# Annual Net Neutrality Report 2021

Aarnio Niko, Nieminen Klaus, Pallas Elina & Priiki Marko

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# 1    Introduction

The openness of the internet, or net neutrality, is guaranteed by EU Regulation 2015/2120 (Open Internet Regulation)[1]. In Finland, compliance with the Regulation is monitored by the Finnish Transport and Communications Agency (Traficom). The Regulation aims to safeguard equal and non-discriminatory treatment of traffic in the provision of internet access services and to ensure users' right to open internet access. For a more detailed definition of net neutrality, please refer to chapter 2.

Based on Traficom's findings, the status of net neutrality in Finland is healthy, and internet access service providers (ISPs, operators) comply with the Regulation. For a more detailed description of Traficom's actions and observations, please refer to chapters 3 and 4. Traficom has maintained an active dialogue on net neutrality with the industry. An indication of successful collaboration is that Traficom did not have to issue any binding supervision decisions during the monitoring period. Like in previous years, all issues that were raised have mainly been resolved or progress has been made in negotiations with operators.

Topical matters have included first and foremost informing stakeholders of the updated BEREC Guidelines on the Implementation of the Open Internet Regulation published in June 2020 and changes to national guidelines, assisting in the drafting of a written intervention concerning a request for a preliminary ruling on the interpretation of Article 3 of the Open Internet Regulation brought before the Court of Justice of the European Union, participating in the work to update the standard terms and conditions used in the telecommunications sector and updating Traficom's Recommendation on filtering traffic to certain communications ports.

Some of Traficom's activities were related to measures initiated in previous years. These concerned, for example, the following themes: the effect of the coronavirus pandemic on communications networks, 5G, the provision of public IPv4 addresses and monitoring the entry into the market of new FWA subscriptions.

The Open Internet Regulation requires national regulatory authorities to publish an annual report regarding net neutrality-related monitoring activities and findings. This report must be provided to the European Commission and the Body of European Regulators for Electronic Communications (BEREC).

Under the Regulation, Traficom must in its supervisory activities take utmost account of BEREC guidelines regarding the application of net neutrality rules[2]. In line with the guidelines, this report covers the time period from 1 May 2020 to 30 April 2021. As instructed in the guidelines, the report contains an overall description of net neutrality, Traficom's monitoring activities and their main results, complaints submitted to Traficom, reported infringements, and the availability and quality development of non-discriminatory internet access services.

Traficom has not carried out any technical net neutrality measurements or imposed new technical service requirements or minimum quality requirements based on the Regulation.

This report comprises the following chapters:

- Chapter 2: Net neutrality in a nutshell

- Chapter 3: Equal treatment of traffic

- Chapter 4: User's rights

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[1] The Official Journal of the European Union L 310
[2] BEREC Guidelines on the Implementation of the Open Internet Regulation

- Chapter 5: Bittimittari.fi measurement tool

- Chapter 6: Trends in internet access services

- Chapter 7: Stakeholder cooperation and other activities

# 2   Net neutrality in a nutshell

Under the EU Open Internet Regulation, users of internet access services have the right to access and distribute information and content, and to use and provide applications and services of their choice. Users have this right irrespective of the origin or destination of the information. This principle is also called net neutrality.

End users and ISPs are still free to agree on the features of internet access services, such as speed, included data volumes or price. However, such agreements may not limit users' rights to open internet access.

Net neutrality also means that users have the freedom to use the terminal equipment (such as a phone or modem) of their choice. However, the terminal equipment must meet the technical requirements imposed by operators.

## 2.1   Equal treatment of traffic as a starting point

The principle of net neutrality requires operators to treat all internet traffic equally. For instance, operators may not usually restrict traffic to certain internet addresses or impose restrictions on certain types of traffic. Operators may, however, offer subscriptions with different levels of quality as well as application-agnostic connections, such as low-latency connections for online gamers.

As an exception, operators may restrict internet traffic as necessary in order to

a) comply with legislation, or orders by courts or public authorities

b) preserve the security of the network and terminal equipment

c) prevent network congestion and mitigate the effects of exceptional or temporary congestion.

Operators may take reasonable traffic management measures designed to promote the efficient use of network resources and optimise the quality of internet services. In order to be deemed reasonable, such measures must be transparent, non-discriminatory and proportionate, and they must not be based on commercial considerations but on objectively different technical quality of service requirements of specific categories of traffic.

Furthermore, operators are free to offer services in their network that are optimised for specific content, applications or services requiring a higher level of connection quality than provided by ordinary internet access services. Services requiring optimisation may include telephone services in the mobile network (e.g. VoLTE), television services provided by operators over broadband (IPTV), M2M services, or access to the critical systems of industry or, for example, airports.

However, all subscribers to internet access services must be treated equally, without discrimination. This means that operators may not, for example, prioritise corporate subscriptions over those of other customers. Operators may offer optimised services only if it does not impair the general quality of internet access services.

## 2.2 Terms of contract and net neutrality

Net neutrality also means that operators must provide clear and comprehensible information about the characteristics of different subscriptions in their contracts and on their websites. Customers must be informed of, for example, the following:

- the speed of the internet access service as required by the Open Internet Regulation

- how data quotas, speed or other quality factors may in practice affect the internet access service and the use of different contents, applications and services, in particular

- how traffic management measures applied by the operator may affect the quality of the internet connection

- how ordered services that require optimisation (such as the above-mentioned IPTV) affect the internet access service, including its speed.

# 3 Equal treatment of traffic

## 3.1 Provision of subscriptions and connections with different levels of quality

Traficom updated its checklist based on the BEREC guidelines firstly by ensuring that the checklist[3] published in the autumn of 2020 now takes into account the guidelines on contractual quality levels.

As stated in the BEREC guidelines (paragraph 53), equal treatment does not necessarily imply that all end-users will experience the same quality of service (QoS). The Regulation allows offering internet access subscriptions with differing QoS levels regarding parameters like speed, latency, jitter and packet loss. Examples include broadband subscriptions offering different speeds (e.g. 100 and 300 Mbps). It is also possible to offer several connections of varying quality for the same subscription, such as low-latency connections provided on top of a broadband subscription.

In accordance with the checklist, operators may thus employ traffic management measures to deliver different levels of quality when this is necessary in order to fulfil contractual promises made to users regarding service quality. Operators must otherwise treat all traffic in an equal and non-discriminatory manner. This means that mobile broadband subscriptions sold to corporations, for example, cannot be given priority over consumer subscriptions.

In addition to contractual QoS levels, the checklist has been revised to reflect the BEREC guidelines also in terms of national instructions on the use of optimised services and their particular conditions. For example, the checklist now better addresses the particular requirements of M2M and IoT devices.

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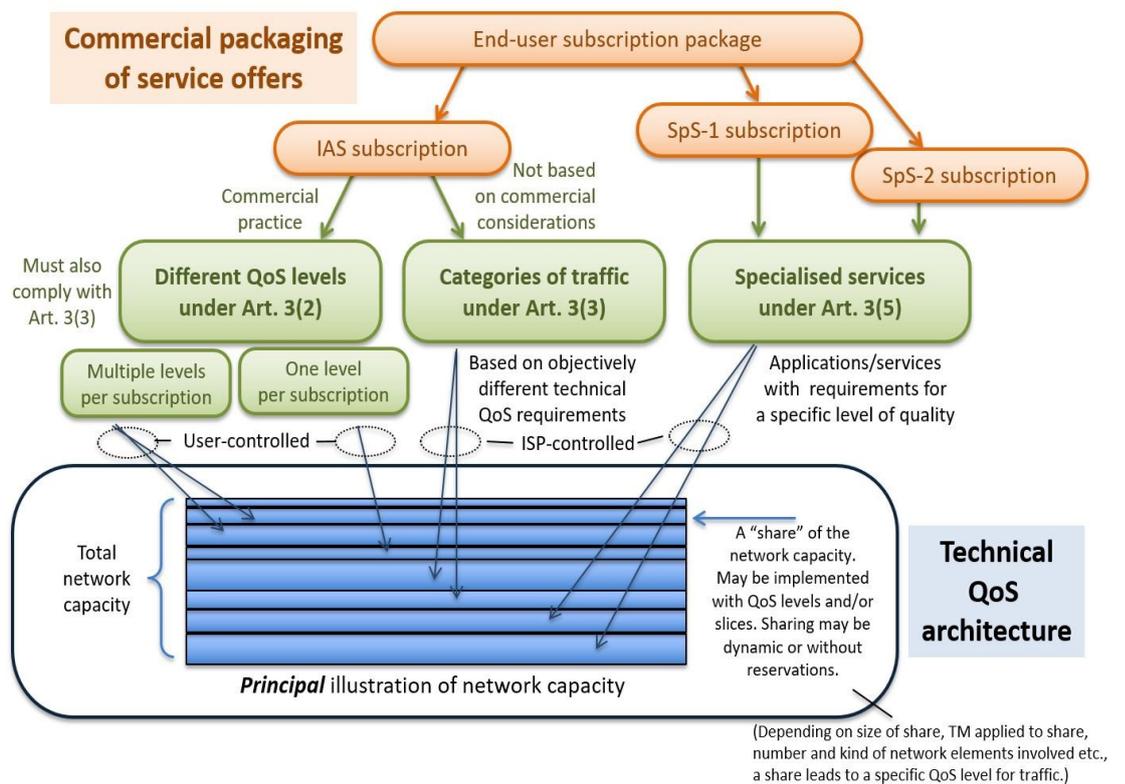[3] [Checklist for Compliance with the Open Internet Regulation](#)

*Figure 1. Principal illustration of network capacity*

## 3.2    Recommendation on filtering traffic updated

Traficom updated its Recommendation 312 A/2020 on filtering traffic to certain communication ports for information security reasons. The Recommendation describes the previous and current filtering recommendations.[4] The most recent updates included lifting the recommendation on filtering traffic to and from port 7547 and making the changes required by the 2019 agency merger to form the new agency Traficom. The lifted recommendation was connected to the prevention of and protection against denial-of-service attacks associated with the Mirai bot network, and a general recommendation was no longer considered necessary. The previous update to the Recommendation was issued in February 2018. The Recommendation also describes the procedure by which Traficom issues further filtering recommendations or recommends to discontinue filtering. Traficom has regularly examined the recommendations both within the agency and in collaboration with external stakeholders.

Each operator makes decisions concerning the application of the Recommendation independently, and is individually responsible for meeting its information security obligations. If necessary, operators may also be required to implement additional filters to those referred to in the Recommendation. Lifting a recommendation does not prevent an operator from continuing to filter the relevant traffic if it still considers it to be necessary and lawful.

In Traficom's view, operators have complied well with the basic principles of the Recommendation, and as a result, there has so far been no reason to amend them beyond changes to individual recommendations. It has also been considered

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[4] The Recommendation is available on Traficom's website ("Filtering traffic in telecommunications operators' networks to certain communications ports for information security reasons").

unnecessary to lay down provisions on the matters covered by the Recommendation in the more binding form of a regulation.

## 3.3 Impact of the COVID-19 pandemic on information networks

Against the backdrop of the restrictions implemented to combat the global coronavirus pandemic, the Finnish Government issued in the spring of 2020 a recommendation regarding remote work. Restrictions were also placed on classroom teaching, with only a few exceptions. The dramatic increase in remote work and distance learning and the upward trend in the use of various streaming services caused concern regarding the capacity of communications networks, also raising the question of whether the exception concerning measures designed to mitigate the effects of network congestion specified in Article 3 of the Open Internet Regulation would be applicable.

Based on the responses Traficom received from operators, however, the fears of network congestion proved unfounded. Despite the increased traffic, networks proved capable of withstanding the additional strain. Operators have not reported any notable anomalies or the need to take action going beyond reasonable traffic management measures during the pandemic. In practice, the changes in workers' and students' conditions simply resulted in a second peak usage period in the morning in addition to the usual evening hours.

Traficom continued to participate in monitoring the situation at the European level via the reporting tool created by BEREC and the European Commission.

# 4 User's rights

## 4.1 Updated general terms and conditions for the telecommunications sector

Traficom, the Finnish Competition and Consumer Authority (FCCA) and the Finnish Federation for Communications and Teleinformatics (FiCom) negotiated updated general terms and conditions[5] for the telecommunications sector. They entered into force at the end of 2020. The parties reviewed the previous standard terms of contract and ensured, for example, that the updated terms comply with the Open Internet Regulation.

## 4.2 User's right to a public IPv4 address

On 18 October 2018, Traficom published the first update to its checklist helping operators take into account the requirements of the Open Internet Regulation. As a new element, the updated memorandum issued guidelines on users' right to a public IPv4 address when network address translation (NAT) is used. Traficom also addressed the matter in the most recent checklist published in June 2020.

The matter is important, as IP addresses are key to the functioning of the internet. Both the user and the service being used must have public IP addresses in order to communicate with each other. But as the number of available IPv4 addresses is not sufficient to cover everyone, they are often shared between several users by means of network address translation. This comes with its own set of downsides, as network address translation limits the possible uses of internet subscriptions, especially for those users looking to host a server or offer services. Problems may also arise in relation to IoT devices.

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[5] General terms and conditions for the telecommunications sector (31 December 2020, in Finnish)

The guideline in the Traficom memorandum is based on Article 3(1) and (2) of the Open Internet Regulation. Because NAT in practice restricts the end-user's right to provide services under Article 3(1) of the Open Internet Regulation, Traficom considers the use of NAT a prohibited restriction. Thus, operators cannot refuse to remove such an unlawful block at the user's request or charge a fee for the operation.

During the monitoring period covered by the present report, Traficom continued to discuss the matter with operators regarding, for example, possible implementation models and followed the matter in its general supervision activities. The issue has also been addressed in the updated checklist for operators, as mentioned above.

## 4.3    Indicating the speed of an internet access service

During the monitoring period, Traficom also updated its opinion[6] on a reasonable method of indicating the speed of internet access services. The opinion was revised to better reflect the BEREC guidelines on methods for indicating and determining the speed of Fixed Wireless Access (FWA) subscriptions and hybrid subscriptions that combine fixed and mobile connections. The opinion also addresses the level at which speed is specified in line with the BEREC guidelines.

The updated opinion reflects the BEREC guidelines and states that with respect to the obligation to indicate speeds FWA subscriptions are, when certain conditions are met, considered fixed-network subscriptions as referred to in the Open Internet Regulation. According to the opinion, the minimum and normally available speeds of FWA subscriptions that meet the conditions must be in reasonable proportion to the maximum speed. However, Traficom did not issue a more detailed opinion concerning the level at which normally available speed is considered reasonable, but will first monitor telecommunications operators' contractual practices and general market development. If necessary, Traficom may intervene on a case-by-case basis if it considers indications of normally available speeds to result in unreasonable specifications of normally available speeds.

With respect to hybrid subscriptions, Traficom takes the view that the minimum and normally available speeds of a subscription must be indicated at least on the basis of the speed of the fixed subscription, with an additional assessment by the operator as to how much the guarantees regarding speeds can be adjusted upwards on the basis of the mobile network component. For both FWA and hybrid subscriptions, maximum speed is the speed that the end-user can expect to achieve at least some of the time (e.g. once per 24-hour period).

In its updated opinion, Traficom follows the BEREC guideline that the data transfer speeds of internet access services must be indicated on the basis of the transport layer protocol payload, as mentioned above.

# 5    Bittimittari.fi measurement tool

In 2019, a project was launched to develop a tool for measuring the speed and quality of internet connections. The project continued under the monitoring period. The upcoming measurement tool was named "Bittimittari.fi" and registered as a trademark by Traficom in early 2020. Traficom presented the project's latest developments and goals in a stakeholder event in the autumn of 2020. Stakeholder involvement is planned to continue as the development work progresses.

The original aim of the project was to develop a measurement application based on BEREC's reference tool, with an estimated completion date in late 2020. However, as BEREC experienced difficulties with regard to the supplier of its reference tool,

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[6]Opinion regarding the reasonable method of indicating the speed of internet access services

Traficom explored other options and had to push the target date for the launch of its own measurement tool back by a year.

In spring 2020, Traficom decided to abandon its plans to utilise BEREC's reference tool, and instead continued development on its own application with the help of an open-source measurement tool (NetTest) already in use by several European public authorities. A call for tenders for the implementation of the tool was prepared in 2020, and the contract was awarded in early 2021. Traficom's aim is to make Bittimittari.fi available by the beginning of 2022.

# 6 Trends in internet access services

Under the Open Internet Regulation, Traficom must promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology. Non-discrimination is at a high level in Finland, as can be seen in chapters 3 and 4.

## 6.1 Mobile network

Mobile broadband subscriptions started to rapidly gain in popularity in Finland during 2007. After considerable growth over the course of the decade that followed, this trend has since stabilised. In late 2020, Finland counted 1.6 subscriptions with mobile data service per person. Limits on the use of mobile data have seen a steady decrease. In late 2020, 85 per cent of all subscriptions used to transfer mobile data had no limits on domestic data use, while the share of unlimited domestic data plans among mobile subscriptions purchased by household customers was nearly 90 per cent. There were 1.3 unlimited data plans per person in total, up 7 per cent on the previous year.
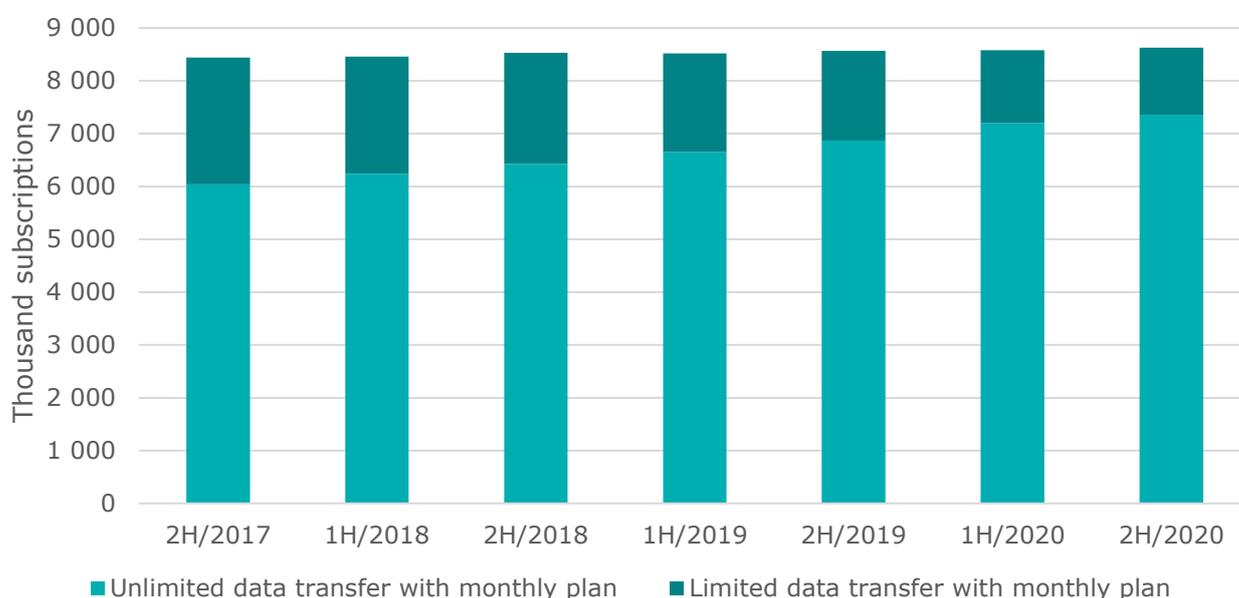
*Figure 2. Mobile data transfer subscriptions*

The lack of volume limitations is reflected in higher-than-average data volumes in international comparison. In the second half of 2020, an average of 52 GB of mobile data was transferred per Finn each month. Data-only subscribers (mobile broadband subscriptions) transferred an average of 82 GB of data per month. Subscribers with call and data plans transferred 17 GB of data in the same period.

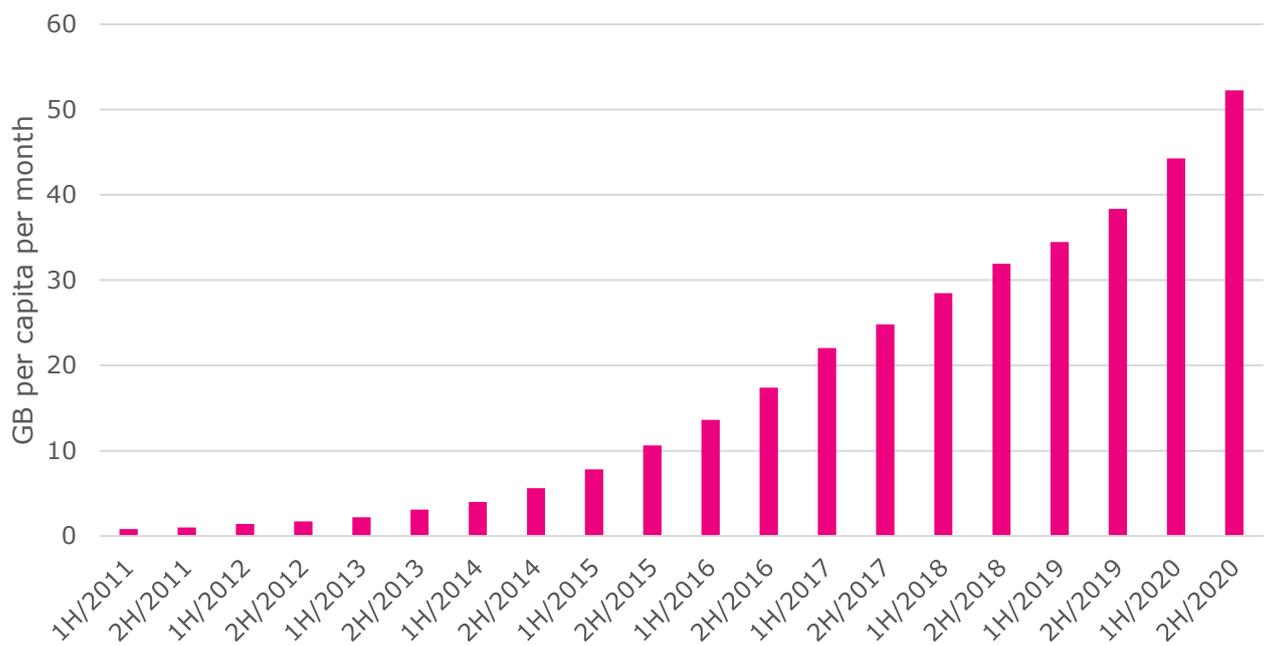Because of the lack of data limitations, zero rating does not exist in Finland.

*Figure 3. Volume of data transferred in mobile networks per person in Finland*

## 6.2 Fixed network

The total number of fixed-line subscriptions has seen rather moderate development, but download speeds in particular have increased consistently. At the end of 2020, 46 per cent of fixed broadband subscriptions offered a download speed of 100 Mbps or more, while 97 per cent had a minimum download speed of 10 Mbps.
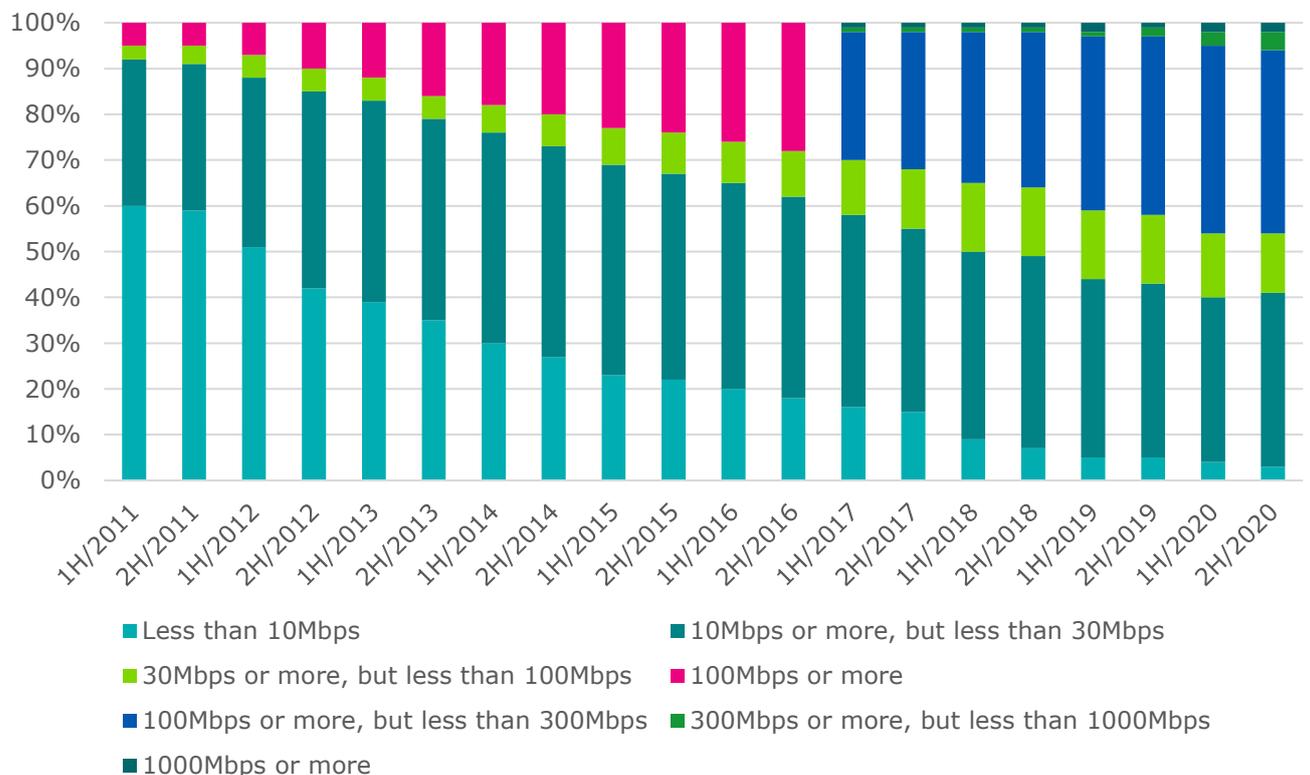


*Figure 4. Fixed-line broadband subscriptions by connection speed*

At the end of 2020, more than 2.1 million households in Finland had access to fixed broadband with a download speed of 30 Mbps or higher[7]. This represented 77 per cent of all Finnish households.

In late 2020, some 1.8 million or roughly 65 per cent of Finnish households had access to 100 Mbps fixed broadband. 51 per cent of households were covered by a 1 Gbps network.

The availability of fast fixed access is thus growing steadily with increasing demand, and the subscriptions on offer do not include pre-set data volume limitations.

Please note that the above figures represent download speeds and the corresponding upload speeds are significantly lower. Upload speeds will become more significant as cloud services and bidirectional streaming gain in popularity.

# 7    Stakeholder cooperation and other activities

During the monitoring period, Traficom has met with several industry actors, including operators, universities, device manufacturers and service providers. Traficom has also organised stakeholder events, for example, on the updated BEREC Open Internet Guidelines and the national instructions updated on the basis of the BEREC guidelines, and given interviews on the matter to various media outlets. As much discussion has taken place during the year on the impact of net neutrality legislation on 5G services, Traficom has actively disseminated information on the matter, including via the 5G Momentum project, discussions on 5G test projects and participation in the 5G TNF research project[8]. Traficom's dialogue with operators has also touched upon FWA subscriptions and the provision of services optimised for certain applications, among other topics.

Furthermore, Traficom has taken active part in the work of the BEREC Open Internet working group, including in the context of updating the guidelines on interpreting the Open Internet Regulation, and assisted in the drafting of written interventions concerning a matter brought before the Court of Justice of the European Union regarding the interpretation of Article 3 of the Regulation.

In addition to the above, Traficom has continued its advisory work both by responding to direct enquiries from citizens as well as actively engaging in discussions on social media and other forums.

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[7] All the presented availability statistics have been retrospectively corrected, and can thus not be compared as such with the figures provided in earlier reports.
[8] 5G Test Network Finland