

RTR INTERNET MONITOR

2017 Annual Report

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Preface

Dear readers,


in presenting this first issue of the Internet Monitor, RTR is responding to a trend that has been gaining momentum in recent years: internet access is becoming the basis for an ever-growing number of telecommunications and media services. Whereas past interest was focused on voice calls, text messaging or other telecoms services, these types of service are nowadays being provided in increasing numbers 'over the top' via the internet, that is, by OTT providers and platform operators. Taking the place of subscriptions for various telecoms services, internet access is becoming an all-purpose technology, a universal gateway to access many diverse possibilities. The significance of the internet is not limited to its impact on telecommunications and media, but is much wider in scope, modifying and even disrupting business models pursued in a wide range of sectors. Examples illustrating this include Amazon for the retail sector, Uber for transport and AirBnB for accommodation.

This development, centred on the internet as its focal point, is in effect resulting in increased substitution of retail telecommunications services, but not without impact on the wholesale market. For example, wholesale voice services such as origination and carrier (pre-)selection, which supported competition in the early stages of liberalisation, have since been exempted from regulation. In contrast, other wholesale offerings associated with the provision of internet access services are gaining in importance, with virtual unbundling particularly important here.

In previous publications, RTR responded to this trend by making subtle changes to the quarterly Telekom Monitor. As more and more internet-related information was included, other apparently less relevant data were aggregated or omitted, to limit the size of the publication. In view of the vast array of topics, as well as the growing public relevance of core telecoms issues and the unbroken interest in them, RTR decided in 2017 to introduce a new product: the Internet Monitor. Appearing on a quarterly basis, it is intended as a supplement to and not a substitute for the Telekom Monitor. The Telekom Monitor will remain substantially the same in the foreseeable future. The Internet Monitor, meanwhile, is conceived as a special product that delves more deeply into all issues surrounding the internet. RTR is additionally planning an annual report entitled 'Austria Connected', to feature selected topics accompanied by a brief analysis as well as geographic information. In publishing these new periodicals with empirical data, RTR is convinced that we will be able to provide first-hand information on current developments in Austria, so as to meet the public's growing need for information and to give appropriate priority to the internet.

What are the main topics featured in this issue of the Internet Monitor? The first section provides a market overview, including details on items such as penetration rates as well as internet usage and price changes. This is followed by sections focused on the two access technologies – fixed network and mobile network – with subscribers, volumes and revenues presented for each. Due to an amendment to the Communications Survey Ordinance, certain kinds of data such as fixed network download volumes are now available for the first time, as of Q4 2017. In some cases, figures can vary from previous quarters as a result of revised definitions. Section 4 features numerous evaluations based on the RTR-NetTest, including download and upload speeds depending on the technology, time of day or province of Austria, for example. That section also presents selected items related to geography. Like the current Telekom Monitor, this issue is an annual report. The final section correspondingly presents several international comparisons that relate primarily to key data from the previous sections and reveal Austria's standing compared with other countries.

Hopefully you will find this report relevant and informative and will wish to read it on a quarterly basis in future. We are always open and happy to receive suggestions and critique. My wish is that this product will get off to a good start, proving thought-provoking and a source of new information for you, our dear readers.

**Johannes Gungl**

Managing Director
Telecommunications and Postal Services Division
RTR



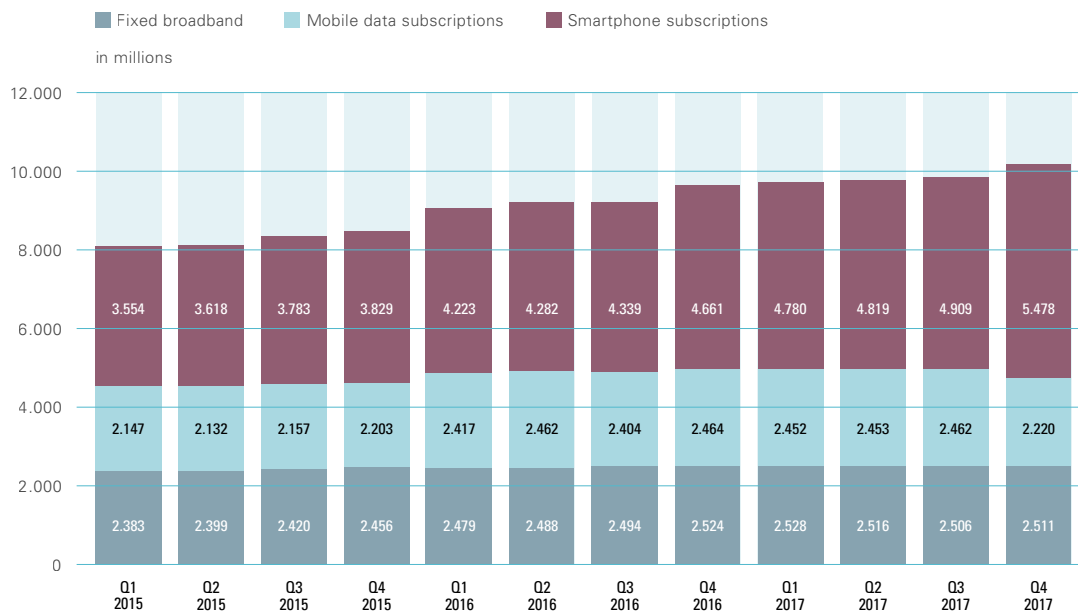
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Broadband in Austria

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Fixed and mobile broadband connections

➔ Already over 10 million broadband connections in total

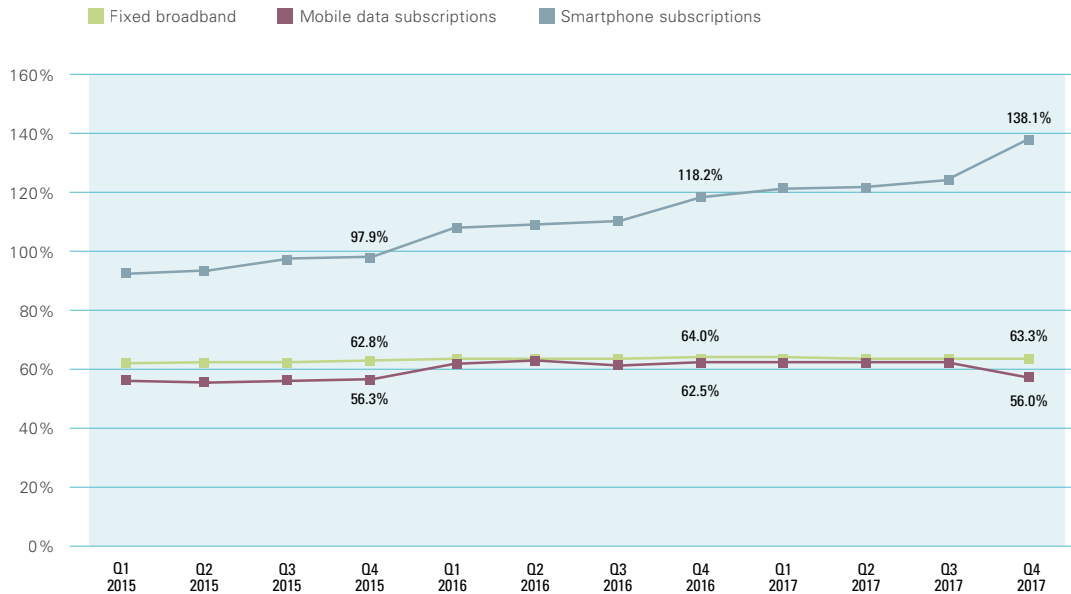


- Fixed and mobile broadband connections totalled 10.2 million at the end of 2017. This is 5.8% more than at the end of 2016.
- Fixed broadband connections decreased year-on-year, but only slightly, by 0.5% (to 2.5 million connections).
- As a result of a change in query definition, the number of active mobile broadband connections declined sharply. From Q4 2017, mobile broadband connections are now counted only if used for internet access at least once in the quarter. These totalled 2.2 million at the end of 2017.
- In contrast, the number of smartphone subscriptions rose sharply. This can also perhaps be attributed to changes in category assignments on the part of operators. The 5.5 million subscriptions in total are 17.3% more than at the end of 2016.

The chart above shows the total number of fixed and mobile broadband connections. With mobile broadband, a distinction is made between mobile data subscriptions (with or without data volumes included) and smartphone subscriptions. 'Broadband connections' is defined in the Glossary at the end of the report.

Broadband penetration

1.4 Smartphone subscriptions per household



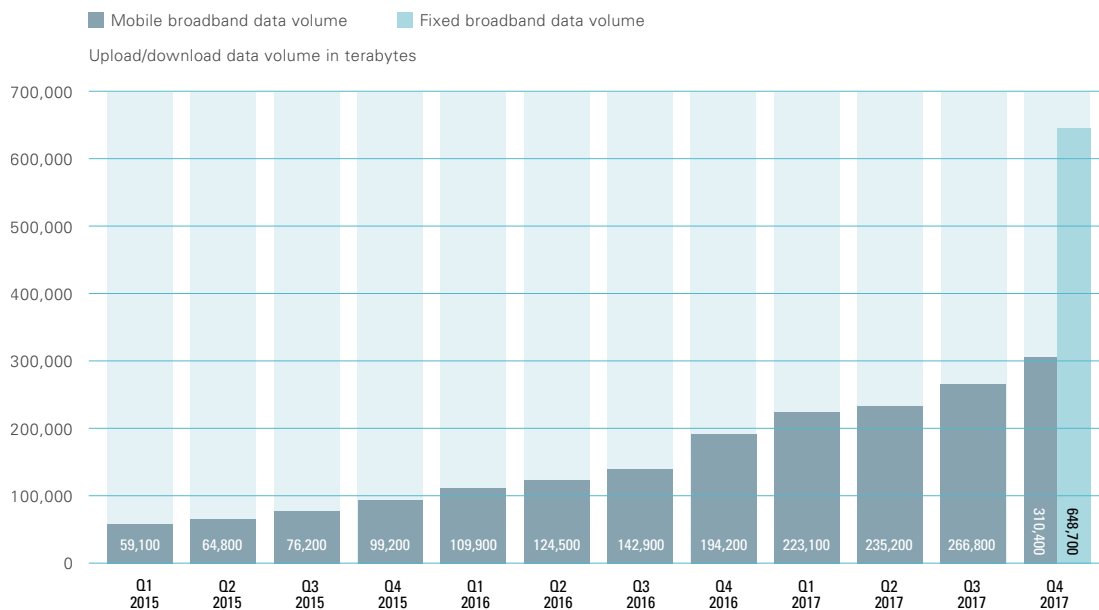
Source for number of households: Statistics Austria

- The penetration rates clearly reflect the result of changing the definitions of mobile broadband categories, as described above on the previous page.
- The household penetration rate for fixed broadband languished at about 63% (last figure 63.3%), while mobile broadband dropped somewhat. This is because mobile broadband connections are now only counted when used to access the internet at least once in a quarter.
- The rate for smartphone subscriptions added substantially to an already high figure, with 138.1% of households having such plans at the end of 2017. As stated, this figure may be a result of changes to provider categories in the amended query.

Broadband penetration refers to the ratio of fixed and mobile broadband connections to the total number of households in Austria. The penetration rate also takes into account broadband connections used by businesses.

Fixed and mobile data volume – retail market

➔ Fixed network data volume was double the mobile network volume in Q4

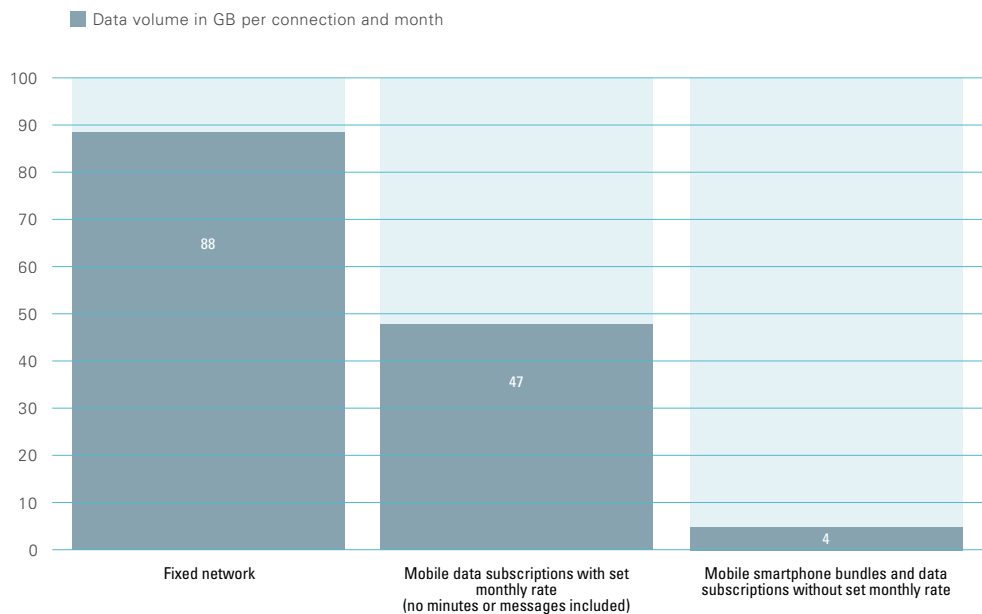


- A familiar pattern is seen for mobile data volume – it is consistently increasing. Whereas users consumed roughly 571,000 terabytes in 2016, the figure rose to 1,035,000 terabytes in 2017 (+81%).
- About 649,000 terabytes were uploaded or downloaded in fixed networks just in Q4 2017, while roughly 310,000 terabytes or less than half was handled via mobile networks in that period.

The chart above shows the data volume in terabytes that was uploaded and downloaded in the retail fixed and mobile markets (1 terabyte = 1,024 gigabytes = 1,048,576 megabytes). The data volume for retail fixed networks is only available from Q4 2017.

Fixed and mobile data volume per connection

➔ An average of 88 gigabytes per month over fixed broadband connections

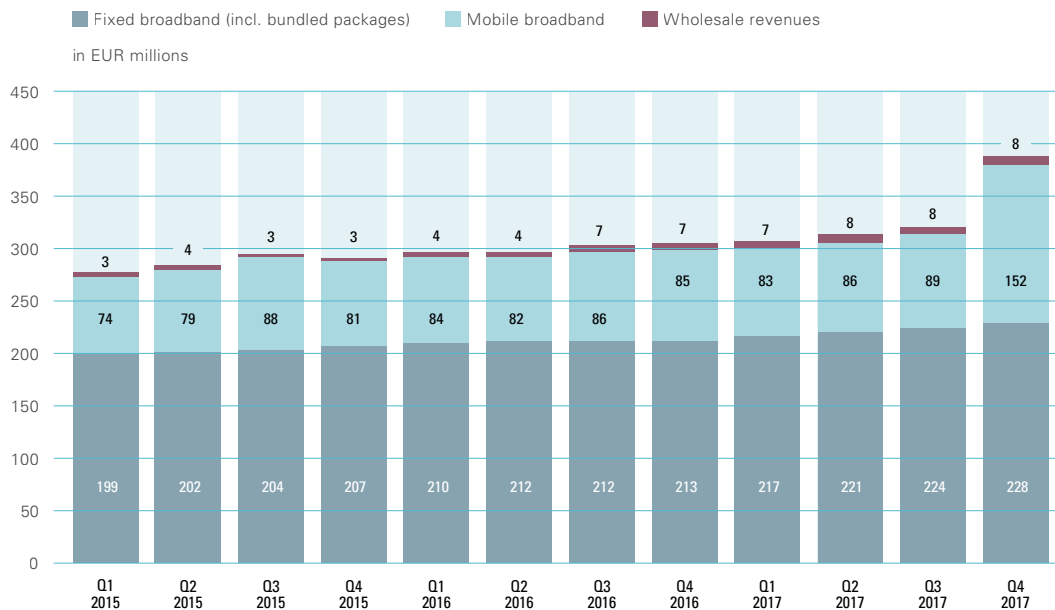


- If the average data volume consumed is calculated per connection and per month, this results in some 88 gigabytes upload/download for fixed broadband connections, while mobile data subscriptions (cubes, dongles and other dedicated data subscriptions without inclusive minutes and texts) handle some 47 gigabytes per month and per active mobile broadband connection.
- With other mobile data subscriptions (smartphone bundles with data included and plans without a free data volume), consumption is considerably lower: the average figure here per month and connection for upload/download volume is only around 4 gigabytes.

The chart shows the average volume of data uploaded/downloaded in the retail fixed and mobile markets in gigabytes per connection and month. The figures are derived by dividing the data volume by the number of connections that customers have used to access the internet at least once in the particular quarter.

Broadband revenues

➔ EUR 1.3 billion in annual broadband revenues



- Broadband generated a total of EUR 1.332 billion in revenues in 2017, EUR 891 million of which were achieved through retail fixed connections, EUR 410 million through mobile broadband and EUR 31 million through wholesale connections (fixed and mobile).
- In the case of mobile broadband, only limited comparisons are possible with previous years or quarters due to the revised definitions introduced in Q4 2017; the modified query logic results in a significant jump in revenues for that segment.

The chart shows revenues from broadband connections, broken down by fixed broadband revenues (including bundle revenues), revenues from mobile broadband and wholesale revenues (bitstream and resale). Up to and including Q3 2017, 'mobile broadband' represents the category of 'fees for data and value-added data services', and as of Q4 2017 'data-only subscriptions'.

Activities in the internet

➔ Four out of five Austrians send and receive email



Source: Statistics Austria/Eurostat

- The majority of Austrian residents (78% in 2017) use the internet to send and receive email and, to a lesser extent, to search for information on goods and services (63%).
- Considerably more than half the population use the internet to read news, newspapers or magazines online (63%).
- The internet is less commonly used to upload original content to a website accessible for others (29%), to access online learning materials (17%) or to sell goods or services online (13%).

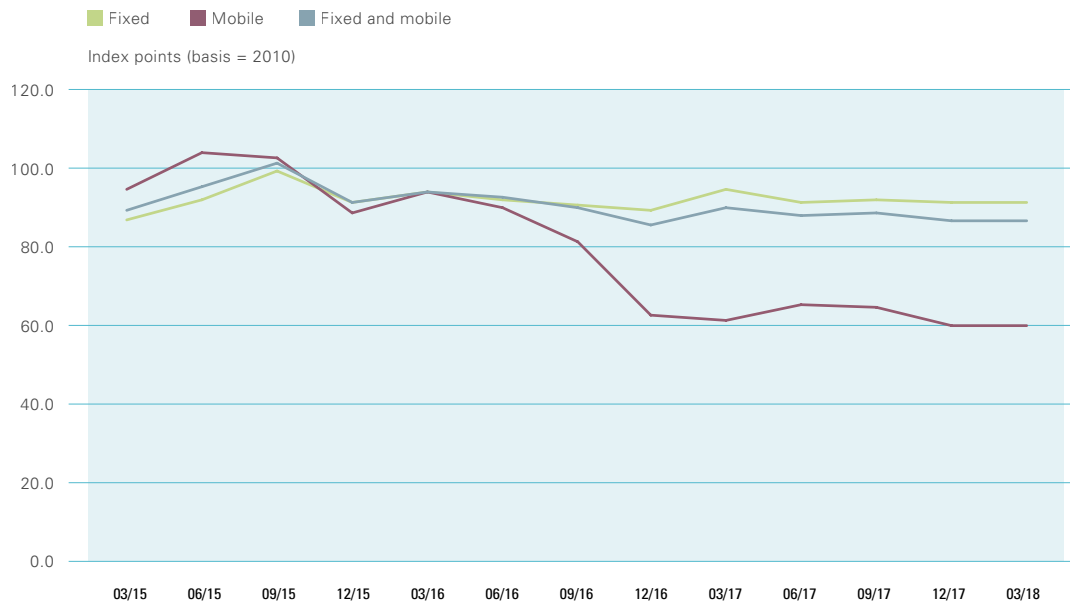
The usage data presented here are derived from surveys taken by Statistics Austria on the subject of information and communication technologies (ICTs).

The resulting responses given by Austrian residents are given here as percentages.

The section entitled 'International comparison' provides additional charts based on the survey.

Broadband index

➔ Slight drop in all categories



- There was little change in the hedonic broadband index between Q4 2017 and Q1 2018.
- There was a rise in the index both for fixed and mobile services, by about 0.2 and 0.3 points respectively.
- Hardly any changes were seen in prices or products features, with the exception of A1's hike in service charges and set-up charges.

The broadband index is a hedonic price index for fixed and mobile broadband products. Hedonic means that both price changes and changes in product features (in particular download rate and download volume) are taken into account. The reference base is 2010. Refer to the Glossary for details on methodology. Data are available up to March 2018 and are included in the chart.

TABLE 01: FIXED AND MOBILE BROADBAND CONNECTIONS (IN MILLIONS)
 SEE PAGE 8

	Fixed broadband	Mobile data subscriptions	Smartphone subscriptions
Q1 2015	2.383	2.147	3.554
Q2 2015	2.399	2.132	3.618
Q3 2015	2.420	2.157	3.783
Q4 2015	2.456	2.203	3.829
Q1 2016	2.479	2.417	4.223
Q2 2016	2.488	2.462	4.282
Q3 2016	2.494	2.404	4.339
Q4 2016	2.524	2.464	4.661
Q1 2017	2.528	2.452	4.780
Q2 2017	2.516	2.453	4.819
Q3 2017	2.506	2.462	4.909
Q4 2017	2.511	2.220	5.478

TABLE 02: BROADBAND PENETRATION (PERCENTAGE OF HOUSEHOLDS)
 SEE PAGE 9

	Fixed broadband	Mobile data subscriptions	Smartphone subscriptions
Q1 2015	61.9%	55.7%	92.3%
Q2 2015	62.2%	55.2%	93.7%
Q3 2015	62.4%	55.6%	97.6%
Q4 2015	62.8%	56.3%	97.9%
Q1 2016	63.2%	61.6%	107.7%
Q2 2016	63.3%	62.7%	109.0%
Q3 2016	63.3%	61.0%	110.2%
Q4 2016	64.0%	62.5%	118.2%
Q1 2017	64.0%	62.1%	121.1%
Q2 2017	63.6%	62.1%	121.9%
Q3 2017	63.3%	62.1%	123.9%
Q4 2017	63.3%	56.0%	138.1%

TABLE 03: FIXED AND MOBILE DATA VOLUME – RETAIL MARKET (IN TERABYTES)
 SEE PAGE 10

	Mobile broadband data volume	Fixed broadband data volume
Q1 2015	59,100	
Q2 2015	64,800	
Q3 2015	76,200	
Q4 2015	99,200	
Q1 2016	109,900	
Q2 2016	124,500	
Q3 2016	142,900	
Q4 2016	194,200	
Q1 2017	223,100	
Q2 2017	235,200	
Q3 2017	266,800	
Q4 2017	310,400	648,700

TABLE 04: BROADBAND REVENUES (IN EUR MILLIONS)
SEE PAGE 11

	Fixed broadband (incl. bundled packages)	Mobile broadband	Wholesale revenues
Q1 2015	199	74	3
Q2 2015	202	79	4
Q3 2015	204	88	3
Q4 2015	207	81	3
Q1 2016	210	84	4
Q2 2016	212	82	4
Q3 2016	212	86	7
Q4 2016	213	85	7
Q1 2017	217	83	7
Q2 2017	221	86	8
Q3 2017	224	89	8
Q4 2017	228	152	8

TABLE 05: FIXED AND MOBILE DATA VOLUME PER CONNECTION
SEE PAGE 12

	Fixed network	Mobile data subscriptions with set monthly rate (no minutes or messages included)	Mobile smartphone bundles and data subscriptions without set monthly rate
Data volume in GB per connection and month	88	47	4

TABLE 06: ACTIVITIES IN THE INTERNET (PERCENTAGE OF THE POPULATION)
SEE PAGE 13

	2015	2016	2017
Email	75	77	78
Information	62	70	63
News	57	56	63
Television/videos		60	
Banking	51	53	57
Health	54	56	54
Social networks	45	49	51
Music		41	
Travel	44	40	43
Voice calling	26	27	37
Games		24	
Websites	21	18	29
Learning	15	14	17
Sales	10	11	13

TABLE 07: BROADBAND PRICE INDEX (INDEX POINTS) (BASE = 2010)
 SEE PAGE 14

	Fixed	Mobile	Fixed and mobile
March 15	87.4	95.1	89.6
June 15	92.7	104.9	95.7
Sept. 15	99.7	103.3	101.7
Dec. 15	91.7	89.3	92.1
March 16	94.4	94.4	94.8
June 16	92.8	90.4	93.4
Sept. 16	91.3	81.9	90.7
Dec. 16	89.9	63.0	86.1
March 17	95.1	61.8	90.2
June 17	92.0	65.5	88.2
Sept. 17	92.6	65.1	88.9
Dec. 17	91.7	60.2	87.2
March 18	91.9	60.6	87.0



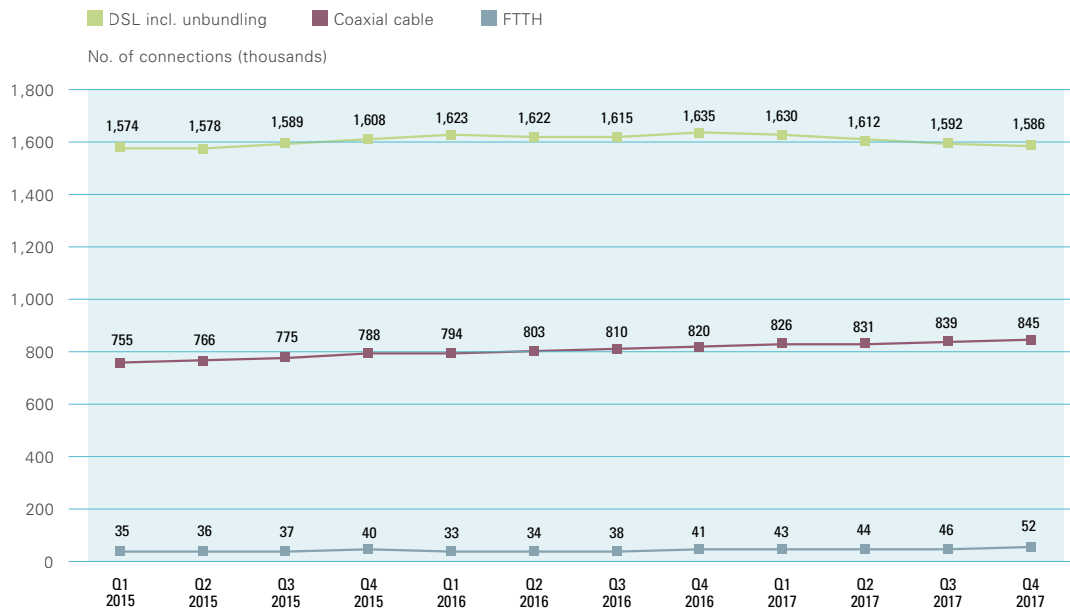
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Fixed broadband

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Retail fixed broadband by infrastructure

➔ FTTH gains 27%

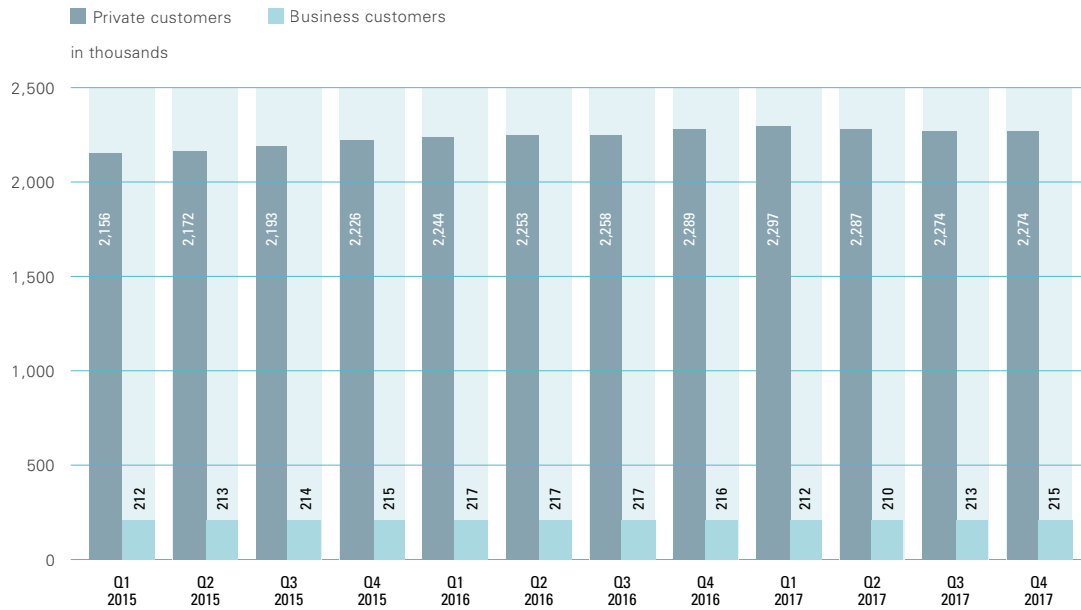


- At the end of 2017, Austria had around 1.5 million DSL connections (including unbundled connections), 845,000 cable connections and 52,000 FTTH connections.
- There were in addition roughly 28,000 retail FWA connections (not shown in the chart).
- Comparing Q4 year-on-year, the number of DSL connections dropped by 3%, while cable connections increased by 3.1%. FTTH showed the strongest growth rate of all at 27.1%.

The chart shows the number of fixed broadband connections, broken down by infrastructure. Hybrid products represent a relatively novel technology. With such products, data traffic is normally via a fixed connection (usually based on DSL) and additionally via a mobile network when required. As they are based on fixed broadband, hybrid products are included in the chart under DSL connections.

Retail fixed broadband by customer category

➔ About 2.3 million private customers and 215,000 business customers

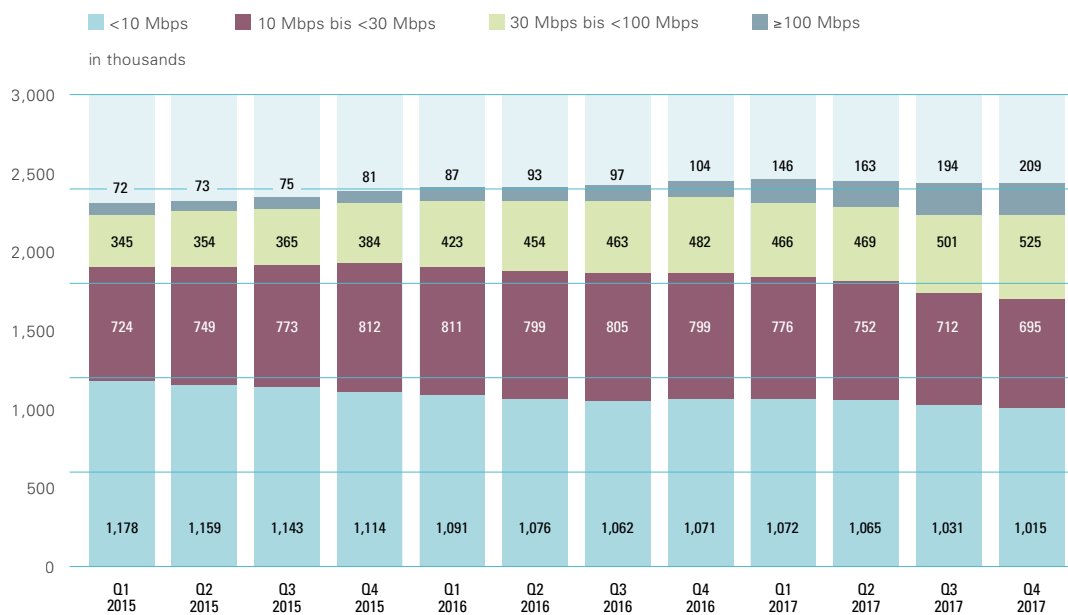


- Fixed broadband connections numbered about 2.5 million by the end of 2017, comprising roughly 2.3 million products for private customers and 215,000 business products.
- Compared with Q4 2016, hardly any changes were seen, with connection numbers decreasing minimally by less than one per cent in either segment (-0.7% for private customers and -0.6% for business customers).

The chart shows the number of fixed broadband connections, broken down by customer category. The categories are differentiated based on the product or type of connection. When sold as a product for private customers, a connection is classified under the private customer segment, even if purchased by a business customer. Refer to the Glossary for the precise definition.

Retail broadband connections by bandwidth category – fixed network

➔ Number of 100 Mbps+ connections doubles within one year

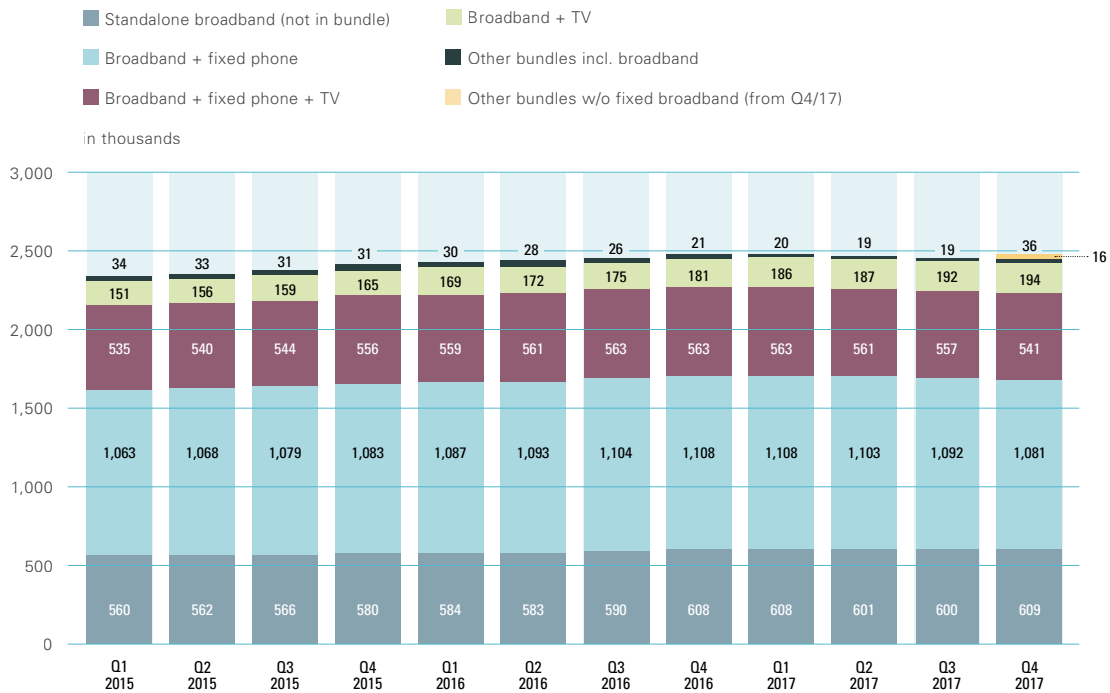


- Broadband connections supporting <10 Mbps represent the largest bandwidth category at 41.5%.
- Connections offering between 10 and <30 Mbps make up the second biggest group. This category shrank by 13% in the course of the past year.
- Just under one fifth of connections falls into the category of 30 to <100 Mbps, which grew considerably at a rate of 8.9% in 2017.
- Still the smallest category overall at 8.5%, connections supporting 100 Mbps or more increased at the fastest rate by far in 2017, with the number more than doubling from 104,000 to 209,000.

The chart depicts the number of fixed broadband connections based on provider-owned infrastructure or unbundled lines, broken down by bandwidth category. All connections supporting low bandwidths of <10 Mbps are subsumed under one chart category.

Retail broadband connections by bundle category – fixed network

➔ Broadband connections still often combined with fixed network telephony

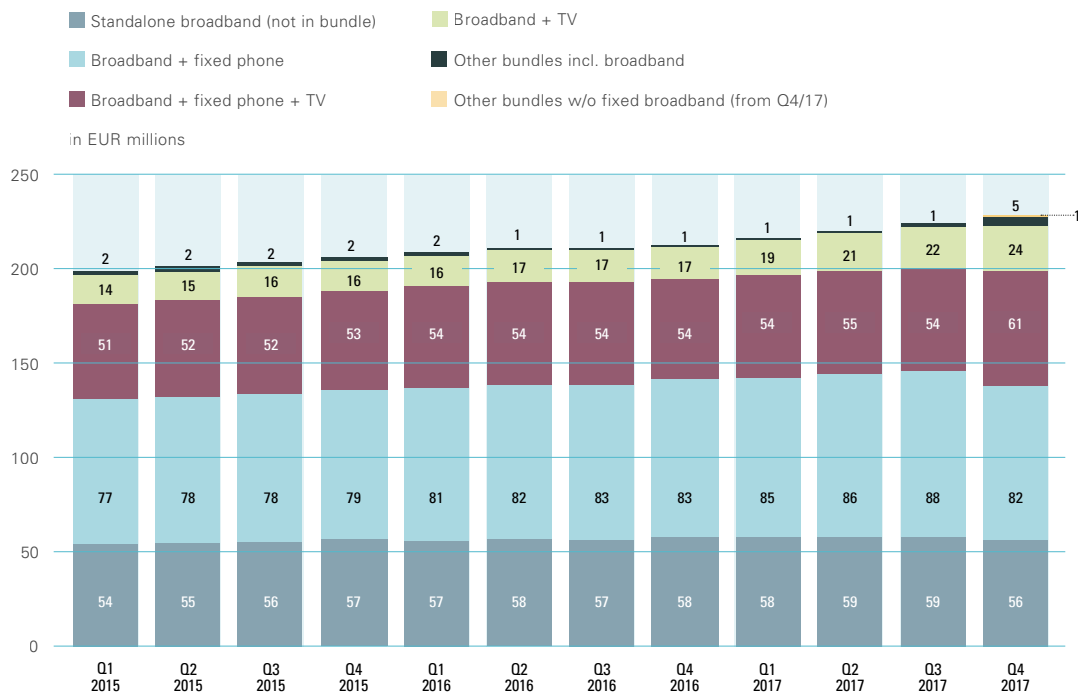


- Broadband plus fixed network is the most common broadband bundle (43.7%), followed by standalone broadband (24.6%), and broadband plus fixed network and TV (21.8%).
- From Q4 2017, data is now also collected on bundles not combined with fixed broadband but instead offered with other telecoms services (e.g. TV and mobile services or fixed network voice telephony and TV). There were some 16,000 such bundles at the end of 2017.

The chart shows the number of broadband products sold to retail customers, where the products are based on the provider's own infrastructure or an unbundled line and not on additionally purchased infrastructure. Broadband products may be fixed broadband products sold without any other product (standalone) or can be a combination of fixed broadband with one or more other products (bundled product). From Q4 2017, figures for bundled products without fixed network broadband are also presented.

Revenues from retail broadband connections – fixed network

➔ Revenues of EUR 893 million from broadband and bundles

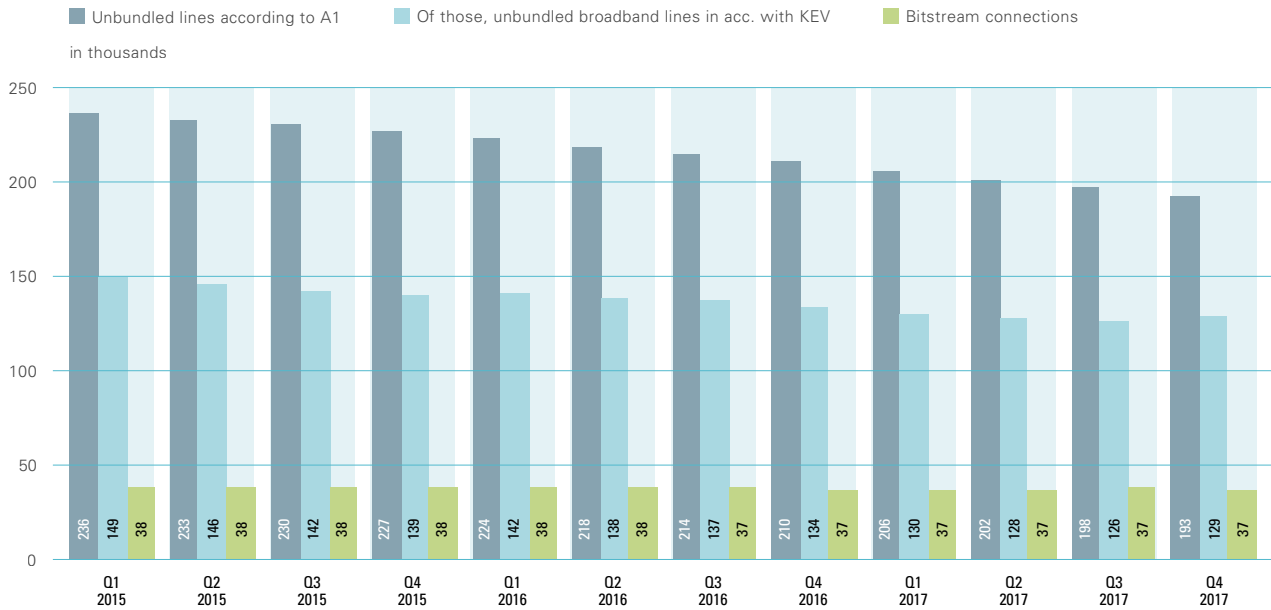


- In 2017 broadband bundled products generated EUR 660 million, while revenue from standalone broadband reached EUR 232 million. Overall, this marks a rise of 5.4% compared with 2016.
- The biggest gains were made by the broadband plus TV category (+28.8%), while revenues for standalone products showed year-on-year growth of just 1.2%.

The chart shows the revenues from broadband access sold to retail customers, for connections based on provider-owned infrastructure or an unbundled line. This includes both broadband standalone products and bundled products, the latter referring to broadband offered in combination with another product (voice telephony and/or TV and/or other products).

Wholesale broadband products offered by A1 Telekom Austria AG

➔ 193,000 unbundled lines – 37,000 bitstream connections



- As of the end of 2017, A1 Telekom was providing roughly 193,000 unbundled lines, or 8.3% fewer than a year earlier, as well as 37,000 bitstream connections.
- About two thirds of the unbundled lines supported broadband access, that is, roughly 129,000 or 4.1% fewer than in 2016.

The chart compares the total number of unbundled lines provided by A1 with the demand-side broadband lines unbundled by other providers. The difference between the two categories is accounted for by the unbundled lines that are used only for voice services or as leased lines, thus not falling under broadband. The chart also depicts the total numbers of bitstream connections provided by A1 at wholesale level (see Glossary).

TABLE 08: RETAIL FIXED BROADBAND BY INFRASTRUCTURE (IN THOUSANDS)
SEE PAGE 20

	DSL incl. unbundling	Coaxial cable	FTTH	FWA
Q1 2015	1,574	755	35	16
Q2 2015	1,578	766	36	16
Q3 2015	1,589	775	37	17
Q4 2015	1,608	788	40	17
Q1 2016	1,623	794	33	29
Q2 2016	1,622	803	34	29
Q3 2016	1,615	810	38	29
Q4 2016	1,635	820	41	29
Q1 2017	1,630	826	43	29
Q2 2017	1,612	831	44	29
Q3 2017	1,592	839	46	29
Q4 2017	1,586	845	52	28

TABLE 09: RETAIL FIXED BROADBAND BY CUSTOMER CATEGORY (IN THOUSANDS)
SEE PAGE 21

	Private customers	Business customers
Q1 2015	2,156	212
Q2 2015	2,172	213
Q3 2015	2,193	214
Q4 2015	2,226	215
Q1 2016	2,244	217
Q2 2016	2,253	217
Q3 2016	2,258	217
Q4 2016	2,289	216
Q1 2017	2,297	212
Q2 2017	2,287	210
Q3 2017	2,274	213
Q4 2017	2,274	215

TABLE 10: RETAIL BROADBAND CONNECTIONS BY BANDWIDTH CATEGORY – FIXED NETWORK (IN THOUSANDS) SEE PAGE 22

	<10 Mbps	10 Mbps to <30 Mbps	30 Mbps to <100 Mbps	≥100 Mbps
Q1 2015	1,178	724	345	72
Q2 2015	1,159	749	354	73
Q3 2015	1,143	773	365	75
Q4 2015	1,114	812	384	81
Q1 2016	1,091	811	423	87
Q2 2016	1,076	799	454	93
Q3 2016	1,062	805	463	97
Q4 2016	1,071	799	482	104
Q1 2017	1,072	776	466	146
Q2 2017	1,065	752	469	163
Q3 2017	1,031	712	501	194
Q4 2017	1,015	695	525	209

TABLE 11: RETAIL BROADBAND CONNECTIONS BY BUNDLE CATEGORY – FIXED NETWORK (IN THOUSANDS)
 SEE PAGE 23

	Standalone broadband (not bundle)	Broadband + fixed phone	Broadband + fixed phone + TV	Broadband + TV	Other bundles incl. broadband	Other bundles w/o fixed broadband (from Q4/17)
Q1 2015	560	1,063	535	151	34	
Q2 2015	562	1,068	540	156	33	
Q3 2015	566	1,079	544	159	31	
Q4 2015	580	1,083	556	165	31	
Q1 2016	584	1,087	559	169	30	
Q2 2016	583	1,093	561	172	28	
Q3 2016	590	1,104	563	175	26	
Q4 2016	608	1,108	563	181	21	
Q1 2017	608	1,108	563	186	20	
Q2 2017	601	1,103	561	187	19	
Q3 2017	600	1,092	557	192	19	
Q4 2017	609	1,081	541	194	36	16

TABLE 12: REVENUES FROM RETAIL BROADBAND CONNECTIONS – FIXED NETWORK (IN EUR MILLIONS)
 SEE PAGE 24

	Standalone broadband (not bundle)	Broadband + fixed phone	Broadband + fixed phone + TV	Broadband + TV	Other bundles incl. broadband	Other bundles w/o fixed broadband (from Q4/17)
Q1 2015	54	77	51	14	2	
Q2 2015	55	78	52	15	2	
Q3 2015	56	78	52	16	2	
Q4 2015	57	79	53	16	2	
Q1 2016	57	81	54	16	2	
Q2 2016	58	82	54	17	1	
Q3 2016	57	83	54	17	1	
Q4 2016	58	83	54	17	1	
Q1 2017	58	85	54	19	1	
Q2 2017	59	86	55	21	1	
Q3 2017	59	88	54	22	1	
Q4 2017	56	82	61	24	5	1

TABLE 13: WHOLESALE BROADBAND PRODUCTS (IN THOUSANDS)
 SEE PAGE 25

	Unbundled lines according to A1	Of those, unbundled broadband lines in acc. with KEV	Bitstream connections
Q1 2015	236	149	38
Q2 2015	233	146	38
Q3 2015	230	142	38
Q4 2015	227	139	38
Q1 2016	224	142	38
Q2 2016	218	138	38
Q3 2016	214	137	37
Q4 2016	210	134	37
Q1 2017	206	130	37
Q2 2017	202	128	37
Q3 2017	198	126	37
Q4 2017	193	129	37



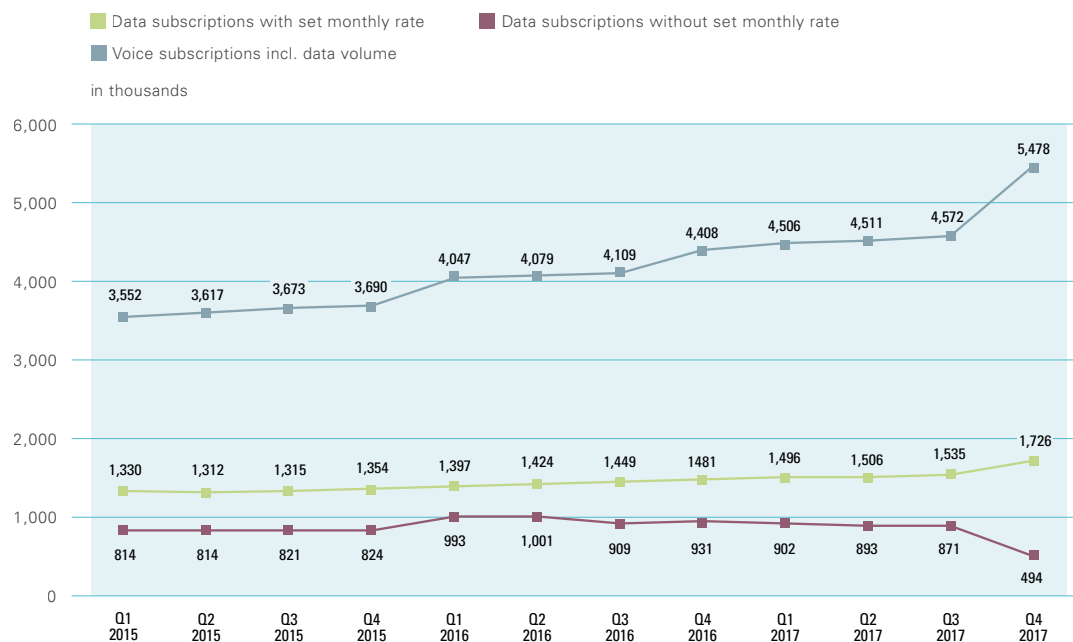
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Mobile broadband

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Active mobile broadband connections – retail

➔ Already over 7 million active mobile broadband connections

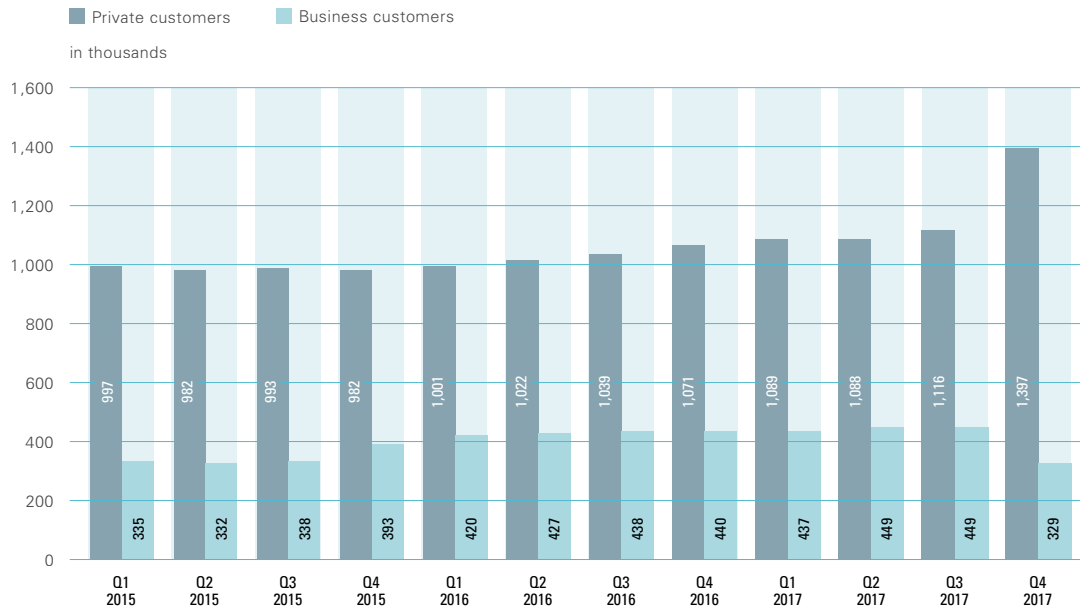


- As of the end of 2017 there were about 5.5 million smartphone subscriptions and 1.7 million mobile data subscriptions with a set monthly fee. The smallest category, at about 494,000, is made up of subscriptions that do not include any data in the monthly fee but were used for internet access.

The chart shows the number of active mobile broadband connections (excluding M2M), distinguished according to data subscriptions with a set monthly fee, data subscriptions without a set monthly fee and smartphone subscriptions. These categories have been revised in detail, initially when data were supplied for Q1 2016, and later as of Q4 2017 after the amendment to the KEV. The definitions are explained in detail in the Glossary at the end of the report.

Active mobile broadband connections by customer category

➔ Three quarters of mobile broadband connections are private subscriptions

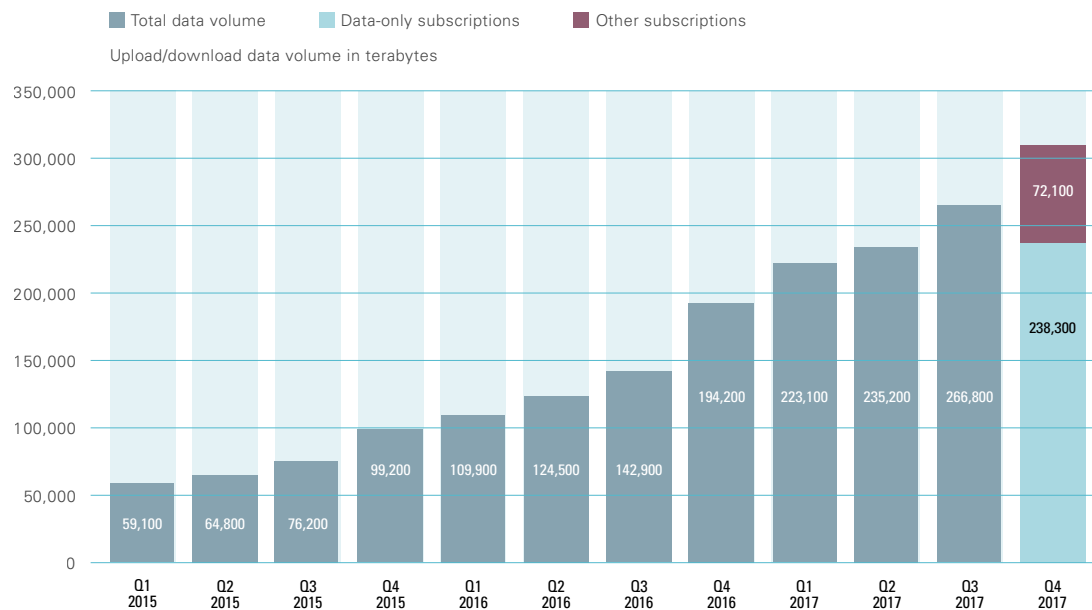


- At the end of 2017, there were 1.7 million mobile data subscriptions with a set monthly fee. Around 1.4 million of them or 81% belonged to private customers.
- Business customers accounted for the remaining roughly 330,000 connections.

The chart shows the number of active mobile broadband connections (excluding M2M), broken down by customer category. With fixed broadband, private and business customers are distinguished based on the type of product purchased. Here, in contrast, the customer type determines the category, so that even a product for private customers can fall under the business customer category when purchased by a company (see Glossary).

Retail data volumes in mobile networks

➔ Data traffic reaches over 300,000 terabytes in Q4 2017

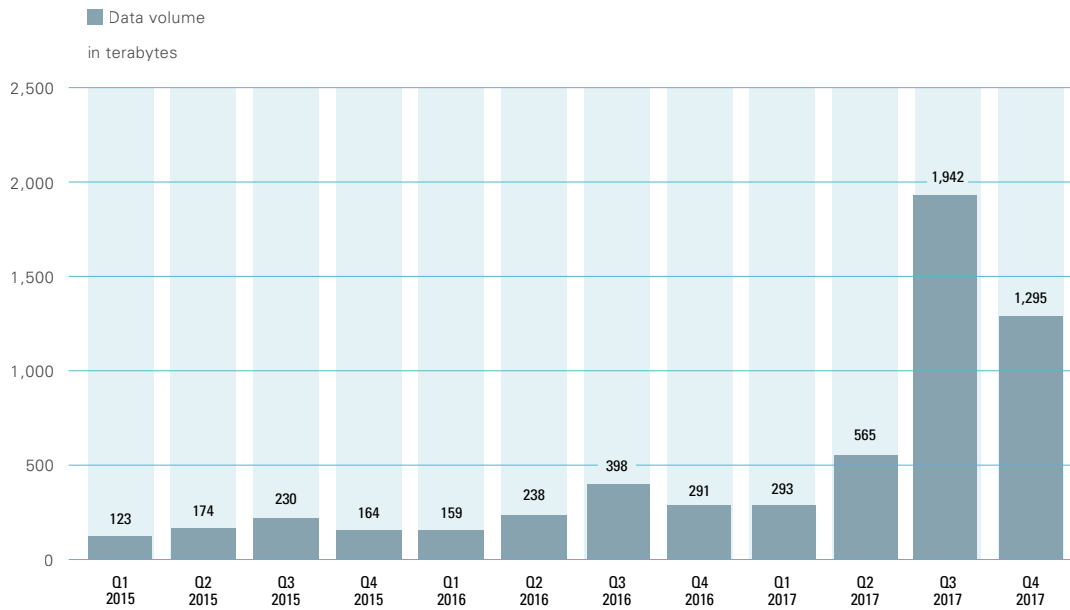


- Whereas users consumed only about 571,000 terabytes of mobile data in 2016, the volume rose sharply by 81.2% in 2017 to around 1 million terabytes.
- From Q4 2017 onwards, a distinction is made between data traffic under data-only subscriptions (no voice/texts) and under all other plans. In Q4 providers ascribed 76.8% of the data volume used to data-only subscriptions.

The chart above shows the data volume in terabytes that was uploaded and downloaded in the mobile retail market (1 terabyte = 1,024 gigabytes = 1,048,576 megabytes). The figures do not include text or multimedia messages. From Q4 2017, data volumes can be distinguished based on whether they originated from data-only subscriptions (plans not including voice or text services) or from another kind of subscription (smartphone bundles and other plans including voice and text services).

Roaming data usage

➔ Sharp increase in data usage after roaming fees eliminated



- The changes in roaming data usage clearly reflect the impact of the new Roaming Regulation: data usage has climbed steeply since the Regulation took effect.
- Roaming data usage has climbed continuously over the entire period, with a seasonal peak each year in the third quarter. While usage was still only about 398 terabytes in Q3 2016, it jumped to almost 2,000 terabytes in Q3 2017, equal to a 387.5% increase.
- A comparison of the fourth quarters of 2016 and 2017 similarly reveals a striking increase of 369.6%.
- Refer to the following press release (in German) for more details: www.rtr.at/de/pr/PI07022018TK.

The chart depicts changes in the data volume used by Austrian mobile customers while in other EU and EEA countries.

On 15 June 2017, roaming fees in the EU and EEA became a thing of the past. Since the Roaming Regulation took effect, consumers in the EU have been able to use their mobile phones as they would in their home countries, at no additional charge ('roam like at home' or RLAH).

TABLE 14: ACTIVE MOBILE BROADBAND CONNECTIONS – RETAIL (IN THOUSANDS)
SEE PAGE 30

	Data subscriptions with set monthly rate	Data subscriptions without set monthly rate	Voice subscriptions incl. data volume
Q1 2015	1,330	814	3,552
Q2 2015	1,312	814	3,617
Q3 2015	1,315	821	3,673
Q4 2015	1,354	824	3,690
Q1 2016	1,397	993	4,047
Q2 2016	1,424	1,001	4,079
Q3 2016	1,449	909	4,109
Q4 2016	1,481	931	4,408
Q1 2017	1,496	902	4,506
Q2 2017	1,506	893	4,511
Q3 2017	1,535	871	4,572
Q4 2017	1,726	494	5,478

TABLE 15: ACTIVE MOBILE BROADBAND CONNECTIONS BY CUSTOMER CATEGORY (IN THOUSANDS)
SEE PAGE 31

	Private customers	Business customers
Q1 2015	997	335
Q2 2015	982	332
Q3 2015	993	338
Q4 2015	982	393
Q1 2016	1,001	420
Q2 2016	1,022	427
Q3 2016	1,039	438
Q4 2016	1,071	440
Q1 2017	1,089	437
Q2 2017	1,088	449
Q3 2017	1,116	449
Q4 2017	1,397	329

TABLE 16: RETAIL DATA VOLUMES IN MOBILE NETWORKS (IN TERABYTES)
SEE PAGE 32

	Total data volume	Data-only subscriptions	Other subscriptions
Q1 2015	59,100		
Q2 2015	64,800		
Q3 2015	76,200		
Q4 2015	99,200		
Q1 2016	109,900		
Q2 2016	124,500		
Q3 2016	142,900		
Q4 2016	194,200		
Q1 2017	223,100		
Q2 2017	235,200		
Q3 2017	266,800		
Q4 2017		238,300	72,100

TABLE 17: ROAMING DATA VOLUMES (IN TERABYTES)
 SEE PAGE 33

	Data volume
Q1 2015	123
Q2 2015	174
Q3 2015	230
Q4 2015	164
Q1 2016	159
Q2 2016	238
Q3 2016	398
Q4 2016	291
Q1 2017	293
Q2 2017	565
Q3 2017	1,942
Q4 2017	1,295



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Monitoring internet access quality

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RTR-NetTest

The RTR-NetTest allows users to check the speed and quality of an internet connection, reliably and independently of the provider. The RTR-NetTest is available as a mobile app for Android and iOS as well as a browser test, at www.netztest.at.

The RTR-NetTest measures a number of parameters of the internet connection. These include:

- Download speed
- Upload speed
- Ping time (latency)
- Signal strength (depending on the terminal device)

The results displayed by the RTR-NetTest include:

- Network type, that is, mobile network (2G, 3G or 4G), WLAN or browser
- Location where measurements were taken
- Provider of fixed or mobile internet access

All of the results described in this section are based on RTR-NetTest Open Data (see section 6).

The following measurements are not used:

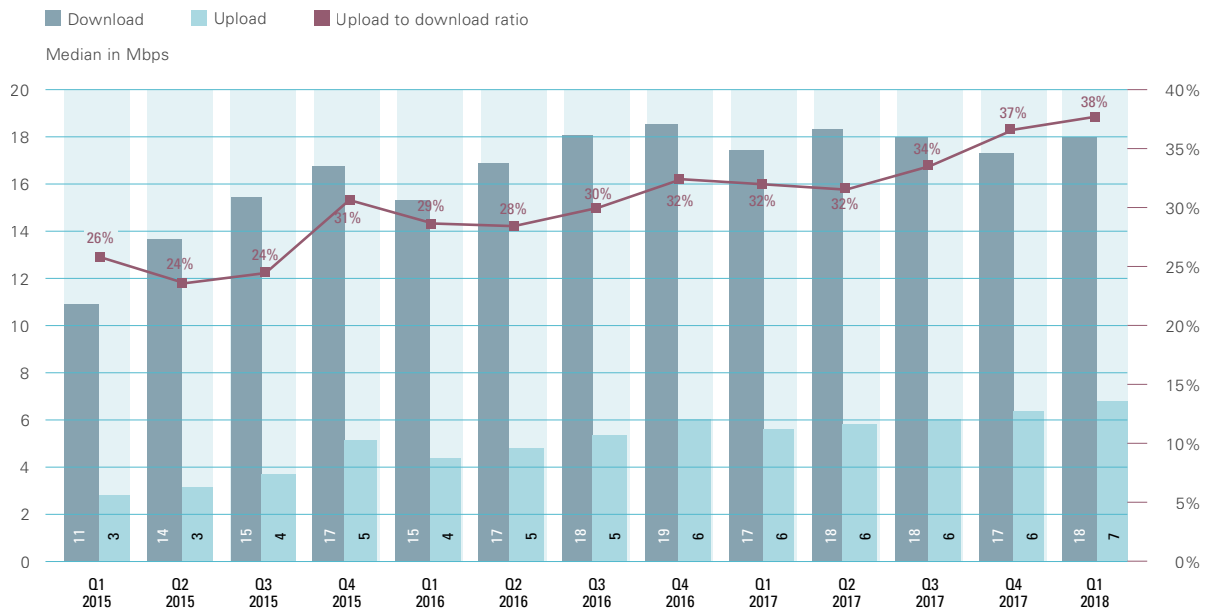
- Measurements taken outside of Austrian territory
- Measurements for which the location can only be determined to within 2 or more km, or without any location details
- Repeated or implausible tests

The results shown are based on actual measurements, which depend on factors such as the available technology or network coverage at the particular location, the user's tariff plan, network traffic level, and the test environment (including device performance and operating system). The method behind RTR-NetTest is based on crowd sourcing, meaning that the test environment is not consistent over time, nor are conditions controlled or the sample representative.

Due to subsequent modification, results can differ from those previously published.

Download and upload speeds (all technologies)

➔ Slight rise in the first quarter of 2018

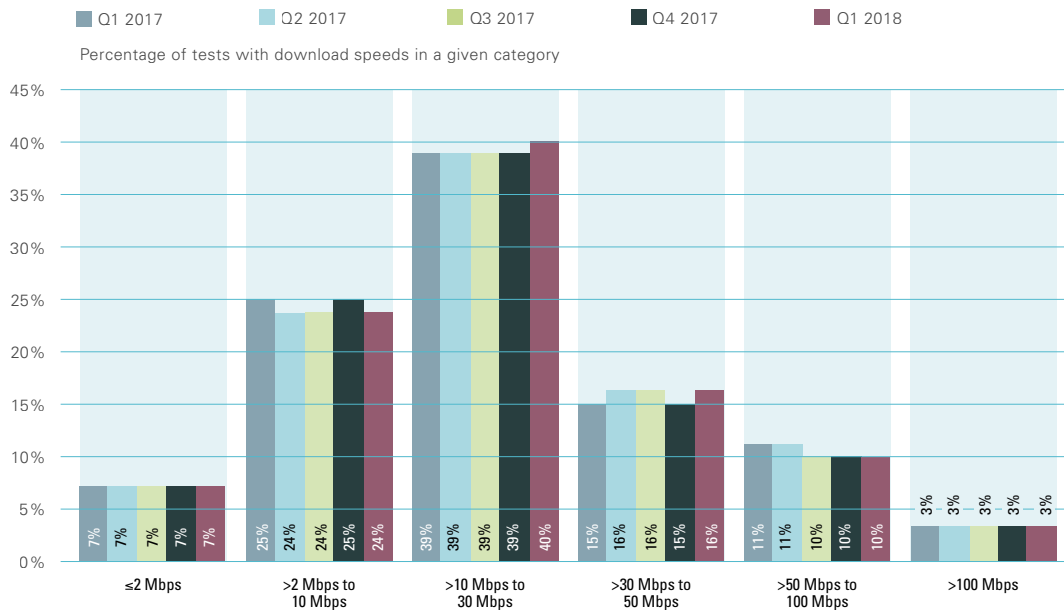


- The median download speed rose in Q1 2018 from the previous quarter, from about 17 to 18 Mbps.
- There was also a rise in the median upload speed, from just over 6 to around 7 Mbps.
- No overall clear trend was seen for the median download speed in the past year, while the median upload speed displayed a slight upward trend.
- There is also a continued tendency towards an improving ratio of upload to download speed. The median upload speed was about 38% of the median download speed in Q1 2018.

Expressed in megabits per second (Mbps), internet access speed represents the amount of data transferred in one second. Downloading refers to data transfers from the internet to a user. Uploading refers to data transfers from a user to the internet. The speeds shown are the rates actually measured (and not potential maximum or advertised speeds). The median is the value at the exact midpoint of a list sorted according to magnitude.

Download speed by bandwidth category

➔ Almost 40% of measurements between 10 and 30 Mbps

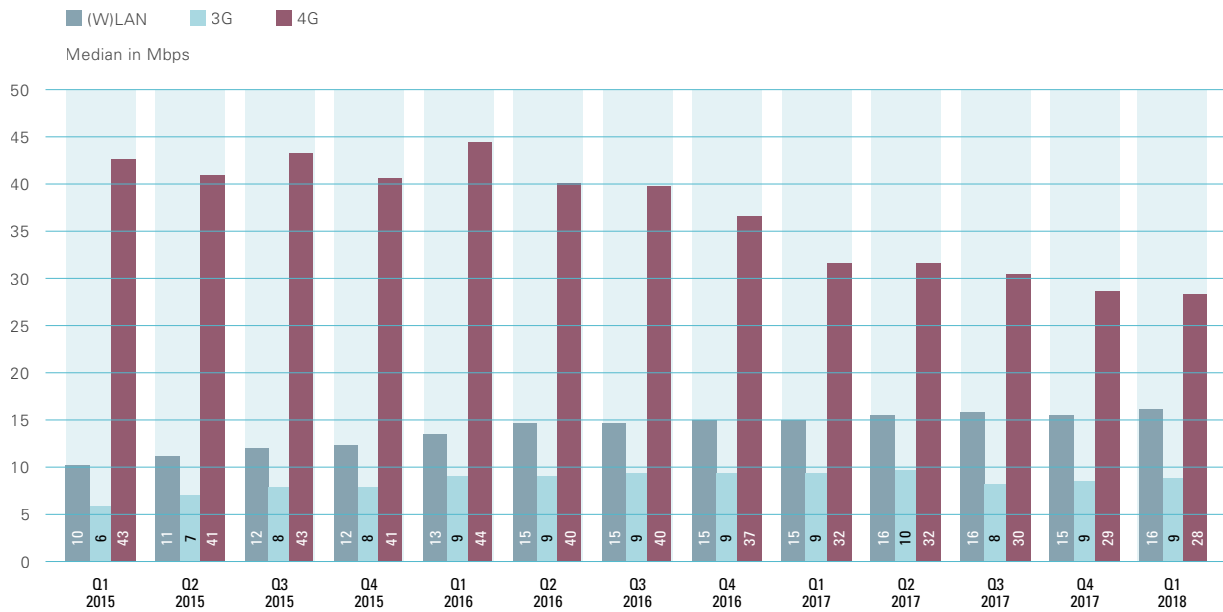


- In Q1 2018 the majority (around 64%) of the download speeds measured by RTR-NetTest fell into the categories of <2 to 10 Mbps and >10 to 30 Mbps.
- Relatively little variation was seen in the proportion of categories to one another in the past year.

The chart above displays the percentage of measurements falling under each of the bandwidth categories. The bandwidth categories correspond largely to those listed in section 2. While section 2 lists nominal (advertised) bandwidths, here the actual bandwidths that were measured for fixed and mobile connections are shown.

Download speed by technology

➔ 4G tests show further drop in median speed

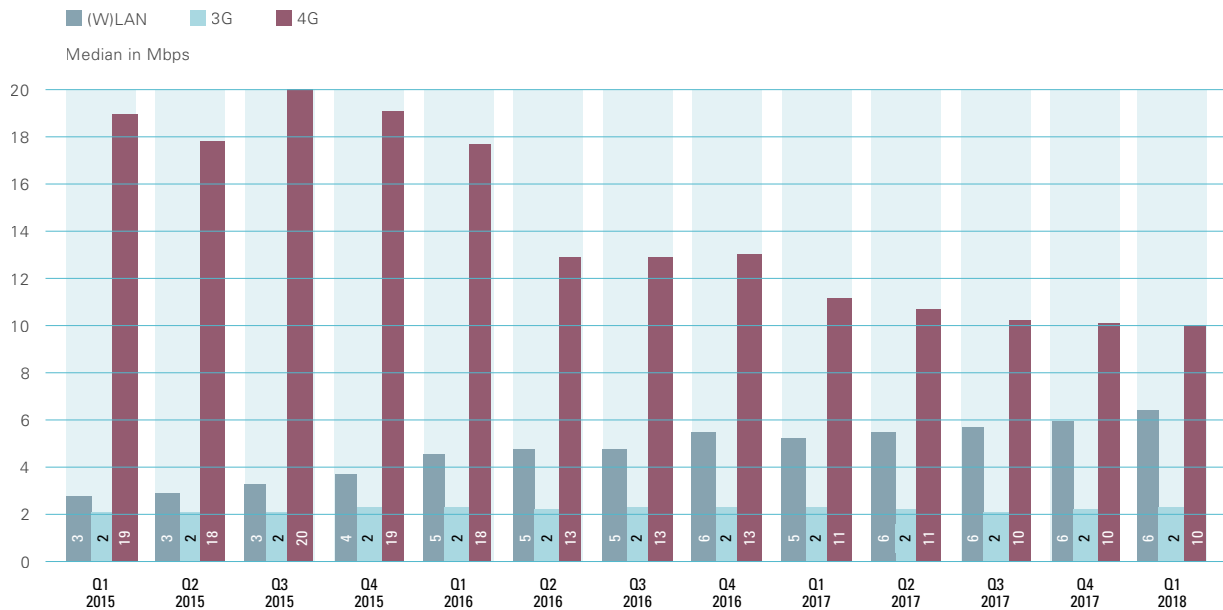


- In 4G tests, the median download speed dropped in Q1 2018 from the previous quarter, from 29 to 28 Mbps.
- Thus, the decline in 4G median download speed registered in 2016 continued in the past year.
- In Q1 2018, tests of (W)LAN connections showed an increase from 15 to 16 Mbps, while the median speed of 3G networks stayed relatively constant at 9 Mbps.
- The median of (W)LAN tests was somewhat higher in 2017 than in the previous year. For the 3G median, tests in recent years reveal no clear trend.

Internet access speed depends on factors including the technology implemented. Distinctions are made between 2G (GPRS, EDGE), 3G (UMTS, HSPA) and 4G (LTE) as well as on the basis of measurements of various fixed and network technologies. The measurements were taken with the aid of a browser or app (for WLAN) and have been aggregated here under the heading of (W)LAN. The chart shows the median, that is, the empirical value at the exact midpoint of all measurements, for each technology and quarter. Due to the low data rates achieved with 2G, no median values are shown for such connections.

Upload speed by technology

➔ 4G tests show slight decline in median upload speed

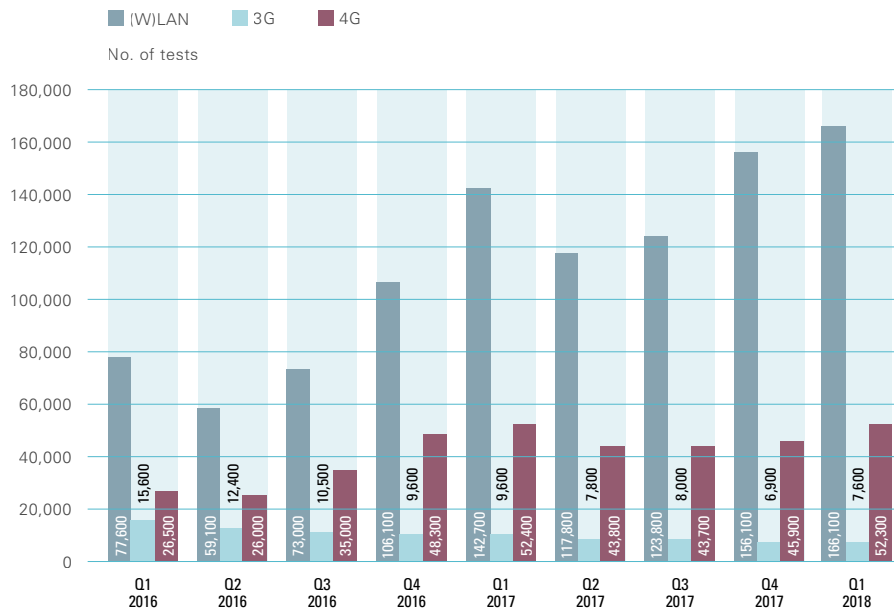


- In 4G tests, the median upload speed was only slightly lower in Q1 2018 than in the previous quarter.
- Thus, the downwards trend seen for median upload speeds in recent years, while continuing in 2017, lost some momentum.
- The median obtained for (W)LAN measurements was slightly higher in Q1 2018.
- The median of (W)LAN tests was somewhat higher in 2017 than in 2016, while tests in recent years reveal no clear trend for the 3G median.

Uploading refers to data transfers from a user to the internet. Rarely the subject of advertising, the upload data rate is usually significantly lower than the download rate. Yet, because communication in the internet is a two-way street, the upload rate is just as important for fast internet access. The upload data rate is particularly important when sharing photos or files or for video calling.

Number of tests for each technology

➔ Strong increase in (W)LAN and 4G tests

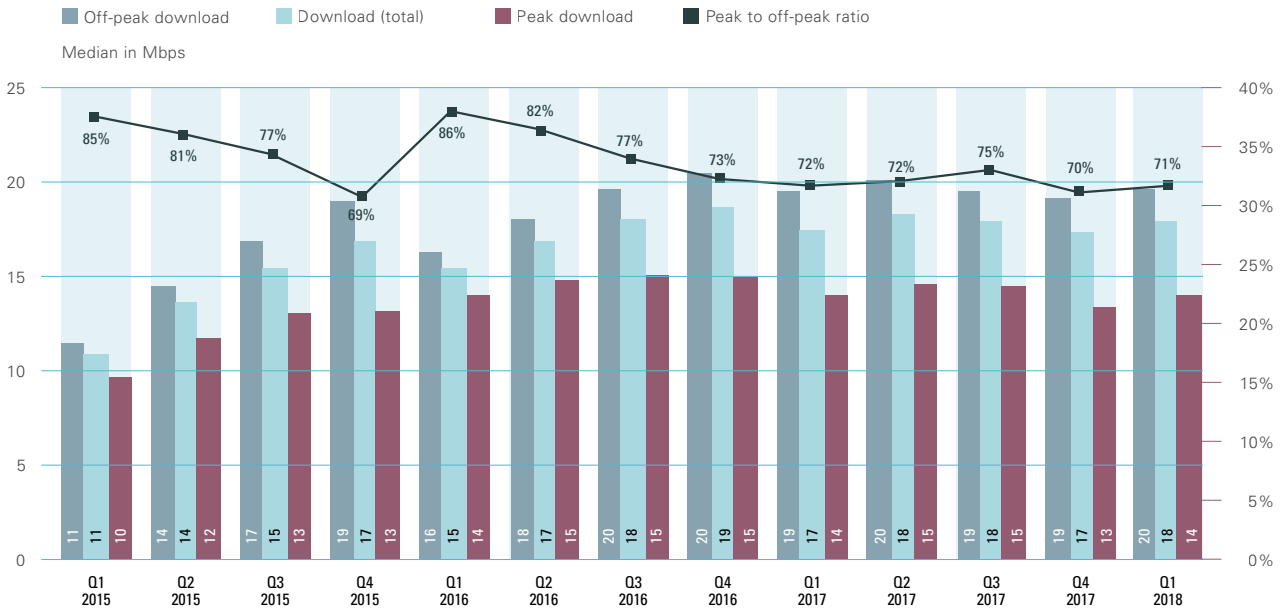


- The number of tests performed using RTR-NetTest continued to rise in the first quarter of 2018. A total of 227,500 tests equates to an 8% increase from the Q4 2017 figure.
- Around three quarters of all tests involved (W)LAN, while only about 3% involved 3G.

All tests done in Austria (or by Austrians roaming abroad) are included in the number of tests, when the location can be determined to within 2 km. Repeated or implausible tests are not taken into account.

Download speed – peak and off-peak

➔ Slightly higher peak to off-peak ratio

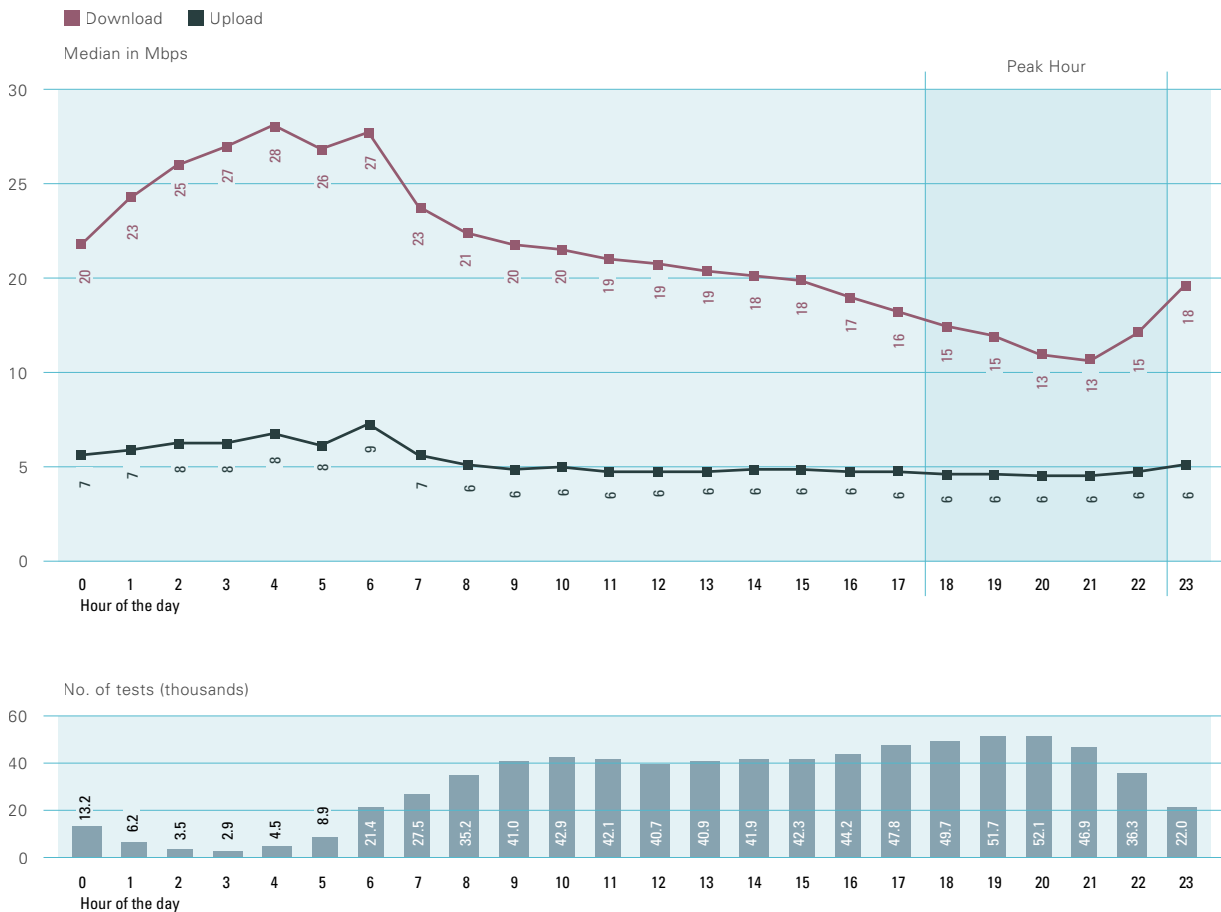


- The median off-peak download speed was about 20 Mbps in Q1 2018, while the median during peak hours was about 14 Mbps.
- At 71%, the peak to off-peak ratio was somewhat higher than in the previous quarter.
- Last year the peak to off-peak ratio was considerably lower than in 2016.

Internet access speeds can also depend on the time of day when the internet is used. Because available resources have to be divided up among users, speeds can drop when numerous users access the internet at the same time, during peak hours. For the purpose of evaluation, peak hours are defined as 6 pm to 11 pm, the evening period of heavy internet use. Other times during the day are regarded as off-peak hours. No distinction is made between working days, weekends and holidays.

Download and upload speeds by time of day in 2017

➔ Peak hours mean much reduced download speeds but upload speeds less affected

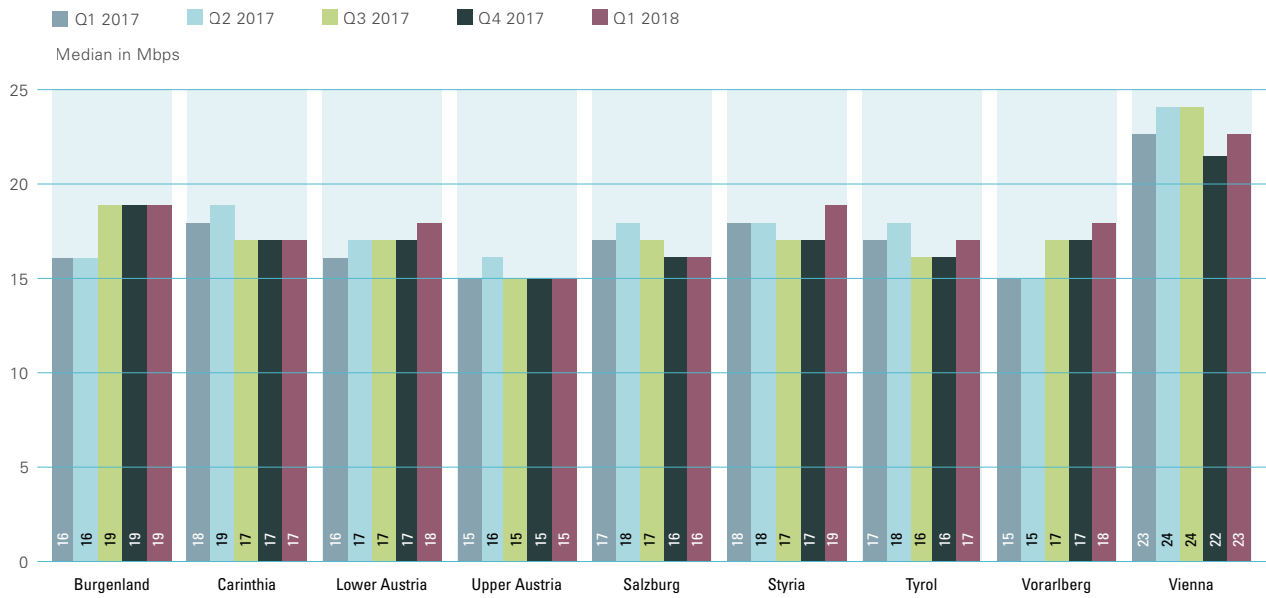


- The median download and upload speeds are the highest during night hours, when relatively few people are accessing the internet. The peak speed during that period is around 28 Mbps.
- The median download speed continually drops as the day progresses, reaching the lowest level of 13 Mbps between 9 pm and 10 pm.
- Yet the median upload speed is relatively constant during the day, at about 6 Mbps.

The number of network test runs varies considerably over the course of the day. With the number of tests performed during night hours being low, the median obtained for this period fluctuates more. The evaluation is based on the results of all tests performed in 2017.

Download speed by province

➔ Higher speeds in almost all Austrian provinces

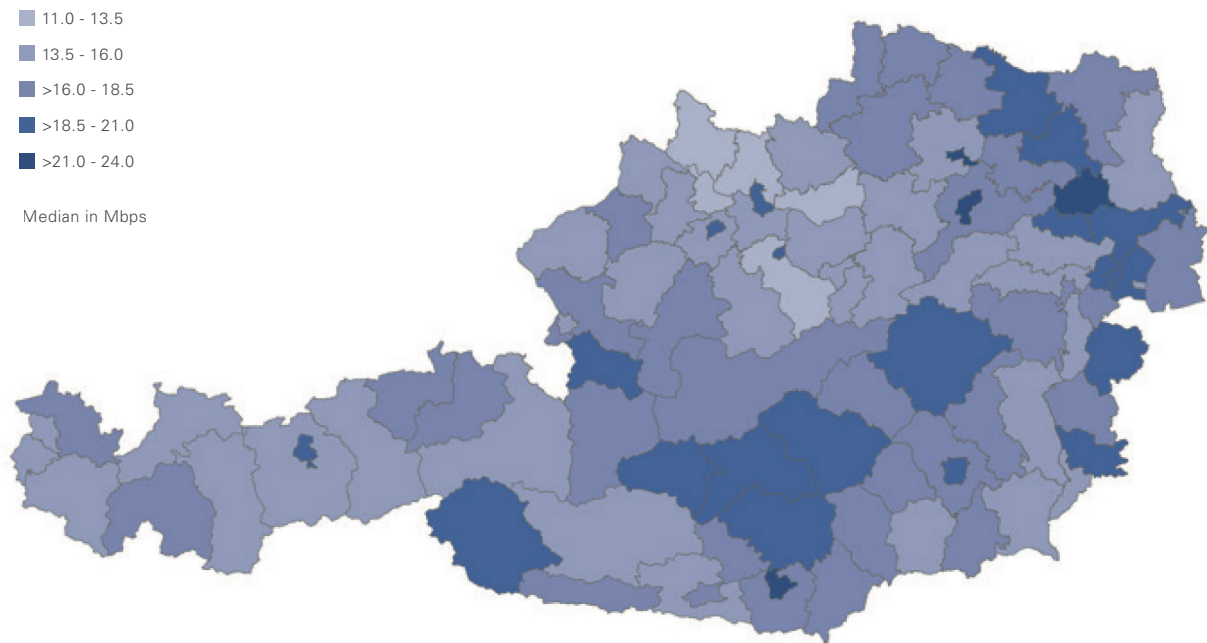


- In every Austrian province except Carinthia, the median download speed was up in Q1 2018.
- The highest values were recorded for Vienna, at about 23 Mbps.
- Measurement results in the other provinces were somewhat lower, ranging from roughly 15 Mbps for Upper Austria to 19 Mbps for Burgenland.

RTR-NetTest can identify the location where the test is being run. This allows a median download speed to be determined for every Austrian province. The median as calculated here includes all network technologies.

Download speed by district in 2017

➔ Median speeds usually high in urban areas



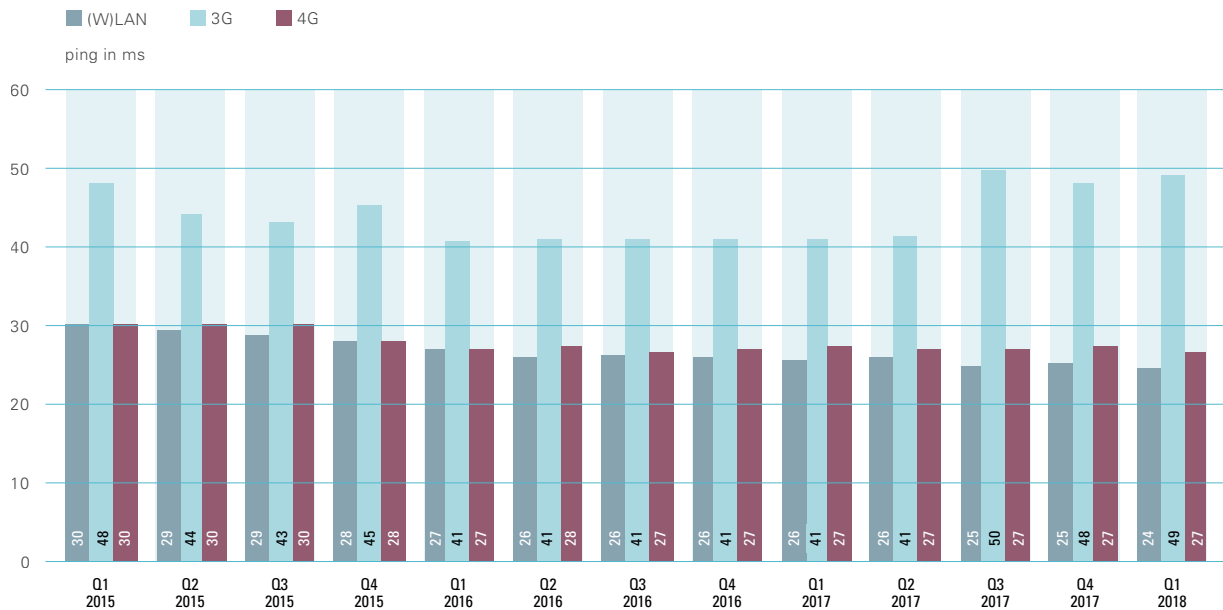
Source for district boundaries: Austrian Federal Office of Metrology and Surveying

- In 2017 high median download speeds were mostly measured in urban areas, especially in the provincial capitals of Klagenfurt, Vienna, St. Pölten, Eisenstadt and Innsbruck, as well as in Wels. The median for those districts, in each case comprising the town or city of the same name, ranged from 20 to 24 Mbps.
- The highest median value of 24 Mbps was seen for the district referred to as Krems an der Donau (Stadt).
- At the opposite end of the scale were five districts in Upper Austria with medians ranging between 11 and 13.5 Mbps: Rohrbach, Steyr-Land, Urfahr-Umgebung, Perg and Eferding.

The number of tests performed in 2017 varied from 155 in Rust (Stadt) to about 175,500 in Vienna (viewed here as one district). Total tests numbered more than 1,000 in every district except two, Rust (Stadt) and Waidhofen an der Ybbs (Stadt). The median values shown on the map are no indication of how complete coverage is in that particular district, either in general or with specific bandwidths.

Ping time (latency)

➔ Comparable median ping times for (W)LAN and 4G – 3G takes much longer



- The median ping time for 4G tests in Q1 2018 was 27 ms, the same as in the previous quarter.
- A slight drop from 25 to 24 ms was seen for (W)LAN tests.
- The median values obtained for 3G tests, while much higher throughout the entire period, varied somewhat in 2017.

‘Ping time’ – or ‘latency’ as it is more correctly termed – is the time needed by a small data packet to make its way from a user device (such as a mobile or laptop) to an online server and back. The ping time is measured in milliseconds (ms). The ping time is a key indicator for online games, but the ping time can also have a significant impact on the ‘sluggishness’ of access when surfing in the internet. The delay can be markedly influenced both by the technology applied to access the internet and its level of utilisation.

TABLE 18: MEDIAN DOWNLOAD AND UPLOAD SPEEDS (ALL TECHNOLOGIES)
 (IN MBPS) SEE PAGE 39

	Download	Upload	Upload to download ratio
Q1 2015	11	3	26%
Q2 2015	14	3	24%
Q3 2015	15	4	24%
Q4 2015	17	5	31%
Q1 2016	15	4	29%
Q2 2016	17	5	28%
Q3 2016	18	5	30%
Q4 2016	19	6	32%
Q1 2017	17	6	32%
Q2 2017	18	6	32%
Q3 2017	18	6	34%
Q4 2017	17	6	37%
Q1 2018	18	7	38%

TABLE 19: DOWNLOAD SPEED BY BANDWIDTH CATEGORY (IN MBPS)
 SEE PAGE 40

	≤2	>2 bis 10	>10 bis 30	>30 bis 50	>50 bis 100	>100
Q1 2017	7%	25%	39%	15%	11%	3%
Q2 2017	7%	24%	39%	16%	11%	3%
Q3 2017	7%	24%	39%	16%	10%	3%
Q4 2017	7%	25%	39%	15%	10%	3%
Q1 2018	7%	24%	40%	16%	10%	3%

TABLE 20: MEDIAN DOWNLOAD SPEED BY TECHNOLOGY (IN MBPS)
 SEE PAGE 41

	(W)LAN	3G	4G
Q1 2015	10	6	43
Q2 2015	11	7	41
Q3 2015	12	8	43
Q4 2015	12	8	41
Q1 2016	13	9	44
Q2 2016	15	9	40
Q3 2016	15	9	40
Q4 2016	15	9	37
Q1 2017	15	9	32
Q2 2017	16	10	32
Q3 2017	16	8	30
Q4 2017	15	9	29
Q1 2018	16	9	28

TABLE 21: MEDIAN DOWNLOAD AND UPLOAD SPEED BY TECHNOLOGY (IN MBPS)
SEE PAGE 42

	(W)LAN	3G	4G
Q1 2015	3	2	19
Q2 2015	3	2	18
Q3 2015	3	2	20
Q4 2015	4	2	19
Q1 2016	5	2	18
Q2 2016	5	2	13
Q3 2016	5	2	13
Q4 2016	6	2	13
Q1 2017	5	2	11
Q2 2017	6	2	11
Q3 2017	6	2	10
Q4 2017	6	2	10
Q1 2018	6	2	10

TABLE 22: NUMBER OF TESTS FOR EACH TECHNOLOGY
SEE PAGE 43

	(W)LAN	3G	4G
Q1 2016	77,600	15,600	26,500
Q2 2016	59,100	12,400	26,000
Q3 2016	73,000	10,500	35,000
Q4 2016	106,100	9,600	48,300
Q1 2017	142,700	9,600	52,400
Q2 2017	117,800	7,800	43,800
Q3 2017	123,800	8,000	43,700
Q4 2017	156,100	6,900	45,900
Q1 2018	166,100	7,600	52,300

TABLE 23: MEDIAN DOWNLOAD SPEED – OFF-PEAK AND PEAK (IN MBPS)
SEE PAGE 44

	Off-peak download	Download (total)	Peak download	Peak to off-peak ratio
Q1 2015	11	11	10	85%
Q2 2015	14	14	12	81%
Q3 2015	17	15	13	77%
Q4 2015	19	17	13	69%
Q1 2016	16	15	14	86%
Q2 2016	18	17	15	82%
Q3 2016	20	18	15	77%
Q4 2016	20	19	15	73%
Q1 2017	19	17	14	72%
Q2 2017	20	18	15	72%
Q3 2017	19	18	15	75%
Q4 2017	19	17	13	70%
Q1 2018	20	18	14	71%

TABLE 24: MEDIAN DOWNLOAD AND UPLOAD SPEEDS BY TIME OF DAY IN 2017 (IN MBPS)
 SEE PAGE 45

	Download	Upload	No. of tests
0	20	7	13,200
1	23	7	6,200
2	25	8	3,500
3	27	8	2,900
4	28	8	4,500
5	26	8	8,900
6	27	9	21,400
7	23	7	27,500
8	21	6	35,200
9	20	6	41,000
10	20	6	42,900
11	19	6	42,100
12	19	6	40,700
13	19	6	40,900
14	18	6	41,900
15	18	6	42,300
16	17	6	44,200
17	16	6	47,800
18	15	6	49,700
19	15	6	51,700
20	13	6	52,100
21	13	6	46,900
22	15	6	36,300
23	18	6	22,000

TABLE 25: MEDIAN DOWNLOAD SPEED BY PROVINCE (IN MBPS)
 SEE PAGE 46

	Burgenland	Carinthia	Lower Austria	Upper Austria	Salzburg	Styria	Tyrol	Vorarlberg	Vienna
Q1 2017	16	18	16	15	17	18	17	15	23
Q2 2017	16	19	17	16	18	18	18	15	24
Q3 2017	19	17	17	15	17	17	16	17	24
Q4 2017	19	17	17	15	16	17	16	17	22
Q1 2018	19	17	18	15	16	19	17	18	23

TABLE 26: MEDIAN DOWNLOAD SPEED (DL) BY DISTRICT IN 2017 (IN MBPS)
SEE PAGE 47

District	Prov	DL	Bezirk	Prov	DL
Krems an der Donau (Stadt)	Lower Austria	24	Graz-Umgebung	Styria	17
Klagenfurt (Stadt)	Carinthia	24	Waidhofen an der Thaya	Lower Austria	16
Vienna	Vienna	23	Leibnitz	Styria	16
Sankt Pölten (Stadt)	Lower Austria	21	Zwettl	Lower Austria	16
Eisenstadt (Stadt)	Burgenland	21	Klagenfurt (Land)	Carinthia	16
Wels (Stadt)	Upper Austria	21	Wolfsberg	Carinthia	16
Innsbruck-Stadt	Tyrol	21	Neusiedl am See	Burgenland	16
Mödling	Lower Austria	21	Mistelbach	Lower Austria	16
Murau	Styria	20	Gmunden	Upper Austria	16
Hollabrunn	Lower Austria	20	Salzburg (Stadt)	Salzburg	16
Güssing	Burgenland	20	Spittal an der Drau	Carinthia	16
Linz (Stadt)	Upper Austria	20	Waidhofen an der Ybbs (Stadt)	Lower Austria	16
Steyr (Stadt)	Upper Austria	20	Villach (Land)	Carinthia	16
Eisenstadt-Umgebung	Burgenland	19	Zell am See	Salzburg	16
Murtal	Styria	19	Hartberg-Fürstenfeld	Styria	16
Sankt Veit an der Glan	Carinthia	19	Kirchdorf an der Krems	Upper Austria	16
Tamsweg	Salzburg	19	Lilienfeld	Lower Austria	16
Korneuburg	Lower Austria	19	Feldkirch	Vorarlberg	16
Graz (Stadt)	Styria	19	Bludenz	Vorarlberg	15
Bruck-Mürzzuschlag	Styria	19	Dornbirn	Vorarlberg	15
Bruck an der Leitha	Lower Austria	19	Baden	Lower Austria	15
Oberpullendorf	Burgenland	19	Linz-Land	Upper Austria	15
Lienz	Tyrol	19	Grieskirchen	Upper Austria	15
Hallein	Salzburg	19	Krems (Land)	Lower Austria	15
Landeck	Tyrol	18	Innsbruck-Land	Tyrol	15
Kufstein	Tyrol	18	Wiener Neustadt (Land)	Lower Austria	15
Kitzbühel	Tyrol	18	Gänserndorf	Lower Austria	15
Liezen	Styria	18	Rust (Stadt)	Burgenland	15
Mattersburg	Burgenland	18	Scheibbs	Lower Austria	15
Hermagor	Carinthia	18	Wels-Land	Upper Austria	15
Voitsberg	Styria	18	Vöcklabruck	Upper Austria	15
Salzburg-Umgebung	Salzburg	17	Melk	Lower Austria	15
Horn	Lower Austria	17	Imst	Tyrol	15
Villach (Stadt)	Carinthia	17	Schärding	Upper Austria	15
Leoben	Styria	17	Reutte	Tyrol	15
Völkermarkt	Carinthia	17	Amstetten	Lower Austria	15
Feldkirchen	Carinthia	17	Schwaz	Tyrol	14
Gmünd	Lower Austria	17	Freistadt	Upper Austria	14
Wiener Neustadt (Stadt)	Lower Austria	17	Südoststeiermark	Styria	14
Ried im Innkreis	Upper Austria	17	Deutschlandsberg	Styria	14
Sankt Pölten (Stadt)	Lower Austria	17	Jennersdorf	Burgenland	14
Weiz	Styria	17	Braunau am Inn	Upper Austria	14
Tulln	Lower Austria	17	Rohrbach	Upper Austria	13
Bregenz	Vorarlberg	17	Steyr-Land	Upper Austria	13
Oberwart	Burgenland	17	Urfahr-Umgebung	Upper Austria	13
Sankt Johann im Pongau	Salzburg	17	Perg	Upper Austria	12
Neunkirchen	Lower Austria	17	Eferding	Upper Austria	11

TABLE 21: MEDIAN PING TIME (IN MS)
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	(W)LAN	3G	4G
Q1 2015	30	48	30
Q2 2015	29	44	30
Q3 2015	29	43	30
Q4 2015	28	45	28
Q1 2016	27	41	27
Q2 2016	26	41	28
Q3 2016	26	41	27
Q4 2016	26	41	27
Q1 2017	26	41	27
Q2 2017	26	41	27
Q3 2017	25	50	27
Q4 2017	25	48	27
Q1 2018	24	49	27



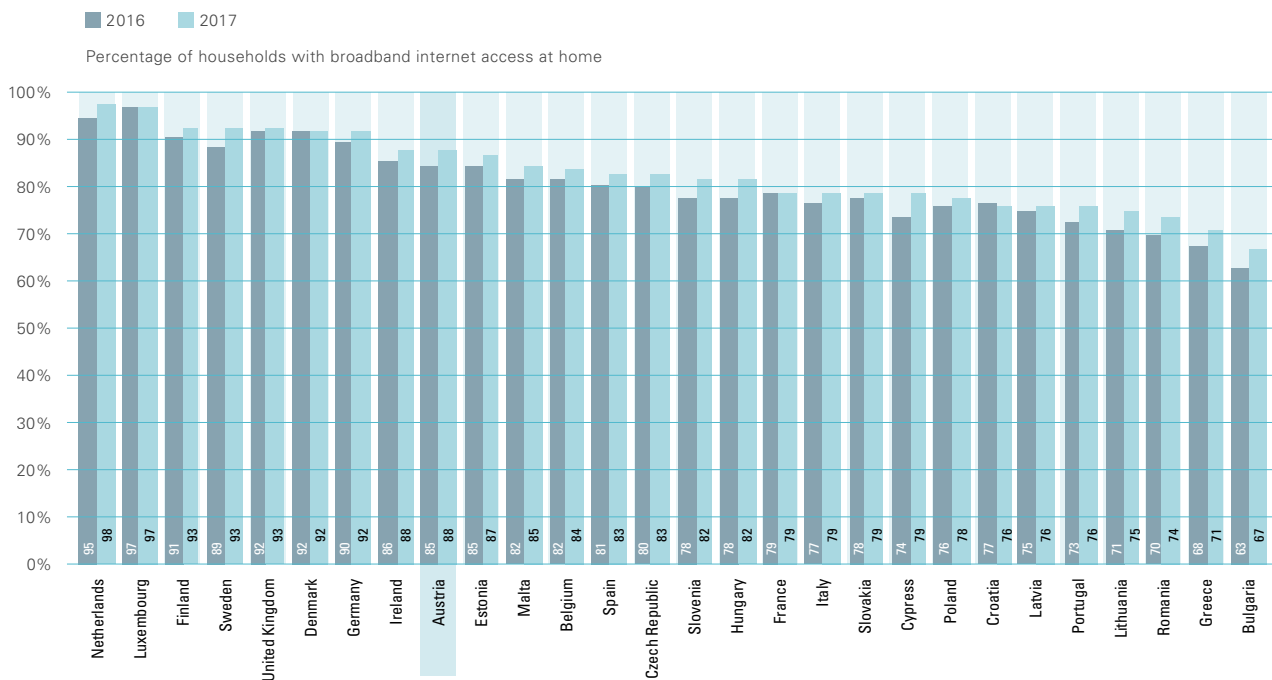
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International comparison

5	International comparison	55
	Percentage of households with broadband internet access at home (fixed or mobile)	56
	Enterprises with broadband internet access (fixed or mobile)	57
	Percentage of fixed broadband internet connections ≥ 30 Mbps	58
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Percentage of households with broadband internet access at home (fixed or mobile)

➔ Austria ranks within the top third EU-wide



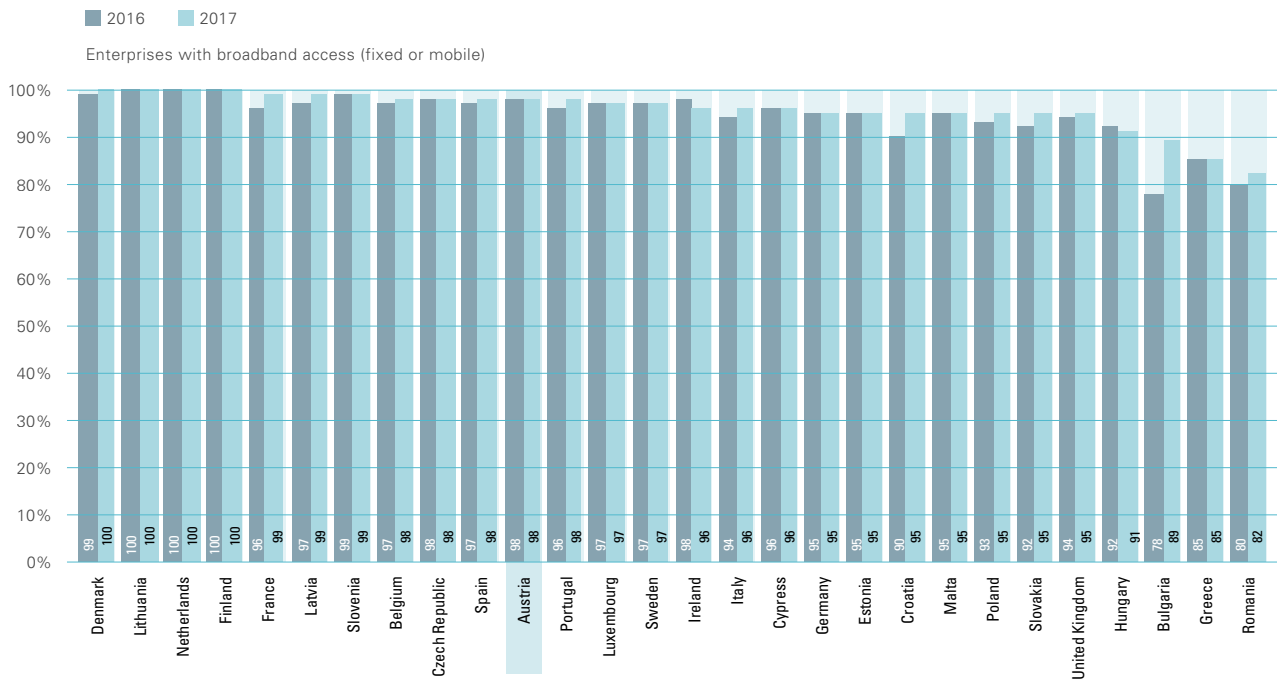
Source: Eurostat

- With a broadband penetration rate of 88% of all households, Austria ranked ninth EU-wide in 2017.
- The rate for Austria rose by 3% compared with 2016.

The data shown in the chart are taken from a Eurostat survey (digital economy and society statistics). By virtue of a Regulation, EU Member States are required to survey data using a standard questionnaire, allowing EU-wide comparisons of survey results. The data on Austria are collected by Statistics Austria and are based on a survey of some 3,500 households. The households were asked about the extent to which they were equipped with fixed or mobile broadband access.

Enterprises with broadband internet access (fixed or mobile)

➔ 98% of enterprises have broadband access



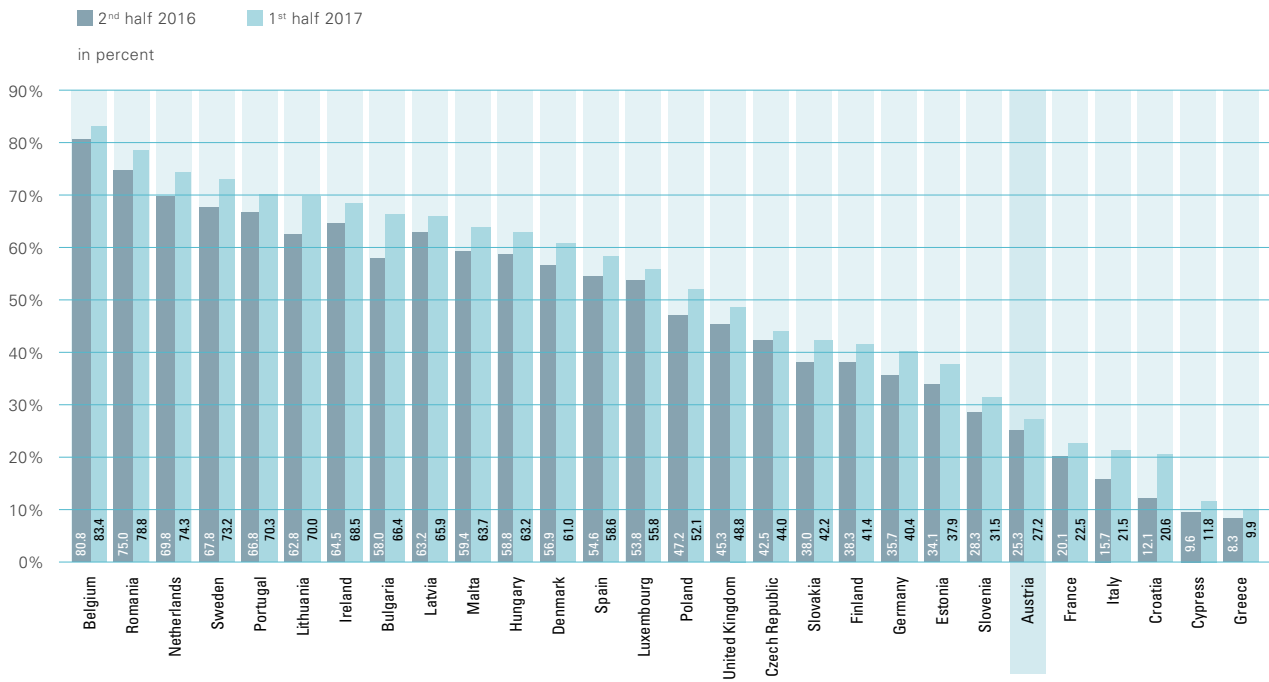
Source: Eurostat

- At 98% Austria shares eighth place within the EU with Belgium, the Czech Republic, Portugal and Spain.
- The results for Austria did not change from 2016.

The data shown in the chart are taken from an Eurostat survey (digital economy and society statistics) and are based on a population consisting of all enterprises with ten or more employees, excluding the banking sector. The data on Austria are collected by Statistics Austria. About 2,950 enterprises were surveyed.

Percentage of fixed broadband internet connections ≥ 30 Mbps

➔ Austria only ranks in bottom third for fast access



Source: European Commission, Digital Agenda Scoreboard

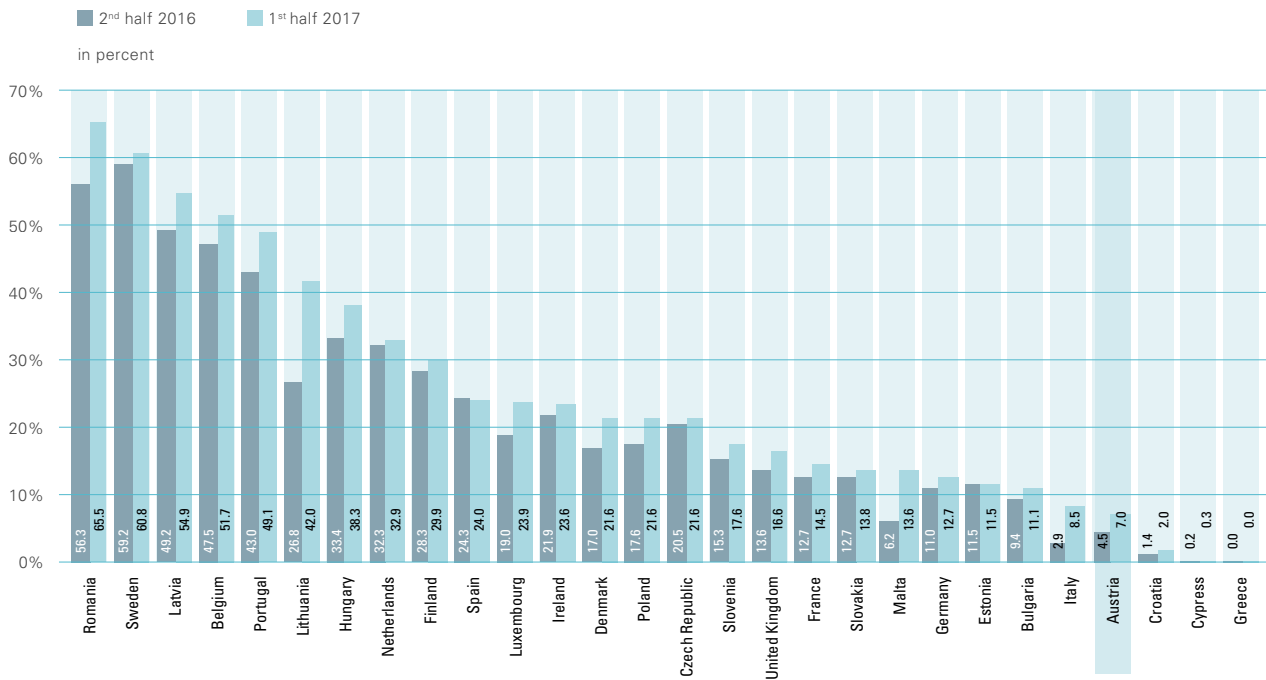
- With 27% of fixed internet connections having a download speed rating of 30 Mbps or more, Austria is ranked only twenty-third among EU countries.
- Similarly, the 2% improvement seen between the second half of 2016 and the first half of 2017 was below average.

The chart data are based on figures from the Digital Agenda Scoreboard, which is published by the European Commission and includes various digital economy statistics. The chart shows the percentage of fixed broadband connections having a download speed rating of ≥ 30 Mbps.

The data for Austria are derived from RTR surveys and are based on queries authorised under the Communications Survey Ordinance (KEV).

Percentage of fixed broadband internet connections ≥ 100 Mbps

➔ Austria in fourth to last place



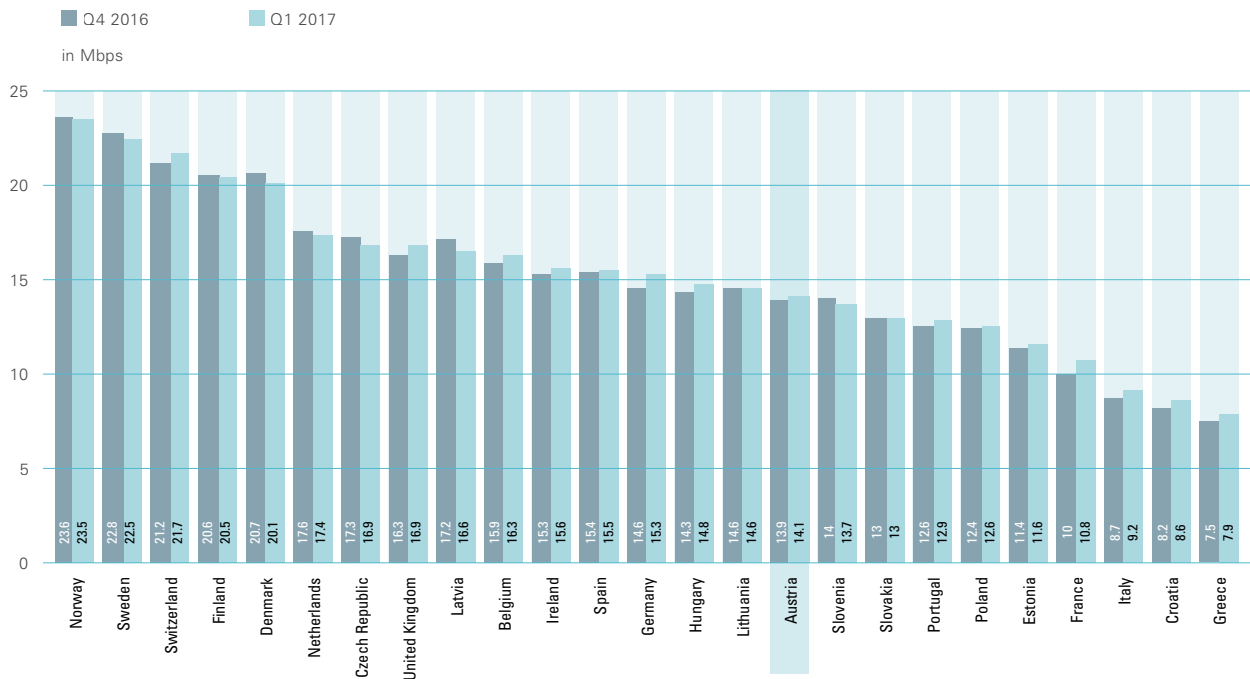
Source: European Commission, Digital Agenda Scoreboard

- With 7% of fixed internet connections having a download speed rating of 100 Mbps or more, Austria ranks twenty-fifth among EU countries.
- A gain of 3% was recorded between the second half of 2016 and the first half of 2017.

The chart data are based on figures from the Digital Agenda Scoreboard published by the European Commission. The chart shows the percentage of fixed broadband connections having a download speed rating of ≥ 100 Mbps.

Average fixed network download speed

➔ Austria ranks in the bottom half



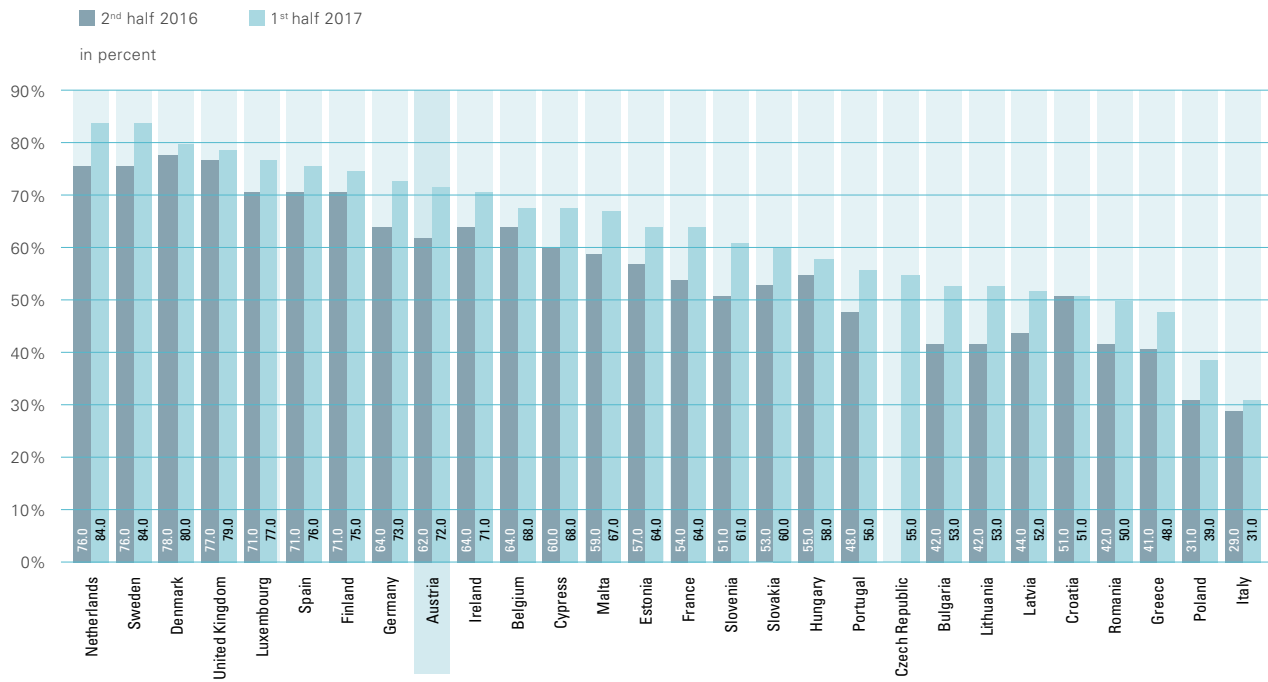
Source: Akamai State of the Internet report

- For fixed networks in Austria, Akamai reports an average download speed of 14.1 Mbps in Q1 2017.
- This puts Austria in sixteenth place among the 25 European countries analysed in the report.

The chart shows the average download speed for each country. The data are taken from the quarterly Akamai State of the Internet (SOTI) Report. Akamai is a leading global corporation specialising in content delivery networks (CDNs). A CDN is used to distribute and deliver internet content.

Internet access via smartphone

➔ Austria places in the upper half



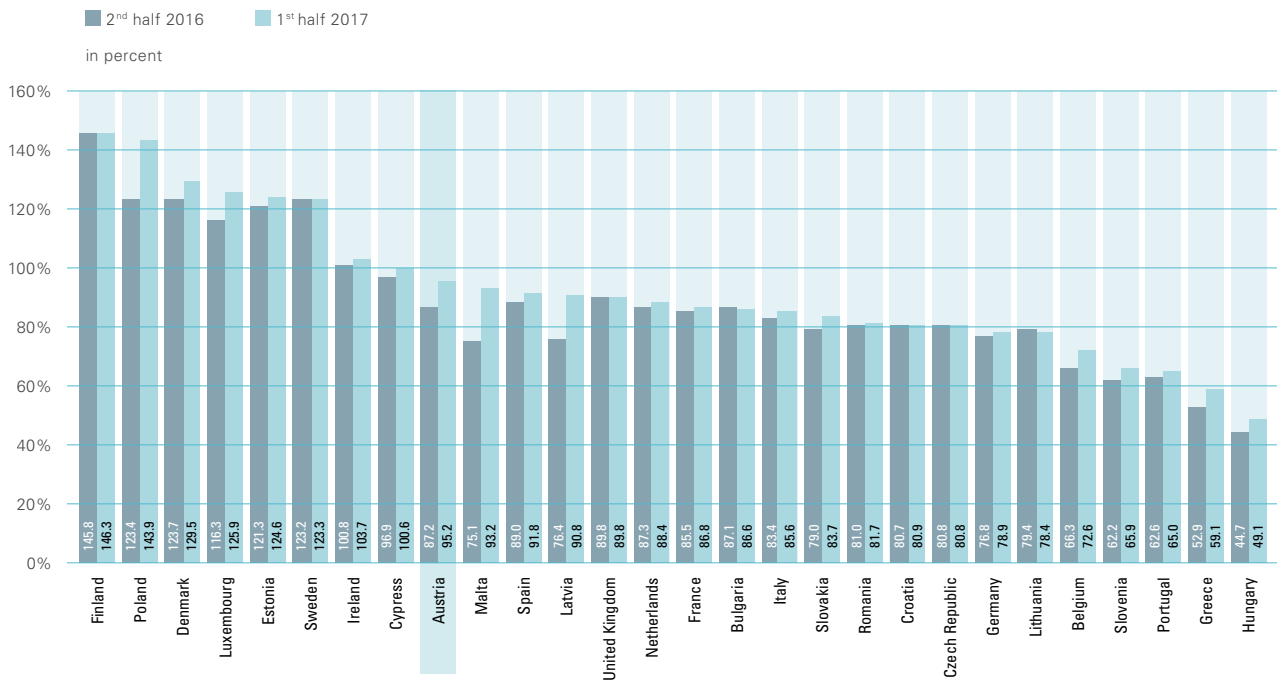
Source: Eurostat

- In 2017 Austria ranked ninth within the EU in terms of smartphone penetration rate, which at 72% of the entire population was 10% more than in 2016.

The data shown in the chart are taken from a Eurostat survey (digital economy and society statistics). The chart shows the percentage of those surveyed who use a smartphone for internet access. The data on Austria are collected by Statistics Austria.

Mobile broadband penetration

➔ Austria aiming for 100%



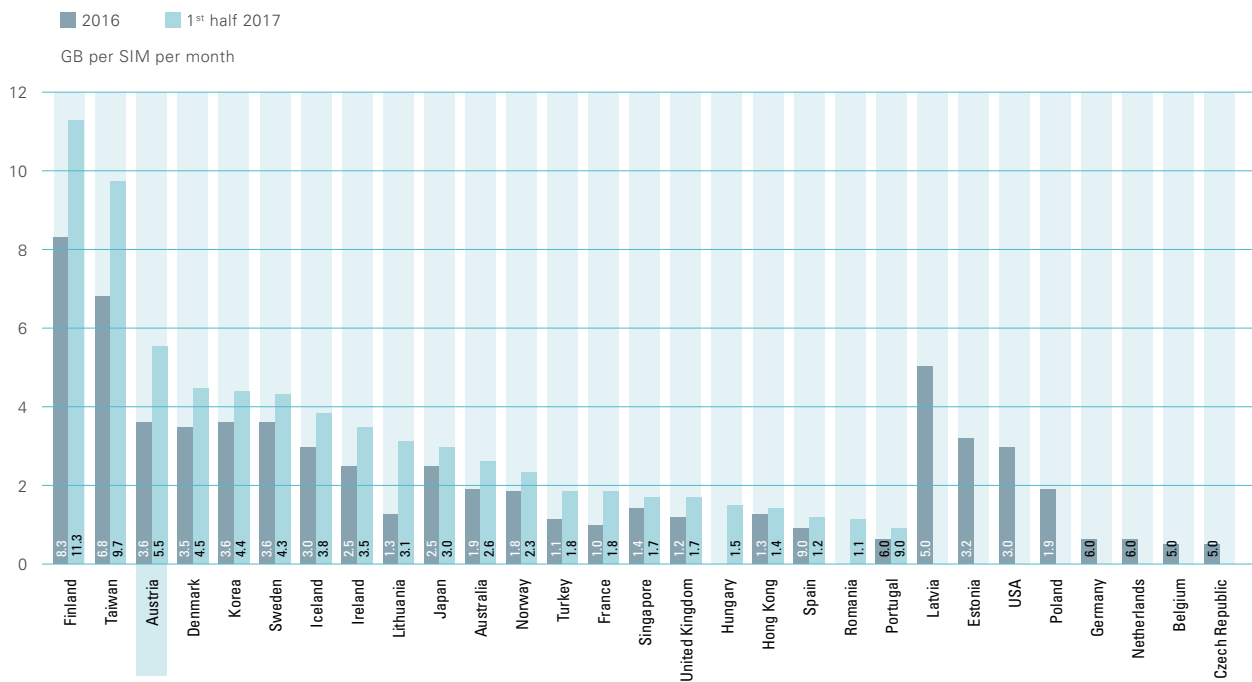
Source: European Commission, Digital Agenda Scoreboard

- In terms of mobile broadband penetration, Austria takes ninth place among EU countries, with a rate of 95%.
- This represents a gain of 8 percentage points compared with 2016.

The data are taken from the Digital Agenda Scoreboard of the European Commission. The figures here take into account mobile data-only subscriptions as well as smartphone bundled products (including call minutes, text messages and data) that allow mobile broadband use.

Mobile data volume per SIM card

➔ Austria among the leaders in mobile data usage



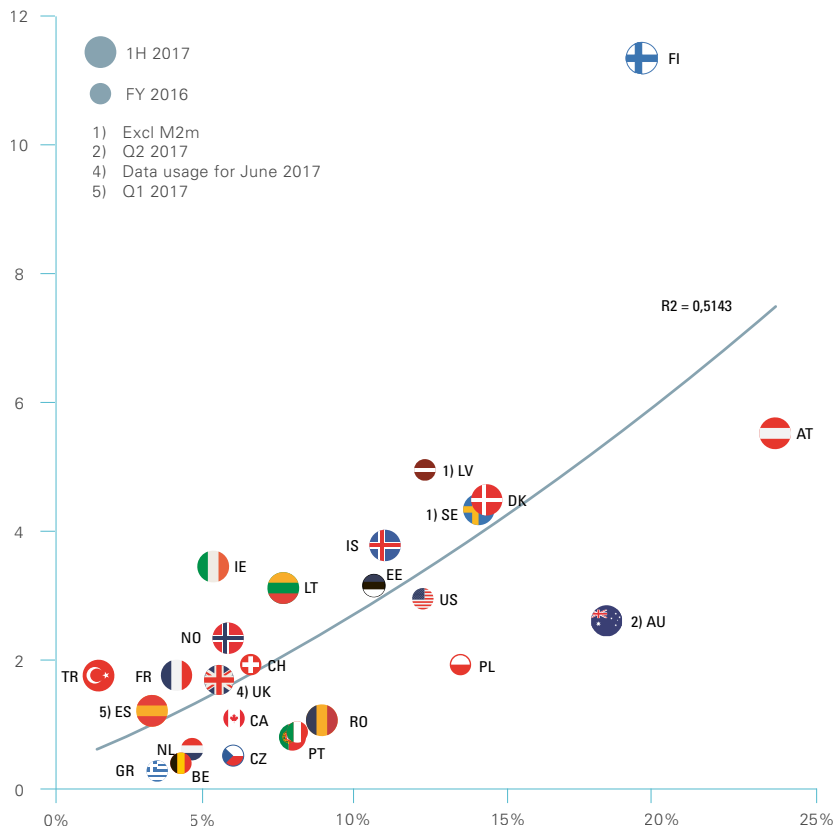
Source: tefficient

- With an average of 5.5 gigabytes of data used by each SIM card, Austria ranked third in the first half of 2017 among the countries shown.
- The comparison takes into account European countries as well as the US, Australia and certain Asian countries.

The chart provides an international comparison of mobile data usage in gigabytes, per SIM card and month. The data are taken from the public industry analysis, a semi-annual survey of mobile broadband use published by business consultant tefficient. Figures are provided by the operators or authorities in each case.

Mobile data usage and data-only penetration

➔ Austria had highest data-only penetration in first half of 2017



Source: tefficient

- In the first half of 2017, among all countries surveyed by tefficient Austria had the highest data-only penetration rate at 23.7% (the percentage of data-only SIM cards).
- The chart shows the positive correlation between mobile data usage per SIM card and the data-only penetration rate.

Here mobile data usage in gigabytes per SIM and month is plotted against the data-only penetration rate (that is, the number of data-only mobile broadband subscriptions per 100 residents). The chart was originally published by business consultant tefficient (see Explanatory notes and Glossary).



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Explanatory notes and Glossary

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Details on data sources

Communications Survey Ordinance

Where not otherwise mentioned, the charts published in the Internet Monitor are based on data collected in accordance with the Communications Survey Ordinance (KEV), FLG II 365/2004, which became effective as of 1 October 2004. Under the KEV, RTR is obliged to carry out quarterly surveys of communications markets and to compile and publish the statistics. The most recent amendment of the KEV entered into force on 1 October 2017, which means that data was collected accordingly for the first time in Q4 2017.

The data collected under the KEV can be viewed as Open Data in the formats XLSX, CSV, XML and JSON at <https://www.rtr.at/de/inf/odKEV> (in German).

RTR-NetTest

Data collected through the RTR-NetTest are available as Open Data under the Creative Commons Attribution 3.0 Austria (CC BY 3.0 AT) licence; see <https://www.netztest.at/de/Opendata>.

Data sources for international comparisons

The European Commission publishes the Digital Agenda Scoreboard, consisting of statistics on the European information society: <https://ec.europa.eu/digital-single-market/en/create-graphs>

Eurostat statistics on the digital economy and society are collected in a database accessible at: <http://ec.europa.eu/eurostat/web/digital-economy-and-society/data/database>. Data on Austria are additionally available (in German) on the Statistics Austria website: http://www.statistik.at/web_de/statistiken/energie_umwelt_innovation_mobilitaet/informationsgesellschaft/index.html.

Several of the charts have been taken from the quarterly Akamai State of the Internet (SOTI) report. Akamai is a leading global corporation specialising in content delivery networks (CDNs). The most recent issue of the SOTI report can be downloaded by following this link: <https://www.akamai.com/uk/en/about/our-thinking/state-of-the-internet-report/>.

Some of the data presented in this report were originally collected and disclosed by business consultant tefficient, who publish a semi-annual 'public industry analysis' including a variety of internet-related data; follow this link to view the data: <https://tefficient.com/analysis/public-industry-analysis/>

One of the charts used in this report originally appeared in the tefficient report entitled: 'More for less' tips the balance, Mobile data – first half 2017, Industry analysis #3 2017 (<https://tefficient.com/more-for-less-tips-the-balance/>).

Glossary

Bitstream and resale

Bitstream and resale access are wholesale products at different levels of the value chain, on the basis of which internet connections can be provided to end users. For bitstream access, data traffic is transferred at predefined (regional or national) handover points, with the wholesale customer directly providing internet connectivity. By comparison, in the case of resale access, internet connectivity is provided by the wholesale supplier, with the wholesale customer acting merely as reseller.

Broadband

Broadband internet access or a broadband internet connection refers to an internet connection (technology neutral) with a download speed higher than 144 Kbps. The internet connection can also be provided as part of a bundle with other services. The connection can be established by the following means:

- Proprietary line (a copper wire pair in the A1 Telekom Austria AG network)
- Unbundled line (see unbundling)
- Virtual unbundling (see virtual unbundling)
- Coaxial cable (cable modem)
- Fixed wireless access, e.g. WLAN, WiFi or WLL ('fixed' access but not via a hotspot)
- Other infrastructure, including powerline (PWL) broadband via the power grid and satellite (SAT) broadband access

Unbundling

In telecommunications, unbundling refers to the separate provision of specific services which were previously available only in conjunction with other services. The unbundling of subscriber lines from fixed network access as offered by the incumbent operator, for example, gives alternative service providers direct access to customers without requiring the latter to install the 'last mile' themselves, as they can lease (naked) subscriber lines from the incumbent at a regulated price. Unbundled network elements are made available where as a result of a market analysis procedure the regulatory authority has identified one company having significant market power and has imposed on that operator the obligation to grant access to its telecommunications network and the corresponding unbundled elements.

Hybrid products

With hybrid products, data traffic is normally via a fixed connection (usually based on DSL) and additionally via a mobile network when required.

Median

The median is the value at the exact midpoint of a sorted list of empirical values. The median is an actual, observed value, unlike the mean, which is a parameter calculated using statistical techniques. The mean of the values 1, 2, 4, 8 and 16 is 6.2. The median, in contrast, is 4, with two other empirical values each above and below that value.

Mobile broadband

With mobile broadband, a distinction is made between data-only subscriptions with a fixed monthly fee, data subscriptions without a fixed monthly fee and smartphone subscriptions.

Up to Q4 2015, data-only subscriptions (which cover data but not voice calls or text messages) were restricted to those that included at least 250 megabytes in the monthly rate. This restriction was lifted as of Q1 2016. From Q4 2017 onwards, an activity criterion has also been introduced for this category: SIM cards are counted only if they have been used for internet access at least once in the corresponding quarter.

Products not based on a fixed monthly charge include products that are used by customers to access the internet at least once each quarter, even where such products do not include free data as part of the monthly charge.

Smartphone subscriptions are all contracts for voice and text messaging services that also include data and are used by customers to access the internet at least once each quarter. Up to Q4 2015, such subscriptions were additionally restricted to those that included at least 250 megabytes in the monthly rate. This restriction was lifted as of Q1 2016.

Broadband price index (hedonic)

The broadband index is a hedonic price index for fixed and mobile broadband products. Hedonic means that both price changes and changes in product features (in particular download rate and download volume) are taken into account. To arrive at the index, a regressive analysis of prices is performed in relation to product features and time variables.

For the calculation, tariffs and product features are surveyed quarterly for the broadband products supplied by the major providers (currently A1, HoT, Hutchison, Kabelplus, LIWEST, Russmedia IT, Salzburg AG, Tele2, T-Mobile and UPC). All subscriptions available to new customers at that particular time are collected. Both standalone broadband products and products bundled with fixed line telephony or TV are surveyed. In the case of mobile broadband, prepaid rates are not included. In addition to monthly charges, one-off charges and annual charges as well as special offers are taken into account. The most expensive 10% of subscriptions (currently plans costing more than EUR 65) are not included in the calculation, as they can be assumed to be in low demand by customers. The remaining tariff plans are weighted in proportion to the operators' market shares in the respective quarter. In calculation, all tariff plans offered by one operator are weighted by the same amount in one quarter. The reference base is 2010. The indexes are calculated by means of a regressive analysis, first of only fixed network tariff plans (fixed index), then of only mobile subscriptions (mobile index) and finally of all plans (fixed and mobile index).

Private customers – business customers

Separate differentiators apply to fixed network and mobile in the private and business customer segments. While the fixed network distinguishes by product (private vs. business customer product), mobile networks distinguish by customer.

The following applies to fixed connections (DSL, cable, wireless and fibre optics):

'business customer products' are all broadband products or product bundles with broadband that are geared towards business customers. These products are either discernible by their name ('business', 'office', etc.) or include certain features that are not typically offered to private customers, such as one or more fixed IP addresses, a larger number of mailboxes, more webspace, a domain name, a security package (antivirus, firewall or similar), business SLAs or lower average overselling on the backbone. SDSL products are also viewed as business customer products.

'Private customer products' are therefore any products not to be categorised as business customer products.

The following applies to mobile connections:

Business customers are all legal persons and corporations under public or private law, partnerships, registered companies and partnerships under the Civil Code, as well as natural and legal persons who are entrepreneurs within the meaning of Art. 1 of the Austrian Consumer Protection Act, FLG 140/1979 as amended (including start-up activities within the meaning of Art. 1 Par. 3 leg. cit). In this context, a business means any organisation that is intended to be permanent and is for the purpose of independent commercial activity, even though it may be a non-profit enterprise. Private customers are all customers not falling under the definition above.

Virtual unbundling

According to an official TTK decision, A1 Telekom Austria AG is obliged to offer virtual unbundling in areas where it is rolling out fibre optic cable (Next Generation Access – NGA). Virtual unbundling is a wholesale service that enables alternative providers to offer their own (broadband) products to end users, in a manner similar to physical unbundling.

Wholesale market

The market in which telecoms companies offer services to one another, thereby enabling services to be provided to end users. The wholesale broadband market, for example, includes all broadband connections made available by one company to other communications service providers for the purpose of allowing end users to access the network. A1 Telekom makes bitstream and unbundling available as regulated wholesale products.

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