Europe, Internet traffic will grow 3.3-fold from 2016 to 2021, a compound annual growth rate of 27%.
- In the rest of Central and Eastern Europe, busy hour Internet traffic will grow 5.2-fold from 2016 to 2021, a compound annual growth rate of 39%.

- In the rest of Central and Eastern Europe, Internet traffic will reach 10.6 Exabytes per month in 2021, up from 3.2 Exabytes per month in 2016.
- The rest of Central and Eastern Europe's Internet traffic will be 348 Petabytes per day in 2021, up from 110 Petabytes per day in 2016.
- The rest of Central and Eastern Europe's Internet traffic in 2021 will be equivalent to 32 billion DVDs per year, 3 billion DVDs per month, or 4 million DVDs per hour.
- In 2021, the gigabyte equivalent of all movies ever made will cross the Internet every 33 minutes.
- the rest of Central and Eastern European Internet traffic in 2021 will be equivalent to 240x the volume of the entire the rest of Central and Eastern European Internet in 2005.
- In the rest of Central and Eastern Europe, Internet traffic will reach 30 Gigabytes per capita in 2021, up from 9 Gigabytes per capita in 2016.
- In the rest of Central and Eastern Europe, average Internet traffic will increase 3.3-fold by 2021 and will reach 32 Tbps.
- In the rest of Central and Eastern Europe, busy hour Internet traffic will increase 5.2-fold by 2021 and will reach 157 Tbps.

Wired Wi-Fi and Mobile Growth

- The rest of Central and Eastern Europe's Fixed/Wi-Fi was 57% of total IP traffic in 2016, and will be 55% of total IP traffic in 2021.
- The rest of Central and Eastern Europe's Fixed/Wired was 27% of total IP traffic in 2016, and will be 14% of total IP traffic in 2021.
- The rest of Central and Eastern Europe's Mobile was 16% of total IP traffic in 2016, and will be 31% of total IP traffic in 2021.
- The rest of Central and Eastern Europe's Fixed/Wi-Fi was 59.7% of total Internet traffic in 2016, and will be 57.3% of total Internet traffic in 2021.
- The rest of Central and Eastern Europe's Fixed/Wired was 23% of total Internet traffic in 2016, and will be 10% of total Internet traffic in 2021.
- The rest of Central and Eastern Europe's Mobile was 17.3% of total Internet traffic in 2016, and will be 32.2% of total Internet traffic in 2021.
- In the rest of Central and Eastern Europe, mobile data traffic will grow 6-fold from 2016 to 2021, a compound annual growth rate of 44%.
- In the rest of Central and Eastern Europe, mobile data traffic will reach 3.4 Exabytes per month in 2021, up from 559 Petabytes per month in 2016.
- the rest of Central and Eastern European mobile data traffic will grow 2 times faster than the rest of Central and Eastern European fixed IP traffic from 2016 to 2021.
- The rest of Central and Eastern Europe's Mobile was 16% of total IP traffic in 2016, and will be 31% of total IP traffic in 2021.
- In the rest of Central and Eastern Europe, mobile data traffic in 2021 will be equivalent to 74x the volume of the entire the rest of Central and Eastern European Internet in 2005.

IP Video

- In the rest of Central and Eastern Europe, IP video traffic will grow 5-fold from 2016 to 2021, a compound annual growth rate of 35%.

- In the rest of Central and Eastern Europe, IP video traffic will reach 8.5 Exabytes per month in 2021, up from 1.9 Exabytes per month in 2016.
- In the rest of Central and Eastern Europe, IP video will be 76% of all IP traffic in 2021, up from 54% in 2016.
- In the rest of Central and Eastern Europe, Ultra HD will be 10.5% of IP Video traffic in 2021, up from 0.5% in 2016 (148.0% CAGR).
- In the rest of Central and Eastern Europe, HD will be 62.7% of IP Video traffic in 2021, up from 36.7% in 2016 (50.6% CAGR).
- In the rest of Central and Eastern Europe, SD will be 26.8% of IP Video traffic in 2021, compared to 62.8% in 2016 (14.1% CAGR).
- In the rest of Central and Eastern Europe, consumer IP video traffic will be 80% of consumer IP traffic in 2021, up from 59% in 2016.
- In the rest of Central and Eastern Europe, business IP video traffic will be 63% of business IP traffic in 2021, up from 38% in 2016.

Internet Video

- In the rest of Central and Eastern Europe, Internet video traffic will grow 5-fold from 2016 to 2021, a compound annual growth rate of 36%.
- In the rest of Central and Eastern Europe, Internet video traffic will reach 8.0 Exabytes per month in 2021, up from 1.7 Exabytes per month in 2016.
- In the rest of Central and Eastern Europe, total Internet video traffic (business and consumer, combined) will be 76% of all Internet traffic in 2021, up from 53% in 2016.
- In the rest of Central and Eastern Europe, Ultra HD will be 10.5% of Internet video traffic in 2021, up from 0.6% in 2016 (145.9% CAGR).
- In the rest of Central and Eastern Europe, HD will be 62.1% of Internet video traffic in 2021, up from 34.6% in 2016 (53.4% CAGR).
- In the rest of Central and Eastern Europe, SD will be 27.4% of Internet video traffic in 2021, compared to 64.9% in 2016 (14.8% CAGR).
- In the rest of Central and Eastern Europe, consumer Internet video traffic will be 79% of consumer Internet traffic in 2021, up from 57% in 2016.
- In the rest of Central and Eastern Europe, business Internet video traffic will be 64% of business Internet traffic in 2021, up from 40% in 2016.
- In the rest of Central and Eastern Europe, Internet-Video-to-TV traffic will be 11% of fixed consumer Internet video traffic in 2021, up from 11% in 2016.
- In the rest of Central and Eastern Europe, Internet-Video-to-TV traffic will increase 4-fold between 2016 and 2021 (32.1% CAGR).
- In the rest of Central and Eastern Europe, 57 billion minutes (109,270 years) of video content will cross the Internet each month in 2021. That's 21,854 minutes of video streamed or downloaded every second.
- In the rest of Central and Eastern Europe, 61% of all Internet video traffic will cross content delivery networks in 2021, up from 51% in 2016.
- In the rest of Central and Eastern Europe, 65.4% of all Internet video traffic will be long-form video (including live) in 2021, up from 64.4% in 2016.

IP VOD

- In the rest of Central and Eastern Europe, Ultra HD will be 12.4% of IP VOD traffic in 2021, up from 0.1% in 2016 (251.1% CAGR).
- In the rest of Central and Eastern Europe, HD will be 84.1% of IP VOD traffic in 2021, up from 73.5% in 2016 (26.8% CAGR).
- In the rest of Central and Eastern Europe, SD will be 3.6% of IP VOD traffic in 2021, compared to 26.5% in 2016 (-17.3% CAGR).

Gaming

- In the rest of Central and Eastern Europe, gaming traffic will grow 5-fold from 2016 to 2021, a compound annual growth rate of 36%.
- In the rest of Central and Eastern Europe, gaming traffic will reach 209 Petabytes per month in 2021, up from 45 Petabytes per month in 2016.
- In the rest of Central and Eastern Europe, gaming traffic will be 2% of consumer Internet traffic in 2021, up from 2% in 2016.

Devices

- In the rest of Central and Eastern Europe, there will be 1.0 billion networked devices in 2021, up from 688.7 million in 2016.
- In the rest of Central and Eastern Europe, there will be 3.0 networked devices per capita in 2021, up from 2.0 per capita in 2016.
- In the rest of Central and Eastern Europe, 49% of all networked devices will be mobile-connected in 2021.
- In the rest of Central and Eastern Europe, M2M modules will account for 47% (487.2 million) of all networked devices in 2021, compared to 28% (195.7 million) in 2016, (20% CAGR).
- In the rest of Central and Eastern Europe, PCs will account for 6% (59.3 million) of all networked devices in 2021, compared to 11% (72.9 million) in 2016, (-4.1% CAGR).
- In the rest of Central and Eastern Europe, Tablets will account for 5% (52.9 million) of all networked devices in 2021, compared to 5% (33.8 million) in 2016, (9.4% CAGR).
- In the rest of Central and Eastern Europe, Smartphones will account for 27% (284.1 million) of all networked devices in 2021, compared to 27% (185.0 million) in 2016, (9% CAGR).
- In the rest of Central and Eastern Europe, Connected TVs will account for 10% (108.2 million) of all networked devices in 2021, compared to 9% (60.0 million) in 2016, (12.5% CAGR).
- In the rest of Central and Eastern Europe, Non-Smartphones will account for 3.5% (36.0 million) of all networked devices in 2021, compared to 19% (134.3 million) in 2016, (-23.1% CAGR).
- In the rest of Central and Eastern Europe, Other Portables will account for 1% (15.2 million) of all networked devices in 2021, compared to 1% (7.1 million) in 2016, (16.5% CAGR).
- In the rest of Central and Eastern Europe, 4K TVs will account for 58% (29.9 million) of all flat panel TVs in 2021, compared to 14.4% (3.0 million) in 2016, (58.2% CAGR).
- The rest of Central and Eastern Europe's IP traffic from non-PC devices was 42% of total IP traffic in 2016, and will be 78% of total IP traffic in 2021.
- In the rest of Central and Eastern Europe, PCs accounted for 58% of IP traffic in 2016, and will be 22% of IP traffic in 2021.

- In the rest of Central and Eastern Europe, TVs accounted for 7% of IP traffic in 2016, and will be 8% of IP traffic in 2021.
- In the rest of Central and Eastern Europe, Smartphones accounted for 22% of IP traffic in 2016, and will be 53% of IP traffic in 2021.
- In the rest of Central and Eastern Europe, Tablets accounted for 11% of IP traffic in 2016, and will be 12% of IP traffic in 2021.
- In the rest of Central and Eastern Europe, M2M modules accounted for 1.6% of IP traffic in 2016, and will be 5.0% of IP traffic in 2021.
- In the rest of Central and Eastern Europe, PCs accounted for 54% of consumer Internet traffic in 2016, and will be 19% of consumer Internet traffic in 2021.
- In the rest of Central and Eastern Europe, TVs accounted for 4% of consumer Internet traffic in 2016, and will be 6% of consumer Internet traffic in 2021.
- In the rest of Central and Eastern Europe, TVs accounted for 3% of total Internet traffic in 2016, and will be 5% of total Internet traffic in 2021.

Speed Evolution

- In the rest of Central and Eastern Europe, the average fixed broadband speed will grow 1.7-fold from 2016 to 2021, from 24.8 Mbps to 42.0 Mbps.
- In the rest of Central and Eastern Europe, 95% of fixed broadband connections will be faster than 5 Mbps in 2021, up from 79% today.
- In the rest of Central and Eastern Europe, 76% of fixed broadband connections will be faster than 10 Mbps in 2021, up from 59% today.
- In the rest of Central and Eastern Europe, 45.8% of fixed broadband connections will be faster than 25 Mbps in 2021, up from 31.8% today.
- In the rest of Central and Eastern Europe, 35.0% of fixed broadband connections will be faster than 50 Mbps in 2021, up from 18.7% today.
- In the rest of Central and Eastern Europe, the average Wi-Fi speeds from mobile devices will grow 1.7-fold from 2016 to 2021, from 16.1 Mbps to 27 Mbps.
- In the rest of Central and Eastern Europe, the average mobile connection speed will grow 3-fold from 2016 to 2021, reaching 22 Mbps in 2021.

Traffic per User and Household

- In the rest of Central and Eastern Europe, the average Internet user will generate 31.2 Gigabytes of Internet traffic per month in 2021, up 151% from 12.4 Gigabytes per month in 2016, a CAGR of 20%.
- In the rest of Central and Eastern Europe, the average Internet household will generate 89.8 Gigabytes of Internet traffic per month in 2021, up 152% from 35.6 Gigabytes per month in 2016, a CAGR of 20%.
- In the rest of Central and Eastern Europe, the average FTTx Internet household will generate 121.3 Gigabytes of Internet traffic per month in 2021, 101.9% more than other broadband households.
- In the rest of Central and Eastern Europe, the average FTTx Internet household generated 52.7 Gigabytes of Internet traffic per month in 2016, 112.6% more than other broadband households.
- In the rest of Central and Eastern Europe, there will be 5 million Internet households (8.5% of all Internet

households) generating more than 250 Gigabytes per month in 2021.

- In the rest of Central and Eastern Europe, there will be 2 million households (3.4% of all Internet households) generating more than 500 Gigabytes per month in 2021.
- In the rest of Central and Eastern Europe, there will be 818,255 households (1.3% of all Internet households) generating more than a terabyte per month in 2021.
- In the rest of Central and Eastern Europe, the average mobile connection will generate 10,337 Megabytes of mobile data traffic per month in 2021, up from 1,881 Megabytes in 2016.

Traffic Topology and Traffic Patterns

- In the rest of Central and Eastern Europe, 52% of all Internet traffic will cross content delivery networks in 2021, up from 31% in 2016.
- In the rest of Central and Eastern Europe, peak Internet traffic will grow at a compound annual growth rate of 39% from 2016 to 2021, compared to 27% for average Internet traffic.