# Net Neutrality And Free Choice Of Routers And Modems In Europe

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**Abstract:** This paper provides context to the right to choose and use internet access equipment as a fundamental element of net neutrality in Europe. It sheds light on the developments over harmonisation of rules from 2016 to 2020 and analyses the future challenges involving the definition of the Network Termination Point, which will determine whether routers and modems should be treated as aspects of the private or public infrastructure. This study also presents insights regarding the free choice of terminal equipment as reflected in the annual reports prepared by National Regulatory Agencies on net neutrality.[**]

## A. Introduction

1 Routers and modems are essential hardware for internet access, transferring data packets along the computer networks by determining the paths to their specific destinations. Since this equipment can be placed on the edge between private and public networks, its ownership has been the subject of discussion[1] in the context of the network neutrality (net neutrality) debate for the last five years in Europe[2]. The implementation of rules regulating the use of private equipment for internet access has followed diverse paths among European countries,

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** The author thanks Richard Schmeidler and the anonymous reviewers for the insightful comments.

1 The public debates have coined such terms as "router freedom", "compulsory routers", "device neutrality" and "device freedom" to refer to the right of equipment choice. See e.g.: "Modem Libero" in Italy <www.modemlibero.it/chi-siamo/> and "Routerzwang" in Germany <https://fsfe.org/activities/routers/timeline.de.html> both accessed 25.08.2020.

2 This article will focus mainly on the developments after the adoption of Regulation (EU) 2015/2120, as it represented the introduction of the net neutrality regulatory framework in Europe and, consequently, the right to choose and use routers and modems.

creating a fragmented regulatory patchwork. This panorama is characterised by enhanced complexity due to the looseness of the specification of the location of the Network Termination Point (the NTP), which is the boundary between the end-users' private and the Internet Access Providers' (the IAPs')[3] network equipment. Specifying the location of the NTP is a task of the National Regulatory Agencies (the NRAs). Jurisdictions can have different identifications of the location of the NTP. Choosing can be a source of tension between the interests of consumers and IAPs. This paper captures the notion of free choice of routers and modems as a principle of net neutrality and the challenges of its adoption in Europe. The analysis will refer mainly to the documents produced by the Board of European Electronic Regulators (BEREC) relating to the NTP, as well as the NRAs' annual reports on net neutrality from 2017 until 2020, to evaluate the regulators' performance in reporting issues and solutions concerning the right to freely choose terminal equipment.

2 This article is divided into two parts. First, the free choice of terminal equipment will be put into the context of efforts to implement and harmonise net neutrality rules in Europe. For that, Regulation (EU) 2015/2120 (the Net Neutrality Regulation)[4] and the technical set of rules regarding the NTP prepared by BEREC will serve as the main sources of analysis. Since the European Electronic Communications Code (the EECC)[5] is the most recent set of rules concerning equipment neutrality to be transposed to national jurisdictions, the second part of this article is dedicated to inspection of the NRAs' monitoring of issues of free choice of terminal equipment in 2017-2020, based on the annual reports presented to the European Commission on the NRAs' enforcement activities regarding net neutrality[6].

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3 Although this article uses the term Internet Access Providers (IAPs), in art. 2(c) Directive 2002/21/EC (Framework Directive) companies providing the "last mile access" are denominated "Electronic Communications Network Providers". The Board of European Electronic Regulators (BEREC) in its several guidelines related to the freedom of terminal equipment has used the more generic term "Internet Service Provider (ISP)"

4 This article will refer to Open Internet Regulation (EU) 2015/2120 as the Net Neutrality Regulation, as it contains the main source of net neutrality principles.

5 Directive (EU) 2018/1972 of 11 December 2018 establishing the European Electronic Communications Code.

6 Commission, 'Annual country reports on open internet from national regulators' (Shaping Europe's digital future, 10.06.2020)

## B. Are end-users allowed to use their own routers in Europe?

3 The right of free choice of terminal equipment has been codified in Europe since 2015 by the Net Neutrality Regulation, which sets out the main principles for internet access for end-users. The terms for its implementation are conditioned by other rules which depend on further specification of the NTP by NRAs in accordance with BEREC harmonisation guidelines. Specifying the location of the NTP is important not only in relation to the free choice of terminal equipment, but also in relation, for instance, to traffic management, transparency, enforcement and monitoring mechanisms. The main elements of this fragmented and complex regulatory patchwork will be analysed below.

## I. Free choice of terminal equipment as a net neutrality principle

4 Net neutrality represents the latest phase of a debate over control of communications media in the broader context of the digital transformation of social life through the Internet[7]. The Internet evolved from

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<https://ec.europa.eu/digital-single-market/en/policies/open-internet> accessed 08.01.2021.

7 The public debate in Europe started with the review of the Telecommunications Framework from 2007-2009 extending the discussions already taking place in the US during the 2000s. The European legislative activity culminated with the Net Neutrality Regulation in 2015. For an historical overview on the evolution of the position of the stakeholders in the debate and the elements of the broad definition of the concept, see in the US: M. Lemley / L. Lessig, The end of end-to-end: Preserving the architecture of the Internet in the broadband era. (2000) UCLA L. Rev. 48; T. Wu, Network neutrality, broadband discrimination. (2003) J. Tele-comm. High Tech. Law 2, p. 141–179. In Europe, see: S. Schlauri, Network neutrality – Netzneutralität als neues Regulierungsprinzip des Telekommunikationsrechts, (Baden-Baden 2010); BEREC, Response to the European Commission's consultation on the open Internet and net neutrality in Europe. (BoR (10) 42, 30.09.2010); C. Marsden, Net Neutrality: Towards a Co-regulatory Solution. (Bloomsbury Academic 2010); Cave and P. Crocioni, Net Neutrality in Europe. (2011) Communications & Convergence Review; European Parliament, Network Neutrality: Challenges and Responses in the EU and in the U.S. (Brussels 2011); M. Kloepfer (ed), Netzneutralität in Der Informationsgesellschaft. (Beck 2011); J. Sluijs, Network Neutrality and European Law, (Nijmegen 2012); A. Strowel, 'Net Neutrality: What Regulation for the Internet in Europe and Beyond?' Net Neutrality in Europe - La neutralité de l'Internet en Europe (Bruylant 2013); J. Krämer, L. Wiewiorra

a limited state-controlled project to the largest computer network in the world, encompassing not only information exchange alone, but also a sophisticated multidisciplinary network for human interaction, communication, data processing and storage, and control of digital infrastructure. In this sense, access to the Internet has become a central prerequisite for individuals exercising rights and freedoms in the information society[8]. Net neutrality is intended to protect the basic rights of internet users against opaque and invidious practices by their IAPs. That means, in general terms, no throttling, no blocking of rival content and no discrimination of users, content, platform, application, type of equipment, source address, destination address or method of communication, except under narrowly defined conditions[9].

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et al, Net neutrality: A progress report. (2013) Telecomm. Policy 37 (9): p. 794–813; J. Osing, Die Netzneutralität im Binnenmarkt. (Nomos 2017).

8    The correlation between net neutrality and human rights became clear with the revelations of 2013 by Edward Snowden which demonstrated the IAPs' long-term cooperation with law enforcement on mass or individual surveillance. See: P. Aust, *Spionage im Zeitalter von Big Data – Globale Überwachung und der Schutz der Privatsphäre im Völkerrecht.* (2014) AVR 52; M. Peuker-Minecka, *Netzneutralität als grundrechtliche Gewährleistungspflicht.* (Univ. Dissertation, Jena 2014); W. Schulz / J. van Hoboken, *Human Rights and Encryption* (UNESCO 2016); C. Marsden, *Network Neutrality: From Policy to Law to Regulation.* (Manchester University Press 2017); M. Reglitz, *The Human Right to Free Internet Access.* (2019) J. Appl. Philos., 37: p. 314-331. For the definition of the term "information society", see: J. Feather. *The Information Society: A study of continuity and change.* (Facet 2017).

9    Net neutrality encompasses complex and multi-faceted concepts, involving several regulatory arenas. Together with freedom of terminal choice, privacy and data protection issues involving traffic management by the IAPs, differential pricing practices (zero-rating) and "specialised services" are central topics in the broader spectrum of the debate. The Net Neutrality Regulation brought a review clause, by which the Commission must issue a report every 4 years starting in 2019 to monitor the implementation of net neutrality in Europe. For the first one, the law firm Bird & Bird, in consortium with the research and consultancy company Ecorys, was tasked by the Commission to conduct a review based on inquiries to various stakeholders ranging from NRAs to operators and civil society organisations. See: Commission, *Study on the Implementation of the Open Internet Provisions of the Telecoms Single Market Regulation.* (Publications Office of the European Union 2019). The historical Covid-19 pandemic affected net neutrality. In 2020, internet traffic greatly increased following confinement measures. The Commission and BEREC set up monitoring mechanisms for traffic treatment and internet access. To prevent network congestion, exceptional traffic management measures were
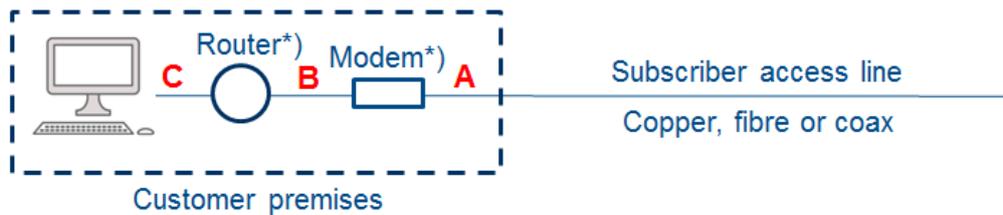
**5**  When accessing the Internet, end-users should be free to choose between various types of equipment. IAPs should not impose restrictions on the use of terminal equipment connecting to the network in addition to those imposed by manufacturers or distributors of terminal equipment. These principles are condensed in art. 3(1) of the Net Neutrality Regulation, comprising measures intended to safeguard net neutrality, covering end-users' rights and IAPs' obligations: "*End-users shall have the right to access and distribute information and content, use and provide applications and services, and use terminal equipment of their choice, irrespective of the end-user's or provider's location or the location, origin or destination of the information, content, application or service, via their internet access service*". As an EU Regulation, it requires no transposition into national law and enjoys primacy in application over national laws. It applies equally in all EU member states and three additional states of the European Economic Area (EEA) (Norway, Iceland and Liechtenstein).

**6**  For the terms of the Net Neutrality Regulation, "end-users" encompass individuals and businesses, including consumers[10]. "Terminal equipment"[11] relates to devices that directly or indirectly connect to the interface of a public network. This interface, the NTP, is defined as the physical point at which a subscriber is provided with access to a public communications network[12]. The location of the NTP has an impact on whether the router and modem are part of the IAPs' network or end-users can use their own equipment to access the Internet, as seen in Image 1. If the NTP is located at point A, both modem and router are part of the domain of the end-user. At point B the end-user can have only the router and has to use the modem of the network operator. At point C modem and router belong to the network operator. As an element of net neutrality, this article considers that only having the NTP be at point A is compliant to art. 3(1) of the Net Neutrality Regulation. The NTP can be mobile rather than fixed, as when smartphones are used for internet connection[13].

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allowed. See: Commission, 'Reports on the status of internet capacity during coronavirus confinement measures'. (*Shaping Europe's digital future*, 29.04.2020) <https://ec.europa.eu/digital-single-market/en/news/reports-status-internet-capacity-during-coronavirus-confinement-measures> accessed 26.11.2020.

10   Art. 2(n) of the Framework Directive.

11   Art. 1(a) of Directive 2008/63/EC of 20 June 2008 on competition in the markets in telecommunications terminal equipment.

12   Art. 2(a) and (d) of the Framework Directive.

13   This paper deals mostly with fixed NTPs. For mobile NTPs,

**Image 1: The three possible locations of the fixed NTP according to BEREC[14].**

7   Normally, all internet-based communication passes through routers[15]. While the modem brings the information in, the router distributes (or "routes") it to different devices. Routers share information between computers and connect to the internet through a modem. Since routers can handle other functions too, for instance WiFi, Voice over IP (VoIP) and TV streaming, and also technical details such as port forwarding, dynamic DNS or VPN tunnelling, routers and modems are quite often offered by IAPs in the same device. All major consumer IAPs are vertically integrated to some extent with content (video, streaming, audio, etc.) services, in such a way that routers and modems represent important elements in their business models[16]. End-users connect to the Internet mainly through the IAPs'

networks[17]. Therefore, IAPs hold a position of power for providing unique public service, demand special treatment from governments and impose their own equipment on consumers with relative flexibility[18].

8   Freedom of terminal equipment is considered a fundamental element of net neutrality. This is based on principles of freedom of choice, privacy, compatibility, fair competition, security and data protection. Although a combined router/modem unit provided by an IAP can be a simpler option for most end-users, some of them may wish for features not provided by the IAP to meet security and privacy requirements . Besides, end-users regularly change their IAPs. Only if they can continue using their own devices, can they port their existing settings and devices to the new provider . If the devices are owned by the IAPs, compatibility to other providers and their specific requirements might be limited . End-users should also profit from the free and fair competition that guarantees free choice and steady improvement of products. The lack of competition can come at the expense of the user because security features would be continually reduced and the user-friendliness would drop .End-users should also profit from the free and fair competition that guarantees free choice and steady improvement of products. The lack of competition can come at the expense of the user because security features would be continually reduced and the user-friendliness would drop[19].

9   Freedom of terminal equipment encompasses the physical aspect of internet connections. This freedom requires setting standards for IAPs' practices to-

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BEREC has stated that "*since end-users use their mobile equipment (e.g. smartphones) for internet connection in the 27 EU member states, there is no objective technological necessity for mobile equipment to be considered as part of the public mobile network*". BEREC, *Guidelines on Common Approaches to the Identification of the Network Termination Point in Different Network Topologies.* (BoR (20) 46, 05.03.2020), p. 24.

14   BEREC, *Location of the Network Termination Point.* (BoR (18) 159, 04.10.2018), p. 7.

15   This article focuses on routers and modems used by end-users for personal purposes. For other roles of routers in networks, see e.g.: C. Severance, *Introduction to Networking: How the Internet Works.* (Sue Blumenberg, 2015).

16   For economic integration of routers and modems into IAPs' business strategies, see:  W. Lehr, *Understanding Vertical Integration in the Internet.* (EURO CPR 1998) J. Kranz / A. Picot, 'Internet Business Strategies', *Handbook on the Economics of the Internet.* (Edward Elgar, 2016); F. Schuett, *Network neutrality: A survey of the economic literature.* (2010) Rev. Network Econom. 9 (2): p. 1-15; N. Economides / B. Hermalin,  *The economics of network neutrality.* (2012) Rand J. Econom. 43 (4): p. 602–629.

17   See e.g.: B. Leiner, V. Cerf et al, *A Brief History of the Internet.* (2009) ACM SIGCOMM Computer Communication Review, p. 22–31.

18   Marsden (n 8), p. 2.

19   For competition concerns affecting end-users raised by stakeholders during the BEREC public consultation on the NTP Guidelines, see: BEREC, *Report on the Outcome of the Public Consultation on Draft BEREC Guidelines on Common Approaches to the Identification of the Network Termination Point in Different Network Topologies.* (n 21), p. 34–39.

wards end-users in order to safeguard open, neutral and secure access to the Internet. The next section addresses the harmonisation process of this right across Europe.

## II. BEREC's role in harmonising EU rules on the NTP

**10** Since 2015, the European Union has formally implemented net neutrality rules encompassing free choice of routers and modems. The regulatory framework is intended to protect end-users and guarantee the continued functioning of the internet ecosystem as an engine for innovation. However, the effectiveness of this framework will depend on how NRAs deal with the harmonised concepts proposed by BEREC in its guidelines and reports on the NTP. BEREC is commissioned by EU laws in two respects to provide guidance on the implementation of the obligations of NRAs[20]. While NRAs "must take utmost account" of BEREC decisions[21], they are not legally required to follow BEREC guidelines[22]. Particularly for the choice of terminal equipment, the following set of documents can serve as basis for calibrating the future regulatory behaviour of NRAs:

1. The BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules, 30.08.2016[23];

2. The BEREC Report on the Location of the Network Termination Point, 04.10.2018[24]; and

3. The BEREC Guidelines on Common Approaches to the Identification of the Network Termination Point in different Network Topologies, 05.03.2020 (the Guidelines on the NTP)[25].

## III. The BEREC guidelines on the Implementation by National Regulators of European Net Neutrality Rules, August 2016

**11** By art. 5(3) of the Net Neutrality Regulation, BEREC was commissioned to provide guidance on the implementation of the net neutrality obligations of NRAs. These Guidelines represent the first document on interpretation of net neutrality rules issued by BEREC. Following the principles contained in the Regulation, the Guidelines set up the first regulatory environment for NRAs. Notwithstanding that it recognises the prohibition against limiting the choice of terminal equipment, BEREC only mentions that NRAs should consider whether there is an "objective technological necessity for the obligatory equipment to be considered as part of the IAP network". If there is no objective technological necessity, an IAP's subjective desire to limit router freedom would be in conflict with the Net Neutrality Regulation (paragraphs 26 and 27)[26].

**12** As will be discussed below, limiting the NRAs' discretionary power to determine a vague and unproved necessity will be the major challenge for end-users to meet in their effort to be able to choose routers and modems during the national implementations.

## IV. The BEREC Report on the Location of the Network Termination Point, October 2018

**13** The BEREC Report on the Location of the Network Termination Point (the Report) is much denser and more detailed. The Report aims to foster knowledge transfer between NRAs and to give a deeper insight into the rules applicable to NRAs regarding mobile and fixed NTPs. The Report provides a view of the complex panorama in Europe regarding terminal equipment. While the BEREC Guidelines on the NTP

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20 According to art. 5(3) of the Net Neutrality Regulation and art. 61.7 EECC.

21 According to art. 61.7 EECC.

22 Originally, BEREC was created with competence to override national telecommunications regulators, but the political debate over the proper balance of powers between the Commission and NRAs led to its restriction to a 'regulatory network'. It is, therefore, not a law-making body but a consultative body for the Commission. For more on BEREC's nature, see: P. Parcu / V. Silvestri, *Electronic Communications Regulation in Europe: An Overview of Past and Future Problems.* (2014) Utilities Policy 31, p. 246-255; Commission, *European Electronic Communications Code and BEREC Regulation.* (Directorate General for Communications Networks, Content and Technology 2018); Marsden (n 8), p. 119.

23 BEREC, *Guidelines on the Implementation by National Regulators of European Net Neutrality Rules.* (BoR (16) 127, 30.08.2016).

24 BEREC, *Location of the Network Termination Point.* (n 14).

25 BEREC, *Guidelines on Common Approaches to the Identification of the Network Termination Point in Different Network Topologies.* (n 13).

26 BEREC, *Guidelines on the Implementation by National Regulators of European Net Neutrality Rules.* (n 26), p. 8.

state how to harmonise the rules on the NTP, the Report presents a description of what has been done by the NRAs in specifying the location of the NTP or solving disputes between end-users and IAPs.

14 The Report clarifies that some NRAs (Cyprus, Germany, Italy, Latvia and the Netherlands) have specified or are about to identify the location of the NTP. In the other 22 EU countries the situation is mixed. In 13 of them, the NRA has the legal power to identify the NTP but has not done so because, according to the information provided by the NRAs, there have been no (or only minor) complaints by end-users that they cannot use their own routers or modems. The report mentions but does not clarify the situation for eight of these 13 countries, where the location of the fixed NTP has been chosen by the IAP at a point which allows end-users to use their own modems or routers (point A or B, as seen in Image 1; if the NTP is at point B, users will have to use the IAPs' modems to connect to the Internet). Besides, the location of the fixed NTP can be diverse. While in Germany and Italy routers and modems are part of the domain of the end-user, in Latvia the location of the fixed NTP depends on the ownership of equipment and cables, which means that the modem and the router could still be part of the public network.

15 Most importantly, the Report explains that the efforts to specify the location of the NTP were not a response to complaints from end-users or other market players, but were necessary to clarify the existence of an objective technological necessity for routers to be considered as part of the public network. This necessity would have been determined by factors including the interoperability of the networks, the simplicity of the equipment used, security of the equipment, and data protection. Some of the criteria employed by NRAs were used later by BEREC in the NTP Guidelines to orientate the future harmonisation on the NTP location.

## V. The BEREC Guidelines on Common Approaches to the Identification of the Network Termination Point in Different Network Topologies, June 2020 (the Guidelines on the NTP)

16 As the most recent and important BEREC document regarding the free choice of terminal equipment, the NTP Guidelines are designed in accordance with Article 61(7) of the EECC to provide guidance to NRAs when they specify the location of the NTP. The NRAs should "take utmost account" of the Guidelines during the implementation in their jurisdictions. The Guidelines are intended to harmonise defining

the location of the NTPs in the EU by providing the criteria NRAs should follow when specifying the location of the NTP, including conformity of the definition of the fixed NTP location with the EU legal provisions, the impact on the market for router/modems, and whether there is any technological necessity for equipment to be part of the public network.

17 Differently from its approach in the earlier documents, BEREC recognises that the immediate context of the Guidelines in the EECC is "regulation of internet access and interconnection". Competition issues, especially bottleneck conditions in access to networks, affect the methods to be used when identifying the NTP location and interpreting the EU legal provisions that refer to the NTP. Therefore, to consider terminal equipment like the modem, router and media box part of the accessed infrastructure, the NRA should prove the existence of an objective technological necessity. The assessment criteria are[27]:

• Interoperability between the public network and the terminal equipment;

• Simplicity of operation;

• Network security;

• Data protection;

• Local traffic;

• Fixed-line services based on wireless technology.

18 On the other hand, the BEREC Guidelines on the NTP fail to set very narrow and restrictive standards for setting the NTP at points B or C (see Image 1), which can deny the rights of end-users, reflecting a lax approach which prioritises IAPs' commercial interests over end-users' liberties[28]. The allowance of NRAs' discretionary power to set the NTP at three different positions can impose significant barriers to end-users effectively using their equipment. As the next part of this article will show, most NRAs in Europe have been careless with end-users' interests when they do not prioritise the enforcement of net neutrality principles.

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27 BEREC, *Guidelines on Common Approaches to the Identification of the Network Termination Point in Different Network Topologies*. (n 13), p. 11-24.

28 Marsden's book cites BEREC's pro-commercial behaviour on other occasions: "*This does reflect the technocratic and commercial nature of [BEREC's] interactions with telecommunications companies, rare interactions with IT and broadcast content providers, and extremely rare interactions with civil society, user groups and consumer representatives*". Marsden (n 8), p. 120.

## C. Net Neutrality and the NTP

**19** The debate over net neutrality has resulted in regulatory solutions that have limited themselves to interoperability and competition. The Guidelines on the NTP, which have the "immediate context in regulation of access and interconnection", are an example of that[29]. However, the multi-faceted questions surrounding internet access, including issues of privacy and free expression, urge the consideration of end-users-orientated legal principles in the development and enforcement of net neutrality policies. Freedom of equipment choice is one of the central elements of net neutrality, dealing with last mile internet access, allowing end-users to choose and use their own trusted equipment. The promulgation of the EECC marks the revision of the EU framework for telecoms regulation, which was aimed to include long pre-existing objectives that have been the core of the telecoms framework (promoting competition, the internal market and interests of citizens). Nevertheless, the inclusion of such elements of the transposition of the EECC into an effective and enforceable framework in national jurisdictions depends heavily on NRAs' discretionary understanding of the BEREC Guidelines on the NTP, specifically what the NRAs identify as objective technological necessities. End-users' interests can be negatively impacted by the NRAs' poor record of transparency in supervising the market actors and low performance in imposing sanctions on net neutrality violations.

## I. The NRA annual reporting on net neutrality and issues of net neutrality and free choice of terminal equipment

**20** BEREC was given the task to define the aspects related to the position of the NTPs and to prepare guidelines to orientate the NRAs for defining the NTP in their jurisdictions. However, a fair assessment of positioning must take into consideration the real characteristics of the market, the overall technical infrastructure of the national networks and the commercial practices to which end-users are subjected. The NRAs' annual reports to the Commission on net neutrality would demonstrate the regulators' degree of readiness to engage with stakeholders in a democratic process to determine the rules regarding the hardware for internet access[30].

**21** As an obligation imposed by art. 5(1) of the Net Neutrality Regulation, the NRAs should annually inform the Commission about their activities in monitoring and enforcing the net neutrality rules[31]. The reports would serve as summaries for the Commission on the state of affairs in national jurisdictions and would serve to provide a minimum level of transparency and comparability of the implementations across Europe. Among the things expected to this end from the reports are the overall description of the national situation regarding net neutrality, the description of the NRAs' monitoring activities, the number and types of complaints, IAPs' infringements related to the Regulation and results of surveys, evaluations, and technical measurements implemented by the NRAs[32].

**22** Below, this research assesses the documents produced by the NRAs from the first reporting period until the last to date (2017-2020)[33] on topics concerning terminal equipment. More precisely, which kind of efforts the NRAs employed to build a structured source of information on the experience of the first years of net neutrality monitoring. The analysis searched for topics concerning terminal equipment, including:

- Information on surveys and public consultations for gathering data on the experience and opinion of stakeholders, e.g. end-users, expert circles, equipment manufacturers, IAPs, other regulators, and civil society organisations;

- Reporting about IAPs' infringements and end-users' complaints on the right to choose terminal equipment, including numbers and types of complaints, as well as the measures adopted for conflict resolution and enforcement;

- Results of research regarding IAPs' commercial practices involving terminal equipment and assessments regarding the locations of the NTP (positions A, B or C, as seen in Image 1).

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about the implementation of net neutrality rules in Europe by Member States. Their work provides a complete overview of the content of the NRAs' reports during the first two years. Besides, their study has analysed the quality of the NRAs' reports in general and whether they are compliant with the basic requirements from BEREC. See: epicenter. works, *The Net Neutrality Situation in the EU.* (Vienna 2019), p. 13-16.

31    The reports are found on the European Commission Open Internet website. Commission, 'Annual country reports on open internet from national regulators' (n 6).

32    See BEREC, *Guidelines on the Implementation by National Regulators of European Net Neutrality Rules* (n 26), p. 42-43.

33    The most recent set of reports covers the time frame from 1 May 2019 until 30 April 2020.

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29    BEREC, *Guidelines on Common Approaches to the Identification of the Network Termination Point in Different Network Topologies.* (n 13), p. 6.

30    The Austrian charity epicenter.works has produced a report

**23** To ensure comparability, only the English-language reports were evaluated. From a total of 112 reports, only 42 had an English version. The findings are summarised in Table 1.

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|---|---|---|---|---|---|
| **NRA Annual Reports on Net Neutrality** | | | | | |
| **References to Free Choice of Terminal Equipment and Related Topics** | | | | | |
| **Legend:** Topic related to free choice of equipment? **yes/no** | | | | | |
| Report not available in English: **n.a.** | | | | | |
| **Country** | **2017** | **2018** | **2019** | **2020** | **Topics related to free choice of equipment** |
| **Austria** | n.a. | no | no | n.a. | |
| **Belgium** | n.a. | yes | yes | no | (2018) Free choice of terminal equipment. (2019) Tethering restriction. |
| **Bulgaria** | n.a. | n.a. | yes | n.a. | (2019) Free choice of terminal equipment. |
| **Croatia** | n.a. | n.a. | yes | n.a. | (2019) NTP specification issues. |
| **Cyprus** | n.a. | n.a. | yes | n.a. | (2019) Free choice of terminal equipment. |
| **Czech Republic** | n.a. | yes | yes | n.a. | (2018) Free choice of terminal equipment. (2019) NTP specification issues. |
| **Denmark** | n.a. | n.a. | n.a. | n.a. | |
| **Estonia** | n.a. | n.a. | no | n.a. | |
| **France** | n.a. | yes | yes | yes | (2018) Device neutrality issues. (2019) Device neutrality issues. (2020) Device neutrality issues. |
| **Finland** | n.a. | n.a. | n.a. | n.a. | |
| **Germany** | yes | yes | yes | n.a. | (2018) Free choice of terminal equipment. (2018) Device neutrality issues. (2019) Device neutrality issues. (2019) Free choice of terminal equipment. |
| **Greece** | n.a. | n.a. | n.a. | n.a. | |
| **Hungary** | n.a. | yes | yes | n.a. | (2018) Free choice of terminal equipment. (2018) Tethering restriction. (2019) NTP specification issues. (2019) Tethering restriction. |
| **Ireland** | yes | yes | yes | yes | (2017) Free choice of terminal equipment. (2018) Free choice of terminal equipment. (2019) Free choice of terminal equipment. (2020) Free choice of terminal equipment. |
| **Iceland** | n.a. | n.a. | n.a. | n.a. | |
| **Italy** | n.a. | n.a. | n.a. | n.a. | |
| **Latvia** | n.a. | n.a. | no | n.a. | |
| **Liechtenstein** | n.a. | n.a. | n.a. | n.a. | |
| **Lithuania** | n.a. | n.a. | no | n.a. | |
| **Luxembourg** | n.a. | n.a. | n.a. | n.a. | |
| **Malta** | n.a. | n.a. | no | n.a. | |
| **Netherlands** | n.a. | no | yes | no | (2019) NTP specification issues. |
| **Norway** | no | no | yes | yes | (2019) Tethering restriction. (2020) Tethering restriction. |
| **Poland** | n.a. | no | no | no | |
| **Portugal** | n.a. | n.a. | n.a. | n.a. | |
| **Romania** | n.a. | n.a. | n.a. | n.a. | |
| **Slovakia** | n.a. | n.a. | yes | n.a. | (2019) Free choice of terminal equipment. |
| **Slovenia** | n.a. | n.a. | n.a. | n.a. | |
| **Spain** | n.a. | n.a. | n.a. | n.a. | |
| **Sweden** | n.a. | no | n.a. | yes | (2020) Free choice of terminal equipment. |
| **United Kingdom** | yes | yes | yes | no | (2017) Free choice of terminal equipment. (2018) Free choice of terminal equipment. (2018) Tethering restriction. (2019) Free choice of terminal equipment. (2019) Tethering restriction. |

**Table 1** NRA Annual Reports on Net Neutrality – References to

Free Choice of Terminal Equipment and Related Topics.

24 From 2017 to 2020, not all NRAs submitted the required reports. Although some of these reports offer valuable insights into the enforcement activities carried out by the regulator, others demonstrate complete inactivity, with almost no information regarding free choice of equipment in the year being reported on.

25 The majority of the NRAs have been silent and have provided no data on concrete issues involving violation of or compliance with art. 3(1) of the Net Neutrality Regulation. Some of the reports provided superficial information on complaints but failed to provide details on the numbers of violations, the different forms of remedy and the solutions provided. Very few reports offer concrete numbers on the disputes between end-users and IAPs regarding terminal equipment. The vast majority of the reports contain no data on commercial practices restricting use of private terminal equipment or the reasoning behind them. With the exception of a few reports, no results of surveys or technical measurements were provided, nor were any such efforts mentioned. Some reports state, however, that some IAPs consider terminal equipment to be part of their network. Almost all reports contain no information on research or surveys regarding the consequences of application of art. 3(1) to contracts and other commercial practices. In the last four years, the majority of NRAs did not provide information about the status of the NTP in their jurisdictions or the plans to determine its location in the different network topologies. In general, the reports confirm the lack of coordination among the NRAs on identifying interests of stakeholders in public debates on the NTP. Some reports have manifested the IAPs' position on terminal equipment location, but fail to express the position of other stakeholders, mainly end-users and civil society organisations.

26 These summaries show the opacity of the NRAs' reporting involving terminal equipment. The data are too sparse to justify more analysis than just these samplings.

27 On the other hand, some NRAs presented overviews of their practices relating to end-users' free choice of terminal equipment with surveys with stakeholders, market analysis or inspection of contracts. Some provided insights on the number and nature of complaints and infractions involving routers or modems and indicated the status of the NTP in their jurisdictions. Other regulators provided substantial information on the circumstances of the market, the IAPs' commercial practices, the process of specification of the location of the NTP, and the end-users' complaints related to free choice of terminal equipment. Below is a short summary of the reports which provided more detailed information regarding the status of free choice of terminal equipment[34].

### Croatia

28 In the one evaluated report (2019), the regulator reported a survey regarding the choice and use of terminal equipment. The majority of IAPs consider the modem and router as part of the electronic communications network but only the modem is an integral part of the network[35]. In its turn, the Croatian regulator finds reasonable the imposition of obligatory equipment by the IAP for managing and monitoring network security (through PPPoE authentication), providing quality of bundle services (voice, internet, IPTV), and supporting equipment and service through remote access. However, it would be possible for end-users to have their own router/modem. No further information on complaints, infractions and measures adopted for conflict resolution was provided, however.

### Cyprus

29 In the only report analysed (2019), the regulator states that in a formal survey IAPs have reported that they impose their terminal equipment on consumers to ensure configuration and support of the devices and of commercial purposes (bundle services - internet, voice, TV). Authentication credentials are not provided to customers but are built into the terminal equipment (PPPoE authentication). The regulator has not provided further information on complaints, infractions, and enforcement measures adopted.

### Czech Republic

30 The Czech regulator, in the two analysed reports (2018 and 2019), provided an overview on the commercial practices that could lead to restrictions on end-user rights to use terminal equipment. Inspection of contractual practices found that: (i) Some IAPs enforced contracts with clauses for acquisition (usually purchase) of terminal equipment offered by the provider; (ii) Other contract terms could lead customers to a wrong conclusion about

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34 Only reports submitted in English were analysed. The reports from Austria, Belgium, Estonia, Ireland, Latvia, Lithuania, Malta, Norway, the Netherlands, Poland and Sweden have brought only superficial information on free choice of terminal equipment and the definition of the NTP in their jurisdictions. Some of the reports mention complaints and other issues but fail to provide details, measures adopted and conclusions on the cases.

35 According to BEREC Guidelines on the NTP, the location would be considered point B (see Image 1).

the connection between the service and the terminal equipment; (iii) The use of private terminal equipment was often tied to the service provider's prior approval. The regulator also reported the number and status of proceedings involving terminal equipment.

### France

**31** In the three analysed reports (2018, 2019 and 2020), the French regulator broached several aspects of net neutrality in detail and proposed the widening of the debate on freedom of terminal equipment to embrace "device neutrality"[36]. The regulator proposes a holistic view of internet policy and the multiple factors that influence user choice and innovation, arguing how restrictions regarding end-users' devices and software (browsers, search engines and OS) could affect the free choice of access equipment.

**32** Device neutrality issues fall outside the scope of the current net neutrality framework in Europe. The Regulation is directed at the behaviour of IAPs on the premise that they are uniquely situated to act as gatekeepers of internet access. However, the French regulator proposes a course of action that could be taken as methodological reference for other NRAs to

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36 As early as 2011 the difference between "open Internet" and "net neutrality" was discussed in Europe. While the first relates to applications that could compromise the open character of the web, the second is about commercial treatment of consumers by network operators. Device and data neutrality are the natural extension and merger of both debates about user freedom in the several layers of the Internet. Data and device neutrality can encompass topics such as, for instance, that search engines could rank search results giving preference to their own or affiliated services. Non-neutral practices can also be involved with operating systems imposed on consumers depending on hardware. Web browsers, including their associated plug-ins, could interfere in the neutrality of how content is displayed. For a broader discussion, see: J. van Hoboken, 'Search Engines, Pluralism and Diversity: What Is at Stake and How to Move Policy Forward?' Media Pluralism and Diversity: Concepts, Risks and Global Trends (Macmillan 2015); J. Krämer, D. Schnurr et al, Internet Platforms and Non-Discrimination (CERRE 2017); R. Easley, H. Guo et al, Research Commentary - From Net Neutrality to Data Neutrality: A Techno-Economic Framework and Research Agenda. (2018) Information Systems Research; BEREC, Report on the impact of premium content on ECS markets and the effect of devices on the open use of the Internet (BoR (18) 35 08.03.2018); A. Kak / J. Ben-Avie, 'ARCEP report: "Device neutrality" and the open internet' (Mozilla Corporation 29.05.2018). <https://blog.mozilla.org/netpolicy/2018/05/29/arcep-report-device-neutrality/> accessed 28.11.2020; J. Krämer, Device Neutrality: The missing link for fair and transparent online competition? (CERRE 2019).

approach issues regarding terminal equipment and the definition of the NTP. Although the regulator reported surveys, meetings and discussions with a wide range of stakeholders, no concrete information on limitation of end-users' rights and other practices involving terminal equipment was provided.

### Germany

**33** The German regulator published three reports (2017, 2018 and 2019) in English which provided superficial information on the number and type of end-users' complaints regarding terminal equipment. As in France, the NRA mentioned the increasing importance of device and data neutrality issues and made references to complaints submitted by end-users but excluded the applicability of the Net Neutrality Regulation to settle the disputes. Regarding the location of the NTP, although Germany has a law for locating the NTP on point A (see Image 1), the regulator has provided no information about plans to update the national legislation according to BEREC Guidelines on the NTP[37].

### Hungary

**34** In the two analysed reports (2018, 2019), the regulator disclosed the results of market research among end-users and a survey to understand the general public's opinion on net neutrality. The market research revealed that three IAPs indicated that the point of delivery of the service is understood as the ethernet port of the modem[38]. The market research also ascertained that some modems or routers contain proprietary software of the service provider, and therefore free choice of equipment can be limited.

## II. Can NRAs specify the location of the NTP on a fair basis?

**35** Regarding the central element for the right of choosing terminal equipment, the NTP represents the boundary between the end-user private network and the IAP's domain. Leaving the specification of the location of the NTP for the NRAs opened a broad space for their discretionary action. In the absence of case law[39] of the Court of Justice of the

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37 The draft of the implementation law for the EECC in Germany recognizes exceptions for point A according to the BEREC Guidelines on the NTP. See footnote 45.

38 According to BEREC Guidelines on the NTP the location would be considered point B (see Image 1).

39 Worth noting is that in September 2020 the CJEU handed down the first decision on net neutrality in Europe. The

European Union on an enforceable rule on the freedom of terminal equipment, the NTP Guidelines is the authoritative document on router freedom in Europe. The enforcement can be harmonised to the extent that the Guidelines offer clear rules, but there are topics open for further interpretation (e.g., technological necessity issues), leading to uncertainties.

36 The EECC entered into force on 11 December 2018 and the transposition into national law by each of the member states has a deadline of 21 December 2020. By then all NRAs should have specified the location of the NTP in their jurisdictions according to the three possible locations identified by BEREC (points A, B or C, as seen in Image 1). The EECC marks not the end of the discussion of the right to choose terminal equipment, but the start of a new chapter in the history of this right in national jurisdictions. Specifying the location of the NTP is important not only in relation to the free choice of terminal equipment, but also in relation to traffic management, transparency, enforcement and monitoring mechanisms. Diverging interpretations of the location of the NTP create uncertainties as to the rights of end-users. There are 23 EU countries in which the location of the NTP has not been specified, in which the respective NRAs have not decided to use this legal power for lack of complaints of end-users. The end-users' interests, therefore, can be negatively impacted by the passive approach of the NRAs.

37 As the results in Section I above have shown, IAPs have an interest in considering routers and modems to be part of their networks in order to monitor network security and to guarantee quality of service[40]. All major consumer IAPs are vertically integrated to some extent with digital video, voice and web services. Incorporating the router and modem into their infrastructure allows them to discriminate against private equipment with negative consequences for end-users. The NRAs have been flexible in their enforcement of art. 3(1), allowing IAPs to consider at least the modem to be their equipment, as the annual reports demonstrate. Therefore, NRAs could interpret the technological necessity criteria of the NTP Guidelines to be aligned with commercial interests of IAPs. This might be

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court ruled that zero-rating practices are incompatible with art. 3(2) and (3) of the Net Neutrality Regulation. See: CJEU, Joined Cases C-807/18 and C-39/19 *Telenor v Nemzeti* (2020) ECLI:EU:C:2020:708.

40 As shown by results of surveys conducted by some NRAs and related in their annual reports. The report evaluation from the Commission reached similar conclusions. See: Commission, *Study on the Implementation of the Open Internet Provisions of the Telecoms Single Market Regulation.* (n 9), p. 52.

done in specifying the management of the network, granting a dominant position to bundle services (voice, IPTV) and commercial practices, such as price levels and providing extra support for the equipment.

38 Net neutrality from the perspective of internet access hardware does not lack regulatory tools on the European level per se. However, the potentially complex implementation by the NRAs endangers end-users' interests. The end-users face the IAPs' unreasonable discrimination in commercial practices involving terminal equipment. No matter how clearly art. 3(1) of the Net Neutrality Regulation asserts the neutrality of devices, in practice national regulators can completely prevent the possibility of end-users having their own devices.

39 In countries where laws relating to end-users' choice of terminal equipment have been passed[41], the specifications of the location of the NTP can vary from those already implemented – definitions that have served as bases for end-users' rights. In Germany, for instance, the current NTP is located at point A (see Image 1) and customers can demand from their IAP that they be permitted to use their own equipment – backed up by national courts[42]. However, with the new elements provided by the BEREC Guidelines, the German NRA has new opportunities to consider the relocation of the NTP, which might lead to the restriction of end-users' rights[43]. Customers can only be formally secure in

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41 Germany is an example with the "Gesetz zur Auswahl und zum Anschluss von Telekommunikationsendgeräten" of 01.08.2016. For an analysis of the act, see: T. Sörup, *Router-zwang adé? – Der Referentenentwurf zur Endgerätewahlfreiheit.* (2015) 31 Computer und Recht 217, p. 217–222.

42 See, for example, in Germany: G. Kiparski / S. Wettig, *Nicht Ohne Meinen Router?! – Routerfreiheit Im Spannungsverhältnis Der Anschlussbündelangebote.* (2020) Computer und Recht, p. 265–268. However, the court ruled that free choice of equipment depends upon customer requests and IAPs are not required to actively inform end-users of the possibility of using a third-party device. See: OLG Koblenz: *Routerfreiheit* (2020) OLG Koblenz 9 U 1407/19.

43 The draft of the law for implementation of the EECC (TKG-E) allows in its Paragraph 70(2) the introduction of exclusions on free choice of terminal equipment based on BEREC Guidelines on the NTP after years of accumulated good experience of the NTP at point A (see Image 1). See: Bundesministeriums für Wirtschaft und Energie, Bundesministeriums für Verkehr und digitale Infrastruktur, *Entwurf eines Gesetzes zur Umsetzung der Richtlinie(EU) 2018/1972 des Europäischen Parlaments und des Rates vom 11. Dezember 2018 über den europäischen Kodex für die elektronische Kommunikation (Neufassung) und zur Modernisierung des Telekommunikationsrechts* (2020)

the ability to be able to choose their router freely. In practice, IAPs' commercial strategies can hinder the formally free choice even when the IAPs are acting legally. IAPs may fail to inform end-users about the right to choose other devices and may engage in legal but manipulative advertising practices[44].

40  Powerful methods of inferior decision-making lead to solutions detrimental to end-users' rights, impairing not only internet access but also their privacy, security, and data protection[45]. Assuring freedom of choice, therefore, requires end-user focused policies in the NRAs' decision-making processes. Decisions concerning the NTP, for instance, impact directly upon what is increasingly declared a human right: access to the Internet. Following the good example of the French regulator, ARCEP, the NRAs' decision-making should take into consideration a balance among the interests of stakeholders, but an emphasis should be given to the needs of the end-users. Therefore, the implementation of the EECC in national jurisdictions should involve proposals to accommodate the interests of operators and other market players, but at the same time maintain the ability of end-users to freely choose their equipment. For this purpose, the NRAs should at least:

- Employ data-driven mechanisms for decision-making, including impact assessments, surveys, public opinion polls, market research, contract inspection measures and self-evaluation reports. The collected data and the overall outcome should be made openly accessible in formats that allow review and comparability;

- Develop an accessible information base for the reporting on the number, type and nature of end-users' complaints and IAPs' violations regarding terminal equipment. Conduct legal research on national case law involving terminal equipment cases and make the results available. Monitor IAPs' contractual restrictions imposed on end-users and publicly take action;

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<https://www.bmvi.de/SharedDocs/DE/Anlage/Gesetze/ Gesetze-19/referentenentwurf-zum-telekommunikatio nsmodernisierungsgesetz.pdf?__blob=publicationFile> accessed 28.11.2020.

44  See e.g.: M. Mehl / L. Lasota, 'Fear, Uncertainty, and Doubt - the Barriers to Router Freedom in Germany' (*Free Software Foundation Europe*, 03.02.2020) <https://fsfe.org/news/2020/ news-20200302-01.en.html> accessed 29.08.2020.

45  As also noticed by Marsden: "*End-users are sometimes poorly motivated economic actors and imperfectly rational*" [...] "*Without comprehending that users view Internet access as a more utilitarian and therefore profound service than that of social networks or Internet search, it is impossible to understand the net neutrality debate*". Marsden (n 8), p. 75.

- Take into consideration competition policies to safeguard market liquidity but remain vigilant about consumer law and human rights law, especially when abiding by the criteria proposed by the BEREC Guidelines on the NTP.

41  Employing such a methodology, the NRAs could improve their communication to stakeholders on the subjects impacting their rights, increasing the quality of the public debate. The current lack of transparency inhibits a fair and well-balanced judgement of the state of interests in their jurisdictions. Better understanding of the free choice of terminal equipment in the context of net neutrality in Europe depends on the European Commission exercising closer supervision over the NRAs' monitoring and enforcement by taking swift action against their ineffective reporting on their activities and by imposing higher standards on the annual reports, since the reports represent an important information channel for end-users as well.

## D. Conclusion and future work

42  Free choice of terminal equipment is a fundamental principle of net neutrality. It enables end-users to remain autonomous in their physical capacity to access the Internet, employing devices they trust for security, privacy and data protection. Although art. 3(1) of the Net Neutrality Regulation clearly sets forth the principle of device freedom, the EECC requires further specification of the location of the NTP. Notwithstanding the efforts BEREC has made to harmonise the concept of device freedom on the European level, the national implementations are challenged by the untransparent behaviour of the NRAs. A fair assessment of the criteria to identify the location of the NTP and of the further monitoring requires clear and data-driven approaches by the NRAs and a higher commitment by the European Commission to the supervision of compliance with the Net Neutrality Regulation's rules.

43  The conclusions of this paper have limitations which may prompt future research. First, further review on the different approaches during the implementation processes of the EECC depends on verifiable data on how the NRAs will approach the BEREC Guidelines on the NTP and which elements will be taken into consideration to determine objective technological necessity in their national jurisdictions. Second, this research has not developed any argument in relation to device neutrality concepts. Since some NRAs comprehend the topic as related to terminal equipment, the scope and limits of the debate on data neutrality and terminal equipment need further clarification.